

TRANSPORT HUB
a CSR initiative of āyushcā GOA



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M7 Report





Non nobis solum nati sumus

Not for ourselves alone are we born

Marcus Tullius Cicero

Data Source

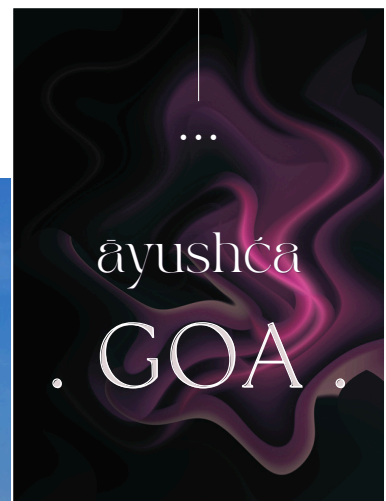
Working papers on Bus Transport Projects. World Bank, Washington DC. BRT in this report refers to Bus Rapid Transport and Quality Bus System. This report is to be read with the M7 report, which can be downloaded from transport.iitcouncil.org. The āyushcā concept report can be downloaded from āyushcā.org. The initial Goa consultation paper is available on goa.āyushcā.org.



Contact

1 650 900 8833
goa.āyushcā.org

AN INITIATIVE OF

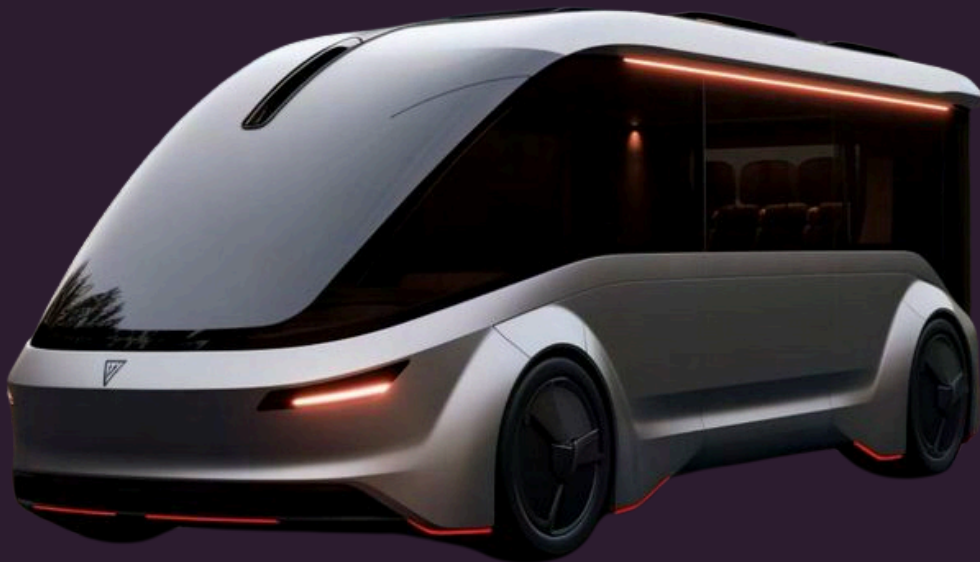


TRANSPORT HUBS
GOA STATE

EXECUTIVE SUMMARY

Transport Hub DPR

& document guide



Based on an evaluation of the existing public bus infrastructure and a review of the traffic in Goa, it is recommended that an additional overlay comprising of 1200 e-buses and three transport hubs be created.

The hub infrastructure would include civil works and land to provide for an expansion of fleet upto 5,000 vehicles. Beyond this capacity additional hubs would need to be created.

The total capital cost of the transportation network has been estimated at around Rs 2500 crores and could require one-time viability gap funding support of up to Rs 1,000 crores. After this one-time injection of grant funds, the operation is expected to be self-sustaining and viable.

A summary of the Financial plan is given in Section 1, Chapter 3. A more detailed pre-consultation version is included in Annexure 1. Based on the internal consultation and discussions with the Govt of Goa, the plan has been altered to provide buses on wet lease ie with driver and electronic automated “tap and go” billing systems similar to that in the metro stations of New Delhi.



The plan does not propose any change to the existing structure and operations of the Kadamba Transport Corporation.

KTC does not manufacture buses or own any of the fuel stations. KTC operates a bus service using the traditional format of fixed bus routes, open-air parking depots and manually controlled bus frequencies and timings. Drivers are on the payroll of KTC.

The additional infrastructure being created envisages 100% replacement of the entire Kadamba fleet with eBuses over a reasonable time window. The plan foresees the provision of these buses at a flat Rs 1.0 per seat per km (subject to a minimum of 80,000 km per annum per bus). This excludes government levies and taxes, if any.

This target amount of Rs 1 per seat per km includes provisions for bus maintenance, battery charging/replacement, hydrogen or alternate fuel for onboard charging of serial hybrid buses, and live/passive advertising panels. KTC will bear the cost of the driver/conductor and insurance. KTC will own the revenue.

The vehicles on wet lease would be provided with drivers at Rs 1.5 per seat per km. These vehicles could be operated by the Transport PPP company and provided to hotels and to corporates for their own use. This would help further the larger goal of āyushóá to catalyse the transition from fossil fuels to net zero fuels.



The āyushcā project envisages the creation of three entities, two of which would be specifically for the transportation module.

The main āyushcā entity would be a Section 8 company - PanIIT Foundation - and would own the Global Alumni Hub assets in North Goa. The open parking lot for the convention centre in the Alumni Hub would host a transportation hub and service centre at no cost to the transport project.

The second entity is another Section 8 company - PanIIT Forum - and will act as the investor on behalf of the IIT Alumni Council in the proposed PPP company. The PPP company has been proposed as a 50:50 JV on the lines of DIMTS Ltd in New Delhi. The proposed PPP company has been tentatively named “Go Goa Ltd” with the tagline “Goa on the Go!”. An overview of the proposed branding and a draft of the company formation papers is included in Section 2. The PPP (public-private partnership) company would primarily be for the development and ownership of the one million square foot transportation hub infrastructure in Provorim spread over a 30,000 sqm plinth area and 100,000 sqm total land area which would be acquired by the PPP company at designated circle rate of the land. T

The third company is proposed as a conventional company for owning and leasing the rolling stock. The fleet-owning company would be an independent leasing company providing e-buses to both the PPP company and to KTC - in addition to private players. It would be optimally structured to collect carbon credits and other incentives as available.



Segments Covered

by this document...



Section 1

Chapter 1 | Background & Task Force members
Chapter 2 | Summary of DPR Consultation
Chapter 3 | Study of BRT projects globally, along with key learnings

Section 2

Chapter 1 | GoGoa, the brand and tagline
Chapter 2 | Shareholder Agreement Key Points
Chapter 3 | Draft MoA & AoA of GoGoa

Annexure I | Transport Hub Report

Annexure II | āyushća Goa Report

Annexure III | āyushća Epithets



SECTION 1

Transport Network Overview

Chapter 1 | Background & Task Force members

Chapter 2 | Summary of Transport Report

Chapter 3 | Study of BRT projects globally



CHAPTER 1

Background & Task Force

The IIT Alumni Council established the nine-member BRT Transportation Task Force in September 2019, which was expanded to fifteen members in 2024.

The terms “Quality Bus Network” and “BRT” have been used interchangeably. The abbreviation BRT here does not refer to the conventional Bus Rapid Transport, which is implemented with dedicated bus lanes.

The Taskforce has held over 100 meetings over the period from October 2019 to May 2024. The task force included eminent IIT Alumni from various domains relevant to the project and comprises of:

- The founding Chairperson was Late Prof Dinesh Mohan (passed on after a Covid infection in 2021), a distinguished alumnus of IIT Bombay/ University of Delaware and a professor of transport engineering at IIT Delhi since 1976. Prof Dinesh Mohan was involved in the conceptualisation of the BRT corridor in New Delhi for the Commonwealth Games, which, though considered a failure (and subsequently reversed), served as an important experiment on what can work and what should be avoided in India. The task force is currently led by Mr Ravi Sharma on a temporary basis in his capacity as Chief Volunteer.
- The energy transition member of the Transport Group was the Late Prof Prasad Durjoti (passed on after a COVID-19 infection in 2020), a distinguished alumnus of IIT Kanpur/ University of Delaware. Prof Durjoti did path-breaking work in the microbial conversion of Indian coal into methane and hydrogen, which could be used to re-configure standard BEV (battery electric buses) into serial hybrid buses based on an onboard, self-charging 40KW electric generator based on either an H₂-powered fuel cell or a CNG powered Maruti Ertiga Engine. He is succeeded by Dr Rohinton Dehmubed, an alumnus of IIT Bombay/Columbia University and a Distinguished Fellow of the IIT Alumni Council in the area of advanced materials for climate change applications.
- The development sector member of the Transport Group was Late Ashok Madhukar (passed on in 2022), a distinguished alumnus of IIT Kharagpur and a Lifetime Achievement Awardee of IIT Alumni Council for his work in development economics and for setting up the Social Fund for Development in Egypt, one of the largest and most successful social funds in the world. He is succeeded by Dr Ashok Khosla, the founder of Development Alternatives and a key advisor to āyushcā Global. He invented the concept of “sustainability” and delivered the first course on the subject at Harvard (where Al Gore was his student). As the UNCEP head, he helped set up the Ministry of Environment in India and several other countries.
- The alumni coordinator member is Mr Ravi Sharma, a distinguished alumnus of IIT Roorkee. He is a former corporate leader who has headed several corporations, including British Telecom, Alcatel Lucent, and Adani Power. He is currently the President and Chief Volunteer of the IIT Alumni Council.

- The finance member and project coordinator is Mr Satish Mehta, an alumnus of IIT Mumbai who has been a consultant to the World Bank on local utilities from 1987 to 2002. He was also instrumental in setting up TRAI & SEBI in addition to corporatisation of DoT into BSNL. He is the convenor of the IIT Alumni Social Impact Fund which is providing part of the viability gap funding for the project. He is a life fellow of the IIT Alumni Council in the area of photogrammetry.
- The decision support member is Mr Sanjay Nagi, an alumnus of IIT Roorkee. He has been working in decision support for over 25 years. He is the leading consultant in the aviation sector with over 15 years of experience in the design and audit of processes and systems within airport terminals. He leads the team designing public amenities in the proposed transport hubs. He is a Life Fellow of the IIT Alumni Council.
- The architecture and town planning member is Mr Anil Sharma, an eminent architect and alumnus of IIT Roorkee. He has designed nearly 150 five-star hotels worldwide, including the Khyber in Gulmarg, which is among India's highest average room rent hotels. He is a Life Fellow of the IIT Alumni Council in the area of Hotel architecture.
- The digital card member is Mr Tarun Mohan, an alumnus of IIT Delhi. He has been a pioneer in the development of the single mobility card and has developed SIM overlays which allow a low-cost feature phone to be used for tap-and-pay applications in areas like bus ticketing and card tokenisation.
- The public policy member is Dr Mahesh Uppal, an alumnus of IIT Kanpur and Cambridge University. He is one of India's leading public policy experts in the areas of connectivity. He is a distinguished fellow of the IIT Alumni Council in public policy.
- The AI member is Dr Jyoti Joglekar, an alumnus of IIT Bombay. She is one of India's leading experts in the area of AI. She has served as an expert for ISRO on Chandrayaan and is a Professor of Computer Science for over twenty years. She is a distinguished fellow of the IIT Alumni Council in Artificial Intelligence.

- The management consulting member is Dheeraj Rathi, an alumnus of IIT Bombay. He is the Managing Director of RKCA Ecovis, the Indian partner firm of the global Ecovis platform, which has operations in over ninety countries. Ecovis provides a wide range of project advisory services, including techno-economic feasibility studies and financial accounting. He is a Life Fellow of the IIT Alumni Council in Accounting Automation.
- The media and branding member is Mrinalini Gupta, an alumnus of FMS, Delhi, and an Honorary Fellow of the IIT Alumni Council. She has served as the Chief Marketing Officer of Hindustan Times, Head of Broadband for Airtel, and Chairperson of Anytime Media, a subsidiary of Anytime Pte, a joint venture of Hollywood Studios.
- The GIS and Geo-Spatial members are Dr Rajshekhar Nyati and Dr Yogita Shukla, CTO and Board Member respectively of Genesys International – India's largest digital twin company. Dr Rajshekhar is an alumnus of IIT Mumbai, Department of Geology whereas Dr Shukla has a Phd from the Indian Institute of Remote Sensing.. Genesys is the global field partner of Google Earth, Google Streetview and Apple Maps. They have successfully built the Digital Twin of Varanasi and Ayodhya – and are currently developing the Digital Twin of Mumbai, Mecca and Goa. Dr Rajshekhar is a Distinguished Fellow of the IIT Alumni Council in the area of 3D Mapping. Dr Yogita Shukla is a Honorary Fellow in Remote Sensing.
- The project finance member is Dr Rakesh Seth. He is an alumnus of IIT Bombay and a career investment banker. He is the Managing Director of Scsi Capital which is the largest boutique investment banking firm in the highly specialised domain of setting up and administering investment funds including Social Funds, Venture Funds, Angel Funds, Private Equity funds and Fund of Funds. He is an established angel investor and book running lead manager on global platforms such as Nasdaq Nordic. He is a Distinguished Fellow of the IIT Alumni Council in Fund Management.
- The waste management member is Manoj Karmarkar. He is an alumnus of IIT Bombay and has been an expert in handling toxic and waste material for recycling and creating net zero campuses. He is a Life Fellow of the IIT Alumni Council in Waste Recycling.

The BRT Transportation Task Force was constituted by the Forum Mission of the IIT Alumni Council in 2019.

The relevant dates are as under:

Constitution of Task Force	Target July 30 2024
Start of project:	Target August 15 2024

The task force recommended that each āyushća campus proposed to be built should support a large climate change project aimed at helping local communities and that such a project be supported to the extent of around 15% of the project cost of the āyushća. The support was to be given as a one-time grant to cover the viability gap subject to the project becoming self-sustaining and independent pursuant to the grant.

The report was put up for consultation at www.āyushća.org in the period April 2022 to September 2022. Based on feedback from the consultation process, it was decided to set up āyushća estates in each state of India as well as overseas.

The first campuses

WERE PROPOSED FOR THE FOLLOWING LOCATIONS:

āyushća estate category	Location	Special feature
āyushća by the sea	Goa	The Global Alumni Hub (with Convention Centre)
āyushća in the hills	Himalayan belt	The Global Wellness Hub
āyushća in the forest	adjacent to a forest	The Global Biodiversity Hub

Goa Recommendation Report

MARCH 2023

- The task force recommended that āyushcā in Goa be configured to support climate change projects in the area of waste management and local transportation. The waste management area was decided on the basis of the IIT Alumni group involvement in setting up the Goa Waste Management project (under the leadership of Late Manohar Parrikar). This project was configured to recycle the huge waste (organic and well as others) which was expected to be generated by the booming tourism economy. The proposal was to convert organic waste in biogas which would be used to generate power. The local transportation project was conceptualized based on the findings of the task force that the primary constraint to growth of the Goa Tourism GDP was the lack of adequate roads commensurate with the needs of 7.5 million tourists that are expected to arrive in Goa during the peak tourist month in 2028.
- With an average stay of four days, this could translate into a floating tourist population upward of one million tourists. This in turn would translate into a need for four million local commute trips per day just for tourists. At 25 kms per trip and 30 passengers per bus – in ideal 100% occupancy scenarios – this would translate into a theoretical need for 15,000 ebuses. If this demand is met by cars and taxis, it would choke the roads and lungs of Goa completely making it impossible for tourists to move around, other than by new options like flying taxis and tourist boats.
- This is a manifold increase over the existing tourist inflow of 8 million tourists per annum which translates into a maximum 1.2 million tourists in the peak month resulting in 200,000 commutes per day which in theory can be met by 670 buses (and by roughly 1340 to 2010 buses in real life scenarios). This 20x increase (from 200K commutes per day to 4000K commutes per day) is likely to choke the roads of Goa as well as cause severe air pollution. This would lead to city wide traffic jams and irreversible damage to the environmental ecosystem.
- This report was put up for consultation from April 2023 to September 2023. Based on the feedback from the various stakeholders, an amount of USD 100 million was approved as a viability gap grant fund for a public transportation initiative in Goa.

āyushća Goa Investment Plan

OCTOBER 2023

The āyushća Goa proposal was put up to the Investment Committee of the IIT Alumni Social Fund, seeking Rs 700 crore viability gap support for a local transportation project with non-polluting e-buses. The project was put up for consultation at www.goa.āyushća.org from October 2023 to December 2023. The project was thereafter submitted to the state government for their perusal and acceptance. Based on meetings with the Smart City Goa Council and other community leaders, it was jointly decided to assess the traffic situation during a large MICE event. This event was identified as the India Energy Week (IEW 2024) which was to be held in the southern part of Goa during February 2024. Accordingly, the task force mandated various alumni groups to survey the event from inside the ground, from the adjoining cities, from the road (using Google Street View type equipment) and from the air using drones and specially fitted out aircraft. The simulations carried out prior to the event clearly indicated that the roads adjoining the venue would all get choked. In keeping with expectations, the event led to massive traffic jams. It took visitors up to three hours to reach the venue from their hotels and up to four hours to reach the hotel back using the complementary public transport provided by the event hosts. Because of these traffic jams, speakers were unable to reach the venue for their events. The project served as an excellent study case for preliminary bus network planning.

Goa Budget Coverage	February 8, 2024
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The Global IIT Alumni Hub project was announced by the Hon'ble Chief Minister as part of the State Budget Speech on February 8, 2024. Subsequently, the state government gave the go-ahead for completing the DPR.

DPR Consultation Draft	February 15 - April 15 2024
DPR Consultation	until May 30 2024
DPR Draft post consultation	June 1 2024

Next Steps

Approval of PPP Entity and Land Allotment for first Hub	Target July 30 2024
Start of project	Target August 15 2024

This document is being issued on June 1, 2024, and constitutes the Draft DPR, which will be finalised based on feedback from the State Government.

State government interaction request	June 7 2024 - June 16 2024
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SECTION 1 . CHAPTER 2

Transport Hub

extract of annexure I



Project Cost

OF THE TRANSPORT HUB

TransportHub components	Land Area acres	MegaFund Equity Cr	MDB. Private Contribution
1200 electric vehicles (over 30 months for first 18 months of operation). Scaleable to 5000 vehicles in 50 months from 15.8.24	0	200	1000
Three Transport Hubs land Porvorim, Sindhudurg, Concona	45	175	-
Three transport hub terminal buildings with 1,15,000 sqm customer area plus parking area of 85,000 sqm	0	440	200
300 mega chargers and 500 medium capacity chargers with service centre and maintenance bays	20	0	95
Maintenance fleet, medical vans and other utility vehicles and equipment	0	15	-
Power sub station for 125 MW cumm. at three locations with emergency backup	0	14	-
Misc including contingency and WC	-	106	105
	Area	Megafund	MDB. Pvt fin.
TOTAL Rs 2350 Crores	65 Acres	950 Cr	1400 Cr

an āyushća GOA Project

TRANSPORT HUB

Transport Hub is the CSR component of the āyushća Global Alumni Hub

Aim of transport hub

- The aim of this hub is to establish a space that seamlessly integrates all modes of transportation, creating a vibrant environment for living, working, and leisure activities, whether individuals are using public transit or not.
- It will introduce a safe, comfortable 24/7 place for tourists to rest in between visits during monsoon months and at odd hours.

Transportation Hub

- The transportation hubs are being designed to include access to various modes of transport, such as virtual metros, buses, water taxis, and flexible vehicles, as well as direct point-to-point connections.
- They plan on enhancing the surrounding landscape of the hub to attract tourists.
- **Hub's vision:** the multiport is envisioned as a lively gathering spot, reviving Goan's eclectic culture and serving as a hub for social interactions, public performances and calendar events.

Digital Card

- āyushća goa card will be an Aadhar or passport-linked ID smart card based on the India Technology Stack.
- The card will permit access to and payment for all transport facilities, parking, government services, toll charges, entry fees to tourist attractions, use of electric carts in pedestrian areas, etc.
- The card will be compatible with the Kodoy health card for continuous health monitoring for locals as a preventive medicine system.



Project Details

Project cost	INR 2350 - 2450 CR
Land required	65 acres
No of electric vehicles	Initially 1200, going up to 5000
Lease finance funding	INR 1000 CR with INR 200 CR margin
Social impact equity funding	INR 750 CR
Commercial finance	INR 400 CR
Main transport hub and first location	Porvorim
Tentative start date	15th Aug, 2024
End date	30 months from start
Stakeholders	• Office of the Chief Secretary • Kadamba Transport Corporation • Smart City Goa & Panchayats • Goa Industrial Development • Indian Navy, Civil aviation • The Goa campus of BITS Pilani • Sustainability division of ITC Ltd

- India's first card for paying transit fares, parking fees, and utility bills across different modes of transportation.
- Project to be housed in a PPP (Public-Private Partnership) company which targets to start operations on 15.8.24.

Current Public Transport

IN GOA

KTC buses	450
Private buses	1150
Other buses	4500
Goods vehicles	55000
Taxi	37000
3 & 2 wheelers	35000

- Electrifying this would cost over Rs 25,000 crores.
- Charging the fleet at night over four hours would require over 500MW of power, which exceeds the grid's capacity.
- The State grid's supply of 560MW falls short of peak demand by approximately 100MW, resulting in power cuts.

under āyushcā community outreach...

accelerate electrification & upgradation of
public / tourist infrastructure



Photographer Pantaleão
Fernandes's book 'Goa:
Rare Portraits' is a glimpse
into the rural and tribal
culture of the state.

Proposal

Vehicle Fleet	5000
Standalone high speed charging stations	300
Embarking gates/ stops with pantograph chargers*	200

**Pantograph chargers - the use of an overhead charging system that allows electric vehicles to charge while they are in motion*

Phase 1

Upgrade buses	500	
Comfort buses upto 12m	100	
Luxury coaches upto 9m	120	
Longhaul metro upto 24m	30	
Amphibian sightseeing 12m	15	
Mobile clinics 12m	15	
Hotel coaches upto 7m	400	
Emergency response 12m	10	
Support Vehicle 20m	5	
Water cruisers 15m	5	
Total	1200	

Out of these 1200, a total of 400 vehicles would be contributed by partner hotels and restaurants who will also provide parking and charging infrastructure.



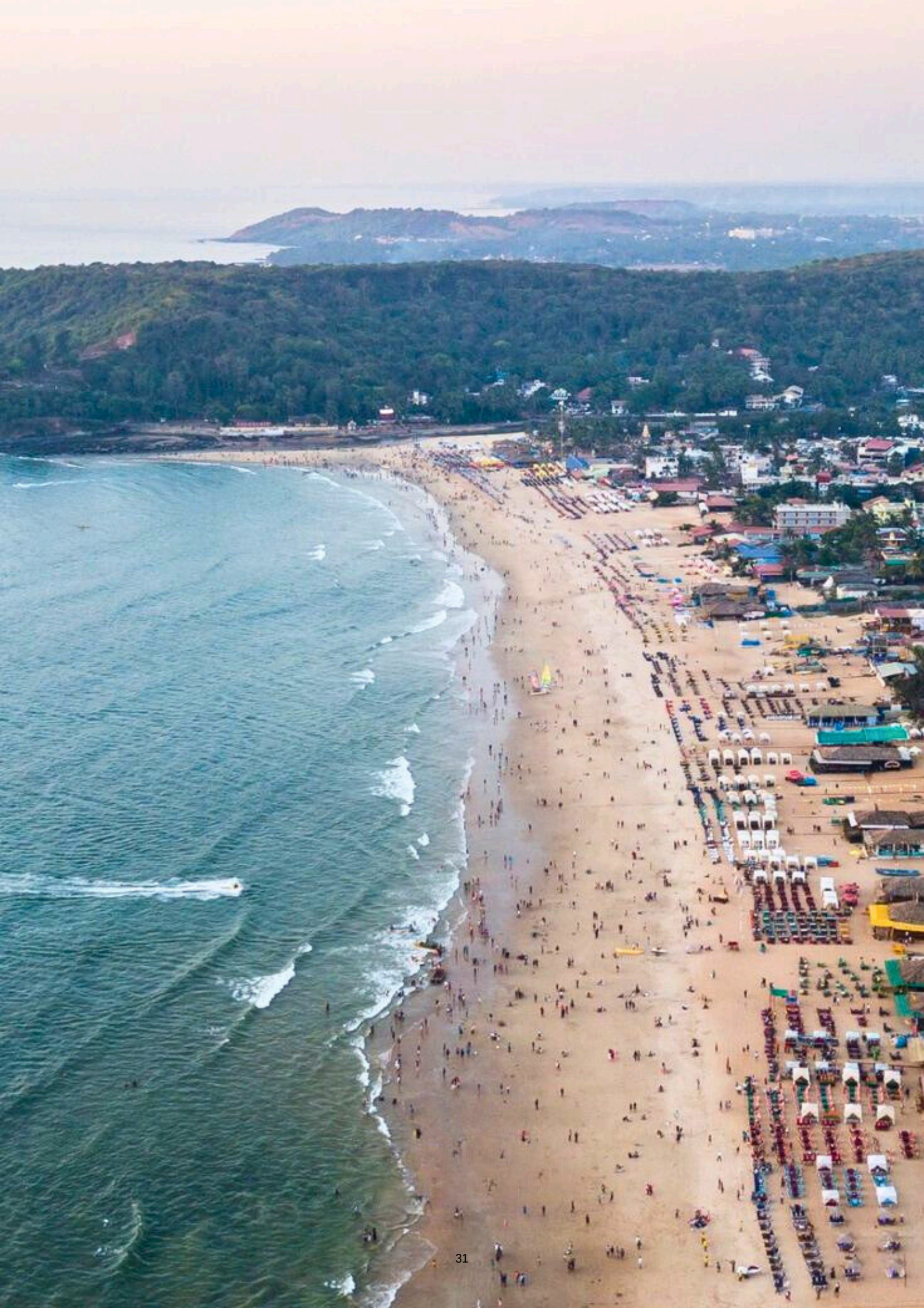
Transport Hub

The passenger transport market broadly consists of two segments - locals and tourists.

- Locals primarily use two wheelers.
- Tourists: Ola and Uber are not available in Goa. Thus tourists use taxis or rent self-drive cars.
- KTC buses supplement private buses to provide affordable local transportation options at low levels of customer convenience.

Need for Transport Hub

The key limiting factor to the growth of tourist numbers is the traffic-bearing capacity of the local roads. This will necessitate a shift to shared modes of transport such as electric buses.



Goa Tourist Bifurcation

Current no of tourists	8 million
Tourists who travel by air	3 million
Tourists who travel by road and rail	5 million
Expected no of tourists in 2029	18 million
Expected no of tourists who will travel by road in 2029	10 million

NH66

Goa Mumbai Highway



Problem with current buses in Goa

If one assumes four days per tourist and 60% tourist in the four peak months for the 10 million road arrivals, the bus footfall per day in tourist season would be upward of 500,000 with an average trip length of 30 kms yielding 15 million passenger kms. Assuming 5000 passenger-kms per bus per day - this will need 3,000 buses. In contrast Kadamba currently has around 500 ageing buses. Thus, in effect Goa needs an indicative 5000 buses including long distance buses. To cope up with future demand by 2028, depending on the scenario selected, as many as 30,000 small buses may be required to keep pace with tourist demand alone.

Solution

To ramp up from the existing 500 Kadamba Buses to 5000 over 50 months, 100 buses would need to be added per month.



Description

OF THE TRANSPORT HUB

- The transport hub will host multiple electric vehicle technologies, including pure electric, hydrogen and serial hybrid, with fully automated hands-free charging.
- Electric vehicle parking, charging & maintenance and repair service stations will be established at the three transport hub locations.
- Facilities:
 - boarding gates, digiyatra access, baggage handling, food courts, retail spaces, lounges, prayer room, clean washrooms, medical care, walkathons, large information screens, airconditioned access till boarding gates, public wifi, direct connectivity to other airports/stations etc.
- The Porvorim hub spread over close to one million square feet has been conceived of as the main tourism hub with direct loop route connectivity to large hotels, both airports, railway stations, leisure areas, tourism landmarks, beaches etc.
- The Sourthern hub, spread over fifty acres near the Lalit Hotel Golf Course and Helipad, has been conceived as a multimodal hub connecting the virtual metro, luxury buses, and water transport.
- The Northern hub spread over two hundred and fifty acres in-between Sindhudurg and Mopa on NH66 will house a 18 hole golf course, helipad, main convention centre and Global Alumni Hub. It will also house the main maintenance and servicing area for the bus fleet.
- Transport hub will host multiple electric vehicle technologies including pure electric and serial hybrid.



Autonomous Virtual Metro

- Launch Date: 2025
- Connectivity: northern tip of the state at Sindhudurg Airport with the Sourthern Hub via the Porvorim Hub in under 100 minutes.
- The fully AI based system will use white painted tracks on NH66 to lock the wheels accurately to the Rails.
- The virtual rail movement will by synchronised with the traffic lights so that the lights are green when the virtual rail is passing by:

EV Categories

Comfort Buses	Replace buses currently used by Kadamba Transport Corporation.	Charged & maintained at transport hub	Movement will happen through a transit card
Luxury Coaches	Distinctive look, low cost, bespoke interiors, large glasspanels, easy fast charging and low cost	Heavy luggage and easy disembarking for wheelchair passengers	developed indigenously through the council's initiatives
Long Haul Virtual Metro	-	-	-
Estate buggies	Use inside the āyushcā campuses & in the pedestrian zones near tourist attractions.	Vehicle to vehicle charging	-
Amphibian Sightseeing	It is like a bus used in water for transport	Provide safe travel on land or in water	used for disaster management or in flooded areas during rainy season
Mobile Clinics	first set of MegaLab buses were flagged off on May 1, 2020 as an emergency fleet to help manage the covid pandemic in Mumbai & other cities	-	-
Emergency Response Vehicles	wide range of functionalities from medical facilities onboard to satellite connectivity for communications backup	Live video broadcast to hosting remote control rooms.	-
Support Buses	handle breakdowns and other maintenance issues including depot to depot transfer for remodelling, battery replacement, change of interiors, software upgrade etc	-	-
Water Cruises	high speed yachts	The zero-pollution boats can take luxury tourism to the next level.	-

Realtime Digital Twin

Alumni partner companies have started work on developing the Digital Twin, Street View type real time functionalities.

State-Wide Digital Operating System. The "born digital" system would be "cloud native" to ensure the fastest response times and minimal delays.. Delays are particularly important if the Bus conductor is to be avoided and an automated system installed to accept stored value cardds like in metro station.

Challenges in e-bus financing

Challenges	Overcoming Challenges
Public charging infrastructure	Modification of commercially available electric buses to operate with partial battery pack and serial hybrid type onboard charging station.
Substantially higher capcost vis a vis diesel buses	Rapid indigenisation of the drive train and other modules including invertors and control systems
Financial health of subsidised bus operation/ PSU enterprises	Working out subsidised transfer pricing on a per km basis for the buses. Cross subsidising the local buses from premium ticketing on tourist and luxury buses
Practical issues including ticket prices/affordability and employment for locals.	Transferring the transport hub terminals to a REIT based on rental discounting to unlock capital which can be used to subsidise operations to the extent of around Rs 600 crores.
Challenges	Overcome Challenges

Feedback

from consultation process



Based on the feedback from the consultation process, the following activities have been carried out:

- Several queries were raised regarding the AI system to ensure availability of bus on demand and the functionality proposed therein. In response to the same, two workshops were held to explain the research papers based on which the system was being developed. The abstract of these papers is included in Section 3 of this document for context. There is a general agreement that this approach can considerably reduce total kilometres covered per bus, reduce waiting time, improve customer comfort and substantially improve on transit times.
- The donor group also went through the pilot project carried out between Sonapat in Haryana and Jehangirpuri in Delhi for students of Ashoka University. The said pilot project involves around 3,000 students booking a seat on a shuttle bus via their Uber app. The app facilitates a bus on demand, which is meshed with onward connectivity in New Delhi via the metro or single-user Uber cab without any waiting time. The rationale of a three-hub approach with one main transshipment hub, one land-to-water hub and one airport hub. It was agreed upon that Porvorim was the best location for the transshipment hub. Similar integration with the Goa Miles app would need to be explored.
- Detailed assumptions relating to the proposed pricing of the eBus on a per km basis were discussed with scenario analysis. It was generally agreed upon that a simple single number was the best format to work with. Tenders of various states were analysed and it was agreed upon that Rs 35 for a 35 passenger capacity bus with a suitable increase for larger buses (based on ratio of passenger capacity) and suitable reduction for smaller buses was an appropriate and fair number.
- The effort and cost involved in upgrading the battery type eBuses to serial hybrid was discussed and detailed comparisons were provided comparing hydrogen and CNG based onboard electric generators. Given the power situation in Goa and the possibility of demand going up faster than supply – it was felt that at least 50% of the fleet should be upgraded to serial hybrid based on hydrogen. This will also allow for a truly green service since most of the electricity consumed in Goa is currently not green. It will also allow for higher range of upto 800 kms. With hydrogen refilling it could be even more.

- Discussions were held regarding the proposal to bottle CNG which is being flared at the Goa Waste Management Company. As per interactions with BITS Pilani,,it has been estimated that 5,000 cu.m. gas with an average 56% methane content is being flared daily. The capital cost of setting up a plant to bottle this is estimated at Rs 2.5 crore with a variable annual cost of around Rs 12 lacs. This will yield CNG with a retail market value of around Rs 4.5 crores pa. It is also possible to divert CNG from power generation to increase the gas output to close to Rs 10 crores pa (though capital cost will be higher). This CNG can be converted into an indicative one ton per day of hydrogen and three tons of graphene. This hydrogen is adequate to power 20,000 bus kilometres or 50 buses at 400 km per day. The graphene can be used to build water jetties using extra strength concrete and carbon nanotubes or fibres (in place of steel).
- The success of the 6m Karsan electric bus in Japan was debated. This bus is built using a drivetrain from BMW on similar basis as is being attempted for the water boats. The bus body itself is made in Turkey and then shipped to Japan. An identical model can be made for India. The Karsan vehicle has several advantages. For one it can climb very steep roads. Second it has a wide 1.2m automated door which allows for a passenger to embark with baggage or in a wheelchair. This is not possible in a conventional bus. The vehicle can host 12 sitting passengers with a provision for ten more standing passengers. By using a home theatre kind of seating (each row is higher than the earlier one) – a unique ergonomic profile has been created which is ideal for a 270 degrees sightseeing view. The bus partners have already started development of bus units with this form factor. The government is being pursued to provide regulatory benefits and subsidies identical to those offered for cars to this 5.85m bus which is actually shorter than a Tesla car. This format of minibus could replace the cars that were anticipated in the 5000 vehicle initial fleet. In a serial hybrid configuration, this bus can give a range of 500 kms, battery swapping in less in five minutes (using the Nio robotics from Europe) and a hydrogen range extender which can enable infinite range if hydrogen filling stations are available. A fleet of around 50,000 such buses can provide an alternative public transport which is superior to, cheaper than and faster than private taxis or personal cars. Each bus requires just one driver and has extremely fast hop on, hop off facility because of the wide entry/exit gate. The Indian equivalent of the Karsan should be available for mass deployment in early 2025 at a cost of well under Rs fifty lacs for a twenty passenger version with adequate luggage space etc.

- The financial estimates of capcost and annual opcost along with the cross subsidy rationales therein were reviewed and the project finance member was requested to rework the financials based on the Karsan type vehicle format.
- The large trans-shipment hub proposed at Porvorim was unanimously approved based on results of the aerial survey on all the available options as indicated by KTC. The land could be paid for in cash at the circle rate for the entire 100,000 square metres. The proposed hub would have a plinth area of 30,000 square metres and need height approval for 90 feet and a FSI of 1.0 (to enable a million square feet terminal with 100 boarding gates and commensurate charging stations).
- For vehicles other than those provided to KTC at Rs 35 per km – the possible business case options were reviewed. The option with maximum support was to offer an eat all you can daily or monthly pass which could be used in any bus (KTC or otherwise) at an indicative Rs 250 per person per day or Rs 1500 per month or Rs 10,000 pa. For pass users boarding KTC buses, KTC would be reimbursed the fare than KTC would receive if it were a direct retail passenger. It was decided to explore business plan options in greater detail once the hub location and PPP company were finalized.
- The functionality to be built into the Digital Twin was discussed. The coordinator shared the digital twin tenders of Varanasi, Ayodhya and Mumbai which were broadly identical. However, these tenders did not envisage the elaborate detailed and dynamic digital twin functionality required for live AI based transportation networks. Dr Nyati offered to arrange for 50 flight sorties over Goa by June 15, 2024 and help estimate the cost of developing the dynamic digital twin using the Kodoy stack with the private planes and vehicles that are used for Google street view. The partners have been gracious enough to agree to do the Digital twin development work at cost with a small overhead cover using the planes, drones and other vehicles when they are not in use for commercial projects. Dr Nyati made a presentation on the work done for the Dharavi digital twin and gave a demo of the footage already captured for Goa and for the Porvorim traffic simulation. A clip of the video is appended.

SECTION 1, CHAPTER 3

Overseas Projects

a synopsis



This document serves as a brief compilation of the institutionally-funded Bus Transportation projects in emerging markets from the year 2000-2020. The primary information source used for compilation of this document are public-domain reports of the multilateral development banks including the World Bank (who have also published working papers related to many of the below mentioned case studies). It documents findings related to select aspects discussed in the case study cities, including significant experiences, challenges, successes and lessons learned, to relay practical, ground-level guidance on local bus planning and implementation. The information presented herein has been customized and collated for the purposes of the āyushcā Transport Hub which is part of the Global IIT Alumni Hub @Goa.

Among the case study cities, the implementation of BRT corridors has been believed to deliver a remarkable transformation in urban mobility, often replacing chaotic traditional transport systems and delivering tangible impacts on the city and its peoples. However, BRT implementation is a complex affair since it involves complex planning and design, adaption to local conditions, and extensive coordination of stakeholder engagement, institutional change, as well as project and financial risk management.

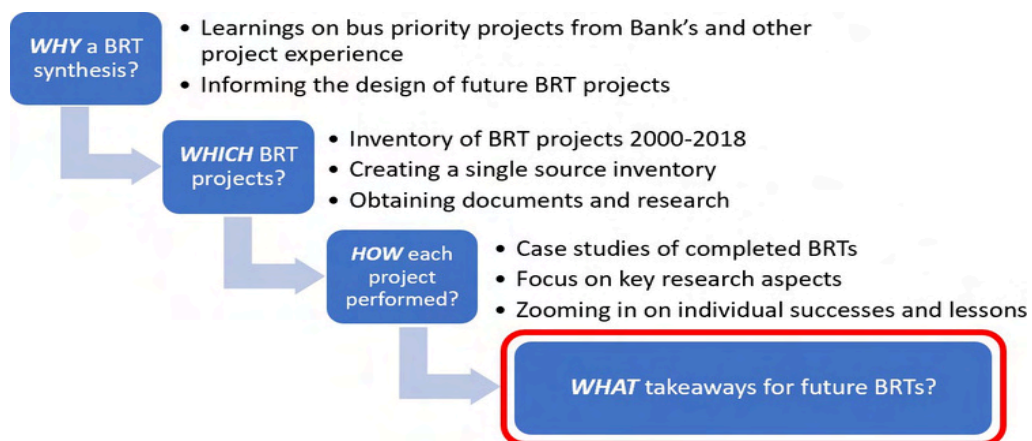
It is important to note here that the BRT project implemented in New Delhi in anticipation of the traffic surge during the Commonwealth Games of 2010 was an abject failure and had to be dismantled at substantial cost. At the same time, the virtual metro concept which has been experimented with in Germany as well as China seems to hold substantial promise – especially for Goa – because it is built ground up for autonomous vehicles and does not involve laying of any electrified tracks. If the virtual metro is interfaced with a smart integrated traffic light management, it can deliver most of the benefits of a metro rail system including capacity, waiting time and transit time. Rail based metro would be difficult to implement in a location like Goa which is not only spread out geographically over 3500+ square kilometres but would also be a challenging topology for construction of either underground or overhead rail lines. Most routes may not have the requisite economy of scale in terms of passenger demand. The AI based system now proposed for Goa has the promise of providing point to point on-demand services at a very low cost with an excellent consumer experience. We expect this experience to draw a significant proportion of the customers in preference to using their own cars or self drive/chauffeured taxis. The lack of migration and legacy issues would play to Goa's advantage.

This document aims to conduct an honest and balanced appraisal of local bus transport formats to understand the underlying reasons and causes for achieved results in several completed projects, thus discussing both successes and learnings.

This synopsis is primarily based on desktop research with limited field work carried out by volunteers from the IIT Alumni Chapters in premium locations like Lake Como, Venice, Marbella Spain, Bali etc.

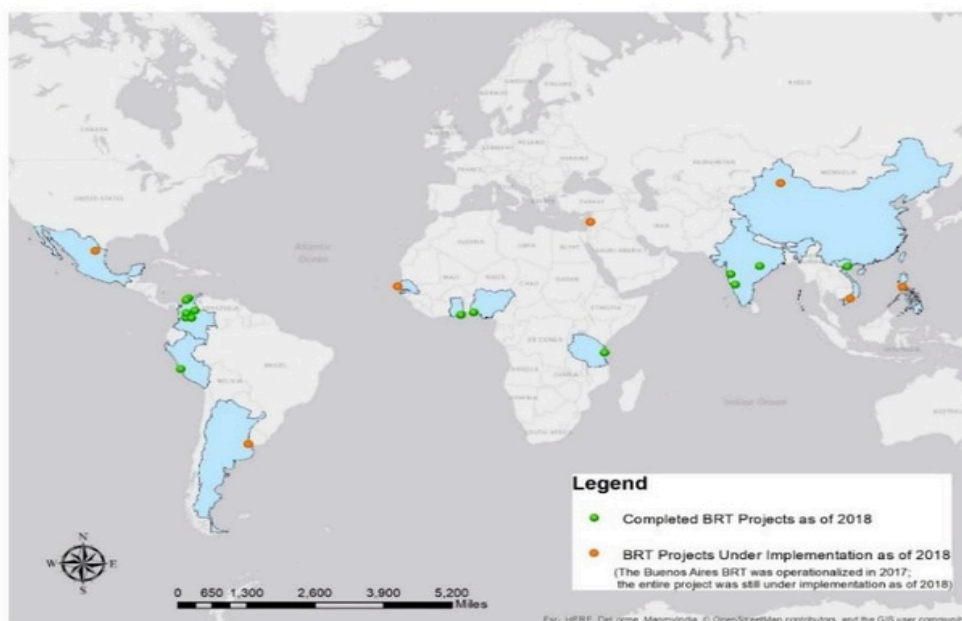
Multilaterals like the World Bank have focused primarily on BRT projects and have analysed the projects using the following framework:

Research Framework & Structure



Locations of Completed BRT Projects

UNDER WORLD BANK-FINANCING (2000-2018)



For the period from 2000 through 2018, the World Bank financed a total of 19 BRT systems under Investment Project Financing (IPF), including nine completed BRT projects by the end of 2018, the time this research project began, and 10 in various stages of implementation.

These projects represent a total cost of an indicative \$5 billion, of which around \$2 billion or approx. 40% was financed by the World Bank. The World Bank projects are located in seven countries involving 14 cities: Accra in Ghana, Bogotá in Colombia (two projects), six cities in Colombia (Bogotá, Barranquilla, Bucaramanga, Cartagena, Pereira, and Medellín), Dar es Salaam in Tanzania, Hanoi in Vietnam, three mid-sized cities in India (Hubli-Dharwad, Naya Raipur, and Pimpri-Chinchwad), Lagos in Nigeria, and Lima in Peru. We believe that 40% project funding via multilaterals is a good thumb-rule to follow.

All completed BRT projects had similar Project Development Objectives (PDO) as Goa. They all focused on improving transport and mobility and encouraging modal shift to environmentally sustainable public transport. In some cases, PDOs included a specific aim to deliver reliable and cost-effective systems (Dar es Salaam). Other common objectives included improving access for the poor and strengthening institutional capacity, with one case targeting improvements in local level urban transport planning and traffic management (Accra, NUTP Colombia). A few projects highlighted developing integrated urban transport plans and policies to enhance economic productivity and quality of life (Colombia's NUTP cities, Lima, Lagos).

It is claimed that BRT became a catalyst for institutional and sector reform in some cases. The establishment of Urban Transport Authorities (UTA) specifically to lead BRT implementation was less effective. Planned UTAs in some cases were not realised (Hanoi, India cities); some were not sufficiently robust as a political, regulatory or coordinating entity to undertake implementation of a major sector reform together with a BRT implementation (Accra); and some new BRT agencies lacked the strength to match influential power players (Dar es Salaam). In the case of Colombian cities, a central government program provided technical assistance and funding while municipalities formulated projects. In the Indian cities, establishing financial and technical resources at the state capital level developed a centralised capacity that was able to effectively support multiple cities in their state. Based on an analysis this far, we believe that the PPP framework entity working alongside a state government entity like Kadamba Transport Corporation can provide the best possible fit to the market and investor need.

Whilst it is important to note upfront that central lane BRT failed in New Delhi, it is none the less useful to study central lane BRT and other Quality Bus System (Improvement) projects in various emerging markets. For the purpose of this report, the term “BRT” has been used interchangeably with Quality Bus System (Improvement) projects.

Virtual metro and shared minibus services have been proposed as part of the BRT framework. Key highlights of the case study cities in implementing BRT are briefly described as follows (in alphabetic order) along with a conclusion at the end of each in terms of “takeaways for the goa project”:

Accra BRT

The project did not implement the BRT due to cost overruns, opting instead for a Quality Bus System (QBS). The QBS struggles with traffic congestion due to lack of dedicated lanes and massive growth in private vehicles, which created financial hardships, but QBS provides valuable experience upon which to build ongoing improvements. Formalizing the route operators is a significant step to improving regulation and standardization of services since it establishes the government's role as facilitator/regulator of public transport. The issues raised by this deployment experiment have been addressed by the use of AI controlled, on-demand routing. This eliminates the need to have pre-defined bus routes or "time of day" based bus frequencies.

Bogotá BRT

Bogotá's TransMilenio project was developed with solid planning objectives that included a socially inclusive approach to transforming city mobility. It introduced TransMilenio SA as the network manager and built a regulatory model of private sector operators while also including existing stakeholders into the new business model. All three BRT projects in Bogotá achieved their PDOs with remarkable system performance. However, TransMilenio's earlier mandate for full cost recovery from fares of its operational expenditure proved difficult to manage, causing pressure on fares and user dissatisfaction with particular impacts on the affordability for low-income users. The quest for full cost recovery through higher efficiency and productivity manifested itself in passenger overcrowding, which negatively impacted public support. Since 2015, legislative changes involved replacing 'financial self-sufficiency' with 'financial sustainability,' allowing other funding sources to supplement fare revenue. This experiment has very useful learnings for Goa and it is desirable to build a complete ecosystem which aligns the interests of both the state transport company as well as various private operators, self-drive car providers and hotel owners with own vehicles (besides other stakeholders).

Colombian BRT Program

SIX CITIES

Bogotá⁵, Barranquilla, Bucaramanga, Cartagena, Medellín and Pereira

Colombia's decision to scale up the successful Bogotá's BRT under the National Urban Transport Scheme (NUTP) provided political emphasis, and offered technical assistance and a proportion of the funding required for cities to undertake their own BRT projects. In each case, a key intervention was to define a new regulatory framework to address operational problems and negative impacts of traditional bus transport. Lower than expected ridership in all cities caused financial hardship, but cities with greater success improved BRT integration with the surrounding networks and feeder services. Despite the varying levels of challenges and successes, BRT served as a catalyst for cities to develop their own integrated road-based public transport systems. While access to the poor remains a challenge, the percentage of low-income passengers using BRT increased significantly, reaching 71 percent on Barranquilla BRT and around 60 percent on Pereira and Bucaramanga BRTs. The conception of a new overlay built ground-up for on-demand point-to-point services based on eVehicles, varying levels of comfort/QoS and a hub-based changeover point can fundamentally alter the price performance of public services. This in turn can help shift a substantial proportion of tourist traffic to public transport. This would prevent choking of the roads and lungs of the city. This could enhance the State's ability to cater to many more tourists and to capture the revenue therefrom.

Dar es Salaam BRT

Following the style of Latin American models, Dar es Salaam built a high-quality system that inspired other sub-Saharan Africa (SSA) cities looking for ways to transform urban mobility. Dar es Salaam's Line 1 has been operating for over five years, and further expansion is underway. At opening, the BRT carried 180,000 daily passengers and reduced travel time along the corridor by a remarkable 50 percent. Lack of institutional readiness, uncertainty surrounding the business model and risk assignment, and an unclear plan on how to incorporate the displaced daladala minibus sector posed difficult implementation challenges. *It would seem that aligning the incentives of the private operators by giving them buses with charging and parking on a “per km based rental” may help to get them on board.*



Dar es Salaam, Tanzania

Hanoi BRT

Hanoi's BRT experience presents valuable lessons on the complexity of implementing BRT. Despite its challenges, the case provides an example of a pilot BRT system replicable in other corridors. The project also instilled in city managers confidence in their ability to improve public transport. While other PDOs were met, ridership fell well below the target, with 14,000 daily at the opening, partly reflecting the limited integration with regular bus services. Over 50 per cent of surveyed users report being previous motorcycle riders. The key challenge in Goa is to shift tourists from vehicles carrying an average of 2 or 3 passengers to those that can carry 10 or 15 tourists in one vehicle which is of the same size.

India BRT Program

THREE MID-SIZED CITIES

Hubli-Dharwad, Naya Raipur and Pimpri-Chinchwad

India's three-city BRT project was remarkable in that it prioritized capacity building as a first intervention, which equipped local decisionmakers to define their own mobility initiatives around the BRT implementation and develop competency to manage unforeseen risks. This Global Environment Facility (GEF)-Sustainable Urban Transport Project (SUTP) involved a large capacity-building program in mid-sized cities where resources and capacity lag behind large cities. It utilized capacity at a state level to provide technical assistance to multiple cities. The BRT implementation programs overcame a myriad of challenges, notably land acquisition and contestations over street space. At opening, the cities achieved significant mode shift to public transport on BRT corridors. Ridership in Hubli-Dharwad rose to 100,000 daily, however in Pimpri-Chinchwad and Naya Raipur, BRTs are lagging in ridership growth. *The key learning here is the base infrastructure in terms of the passenger terminals and charging hubs has to be created upfront and then the rolling stock can be increased in keeping with demand.*

Lagos BRT

The Lagos BRT demonstrated that a BRT project does not necessarily need to achieve ‘full BRT’ status, instead it can use a variety of bus system improvements appropriate to the local context. This learning is particularly relevant for Goa. Lagos Phase 1 BRT commenced with a government-sponsored BRT Lite project supported by MDB funded technical assistance. The project took a pragmatic design approach by concentrating infrastructure on where it delivered the most impact. Building on BRT Lite’s success, the Bank financed Phase 2 (LUTP2), which involved system improvements and median BRT extension and road widening. System performance has been remarkable for a low-cost BRT, with daily ridership reaching 200,000 passengers. This pragmatic approach involved strategically prioritized actions, such as comprehensive public engagement and communications to build public acceptance and trust, and design/build construction contracts to reduce delays. Also notable was the early and comprehensive investment in capacity building in all aspects of transport management, which was instrumental to success. Integrated Public Transport System (the transport authority in Lagos, also known as LAMATA) has become a textbook example of how to develop institutional strengthening, fostering a competency to undertake a locally-derived system design and in managing unforeseen risks. The crisis of deteriorating performance of the first BRT operating company for BRT Lite demonstrates how the business model can influence behavior. In this case, the operator seized control over revenue to gain a power advantage to exploit a financial opportunity. Fortunately, LAMATA was able to prevail and terminated the contract.

Lima BRT

Lima leveraged outstanding political support to develop a BRT system out of a chaotic transport situation. Ridership took time to build up, causing some early difficulties. However, once the system was fully operational, it exceeded its target demands and achieved its PDOs, including reductions in travel time by 34 percent, and in fatal and serious accidents by 65 percent. Despite a key objective to improve access to the poor, the project found this a challenging task, and Protransporte is now aiming to improve access and affordability by implementing a large feeder route network and also optimizing its fare policies. *Fleet renewal and bus scrapping were part of the reforms but they added an extra layer of complexity that caused delays. Separating fleet renewal from the critical path of the project was a lesson to be learned. It seems important that the path to replacing the ageing fleet of KTC be defined clearly upfront*

The transportation task force of the IIT Alumni Council which was constituted as part of the Forum mission has tried to assess the reported data on the various BRT projects objectively and also compared the same with BRT experiences in cities like New Delhi. Very interesting learnings have also emerged from field work in locations like Gold Coast, Bali, Marbella etc.

It must be explicitly stated that the findings of the IIT Alumni Council's Task Force are not consistent with the findings and recommendations of the World Bank primarily because the World Bank has not factored in several major inflection points – emergence of electric vehicles, the advent of AI in route analytics, the ubiquity of smartphones, cost effectiveness of digital citizen service platforms, success of virtual metro architectures and new formats of asset and infrastructure sharing between the government, PPP entities and the private sector.

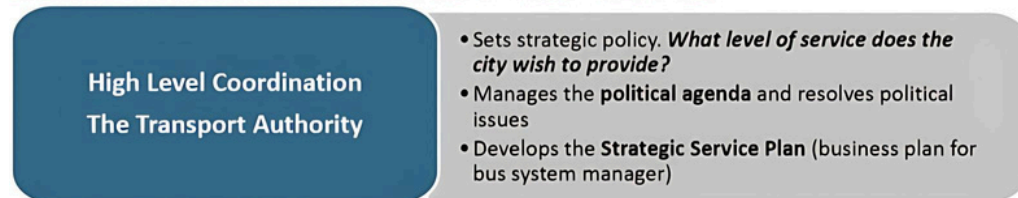
However, there are some interesting points raised in the World Bank analysis which merit a mention. These are summarised in brief from the World Bank working papers :

- While BRT offers a range of design options for both infrastructure and operations and is an effective instrument in the Urban Mobility Toolbox, it is not a 'silver bullet' solution for every city and corridor. BRT should be approached as an integrated set of measures that can be applied according to the local conditions. Characteristically, BRT aims to improving the standard of road-based public transport with quality infrastructure and high-frequency services to promote substantial ridership. The case studies consistently demonstrated BRT or its equivalent to be a key intervention and cost-effective instrument to address the urban mobility conundrum that cities face.
- In its basic form, BRT infrastructure can range from low-cost infrastructure ('lite') that offers operational enhancements (sometimes with lower capacity) to more sophisticated high-capacity infrastructure. This should not be regarded as an either/or choice, as BRT design can blend various features to satisfy the agreed objectives developed in conjunction with city managers. It is also flexible, being able to adapt to the complex local systems in which cities operate, such as by balancing intricate interplays with other road-based transport modes and users, institutional structures, technology applications, and the prevailing political dimensions.
- Corridors with lower demand or medium-sized cities can explore Integrated Corridor Management (ICM) that seamlessly combines bus lanes and other bus improvements with traffic management, road safety features, and walking and biking facilities as a cost-efficient alternative.

- Regarding BRT corridor carrying capacity, this review found that globally, in typical cities, BRT systems have a corridor capacity threshold of around 10,000 passengers per hour per direction (phpd) before operational bottlenecks (such as berths at stations, intersections) begin to impact on efficiency and quality.
- institutional aspects of BRT can have more influence than infrastructure on the BRT's success . Flawed design in BRT infrastructure can reduce a system's effectiveness, but a weak or botched institutional framework could see the system fail.
- The role and function of the authority/agency needs clear definitions, whether it is to serve at a high level and be responsible mainly for policy, planning, and regulation (LAMATA Lagos), or at a middle level, in managing BRT day-to-day operations, service planning, and the operator contracts (TransMilenio-Bogotá, Protransporte-Lima).

Tiered Level of Functions and Risk Assignments Among Players

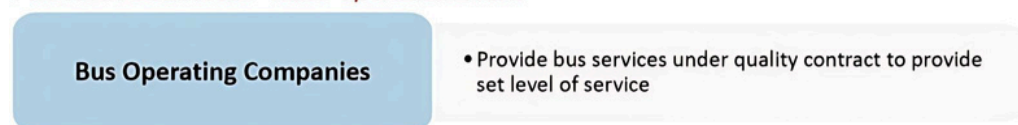
STRATEGIC PLANNING and COORDINATION - Takes Political Risk



BUSINESS MANAGEMENT AND TACTICAL PLANNING - Takes Business Risk



PROVIDING SERVICES -Takes Operational Risk



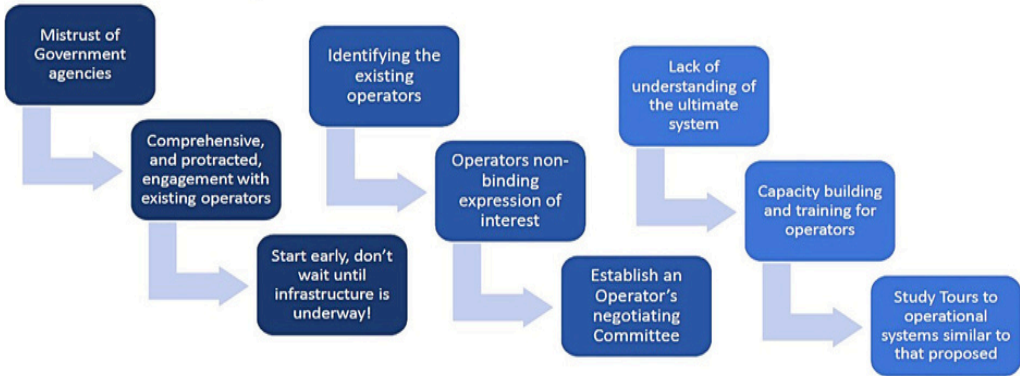
- Management capacity of the agency needs to be robust, with careful attention given to the relationship (or power balance) with operators. In particular, this relates to the contractual assignment of roles, responsibilities and risks between the BRT agency and operators, defining the power relationship and influencing the behavior of the players, as experienced in Dar es Salaam and Lagos BRT Lite.
- The bus operator contract is not a standard model contract; it needs to be tailored to local context and to the relative strengths of the parties. Typically, bus operator contracts are classified as net-cost contracts (NCC) where the operator carries the financial risk, and gross-cost contracts (GCC) which places revenue risk on the agency (city). Hybrid contract models where risk is shared are becoming more common. Due to risk exposure on both sides, it is useful to think of a hybrid contract as a partnership contract. The following figure outlines the type of contract appropriate to different circumstances, namely the experience of the operators and their ability to manage risk.

Hybrid Contracts Based on Relative Capacity of the Parties



Requires More Agency Control		Allows Some Operator Control
Suits less experienced operators	↔	Suits more experienced operator
Protected from demand risk	↔	Able to take some demand risk
Service planning wholly by the agency	↔	Operator involved in service planning
Prescriptive service specifications	↔	Greater flexibility to innovate and develop service efficiency
Paid set rate for supply of services (but could include passenger incentive)	↔	Paid for services but business model rewards ridership growth
Strong emphasis on penalty regime to guarantee quality	↔	More emphasis on economic incentives for quality service delivery (+some penalties)

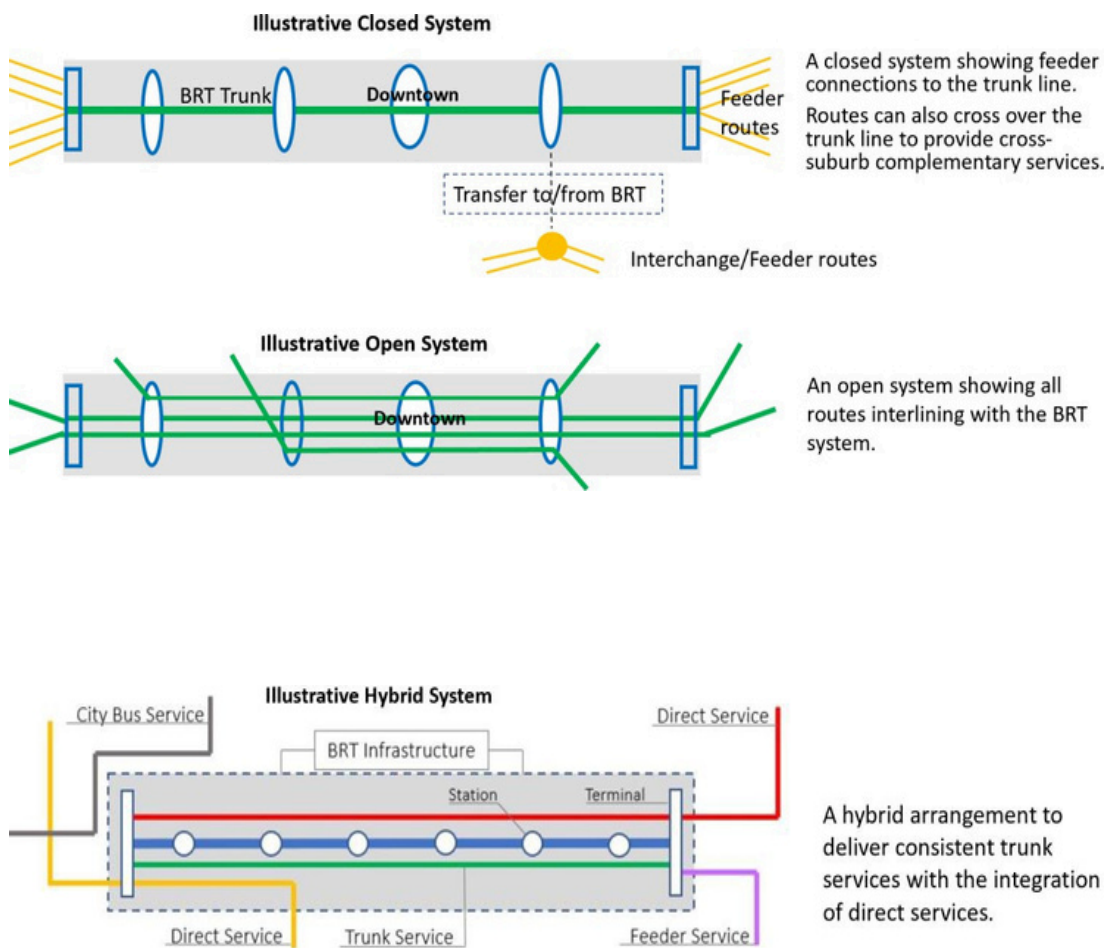
- Procurement of operators for new contracting arrangements is a major challenge. Typically, operators are unfamiliar with new arrangements and/or lack trust in government, or they may have practical concerns over issues such as loss of employment. However, when a new contract identifies costs and appropriately assigns risks, it is likely to be a more sustainable business model than what operators currently have, so the city should not be hesitant to promote a transition to a new business opportunity. The figure below shows important areas to consider and the subsequent steps involved in the process.



- BRT can be leveraged to spearhead speedy changes to formalize the passenger transport sector and rationalize operators and services. A large investment in transport infrastructure can create momentum for change. Leveraging BRT for sector reform should aim for a “triple win” – benefits for the city, for the customer and for the operator. Simply using BRT leverage to enact sector reform, without a clear-eyed view of local conditions, could run into serious problems.
- Paratransit private operators, while often displaced by BRT, are an essential part of the network supporting BRT. Paratransit ownership structures are not always identifiable, and their semi legal/vulnerable status often fosters political affiliations. Lack of capacity may also hinder participation by informal paratransit operators. Notwithstanding the challenges, a good approach is to focus on business transition that empowers the industry either by (1) incorporating interested parties into a formal entity to operate the BRT as a service provider company or (2) structuring operators into a business model that provides feeder services to the BRT, which can be an effective approach since it leverages their ability to fill the gaps as feeders to the BRT and to provide complementary services in lower-demand corridors and peri-urban areas.
- With BRT and public transport generally, cities need to balance financial sustainability with transport affordability and wider social objectives by fine-tuning fare policy, subsidy levels and operational efficiency. Where fare setting is a political exercise, resulting in financial deficits, stable alternative sources of funding will need to be secured. However, while subsidy or non-fare revenue is usually required, such funding should not be considered automatic compensation for financial losses. The use of subsidy funding must be a commercial decision based on well-grounded financial and economic analysis and structured in a way that avoids fostering subsidy dependency, which may dilute management’s focus on business performance. Furthermore, fare policy (willingness- to-pay and affordability) must be managed, together with a strategy to achieve ridership targets. From a business management perspective, financial sustainability requires establishing the business case and taking a business-like (commercial) approach to develop the market, build ridership and revenues, and efficiently managing costs.

- The physical and operational integration of BRT as part of a public transport network is difficult to manage in part due to the unique and complex urban environments in which BRTs are built, and it usually require some trade-offs. For example, where BRT operations are disconnected from local bus services, the gain in travel time savings on the BRT could be lost in passenger transfer and access time.
- Operations planning and infrastructure design are interdependent processes. Operations planning is a core part of the Concept and Feasibility Plan upon which the city gives approval, thus allowing the project to proceed to detailed design. BRT operations planning should guide the infrastructure design and not be left until it is time to operationalize the system. Common design choices as seen in the case study cities have shown that:
- **The decision for curbside or median alignment is not a binary choice as systems can use both types within the one system if necessary.** Curbside alignment may be suitable where roads are narrower and allows the station/bus stop facilities to be incorporated on the sidewalk, reducing the demand on road space, whereas median alignment is less subject to operations disruptions and encroachment and capable of providing higher bus throughput and frequency.
- A direct BRT system (off/on busway) improves integration by reducing passenger transfers, penetrating communities, and improves 'first-last-mile' access. Direct services are more suited to corridors of medium density and moderate ridership.
- **However, a closed BRT system is more suited to higher capacity systems, avoiding the random entry of buses onto the busway which could disrupt a highly scheduled BRT trunk operation.** It also allows for better allocation and utilization of resources by concentrating high-capacity vehicles on the trunk route where high demand exists and allows feeder services to be tailored to demand, using smaller buses. Passengers understand the simple design concept of a trunk-feeder system, where route design is less complex.

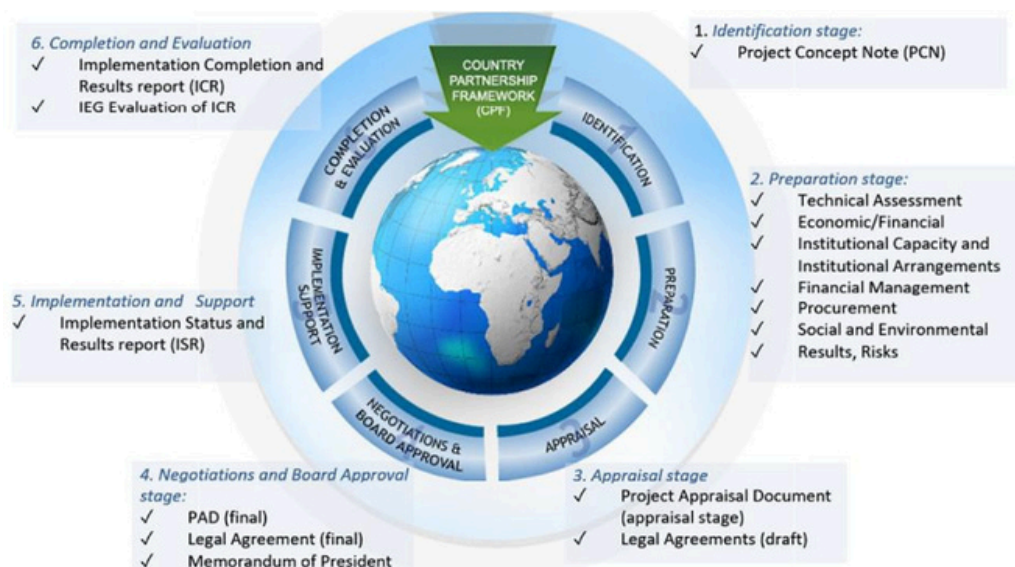
Illustration of Closed & Open System Design



- Intersection control is often not sufficiently prioritized in BRT design, but it plays an essential role in maintaining reliable schedules and helps to space buses properly to avoid overloading stations – a key capacity constraint.
- Station and hub designs must consider passenger capacity requirements, including convenience, safety, wayfinding, pedestrian flow, and passengers with special needs. ROW constraints at stations may require some innovative planning which could include the use of guided bus systems to improve bus docking and reduce space demand. A MDB-financed IPF project generally proceeds through a six-step cycle which is illustrated below.

The following images serve as an ideaboard for simple design changes which can significantly improve the design of the bus system.

IPF Project Cycle



Bus Congestion on the Busway



Source: <https://use.metropolis.org/case-studies/transmilenio-bus-rapid-transit-system>

Congestion Affecting Service Efficiency



Source: <https://theBogotápost.com/Bogotá-transmilenio-system-a-painful-route-to-the-future/1177/>

Medellín Metro



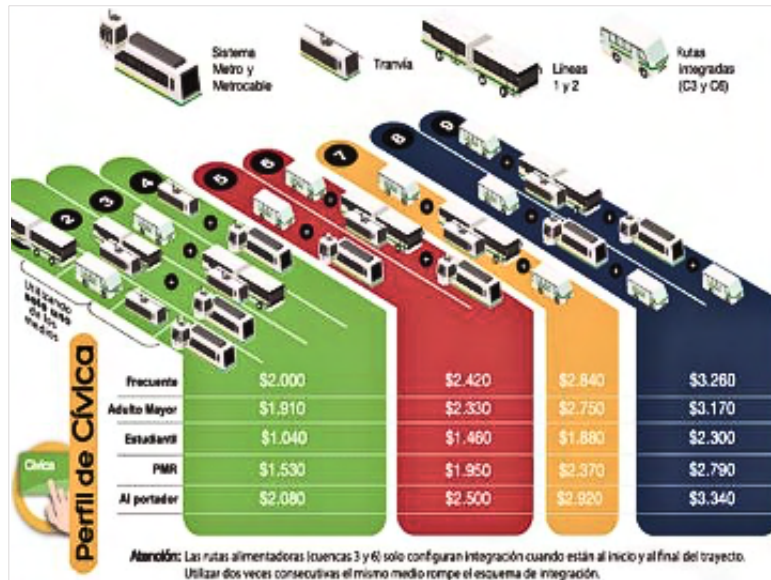
Tranvía tramcarline T-A



Tranvia Tramcar Line



Source: <https://medellinliving.com/medellin-metro/>



Cívica Integrates Fare system



BRT station Accessible & Air-Conditioned

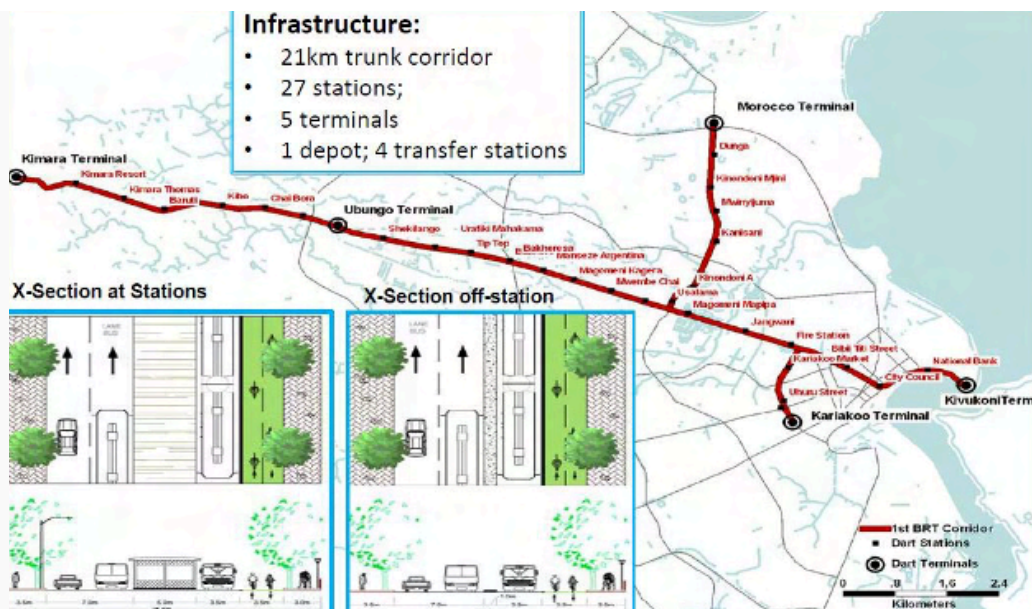
Source: TransCaribe



Pre-Troncal Bus

Source: ITDP

Phase 1 BRT Corridor



Source: Yonas Eliesikia Mchomvu, World Bank

Inner City Bus Congestion



Bus Station



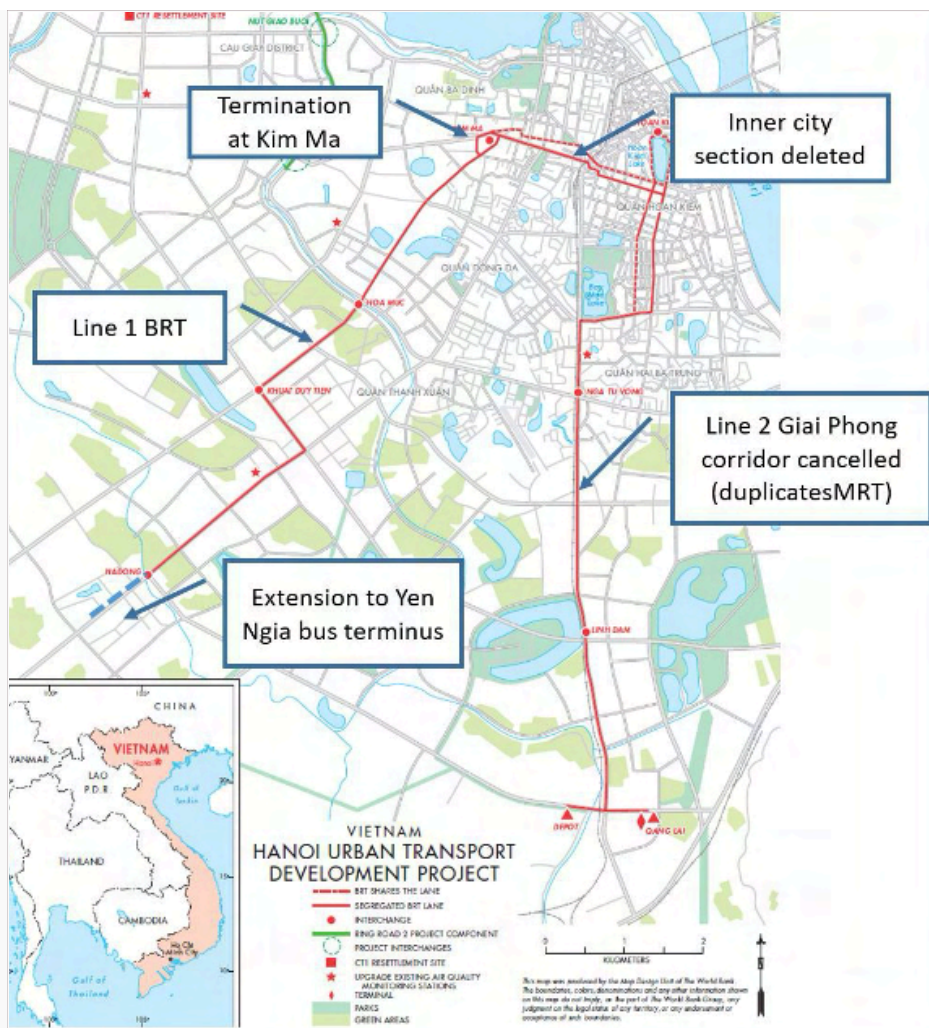
Source: Wenyu Jia, World Bank

Overcrowding on DART BRT (2018)



Source: Yonas Eliesikia Mchomvu, World Bank

Map of Planned BRT lines



Source: HUTPMU

Need for hard barrier



Occupancy of the BRT lane is commonplace, and despite the BRT bus horn-blowing, these violators are unwilling to move aside. While the painted line 'soft' barrier generally separates traffic from the bus lane, the BRT driver is constantly under stress, threatened by traffic intruding on the bus lane.

BRT lane invasion



The painted barriers need constant enforcement. When traffic gets heavy, such as in wet weather, motorists appear to see it as OK to take over the BRT lane. The lack of left turn management at intersections caused the BRT to be blocked at this intersection

Lack of traffic enforcement



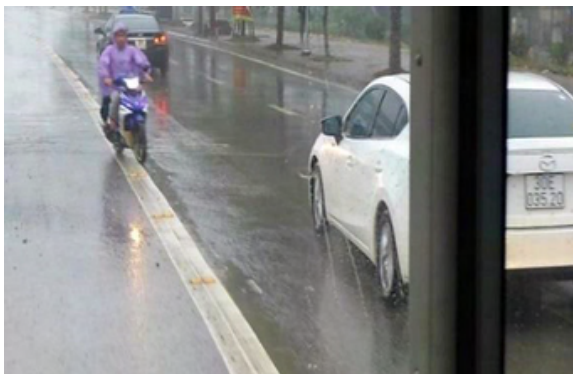
Poor intersection management has a severe effect on BRT, as a large portion of signal green time is wasted by persistent cross traffic violating red lights. Traffic rules enforcement is key.

Mixed traffic operation on an overpass



Poor intersection management severely affects BRT, as a large portion of signal green time is wasted by persistent cross-traffic violating red lights. Traffic rules enforcement is key.

improved discipline for traffic violators



Lack of order (and consequently accidents) is largely due to the 'village driver attitudes' by motorists, who endanger themselves and others with undisciplined behaviour and impulsive and erratic actions.

Ignorance of BRT rules is an accident risk



Cyclists regularly see the bus lane as a clear cycle path, putting themselves in high danger.

Source: Frits Olyslagers (2017)

Four Indian Projects

a synopsis



India is fundamentally different from all other emerging markets because of three parameters. First is the level of digital penetration and digital citizen services. The digital twin work for Varanasi for example is more advanced than that done for Singapore. Similarly the digital payment ecosystem is far more mature. Second is the calibre of civil servants and government officials. India attracts the very best domestic talent in its highly competitive civil services whereas most developed countries are not able to attract comparable talent. Government jobs are pretty low down on the demand hierarchy with litigation pursuing lawyers and hedge fund managers topping the list. In recent times, the Task Force noted that the so-called experts from multilateral development banks like the World Bank are not on par with Indian civil servants. Staffed mostly by economists and not by engineers, the multilateral development banks look upon challenges without understanding or even contemplating the use of emerging frontier technologies. The ability to implement such technological advances fundamentally alters the ability of India to lead globally. New algorithms to run transportation is the third and most lethal comparative advantage for India. To that extent, the World Bank findings are more about “What was” rather than about, “What should be or can be?”

Three medium-sized Indian cities developed BRT under World Bank financing, including Hubli- Dharwad, Pimpri-Chinchwad, and Naya Raipur. As per the World Bank, “Each of the BRT systems, whether BRT Lite in Naya Raipur or fully segregated BRT in the other two cities, received very positive public responses, achieved significant modal shift to public transport in the BRT corridors and most importantly, developed capacity through ‘learning by doing’.”

However the experience of New Delhi with the BRT was not positive. And in fact, the entire corridor had to be dismantled at considerable direct expense and even more indirect expense caused by the delays and consequent fuel expenses/productivity loss. It is thus the view of the Task Force that a hybrid design with AI based on-demand point to point services is the ideal way to go forward. This will necessitate a much larger fleet size and a vehicles of different sizes ranging from sub 6m/22 passenger minibuses (similar to the Karsan buses piloted in Japan) to the 24m virtual metro coaches which can carry upto 500 passengers on the main elevated corridor from point to point.



In the Hubli case, the proactive involvement of the state government created the Land Transport Department, connecting the city to urban transport grants to implement small innovations at the city level. Hubli was clearly more successful; as it established a SPV BRT agency in Hubli-Dharwad which was able to coordinate planning, delivery and operations in a highly fragmented institutional setting. Whereas BRT ridership in Hubli-Dharwad rose to 100,000 daily, BRT in Pimpri- Chinchwad and Naya Raipur have yet to improve their ridership performance. The BRT implementation overcame the myriad of unforeseen problems in land acquisitions, community opposition, change to design drawings, staff turnovers and resultant design changes.

India is rapidly urbanizing. Urban population is projected to grow from 290 million in 2000 to 590 million by 2030 and urban transport problems pose a serious threat to the environment both locally and globally. High level of air pollution has been part of daily life in many big Indian cities where streets are overloaded by motorized vehicles. Under these trends, India will soon be the world's third largest consumer of oil, only after the US and China. Unless deliberate steps are taken to develop and implement an environmentally friendly urban transport strategy in the coming decades, India's increasingly growing urban areas may well become the largest single source of GHG emissions increase. Goa which is heading towards massive increases in tourist numbers (because of the new Mumbai Goa expressway) is likely to see massive increase in numbers. The task force estimates a 20x increase in ridership from existing levels (taking into consideration both KTC and private buses). Most important is the realization that the roads and lungs of Goa will both choke under the load of incoming tourist influx in the peak months. This will lead to traffic jams like those witnessed during the IEW seminar in Feb 2024 of three hours each way. It will also lead to Delhi type AQI levels which will drive tourists away. Congestion is bad for both - tourist revenues as well as viability and thus growth of tourism dependent businesses. In a way, congestion is bad for the economy as well as for job creation.

One should however look at the MDB funded projects to gauge their real performance. In 2009 the GoI formally requested the World Bank and GEF to assist to develop adequate institutional structures and capacity for implementing the National Urban Transport Policy which will in turn, abate GHG emissions. The MoUD developed an India-GEF- World Bank-UNDP Sustainable Urban Transport Program (SUTP) to strengthen the capacity of national and local governments in urban transport planning and management in more integrated and comprehensive manner. The core of this multicity program involved a wide range of activities under both capacity building and demonstration projects. Through the demonstration projects, SUTP financed BRT systems for three cities: Hubli-Dharwad, Naya Raipur, and Pimpri-Chinchwad.

The Project's Development Objective (PDO) was to promote environmentally sustainable urban transport nationally and to improve the use of environmentally friendly transport modes in the project cities.

The length of implementation was 9 years from 2009 to 2018, having been amended seven times and extended twice to accommodate new developments. One extension was by one year in December 2012 to include Hubli-Dharwad BRT, and the second time by 28 months in November 2015 to ensure completion of five of the six demonstration projects, which were critical to the achievement of the PDO. The complexity of involving multiple cities and agencies required flexibility in implementation.

BRT in Project Cities

Hubli- Dharwad

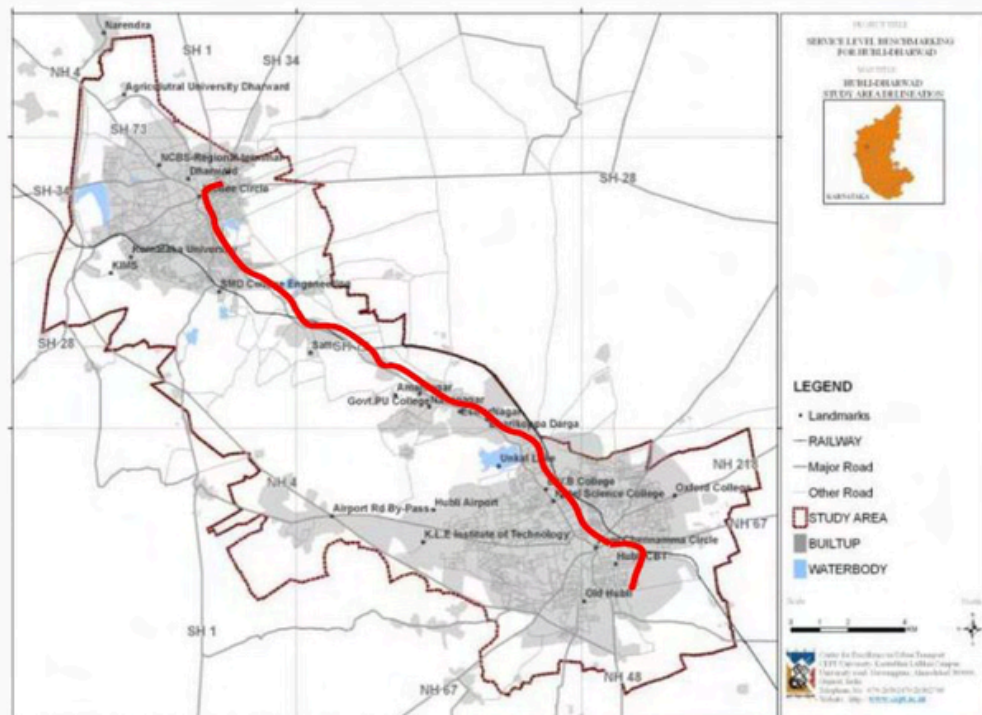


Pimpri- Chinchwad



Naya- Raipur

Hubli-Dharwad BRT

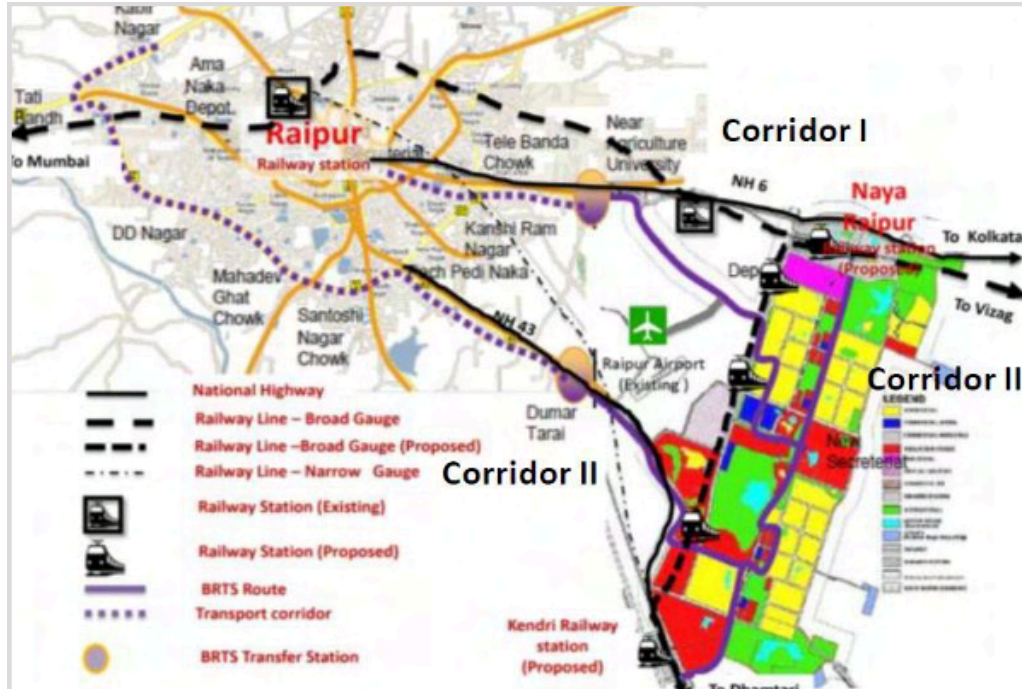


The BRT in Hubli-Dharwad is managed by the Hubli-Dharwad BRT Co, operationalizing the project in October 2018 starting as a 5-bus trial, rapidly growing to an operation of 100 bus fleet. The daily ridership was 65,000 initially and is now reaching 100,000 with travel time having decreased from one hour to 35 minutes with express services. At opening, indications were that the BRT was able to retain 50 percent of the previous bus passengers, and that 18 percent of the users have shifted from personal modes of which 9 percent are from cars.

Naya Raipur BRT

Raipur, the original city, was the capital of the State of Chhattisgarh and the major urban center in the state. Naya Raipur, is a planned city to replace Raipur as the official legislative capital city of Chhattisgarh and is being developed as a 'green city' under the Smart Cities Mission Program by the national government. The population of Raipur in 2019 was estimated at 1.87 Million, and Naya Raipur close to 200,000 people.

Naya Raipur BRT



The SUTP financed the BRT Lite corridor (Corridor I in Figure) between Raipur and the newly developing administrative centre of Naya Raipur, over a distance of 26 km, as an express service without a dedicated right of way. Before the project, and with the launch of the new state capital, passengers had to rely on personal modes of transport and a minimal public bus service. To avoid creating dependence on personal modes, the World Bank encouraged the Naya Raipur Development Authority (NRDA) to initiate an interim bus service. Accordingly, NRDA launched an employee-only government bus service as most commutes between the two cities were by government staff commuting to work. Two additional BRT corridors were planned: Corridor II as a BRT corridor linking Kabir Nagar (Raipur) with the Capital Complex in Naya Raipur (35 km) and Corridor III as a Quality Bus Service.

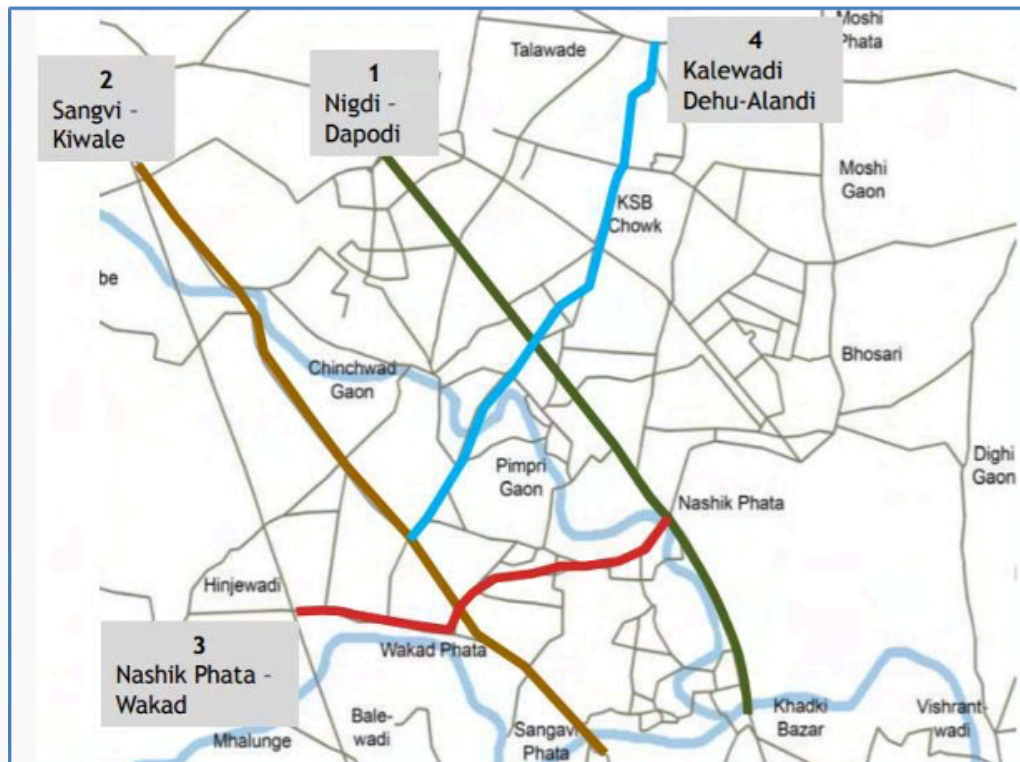
System operation was assigned to the Naya Raipur Mass Transport Ltd (NRMTL), an SPV Company commencing with Corridor 2 partially operational with a plan for full operations as the population of Naya Raipur grows. Daily ridership on the BRT Lite proliferated from 950 at opening to more than 3,000 passengers per day by 2018. The public transport mode share of trips between Naya Raipur and Raipur reached over 42 per cent at project close, a significant achievement given the negligible public transport available in Raipur at the start of the project.

Pimpri-Chinchwad BRT

Pimpri-Chinchwad, under Pune Metropolitan Region in the State of Maharashtra, is part of an urban agglomeration comprising of Pune, Pimpri-Chinchwad, and Sangavi as well as Nigdi which is under the civic body. As of 2019, its population was estimated at 2.2 million.

Pune City previously launched a pilot BRT in 2006 which was beset with many problems, which some critics blame on it not following established BRT standards. The actual situation maybe that the BRT standard itself is irrelevant in an “AI Age”. This haunted the Pimpri-Chinchwad BRT especially during the implementation phase.

Pimpri-Chinchwad BRT



Pimpri-Chinchwad city implemented a network of four BRT corridors, with the SUTP financing Corridors 3 and 4 – both greenfield corridors totaling 19km that connect the two parts of the city divided by a river, railway line, and major highway, creating a grid network. The system was branded as Rainbow BRT with a new image, incorporating successful elements and learnings from the pilot project and best practice.

The system operation was assigned to Pune Mahanagar Parivahan Mahamandal Limited (PMPML), a State Transport Undertaking (STU) being the traditional bus operator in the city. At project completion, daily ridership on Corridor 2 was 80,000 and Corridor 3 17,000/day. Corridor 4 has since been operationalized. Of the passengers using BRT, 28 percent had switched modes from motorcycles, autorickshaws, walking, cycling, and cars. The overall public transport mode share for the city more than doubled, exceeding targets. Soon after its launch, the dedicated bus lanes enabled commuters to reach their destinations 10 to 15 minutes earlier than usual.

Rainbow BRT is yet to achieve its full potential. The branding itself may require rework. Ridership only increased by 12-17 percent over the three years while the number of personal motor vehicles on the road continues to grow unabated due to limitations of bus availability and resultant lower frequency of services. The ongoing Metro construction along Corridor 1, the most heavily trafficked corridor, has prevented the full operationalization of BRT services on that corridor.

Govt. Funding Limitations

CASE ANALYSIS

India has traditionally under-invested in public transport. As of 2007, of 80 cities with a population size exceeding half a million, only 20 had organized public transport; and a large majority of bus operators had inadequate resources and technical know-how. In particular, medium-sized cities lack technical capacity and resources and have lagged in developing institutional capacity, as urban transport falls under the state government's purview and local government is the weakest tier.

The template developed by the national and state-level institutions responsible for public transport has strengthened the commitment, efficiency and capacity for project implementation to improve mobility in medium-sized cities.

At the multicity program level, the combination of capacity-building and demonstration projects focused on technical assistance as a first intervention, building the capacity for the cities to develop their own sustainable urban transport initiatives, instead of an infrastructure-led approach where capacity building needs to 'catch up' or be expected to develop in parallel.

In the absence of consistent operational subsidy support to the BRT, sustaining the quality and level of service is an ever-present challenge. Since independence, subsidy was a consistent part of the transport funding arrangement in India until 1988, when the Govt of India modified its policies, withdrawing financial support, with the states largely following suit. This resulted in a low fare revenue base that was insufficient to cover the operational costs. Identifying and designating non-revenue and subsidy sources is key to meeting operational deficits and sustaining the BRT operations and infrastructure renewal.

It is important that the cities pursuing BRT earmark such revenue sources so that quality BRT infrastructure and service can continue to be maintained.

In Hubli-Dharwad, the state (Government of Karnataka) established the Hubli – Dharwad BRTS Company Ltd (HDBRTS Co) as a Special Purpose Vehicle (SPV) to coordinate the planning and delivery of BRT, conduct its operations, and be the owner of the assets. This was a key factor in the success of the BRT. Apart from the Government of Karnataka, shares in the company are held by the Hubli–Dharwad Municipal Corporation (HDMC), Hubli–Dharwad Urban Development Authority (HDUDA) and North Western Karnataka Road Transport Corporation (NWKRTC). The NWKRTC is the state-run bus service company in Karnataka and it has blended BRT operations into its city bus service and an inter-city service.

In Pimpri-Chinchwad, a lack of clarity exists in the definition of roles. The Pimpri-Chinchwad Municipal Corporation (PCMC) developed the BRT infrastructure, but Pune Municipal Corporation failed to develop sections of Corridor 1 and 2 which fell within their geographical limits. However, at the end of the project, based on the success of the BRT in Pimpri-Chinchwad, Pune had revived the proposal for extending the BRT.

The Pune Mahanagar Parivahan Mahamandal Limited (PMPML), a State Transport Undertaking (STU), is the public transport bus service provider for the twin cities of Pune and Pimpri-Chinchwad. It operates the Rainbow BRT routes and more than 300 local routes within a radius of 20 km around the two cities including the local service connecting with the BRT corridors. However, in the absence of a dedicated entity (such as the HDBRTS Co in Hubli-Dharwad) neither the municipality nor the bus company fully owns the project.

In Naya Raipur, the Naya Raipur Development Authority (NRDA), responsible for the management and urban governance of Naya Raipur, led the BRT development. The Naya Raipur Mass Transport Ltd (NRMTL), an SPV company, operates the BRT. However, the SPV suffers from limited staffing and financial constraints.

Stakeholder communication and coordination was essential yet time consuming, in finalizing designs, completing implementation, and finalizing operating arrangements across cities. The agreements with regard to the rolling stock designs between the twin cities, Pune and Pimpri-Chinchwad took time, and similar delays were encountered for ITS. In Hubli-Dharwad, HDBRTS Co had to coordinate continuously with NWKRTC, the public transport operator, first on the designs and later on the operations plan and operating arrangements.

Conventional Approach

to BRT NETWORK



A BRT project of the nature proposed requires coordination and management of vast and disparate aspects, a dedicated lead agency (the proposed PPP company) needs to be assigned the authority to prepare, implement and operate the system, taking the project forward while continuously coordinating with fragmented stakeholders, including the Traffic Police for lane enforcement and managing driver behavior. Land acquisition and taking away road space for BRT and managing contestations over street space are important issues for timely implementation of the project.

The project planning and schedule needs to be very thorough. The scale and innovation of the project requires a much stronger preparation for land allotment, project designs including alternatives analysis and stakeholder consultations, operations planning and financial analysis etc. and more time to cope with the unforeseen risks and allow time for the cities to 'gear up'.

An Artist's Rendering of BRT-Lite Corridor

BEFORE & AFTER



The system performance is reported in the public domain for Indian BRTs is:

- Carrying over 400 million passengers in the last five years;
- Average daily ridership is 180,000 passengers;
- Average load factor of 800 passengers carried per bus daily;
- Average daily trip per bus per day is 5;
- Average waiting time is 15 minutes;
- Average speed is 30km/h.

The Range of BRT Infrastructure

	Stations	Running Ways	Service Plan	Vehicles	Systems
Rapid Bus, BRT Lite	“Super” stops with shelters	Some dedicated lanes, Mixed Traffic, Queue Jumpers	Trunk/ Feeder: All- Stops Trunk Line	Buses with Unique Route Numbers, Head signs, livery	Next bus information at stations, IC/phone fare collection
High, Quality, Capacity (e.g., Bogota)	High Platforms, P/R,Amenities, Services	Fully dedicated running way, partially grade- separated	Combo.: All- Stops; On- Line Expresses; Integrated Feeder/ Trunk	Hybrid electric; Guided; Specialized Vehicles	Central Control Room, TSP, CAD,Off-board/ efficient fare collection
	Stations	Running Ways	Service Plan	Vehicles	Systems

BRT

Capacity

BRT carrying capacity is usually measured as passengers per hour per direction (phpd) throughput at a single point (screen line), however the single-point capacity does not represent the practical carrying capacity of the whole corridor in day-to-day operations.

Typically, the practical carrying capacity of a BRT corridor will max out at around 10,000 passengers phpd, limited by choke points in the system such as bus berths at stations and intersections. Systems with a corridor capacity exceeding 10,000 passengers phpd would demand a very different infrastructure level, which many cities will not be able to achieve. Hidalgo et al. (2012) stated that: “these high capacity systems also require a much scaled up infrastructure, such as large passenger hubs/stations, overtaking lanes, level boarding, prepayment, large buses with multiple doors, express and local services, and traffic engineering measures at intersections, allowing for very large passenger throughput thus being able to reach an actual throughput of 43,000 passengers per hour per direction with average bus occupancy of 150 passengers per articulated bus, and a commercial speed of 22–24 km/h.

In contrast, Goa is currently at a need level of 40,000 phpd across all the corridors in the tourist circuit. This is likely to go up by 20x by 2028-29. This is a very large number compared to all other BRT operations set up in emerging markets by MDBs like the World Bank.

FTransMilenio (rush hour)



Source: BRT Centre of Excellence

FTransMilenio (rush hour)



Source: Roberto Vargas, El Tiempo.com

Capacity Considerations

BRT vs. Metro

At a level of 10,000 (or even 15,000) passengers phpd for a corridor, Metro rail would not be financially viable, demonstrating BRT's effective niche in the mass transit market. On this basis, BRT and Metro cannot be accurately described as 'competition' or as an 'either/or' proposition. It shows BRT as being ideally placed to build up corridor demand in the medium term to support LRT/ MRT investment in the long term, mindful that BRT and LRT/Metro can complement each other in an integrated public transport network.

Research has suggested that a switching point exists in developing countries where BRT may have competitive OPEX costs for moving up to 25,000 passengers phpd and Metro may have comparative advantages above that value. The switching value may be lower for developed countries due to labor and other costs. However, this is a financial reckoning and may not be reflective of practical and other realities.

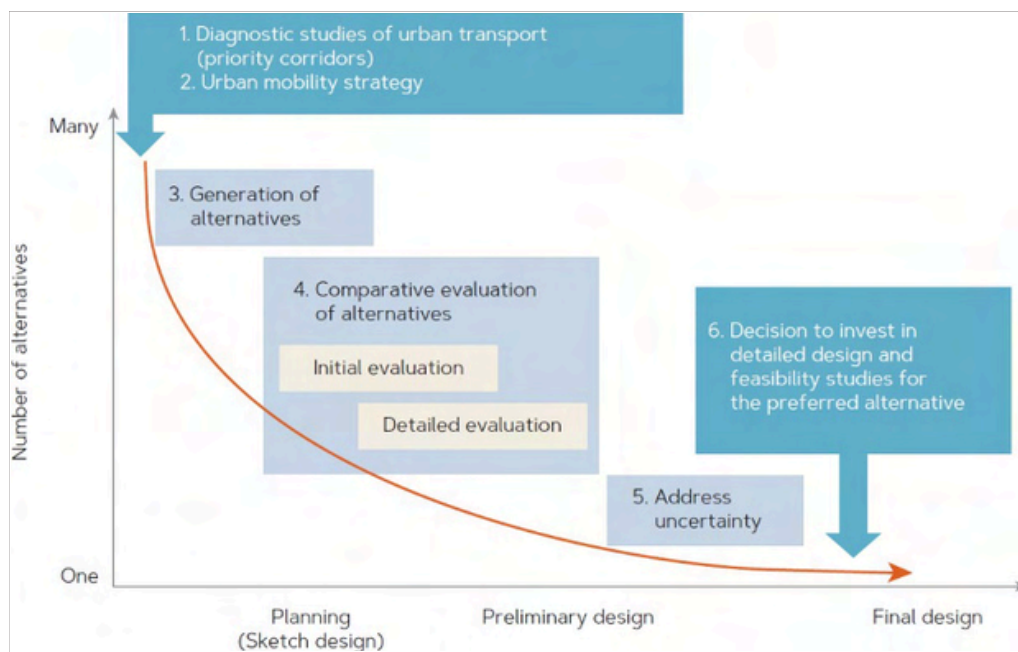
Rapid transit projects may be among the largest transport investments ever made in a city or metropolitan region and represents large and essentially irreversible outlays of investment capital on long-term assets in complex, interconnected, and uncertain urban systems. It is therefore critical to evaluate and compare the potential benefits and costs of alternative investments when planning the transportation system (network) and its corridors.

What is apparent, is that the choice should not be technology-driven, (rail or bus) but be 'needs driven'. Serious alternatives analysis is required which considers corridor characteristics (section width, urban form), passenger demand, integration and connectivity, and funding and financing capacity. For a new BRT, planners should consider the practical limit to the BRT capacity threshold at which it can maintain an acceptable or appropriate quality of service.

The Urban Rail Development Handbook (2018: Ch 3) describes the planning sequence and alternatives analysis for a Rapid Transit system. The logical six-step sequence, shown in Figure below is intended to help direct decision makers to develop their projects in a transparent and objective way, while still providing flexibility to tailor the process to local conditions.

Rapid Transit Alternative Analysis

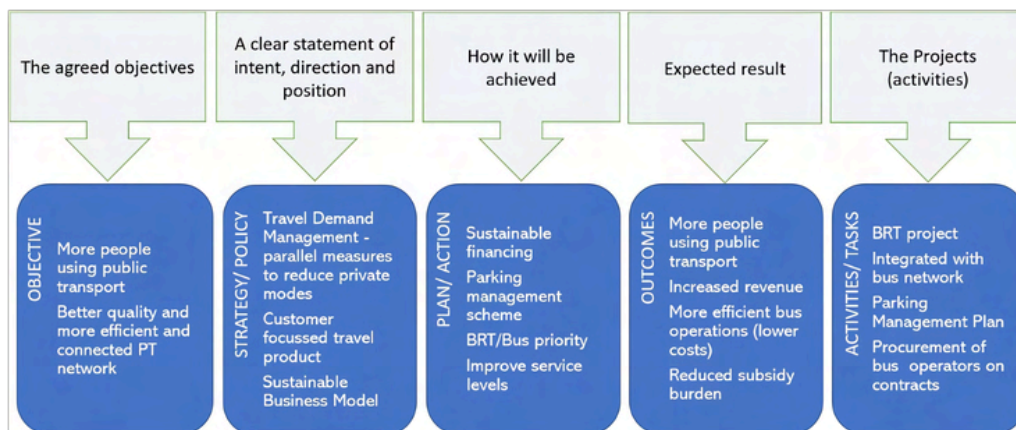
SIX-STEP SEQUENCE



Source: The Urban Rail Development Handbook, World Bank, 2018

Public Transport Strategic Policy Framework

AN EXAMPLE



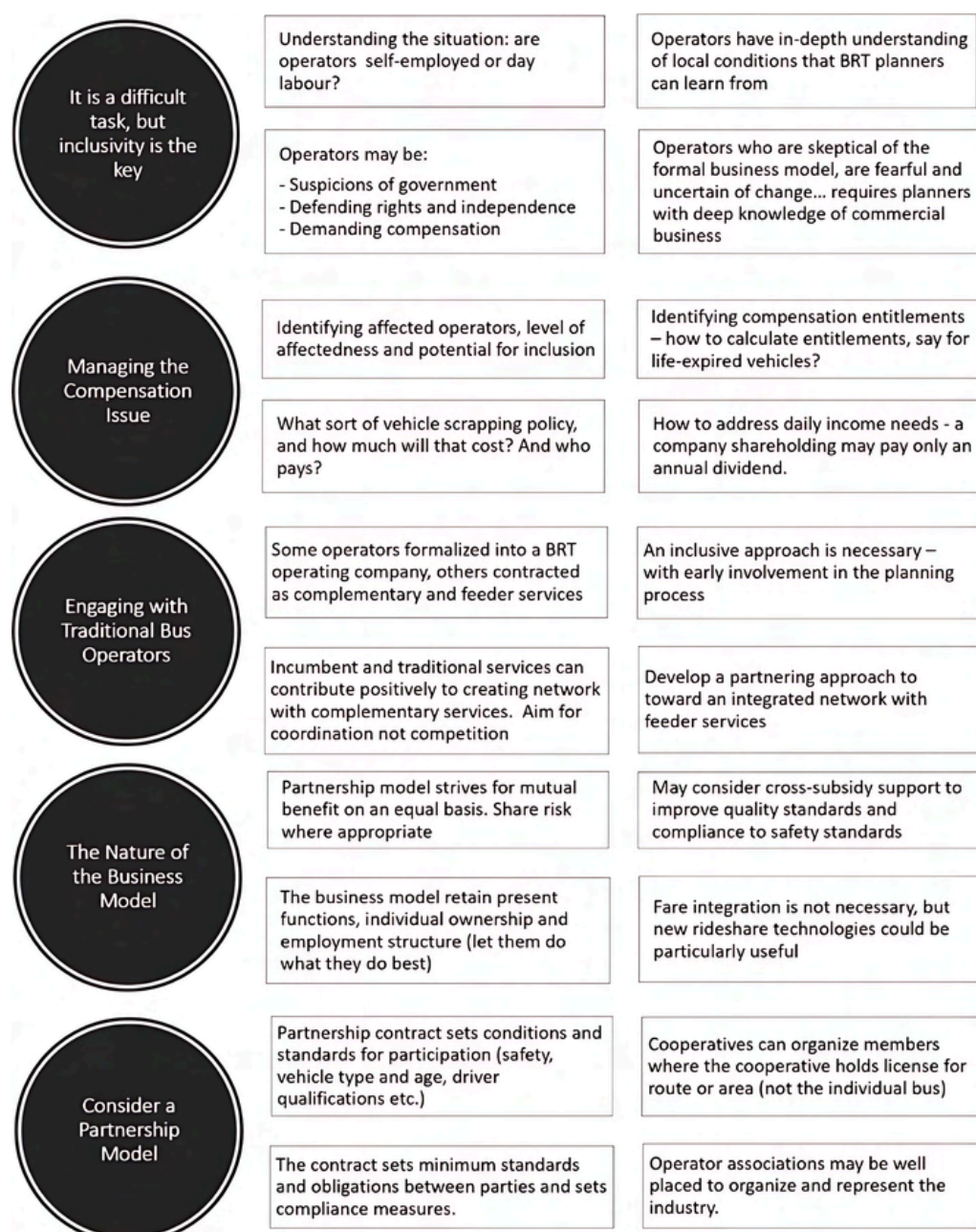
The above analysis can be used to configure the virtual metro on the same lines as a real metro service.

Establishing a PPP company

Cities typically employ a range of institutions to manage transport and traffic; however, their roles and functions are often fragmented and uncoordinated, both in budgets and operations. The model being proposed for Goa involves the following key attributes:

- KTC would continue operations and grow the same in keeping with the State's objectives of providing affordable subsidized services. The ageing fleet of KTC would be replaced by a modern fleet of eBuses leased on a per kilometre basis. The cost of the same would be similar to the cost of maintenance/fuel currently borne by KTC
- A newly established PPP company would acquire the land in Provorim to build a state of the art transport hub with multilevel parking, pantography chargers, boarding gates and public amenities similar to an airport terminal with aerobridges. This hub would be complemented by a smaller multimodal hub in South Goa near Concona. These transport hubs would eventually be self-sustaining on an operating cost basis.
- The rolling stock would be acquired by a leasing company which would provide the same to KTC, private operators, hotels and the PPP company on a per kilometer basis – inclusive of interest, fuel, charging, maintenance, facilities management, servicing, battery replacement and depreciation.

Pointers for Engaging with Traditional Bus Operators



Financial Sustainability for BRT

Providing public transport services that are financially sustainable, at a level of fares that is affordable, is a struggle for most cities, having to balance financial sustainability with both transport affordability and wider social objectives. This typically involves managing and fine-tuning fare and subsidy policy and working to optimize operational efficiency. For political reasons, governments might be inclined to restrain fare increases and, in such cases, this will necessitate financial analysis at the backend, to ensure that any widening of the farebox ratio gap is covered by stable sources of funding. Recent cases where governments needed to secure funding for political or social initiatives are Bogotá (2013); London's hopper fare (2016), and cities opting for free transit pilots (Washington DC Circulator; Kansas City).

The expectation in early BRT projects of full OPEX recovery through the farebox proved unsustainable and was perhaps 'too-narrow' a focus. It was also implausible to expect that public transport users would pay 'fully-priced' fares (covering fare collection, fleet or even infrastructure costs) while many private vehicle users pay little, if any, cost for the infrastructure used for their private trips.

TransMilenio's early experience with a limited network and high efficiency allowed for farebox revenues to cover its OPEX costs¹⁷¹. Thus, when Colombia expanded BRT projects to medium-sized cities under the NUTP program, operational subsidies were not considered. The implicit (wrong) assumption was that eliminating the inefficiencies of traditional systems (over-supply of services and a redundant network route design) would fund the additional costs of the new BRT systems including the added costs of a higher standard of fleet maintenance, management and regulatory compliance (Gomez-Lobo 2019:7).

Whether this was possible or not is a moot point, as lower than expected ridership in these medium-sized cities (and also the case in India), together with the inelasticity of fares, caused financial problems to surface. Hence, for the above reasons, including the expansion to more complex networks and aspirations of city-wide coverage (in the case of Bogotá), it is apparent that fare and ridership increases cannot always absorb all the costs. When costs rise, and fares are inelastic (and possibly ridership is below expectations) the funding shortfall will need to be covered by additional non-farebox funding; otherwise operating costs will need to be reduced— sending the system into a negative spiral of service reduction (Gilbert 2008:456)

Achieving Financial Sustainability

Taking a 'business approach' in the field of public transport management, is not commonly adopted or elaborated as it is commonly thought that public transport requires subsidy. We expand the discussion to a wider appreciation of a 'business-like' (commercial) principles of management which can help to achieve financial performance. But 'commercial' does not mean 'no subsidy' – funding a subsidy can also be a commercial decision if it compensates for government price (fare) control or to fund non-commercial social service obligations.

A narrow focus on cost recovery through fares does not factor in the important role of subsidy and its value towards broad societal benefits of BRT. While subsidy is often branded as inefficient and loss-compensating (which may be true in some cases), a subsidy compensating for low fares is actually a 'user-subsidy'.

Subsidy can also be viewed as a government pricing intervention which serves as an investment into good mobility outcomes and its resultant economic benefits. Van Goeverden et al. (2006)¹⁷⁴ lists four typical subsidy scenarios as:

1. Subsidies motivated by the 'social function' of public transport to support vulnerable groups to avoid problems of social exclusion.
2. Subsidies used as a 'second-best' instrument to address car related problems such as; noise, pollution, parking externalities and congestion, where direct action options are limited ('first-best' would be direct pricing to generate mode shift).
3. Marginal cost pricing (being welfare optimizing) leading to deficits that need to be subsidized (because public transport is characterized by economies of scale, where marginal costs are below average costs).
4. Promoting the positive externalities in public transport.

However, while non-farebox revenue/or public subsidy is usually necessary, it does not imply such funding should automatically be compensating for financial losses. The use of subsidy funding must be a commercial decision based on well-grounded financial and economic analysis, structured in a way that avoids fostering subsidy dependency which reduces management focus on customer satisfaction, ridership, revenue growth and operating efficiencies.

From a business management perspective, financial sustainability requires establishing the 'business case' with management taking a business-like approach to developing the market, building ridership and revenues and efficiently managing costs.

Lower than expected ridership has been a challenge in most BRT systems where demand forecasts have not been realized (particularly at initial stages), causing financial hardship. This has placed financial pressure on operators who either carry the financial risk (LAC cases) or demand government subsidy (India cases).

On the revenue side, 'willingness-to-pay' and affordability are key considerations as well as reaching ridership targets. While often appearing synonymous, willingness to pay is more related to a customer's perception of value, requiring fares to be reflective of market sensitivity. Affordability, on the other hand, is generally measured by the percentage of the minimum wage assigned to travel costs for certain low-income groups. Affordability considerations may also be driven by political imperatives such as a defined benchmark on cost recovery (farebox ratio), which may be a performance indicator for the system.

On the cost side, the agency needs to actively work to achieve operating efficiencies to reduce wasted kilometres or inefficient services. Unit costs also need to be defined according to a methodology that recognises the structure of labor and inputs and is adjusted according to recognised price indices.

Ridership Forecasts

Passenger transport planning relies heavily on demand forecasts; however, the inherent weakness of travel demand forecasting could lead to flawed projections, caused by travel demand (TD) models being too-aggregated in nature to predict location-specific routes and boarding and alighting at stations. They also lack the ability to predict behavioral or social nuances in how passengers make journey decisions. Optimism bias and insufficient assessment of risk can also play a part in influencing demand forecasts.

A better approach is to plan BRT with a practical 'ridership target' using the TD forecast as one of the reference points. The city can set annual targets (e.g. modal shift, ridership) for the initial operating years, and apply strategies to develop the market and build ridership. BRT performance in three medium-sized cities in India was primarily measured through mode shift.

In most cases, passenger demand at launch is usually well below the anticipated capacity that the system could expect to reach in the medium term. Planning should therefore take into account two discrete projections, being 1) ridership projections at launch to ensure sufficient fleet is provided, and 2) medium to long term ridership, to ensure the system has sufficient capacity by way of infrastructure for the future. Fundamental in the planning are the strategies and marketing to grow ridership which could include:

 Marketing and communication to identify the target market, understand varying travel needs, and to inform the design of the travel product. This requires key 'messaging' to impact customer's decisions at 'journey level'. It is good practice to interact with user groups to explore market characteristics and needs, test design decisions, and seek feedback on operations.

 Operations planning and optimization to deliver the right travel product. Barranquilla and Cartagena developed better service integration using pre-trunk services to increase ridership significantly. Lima Integrated fares across trunk and feeder services.

 Adopt an intelligent fare policy and technology applications such as ticketing and payment systems and passenger travel information that are user-friendly. In some instances, sub-optimal fare policies can deter passengers from the system or resulted in fare leakage. Using locally suitable ticketing payment systems, allowing for a single ticketing medium to transfer between BRT and other public transport modes, and offering discounts on transfers are some of the strategies employed.

The BRT business case refers to the financial sustainability of the business. As in any public transport business, satisfying the following three factors will support the business case, but unit costs (per km cost) remain a 'wild card' as discussed below¹⁷⁵:

1. Operating efficiency of the buses – based on work practices, commercial
2. speeds' (usually assured on a priority busway)
3. Bus Occupancy (traditionally bus operations aim for 80 percent)
4. A reasonable bus fare level (usually modelling starts with existing fares)

While traditional bus services generally have some leverage to adjust services to maintain adequate occupancy levels and optimize fleet efficiency, BRT faces a different challenge, namely, that to justify exclusive use of a busway lane, it needs to provide a substantial service frequency to attract passengers; build market share and produce travel mode shift. The BRT in Bucaramanga Colombia lost political support because bus lanes were seen as mostly running empty.

Supplementary funding will be required to provide an adequate level of service to attract passengers while initial ridership is low. Hanoi took such an approach, in that ridership was basically unknown prior to launch, so financial estimates were made based on various occupancy scenarios to forecast the amount of subsidy required during the period of initial operations. This allowed the calculation for the financial support necessary while BRT builds up ridership, and at the same time avoiding the risk of a public backlash if BRT was perceived as under-utilizing the bus lane.

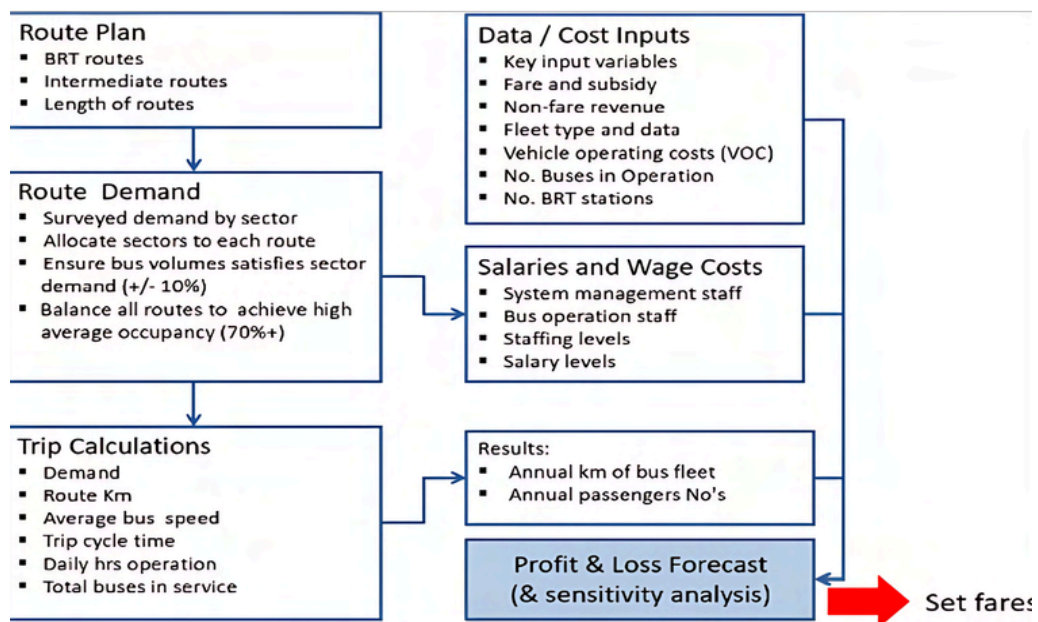
However, it is incumbent on management not simply to be reliant on subsidy; it must take a business-like approach to building ridership and revenues, manage fares as a pricing mechanism to influence travel behavior – and improve the system performance and efficiency to manage costs.

In such a 'business management' role, the BRT agency is more of a manager than a regulator. A 'regulator' does not take risk, instead it manages the 'risk-takers'; whereas a manager carries and manages some risks which also gives it greater control (by having 'skin in the game')¹⁷⁸. A good example is TransMilenio S.A. proactively managing demand, revenues and costs, which is arguably a key reason for its success.

As stated above, the 'wild card' may be the legitimacy of the per-km unit cost of bus operation. In the case of a city lacking organised public transport and transparent data on organised bus operations, obtaining the 'right price' through competitive tendering may be difficult. The operator (an incumbent or a new player) may exploit a knowledge/information advantage and/or build in a risk premium to cover uncertainties and/or gain a price advantage by exploiting entry barriers that reduce competition. A critical evaluation of vehicle operating costs (VOC) and the development of an OPEX model would help inform the city and mitigate risks. The figure below shows the components of an operational model which can forecast system profit or loss. It is not a 'crystal ball'; but a tool used to test data inputs for critical elements of the system.

Input & Output

OPERATIONS COST (OPEX) MODEL



Proposed Approach

to GOA TRANSPORT HUB



The approach proposed for the Goa Transportation Hub is consistent with the principles articulated in the earlier section on the conventional approach in the long term. However, in the interests of time and efficacy, it is proposed to adopt an alternate approach for the first ten years starting on 15.8.24. The three key aspects of the proposed approach are:

- To set up a parallel overlay which does not in any way interfere with the operations of KTC other than to replace its ageing fossil fuel fleet of buses with contemporary eBuses at a lease cost which is comparable to the cost likely to be incurred on regular diesel buses.
- To invest in the creation of a 100,000 sqm multi-level transport hub in Porvorim, to act as the main passenger terminal with airport type passenger amenities that acts as the parking bay, charging area and trans-shipment point for a range of bus operators including KTC, private operators, hotel buses etc. This hub would be owned by a PPP company which would acquire the land at circle rate from the entity currently owning the land.
- To provide equity/margin money for a leasing company which would own a fleet of ebuses to be leased to users such as KTC on an indicative flat rate of Rs 1 per seat per km. This price we believe would be an adequate incentive for users of fossil fuel buses to change to ebuses. For KTC, it would provide one more avenue to add buses to its fleet in addition to other government subsidy schemes.

The macro modelling approach for the project finance module is to provide a one time viability gap grant such that the project is self-sustaining thereafter. As and when the PPP company becomes viable, it should be planned to make the company an independent company listed on a stock market. If for some reason, the entity does not become viable, the IIT Alumni group would not be liable to bear any losses or provide additional funding over and above the amount initially provided. In any event, the PPP company should plan to transfer physical assets of the transport hub to a Real Estate Investment Trust – so as to use the funds realised therefrom to enhance the funding for the transportation operations – without having to call for fresh contributions from the promoting entities of the PPP company.



The PPP company needs to be structured like any limited liability commercial operations with the following clauses in the articles of association:

- None of the shareholders will draw dividends or sell their shares till the company is viable and listed on a stock exchange.
- The Board of Directors of the company will comprise of five independent directors and one nominee each from the state government and the IIT Alumni Council. The nominee of the state government will act as the Chairman of the Board.
- The independent directors will be IIT Alumni who are Indian Nationals and designated Fellowship awardees of the IIT Alumni Councils. They will retire after holding office for three years and would be eligible for re-appointment after a break of one year.
- The CXOs of the company would be suitable professionals hired at market salaries.
- The captable of the company will be structured in such a way that the company will not be a public sector undertaking.
- The company will be audited by a Big4 auditor.

The leasing company will be structured like any leasing company which will acquire the rolling stock against cash or on deferred payment or against debt. The rolling stock will be provided to KTC on an indicative lease of Rs 1 per km per passenger. The company will be free to price the rolling stock to non-KTC customers as per market conditions. The leasing company will be free to place its equity with any investor or to access the stock markets. Initially 100% of the equity will be owned by the PPP company and the IIT Alumni fund in a 49:51 ratio.

The target date to set up the PPP company is 15.8.24.

SECTION 2

PPP Transport Co

Chapter 1 | GoGoa, the brand and tagline
Chapter 2 | Draft Shareholder Agreement
Chapter 3 | Draft MoA & AoA of GoGoa



CHAPTER 1

Proposed Name



PPP Company Name Proposed	Go Goa Ltd.
Consumer Brand	GO
Tagline	GOA on the GO!







Mobile Clinic



The first set of MegaLab buses were flagged off on May 1, 2020 as an emergency fleet to help manage the covid pandemic in Mumbai and other cities. The bus interiors were modelled using paradigms used by private planes refitted for medical use. The MegaLab fleet was the first electric bus to have a full function digital X-ray and RTPCR lab on board for covid testing.

SECTION 2, CHAPTER 2

Draft JV Agreement Points

for PPP Company



Key points to be incorporated in the shareholder agreement in keeping with similar precedents in PPP entities

1	<u>Definitions</u>
(i)	"Act" means the Companies Act, 2013 as amended from time to time and shall include any statutory replacement or re-enactment thereof.
(ii)	"Affiliate" means with respect to any person, any other person, directly or indirectly Controlling, Controlled by, or under direct or indirect common Control with, and such Person. In case of IITAC, it includes (i) fund(s) and/or trust(s) under the control/management of IITAC; (ii) any other Company in which such fund(s) and/or trust(s) managed by IITAC.
(iii)	"Agreement" & "Share holders Agreement" means Shareholders Agreement entered into between GOG and IITAC on the and Share Subscription Agreement of even date entered simultaneously between the Company and IITAC as from time to time amended, supplemented or replaced or otherwise modified and shall include any document which amends, supplements, replaces or otherwise modifies the agreement.
(iv)	"Auditors" means and includes those persons, appointed, as such for the time being by the Company.
(v)	"Articles of Association" shall mean the Articles of Association of the Company.
(vi)	"Board" or "Board of Directors" means Board of Directors of the Company.
(vii)	"Business Day" shall mean any day other than a Saturday, a Sunday, or a day on which banks in New Delhi are authorized or required by Law to be closed.
(viii)	"Business Plan" shall mean the base case business plan to be finalised by the Company.
(ix)	"The Company" or "this Company" means Go Goa Ltd

(x)	"The Chairman" means Chairman of the Board of Directors of the Company for the time being.
(xi)	"Capital" means the share Capital for the time being raised or authorised to be raised, for the purpose of the company.
(xii)	"Control" shall mean with respect to any person, the ability to direct the management or policies of such person, directly or indirectly, whether through the ownership of shares or other securities, by contract or otherwise, provided that in all event direct or indirect ownership of or the power to direct the vote of fifty percent (50%) or more of the voting share capital of a person or the power to control the composition of the board of directors of a person shall be deemed to constitute control of that person (the expressions "Controlling" and " Controlled" shall have the corresponding meanings.)
(xiii)	"Debenture" includes debenture stock.
(xiv)	"Dividend" includes bonus.
(xv)	"Directors" means Director for the time being of the Company or as the case may be, the Directors assembled at a Board, including any Alternate Director.
(xvi)	Effective date shall mean
(xvii)	"Extra Ordinary General Meeting" means an Extra Ordinary General meeting of the members duly called and constituted and adjourned holding thereof.
(xviii)	"Financial year" shall mean a period of twelve months commencing from 1st April of any calendar year and ending on the 31st March of the next calendar year. The first financial year of the Company shall be from the date of its incorporation to 31st March, 2025

(xix)	"Fundamental Issues" shall mean the following issues or matters in respect of which special voting rights are provided for under the Agreement: (i) Approval of Business plan. (ii) Merger with or acquisition of any company by the Company. (iii) Any change in the capital structure of the Company including any fresh issue of capital. (iv) Investment in the any operating companies. (v) Raising of any debt by the Company. (vi) Amendment of the Memorandum of Association and Article of Association of the Company. (vii) Declaration of any dividend or the distribution in any other form and return to the Shareholders of the Company. (viii) Any proposal for the renewal or appointment of Statutory Auditors and internal auditors of the Company. (ix) Establishment of the subsidiaries and/or entering into any of partnerships or joint ventures. (x) Diversification or proposed entry into new business or activity which falls outside the scope of its current areas of operations. (xi) Any increase or decrease in the size of Board of Directors, beyond nine. (xii) Dissolve, liquidate or re-organise the Company. (xiii) Sell, transfer, lease substantial assets of the Company. (xiv) Issue of fresh equity (including preference shares, convertible debentures, warrants or any other quasi equity instrument) including initial public offer.
(xx)	"Funds" shall mean the fund provided, set up, established or promoted by IITac or their affiliates to facilitate development and funding of Integrated Multi- Modal Public Transport Network project in the State of Goa
(xxi)	"GOG" shall mean the Government of Goa and its affiliate including public sector undertakings and autonomous bodies.

(xxii)	"IITAC" shall mean the IIT Alumni Council, a Section 8 company incorporated under the Companies Act, 2013 and shall include its Affiliates – specifically including PanIIT Forum and PanIIT Foundation – both Section 8 companies incorporated under the Companies Act 2013
(xxiii)	"In Writing" and "Written" include printing, lithography and other modes of representing or reproducing words in a visible form.
(xxiv)	"Indian GAAP" shall mean Indian generally accounting principles consistently applied from time to time.
(xxv)	"IPO" shall mean the initial public offering of the Shares of the Company either through a primary offering (i.e. an issue by the Company of additional Shares) or a Secondary offering (i.e. a sale by one or more Shareholders of any of their respective Shares) or both, which would (i) comply with all applicable laws, including without limitation, the rules and regulations of the Securities Exchange Board of India and any other relevant stock exchange, (ii) result in the Company and/or its Shares being listed on one or more recognised stock exchanges.
(xxvi)	"Integrated Multi Modal Public Transport Network Projects" or "IMMPTN Projects" shall mean the projects as under hereto and shall include such other projects to be under taken by the Company: 1. Construction of High Capacity Bus System 2. Construction of Water transport System
	3. Construction of Drone transport system 4. Integrated Ticketing System and other digital platforms for all modes of Public Transport and other digital services. 5. Development of Intermodal Interchange points. 6. Consultancy for improving Public Transport System 7. Bus Depots and Interchange Points. 8. Improvement and Development of Existing and Planned ISBTs.
(xxvii)	Words importing the Masculine gender include also feminine gender.

(xxviii)	"General Meeting" means a general meeting of the members held in accordance with the Act.
(xxix)	"Managing Director" means the Managing Director for the time being of the Company.
(xxx)	"Member" means the duly registered holder from time to time and include "the subscribers to, the, Memorandum of, Association of the Company and includes Shareholders.
(xxxi)	"Month" means a calendar month.
(xxxii)	"Office" means the Registered Office for the time being of the Company.
(xxxiii)	"Ordinary Resolution" and "Special Resolution" shall have meanings assigned thereto under the Act.
(xxxiv)	"Paid-up" in relation to the Share Capital of the Company includes credited as paid-up.
(xxxv)	"Person" shall mean any individual, corporation, partnership, limited liability company, joint venture, association or trust or any other entity or organisation and may include party hereto.

(xxxvi)	"Proxy" includes Attorney duly constituted under a Power of Attorney.
(xxxvii)	"The Registrar" means the Registrar of Companies of the State in which the office of the Company is for the time being, situated.
(xxxviii)	"Register" means the Register of Members to be kept pursuant to the Act and unless it be repugnant to the context or otherwise, the register of Beneficial Owners in case of shares held in Depository.

(xxxix)	"Seal" means the Common Seal for the time being of the Company.
(xxxx)	Shares shall mean the equity shares of face value Rs 10/- each of the Company issued from time to time.
(xxxixi)	"Shareholder" shall mean the holder of the Shares of the Company for the time being and "Shareholders" means collectively all those who hold shares of the Company.
(xxxixii)	"Secretary" means the Company Secretary within the meaning of clause(c) of sub section (1) of section 2 of the Company Secretaries Act, 1980 and includes any individual possessing the prescribed qualifications and appointed to perform the duties which may be, performed by a Secretary under the Act and any other ministerial or administrative duties and includes an Assistant or Deputy Secretary possessing these qualifications.
(xxxixiii)	Words importing the singular number include, where the context admits or requires the plural number or vice versa
(xxxixiv)	"Super Majority Resolution" in relation to fundamental issue shall refer to a special resolution as defined in the Act in the case of a general

	meeting of the Company, and in the case of the a meeting of the Board of Directors a resolution on which atleast 75% of those directors present and being entitled to vote on such matter, vote in favour of the resolution with respect to such Fundamental Issue. Provided every such resolution to be passed shall require the affirmative vote of the authorized representative of each of the shareholder or the shareholder director, as the case may be.
(xxxixv)	"Third Party" shall mean any person other than the Parties.
(xxxixvi)	"Transfer" in relation to Shares and or other securities of the Companies, shall mean and include any direct or indirect sale, assignment, transfer, pledge, gift, alientation of, or the grant of any option or right to purchase or otherwise acquire Shares of the Company.

(xxxvii)	"Year" means a calendar year.
2	<u>Shares to rank pari passu</u> The Shares issued, subscribed and allotted further to the existing Shares of any class will rank pari passu in all respects and be identical with the shares issued, subscribed and allotted of any class prior to the date of allotment of Shares to the Shareholders, with reference to all rights and benefits including but not limited to voting rights, dividends, stock splits, bonus issuance and right issuance.
3	<u>Meeting called by requisitionists</u> a. Any meeting called under the foregoing Article by the requisitionists shall be called in the same manner as nearly as possible as that in which meetings are to be called by the Board. b. The Board may convene a general meeting of the company. The Board shall proceed to convene a general meeting if so requisitioned in accordance with the relevant provisions of the Act. The shareholders shall use all reasonable endeavors to procure that a quorum is present at and throughout each meeting of the shareholder.
4	<u>Quorum at General Meeting</u> Five members present in person shall be a Quorum for a General Meeting. Unless otherwise waived in writing by the respective party, a valid quorum for a meeting of the shareholders/members shall be Deemed to be constituted only if, an authorised representative each of GOG & IITAC are present at the beginning and throughout such meeting.
	The shareholders shall use all reasonable endeavors to procure that a quorum is present at and throughout each meeting of the Shareholder

	<u>If quorum not available, meeting to be dissolved or adjourned</u> (a) If within half an hour of the time appointed for the meeting of the shareholders, a quorum is not present, the meeting shall automatically stand adjourned till the same day in the next meeting. (b) If at such second adjourned meeting of the Shareholders, atleast one representative appointed by each of the Shareholders is not present, but the number of Shareholders is sufficient to constitute a valid quorum under the Act, then the Shareholders present shall be deemed to constitute a valid quorum for that meeting. In such an event, the requirement of the presence of one authorized representative of each of the shareholder shall not be a condition for constituting a valid quorum for such adjourned meeting of the shareholders if such a meeting does not include any matter relating to Fundamental issues. Provided that no decision shall be taken and no resolution shall be passed at such adjourned meeting on any matter relating to the Fundamental Issues, without the presence and affirmative vote of the authorized representatives each of the shareholders.
5	<u>Number of Directors</u> The Board shall comprise of not less than 4(four) directors and not more than 12 (twelve) directors. Unless otherwise agreed between the Parties to this Agreement, GOG shall have a right to nominate four (4) directors and IITAC shall have a right to nominate four (4) directors to the Board. There shall be one (1) independent director, to be appointed on mutual agreement between IITAC and GOG.

6	<u>Power to appoint nominee Directors</u> (a) Subject to the relevant provisions the Act, whenever the Directors and/or Company enter into a contract with any Government, Central, State. or Local, or any person or persons for borrowing any money or for providing any guarantee or security or for technical collaboration or assistance or for underwriting or enter into any other arrangement whatsoever, the Directors shall have, subject to the relevant provisions of the Act, the power to agree that such Government person or persons shall have the right to appoint or nominate by a notice in writing addressed to the Company one or more Directors on the Board for such period and upon such condition as may be mentioned in the Agreement and that such Director or Directors may not be liable to retire, nor be required to hold any qualification shares. The Directors may also agree that any such Director or Directors may be removed from time to time by the Government person or persons entitled to appoint or nominate them and such Government person or persons may appoint another or others in his or their place and also fill in any vacancy which may occur as a result of any such Director or Directors ceasing to hold that Office for any reason whatever. The Directors appointed or nominated under this Article shall be entitled to exercise and enjoy all or any of the rights and privileges exercised and enjoyed by the Directors of the Company including the payment of remuneration and traveling expenses to such Director or Directors as may be agreed by the Company with such person or persons, aforesaid; (b) Any trust deed securing and covering the issue of debentures of the Company may provide for the appointment of a Director for and on behalf of Debenture Holders for such period as is therein provided not exceeding the period for which the debentures or any of them shall remain outstanding and for the removal from Office of such Director and on a vacancy being caused whether by resignation, death, removal or otherwise, from appointment of a Director in the vacant place. The Director shall not be liable to retire by rotation or be removed, from office except as provided as aforesaid.
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7	<u>Qualification of Directors</u> No Director shall be required to hold any share or Qualification Shares of the Company;
8	<u>Retirement and rotation of Directors</u> All the directors of the Company shall unless otherwise provided , be appointed for a term of 5 years or till the annual general meeting of the Company held after the lapse of the said period of five years, whichever is later, and shall be liable to retirement by rotation. One third of the directors eligible to retire shall retire by rotation at each annual general meeting of the Company. Each director shall be eligible to serve consecutive terms if re-appointed. Any vacancy created by the retirement or removal of any director being a nominee of any of the Shareholders shall be filled by a nominee of such shareholders unless otherwise agreed in this Agreement. The removal of a director appointed shall as per the agreement shall only be at the request of the Shareholder who has nominated such director. The Shareholders hereby undertake to exercise their voting rights and to cause their nominee directors on the Board to exercise their voting rights.
9	<u>Managing Directors</u> (a) The Company shall have a Managing Director and Chief Executive Officer appointed by the Board, who shall be a nominee of IITAC. Subject to the provisions of the Act, the terms and conditions of MD & CEO shall be stipulated by the Board. (b) Subject to the relevant provisions of the Act, the Board may from time to time, appoint one or more Directors to be Whole time Directors of the company, for a fixed term, not exceeding Five

	years at a time and may, from time to time, remove or dismiss him or them from Office and appoint another or others in his place or their places. (c) Subject to the relevant provisions of the Act and subject to above proviso, a Managing or a Whole Time Director shall not, while he continues to hold that Office, be subject to retirement by rotation but he shall be reckoned as a Director for the purpose of determining retirement of Directors by rotation, and in fixing the number of Directors to retire, and subject to the same relevant provisions as to removal as the other Directors, and he shall ipso-facto and immediately, cease to be a Managing or a Whole- Time Director, if he ceases to hold the Office of Director for any cause.
10	<u>Notice of Meetings</u> (a) The Company shall furnish to each director for the time being in India and at his usual address in India not less than 7 days notice (unless a written consent is obtained for a shorter notice), of the calling of any meeting of the Company's directors or of any meetings of any Committee established by the Board, which notice shall indicate the agenda and shall promptly thereafter furnish to such director copies of all proposals, resolutions, communications and report prepared by the Company for its directors in connection with such meetings and copies of the minutes of all such meetings. (b) A Board Meeting may be convened with shorter notice provided that the consent of all directors is obtained for such short notice period and the agenda for such meeting is sent to each director.
11	<u>Quorum</u> (a) Subject to the relevant provisions of the Act, the quorum for a meeting of the Board shall be one-third of its total strength (excluding Directors, if any, whose place may be vacant at the time and any fraction contained in the one third being rounded off as one) or three Directors,

	whichever is higher, provided that where at any time the number of interested Directors exceeds or is equal to two-third of the total strength the number of the remaining Directors that is to say, the number of Directors who are not interested, present at the meeting being not less than three, shall be the quorum during such time. (b) No such quorum shall be said to be complete unless atleast one director representing each of GOG and IITAC is present at such meeting.
12	<u>Adjournment of Meeting for want of Quorum</u> In case the quorum is not present, the meeting shall be adjourned to the same day in the following week or if such day is the holiday the next Business day thereafter, and directors present at such meeting shall constitute the quorum. At any meeting of the Board, each director shall have one vote.
13	<u>Chairman</u> The company shall have a non-executive Chairman appointed by the Board, who shall be the Chief Secretary, GOG ex-officio. The term of the Chairman shall be co-terminus with that of his term as the director of the Company. In case the Chairman is unavailable within fifteen minutes from the time fixed for a meeting, one of the directors nominated by the GOG on the Board, present at that meeting may be appointed by the Board as the Chairman for that particular meeting.
14	<u>Powers of Board</u> The Company shall be managed and controlled by the Board and the Board shall be responsible for the overall policies and objectives and activities of the Company, in terms of its Memorandum of Association and Article of Association, the relevant provisions of the Act, and this Agreement. The Board may exercise all such powers of the Company and do all such lawful acts and things as are permitted under the Agreement, applicable law and the Memorandum of Association and Article of Association of the Company.

15	<u>Directors may appoint Committee</u> The Company shall if required, constitutes a committee or committee(s) of the Board whose composition, powers and term of reference shall be decided by the Board from time to time. The Committee(s) shall be subject to and be under the supervision of the Board. Each of Shareholders shall have the right to nominate its nominees to the each of the committee(s).
16	<u>Meeting of Committee</u> Unless otherwise agreed to by each of the parties to this agreement, no quorum of the meeting of any such committees shall be said to be complete unless atleast 1 (one) nominee of GOG and IITAC is present at such meeting of the committee. If any of the Fundamental issue are delegated by the Board to any such committee, the relevant provisions of the Articles of Association shall, mutatis mutandis, apply to the relative resolution proposed at such committee.
17	<u>Resolution by circulation</u> (i) Subject to the relevant provisions of the Act, requiring Board meeting in certain specified cases, no resolution shall be deemed to have been duly passed by the Board or by a Committee thereof by circulation, unless the resolution has been circulated in draft together with explanatory note, to all the Directors, or to all the members of the Committee, then in India (not being less in number than the quorum fixed for a meeting of the Board or Committee, as the case may be) and to all other Directors or Members of the Committee, at their usual address in India and has been approved by such of the Directors or Members of the Committee as are then in India or by a majority of such of them as are entitled to vote on the resolution
	provided that such approval shall include the approval of the Managing Director appointed under Article 144 hereof. (ii) No obligation of the Company shall be entered into, no decision shall be made and no action shall be taken by or with respect to the Company in relation to fundamental issues by way of resolution by circulation unless such obligation, decision or action, as the case may be approved by the affirmative vote of all the Shareholders Directors.

18	<u>Secretary</u> The Directors may, from time to time, appoint a person at such remuneration and upon such terms and conditions as they may think fit (hereinafter called "the Secretary") to perform functions which by the Act and the Articles for the time being of the Company are to be performed by the Secretary and to execute any other duties which may from time to time be assigned to the Secretary by the Directors and at their discretion the Directors may remove the person so appointed.
19	<u>Dividends how remitted</u> Unless otherwise directed, any dividend may be paid by cheque or warrant, by a pay slip or receipt having the force of a cheque or warrant sent by post or through ECS to the registered address of the member or person entitled to; in case of joint holders, to that one of them first named in the register in respect of the joint holding, Every such cheque or warrant shall be made payable to the order of the person to whom it is sent. The Company shall not be liable or responsible for any cheque or warrant or pay slip or receipt lost in transmission or for any dividend lost to the member or person entitled thereto by the forged endorsement of any cheque or warrant or the forged signature or any pay slip or receipt or the fraudulent recovery of the dividend by any other means.
20	<u>Directors to keep true accounts</u> (i) The Company shall keep at the office or at such other place in India, as

	the Board thinks fit, proper books of account in accordance with Section 209 of the Act with respect to: (a) all sums of moneys received and expended by the Company and matters in respect of which receipts and expenditure take place; (b) all sales and purchases of goods by Company; (c) assets and liabilities of the Company. The company shall also keep and maintain all such books and records as may be and are prescribed under Section 209 (i) (d) of the Act. Where the Board decides to keep all or any of the Books of Account at any place other than the office of the Company, the Company shall, within seven days of the decision, file with the Registrar a notice in writing giving the full address of that other place provided that the said other place shall also be in India. The Company shall preserve in good order the Books of Account relating to a period of not less than eight years preceding and current year together with Vouchers relevant to any entry in such books of account. Where the Company has a branch office, whether in or outside India, the Company shall be deemed to have complied with this Article if proper Books of Account relating to the transactions effected at the branch office are kept at the branch office and proper summarised returns, made up to date at intervals of not more than three months, are sent by the branch office to the Company at its office or other place in India, at which the Company's Books of Accounts are kept as aforesaid. The Books of Account shall give a true and fair view of, the state of affairs of the Company or branch office, as the case may be, and explain its transactions. The Books of Account and other books and papers shall be open to inspection by any Director during business hours. (ii) The Company shall adopt and follow generally accepted accounting policies applicable in India, sound systems and procedures in respect of maintaining all records and book accounts to reflect the true financial status of the Company at any point of time including off balance sheet
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	items and contingencies liabilities. The Company shall make and keep books, records and accounts, in details that accurately and fairly reflect all of the transactions and disposition of its assets. The records shall include monthly-unaudited financial statements or other similar reports specified by the investors (including a balance sheet and statements of income and cash flows). All such statements and reports shall be prepared in accordance with Indian GAAP. The Company shall also highlight to the any material deviations between Indian GAAP and International Accounting Standards and the quantitative impact of such deviations on the accounts, books and records of the Company
21	<u>As to inspection of accounts or books by Members</u> (i) The Board shall from time to time determine whether and to what extent and at what times and places and under what conditions or regulations the accounts and books of the Company or any of them shall be open to inspection by members, not being Directors and no Member (not being a Director) shall have any right of inspecting any account or book or document of the Company except as conferred by law or authorised by the Board. (ii) Upon such notice to the Company and/or the Operating Companies, the Shareholders and its authorized representatives (such as employees, directors, shareholders, lawyers, accountants or other professional advisors) shall have a right to (a) visit and inspect the properties of the Company and/or the Operating Companies; (b) access and review the books, corporate and financial records and financial statements of the Company and/or the Operating Companies; and (c) discuss the business and finances of the Company and/or the Operating Companies with officers of the Company and/or the Operating Companies.
22	<u>Copies shall be sent to each Member</u> (i) A copy of every balance sheet (including profit and loss account, the

	auditors' report and every other document required by law to be annexed or attached, as the case may be, to the balance sheet) which is to be laid before the Company in the General Meeting shall be made available for inspection at the Registered Office of the Company during working hours for a period of twenty one days before the date of the Meeting and a statement containing salient features of such documents in the prescribed form or copies of documents as aforesaid, as the Company may deem fit, will be sent to every member of the Company and to every Trustee for the holders of any debenture issued by the Company, not less than twenty one days before the date of the Meeting at which such documents are to be laid.
23	<u>Accounts to be audited</u> The Company shall appoint a reputed auditing firm satisfactory to the Shareholders, for conducting its statutory audit ("Statutory Auditor") and their rights and duties regulated in accordance with Sections 224, 224A to 233 of the Act.
24	<u>Reading and Instructions of Auditors' Report</u> The Auditors Report shall be read before the Company in general meeting and shall be open to inspection by any member of the Company.
25	<u>Service of documents or notices on members by the Company</u> (i) A document or notice may be served or given by the company on any member either personally or by sending it by Speed Post Acknowledgment due to him at his registered or (if he has no registered address in India) to the address, if any, in India supplied by him to the Company for servicing documents or notices on him. (ii) Where a document or notice is sent by Speed Post Acknowledge , service of the document or notice shall be deemed to be effected by properly addressing, prepaying and posting a letter containing the

	document or the notice, provided that where a member has intimated to Company in advance that documents or notices should be sent to him under a certificate of posting or by registered post with or without knowledge due and deposited with the Company, a sum sufficient to defray the expenses of doing so, service of the documents or notice shall not be deemed to be effected unless it is sent in the manner intimated by the member, and such service shall be deemed to have been effected in the case of a notice of a meeting at the expiration of forty eight hours after the letter containing the document or notice is posted and in any case, at the time at which the letter would be delivered in the ordinary course of post.
26	<u>Members bound by documents or notices served on or given to previous holders</u> (i) Every person, who by operation of law, transfer or other means whatsoever, shall become entitled to any share, shall be bound by every document or notice in respect of such share which previously to his name and address being entered on the Register of members, shall have been duly served or given to the person from whom he derived his title to such shares. (ii) Subject to the terms and conditions hereof, this agreement is binding upon and will ensure to the benefit of the Parties and their respective successors and permitted assigns.”

27	<u>Shareholding limits</u>
	The subscription and allotment of the share capital of the Company shall be in the following manner; GOG 50% IITAC 50%
28	<u>Authority to dematerialize securities:</u> Notwithstanding anything contrary contained in these Articles, the Board may at any time decide to permit holding of and dealing in any or all shares or debentures or other securities of the Company (hereinafter referred to as "Securities") in dematerialized form under the relevant provisions of the Depository Act and may offer the securities of the Company for Subscription/allotment in dematerialized form in the manner provided by the said Act.
29	<u>Option to hold securities in certificates or with Depository</u> Every person holding any securities of the Company through allotment or otherwise shall have the option to receive and hold the same in the form of certificates or to hold the same with the Depository.
30	<u>Securities with Depository to be Dematerialized</u> All securities held with a Depository shall be dematerialized and the depository shall hold the same for the beneficial owners thereof in a fungible form.
31	<u>Beneficial Owner is member</u> Every person holding securities of the Company and whose name is entered as a beneficial owner in the records of the Depository shall be deemed to be a member of the Company. The beneficial owner of the securities shall be entitled to all the rights and benefits and be subject to all the liabilities in respect of the securities held by him in a depository.

32	<u>Beneficial owner may opt out of a depository.</u> Every person holding securities of the company with depository, being the beneficial owner hereof, may at any time opt out of the depository in the manner provided under the relevant provisions of the Depository Act and on exercise of such option and on fulfillment of the conditions and payment of fees prescribed under the said Act the Company shall rematerialise the relevant securities and issue to the beneficial owner thereof the requisite certificates of such securities.
33	<u>Intimation to Depository</u> The Company shall make available to the depository, copies of relevant records in respect of securities held by such depository for the beneficial owners thereof When a holder or an allottee of the securities and issue to the beneficial, the Company shall intimate such depository the details of his holdings or allotment of securities and thereupon the depository shall enter in its records the names of the holders/allottees as the beneficial owners of such securities.
34	<u>Register and Index of Beneficial Owners:</u> The Register and Index of Beneficial Owners of securities maintained by a depository under Section 11 of the Depository Act shall be deemed to be and forming part of the Register and Index of Members or of holders of Debentures or other securities of the Companies.
35	<u>Transfer of securities held in a Depository:</u> (a) Every depository shall furnish to the company information about the transfer of securities, the names of the Beneficial Owner at such intervals and in such manner as may be specified under the relevant provisions of the Depository Act. (b) Every depository shall furnish to the Company information about the

	transfer of securities, the names of Beneficial Owner at such intervals and in such manner as may be specified under the relevant provisions of the Depository Act. (c) Section 108 of the Act shall not apply to transfer of securities affected by the transferor and the transferee both of whom are entered as Beneficial Owners in the records of a Depository.
36	<u>Lock in Period</u> None of the Shareholders shall Transfer any part of the Shares acquired by them pursuant to the relevant provisions of this Agreement for a period of three years from the effective date. Notwithstanding the aforesaid the Shareholders have the right to Transfer their Shares to any of its Affiliates.
37	<u>Right of Refusal</u> In case IITAC desire to dilute their shareholding in the Company other than transfer to its affiliate, GOG shall have the right to refusal to acquire the shares proposed to be sold by IITAC and/or to require IITAC, to sell otherwise transfer the same to the third party nominated by GOG as the transferee.
38	<u>Transfer to Third Party</u> Subject to the relevant provisions of the agreement, no transfer of any shares shall be made to the third party unless such third party shall have agreed in writing to be bound by the relevant provisions of the agreement by executing an deed adherence in a form and manner acceptable to the shareholders.
39	<u>No Assignments</u> Neither this Agreement (in part or In whole) nor any right or obligation hereunder or part hereof may be assigned by any party hereto (any attempt to do so will be void), except as otherwise specially provided herein. Notwithstanding the aforesaid, IITAC and GOG may at their option assign any of its rights or obligations under this Agreement to any of its Affiliates.

40	<u>Shareholders meeting called by Board.</u> The Board may convene a general meeting of the Company. The Board shall proceed to convene a general meeting if so requisitioned in accordance with the relevant provisions of the Act.
41	<u>Passing of Resolutions.</u> Except in cases where Super Majority Resolution to be passed in matters relating to the Fundamental Issues specified in Article 87B, any other resolution which, under these Articles or the Act is permitted or required to be done or passed by the Company in General Meeting shall be sufficiently so done or passed if effected by an ordinary resolution as defined in section 189(1) of the Act. Unless either the Act or the Articles specifically require such act to be done or resolution to be passed by a specific majority or by special resolution as defined in section 189(2) of the Act.
42	<u>Resolution relating to Fundamental Issues</u> Except as otherwise provided in the Act, every resolution to be passed at a General Meeting (including any adjourned General Meeting) with respect to matters relating to Fundamental Issues specified below, shall require the affirmative vote of the authorized representative of each of the Shareholder. 1. Merger with or acquisition of any Company by the Company 2. Any change in the capital structure of the Company including any fresh issue of capital. 3. Amendment of the Memorandum of Association or Article of Association. 4. Declaration of any Dividend or the distribution in any other form and return to the Shareholders of the Company.

	5. Any proposal for the renewal or appointment of Statutory Auditors. 6. Establishment of Subsidiaries and/or entering into any of partnerships or joint ventures. 7. Diversification or proposed entry into new business or activity which falls outside the scope of its current operations. 8. Any increase or decrease into the size of the Board of Directors. 9. Dissolve, liquidate, or re-organise the Company. 10. Sell, transfer, lease substantial assets of the Company. 11. Issue of fresh equity (including preference shares, convertible debentures, warrants or quasi equity instruments) including initial public offer.
43	<u>Removal of Directors</u> The Shareholder who have the right to nominate and appoint the directors to the Board and to remove and replace such directors to the Board and to remove and replace such directors by notice to such director and the Company.
44	<u>Super majority resolution at Board Meeting</u> Except as otherwise provided in the Act, every resolution to be passed at a Board Meeting (including any adjourned Board Meeting) with respect to matters relating to Fundamental Issues specified below, shall require the affirmative vote of the authorized representative of each of the Shareholder. 1. Approval of Business Plan (which shall be presented to the Board by MD & CEO at the beginning of each financial year. 2. Merger with or acquisition of any company by the Company 3. Any change in the capital structure of the Company including any fresh issue of capital (other than already envisaged herein). 4. Investment in the any operating companies ("the operating companies").

	5. Raising of any debt by the Company. 6. Amendment of the Memorandum of Association and Article of Association of the Company. 7. Declaration of any Dividend or the distribution in any other form and return to the Shareholders of the Company. 8. Any proposal or the renewal or appointment of Statutory Auditors and Internal auditors of the Company. 9. Establishment of the subsidiaries and/or entering into any of partnerships or joint ventures. 10. Diversification or proposed entry into new business or activity which falls outside the scope of its current areas of operations. 11. Any increase or decrease in the size of the Board of Directors, beyond that envisaged in this agreement. 12. Dissolve, liquidate, or re-organise the Company. 13. Sell, transfer, lease substantial assets of the Company. 14. Issue of fresh equity (including preference shares, convertible debentures, warrants or any other quasi equity instrument) including initial public offer.
45	<u>Dispute Resolution</u> In event of any dispute, controversy or any difference ("Dispute") of whatever nature, arising under, out of, in connection with or relating to the enforcement, performance or the terms and conditions of this agreement or any provision thereof, such dispute shall be amicably settled through good faith negotiation amongst the parties to such Dispute. In the event that such Dispute cannot be resolved by negotiation within (30) days of the Dispute having arisen such dispute shall be referred for arbitration in accordance with the relevant provisions of the Arbitration and Conciliation Act, 1996.. The place of arbitration and the seat of arbitral proceedings begun pursuant to any reference made under this agreement shall be conducted in English language. The decision of the arbitral tribunal and any award given by the arbitral tribunal shall be final and binding upon the parties.

Information to Parties

(i) The Companies shall furnish to the shareholders the following the pertaining to the company as well as the operating companies.

(a) Audited annual financial statements (within 90 days of the end of the financial year)

(b) un-audited annual financial statements (within 30 days of the end of the financial year)

(c) quarterly financial statement (within 30 days).

(d) the opinion of the statutory auditors concerning the Company's financial year; and

(e) some other financial and accounting reports and information as the shareholders may reasonable request on a timely basis.

(ii) The Company shall furnish or cause to be furnished promptly to a shareholder all such records and information as it shall reasonably request concerning (a) the financial statements or audit refer to in the Agreement (b) audited financial statements and auditor's report of each of the funds under management of the Company; and (c) any other matters relating to their respective investments in the Company. The Company shall, upon request by the Shareholder, consult with the Shareholders on any of these matters."

SECTION 2, CHAPTER 3

Proposed MoA and AoA

for PPP Company



MEMORANDUM OF ASSOCIATION GO GOA LIMITED
PRELUDE
I. The name of the Company is GO GOA LIMITED. II. The Registered Office of the Company will be situated in the National Capital Territory of Delhi. JlI. The objects for which the Company is established are as under:
A. MAIN OBJECTS OF THE COMPANY TO BE PURSUED BY THE COMPANY ON ITS INCORPORATION:
1. To establish and facilitate the operation of an appropriate framework of non-profit entities for channelizing funds from philanthropic bodies, social impact funds, CSR and other sources for the purposes of facilitating the migration of existing fossil fuel powered multi modal public transport services to green and clean sources of energy. 2. To establish an environmentally, socially and financially sustainable network of public transport including associated infrastructure so as to encourage commuters to shift to public transport. 3. Planning, design, development, construction, maintenance, operation and financing of Public Transport Systems that may be at - grade, elevated and underground. This will include but not limited to the following: (i) Integrated planning, design and development_ of the public transport network and other associated activities to provide a comprehensive service to commuters; (ii) High-Capacity Bus System (HCBS), bus rapid transit, busways and bus priority lanes; (iii) Guided transit such as the commuter rail, metro rail, light rail, monorails (including all variations such as Mag lev, personal rapid transit, suspended or supported type monorail) and automatic guided transit systems; (iv) Transport terminals, transport centers, transport hubs, modal interchange points and interstate bus terminals; (v) Transit stations and bus stops with facilities for changing between modes and corridors, passenger amenities including those for the handicapped and allocate space for hawkers and parking of vehicles; (vi) Workshop, repair, maintenance and stabling facilities for various modes

of transport;

- (vii) Re-organization and re-construction of road x-section to create infrastructure needed for introduction and operation of public transport services including construction of new roads, grade separators, elevated roads and flyovers, foot overbridges, subways for pedestrians, street furniture, lighting and signage and maintenance of the infrastructure created to maintain an attractive service for the commuters;
- (viii) Introduction of modern management techniques such as ITS, vehicle tracking systems, GIS and global positioning systems, centralized traffic control, signal synchronization and traffic signals.
- (ix) To establish, provide, maintain, procure and perform engineering and related technical and consulting services for transportation projects of all kinds.
- (x) To establish, provide, maintain and perform procurement, inspection, expediting, management of construction and related services in connection with construction of transportation projects of all kinds and to carry on all kinds of business relating to design, construction, operation, maintenance and repairs of works and buildings of every nature.

4. FINANCING

- (i) Planning and managing the financing of public transport schemes both through the fare-box and other means such as advertisements, shops and kiosks, commercial use of available land and air space above its premises, use fees from operators for using the infrastructure provided for their operation;
- (ii) Fixing fares policy keeping in view rules and regulations framed by the Government including those for concessional and promotional fares and fines for misuse of the services and facilities;
- (iii) Management of collection of fares, integrated ticketing and allocation of earnings amongst various operators;
- (iv) Organizing the involvement of the private sector in all aspects of planning and provision of public transport services.

5. OPERATIONS

- a) Planning, designing, development, construction, maintenance, procurement, operation, consultancy and advisory services of all kinds of public transport services of all descriptions either on its own or in Association/collaboration with other Undertakings or companies in India and/or abroad;
- b) Co-ordination of all kinds of public transport services.
- c) Organizing and operating integrated passenger information display

- systems of all kinds of services.
- d) Organizing and operating other feeder services to the planned public transport network.
 - e) Ensuring traffic management in the areas that effect provision of public transport services. This will include planning and implementation of all traffic management schemes including pedestrianization of certain areas in the city and ban on the operation of certain type of vehicles.
 - f) Organizing legal requirements, law and order and security aspects of services; both assets and commuters.
 - g) Planning and providing for meeting emergencies such as accidents, breakdowns and power failure.
6. To carry on business relating to maintenance and operation of public transport of any kind and description and to enter into contract on a turnkey basis or otherwise, either on its own or jointly with other undertakings and companies or persons abroad or in India, including supply, erection, commissioning of equipment's, testing, operation and maintenance and all other services ancillary thereto, including but not limited to:
- (i) Upgradation, strengthening, doubling or conversion of any or all components of existing systems.
 - (ii) Laying and renewal of permanent way, including points and crossings.
 - (iii) Strengthening, re-building or re-garnering of existing infrastructures facilities.
 - (iv) Construction and modernization of manufacturing, remanufacturing and repair workshops and maintenance depots and modernization thereof;
 - (v) Setting up of new production units for manufacture of rolling stock, mass transit vehicles, High-Capacity Buses, Mono-rails, light rails transit vehicles, signaling, interlocking and telecommunication equipment, bridge girders, structures, welded rails, pre-stressed concrete sleeper, various track components and other requirements for mass transit and other urban transport and People Mover Systems of any kind and description;
 - (vi) New signaling, telecommunication and road traffic control and management systems;
 - (vii) Modernization of existing signaling, telecommunication and road traffic control systems, low cost infrastructure elements that can increase the speed and reliability of bus service including bus turnouts, bus boarding islands, and curb alignments;
 - (viii) Construction of central lane busways (where road space is not adequate), thereby providing a single bus platform which can be used for bus passengers in both the directions, thereby resulting into one or two left side bus platforms on each side of all the major intersections, rather than only on one side of the intersection;

- (ix) Construction of bus streets and busways by dedicating all lanes of a city street to the exclusive use of buses, as well as bus lanes for the exclusive or near-exclusive use of buses;
- (x) Provision for Bus Signal Preference and Pre-emption at intersections, which may involve the extension of green time or actuation of the green light at signalized intersections upon detection of an approaching bus;
- (xi) Electrification of systems including but not limited to traction and general power supply systems and public utility systems;
- (xii) Commissioning and operation of mass transit, other urban transport and People Mover System or installations
- (xiii) Maintenance of Ways, Works, all types of fixed installations, rolling stock and other equipments;
- (xiv) To operate and maintain Mass Rapid Transport or other urban transport and People Mover Systems belonging to the Company, through other parties (including bodies corporate and State Transport Undertaking/s) on own, operate, leasing of routes, lease and license, public, private, partnership basis;
- (xv) To provide and arrange integration of various modes of mass transit and other urban transport and People Mover Systems including but not limited to feeder transport services and ancillary arrangements like parking, circulation areas, integrated complex on sharing of revenue basis;
- (xvi) To carry out market research, market surveys and public relation measures;
- (xvii) To contract out HCBS/monorail operations to private operators and force them to pick up the cost of the bus/rail procurement, as well as to provide good quality customer service;
- (xviii) To make provisions for faster boarding as the conventional on board collection of fares slows the boarding process, particularly when a variety of fares is collected for different destinations and/or classes of passengers, therefore an alternative way of collection of fares may be developed upon entering an enclosed bus station prior to the bus arrivals, which would, in turn, allow passengers to board through all the doors of a stopped bus;
- (xix) To plan for Intelligent Transportation Systems (ITS) which are identified as the means to achieve sustainable and environmental friendly transportation which include Data Storage & Processing Equipment, Wireline & Wireless Communication Systems, Global Positioning Systems (GPS), Sensors, Smart Cards;
- (xx) To make provisions for Advanced Public Transport Systems (APTS), which can be comprised of the following three categories:
 - i. Fleet Management Systems (FMS) which will focus on the Communication Systems, Automatic Vehicle Location Systems, Transit Operations Software and Geographic Information System

- (GIS);
- ii. Traveller Information Systems (TIS) which will focus on Pre-Trip Transit and Multimodal Traveller Information Systems, In-Terminal/Wayside, and In-Vehicle Transit Information Systems;
- iii. Electronic Payment Systems (EPS) which includes Smart Cards, Fare Distribution Systems, and Clearinghouse;
- (xxi) To make provisions for communications infrastructure and vehicle-based communications technologies for effective and efficient operation of transit systems. Communications systems will be used to transmit voice and data (both raw and processed) between transit vehicles and operations (e.g., dispatch) centers, and to transmit commands between operators and technologies (e.g., signal priority commands to traffic signal systems), which will be comprised mostly of wireless technologies and applications viz the two-way voice radio system for fleet management and vehicle dispatching, short-range data links for traffic signal priority. Mobile voice and data communication systems for bus transit include the use of analog, digital, and cellular digital packet data (CDPD);
- (xxii) To provide for the Automatic Vehicle Location Systems (AVLS), a computer-based vehicle tracking systems that functions by measuring the real-time position of each vehicle and relaying the information back to a central location, which can also be used in combination with Global Positioning System (GPS); Signpost and Odometer interpolation, both active and passive; Ground-Based Radio, and Dead Reckoning. The benefits of AVLS include improved dispatch and operational efficiency; improved overall reliability of service; quicker responses to disruptions in service, such as vehicle failure or unexpected congestion; quicker response to threats of criminal activity (via silent alarm activation by the driver); and Extensive information provided at a lower cost for future planning purposes;
- (xxiii) To provide and arrange Transit Operations Software (TOS) which will help the operator monitor the fleet's performance in meeting demand, identify incidents, manage response, and restore service more effectively. Also, to provide and arrange Para transit Operations Software and Reporting Systems which will integrate applications such as passenger registration, automatic geo-coding, mapping, real-time and batch trip scheduling, dispatching and brokering for multiple carriers;
- (xxiv) To install Mobile Data Terminals (MDTs) in vehicles to display dispatch messages (e.g., passenger pickup and drop-off addresses and instructions), record and temporarily store certain types of information about each passenger pickup and drop-off, and collect statistical and performance data on services provided. Software programs can include billing, and accounting and reporting;

- (xxv) To provide and arrange for Computer-Aided Dispatch (CAD) systems being the most visible software application in fixed-route bus operations;
- (xxvi) To provide for Geographic Information Systems (GIS) which will allow information to be developed and displayed to assist operators, dispatchers, and street supervisors to make on-the-spot decisions, and to assist planners in service assessment, restructuring and development. GIS will be used for Transportation planning and modeling; Demographic analysis; Route planning, analysis and restructuring; bus/monorail dispatch and scheduling; bus/monorail stop and facility inventory; Ridership analysis; Para transit scheduling and routing; and accident reporting and analysis;
- (xxvii) To provide for Automatic Fleet Management System (AFMS) which will focus on the automation of the RTC's operations utilizing a OPS based vehicle Tracking & GIS based monitoring System and thereby improve the mass transport services, which will in turn provide for the efficient utilization of fleet and reduction of the cost of operations; and corporate management in introducing new routes and planning. The prime functions of AFMS will be to assist in monitoring, control and management of RTC operations by monitoring whether the buses/monorails are adhering to its scheduled route and timetable throughout the route and identify if there are any deviations; monitoring whether the buses/monorails are halting at all the scheduled bus/monorail stops especially for KM- Scheme Operators; generation of exception reports like deviation from schedule route, timing, missing bus/monorails stops/stations, punctuality factor, etc., based on captured vehicle data; providing billing software to generate automatically billing details for the buses/monorails; dispatching of emergency vehicles to breakdown vehicles or vehicles in distress, whenever it is sought; making provision for integrating Smart Card Readers being supplied by Delhi Metro Rail Corporation; working out realistic schedules according to traffic conditions based on speed of bus/monorail during different hours of the day and at different segments; providing for Real Time Passenger Information System - both within the bus as well at major terminuses/stations; vehicles management; monitoring drivers & conductors performance evaluation; monitoring traffic potential; conducting traffic analysis; financial accounting; personnel information maintenance; stores management; budget management & audit.

7. To carry on the business of architects, designer, draughtsmen, surveyor, valuers, consultants, advisors, experts in consultancy services, engineers including independent engineers and constructional engineers and constructional engineers of every type of builder and contractors.

8. To carry on the business of constructing, developing, maintaining and operating of infrastructure facilities like road, highway project, bridge, express ways, Infra-urban roads and/or peri-urban roads like ring roads and/or urban bypasses, fly overs, bus and truck terminals, subways, airports.
9. To set up, acquire and establish, whether directly, or indirectly, companies, special purpose vehicles, ventures, collaborations, funds, associations, societies, trusts, partnerships or any other form of business for undertaking the above in India and/or abroad and to subscribe, acquire or dispose of shares, debentures, other securities or interest therein, as may be applicable, in such companies, special purpose vehicles, ventures collaboration, funds, association, societies, trusts, partnership or any other form of business, subject to compliance of all laws, rules and regulations, directions as may be applicable in this regard from time to time.
10. To create, establish, administer and manage funds and to provide similar services including assistance in management of funds set-up by government/ government agencies or any other entity for purposes conducive to the promotion of the objects of the company.
11. To create, establish, administer and manage depreciation funds, reserve funds, sinking funds, insurance funds or any other special fund, whether for depreciation or for repairing, improving, extending or maintaining any assets managed by the company.
12. To design, develop, manufacture, produce, assemble, fabricate, alter, remodel, install, repair, service, buy sell, lease, distribute, import, export, provide and otherwise to deal in all classes and type of plant and machinery, devices, equipment ,parts thereof, and IT system, such as vehicle registration plates, vehicle evaluation and appraisal, Vehicle Testing training, sticker, electronic chips, smart card, GPS devices and LCD/LED panels, related or associated with the Operation of the company.
13. To design, develop, manufacture, produce, assemble, fabricate, alter, remodel, install, repair, service, buy, sell, lease, distribute, import, export, trained provide and otherwise to deal in all classes and type of Information Technology (IT) Software and to provide IT services & Information Technology Enabled Services (ITES) of all kinds related or associated with the operation of the Company.
14. To provide all kinds of Consultancy and operations services including technical, industrial, Engineering, management, financial, commercial and IT, for all Government/ Non-Government schemes and projects.

15. To combine and apply Company's objectives to achieve a higher level of efficiencies and integration by way of functions or forms in motorized as well as non- motorized traffic and transportation.
16. To engage in planning, designing, development, financing, construction, execution, maintenance, operation, consulting, and advisory services relating to all aspects of regional and urban planning and development, environmental planning, urban and transportation infrastructural planning and development including engineering, architectural, landscaping, and interior design services as principal, agent, contractor, sub-contractor, advisor, consultant, manager or otherwise.
17. To undertake planning, designing, financing, development, execution, construction, operation, maintenance, and advisory services related to, ancillary to and /or incidental to activities involved in the movement of goods across different modes of transportation.
18. To set-up, operate and manage the payment systems such as closed payment systems, semi-closed payment systems, payment banks, payment instruments issuance systems, transaction, acquisition and/or processing and settlement systems, payment acceptance systems and payment gateways to be used for payments in transit, parking, toll, utility bills, retail purchases and payments for various goods and services through online and retail merchants.
19. To issue, implement, undertake, assist, facilitate, offer, distribute, or otherwise promote such services, schemes and projects including but not limited to issue of closed prepaid instruments, semi- closed pre-paid instruments, prepaid cards, mobile pre-paid cash wallets, cash cards, co-branded cards and/or other payment instruments to consumers; support banks in issuing cards and/or other payment instruments, provide payments solutions for transit, parking, toll, utility bills, retail payments and purchase of goods and services through payment instruments remotely and/or over the counter; offer services to end consumers directly (B2C) and/or via retail network (B2B2C).

B. THE MATTERS WHICH ARE NECESSARY FOR FURTHERANCE OF THE OBJECTS ARE AS FOLLOWS

- (i) To apply for, tender, purchase or otherwise acquire any contract and concession for or in relation to the construction, carrying out equipment, improvement, management, administration or control of works and conveniences required for any or the businesses of the Company and to undertake, carry out, dispose of or otherwise turn to account the same in the foregoing matters and things.
- (ii) To enter into any contract or arrangement for more efficient conduct of any of the businesses of the Company or any part thereof and to sublet contracts from time to time upon such terms and conditions as may be thought expedient and beneficial to the Company.
- (iii) To carry on the business of metal workers, builders, contractors and engineers in connection with the business of the Company at any time being conducted and which may seem calculated or capable of being conducted, so as to directly or indirectly benefit the Company.
- (iv) To acquire, establish, construct, provide, maintain and administer workshops, townships, estates, permanent ways, buildings, yards, walls, water reservoirs, channels, pumping installations, purification plants, pipelines, garages, storages, sheds and accommodation of all descriptions connected with the business of the Company and which may seem calculated to directly or indirectly advance the interest of the Company.
- (v) To carry on business as quarry masters and stone merchants, land to buy, sell, get, work, shape, hew, carve, polish, crush and prepare for market or use stone of all kinds and to carry on business as dealers in lime, cement, mortar, concrete and building materials of all kinds, for the business of the Company..
- (vi) To carry on all or any business of buyers, sellers, dealers and workers in plasters, whittings, casks, sacks, mineral, clay, earth, gravel and cake, fuel, artificial stone and builders requisites of all kinds for the business of the Company.
- (vii) To carry on all or any of the businesses of timber, plumber, iron and wood merchants, timber growers and dealers in plants, furniture and builders requisites and to purchase, take on lease or otherwise acquire, plant, cut and deal in forest or timber lands and estate of every description, in connection with business of the Company or otherwise assist or take part in doing any of these things and /or join with any other company.
- (viii) To carry on the business of electric supply for the business of the Company and to do all things incidental to such business.
- (ix) To carry on the business of civil engineers, mechanical engineers, electrical engineers, signaling and telecommunication engineers, sanitary and water engineers, and plumbers, brass founders, metal workers, machinist smith and tool makers, and to buy, sell, exchange, install, work, alter, improve, manipulate, otherwise deal, prepare for market, import or export, let or hire, all kinds of plant and machines, wagons, rolling stock, apparatus, tools, substances, material and things of all kinds necessary or convenient for carrying on any of the businesses for which the Company is authorized to carry on and which seem calculated directly or indirectly to advance the interest of the Company or otherwise assist

or take part in doing any of these things and/or join with any other Company or with any other Government in India or abroad and/or Governmental Authorities in doing any of these things.

- (x) To carry on the business of a water-works company and its branches as calculated directly or indirectly to result in the furtherance of the attainment of the main objects of the Company and to sink wells and shafts, and to acquire, build, provide and maintain dams, barrages, reservoirs, infiltration galleries, water works, Cisterns, culverts, filter-beds, mains and other pipes and other applications, and to execute and do all other acts and things necessary or convenient for obtaining, storing, selling, delivering, measuring, distributing and dealing in water in connection with the several business activities which the Company is authorized to carry on.
- (xi) To purchase, take on lease, under concession or otherwise, lands, buildings, works, mines, mineral deposits, mining rights, plantations, forests and any rights and privileges or interest therein and to explore, work, exercise, develop and to turn into account the same, if any, required directly or indirectly for any of the businesses of the Company.
- (xii) To purchase, take on lease, or in exchange or under amalgamation, license or concession, or otherwise, absolutely or conditionally, solely or jointly with others and make, construct, maintain, work, hire, hold, improve, alter, manage, let, sell, dispose of, exchange, roads, canals, water course, lands, buildings, workshops, railways, business, tramways, machinery and apparatus, water-rights, way leaves, trademarks, patents and designs, privileges or rights of any description or kind, in connection with the business of the Company and which may seem calculated or capable of being conducted so as to directly or indirectly benefit the Company.
- (xiii) To buy and sell explosives and other explosive products and accessories of all kinds and of whatsoever Composition used in connection with the business of the Company.
- (xiv) To acquire from any person, firm or body corporate whether in India and/or outside India in the public or private sector, technical information, know-how, process engineering, manufacturing and operating data, plans, layout and blue prints, useful for design, erection, construction, commissioning, operation and maintenance of plant and equipment required for any of the businesses of the company and to acquire any grant or license and other rights and benefits in the foregoing matters and things.
- (xv) To carry out or to have carried out experiment and research in laboratory, pilot plant and industrial scale, and to incur expenses necessary there for with a view to improving on the present method and process of working of the several business activities for which the Company is authorized to carry on.
- (xvi) To manufacture, buy or sell in India and/or abroad as importers, exporters, agents or otherwise of any ferrous, non-ferrous and chemical plants, equipments and auxiliaries which can be advantageously dealt with by the Company to attain the foregoing objects and to carry on operations or business of

any nature for which Company from time to time may deem fit or expedient in connection with its main business at time being conducted and which may seem calculated capable of being conducted or as to directly or indirectly benefit to the Company.

- (xvii) To build, construct, maintain enlarge, pull-down, remove or replace, improve or develop and work, manage and control any building, office godown, warehouse, shop, machinery, engine, roadway, railway, tramway or other means of transport, siding, bridge, reservoir, dam, water course, water system, dock, wharf, electric works, gas works or works operated by any other kind of power and works, and also such other machinery, equipment, conveyances, works and conveniences which may seem calculated directly or indirectly to advance the interest of the Company and to subsidise, contribute to or otherwise assist or take part in doing any of these things and/or to join with any other person and/or company and/or with any Government, Indian and/or foreign, and/or Governmental Authority in doing any of these things.
- (xviii) To apply for, purchase, or otherwise acquire, and protect and renew in any part of the world any patents, patent rights, trade marks, designs, licenses, concessions and the like, conferring any exclusive or nonexclusive or limited rights, to their use, or any secret or other information as to any invention which may seem capable of being used for any of the purposes of the Company, or the acquisition of which may seem calculated directly or indirectly to benefit the Company, and to use, exercise, develop or grant licenses in respect of, or otherwise, turn to account the property, rights or information so acquired, and to expend money in experimenting upon, testing or improving any such patents, inventions or rights and without prejudice to the generality of the above, any contracts, monopolies or concessions for or in relation to the supply and sale of any minerals, metals, products or other substances, materials, articles or things for or in relation to the construction, execution, carrying out, improvement, management, administration or control of any works and conveniences required for the purpose of carrying out any of the aforesaid business and to undertake, execute, carry out, dispose of or otherwise turn to account such contracts, monopolies or concessions.
- (xix) To sell, dispose of or transfer any building, industrial undertaking, project or factory to any company or association or concern carrying on similar business on such terms and conditions as may be determined by the Company.
- (xx) To acquire from any Government, central, State, Local or Foreign or public body, or person or Authority or from any private individual any concession, grant, decree, right, power and privilege whatsoever which may seem to the Company capable of being turned to account or which the company may think directly conducive to any of its objects or capable of being carried on in connection with its business and to work, develop, carrying, exercise and turn to account the same.
- (xxi) To apply for charter, privilege, concession, license or authorization of any Government, State or Municipality, provisional order or License from any authority for enabling the Company to carry out any of its objects into effect or for

extending any of the powers of the Company or for effecting any modification of the Company or for any other purpose which may seem expedient and to oppose any proceeding or application which may seem calculated directly or indirectly to prejudice the interest of the Company.

- (xxii) To provide residential and/or resting accommodation, medical and welfare facilities for the employees of the Company and in connection therewith to afford to such persons facilities and conveniences for transport, washing, bathing, cooking, reading, writing and for the purchase, sale and consumption of provisions, both liquid and solid and for the safe custody of goods.
- (xxiii) To construct and maintain or windup branch, offices and/or new offices in India or elsewhere as it necessary to Protect and promote the interest of the Company.
- (xxiv) To carry on any other business or any business of any other kind or quality whether manufacturing or otherwise which may seem to the Company capable of being conveniently carried on in connection with the above or calculated directly or indirectly to enhance the value of or render profitable any of the company's properties or rights.
- (xxv) To purchase, take on lease or license or in exchange hire or otherwise acquire any immovable and/or movable property and any right or privilege which the Company may think necessary or convenient for the purposes of its business or may enhance the value of any other property of the Company and in particular any land (freehold, leasehold or other tenure) buildings, basements, machinery, plant, and stock-in-trade and on any such lands to erect buildings, factories, sheds, godowns or other structures for the works and purpose of the Company and also for the residence and amenity of its employees, staff and other workmen and erect and install machinery and plant and other equipment deemed necessary or convenient or profitable for the purpose of the Company.
- (xxvi) To exchange, sell, convey, assign or let on lease or grant licence for the whole or any part of the Company's immovable properties and to accept as consideration or in lieu thereof other land or cash or Government securities guaranteed by Government or shares in Joint Stock Companies or partly one and partly the other or such other property or securities as may be determined by the Company and to take back or re acquire any property so disposed of by repurchasing or leasing the same or obtaining a licence for such price or prices and on such terms and conditions as may be agreed upon.
- (xxvii) To enter into any agreement with any Government, Indian or Foreign, or with any Authority, public, municipal, local, or otherwise or with any other person that may seem conducive to the objects of the Company or any of them and to obtain from any such Government, Authority or persons any right, privilege, authority, contract, license and concession which the Company may think it desirable to obtain and to carry out, exercise and comply therewith and dispose of or turn to account the same.
- (xxviii) To improve, manage, develop, grant rights or privileges including but not

limited to advertising rights in respect of or otherwise deal with all or any part of the property and rights of the Company.

(xxix) To promote and form and to be interested in and take, hold and dispose of shares in other companies having objects in whole or in part similar to those of the Company and to transfer to any such Company any property of the Company, and to take or otherwise acquire, hold and dispose of shares, debentures and other securities in or of any such company and to subsidise or assist any such company.

(xxx) To pay for any right or property acquired by the Company and to remunerate any person or Company whether by cash payment or by allotment of shares, debentures or other securities of the Company credited as paid up in full or in part or otherwise.

(xxxii) To payout of the funds of the Company all costs, charges and expenses which the Company may lawfully incur with respect to promotion, formation and registration of the Company and/or the issue of its capital or which the Company shall consider to be preliminary, including therein the cost of advertising, printing and stationery and commission and other incidental expenses for obtaining application for taking, placing or underwriting or procuring the underwriting of shares, debentures or other securities of the Company, expenses required for the formation of such agencies, branches and local boards.

(xxxiii) otherwise whether in India or abroad in such manner as the Company may think fit and in particular by the issue of Bonds, Debentures or Debenture Stock, perpetual or otherwise and convertible into shares, and to secure the repayment of any such money borrowed raised or received or owing by mortgage, pledge, charge or lien upon all or any of the property assets or revenue of the Company (both present and future) including its uncalled capital and to give the lenders or creditors the power of sale and other powers may seem expedient and to purchase, redeem or payoff any such securities and also by a similar mortgage, charge or lien to secure and guarantee the performance by the Company or any other person, firm or company of any obligation undertaken by the Company or any other person, firm or company as the case may be.

(xxxiv) To draw, make accept, endorse, discount, execute, issue and negotiate promissory notes, bills of lading, warrants, Debentures and other negotiable instruments or transferable securities/ instruments.

(xxxv) To receive grants from the Government of India or any state or Union Territory Government for the said projects and to make other financing arrangements for construction, maintenance and operation of new and existing urban transport and people mover and other related systems including raising loan from local/foreign financial institutions, capital markets and resources from collections through dedicated taxes.

(xxxvi) Receive, hold and disburse funds on behalf of Government and other individuals and bodies corporate or otherwise, for any activity related to the Company.

(xxxvii) To receive money on deposits or interest or otherwise and to lend money with or without securities to such companies, firms or persons and on such terms

and conditions as may seem expedient and in particular to customers and others having dealings with this company and to guarantee the performance of contracts or obligations by any such persons, companies and firms, provided that the Company shall not carry on the business of Banking as defined by the Banking Regulations Act, 2020

- (xxxvii) To subsidise, assist and guarantee the payment of money by or the performance of any contract engagement or obligation by any person or company and in particular, customers of the company, with whom the company may have or intend to have business relations.
- (xxxviii) To invest and deal with the moneys of the Company not immediately required in such manner as may be thought fit and as determined by the Board of Directors of the Company from time to time.
- (xxxix) To open and, keep in accordance with the Sections of the Companies Act, 2013, one or more registers of in any country or countries where it may be advisable to do so and to allocate any number of the Company to such register or registers.
- (xl) To appoint attorneys, managers, secretaries, officers and staff for the purpose of carrying on the business and functions of the Company or sales or distribution of goods dealt in or manufactured, if any, by the Company
- (xli) To carry on any business or branch of a business, which this Company is authorized to carry on, by means or through the agency of any subsidiary company or companies, to enter into arrangements with any such subsidiary company for taking the profits and bearing the losses of any business or branch so carried on, or for financing any subsidiary company or guaranteeing its liabilities or to make any other arrangement which may seem desirable with reference to any business or branch so carried on, including power at any time either temporarily or permanently to close any such business or branch.
- (xlii) To the extent directly or indirectly conducive to or incidental to the attainment of the above objects to make and perform contracts, leases and other commitments of every kind.
- (xliii) To generally do and perform all the above acts and such other things as may be deemed incidental or conducive to the attainment of the above objects or of any of them or any allied objects or which may advantageously or conveniently be combined with the business of the Company in a profitable way.
- (xliv) Arrange and provide necessary security for the assets of the Company and users of its services.
- (xlv) To enter into agreements with the Central Government/State Government, Railway Administrations, Private Agencies and Private Sector Parties for purposes of:
 - a. Working, use management and maintenance of any railway;
 - b. construction and or supply of rolling machinery or for leasing or taking on rolling stock, plant, machines or equipments required for use of railway or for the rolling stock;
 - c. payments to be made and conditions to be performed with respect to

- working, use, management and maintenance;
- d. interchange, accommodation and conveyance of traffic being on coming from or intended for the respective railways of the contracting parties and fixing, collection, appointment and appropriation of revenue arising from that traffic;
 - e. purchasing, acquiring (under Land Acquisition Act), taking on lease, under construction or otherwise, lands, buildings, works, mines, mineral deposit, moving rights, plantations, forests and any right and privilege or interest therein and to explore work, exercise, develop and to turn to account, the same if it is required for the business of the company;
- (xlvi) To manufacture, alter, improve buy, sell, exchange, install, work, import or export and otherwise deal in all kinds of plant, machinery, wagons, rolling stock, apparatus, tools, utensils, substances, materials and things necessary or convenient for carrying on any of the business which the Company is authorized to carry on or are usually dealt in by persons engaged in such business.
- (xlvii) To construct, manufacture, rebuild, repair, purchase, sell, import, export, rent, machines and machinery of any kind, which may appear to be necessary or convenient for or incidental to any business of the Company.
- (xlviii) To produce gas and electricity necessary for the purposes of business of the Company and to process all products resulting from or ancillary to such production and making of gas to convert the same into saleable materials like, coke, road-tar, creosote oil, phenols, creosotes, carbolic acid and other chemical or distilled products any by-products and to otherwise deal with and dispose of the same and to take all steps incidental or required in respect of the same.
- (xlix) To develop and turn to account any land acquired by the Company or in which it is interested, and in particular by laying out and preparing the same for building purposes, constructing, pulling down, decorating, maintaining, furnishing, fitting up and improving buildings and by planting, paving, draining, fanning, cultivating, letting on building lease or building agreement and by advancing money to and entering into contracts and arrangements of all kinds with builders, tenants and others for the main business of the Company.
- (l) To acquire, establish, construct, provide, maintain and administer workshops, townships, estates, permanent way, building yards, walls, water reservoirs, channels, pumping installations, purification plants, pipe lines, garages, storages, storage sheds and accommodation of all description connected with the business of the Company.
- (li) To employ and remunerate experts or consultants to prepare project reports, plants, estimates of schemes of mass transport, to investigate, to examine conditions and prospectus, value and circumstances of mass transport and allied subjects.
- (lii) To enter into agreements and contracts with Indian or Foreign individuals, Companies or other organizations for technical, financial or any other assistance for carrying out all or any of the objects of the Company.
- (liii) To establish and maintain agencies and branches in India or any part of the world for the conduct of business of the Company or for the sale of any

materials or things for the time being at the disposal of the Company for sale.

- (liv) To construct, acquire, establish, provide, maintain and administer factories, estates, generating installations, pipelines, garages, storages and accommodation of all kinds and descriptions in connection with business of the Company
- (lv) Subject to the provisions of the Companies Act, 2013 to lend or deposit money belonging to or entrusted to or placed at the disposal of the Company to any person or Company and in particular to customers and others having dealings with the Company or with or without security, upon such terms as may be thought proper and guarantee the performance of contracts of such person or Company but not to do the business of banking as defined in Banking Regulation Act, 2020
- (lvi) To make advances upon or for the purpose of materials, goods, machinery, stores and other articles or services required for the purpose of the Company.
- (lvii) Subject to the provisions of the Companies Act, 2013 and the Constitution of India, to subscribe or contribute or otherwise to guarantee money to charitable, benevolent, religious, scientific, educational or other institutions or any public, general or useful objects.
- (lviii) To distribute any of the properties of the Company amongst the members in specie or in-kind consequent upon the winding up of the Company.
- (lix) To undertake and execute any trust, the undertaking whereof may seem desirable either gratuitously or otherwise.
- (lx) To establish or promote or concur in establishing or promoting any Company or Companies for the purpose of acquiring all or any property, rights and liabilities of the Company or any other purpose which may seem directly or indirectly calculated to benefit the Company and to place or guarantee the placing of, underwrite, subscribe for or otherwise acquire all or any part of the shares, debentures or their securities of such other Company.
- (lxi) To form subsidiary Companies for any purpose whatsoever.
- (lxii) To experiment and incur expenses necessary for the purpose of improving the present methods and process of working the several business which the Company is authorized to carry on and to carry on research for improving, developing or effecting economy and greater efficiency in the process for the production, manufacture, and working of or trading or dealing in various substances, materials and articles and things for with any of the business for which the Company is established.
- (lxiii) To carry on the business relating to acquiring planning, designing, enlarging, altering, erecting, construction, improving repairing, renovating, developing, managing, and maintaining of immovable properties of all kinds including but not limited to commercial institutional, residential, industrial, lease hold or free hold, anywhere in India or abroad either individually or in association with other undertakings, companies, firms, partnership or any legal associations of persons and or any other entity or entities in India and / or abroad including but not limited to :
 - a. to purchase, take on lease, license, barter, hire, exchange or acquire by

concession, grant or otherwise under any applicable Indian law, either absolutely or conditionally and either alone or jointly any movable or immovable property, privileges, concessions, rights, licenses and easements or interest in or with respect to any such property whatsoever which is deemed essential for any object of the company;

- b. To advance monies or make payments to any person in connection with the above business including payments for and relating to any such immovable property, privileges, concessions, rights, licenses and easements or interest in or with respect to any such property purchased or acquired by or for the company either by cash or other than cash;
- c. To realize the proceeds of any developed or under developed properties of the company by transferring, selling, mortgaging, letting out on hire, leasing out, licensing granting concession or otherwise deal in and/or dispose of all or any portion of immovable properties including advertising rights for properties immovable as well as movable, as may be thought desirable and to accept as consideration cash and consideration other than cash and to take back or reacquire any property so disposed of by re-purchasing or leasing the same or obtaining a license for such price or prices and on such terms, conditions as may be agreed upon;
- d. To vest any immovable property, rights or interests acquired by or belonging to the company in any person or company on behalf of or for the benefit of the company;
- e. To the extent, directly or indirectly, conducive to or incidental to the attainment of the above objects to make and perform contracts, agreements, licenses, leases and other commitments and covenants of every kind, including raising of funds;
- f. To generally do and perform all the above acts and such other things as may be deemed incidental or conducive to the attainment of the above objects or of any of them or which may advantageously or conveniently be combined with the business of the company in a profitable way;
- g. To enter in to agreements with companies, associations, societies, Organizations, or persons, foreign or Indian, for securing any of the above objects of the company or for any purpose conducive to the company

(lxiv) To carry on all or any of the business of the assemblers, processors, repairers, finishers and manufacturers of and dealers in plant, machinery and equipments and tools of all descriptions and components and accessories thereof and in any similar or allied business and either in connection with any of the said businesses or any distinct or separate business.

(lxv) To carry on all kinds of explorations business and in particular to search for prospects, examine, and explore mines supposed to contain metals and minerals for the aforesaid business.

(lxvi) To receive remuneration from, assist and finance any industrial undertaking, project or enterprise, whether owned or run by government, statutory

body, private company, firm or individual with capital, credit or resources for execution of its work and business.

- (lxvii) To carry on the business of any electric power, light and supply company in all its branches, in accordance with the law in force for the time being and in particular to construct, lay down, establish and carry out all necessary power stations, cables, wires, lines, accumulators, rectifiers, lamps and works and to generate and/ or buy in bulk accumulate, distribute, and supply by sale, exchange or otherwise electricity and to light cities, towns, streets, and buildings and places both public and private.
- (lxviii) To issue or guarantee the issue of or the payment of interest of debenture, debenture stock, or other security or obligations of any company or association and to pay or provide for brokerage commission and underwriting in respect of any such issue.
- (lxix) To carry on all or any other business of assemblers, processors, repairers, finishers, manufacturers, of and dealer in plant, machinery, and equipment, and tool of all descriptions and components and accessories thereof.
- (lxx) To carry on the business of agency in all its branches and kinds especially in the fields of advertisements, travel and tourism.
- (lxxi) To carry on the business of hospitality industry in all its branches and kinds by the establishment of hotels, lodging houses, motels, inns, restaurants, cafeteria, pubs, taverns and the like.
- (lxxii) To
 - a. design, establish, provide, maintain and perform engineering, technical and consultancy services for development of urban mass transport projects of all types and descriptions including but not limited to, surveys of all types, feasibility reports, detailed project reports, techno-economic investigations, site selections, supply of basic engineering and detailed design and working drawings for construction of Roadways and other mass transit systems, industrial plants and factories pertaining to their working, and equipment selection therein and manufacture of rolling stock, buses, monorails, tramways and other vehicles, road/rail and equipments of all kinds and description, material handling, preparing specifications and tender documents. Tender evaluation and purchase assistance of all materials and goods pertaining to such projects, expediting, inspection and testing, construction supervision, project management, commissioning and maintenance, training of personnel and any other such services of any kind and description;
 - b. To lend on suitable terms the Company's technicians, experts and others, to parties in India and/or abroad for development of Urban Mass Transport Projects including allied projects in other fields of transportation of all types and descriptions and to send out to foreign countries the Company's technicians, experts and others, plans and drawings, plant and machinery and tools in connection with development of Urban Mass

Transport and allied projects and employ foreign technicians or experts or advisors on a contract basis;

- c. To render technical advice and engineering services and all other connected services relating to the development and operation of Mass Transit and other Urban Transport and People Mover Systems to any person, firm or body corporate in the public or private sector including but not limited to supply of technological information, know-how;
- d. To provide technical know-how and management services to other parties for the manufacture of goods or materials required for Mass Transit and other Urban Transport and People Mover projects of all kinds and description or for installation or erection of machinery or plant for such manufacture or for developing, allied industries in India or abroad;
- e. To lend on suitable terms the Company's technicians, experts and others, to other parties for development of Mass Transit and other Urban Transport and People Mover Systems of all types and descriptions and to send out to foreign countries the Company's technicians, experts and others, plans, and drawings, plant and machinery and tools etc., in connection with development, maintenance and operation of such projects, and employ foreign technicians or experts or advisers on a contract basis for furtherance of Company's objectives aforesaid.

(lxxiii) To carry on the business of mass transit and other urban transport and people mover systems, by road/rail and to generally carry on all businesses relating to these activities, including but not limited to:

- a. making or constructing in or upon, across, under or over any lands, or any streets, hills, roads, water pipes, gas-pipes, oil pipes, sewers, electric supply lines, or telegraph lines, such temporary or permanent, inclined, planes, bridges, embankments, passages, conduits, and fences, as the Company thinks proper;
- b. erecting and constructing such houses, warehouses, offices and other buildings, and such stops, terminuses, yards, stations, machinery, apparatus and other works and conveniences as the Company. thinks proper;
- c. altering, repairing or discontinuing such buildings, works and conveniences as aforesaid or any of them and substitute others in their stead;
- d. making and maintaining works, including afforestation, for the accommodation of the owners and occupiers of lands adjoining the roads such as crossings, bridges, over bridges, under bridges, drains, water sources or other passages over, under or by the sides of or leading to or from the roads;
- e. making boundary marks or fences, erecting gates, chains, bars, stiles or hand rails in connection with the working of the Company;
- f. establishment of ferries for the accommodation of its traffic or otherwise providing and maintaining, bridges and roadways, carrying other traffic roadways constructing and maintaining roads/rails for the accommodation

o f traffic passing, providing and maintaining any means of transport at or near, a station/integrated complex/nodal point which may be required for the reasonable convenience of passengers, carried or to be carried on its People Mover Systems; g. establishment of Mass Transit and other people mover systems of all types and disciplines, road, underground including road based mass capacity rapid transit systems, elevated Ring Road, Surface High Capacity Bus Services, Light Rail/Mono Rail, Road Transit systems (surface, elevated or underground), Rapid Rail Transit Systems, People Mover Systems, including magnetic levitation systems & monorails; h. doing all other acts necessary for making, maintaining, altering or repairing and using the network of public transport system.
The liability of the members is limited.
The Authorised Share Capital of the Company is Rs 5,00,000 (Rupees five lacs only) divided into 50,000 (Fifty thousand) equity shares of Rs one lac each.

We, the several persons whose names and addresses are listed below as subscribers, are desirous of being formed into a Company in pursuance of this Memorandum of Association and we respectively agree to take the number of shares in the capital of the Company set opposite our respective names:

Sr	Name, s/o, Address, Occupation	Number of shares	Sign	Witness.
1.				
2.				
3.				
4.				
5.				
6.				
7.				

ARTICLE OF ASSOCIATION GO GOA LIMITED	
(1) Table A	
The Regulation contained in the Table F of Schedule I to the Companies Act, 2013 shall not apply to this Company, but the Regulations for the management of the Company and for the observance of the members thereof and their representatives, shall, subject to any exercise of the statutory powers of the Company with reference to repeal or alteration of or addition to its Regulations by Special Resolution as prescribed by the said Act, be such as are contained in these Articles.	
(2) Interpretation	
In the interpretation, of these Articles, unless repugnant to or inconsistent with the subject or context:	
(i) "Act"	means the Companies Act, 2013 as amended from time to time and shall include any statutory replacement or re-enactment thereof.
(ii) "Affiliate"	means with respect to any person, any other person, directly or indirectly Controlling, Controlled by, or under direct or indirect common Control with, and such Person. In case of IIT Alumni Council, it includes (i) fund(s) and/or trust(s) under the control/management of IITac; (ii) any other Company in which such fund(s) and/or trust(s) managed by IITAC have a majority shareholding. This specifically includes PanIIT Foundation and PanIIT Forum – both of which are Section 8 companies serving as SPVs for the Goa Alumni Hub project.
(iii) "Agreement" & "Share holders Agreement"	means Shareholders Agreement entered into or to be entered into between Govt of Goa and IITAC and or PanIIT Forum and any Share Subscription Agreement entered simultaneously between the Company and IITac and PanIIT Forum as from time to time amended, supplemented or replaced or otherwise modified and shall include any document which amends, supplements, replaces or otherwise modifies the agreement.
(iv) "Auditors"	
"Auditors" means and includes those persons, appointed, as such for the time being by the Company.	
(v) "Articles"	
"Articles of Association" shall mean the Articles of Association of the Company.	
(vi) "Board" or "Board of Directors"	

"Board" or "Board of Directors" means Board of Directors of the Company.
(vii) " Business Day" shall mean any day other than a Saturday, a Sunday, or a day on which banks in India are authorized or required by Law to be closed.
(viii)"Business Plan" shall mean the base case business plan to be finalised by the Company.
(ix) "The Company" or "This Company"
"The Company" or "this Company" means GO GOA LTD (or whatever variation of the name is approved by the ROC)
(x) "Chairman"
"The Chairman" means Chairman of the Board of Directors of the Company for the time being.
(xi) "Capital"
"Capital" means the share Capital for the time being raised or authorised to be raised, for the purpose of the company.
(xii) "Control" shall mean with respect to any person, the ability to direct the management or policies of such person, directly or indirectly, whether through the ownership of shares or other securities, by contract or otherwise, provided that in all event direct or indirect ownership of or the power to direct the vote of fifty percent (50%) or more of the voting share capital of a person or the power to control the composition of the board of directors of a person shall be deemed to constitute control of that person (the expressions "Controlling" and " Controlled" shall have the corresponding meanings.)
(xiii) "Debenture"
"Debenture" includes debenture stock.
(xiv) "Dividend"
"Dividend" includes bonus.
(xv) "Directors"
"Directors" means Director for the time being of the Company or as the case may be, the Directors assembled at a Board, including any Alternate Director.
(xvi) Effective Date
Effective date shall mean

(xvii) "Extra Ordinary General Meeting"
"Extra Ordinary General Meeting" means an Extra Ordinary General meeting of the members duly called and constituted and adjourned holding thereof.
(xviii) "Financial year" shall mean a period of twelve months commencing from 1st April of any calender year and ending on the 31st March of the next calender year. The first financial year of the Company shall be from the date of its incorporation to 31st March, 2025.
(xix) "Fundamental Issues" shall mean the following issues or matters in respect of which special voting rights are provided for under the Agreement: (i) Approval of Business plan. (ii) Merger with or acquisition of any company by the Company. (iii) Any change in the capital structure of the Company including any fresh issue of capital. (iv) Investment in the any operating companies. (v) Raising of any debt by the Company. (vi) Amendment of the Memorandum of Association and Article of Association of the Company. (vii) Declaration of any dividend or the distribution in any other form and return to the Shareholders of the Company. (viii) Any proposal for the renewal or appointment of Statutory Auditors and internal auditors of the Company. (ix) Establishment of the subsidiaries and/or entering into any of partnerships or joint ventures. (x) Diversification or proposed entry into new business or activity which falls outside the scope of its current areas of operations. (xi) Any increase or decrease in the size of Board of Directors, beyond nine. (xii) Dissolve, liquidate or re-organise the Company. (xiii) Sell, transfer, lease substantial assets of the Company. (xiv) Issue of fresh equity (including preference shares, convertible debentures, warrants or any other quasi equity instrument) including initial public offer.
(xx) "Funds" shall mean the fund provided, set up, established or promoted by GOGIITac or Govt of Goa or their affiliate entities to facilitate development and funding of Integrated Multi- Modal Public Transport Network project in State of Goa
(xxi) "GOGGoG" shall mean the Government of Goa and its affiliate including public sector undertakings and autonomous bodies.
(xxii) "IITAC" shall mean the IIT Alumni Council, a Section 8 company incorporated under the Companies Act, 2013 and shall include its Affiliates – specifically the PanIIT Foundation and the PanIIT Forum
(xxiii) "In Writing" and "Written"

"In Writing" and "Written" include printing, lithography and other modes of representing or reproducing words in a visible form.
(xxiv) "Indian GAAP" shall mean Indian generally accounting principles consistently applied from time to time.
(xxv) "IPO" shall mean the initial public offering of the Shares of the Company either through a primary offering (i.e. an issue by the Company of additional Shares) or a Secondary offering (i.e. a sale by one or more Shareholders of any of their respective Shares) or both, which would (i) comply with all applicable laws, including without limitation, the rules and regulations of the Securities Exchange Board of India and any other relevant stock exchange, (ii) result in the Company and/or its Shares being listed on one or more recognised stock exchanges.
(xxvi) "Integrated Multi Modal Public Transport Network Projects" or "IMMPTN Projects" shall mean the projects as under hereto and shall include such other projects to be under taken by the Company: 1. Construction of Bus System 2. Construction of virtual Metro System 3. Construction of Water Transport System 4. Construction of Aerial Transport System including Drone type systems 5. Integrated Ticketing System for all modes of Public Transport in Goa and elsewhere 6. Development of Intermodal Interchange points. 7. Consultancy for improving Public Transport System and other associated issued like operation 8. Bus Depots, Passenger Terminals and Interchange Points. 9. Improvement and Development of Existing and Planned transportation related infrastructure
(xiii) "Financial Year"
"Financial Year" means such period in respect of which any profit and loss account of the company in an Annual General Meeting is made up as the Board shall determine, whether that period is a year or not.
(xxvii) "Gender"
Words importing the Masculine gender include also feminine gender.
(xxviii) "General Meeting"
"General Meeting" means a general meeting of the members held in accordance with the provisions of the Section 96 of the Act.
(xix) "Managing Director"
"Managing Director" means the Managing Director for the time being of the Company.
(xxx) "Member"

"Member" means the duly registered holder from time to time and include "the subscribers to, the, Memorandum of, Association of the Company and includes Shareholders.
(xxxi) "Month"
"Month" means a calendar month.
(xxxii) "Office"
"Office" means the Registered Office for the time being of the Company.
(xxxiii) "Ordinary' Resolution" and "Special Resolution"
"Ordinary Resolution" and "Special Resolution" shall have meanings assigned thereto under Section 114 of the Act.
(xxxiv) "Paid-up"
"Paid-up" in relation to the Share Capital of the Company includes credited as paid-up.
(xxxv) "Person"
"Person" shall mean any individual, corporation, partnership, limited liability company, joint venture, association or trust or any other entity or organisation and may include party hereto.
(xxxvi) "Proxy"
"Proxy" includes Attorney duly constituted under a Power of Attorney.
(xxxvii) "The Registrar"
"The Registrar" means the Registrar of Companies of the State in which the office of the Company is for the time being, situated.
(xxxviii) "Register of Members"
"Register" means the Register of Members to be kept pursuant to Section 88of the Act and unless it be repugnant to the context or otherwise, the register of Beneficial Owners in case of shares held in Depository.
(xxxix) "Seal"
"Seal" means the Common Seal for the time being of the Company.
(xxxx) "Share"
Shares shall mean the equity shares of face value Rs 10/- (Rs ten each) of the Company issued from time to time.

(xxxxi) "Shareholder" shall mean the holder of the Shares of the Company for the time being and "Shareholders" means collectively all those who hold shares of the Company.
(xxxxii) "Secretary"
"Secretary" means the Company Secretary within the meaning of clause(c) of sub section (1) of section 2 of the Company Secretaries Act, 1980 and includes any individual possessing the prescribed qualifications and appointed to perform the duties which may be performed by a Secretary under the Act and any other ministerial or administrative duties and includes an Assistant or Deputy Secretary possessing these qualifications.
(xxxxiii) "Singular Number"
Words importing the singular number include, where the context admits or requires the plural number or <i>vice versa</i>
(xxxxiv) "Super Majority Resolution" in relation to fundamental issue shall refer to a special resolution as defined in the Act in the case of a general meeting of the Company, and in the case of the a meeting of the Board of Directors a resolution on which atleast 75% of those directors present and being entitled to vote on such matter, vote in favour of the resolution with respect to such Fundamental Issue. Provided every such resolution to be passed shall require the affirmative vote of the authorized representative of each of the shareholder or the shareholder director, as the case may be.
(xxxxv) "Third Party" shall mean any person other than the Parties.
(xxxxvi) "Transfer" in relation to Shares and or other securities of the Companies, shall mean and include any direct or indirect sale, assignment, transfer, pledge, gift, alienation of, or the grant of any option or right to purchase or otherwise acquire Shares of the Company.
(xxxxvii) "Year"
"Year" means a calendar year.
The marginal notes used in these articles shall not affect the construction or interpretation thereof.
Save as aforesaid any words or expressions defined in the Act shall, if not inconsistent with the subject or context, bears the same meaning in these Articles.
(3) Share Capital

The authorized Share Capital of the Company is Rs. 5,00,000 only (Rupees Five lacs) divided into 50,000 (Fifty thousand) Equity Shares of Rs. 10/- (ten) each. The minimum paid up share capital will be Rs. 5,00,000/-.

(3A) Shareholding limits

The subscription and allotment of the sharecapital of the Company shall be in the following manner;
GoG and affiliates 50%
IITac and affiliates IITAC 50%

(4) Increase of Capital by the Company and how carried into effect

The Company in a General Meeting may from time to time increase the capital by the creation of new Shares such increase to be of such aggregate amount and to be divided into shares of such respective amounts as the resolution authorizing such increase shall prescribe. The new Shares shall be issued upon such terms and conditions and with such rights and privileges attached thereto as such resolution shall prescribe and, in particular, such Shares may be issued with a preferential or qualified, right to Dividends and in the distribution' of assets of the Company, and with a right of voting at General Meetings of the Company in conformity with Section 47 of the Act. Whenever the capital of the company has been increased the Board shall comply with the provisions of Section 64 of the Act.

(5) Reduction of the Capital

The Company may (subject to the provisions of Sections 52, 55 and 66 of the Act) from time to time by a 'Special Resolution', reduce its capital and any Capital Redemption Reserve Account or Premium Account in any manner for the time being authorized by a law and in particular, capital may be paid off on the footing that it may be called up again or otherwise. This Article is not to derogate from any power the Company would have if it were omitted.

(6) Sub. Division and Consolidation of Shares

Subject to the provisions of Section 61 of the Act, the Company in a General Meeting may, from time to time, sub - divide or consolidate its shares or any of them and the resolution whereby any Share is sub-divided, may determine that, as between the holders of the Shares resulting from such sub-division one or more of such Shares shall have some preference or special advantage as regards Dividend, Capital or otherwise over or as compared with the others or other. Subject as aforesaid the Company in General Meeting may also cancel Shares which have not been taken or agreed to be taken by any person and diminish the amount of its share capital by the amount of the Shares so cancelled.

(7) Modification of Rights

Whenever the capital, by reason of the issue of preference Shares or otherwise, is divided into different classes of Shares, all or any of the rights and privileges attached to each class may, subject to the provisions of Sections 48 of the Act, be modified, commuted, effected or abrogated or dealt with by agreement between the Company and any person purporting to contract on behalf of that class, provided such agreement is ratified in writing by holders of at least three fourths in nominal value of the issued Shares of the class or is confirmed by a Special Resolution passed at a separate General Meeting of the holders of Shares of that class.

(8) Power to issue Preference Shares

The Company shall have the power to issue preference shares subject to the provisions of the Act, and special resolution authorizing such issue which shall prescribe the manner, terms and conditions of conversion / redemption.

(9) Issue of Shares for consideration other than cash

Subject to these Articles and the provisions of the Act, the Board may issue and allot shares in the capital of the Company as payment or in consideration or as part payment or in part consideration of the purchase or acquisition of any property by the company or for service rendered to the company in the conduct of its business and such consideration shall become debt due to and recoverable by the company from the allottee in lieu of the shares to be allotted to him.

(10) Restriction on Purchase of its own shares.

Except to the extent allowed by Section 67 of the Act or for the purposes of funding the Esop Trust or such purpose as approved by the shareholders and as permitted by the Act, no funds of the Company shall be employed in the purchase of its own shares.

(11) Allotment of Shares

Save as aforesaid, the shares, whether forming part of the original capital or of any increased capital of Company, shall be allotted to such persons, on such terms and conditions and either at a premium or at par or at a discount and at such times as the Directors may think fit but subject to provisions of the Act or Articles.

(11A) Authority to dematerialize securities:

Notwithstanding anything contrary contained in these Articles, the Board may at any time decide to permit holding of and dealing in any or all shares or debentures or other securities of the Company (hereinafter referred to as "Securities") in dematerialized form under the provisions of the Depository Act and may offer the securities of the Company for Subscription/allotment in dematerialized form in the manner provided by the said Act.

(11B) Option to hold securities in certificates or with Depository

Every person holding any securities of the Company through allotment or otherwise shall have the option to receive and hold the same in the form of certificates or to hold the same with the Depository.
(11C) Securities with Depository to be Dematerialized
All securities held with a Depository shall be dematerialized and the depository shall hold the same for the beneficial owners thereof in a fungible form.
(11D) Beneficial Owner is member
Every person holding securities of the Company and whose name is entered as a beneficial owner in the records of the Depository shall be deemed to be a member of the Company. The beneficial owner of the securities shall be entitled to all the rights and benefits and be subject to all the liabilities in respect of the securities held by him in a depository.
(11E) Beneficial owner may opt out of a depository.
Every person holding securities of the company with depository, being the beneficial owner hereof, may at any time opt out of the depository in the manner provided under the provisions of the Depository Act and on exercise of such option and on fulfillment of the conditions and payment of fees prescribed under the said Act the Company shall rematerialize the relevant securities and issue to the beneficial owner thereof the requisite certificates of such securities.
(11F) Intimation to Depository
(a) The Company shall make available to the depository, copies of relevant records in respect of securities held by such depository for the beneficial owners thereof (b) When a holder or an allottee of the securities and issue to the beneficial, the Company shall intimate such depository the details of his holdings or allotment of securities and thereupon the depository shall enter in its records the names of the holders/allottees as the beneficial owners of such securities.
(11G) Register and Index of Beneficial Owners:
The Register and Index of Beneficial Owners of securities maintained by a depository under Section 11 of the Depository Act shall be deemed to be and forming part of the Register and Index of Members or of holders of Debentures or other securities of the Companies.
(11H) Transfer of securities held in a Depository:

- (a) Every depository shall furnish to the company information about the transfer of securities, the names of the Beneficial Owner at such intervals and in such manner as may be specified under the provisions of the Depository Act.
- (b) Every depository shall furnish to the Company information about the transfer of securities, the names of Beneficial Owner at such intervals and in such manner as may be specified under the provisions of the Depository Act.
- (c) Section 56 of the Act shall not apply to transfer of securities effected by the transferor and the transferee both of whom are entered as Beneficial Owners in the records of a Depository.

(12) Commission for placing Shares

Subject, to provisions of the Act, the Company may pay a Commission to any person for subscribing or agreeing to subscribe (whether absolutely or conditionally) for any shares, debentures or debenture stock of the Company or for procuring or agreeing to procure subscription (whether absolute or conditional) for any shares, debentures or debenture stock of the Company. Such commission may be paid or satisfied in cash or in shares, debentures or debenture stock of the Company.

(13) Installment on shares to be duly paid

If, by the conditions of allotment of any share, the whole or part of the amount of Issue price thereof shall be payable by installments, every such installment when due, shall be paid to the company by the person who, for the time being and from time to time, shall be the registered holder of the share or his legal representative. The joint holders of a share shall be severally as well as jointly liable for payment of all installments and calls due in respect of such shares.

(14) Shares under control of the Board

Subject to the provisions of these Articles and of the Act, the Shares shall be under the control of the Board which may allot or otherwise dispose of the same to such persons on such terms and conditions and at such time as it may think fit and subject to the sanction of the Company in General Meeting with full power, to give any person the option to call for or be allotted Shares of any class of the Company either (subject to the provisions of Sections 52 and 53 of the Act) at a premium or at par or at a discount and such option being exercisable for such time and for such consideration as the Directors may think fit. The Board shall cause to be made the returns as to allotment provided for in Section 39 of the Act.

(15) Power to Company in General Meeting to issue shares

In addition to and without derogating from the powers for that purpose conferred on the Board under Articles 13 and 14, the Company in general meeting may subject to the provisions of Section 62 of the Act, determine that any share (whether forming part of the original capital or of any increased capital of the Company) shall be offered to such persons (whether members or not) in such proportion and on such terms and conditions and either (subject to compliance with the provisions of Section 52 and 53 of the Act) at a premium or at par or at a discount, as such general meeting shall determine and with full power to give any person (whether a member or not) the option to call for or be allotted, shares of any class of the Company, either (subject to compliance with the Provisions of Section 52 and 53 of the Act) at a premium or at par or at a discount, such option being exercisable at such times and for such consideration as may be directed by such General meeting or the Company in general meeting may make any other provision whatsoever for the issue, allotment or disposal of any shares.

(16) Acceptance of Shares

Any application signed by the applicant for shares in the Company, followed by an allotment, of any share therein, shall be an acceptance of shares within the meaning of these presents, every person who thus or otherwise accepts any shares and whose name is on the Register shall, for the purposes of these presents, be a Member.

(17) Deposit and Call etc. to be a debt payable immediately

The money (if any) which the Board shall, on the allotment of any share being made by them, require or direct to be paid by way of deposit, call or otherwise, in respect of any share allotted by them, shall immediately on the insertion of the allottee in the Register of Members as the name of the holder of such shares, become a debt due to and recoverable by the Company from the allottee thereof, and shall be paid by him accordingly.

(18) Liability of members

Every member or his heirs, executors or administrators shall pay to the Company the portion of the capital represented by his share or shares which may, for the time being remain unpaid thereon, in such amounts, at such time or times and in such manner as the Board Of Directors shall, from time to time, require or fix for the payment thereof

(19) Trust not recognised

Except as ordered by a Court of competent jurisdiction or as provided by the Act, no notice of any trust, express, implied or constructive shall be entered on the Register of members or of debenture holders of the Company.

(20) Register and Index of Members

(a) The Company shall cause to be kept a Register and Index of Members in accordance with Sections 88 of the Act. The Company shall be entitled to keep in any State or Country outside India a branch Register of Members resident in that State or Country subject to and in accordance with Sections 88 of the Act. (b) The shares in the capital shall be numbered progressively according to their several denominations and except in the manner herein mentioned, no share shall be subdivided.
(21) New shares to be offered to existing members
After the issue and allotment of Shares except in accordance with the provisions of Section 81(1A) of the Act, the Company shall not issue or allot any further shares, unless such shares have first been offered to the existing Shareholders of the Company at the time of issue of such further Shares, in proportion to their shareholding on the date of such issue and allotment and such offer shall be made by a notice in writing specifying the number of shares offered and limiting a time not being less than 15 days from the date of the offer within which the offer, if not accepted, will be deemed to have been declined. After the expiry of the time specified in the notice aforesaid or on receipt of earlier intimation from the person to whom such notice is served that he declines to accept the shares offered, the Board of Directors may dispose of them in such manner as they think most beneficial to the Company.
(22) Certificates how to be issued
The Certificate of title to shares shall be issued under the Common Seal of the Company and shall bear the signature of any person or persons authorised by the Board in that behalf. The Company shall within three months after the allotment of shares and within two months after the application of the transfer of any share, debenture or debenture stock, complete and have ready for delivery the certificates of shares allotted, unless the conditions of issue of shares otherwise provide. Additionally, two Directors may sign a share certificate by affixing their signatures thereon by means of any machine, equipment or other mechanical means such as engraving in metal or lithography but not by means of rubber stamp. Provided always that notwithstanding anything contained in this Article, the certificates of title to shares may be executed and issued in accordance with such other provisions of the Act or the Rules made thereunder as may be for the time being in force.
(23) Member's right to Certificate
Every member shall be entitled, free of charge, to one certificate for all the shares registered in his name Every Certificate of shares shall specify the number and the distinctive number, number of shares in respect of which it was issued and the amount paid up thereon. For each further certificate(s), the Directors shall be entitled, but shall not be bound, to prescribe a charge not exceeding one rupee.
(24) Fractional Certificate

The Company may issue such fractional Certificates, as the Directors may approve, in respect of any of the shares of the Company on such terms as the Directors may think fit as to the period within which the fractional certificates are to be issued.

(25) Issue of new certificate in place of one defaced, lost or destroyed

If any certificate be worn out or defaced or torn to be otherwise mutilated or there is no further space on the back thereof for endorsement of transfer, then, upon production thereof to the Directors, they may order the same to be cancelled and may issue a new certificate in lieu thereof and if any certificate be lost or destroyed, then, upon proof thereof to the satisfaction of the Directors and on such indemnity and the payment of out-of pocket expenses incurred by the company, as the Directors deem adequate, being given and upon such advertisement being published as the Board may require, a new certificate in lieu thereof shall be given to the party entitled to such lost or destroyed certificate upon payment of such sum not exceeding two rupees, as the Directors may from time to time prescribe, shall be paid to the Company for every certificate issued under this clause provided that no fee shall be charged for issue of new certificates in replacement of those which are old or worn out or where the pages on the reverse for recording transfers have been fully utilised. .

(26) Issue of certificates to jointholders

The certificate of shares registered in names of two or more persons shall be delivered to the person first named in the Register.

(27) The first name of joint holders/deemed sole holder

If any share stands in the names of two or more persons, the person first named in the Register shall, as regards receipt of dividends or bonus or service of notices or any other matter connected with the Company except voting at meetings and transfer of shares, be deemed to be the sole holder thereof as per provisions of the Act.

(28) Calls

The Board of Directors may, from time to time, subject to the terms on which any Shares or Debentures may have been issued and subject to the conditions of allotment, by a resolution passed at a meeting of the Board (and not by a resolution by circulation) make such calls as it thinks fit upon the Members or Debenture holders in respect of all moneys unpaid on the Shares or Debentures held by them respectively and each Member or Debenture holder shall pay the amount of every call so made on him to the person or persons and at times and places appointed by the Board. A call may be made payable by installments. The Directors, from time to time, by resolution passed at a meeting of Directors (and not by a resolution passed by circulation) make such calls as they think fit. A call shall be deemed to have been made, when the resolution of Directors authorising such calls, was passed.

(29) Notice of Calls

At least 14, days notice of any call shall be given by the Company specifying the time and place of payment and to whom such calls shall be paid. A call may be revoked or postponed at the discretion of Board.

(30) Directors may extend time

The Board may, from time to time at its discretion, extend the time fixed for payment of any call. It may extend such time as to all or any of the Members or Debentureholders who because of their residence being at a distance or for any other cause cannot pay in time, and whom the Board may fairly deem entitled to such extension. No Member or Debenture holder shall be entitled to such extension save as a matter of grace and favour.

(31) Payment of Calls

If by the terms of issue of any share or otherwise *any* amount is or becomes payable on allotment or at any fixed date or by installments at fixed times whether on account of the nominal amount of the share or by way of premium, every such amount or installment shall be payable as if it were a call duly made by the Directors and payable on the date on which, by the terms of issue or otherwise, such sum becomes payable and of which due notice has been given. In case of non-payment of such sum, all the relevant provisions herein contained as to payment of interest and expenses, forfeiture or otherwise shall apply as if such amount had become payable by virtue of a call duly made and notified.

(32) Calls to carry interest

If any Member or Debenture holder fails to pay any call due from him on the day appointed for payment thereof. or any such extension thereof as aforesaid, he shall be liable to pay interest on the same from the day appointed for the payment thereof to the time of actual payment at such rate as shall from time to time be fixed by the Board by nothing in this Article shall render it obligatory for the Board to demand or recover any interest from any such member or debenture holder.

(33) Evidence in Action for Call

On the trial or hearing of any action for the recovery of any money due for any call, it shall be sufficient. to prove that the name *of* the member sued is entered in the Register as the holder or one of the holders, of the shares, in respect of which such debit accrued, that the resolution making the call is duly recorded in the minute book and that notice of such call was duly given to the member sued, in pursuance of these presents and shall not be necessary to prove the appointment of the directors who made such call neither a quorum nor any other matters whatsoever and the proof of the matter aforesaid shall be conclusive evidence of the debit.

(34) Partial Payment not to preclude forfeiture

Neither a judgement nor a decree in favour of the company calls or other moneys due in respect of any shares not the receipt by the company of a portion of any money which shall from time to time be due from any member in respect of any shares neither by way of principal or interest nor any indulgence granted by the company in respect of payment of any such money shall preclude the company from thereafter proceeding to enforce a forfeiture of such shares as herein provided.

(35) Payment of Calls in advance

(a) The Board may, if it thinks fit, may agree to and receive from any member willing to advance the same, all or any part of the amount of his share beyond the sum actually called up and upon the moneys so paid in advance or upon so much thereof, from time to time, and at any time thereafter as exceeds the amount of the calls then made upon and due in respect of the share on account of which such advances are made, the Board may pay or allow interest, at such rate as the member paying the sum in advance and the Board agree upon. The Board may agree to repay at any time any amount so advanced or may at any time repay the same upon giving to the member three months' notice in writing provided that moneys paid in advance of calls on any shares may carry interest but shall not confer a right to dividend or participate in profits;

(b) No member paying any such sum in advance shall be entitled to voting rights in respect of the moneys so paid by him until the same would but for such payment, become presently payable

(36) Members not entitled to privileges of membership until all calls paid.

No member shall be entitled to receive any dividend or to exercise any privilege as a member until he shall have paid all calls for the time being due and payable on every share held by him, whether alone or jointly with any other person together with interest and expenses, if any.

FORFEITURE AND LIEN**(37) If call or installment not paid, notice may be given**

If any member fails to pay any call or installment on or before the day appointed for the payment of the same, the Directors may at a time thereafter, during such time as the call or installment remains unpaid, serve a notice on such member requiring him to pay the same together with any interest that may have accrued by the company by reason of such non-payment.

(38) Form of notice

The notice shall name a day (not being earlier than the expiry of fourteen days from the date of service of the notice) and a place or places, on and at which such call or installment and such interest and expenses as aforesaid are to be paid. The notice shall also state that in the event of non-payment, on or before the time and at the place appointed, the shares in respect of which the call was made or installment is payable will be liable to be forfeited.

(39) If notice not complied with, shares may be forfeited
If the requisitions of any such notice, as aforesaid, are not complied with, any shares in respect of which such notice has been given may, at any time thereafter, before payment of all calls or installments, interest and expenses, due in respect thereof be forfeited by a resolution of the Board of Directors to that effect. Such forfeiture shall include all dividends declared in respect of the forfeited shares and not actually paid.
(40) Notice of forfeiture
When any share shall have been so forfeited, notice of the resolution of the Board of Directors shall be given to the member in whose name it stood immediately prior to forfeiture and an entry of the forfeiture with the date thereof shall forthwith be made in the register of members, provided however, that failure to give the notice will not in any way invalidate the forfeiture.
(41) Forfeited shares to become property of the Company
Any shares so forfeited shall be deemed to be the property of the Company and the Directors may sell, re-allot and otherwise dispose of the same in such manner as they think fit.
(42) Power to annul forfeiture
The Directors may, at any time, before any shares so forfeited, shall have been sold, reallocated or otherwise disposed of, annul the forfeiture thereof a(a matter of grace and favour but not as of right upon such terms and conditions as they may think fit.
(43) Arrears to be paid notwithstanding forfeiture
Any member whose shares shall have been forfeited shall, notwithstanding the forfeiture, be liable to pay and shall forthwith pay to the company all calls, installments, interest and expenses, owing upon or in respect of such shares at the time of forfeiture together with interest thereon, from the time of forfeiture until payment, at the rate of 12 per cent per annum and the Directors may enforce the payment of such moneys or any part thereof if they think fit, but shall not be under any obligation to do so.
(44) Effect of forfeiture
The forfeiture of a share shall involve extinction of all interests in and also of all claims and demands against the company in respect of the share and all other rights incidental to the same except only such of those rights as by these presents are expressly saved.
(45) Certificate of forfeiture

A certificate in writing under the hands of a Director, Managing Director, Manager or the Secretary of the Company, that the call in respect of a share was made and notice thereof given and that default in payment of the call was made and that the forfeiture of the shares was made by a resolution of the Board of Directors to that effect, shall be conclusive evidence of the fact stated therein as against all persons entitled to such share.

(46) Title of purchaser and allottee of forfeited shares

The company may receive the consideration, if any, given for the share on any sale, re-allotment or other disposal thereof and may execute transfer of the share in favour of the person to whom the share is sold or disposed of and the person to whom such share is sold, re-allotted or disposed of may be registered as the holder of the share. Any such purchaser or allottee shall not (unless by express agreement) be liable to pay any calls, amounts, installments, interest and expenses owing to the company prior to such purchase or allotment nor shall he be entitled (unless by express agreement) to any of the dividends, interest or bonuses accrued, or which might have accrued upon the share before the time of completing such purchase or before such allotment. Such purchaser or allottee shall not be bound to see the application of the purchase money, if any, nor shall his title to the share be affected by any irregularity or invalidity in the proceedings in reference to the forfeiture, sale, re-allotment or disposal of the share.

(47) Company's lien on shares

The Company shall have no lien on its fully paid up shares. In the case of partly paid up shares, the Company shall have a lien only to the extent of all moneys called or payable at a fixed time in respect of such shares; otherwise, such partly paid up shares shall be free from any lien of the Company. Any lien on shares shall extend to all dividend and bonus declared from time to time in respect of such shares. Unless otherwise agreed, the registration of a transfer of shares shall operate as a waiver of the Company's lien, if any, on such shares. The Board of Directors may, at any time, declare any shares to be wholly or in part exempt from the provisions of this Article.

(48) Enforcement of lien by sale

For the purpose of enforcing such lien, the Board of Directors may sell the shares subject thereto in such manner as they think fit but no sale shall be made unless a sum in respect of which the lien exists is payable and until notice in writing has been served on such member or in the event of his death or insolvency of his heirs, executors or administrators stating and demanding payment of such part of amount in respect of which lien exists is presently payable and default shall have been made by him or them in the payment, fulfillment or discharge of such debts, liabilities or engagements for 14 days after such notice. To give effect to any such sale, the Board may authorise some person to execute an instrument of transfer in respect of the shares sold and to transfer the shares sold to the purchaser thereof and the purchaser shall be registered as the holder of the shares comprised in any such transfer. Upon any such sale as aforesaid the certificates in respect of the shares sold shall stand cancelled and become null and void and of no effect and the Directors shall be entitled to issue a new certificate in lieu thereof to the purchaser or purchasers concerned.

(49) Application of proceeds of sale

The net proceeds of such sale shall be received by the Company and after payment of the cost of such sale shall be applied in payment of such part of the amount in respect of which lien exists as is presently payable and the residue, if any, subject to a like lien for sums not presently payable as existed upon the shares before the sales be paid to the persons entitled to the shares as the date of the sales.

(50) Validity of sale in exercise of lien and after forfeiture

Upon any sale after forfeiture or for enforcing a lien in purported exercise of the powers hereinbefore given, the Board of Directors may appoint some person to execute an instrument of transfer of the shares sold and cause the purchaser's name to be entered in the register in respect of the shares sold and the purchaser shall not be bound to see the regularity of the proceedings nor to the application of the purchase money and after his name has been entered in the register in respect of such shares, his title to the shares shall not be affected by any irregularity or invalidity in the proceedings in reference to the same.

(51) Board of Directors may issue new certificate

Where any shares under the powers in that behalf herein contained are sold by the Board of Directors after forfeiture or for enforcing a lien and the certificate in respect thereof has not been delivered upto the Company by the former holder of such shares, the Board of Directors may issue a new certificate of such shares distinguishing it in such manner as they may think fit from the certificate not so delivered.

(52) Application of forfeiture provisions

The provisions of the Articles as to forfeiture shall apply in the case of non-payment of any sum which by the terms of the issue of a share, becomes payable at a fixed time, whether on account of the amount of the share, or by way of premium, as if the same, had been payable by 'virtue of a call duly made and notified. .

(53) Execution of transfer, etc.

No transfer of shares in or debentures of the Company shall be registered unless in accordance with the provisions of Section 56 of the Act and Article 48 hereof a proper instrument of transfer duly stamped and executed by, or on behalf of the transferor and by or on behalf of the transferee and specifying the name, address and occupation, if any, of the transferee has been delivered to the Company along with the certificates relating to the shares or debentures or if no ,such certificate is in existence, along with the letter of allotment of the shares or debentures provided that the transferor shall be deemed to remain the holder of such share until the name of the transferee is entered, in the Register in respect thereof.

(53A) Lock in Period

None of the Shareholders shall Transfer any part of the Shares acquired by them pursuant to the provisions of this Agreement for a period of three years from the effective date. Notwithstanding the aforesaid the Shareholders have the right to Transfer their Shares to any of its Affiliates.
(53B) Right of Refusal
In case IITAC desire to dilute their shareholding in the Company other than transfer to its affiliate, GOG shall have the right to refusal to acquire the shares proposed to be sold by IITAC and/or to require IITAC, to sell otherwise transfer the same to the third party nominated by GOG as the transferee.
(53C) Transfer to Third Party
Subject to the provisions of the agreement, no transfer of any shares shall be made to the third party unless such third party shall have agreed in writing to be bound by the provisions of the agreement by executing an deed adherence in a form and manner acceptable to the shareholders.
(53D) No Assignments
Neither this Agreement (in part or In whole) nor any right or obligation hereunder or part hereof may be assigned by any party hereto (any attempt to do so will be void) , except as otherwise specially provided herein. Notwithstanding the aforesaid, IITAC and GOG may at their option assign any of its rights or obligations under this Agreement to any of its Affiliates.
(54) Form of transfer
The instrument of transfer of any share shall be in writing in the prescribed form and in accordance with Section 56 of the Act.
(55) Notice to the transferee and the transferor on refusal to transfer shares
If the Company refuses to register any such transfer or transmission of any share, the Company shall, within two months from the date on which the instrument of transfer or the intimation of such transmission, as the case may be was delivered to the Company, send notice of the refusal to the transferee and the transferor or to the person giving intimation of such transmission, as the case may be, giving reasons for such refusals.
(56) No transfer to infant etc.
No partly paid shares shall be transferred minor, an infant or person of unsound mind.
(57) Transfer to be left at office and evidence of title given when transfer to be retained

Every instrument of transfer duly executed and stamped shall be left at the office of the Company for registration accompanied by the certificate of the shares to be transferred and such other evidence as the Company may require to prove the title of the transferor or his right to transfer the shares. All instruments of transfer, which shall be registered, shall be retained by the Company, but any instrument of transfer which the Directors may decline to register shall on demand, be returned to the person depositing the same.

(58) Fee on transfer

A fee *not* exceeding Rupees two *may* be charged for each instrument of transfer and shall, if required by the Directors, be paid before the registration thereof.

(59) Closure of transfer books

The Directors may, after giving not less than seven days' previous notice by advertisement as required by Section 91 of the Act, close the Register of Members or the Register of Debenture-holders for any period or periods not exceeding in the aggregate forty-five days in each year, nor exceeding thirty days at anyone time.

(60) Title to share of deceased holders

The executors or administrators of a deceased member shall be the only persons recognised by the Company as having any title to the share except in case of joint holders, in which case the surviving holder or holders or the executors or administrators of the last surviving holder shall be the only persons entitled to be so recognised; but nothing herein contained shall release the estate of a deceased joint holder from any liability In respect of any share jointly held by him. The Company shall not be bound to recognise such executor or administrator unless he shall have obtained probate or letter of administration, succession certificate or other legal representation, as the case may be from a duly constituted Court of India to grant such probate or letters of administration provided nevertheless that in cases, which the Board in its discretion consider to be special cases and in such cases only, it shall be lawful for the Board of Directors to dispense with the production of probate or letter of administration or such other legal representation upon such terms as to indemnify or otherwise as the Board of Directors may deem fit. The holder of succession certificate relating to the Sf are of a deceased member shall be deemed to be an administrator for the purposes of this article.

(61) Directors' power to reject application of Transfer

The Board of Directors shall have absolute and uncontrolled discretion and power to decline to register any proposed transfer or transmission of any shares giving reasons for such refusals.

(62) Registration of persons entitled to shares otherwise than by transfer (transmission clause)

Subject to the provisions of the Act and these presents any person becoming entitled to a share in consequence of death, bankruptcy or insolvency of any member or by any lawful means other than by a transfer in accordance with these presents, may with the consent of the Directors (which they shall not be under any obligation to give), upon producing such evidence as the Board thinks sufficient either be registered himself as the holder of the share or elect to have some person nominated by him and approved by the Board, registered as such holder; provided nevertheless, that if such person shall elect to have his nominee registered, he shall testify the election by executing to his nominee an instrument of transfer of the share in accordance with the provisions herein contained and until he does so, he shall not be free from any liability in respect of the share.

(63) Persons entitled may receive dividends without being registered as members

A person entitled to a share by transmission shall, subject to the right of the Directors to retain in consequence of death, bankruptcy or insolvency any such dividends or money as hereinafter provided, be entitled to receive, and may give a discharge for, any dividends or other moneys payable in respect of the share,

(64) Board may require evidence of transmission

Every transmission of share shall be verified in such manner as the Directors may, require and the Company may refuse to register any such transmission until and unless an indemnity be given to the Company with regard to such registration, which the Directors in their discretion shall consider: sufficient, provided, nevertheless, that there shall not be any obligation on the Company or the Directors to accept any indemnity.

(65) Transfer by Legal Representative

A transfer of share in the Company of a deceased member thereof, made by his legal representative shall, although the legal representative is not himself a member, be as valid as if he had been a member at the time to the execution of the instrument of transfer,

(66) Certificate of transfer

The certification by the Company of any instrument of transfer of shares in or debentures of the Company, shall be taken as a representation by the Company to any person acting in the faith of the certification that there have been produced to the Company such documents as on the face of them show a prima facie title to the share or debentures in the transferor named in the instrument of transfer but not as a representation that the transferor has any title to the shares or debentures.

(67) Transfer of debentures

The provision of these Articles shall *mutatis mutandis* apply to the transfer or transmission by operation of law of the right, Debentures/Debenture stock of the Company.

(68) Joint Holders

Where two or more persons are registered as the holders of any share, the person first named in the Register as one of the joint holders of the share shall be deemed the sole holder for matters connected with the Company subject to the following and other provisions contained in these presents:

- a) The joint holders of any share shall be liable severally as well as jointly for and in respect of all calls and other payments which ought to be made in respect of such share;
- b) On the death of any such joint holders the survivor or survivors shall be the only person or persons, recognised by the Company as having any title to the share but the Directors may require such evidence of death, as they may deem fit and nothing herein contained shall be taken to release the estate of a deceased joint holder from any liability on shares held by him jointly with any other persons;
- c) Anyone of several persons who are registered as joint holders of any share may give effectual receipts for all dividends and payments on account of dividends in respect of such share;
- d) Only the person whose name stands first in the Register of Members as one of the joint holders of any. shares shall be entitled to the delivery of the certificates relating to such share or to receive documents, (which expression shall be deemed to include all documents referred to in Articles) from the Company and any documents served on or sent to such person shall be deemed to have been served on all the joint - holders;
- (e) Anyone of two or more joint holders may vote at any meeting either personally or by attorney duly authorised under power of attorney or by proxy in respect of such shares as if he were solely entitled thereto and if more than one of such joint holders be present at any meeting personally or by proxy or by Attorney then that one of such persons, so present whose name stands first or higher (as the case may be) on the Register in respect of such share shall alone be entitled to vote in respect thereof and the other joint holders shall be entitled to be present at the meeting, provided always that a joint holder present at any meeting personally shall be entitled to vote in preference to a joint holder present by attorney or proxy although the name of such joint holder present by an attorney or proxy stands first or higher (as the case may be) in the Register in respect of such shares. Several executors or administrators of a deceased member in whose (deceased members) sole name any share stands shall, for the purpose of this sub clause, be deemed joint holders.

(69) Issue of further pari passu shares the right of shares already issued

The Shares issued, subscribed and allotted further to the existing Shares of any class will rank pari passu in all respects and be identical with the shares issued, subscribed and allotted of any class prior to the date of allotment of Shares to the Shareholders, with reference to all rights and benefits including but not limited to voting rights, dividends, stock splits, bonus issuance and right issuance.

(70) How new shares to rank with shares in original capital

Except so far as otherwise provided by the condition of issue or by these presents any capital raised by the creation of new shares shall be considered part of the original capital and shall be subject to the provisions of these presents.

(71) Power to Borrow

Subject to the provisions of Section 2(31), 179 and 280 of the Act, the Board of Directors may from time to time by a resolution passed at a Meeting of the Board, accept deposits from members either in advance of calls or otherwise and may generally raise 'or borrow or secure payment of any sum or sums of money for the Company. Provided, however, where the moneys to be borrowed together with the moneys already borrowed (apart from temporary loans obtained from the Company's Bankers in the ordinary course of business) exceed the aggregate of the paid-up capital of the Company and its free reserves (not being reserves set apart for any specific purpose), the Board of Directors shall not borrow such moneys without the consent of the Company in general meeting.

(72) Payment or repayment of moneys borrowed

The repayment of moneys borrowed as aforesaid may be secured in such manner and upon such terms and conditions in all respects as the Board may think fit by a resolution passed at a Meeting of the Board and not by circulation and in particular by the issue of Debentures or debenture-stock of the Company or bonds or other commercial paper or by mortgage or charge, upon all or any part of the property of the Company (both present and future), and Debentures, debenture-stock and other securities may be made assignable free from any equities between the Company and the person to whom the same may be issued.

(73) Debentures to be subject to Control of Directors

Any debenture, debenture stock, bonds or other securities issued or to be issued by the Company shall be under the control of the Directors who may issue them upon such terms and conditions and in such manner and for such consideration as they shall consider to be for the benefit of the Company.

(74) Terms of issue of Debentures

Any Debentures, debenture-stock or other securities may be issued at a discount, premium or otherwise and may be issued on condition that they shall be convertible into Shares of any denomination, and such consideration with any privileges and conditions as to redemption, surrender, drawing, allotment of Shares and attending (but not voting) at General Meetings, appointment of Directors and otherwise.

(75) Mortgage of uncalled capital

If any uncalled capital of the Company is included in or charged by any mortgage or other security, the Board of Directors shall, subject to the provisions of the Act and these presents, make calls on the Members in respect of such uncalled capital in trust for the person in whose favour such mortgage or security is executed or if permitted by the Act, may, by instrument under the Company's seal authorise the person in whose favour such mortgage or security. is executed, or any other person in trust for him, to make calls on the members in respect of such uncalled capital and the provision hereinbefore contained in regard to calls shall mutatis mutandis be applied to calls made under such authority and such authority may be made exercisable either conditionally or unconditionally and either presently or contingently and either to the exclusion of the Board s power or otherwise, and shall be' assignable if expressed to be so.

(76) Priority over charge on uncalled capital

Where any uncalled capital of the Company is charged, all persons taking any subsequent charge thereon shall take the same subject to such ,prior charge and shall not be entitled by notice to the shareholders or otherwise, to obtain priority over such prior charge.

(77) Indemnity

If the Directors or any of them or any other person become personally liable for the payment. of any sum primarily due from the Company, the Directors may execute or cause to be executed any mortgage charge or security over or affecting the whole or any part of the assets of the Company by way of indemnity to secure the Directors or persons so becoming liable as aforesaid from any loss in respect of such liability.

(78) Register of mortgages etc. to be kept

The Board shall cause a proper Register to be kept in accordance with the provisions of Section 85of the Act, of all mortgages, Debentures and charges specifically affecting the property of the Company; and shall cause requirements of Sections 71, 77, 78,79 and 81 to 87(both inclusive) of the Act in that behalf to be duly complied with, so far as they may be applicable.

(79) Register and Index of Debenture holders

The Company, if at any time, issues Debentures, shall keep a Register and Index of Debenture holders in accordance with Section 88 of the Act, The Company shall have the power to keep in any State or Country outside India, a branch register of Debenture holders resident in that State or Country.

MEETING OF MEMBERS

(80) Annual General Meeting

The Company shall, in each year, hold a General Meeting as its Annual General Meeting in addition to any other meeting in that year. All General Meetings other than Annual General Meetings shall be called Extraordinary General Meetings, the first Annual General Meeting -shall be held within eighteen months from the date of incorporation of the Company and the next Annual General Meeting shall be held within .six months after the expiry of the financial year, provided that not more than fifteen months shall lapse between the date of one Annual General Meeting and that of the next. Every Annual General Meeting shall be called for a time during business hours on a day that is not a public holiday and shall be held at the office of the Company or at some other place within the city in which the office of the Company is situated as the Board may determine and Notices calling the Meeting shall specify it as the Annual General Meeting. The Company may in anyone Annual General Meeting fix the time for its subsequent Annual General Meetings. Every member of the Company shall be entitled to attend either in person or by proxy and the Auditor of the Company shall have the right to attend and to be heard at any General Meeting which he attends on any part of the business which concerns him as Auditor. At every Annual General Meeting of the Company there shall be laid on the table the Directors Report and Audited Statement of Accounts, Auditors Report (if not already incorporated in the Audited Statement of Accounts) the proxy Register of Director's shareholding of which latter Register shall remain open and accessible during the continuance of the meeting. The Board shall cause to be prepared Annual list of members, summary of Share Capital, Balance Sheet and Profit and Loss Account and onwards the same to the Registrar in accordance with Sections 92 and 137 of the Act.

(81) Extraordinary General Meeting

The Board may whenever it thinks fit, call an Extraordinary General Meeting and it shall do so upon a requisition in writing by any member or members holding in the aggregate not less than one-tenth of such of the paid up capital, as at that date carried the right of voting in regard to the matter in. respect of which the requisition has been made.

(82) Requisition of Members to state object of meeting

Any valid requisition so made by members must state the object or objects of the meeting proposed to be called, and must be signed by the requisitionists and be deposited at the office provided that such requisition may consist of several documents in like from each signed by one or more requisitionists.

(83) Formalities of requisition

Upon the receipt of any such requisition, the Board, shall forthwith call an Extraordinary General Meeting, and if they do not proceed within twenty-one days from the date of the requisition being deposited at the office to cause a meeting to be called on a day not later than forty-five days from the date of deposit of the requisition, the requisitionists, or such of their number as represent either a majority in value of the paid up share capital held by all of them or not less than one-tenth of such of the paid-up share capital of the Company as referred to in Section 100 of the Act, whichever is less, may themselves call the meeting, but in either case any meeting so called shall be held within three months from the date of delivery of the requisition as aforesaid,

(84) Meeting called by requisitionists
a. Any meeting called under the foregoing Article by the requisitionists shall be called in the same manner as nearly as possible as that in which meetings are to be called by the Board. b. The Board may convene a general meeting of the company. The Board shall proceed to convene a general meeting if so requisitioned in accordance with the provisions of the Act. The shareholders shall use all reasonable endeavors to procure that a quorum is present at and throughout each meeting of the shareholder.
(84A) Shareholders meeting called by Board.
The Board may convene a general meeting of the Company. The Board shall proceed to convene a general meeting if so requisitioned in accordance with the provisions of the Act.
(85) Twenty-one days notice of meeting to be given
Twenty-one days notice, a minimum for every General Meeting, Annual or Extra ordinary and by whomsoever called specifying the day, date, place and hour of meeting and the general nature of the Business to be transacted thereat, shall be given in the manner hereinafter provided, to such persons as are under the provisions of the Act entitled to receive notice from the Company. Provided that in the case of an Annual General Meeting with the consent of all the members entitled to vote thereat and in the case of other meetings with the consent of member holdings not less than 95 per cent of such part of the paid-up share capital of the Company as gives a right to vote at the meeting. A meeting may be convened by a shorter notice, In the case of an Annual General Meeting, if any business other than (i) consideration of the Accounts, Balance Sheets and Reports of the Board of Directors and Auditors (ii) declaration of dividend (iii) appointment of Directors in place of those retiring, (v) appointment of and fixing of remuneration of Auditors is to be transacted, and in the case of any, other meetings in any event there shall be annexed to the notice of the meeting a statement setting out all material facts concerning each such item of business, including in particular the nature of the concern or interest, if any, therein of every Director, and the Manager (if any) where any such item of special business relates to, or affects any other company, the extent of shareholding Interest In other company of every Director, and the Manager, if any of the Company shall also be set out in the Statement, If the extent of such shareholding interest is not less than 20 per cent of the paid-up share capital of that other company. Where any item of business consists of according of approval to any documents by the meeting, the time and place where the document can be inspected shall be specified in the any such meeting,
(86) Omission to give notice not to invalidate the resolution passed
Any accidental omission to give any such notice, as aforesaid, to any of the members, or non receipt thereof by any member shall not invalidate any resolution passed at any such meeting.
(87) Resolution requiring Special Notice

Where by any provision contained in the Act or in these presents, special notice is required of any resolution; notice in respect of the same shall be given to the Company or by the Company as provided In Section 115 of the Act.

(87A) Passing of Resolutions.

Except in cases where Super Majority Resolution to be passed in matters relating to the Fundamental Issues specified in Article 87B, any other resolution which, under these Articles or the Act is permitted or required to be done or passed by the Company in General Meeting shall be sufficiently so done or passed if effected by an ordinary resolution as defined in section 114 of the Act. Unless either the Act or the Articles specifically require such act to be done or resolution to be passed by a specific majority or by special resolution as defined in section 114 of the Act.

(87B) Resolution relating to Fundamental Issues

Except as otherwise provided in the Act, every resolution to be passed at a General Meeting (including any adjourned General Meeting) with respect to matters relating to Fundamental Issues specified below, shall require the affirmative vote of the authorized representative of each of the Shareholder.

1. Merger with or acquisition of any Company by the Company
2. Any change in the capital structure of the Company including any fresh issue of capital.
3. Amendment of the Memorandum of Association or Article of Association.
4. Declaration of any Dividend or the distribution in any other form and return to the Shareholders of the Company.
5. Any proposal for the renewal or appointment of Statutory Auditors.
6. Establishment of Subsidiaries and/or entering into any of partnerships or joint ventures.
7. Diversification or proposed entry into new business or activity which falls outside the scope of its current operations.
8. Any increase or decrease into the size of the Board of Directors.
9. Dissolve, liquidate, or re-organise the Company.
10. Sell, transfer, lease substantial assets of the Company.
11. Issue of fresh equity (including preference shares, convertible debentures, warrants or quasi equity instruments) including initial public offer.

(88) Meeting not to transact business not mentioned in notice

No General Meeting, Annual or Extraordinary, shall be competent to enter upon discuss or transact any business which has not been mentioned in the notice or notice upon which it was convened.

(89) Quorum at General Meeting

(a) Five members present in person shall be a Quorum for a General Meeting. Unless otherwise waived in writing by the respective party, a valid quorum for a meeting of the shareholders/members shall be deemed to be constituted only if, an authorised representative each of GOG & IITAC are present at the beginning and throughout such meeting.

(b) The shareholders shall use all reasonable endeavors to procure that a quorum is present at and throughout each meeting of the Shareholder,

(90) Body Corporate deemed to be present personally

A body corporate being a member shall be deemed to be personally present if it is represented in accordance with, the provisions of Section 113 of the Act.

(91) If quorum not available, meeting to be dissolved or adjourned

(a) If within half an hour of the time appointed for the meeting of the shareholders, a quorum is not present, the meeting shall automatically stand adjourned till the same day in the next meeting.

(b) If at such second adjourned meeting of the Shareholders, atleast one representative appointed by each of the Shareholders is not present, but the number of Shareholders is sufficient to constitute a valid quorum under the Act, then the Shareholders present shall be deemed to constitute a valid quorum for that meeting. In such an event, the requirement of the presence of one authorized representative of each of the shareholder shall not be a condition for constituting a valid quorum for such adjourned meeting of the shareholders if such a meeting does not include any matter relating to Fundamental issues. Provided that no decision shall be taken and no resolution shall be passed at such adjourned meeting on any matter relating to the Fundamental Issues, without the presence and affirmative vote of the authorized representatives each of the shareholders.

(92) Chairman of General Meeting

The Chairman (if any) of the Board of Directors, shall be entitled to take the Chair at every General Meeting, whether Annual or Extraordinary, if there be no such Chairman of the Directors or if at any meeting he shall not be present within fifteen minutes of the time appointed for holding such meeting or if he is unable or unwilling to take the Chair then the members present shall elect another Director as Chairman, and if no Director be present or if all the Directors present decline to take the Chair then the members present shall elect one of their members to be the Chairman.

(93) Business confined to election of Chairman whilst chair vacant

No business shall be discussed at any General Meeting except the election of a Chairman, whilst the Chair is vacant.

(94) Chairman with consent may adjourn meeting

The Chairman, with the consent of members, may adjourn any meeting from time to time and from place to place, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place.

(95) Questions at General Meeting how decided

At any General Meeting resolution put to vote of the Meeting shall be decided on a show of hands unless a poll is (before or on declaration of the result of voting on any Resolution on show of hands) ordered to be taken by the Chairman of the Meeting on his own motion or on a demand made in that behalf by member or members present in person or by proxy and holding shares in the Company which confer the power to vote on the Resolution not being less than one-tenth of the total voting power in respect of the Resolution, or on which an aggregate sum of not less than fifty thousand rupees has been paid up. A declaration by the Chairman that a Resolution has or has not been on a show of hands carried, or has been carried either unanimously or by a particular majority, and an entry to that effect in the book containing the Minutes of the proceedings of the General Meeting of the Company shall be conclusive evidence of the fact, without proof of the number or the proportion of the votes recorded in favour of or against the Resolution.

(96) Chairman's casting vote

In the case of an equality of votes, the Chairman shall both on a show of hand and at a poll (if any) have a casting vote in addition to the vote, or votes to which he may be entitled as a member.

(97) Poll to be taken, if demanded

If a poll is demanded as aforesaid the same shall subject to Article' 93, be taken at such time (not later than forty-eight hours from the time when the demand was made) and place in the City or town in which the Office of the Company is for the time being situated and either by voting or by ballot, as the Chairman, shall direct, and either at once or after an interval or adjournment, or otherwise, and the result of the poll shall be deemed to be the resolution of the meeting at which the poll was demanded. The demand for a poll may be withdrawn at any time by the person or persons who made the demand.

(98) Scrutinisers at poll

Where a poll is to be taken, the Chairman of the meeting shall appoint two scrutinisers to scrutinise the votes given on the poll and to report there on to him. One of the Scrutinizers appointed shall always be a member (not being an Officer or employee of the Company) present at the meeting provided such a member is available and willing to be appointed. The Chairman shall have power at any time, before the result of the poll is declared, to remove a Scrutinizer from office and fill vacancies in the office of Scrutinizer arising from such removal or from any other cause.

(99) In what case Poll taken without adjournment

Any poll demanded on the election of a Chairman or on any question of adjournment shall be taken at the meeting forthwith,
(100) Demand for poll not to prevent transaction of other business
The demand for a poll except on the question of the Chairman and of an adjournment shall not prevent the continuation of a meeting for transaction of any business other than the question on which the poll has been demanded,
(101) Members in arrears not to vote
No member shall be entitled to vote either personally or by proxy at any General Meeting or Meeting of a class of shareholders either upon a show of hands or upon a poll in respect of any shares registered in his name on which any calls or other sums presently payable by him have not been paid or in regard to which the Company has exercised, any right of lien,
(102) Number of votes to which members entitled
Every member, not disqualified by the preceding Article shall be entitled to be present and to speak and vote at such meeting, and on a show of hands every member present in person shall have one vote and upon a poll the voting right of every member present in person or by proxy shall be in proportion to his share of the paid-up equity share capital of the Company, provided however, if any preference shareholder be present at any meeting of the Company save as provided in subsection (2) of Section 47 of the Act, he shall have a right to vote only on resolutions placed before the meeting which directly affect the rights attached to his preference shares
(103) Casting of votes by a member entitled to more than one vote
On a poll taken at a meeting of the Company a member entitled to more than one vote or his proxy or other person entitled to vote for him, as the case may be, need not, if he votes, use all his votes or cast in the same way, all the votes he uses.
(104) How Members non-composment and minor may vote
A member of unsound mind or in respect of whom an order has been made by any Court having jurisdiction in lunacy may vote, whether on a show of hands or on a poll, by his Committees or other legal guardian and any such Committee or guardian may, on poll vote by proxy, if any member be a minor the vote in respect of his shares shall be by his guardian or anyone of his guardians, if more than one, to be selected in case of dispute by the Chairman of the meeting,
(105) Vote of joint members

If there be joint registered holders of any share, anyone of such person may vote at any meeting and, If more than one of such joint holder be present at any meeting, then one of the said person so present whose name stands higher on the register shall alone be entitled to speak and to vote in respect of such shares, but the other or others of the joint-holders shall be entitled to be present at a meeting, Several executors or administrators of a deceased member in whose name shares stand shall for the purpose of these Articles be deemed joint holder thereof. The same provisions shall apply in regard to proxies of such joint holders. The joint holder present in person shall have preference over senior joint holders who are present by proxy.

(106) Voting in Person or by Proxy

Subject to the provision of these Articles votes may be given either personally or by proxy. A Body Corporate being a member may vote either by a proxy or by a representative duly authorised in accordance with Section 113 of the Act and such representative shall be entitled to exercise the same rights and powers (including the right to vote by proxy) on behalf of the body corporate which he represents as that body could exercise if it were an individual member.

(107) Vote in respect of shares of deceased and insolvent Members

Any person entitled under Article 63 to transfer any share may vote at any General Meeting in respect thereof in the same manner as if he were the registered holder of such shares, provided that forty-eight hours at least before the time of holding the meeting or adjourned meeting as the case may be, at which he proposes to vote he shall satisfy the Directors of his right to transfer such shares and give such indemnity, (if any). as the Directors may require or the Directors shall have previously admitted his right to vote at such meeting in respect thereof. .

(108) Appointment of Proxy

Every Proxy (whether a member' or not) shall be appointed in writing under the hand of the appointer or his attorney or if such appointer is Body Corporate under the common seal of such body corporate, or be signed by any Officer or any attorney duly authorised by it, and any Committee or guardian may also appoint such proxy. The proxy so appointed shall not have the right to speak at the meeting.

(109) Proxy either for Specified meeting or for a period

An instrument of proxy may appoint' a proxy either for the purpose of particular meeting specified in the instrument and any adjournment thereof or it may appoint for the purpose of every meeting of the Company, or of every meeting to be held before a date specified in the instrument and every adjournment of any such meeting. No instrument appointing a Proxy shall be valid after the expiration of twelve months from the date of its execution.

(110) Proxy to vote only on a poll

A member present by proxy shall be entitled to vote only on a poll
(111) Deposit of instrument of appointment
The instrument appointing a proxy and the power of attorney or other authority (if any), under which it is signed or a notarised certified copy of that power or authority shall be deposited at the office not later than forty-eight hours before the time for holding the meeting at which the person named in the instrument proposes to vote, and in default, the instrument of proxy shall not be treated as valid.
(112) Form of Proxy
Every instrument of proxy, whether for a specified meeting or otherwise shall as nearly as circumstances will admit, be in any of the forms set out in Schedule IX to the Act.
(113) Validity of votes given by proxy notwithstanding death of Member
A vote given in accordance with the terms of an instrument of proxy shall be valid notwithstanding previous death or insanity of the principal, or revocation of any proxy or of any power of attorney under which such proxy was signed, or the transfer of the shares in respect of which the vote is given, provided that no intimation in writing of the death or insanity, revocation or transfer shall have been received at the office before the meeting,
(114) Time for objections to votes
No objection shall be made to the validity of any vote, except at any meeting or poll at which such vote shall be tendered, and every vote whether given personally or by proxy, not disallowed at such meeting or poll shall be deemed valid, for all purposes of such meeting or poll whatsoever.
(115) Chairman of the meeting to be the judge of validity of any vote
The Chairman of any meeting shall be the sole judge of the validity of every vote tendered at such meeting The Chairman present at the taking of a poll shall be the sole judge of the validity of every vote tendered at such poll.
(116) Minutes of General Meeting and inspection thereof by Member

- (1) The Company shall cause minutes of all proceedings of every General Meeting to be kept by making within thirty days of the conclusion of every such meeting concerned, entries thereof in books kept for the purpose with their pages consecutively numbered;
- (2) Each page of every such book shall be initialed or signed: and the last page of the record of proceedings of each meeting in such book shall be dated and signed by the Chairman of the same meeting within the aforesaid period of thirty days or in the event of death or inability of that Chairman within that period by a Director duly authorised by the Board for the purpose;
- (3) In no case the minutes of proceedings of a meeting shall be attached to any such: book as aforesaid by pasting or otherwise;
- (4) The minutes of such meeting shall contain a fair and correct summary of the proceedings thereat
- (5) All appointment of, Officers made at any meeting aforesaid shall be included in the minutes of the meeting;
- (6) Nothing herein contained shall require or be deemed to require the inclusion in any such minutes of any matter which in the opinion, of the Chairman of the meeting
 - (a) is or could reasonably be regarded as defamatory of any person, or (b) is irrelevant or immaterial to the proceedings, or (c) is detrimental to the interests of the Company. The Chairman of the meeting shall exercise an absolute discretion In regard to the inclusion or non inclusion of any matter in the minutes on the aforesaid grounds or otherwise;
- (7) Any such minutes shall be evidence of the proceedings recorded therein;
- (8) The Book containing the minutes of proceedings of General Meetings shall be kept at the office of the Company and shall be open during business hours to the inspection of any Member without charge

DIRECTORS

(117) The First Directors of the Company shall be:

Mr on behalf of

Mr on behalf of

3. Mr on behalf of

(118) Number of Directors

The Board shall comprise of not less than 4(four) directors and not more than 12 (twelve) directors. Unless otherwise agreed between the Parties to this Agreement, GOG shall have a right to nominate four (4) directors and IITAC shall have a right to nominate four (4) directors to the Board. There shall be one (1) independent director, to be appointed on mutual agreement between IITAC and GOG.

(119) Appointment and Retirement of Directors

Not exceeding 1/3rd of the total number of Directors including the Managing Director for the time being of the Company but excluding debentures and Nominee Director, if any, will not be liable to retire by rotation.

(120) Power to appoint nominee Directors

(a) Subject to the provision of Section 152 of the Act, whenever the **Directors and/or Company** enter into a contract with any Government, Central, State. or Local, or any person or persons for borrowing any money or for providing any guarantee or security or for technical collaboration or assistance or for underwriting or enter into any other arrangement whatsoever, the Directors shall have, subject to the provisions of Section 152 of the Act, the power to agree that such Government person or persons shall have the right to appoint or nominate by a notice in writing addressed to the Company one or more Directors on the Board for such period and upon such condition as may be mentioned in the Agreement and that such Director or Directors may not be liable to retire, nor be required to hold any qualification shares. The Directors may also agree that any such Director or Directors may be removed from time to time by the Government person or persons entitled to appoint or nominate them and such Government person or persons may appoint another or others in his or their place and also fill in any vacancy which may occur as a result of any such Director or Directors ceasing to hold that Office for any reason whatever. The Directors appointed or nominated under this Article shall be entitled to exercise and enjoy all or any of the rights and privileges exercised and enjoyed by the Directors of the Company including the payment of remuneration and traveling expenses to such Director or Directors as may be agreed by the Company with such person or persons, aforesaid;

(b) Any trust deed securing and covering the issue of debentures of the Company may provide for the appointment of a Director for and on behalf of Debenture Holders for such period as is therein provided not exceeding the period for which the debentures or any of them shall remain outstanding and for the removal from Office of such Director and on a vacancy being caused whether by resignation, death, removal or otherwise, from appointment of a Director in the vacant place. The Director shall not be liable to retire by rotation or be removed, from office except as provided as aforesaid.

(121) Appointment of Alternate Directors

The Board may appoint an Alternate Director to act for a Director (hereinafter called "the Original Director") during his absence for a period of not less than three months from the State in which the meetings of the Board are ordinarily held. An Alternate Director appointed under this Article shall not hold Office for a period longer than that permissible to the Original Director in whose place he has been appointed and shall vacate office if and when the Original Director returns to that State. If the term of office of the Original Director is determined before he so returns to that State, any provision in the Act or in these Articles for the automatic reappointment of retiring Director in default of another appointment shall apply to the original Director and not to the Alternate Director.

(122) Directors' power to add to the Board

The Board shall have power at any time and from time to time to appoint any other qualified person to be an Additional Director, but so that the total number of Directors shall not at any time exceed the maximum fixed under Article 118. Any such Additional Director shall hold Office only up to the date of the next Annual General Meeting.

(123) Directors' Power to fill Casual Vacancies

Subject to the provisions of Section 152 and 169 the Board shall have power at any time and from time to time to appoint any other qualified person to be a Director to fill a Casual Vacancy. Any person so appointed shall hold office only up to the date up to which the Director in whose place he is appointed would have held Office, if it had not been vacated by him.

(124) Qualification of Directors

No Director shall be required to hold any share or Qualification Shares of the Company;

(125) Remuneration of Directors

(1) Subject to the provisions of the Act, a Managing Director or Director who is in the whole time employment of the Company may be paid remuneration either by way of a payment or at a specified percentage of the net profits of the Company or partly by one way and partly by the other;
(2) The fees payable a to a Director for attending meeting of Company or meeting of a Board or Committee thereof shall be such sum as may be prescribed under the Act and fixed by the Board from time to time.

(126) Travelling expenses incurred by Directors

The Board may allow and pay to any Director, who is not a bonafide resident of the place where meetings of the Board are ordinarily held and who shall come to such place for the purpose of attending any meeting, such sum as the Board may consider fair compensation for travelling, boarding, lodging and other expenses, in addition to his fee for attending such Meeting as above specified and if any Director be called upon to go or reside out of the ordinary place of his residence on the Company's business, he shall be entitled to be repaid and reimbursed any travelling or other expenses incurred in connection with business of the Company.

(127) Director may act notwithstanding any vacancy

The continuing Directors may act notwithstanding any vacancy in the Board, but if and so long as their number is reduced below the minimum fixed by Article 118 hereof, the continuing Director or Directors may act for the purpose of increasing the number of Directors to that number, or of summoning a General Meeting but for no other purpose.

(128) When office of Directors to become vacant

- (a) he is found to be of unsound mind by a Court of competent jurisdiction, or
- (b) he applies to be adjudged insolvent, or
- (c) he is adjudged an insolvent, or
- (d) he fails to pay any call made on him in respect of shares of the Company held by him, whether alone or jointly with others within six months from the date fixed for the payment of such call unless the Central / Government has by notification in the official Gazette removed the disqualification incurred by such failure, or
- (e) he absents himself from three consecutive meetings of the Directors or from all meetings of the Directors for a continuous period of three months whichever is longer, without leave of absence from the Board or
- (f) he becomes disqualified by an Order of Court or
- (g) he is removed in pursuance of Section 169 of the Act, or
- (h) he (whether by himself or by any person for his benefit or on his account) or any firm in which he is a partner or any private Company of which he is Director, accepts, a loan, or any guarantee or security for a loan, from the Company in contravention of Section 185 of the Act, or
- (i) he acts in contravention of Section 184 of the Act or;
- (j) he is convicted by a court of an offence involving moral turpitude and is sentenced in respect thereof imprisonment for not less than six months, or
- (k) having been appointed a Director by virtue of his holding any Office or other employment in the Company, he ceases to hold such Office or other employment in the Company.

(128A) Removal of Directors

The Shareholder who have the right to nominate and appoint the directors to the Board and to remove and replace such directors to the Board and to remove and replace such directors by notice to such director and the Company.

(129) Director may contract with the Company

- (1) A Director or his relative a firm in which such Director or relative is a partner, or any other partner in such firm, or a private company of which the Director is a member or Director, may enter into any contract with the Company for the sale/purchase or supply of any goods, materials. or services or for underwriting subscription of any shares in, or debentures of the Company, provided that if the paid up share capital of the company is not less than Rs. 1 crore, no such contract shall be entered into except with the previous approval of the Central Government and the sanction of the Board shall be obtained before or within three months of the date on which the contract is entered

into in accordance with provisions of Section 188 of the Act;

(2) No sanction shall however, be necessary for

(a) Any purchase of goods and materials from the Company, or the sale of goods, or materials to the Company, by any such Director, relative firm partner or private company as aforesaid for cash at prevailing market prices; or

(b) any contract or contracts between the Company on one side and such Director, relative, firm, partner, or private company on the other side for sale, purchase or supply of any goods, materials and services in which either the Company or the Director, relative, firm, partner or private company, as the case may be, regularly trades or does business, where the value of the goods and materials or the cost of such services does not exceed Rs.5,000/- in the aggregate in any year comprised in the period of the contract or contracts.

Provided that in circumstances of urgent necessity a Director, relative, firm, partner or private company, as aforesaid, may, without obtaining consent of the Board, enter into any such contract with the company for the sale/purchase or supply of any goods, material or services even if the value of such goods or the cost of such services exceeds Rs. 5,000/- in the aggregate in any year comprised in the period of the contract, but in such a case the consent of the Board shall be obtained to such contract or contracts at a meeting within three months of the date on which the contract was entered into.

(130) Disclosure of interest

Director of the Company who is, in any way, whether directly or indirectly, concerned or interested in a contract or arrangement, or proposed contract or arrangement entered into or to be entered into, by or on behalf of the Company, shall disclose, the nature of his concern or interest at a meeting of the Board in the manner provided in Section 184(2) of the Act. Provided that it shall not be necessary for a Director to disclose his concern or interest in any contract or arrangement entered into or to be entered into with any other company where any of the Directors of the Company holds or two or more of them together hold not more than two percent of the paid up share capital in any such other company.

(131) General Notice of Interest

A General Notice given to the Board by a Director, to the effect that he is Director or member of a specified body corporate or is a member of a specified firm and is to be regarded as concerned or interested in any contract or arrangement which may, after the date of the notice, be entered into with that body Corporate or firm, shall be deemed to be a sufficient disclosure of concern or interest in relation to any contract or arrangement so made. Any such general notice shall expire at the end of the financial year in which it is given but may be renewed for a further period of one financial year, at a time by a fresh notice given in the last month of the financial year in which it would have otherwise expired. No such general notice nor any renewal thereof shall be of effect unless it is given either at a meeting of the Board or the Director concerned takes reasonable steps to secure that it is brought up and read at the first meeting of the Board after it is given.

(132) Interested Directors not to Participate or Vote in Boards Proceedings

No Director shall as a Director take any part in the discussion of or vote on any contract or arrangement entered into or to be entered into by or on behalf of the Company, if he is any way, whether directly or indirectly concerned or interested in such contract or arrangement nor shall his presence count for the purpose of forming a quorum at the time of any such discussion or vote, and if he does vote, his vote shall be void, provided however that nothing herein contained shall apply to:

- (a) any contract of indemnity against any loss which the Directors or anyone or more of them, may suffer by reason of becoming or being sureties or a surety for the company;
- (i) in his being:
 - (a) a Director of such company, and
 - (b) the holder of not more than shares of such number or value therein as is required to qualify him for appointment as a Director thereof, he having been nominated as such Director by the Company,
- Or
- (ii) in his being a member holding not more than 2% of its paid-up share capital.

(133) Register of Contracts in which Directors are interested

The company shall keep a Register in accordance with Section 188(1) and shall within the time specified In Section 188 (2) enter therein such of the particulars as may be relevant having regard to the application thereto of Section 188 or Section 184 of the Act, as the case may be. The Register aforesaid shall also specify in relation to each Director of the Company, the names of the Bodies Corporate and Firms of which notice has been given by him under Article 131. The Register shall be kept at the Office of the Company and shall be open to inspection at such Office and extracts may be taken there from and copies thereof may be required by any member of the Company to the same extent in the same manner, and on payment of the same fee as In the case of the Register of Members of the Company and the provisions of Section 94 of the Act shall apply accordingly,

(134) Directors may be Directors of Companies promoted by the Company

A Director may be or become a Director of any Company promoted by the Company or in which it may be interested as a vendor, shareholder, or otherwise, and no such Director shall be accountable for any benefits received as Director or shareholder of such company except in so far as Section, 197- or Section 188 of the Act may be applicable.

(135) Retirement and rotation of Directors

All the directors of the Company shall unless otherwise provided , be appointed for a term of 3 years or till the annual general meeting of the Company held after the lapse of the said period of three years, whichever is later, and shall be liable to retirement by rotation. One third of the directors eligible to retire shall retire by rotation at each annual general meeting of the Company. Each director shall be eligible to serve consecutive terms if re-appointed. Any vacancy created by the retirement or removal of any director being a nominee of any of the Shareholders shall be filled by a nominee of such shareholders unless otherwise agreed in this Agreement. The removal of a director appointed shall as per the agreement shall only be at the request of the Shareholder who has nominated such director. The Shareholders hereby undertake to exercise their voting rights and to cause their nominee directors on the Board to exercise their voting rights.

(136) Ascertainment of Directors retiring by Rotation and filling of Vacancies

Subject to Section 152 of the Act, the Directors to retire by rotation under Article 135 at every Annual General Meeting shall be those who have been longest in Office since their last appointment, but as between persons who become Directors on the same day, those who are to retire; shall in default of and subject to any agreement among themselves, be determined by lot.

(137) Eligibility for Re-election

A retiring Director shall be eligible for re- election.

(138) Company to appoint Successors

Subject to the provisions of the Act, the Company, at the General Meeting in which a Director retires, in manner aforesaid, may fill up the vacated Office by electing a person thereto

(139) Provision in default of appointment

- (a) the place of the retiring Director is not so filled up and the meeting has not expressly resolved not to fill the vacancy, the meeting shall stand adjourned till the same day in the next week at the same time and place, or if that day is a public holiday, till the next succeeding day which is not a public holiday, at the Same time and place;
- (b) if at the adjourned meeting also the place of the retiring Director is not filled up and the meeting also has not expressly, resolved not to fill the vacancy, the retiring Director shall be deemed to have been reappointed at the adjourned meeting unless:
 - (i) at the meeting or at the previous meeting resolution for the re-appointment of such Director has been put to the meeting and lost;
 - (ii) the retiring Director, by a notice in writing addressed to the Company or its Board, expressed his unwillingness to be so re-appointed;

(iii) he is not qualified or is disqualified for appointment; (iv) a resolution, whether special or ordinary, is required for the appointment or re-appointment by virtue of any provision of the Act; (a) the proviso to sub-section (2) of Section 162 of the Act is applicable to the case,
(140) Company may increase or reduce the number of Directors
The Company may, by Ordinary Resolution, from time to time, increase or reduce the number of Directors and may alter their qualifications and the Company may (subject to the provision of Section 169 of the Act) remove any Director before the expiration of his period of office and appoint another qualified person in his stead, The person so appointed shall hold office during such time as the Director in whose place he is appointed would have held the same, if he had not been removed.
(141) Notice of candidature for office of Director
(a) No person, not being a retiring Director shall be eligible for appointment to the Office of Director at any General Meeting unless he or some member intending to propose him has not less than 14 days before the Meeting left at the office of the Company Notice in writing under his hand signifying his candidature for the office of the Director or the intention of such member to propose him as a candidate for the office as the case may be, along with a deposit of Rupees Five Hundred or such other sum as may be prescribed by law from time to time, which amount shall be refunded to such person or. as the case may be, to such member, if the person succeeds in getting elected as a Director; (b) Every person (other than a Director retiring by rotation or otherwise or a person who has left at the office of the Company, notice under Section 160 of the Act signifying his candidature for the office of a Director) proposed as a candidate for the office of a Director shall sign and file with the Company, the consent in writing to act as a Director if appointed; (c) A person other than a Director re-appointed after retirement by rotation or immediately on the expiry of his term of office, or an Additional or Alternate Director, or a person filling a casual vacancy in the office of a Director under Section 161 of the Act, appointed as a Director or re-appointed as an Additional or Alternate Director immediately on the expiry of his term of Office, shall not act as a Director of the Company, unless he has within thirty days of his appointment signed and filed with the Registrar his consent in writing to act as such Director.
(142) (a) Register of Directors etc. notification of change to Register
The Company shall maintain at its Office a Register containing particulars of its Directors, Managers, Secretaries and other persons mentioned in Section 170 of the Act, and shall otherwise comply with the provisions of the said Section in all respect.
(b) Register of shares/debentures by Directors

The Company shall, in respect of each of its Directors, also maintain at its office Register, as required by Section 170 of the Act, and shall otherwise duly comply with provisions of the said section in all respects.

(143) (a) Disclosure by Director of appointment to any other Body Corporate

Every Director (including a person deemed to be a Director by virtue of the explanation to sub-Section (1) of Section 170 of the Act, Managing Director or Manager and Secretary of the Company shall within twenty days of his appointment to any of the above offices in any other body corporate, disclose in the Company particulars relating to his office in the other body or bodies corporate which are required to be specified under sub-Section (1) of Section 170 of the Act.

(b) Disclosure by a Director of his holdings of shares and debentures of the Company etc.
Every Director and every person deemed to be a Director of the Company by virtue of sub-Section (10) of section 170 of the Act shall give notice to the Company of such matters relating to himself as may be necessary for the purpose of enabling the Company to comply with provisions of that section.

(b) Disclosure by a Director of his holdings of shares and debentures of the Company etc.

MANAGING DIRECTOR AND OTHER WHOLE TIME DIRECTORS

(144) Managing Directors

(a) The Company shall have a Managing Director and Chief Executive Officer appointed by the Board, who shall be a nominee of IITAC. Subject to the provisions of the Act, the terms and conditions of MD & CEO shall be stipulated by the Board.

(b) Subject to the provisions of Sections 196, 203 and 196 of the Act, the Board may from time to time, appoint one or more Directors to be Wholetime Directors of the company, for a fixed term, not exceeding Five years at a time and may, from time to time, remove or dismiss him or them from Office and appoint another or others in his place or their places.

(c) Subject to the provisions of Section 152 of the Act and subject to above proviso, a Managing or a Whole Time Director shall not, while he continue to hold that Office, be subject to retirement by rotation but he shall be reckoned as a Director for the purpose of determining retirement of Directors by rotation, and in fixing the number of Directors to retire, and subject to the same provisions as to removal as the other Directors, and he shall ipso-facto and immediately, cease to be a Managing or a Whole-Time Director, if he ceases to hold the Office of Director for any cause.

(145) Restrictions on Management

The Managing Director or Managing Directors shall not exercise the powers to:

(a) make calls on shareholders in respect of money unpaid on shares in the Company;

(b) issue debentures and except to the extent mentioned in the resolution passed at the Board meeting under Section 179 of the Act, shall also not exercise the power to:

(i) borrow moneys otherwise than Debentures;

(ii) invest the funds of the Company; and, (iii) make loans.
(146) Certain persons not to be appointed as Managing Director/s The Company shall not appoint or employ, or continue the appointment or employment of a person as it Managing or Whole-time Director/s who: (i) is an undischarged insolvent or has at any time been adjudged an insolvent; (ii) Suspends or has at any time suspended payment to his creditors, or makes or has at many time made a composition with them; or (iii) is or has any time been convicted by a Court of an offence involving moral turpitude.
(147) Special position of Managing Director A Managing Director shall ipso facto and immediately cease to be a Managing Director if he ceases to hold the Office of a Director.
PROCEEDINGS OF THE BOARD OF DIRECTORS
(148) Meeting of Directors The Directors may meet together as a Board for the disposing off of Business from time to time and shall so meet at least once in every three months and at least four such meetings shall be held every year. The Directors may adjourn and otherwise regulate their meetings as they think fit.
(149) Notice of Meetings (a) The Company shall furnish to each director for the time being in India and at his usual address in India not less than 7 days notice (unless a written consent is obtained for a shorter notice), of the calling of any meeting of the Company's directors or of any meetings of any Committee established by the Board, which notice shall indicate the agenda and shall promptly thereafter furnish to such director copies of all proposals, resolutions, communications and report prepared by the Company for its directors in connection with such meetings and copies of the minutes of all such meetings. (b) A Board Meeting may be convened with shorter notice provided that the consent of all directors is obtained for such short notice period and the agenda for such meeting is sent to each director.
(150) Quorum

Subject to the provisions of Section 174 of the Act, the quorum for a meeting of the Board shall be one-third of its total strength (excluding Directors, if any, whose place may be vacant at the time and any fraction contained in the one third being rounded off as one) or three Directors, whichever is higher, provided that where at any time the number of interested Directors exceeds or is equal to two-third of the total strength the number of the remaining Directors that is to say, the number of Directors who are not interested, present at the meeting being not less than three, shall be the quorum during such time.

b. No such quorum shall be said to be complete unless atleast one director representing each of GOG and IITAC is present at such meeting.

(151) Adjournment of Meeting for want of Quorum

In case the quorum is not present, the meeting shall be adjourned to the same day in the following week or if such day is the holiday the next Business day thereafter, and directors present at such meeting shall constitute the quorum. At any meeting of the Board, each director shall have one vote.

(152) When meeting to be convened

The Secretary shall, as and when directed by the Directors to do so, convene a meeting of the Board by giving a notice in writing to every Director, in accordance with provisions of section 173 of the Act.

CHAIRMAN

(153) Chairman

The company shall have a non-executive Chairman appointed by the Board, who shall be be the Chief Secretary, GOG ex-officio. The term of the Chairman shall be co-terminus with that of his term as the director of the Company. In case the chairman is unavailable within fifteen minutes from the time fixed for a meeting, one of the directors nominated by the GOG on the Board, present at that meeting may be appointed by the Board as the Chairman for that particular meeting.

(154) Question and Board Meetings how decided

Question arising at meeting of the Board of Directors or a Committee thereof shall be decided by a majority of votes and in the case of equality of votes, the Chairman shall have a second or casting vote.

(155) Powers of Board

The Company shall be managed and controlled by the Board and the Board shall be responsible for the overall policies and objectives and activities of the Company, in terms of its Memorandum of Association and Article of Association, the provisions of the Act, and this Agreement. The Board may exercise all such powers of the Company and do all such lawful acts and things as are permitted under the Agreement, applicable law and the Memorandum of Association and Article of Association of the Company.

(156) Directors may appoint Committee

The Company shall if required, constitute a committee or committee(s) of the Board whose composition, powers and term of reference shall be decided by the Board from time to time. The Committee(s) shall be subject to and be under the supervision of the Board. Each of Shareholder shall have the right to nominate its nominees to the each of the committee(s).

(157) Meeting of Committee

Unless otherwise agreed to by each of the parties to this agreement, no quorum of the meeting of any such committees shall be said to be complete unless at least 1 (one) nominee of GOG and IITAC is present at such meeting of the committee. If any of the Fundamental issue are delegated by the Board to any such committee, the provisions of Article 158A shall, mutatis mutandis, apply to the relative resolution proposed at such committee.

(158) Resolution by circulation

- (i) Subject to the provisions of the Act, requiring Board meeting in certain specified cases, no resolution shall be deemed to have been duly passed by the Board or by a Committee thereof by circulation, unless the resolution has been circulated in draft together with explanatory note, to all the Directors, or to all the members of the Committee, then in India (not being less in number than the quorum fixed for a meeting of the Board or Committee, as the case may be) and to all other Directors or Members of the Committee, at their usual address in India and has been approved by such of the Directors or Members of the Committee as are then in India or by a majority of such of them as are entitled to vote on the resolution provided that such approval shall include the approval of the Managing Director appointed under Article 144 hereof.
- (ii) No obligation of the Company shall be entered into, no decision shall be made and no action shall be taken by or with respect to the Company in relation to fundamental issues by way of resolution by circulation unless such obligation, decision or action, as the case may be approved by the affirmative vote of all the Shareholders Directors.

(158A) Super majority resolution at Board Meeting

Except as otherwise provided in the Act, every resolution to be passed at a Board Meeting (including any adjourned Board Meeting) with respect to matters relating to Fundamental Issues specified below, shall require the affirmative vote of the authorized representative of each of the Shareholder.

1. Approval of Business Plan (which shall be presented to the Board by MD & CEO at the beginning of each financial year.
2. Merger with or acquisition of any company by the Company
3. Any change in the capital structure of the Company including any fresh issue of capital (other than already envisaged herein).
4. Investment in the any operating companies ("the operating companies").
5. Raising of any debt by the Company.
6. Amendment of the Memorandum of Association and Article of Association of the Company.
7. Declaration of any Dividend or the distribution in any other form and return to the Shareholders of the Company.
8. Any proposal or the renewal or appointment of Statutory Auditors and Internal auditors of the Company.
9. Establishment of the subsidiaries and/or entering into any of partnerships or joint ventures.
10. Diversification or proposed entry into new business or activity which falls outside the scope of its current areas of operations.
11. Any increase or decrease in the size of the Board of Directors, beyond that envisaged in this agreement.
12. Dissolve, liquidate, or re-organise the Company.
13. Sell, transfer, lease substantial assets of the Company.
14. Issue of fresh equity (including preference shares, convertible debentures, warrants or any other quasi equity instrument) including initial public offer.

(159) Acts of Board or Committee notwithstanding informal appointment.

All acts done by a meeting of the Board or by a Committee or the Board or by any person acting as a Director shall notwithstanding that it shall afterwards, be discovered that there was some defect in the appointment of such Director or persons acting as aforesaid, or that they or any of them were disqualified or had vacated office or that the appointment of any of them had been terminated by virtue of .any provisions contained in the Act or in these Articles, be as valid as if every such person had been duly appointed and was qualified to be a Director and had not vacated his office or his appointment had not been terminated, provided that nothing in this Article shall be deemed to give validity to acts done by a Director after his appointment has been shown to the Company to be invalid or to have terminated.

(160) Minutes of proceedings of meetings of the Board

- (1) The Company shall cause minutes of all proceedings of every meeting of the Board and Committee thereof to be maintained by making within thirty days of the conclusion of every such meeting, entries thereof in books kept for that purpose with their pages consecutively numbered;
- (2) Each page of every such book shall be initialed or signed and the last page of the record of proceedings of each meeting in such book shall be dated and signed by the Chairman of the said meeting or the Chairman of the next succeeding meeting; "
- (3) In no case the minutes of proceedings of a meeting shall be attached to any such books as aforesaid by pasting or otherwise;
- (4) The minutes of each meeting shall contain a fair and correct summary of the proceedings thereat;
- (5) All appointments of officers made at any of the meetings aforesaid shall be included in the minutes of the meeting;
- (6) The minutes shall also contain
- (a) The name of the Directors present at the meeting; and
- (b) in the case of each resolution passed at a meeting the name of the Director, if any, dissenting from
or not concurring to the resolution;
- (7) Nothing contained in sub-clauses (1) to (6) shall be deemed to require the inclusion of any such minutes of any matter which, in the opinion, of the Chairman of the meeting:'
- (a) is or could reasonably be defamatory of any person
- (b) is irrelevant or immaterial to the proceedings of or
- (c) is detrimental to the interest of the Company
- the Chairman shall exercise an absolute discretion in regard to inclusion or non inclusion of any matter in the minutes on the grounds specified in sub-clause; (8) Minutes of meetings, kept in accordance with the aforesaid provisions shall be evidence of the proceedings recorded therein.

(161) Restrictions on the Powers of Directors

The Board may exercise all such powers of the Company and do all such acts and things as are not by the Act or any other Act by the Memorandum or by the Articles of the Company required to be exercised by the Company in General Meeting, subject nevertheless to these Articles, to the provisions of the Act, or any other Act and such regulations being not inconsistent with the aforesaid regulations or provisions, as may be prescribed by the Company in General Meeting, but no regulation made by the Company in General Meeting shall invalidate any prior act of the Board which would have been valid if that regulation had not been made provided that the Board shall not, except with the consent of the Company in General Meeting:

- (a) sell, lease or otherwise, dispose of the whole, or substantially the whole of the undertaking of the Company, or where the Company owns more than, one undertaking of the whole or substantially the whole of any such undertaking;
- (b) remit, or give time for the repayment of debt due by a Director;
- (c) invest otherwise than in trust securities the amount of compensation received by the Company in respect of the compulsory acquisition of any such undertaking as is referred to in clause (a), or of any premises or properties used for any such undertaking and without which it cannot be carried on or can be carried on only with difficulty or only after considerable time;
- (d) borrow moneys where the moneys to be borrowed together with the moneys already borrowed by the Company (apart from temporary loans obtained from the Company's bankers in the ordinary course of business), will exceed the aggregate of the paid-up capital of the Company and its free reserves, that is to say reserves not set apart for an specific purpose.

Provided further that the powers specified in Section 179 of the Act shall be exercised only at a meeting of the Board, unless the same be delegated to the extent therein stated; or

- (e) contribute to charitable and other funds not directly relating to the business of the Company or the welfare of its employees, any amounts, the aggregate of which will, in any financial year, exceed fifty thousand rupees or five per cent of its average net profits as determined in accordance with provisions of Section 198 of the Act during the three financial years immediately preceding, whichever is greater

(162) General Powers of the Board

Without prejudice to the general powers conferred by the last preceding Article and so as not in any

way to limit or restrict those powers, and without prejudice to the other Powers conferred by these Articles, but subject to the restrictions contained in the last preceding Article, it is hereby declared that Directors shall have the following powers, that is to say, power

- (i) To pay costs, charges and expenses preliminary and incidental to promotion, formation, establishment and registration of the Company;
- (ii) To pay and charge to the capital account of the Company any commission or interest lawfully Payable thereof under the provisions of Sections 40 of the Act;
- (iii) Subject to the provisions of Sections 179, 184 and 188 of the Act to purchase or otherwise acquire for the Company any property, rights or privileges which the Company is authorized to acquire, at or for such price or consideration and generally on such terms and conditions as they may think fit, and in any such purchase or other acquisition to accept such title as the Directors may believe or may be advised to be I reasonably satisfactory;
- (iv) At, their discretion and subject to provisions of the Act to pay for any property, rights or privileges acquired by or services rendered to the Company, either wholly or partially, in cash or in shares, bonds, debentures, mortgages, or other security of the Company, and any. such shares may be issued either as fully paid or with such amount credited as paid up thereon as may be agreed upon and any such bonds, debentures, mortgages, or other securities may be either specifically charged upon all or any part of the property of the Company and its uncalled capital or not so charged;
- (v) To secure fulfillment of any contract or arrangement entered into by the Company by mortgage or charge of all or any of the properties of the Company and its uncalled capital for the time being or in such manner as they may think fit;
- (vi) To accept from any member, as far as may be permissible by law, a surrender of his shares or any part thereof, on such terms and conditions as shall be agreed;
- (vii) To appoint any person to accept and hold in trust for the Company any property belonging to the Company in which it is interested, or for any other purposes and to execute and do all such deeds and things as may be required in relation to any trust, and to provide for the remuneration of such

trustee or trustees;

(viii) To institute, conduct, defend, compound, or abandon any legal proceedings by or against the Company or its officers or otherwise concerning the affairs of the Company and also to compound and allow time for payment or satisfaction of any debts due and of any claim or demands by or against the Company and do refer any differences to arbitration and observe and perform any award made thereon;

(ix) To act on behalf of the Company in all matters relating to bankrupts and insolvents; .

(x) To make and give receipts, releases, and other discharges for moneys payable to the Company and for the claims and demands of the Company;

(xi) Subject to provisions of Sections 179 and 185 of the Act, to invest and deal with any moneys of the Company, not immediately required for the purpose thereof, upon such security (not being shares of this Company) or without security and in such manner as they may think fit, and from time to time vary or realize such investments. Save as provided in Section 187 of the Act, all investments shall be made and held in the Company's own name;

(xii) To execute, in the name and on behalf of the Company, in favour of any Director or other person, who may incur or be about to incur any personal liability, whether as principal or surety for the benefit of the Company, such mortgages of the Company's property (present and future) as they think fit, and any such mortgage may contain a power of sale and such other powers, provisions, covenants and agreements as shall be agreed upon;

(xiii) To determine from time to time who shall be entitled to sign, on the Company's behalf, bills, receipts, acceptance, endorsements, cheques, dividend warrants, releases, contracts, and documents and to give the necessary authority for such purpose;

(xiv) To distribute by way of bonus amongst the staff of the Company a share or shares in the profits of the Company, and give to any officer or other person/employee by the Company, a commission on the profits of any particular business or transaction and to charge such bonus or commission as part of working expenses of the Company;

(xv) To provide for the welfare of Directors or ex-Directors or employees or ex-employees of the Company and their wives, widows and families or the dependents or connections of such persons, by building or contributing to the building of house, dwelling or chawls, or by grants of money pension, gratuities, allowances, bonus or other payments or by creating and from time to time subscribing or

contributing to provident and other associations, institutions, funds or trusts and by providing or subscribing or contributing towards places of instruction and recreation, hospitals and dispensaries, medical and other attendance and other assistance as the Board shall think fit, and to subscribe or contribute or otherwise to assist or to guarantee money to any charitable, benevolent, religious, scientific, national or other institutions or object which shall have any moral or other claim to support or aid by the Company, either by reason of locality of operation, or of public and general utility or otherwise;

(xvi) Before recommending any dividend, but subject to the provisions of Section 123 of the Act and there under to set aside out of the profits of the Company such sums as they may think proper for depreciation or Depreciation Fund or to an Insurance Fund or as a Reserve Fund or Sinking Fund or any Special Fund to meet contingencies or to repay debentures of debenture stock or for special dividends or for equalizing dividends or for repairing, improving, extending and maintaining any of the properties of the Company and for such other purposes (including purposes referred to in the preceding clause), as the Board may, in their absolute discretion, think conducive to the interest of the Company, and subject to provisions of Sections 179, 185 and 186 of the Act, to invest the several sums so set aside or so much thereof as require to be invested upon such investments (other than shares of the Company) as they may think fit, and from time to time deal with and vary such investments and dispose of and apply and expend all or any part thereof for the benefit of the Company, in such manner and for such purpose as the Board in their absolute discretion, think conducive to the interest of the Company, notwithstanding that the matters to which the Board apply or upon which they expend the same, or any part thereof may be matters to or upon which the capital moneys of the Company might rightly be applied or expended: and to divide the Reserve Fund into such special funds as the Board may think fit, with full power to transfer the whole or any portion of a Reserve Fund or division of a Reserve Fund to another Reserve Fund or division of a Reserve Fund and with full power to employ the assets constituting all or any of the assets constituting all or any of the above funds, including Depreciation Fund in the business of the Company or in the purchase or repayment of Debentures or debenture stock and without being bound to keep the same separate from other assets and without being bound to pay interest on the same with power however, to the Board at their discretion to pay or allow to the credit of such funds interest at such rate as the Board may think proper, not exceeding nine per cent per annum;

(xvii) To appoint one or more Directors as wholetime Directors and designate them as Executive Directors, Technical Director, Finance Director etc. with such powers and on such terms and conditions as the Board may deem fit;

(xviii) To appoint, and at their discretion remove or suspend such experts, technicians, advisors, officers, managers, secretaries, assistants, supervisors, clerks, agents and servants for permanent, temporary or special services as they may from time to time think fit, and to determine their powers and duties, and fix their salaries or emoluments or remuneration, and to require security in such instances and of such amount as they may think fit, and also from time to time to provide for the management and transaction of the affairs of the Company in any specified locality in India or

elsewhere in such manner as they think fit and provisions contained in the four following sub-clauses shall be without prejudice to the general powers conferred by this sub-clause;

(xix) To comply with the requirements of any local law which, in their opinion, it shall be in the interest of the

Company be necessary or expedient to comply with;

(xx) From time to time and at any time to establish any Local Board for managing any of the affairs of the Company in any specified locality in India or elsewhere and to appoint any persons to be members of such Local Boards, and to fix their remuneration;

(xxi) Subject to the provisions of Section 179 of the Act, from time to time, and at any time to delegate to any person so appointed any of the powers, authorities and discretions for the time being vested in the Board other than their power to make calls or to issue debentures and to authorise Members for the time being, of any such Local Board, or any of them to fill up any vacancy therein and to act, notwithstanding vacancies, and any such appointment or delegation may be made on such terms and subject to such conditions as the Board may think fit, and the Board may at any time, remove any person so appointed and may annul any such delegation;

(xxii) At any time and from time to time, by power of Attorney under the seal of the Company, to appoint any person or persons to be the Attorney or Attorneys of the Company; for such purposes and with such powers; authorities and discretions not exceeding those vested in or exercisable by the Board under these presents and excluding the power to make calls and to issue debentures and excluding also except in their limits authorised by the Board the power to make loans and borrow moneys) any for such period and subject to such conditions as the Board may from time to time think fit and any such appointment may (if the Board thinks fit) be made in favour of the members of any of the Members of any Local Boards, established as aforesaid or in favour of any company, or the shareholder directors, nominees, or managers of any company or firm or otherwise in favour of any of the Members of any Local Boards established as aforesaid or in favour of any company, or the shareholder directors, nominees, or managers of any company or firm or otherwise in favour of any fluctuating body of persons whether nominated directly or indirectly by the Board and any such Power of Attorney may contain such powers for the protection or convenience of persons dealing with such Attorneys as the Board may think fit, and may contain powers enabling any such delegates or attorneys as aforesaid to sub-delegate all or any of the powers authorities and discretions for the time being vested in them;

(xxiii) From time to time to make, vary and repeal by Laws for the regulation of the business of the company its officers, and servants.

(162A) Dispute Resolution

In event of any dispute, controversy or any difference ("Dispute") of whatever nature, arising under, out of, in connection with or relating to the enforcement, performance or the terms and conditions of this agreement or any provision thereof, such dispute shall be amicably settled through good faith negotiation amongst the parties to such Dispute. In the event that such Dispute cannot be resolved by negotiation within (30) days of the Dispute having arisen such dispute shall be referred for arbitration in accordance with the provisions of the Arbitration and Conciliation Act, 1996.. The place of arbitration and the seat of arbitral proceedings begun pursuant to any reference made under this agreement shall be conducted in English language. The decision of the arbitral tribunal and any award given by the arbitral tribunal shall be final and binding upon the parties.

MANAGEMENT

(163) Prohibition of simultaneous appointment of different categories of managerial personnel

The Company shall not appoint or employ at any time more than one of the following categories of managerial personnel, namely:

- (a) Managing, Director, and
- (b) Manager

(164) Secretary

The Directors may, from time to time, appoint a person at such remuneration and upon such terms and conditions as they may think fit (hereinafter called "the Secretary") to perform functions which by the Act and the Articles for the time being of the Company are to be performed by the Secretary and to execute any other duties which may from time to time be assigned to the Secretary by the Directors and at their discretion the Directors may remove the person so appointed.

THE SEAL

(165) The Seal, its custody and use

- (a) The Board shall provide a Common Seal for the purposes of the Company and shall have power from time to time to destroy the same and substitute a new Seal in lieu thereof and the Board shall provide for the safe custody of the Seal for the time being and the Seal shall never be used except by the authority of the Board or a Committee of the Board previously given; .
- (b) The Company shall also be at liberty to have an official Seal for use in any territory, district or place outside India.

(166) Deeds how executed

Every deed or other instrument to which the Seal of the Company is required to be affixed shall, unless the same is executed by a duly constituted attorney, be signed by two Directors or one Director and Secretary or some other person appointed by the Board for the purpose, provided that in respect of the share certificate the seal shall be affixed in accordance with Article 165 thereof.

(167) The Company shall keep and maintain Registers as required by the Act including the following:

- (i) Register of investments made by the Company but not held in its own name, as required by Section 187(7) of the Act and shall keep it open for inspection of any member or debenture holder of the Company without charge;
- (ii) Register of charges as required by Section 85 of the Act and shall keep it open for inspection of any creditor or member of the Company without fee and any person on payment of a fee of Rs. 101- for each inspection;
- (iii) Register of Members under Section 88 of the Act and shall keep the same open for inspection by any member or debenture holder without fee and of any other person on payment of a fee of Rs. 10 for each inspection, except when the Register is closed;
- (iv) Register of Debenture Holders under Section 88 of the Act and shall keep it open for inspection by any member or debenture holder without fee and for any other person on payment of, a fee of Rs 101 for each inspection, except when the Register is closed;
- (v) Register of Contracts. in which Directors are interested, as required by Section 189 and shall keep it open for inspection by any member without fee;
- (vi) Register of Directors and Secretary, as required by Section 170 and shall keep it open for inspection by any member or the Company without charge and of any other person on payment of a fee of Re. 1/- for each inspection;
- (vii) Registers as to the Holdings by Directors of share and debentures in the Company as required by Section 170 of the Act shall keep it open for inspection by any member or debenture holder of the Company on any working day during the period beginning 14 days before the date of the Company's Annual General Meeting and ending 3 days after the date its conclusion;
- (viii) Register of investments in shares debentures of bodies corporate according to the Act;
- (ix) Books of Account in accordance with provisions of Section 128 of the Act;
- (x) Copy of instrument creating any charge requiring registration according to Section 85 of the Act;
- (xi) Copies of Annual Returns prepared under Section 92 of the Act together with copies of certificates and documents required to be annexed thereto under Section 92;
- (xii) Register of Renewed and Duplicate Certificates according to Rule 7(2) of the Companies (Issue of Share Certificates) Rules, 2014.

Copies of entries in the above Registers shall be furnished to the persons entitled to the same on payment of one Rupee for every hundred words or fractional part thereof required to be copied. The Company shall allow facility of inspection of the above Registers by persons entitled to the same on any working day between 3.00 p.m. and 5.00 p.m.

ANNUAL RETURNS

(168) Annual Returns

The Company shall prepare requisite Annual Returns in accordance with Sections 92 of the Act and shall file the same with the Registrar with copies of Balance Sheet and Profit and Loss Account in Accordance with Section 137 of the Act.

DIVIDENDS

(169) Division of Profits

The profits of the Company, subject to provisions of Sections 123 and 127 of the Act and subject to any special rights relating thereto created or authorised to be created by these Articles and subject to provisions of these Articles shall be divisible among the members in proportion to the amount of capital paid-up or credited as paid-up on the shares by them respectively.

(170) The Company dividend in General Meeting may declare a dividend.

The Company in a General Meeting may declare dividends to be paid to the members according to their respective rights but no dividend shall exceed the amount recommended by the Board but the Company in General Meeting may declare a smaller dividend,

(171) Dividends only to be paid out of profits

Subject to provisions of Section 123 and 124 of the Act, no dividend shall be declared or paid otherwise than out of profits of a financial year arrived at after providing for depreciation in accordance with provisions of Section 123 of the Act or out of the profits of the Company for any previous financial year or year arrived at after providing for depreciation in accordance with these provisions and remaining undistributed or out of both; Provided that:

(a) If the Company has not provided for depreciation for any previous financial year or years it shall, before declaring or paying a dividend for any financial year, provide for such depreciation out of the profits of the financial year or out of the profits of any other previous financial year or years;

(b) If the Company has incurred any loss in any previous financial year or years the amount of the loss or an amount which is equal to the amount provided for depreciation for that year or those years whichever is less, shall be set off against the profits of the Company for the year for which the dividend is proposed to be declared or paid or against the profits of the Company for any previous financial year or years arrived at in both cases after providing for depreciation in accordance with the provision of sub-section (2) of Section 123 of the Act or against both.

Provided further that no dividend shall be cleared or paid for any financial year out of the profits of the Company for that year arrived at after providing for depreciation as above, except after the transfer to the reserve of the Company of such percentage of its profits for that year as may be prescribed in accordance with Rules made under Section 123 and 124 of the Act or such higher percentage of its profits as may be allowed in accordance with those Rules.

(172) Interim Dividend

The Board may from time to time pay to the members such interim dividends as in their judgment the position of the Company justifies.
(173) Capital paid up in advance not to earn dividend
Where capital is paid in advance of calls such capital may carry interest but shall not in respect thereof confer a right to dividend or participate in profits.
(174) Dividends in proportion to amount paid-up
All dividends shall be apportioned and paid proportionately to the amounts paid or credited as paid on the shares during any portion or portions of the period in respect of which the dividend is paid; but if any share is issued on terms providing that it shall rank for dividend as from a particular date, such share shall rank for dividend accordingly.
(175) Dividend etc. to joint-holders
Anyone of several persons who are registered as the joint holders of any share may give effectual receipts for all dividends or bonus and payments on account of dividends or bonus or other moneys payable in respect of such shares
(176) No member to receive dividend whilst indebted to the Company and Company's rights or reimbursement thereof
No member, whilst indebted to the Company in respect of share money, shall be entitled to receive payment of any interest or dividend in respect of his share or shares or otherwise howsoever either alone or jointly, with any other person or persons; and the Board may deduct from the interest or dividend payable to any member all sum of money so due from him to the Company.
(177) Transfer of shares must be registered
A transfer of shares shall not pass the right to any dividend declared thereon before the registration of the transfer.
(178) Dividends how remitted

Unless otherwise directed, any dividend may be paid by cheque or warrant, by a pay slip or receipt having the force of a cheque or warrant sent by post or through ECS to the registered address of the member or person entitled to; in case of joint holders, to that one of them first named in the register in respect of the joint holding, Every such cheque or warrant shall be made payable to the order of the person to whom it is sent. The Company shall not be liable or responsible for any cheque or warrant or pay slip or receipt lost in transmission or for any dividend lost to the member or person entitled thereto by the forged endorsement of any cheque or warrant or the forged signature or any pay slip or receipt or the fraudulent recovery of the dividend by any other means,

(179) Unclaimed Dividends

No unpaid and unclaimed dividend shall be forfeited by the Board unless the claim thereto becomes barred by Law, Any dividend which remained unpaid and unclaimed after having been declared shall be dealt with as per provisions of Section 123 and 124 of the Act.

(180) Dividend and call together

Any General Meeting declaring a dividend may, on the recommendation of the Directors, make a call on the members of such amount as the meeting fixes, but so that the call on each member shall not exceed the dividend payable to him and so that the call be made payable at the same time as the dividend; and the dividend may, if so arranged between the Company against the calls and the member, be set off

RESERVE AND DEPRECIATION FUNDS

(181) Reserve Fund

The Directors may from time to time before recommending any dividend set apart any such portion of the profits of the Company as they think fit as a Reserve Fund to meet contingencies or for the liquidation of any debentures, debts or other liabilities of the Company, for equalisation of dividends or for repairing, improving and maintaining any of the property of the Company and for such other purpose of the Company as the Directors in their absolute discretion think conducive to the interest of the Company and may invest the several sums so set aside upon such investment (other than shares of the Company) as they may think fit and from time to time to deal with and vary such investments and dispose of all or any part thereof for the benefit of the Company and may divide the Reserve Fund into such special funds as they think fit with full power to transfer the whole or any portion of a Reserve Fund to another Reserve Fund or a division of a Reserve Fund and also with full power to employ the Reserve Funds or any part thereof in the business of the Company separate from other assets and without being bound to pay interest on the same with power, however co the Board in their discretion to pay or allow to the credit of such funds interest at such a rate as the Board may think proper.

(182) Depreciation Fund

The Directors may, from time to time before recommending any dividend, set apart any such portion of the profits of the Company as they think fit, as a depreciation fund applicable at the discretion of the Directors, for providing fund applicable at the discretion of the Directors, for providing against any depreciation in the investments of the Company, destroyed or damaged by fire, flood, storm, tempest, earthquake, accident, riot wear and tear or any other means whatsoever and for repairing, altering and keeping in good condition the property of the Company or for extending and enlarging the building, machinery and property of the Company or for extending and enlarging the building, machinery and property of the Company applicable subject to dividend and such moneys and all the other moneys of the Company may be invested by the Directors in or upon such investments or securities as they may select or may be used as working capital or may be kept at any bank on deposit or otherwise as the Directors may from time to time think proper.

(183) Investment of Moneys

All moneys carried to any reserve and depreciation fund respectively shall nevertheless remain and be profits of the Company applicable subject to due provisions being made for actual loss or depreciation, for payment of dividend and such moneys and all the other moneys of the Company may be invested by the directors in or upon such investments or securities as these may be used as working capital or may be kept at any bank on deposit or otherwise as the Directors may from time to time think proper.

CAPITALISATION

(184) Capitalisation

(a) The Company in a General Meeting may resolve that any amount standing to the credit of reserve funds or any Capital Redemption Reserve Account or in the hands, of the Company and available for dividend, (or representing premium received on the issue, of shares and standing to the credit of the Share Premium Account) be capitalised, and distributed amongst such of the shareholders as would be entitled to receive the same if distributed by way of dividend and in the same proportions on the footing that they become entitled thereto as capital and that all or any part of such capitalised fund be applied on behalf of such shareholders in paying up in full either at par or at such premium as the Resolution may provide, any unissued shares of the Company, which shall be distributed accordingly or in or towards payment of the, uncalled liability on any issued shares and that such distribution or payment shall, be accepted by such shareholders in full satisfaction of their interest in the said capitalised sum, provided that a Share Premium Account and Capital Redemption Reserve Account may, for the purpose of these articles, be only applied in the paying of any unissued, share to be issued to members of the Company as fully paid bonus shares. (b) A General Meeting may resolve that any surplus moneys arising from the realisation of any capital assets of the Company, or any investments representing the same, or any other undistributed profits of the Company not subject to charge for income-tax be distributed among the members on the footing that they received the same as capital. (c) For the purposes of giving effect to any resolution under the preceding paragraphs of this Article, the Board may settle any difficulty which may arise in regard to the distribution as it thinks expedient and in particular may issue fractional certificates and may fix the value for distribution of any specific assets and may determine that such cash payments shall be made to any member upon the footing of the value so fixed or that fractions of value less than Re 10/- may be disregarded in order to adjust the rights of all parties and may vest any such cash or specific assets in trustees upon such trust for the persons entitled to the dividend or capitalised funds as may seem expedient to the Board. Where requisite, a proper contract shall be delivered to the Registrar for registration in accordance with the Companies Act, 2013 and the Board appoint any person to sign such contract on behalf of the person entitled to the dividend or capitalised fund and such appointment shall be effective.

ACCOUNTS

(185) Directors to keep true accounts

- (i) The Company shall keep at the office or at such other place in India, as the Board thinks fit, proper books of account in accordance with Section 128 of the Act with respect to:
- (a) all sums of moneys received and expended by the Company and matters in respect of which receipts and expenditure take place;
 - (b) all sales and purchases of goods by Company;
 - (c) assets and liabilities of the Company.

The company shall also keep and maintain all such books and records as may be and are prescribed under the Act. Where the Board decides to keep all or any of the Books of Account at any place other than the office of the Company, the Company shall, within seven days of the decision, file with the Registrar a notice in writing giving the full address of that other place provided that the said other place shall also be in India.

The Company shall preserve in good order the Books of Account relating to a period of not less than eight years preceding and current year together with Vouchers relevant to any entry in such books of account. Where the Company has a branch office, whether in or outside India, the Company shall be deemed to have complied with this Article if proper Books of Account relating to the transactions effected at the branch office are kept at the branch office and proper summarised returns, made up to date at intervals of not more than three months, are sent by the branch office to the Company at its office or other place in India, at which the Company's Books of Accounts are kept as aforesaid.

The Books of Account shall give a true and fair view of, the state of affairs of the Company or branch office, as the case may be, and explain its transactions. The Books of Account and other books and papers shall be open to inspection by any Director during business hours.

(ii) The Company shall adopt and follow generally accepted accounting policies applicable in India, sound systems and procedures in respect of maintaining all records and book accounts to reflect the true financial status of the Company at any point of time including off balance sheet items and contingencies liabilities. The Company shall make and keep books, records and accounts, in details, that accurately and fairly reflect all of the transactions and disposition of its assets. The records shall include monthly-unaudited financial statements or other similar reports specified by the investors (including a balance sheet and statements of income and cash flows). All such statements and reports shall be prepared in accordance with Indian GAAP. The Company shall also highlight to the any material deviations between Indian GAAP and International Accounting Standards and the quantitative impact of such deviations on the accounts, books and records of the Company.

(186) As to inspection of accounts or books by Members

(i) The Board shall from time to time determine whether and to what extent and at what times and places and under what conditions or regulations the accounts and books of the Company or any of them shall be open to inspection by members, not being Directors and no Member (not being a Director) shall have any right of inspecting any account or book or document of the Company except as conferred by law or authorised by the Board.

(ii) Upon such notice to the Company and/or the Operating Companies, the Shareholders and its authorized representatives (such as employees, directors, shareholders, lawyers, accountants or other professional advisors) shall have a right to (a) visit and inspect the properties of the Company and/or the Operating Companies; (b) access and review the books, corporate and financial records and financial statements of the Company and/or the Operating Companies; and (c) discuss the business and finances of the Company and/or the Operating Companies with officers of the Company and/or the Operating Companies.

(187) Statement of Accounts to be furnished to General Meeting

The Directors shall, from time to time, in accordance with provisions of Sections 235, 240 and 247 of the Act, cause to be prepared and to be laid before the Company in Annual General Meeting, such Balance Sheets, Profit and Loss Accounts and Reports as are required by these sections.

(188) Copies shall be sent to each Member

(i) A copy of every balance sheet (including profit and loss account, the auditors' report and every other document required by law to be annexed or attached, as the case may be, to the balance sheet) which is to be laid before the Company in the General Meeting shall be made available for inspection at the Registered Office by the Company during working hours for a period of twenty one days before the date of the Meeting and a statement containing salient features of such documents in the prescribed form or copies of documents as aforesaid, as the Company may deem fit, will be sent to every member of the Company and to every Trustee for the holders of any debenture issued by the Company, not less than twenty one days before the date of the Meeting at which such documents are to be laid.

(188A) Information to Parties

(i) The Companies shall furnish to the shareholders the following the pertaining to the company as well as the operating companies (a) Audited annual financial statements (within 90 days of the end of the financial year) (b) un-audited annual financial statements (within 30 days of the end of the financial year) (c) quarterly financial statement (within 30 days) (d) the opinion of the statutory auditors concerning the Company's financial year; and (e) some other financial and accounting reports and information as the shareholders may reasonable request on a timely basis. (ii) The Company shall furnish or cause to be furnished promptly to a shareholder all such records and information as it shall reasonably request concerning (a) the financial statements or audit refer to in the Agreement (b) audited financial statements and auditors report of each of the funds under management of the Company; and (c) any other matters relating to their respective investments in the Company. The Company shall, upon request by the Shareholder, consult with the Shareholders on any of these matters
(189) Accounts to be audited
The Company shall appoint a reputed auditing firm satisfactory to the Shareholders, for conducting its statutory audit ("Statutory Auditor") and their rights and duties regulated in accordance with Sections 140 to 147 of the Act.
(190) First Auditor or Auditors
The First Auditor or Auditors of the Company shall be appointed or re-appointed by the Comptroller & Auditor General of India, who shall direct the manner in which the Company's accounts shall be audited and shall have the power to give instructions to him in regard to any matter relating to the performance of his functions as such. However, the limits as prescribed under sub-sections (1B) and (1C) of Section 139, 141 and 142 of the Act shall apply in relation to the appointment or re-appointment of the auditors of the Company
(191) Remuneration of Auditors
The remuneration of the Auditors of the Company shall be fixed by the Company in general meeting except that the remuneration of the Auditors appointed to fill any casual vacancy may be fixed by the Board of Directors.
(192) Powers and duties of the Auditors
The powers and duties of the Auditors of the Company shall be as laid down in Section 143 of the Act.
(193) Audit of Branch Offices

The Company shall comply with provisions of Section 143 of the Act in relation to the audit of the accounts of branch offices of the company except to the extent to which may exemption may be granted by the Central Government in that behalf.

(194) Reading and Instructions of Auditors' Report

The Auditors Report shall be read before the Company in general meeting and shall be open to inspection by any member of the Company.

(195) When account to be deemed conclusive

Every account when audited and approved by the Annual General Meeting shall be conclusive.

DOCUMENTS AND NOTICES

(196) Service of documents or notices on members by the Company

- (i) A document or notice may be served or given by the company on any member either personally or by sending it by Speed Post Acknowledgment due to him at his registered or (if he has no registered address in India) to the address, if any, in India supplied by him to the Company for servicing documents or notices on him.
- (ii) Where a document or notice is sent by Speed Post Acknowledge , service of the document or notice shall be deemed to be effected by properly addressing, prepaying and posting a letter containing the document or the notice, provided that where a member has intimated to Company in advance that documents or notices should be sent to him under a certificate of posting or by registered post with or without knowledge due and deposited with the Company, a sum sufficient to defray the expenses of doing so, service of the documents or notice shall not be deemed to be effected unless it is sent in the manner intimated by the member, and such service shall be deemed to have been effected in the case of a notice of a meeting at the expiration of forty eight hours after the letter containing the document or notice is posted and in any case, at the time at which the letter would be delivered in the ordinary course of post.

(197) By Advertisement

A document or notice advertised in a newspaper circulating in the neighbourhood of the Office shall be deemed to be duly served or sent on the day on which the advertisement appears on or to every member who has no registered address in India and has not supplied to the Company an address within India for serving of document on or sending of notices to him.

(198) On joint-holder

A document Company on serving or the joint members in or notice may be served or given by the or to the joint holders of a share by giving the document or notice on or to holder named first in the Register of respect of such share.

(199) On personal representatives etc.
A document or notice may be served or given by the Company on or to the persons entitled to a share in consequence of the death or insolvency of a member by sending it through post in a prepaid letter addressed to them by name, or by the title of representatives of the deceased or assigns of the insolvent or by any like description at the address (if any) in India supplied for the purpose by persons claiming to be entitled to or (until such an address has been so supplied), by serving the document or notice in any manner in which the same might have been given if: the death or insolvency had not occurred.
(200) To whom documents or notices must be served or given
Documents or notice of every General Meeting shall be served or given in the same manner herein before authorised on or to (a) every member, (b) every person entitled to share in consequence of death or insolvency of a member and, (c) the Auditors for the time being of the Company.
(201) Members bound by documents or notices served on or given to previous holders
(i) Every person, who by operation of law, transfer or other means whatsoever, shall become entitled to any share, shall be bound by every document or notice in respect of such share which previously to his name and address being entered on the Register of members, shall have been duly served or given to the person from whom he derived his title to such shares. (ii) Subject to the terms and conditions hereof, this agreement is binding upon and will ensure to the benefit of the Parties and their respective successors and permitted assigns.
(202) Document or notice by Company and signature thereto
Any documents or notice to be served or given by the Company may be signed by a Director or some person duly authorised by the Board of Directors for such purpose and the signature thereto may be written, printed or lithographed.
(203) Service of document or notice by Member
All documents or notices to be served or given by member on the Company or any Officer thereof shall be served or given by sending it to the Company or officer at the office by post under a certificate of posting or by registered post or by leaving it at the office.
WINDING UP
(204) Liquidator may divide assets in specie
The Liquidator or any winding-up (whether voluntary, under supervision of court or compulsory) may, with the sanction of a special resolution, but subject to the rights attached to any preference share capital, divide among the contributories in specie any part of the assets of the Company and may, with like sanction, vest any part of the assets of the Company in trustees upon trusts for the benefit of contributories as the liquidator, with like sanction shall think fit.
INDEMNITY AND RESPONSIBILITY

(205) Directors' and others' right of indemnity

Every officer or Agent for the time being of the Company shall be indemnified out of the assets of the Company against all liability incurred by him in defending any proceedings, whether civil or criminal, in which judgment is given in his favour or in which he is acquitted or in connection with any application under Section 463 of the Act, in which relief is granted to him by the Court.

SECRECY CLAUSE**(206) Secrecy Clause**

(a) Every, Director, Manager, Auditor, Secretary, Trustee, member of a Committee, Officer, servant, agent, accountant or other person employed in the business of the Company shall, if so required by the Directors before entering upon his duties; sign a declaration pledging himself to observe strict secrecy in respect of all transactions and, affairs of the Company with customers and the state of the accounts with individuals and in matters relating thereto and shall, by such declaration, pledge himself not to reveal any of the matters which may come to his knowledge in the discharge of his duties except when required to do so by the Directors or by Law or by the person to whom such matters relate and except so far as may be necessary in order to comply with any of the provisions in these presents contained; (b) No member shall be entitled to, visit or inspect any works of, the Company without the permission of the Director or to require discovery of or any information respecting any details of the Company's trading, or any matter which is or may be in the nature of a trade secret, mystery of trade, secret process or any other matter which may relate to the conduct of business of the Company and which in the opinion of the Directors it would be inexpedient in the interest of the Company to disclose.

ANNEXURE 1

Transport Hub Consultation Report

for PPP Company



...
āyushcā
. GOA .

TRANSPORT HUBS

goa.āyushcā.org

AN INITIATIVE OF



āyushcā



Non nobis solum nati sumus

Not for ourselves alone are we born

Marcus Tullius Cicero

Confidential and strictly for internal use of the Investment Committee members only.
Interim document. Final figures may vary substantially. Report may contain errors.

transportation hub

VIRTUAL METRO TERMINUS . BUS TERMINUS . BOAT TERMINUS

A city's transportation infrastructure serves as the cornerstone of productivity and innovation, facilitating the rapid connection of people and ideas while fostering development and progress for the local people. For tourism, quality public transportation enhances the people-carrying capacity of the existing roads, reduces costs, increases convenience and catalyses various related businesses from food and beverages to events and footfalls at tourist venues.

The aim of this hub is to establish a space that seamlessly integrates all modes of transportation, creating a vibrant environment for living, working, and leisure activities, whether individuals are using public transit or not. Furthermore, it will introduce a safe, comfortable 24/7 place for tourists to rest in between visits during monsoon months and at odd hours.

The transportation hubs are being designed by best in any class experts to accommodate a multi-modal centre providing access to virtual metro, buses, water taxis, and flexible tyre vehicles in addition to direct point to point connectivity to all major hotels and tourist attractions. Additionally, the station plans to enhance the surrounding landscape to attract tourists and locals. The largest in the state, the multiport is envisioned as a lively gathering spot, reviving Goan's eclectic culture and serving as a hub for social interactions, public performances and calendar events



Investment Committee
Urgent update 31.3.24

Summary of changes in
transport hub financials from
preliminary report of December
2023 to DPR Module M7 of
March 31 2024:

- Project cost of Rs 2350 crores and total land requirement of 65 acres (I500 crores earlier). Three transport hubs instead of two. I200 electric vehicles going up to 5,000 buses (instead of 300 going up to I200).
- To be funded by Rs I000 crores lease finance with Rs 200 crores margin, Rs 750 crore social impact equity funding and Rs 400 crore commercial finance.
- First location to be main transport hub at Porvorim.
- India's first multimodal transit, parking and utilities payment card.
- Project to be housed in a PPP company which targets to start operations on I5.8.24





Transport Hub M7 Report

Transport Hub is the
CSR component of the
āyushā GOA Project





This report pertains to Module 7 (M7) of the āyushća GOA DPR. M7 includes details of the three transport hubs to be supported as part of the Global Alumni Hub project in Goa.

This document should be read with Module 0 (M0) which has an overview of the Project as of December 31, 2023

Document: M7/310324/goa.iitcouncil.org



DPR Commencement Date
February 15, 2024

Interim Report
March 31, 2024

Final Report
April 15, 2024

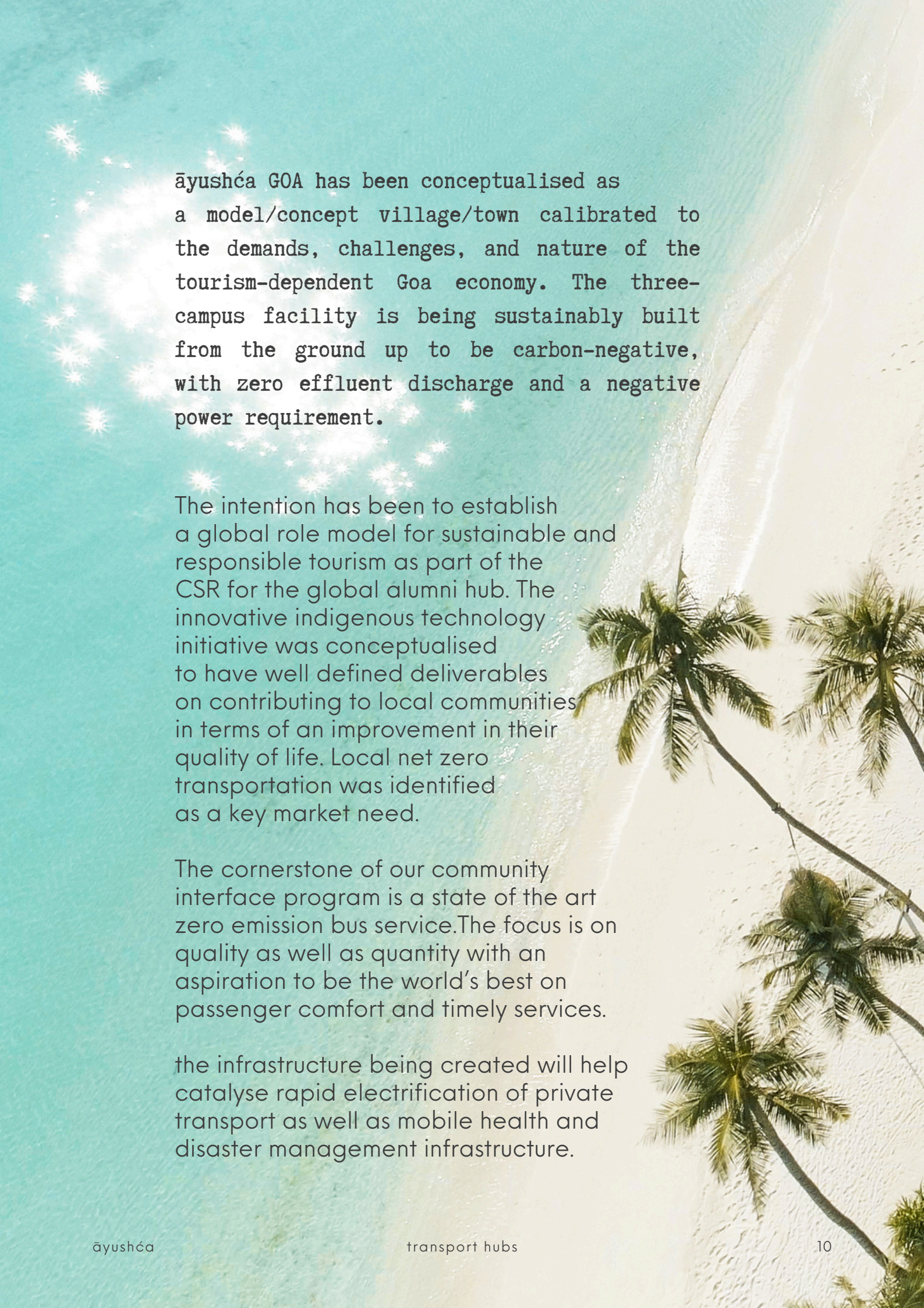
Tentative start date for the project
August 15, 2024

End Date
30 months from start



This report could be completed on schedule within two months because of the high degree of proactivity and cooperation from the various government departments in Goa including :

- Office of the Chief Secretary
- Kadamba Transport Corporation
- Smart City Goa & Panchayats
- Goa Industrial Development
- Indian Navy, Civil aviation
- The Goa campus of BITS Pilani
- Sustainability division of ITC Ltd



āyushća GOA has been conceptualised as a model/concept village/town calibrated to the demands, challenges, and nature of the tourism-dependent Goa economy. The three-campus facility is being sustainably built from the ground up to be carbon-negative, with zero effluent discharge and a negative power requirement.

The intention has been to establish a global role model for sustainable and responsible tourism as part of the CSR for the global alumni hub. The innovative indigenous technology initiative was conceptualised to have well defined deliverables on contributing to local communities in terms of an improvement in their quality of life. Local net zero transportation was identified as a key market need.

The cornerstone of our community interface program is a state of the art zero emission bus service. The focus is on quality as well as quantity with an aspiration to be the world's best on passenger comfort and timely services.

the infrastructure being created will help catalyse rapid electrification of private transport as well as mobile health and disaster management infrastructure.

In pursuance of our objective of contributing to the state in general and to the local communities around the main campus in particular, the project had been budgeted in December 2023 to include:

- two multimodal transport hubs for 300 buses going up to I200 electric buses eventually with 300 station Mega chargers and 60 MW captive power generation
- state of the art medical clinics on wheels, emergency and disaster management vehicles
- India's first multimodal transit, parking and utilities payment card
- Project cost of Rs I500 crores and a land requirement of 80 acres
- To be funded by Rs 700 crores of social impact equity funding and Rs 800 crores of multilateral agency funding for the rolling stock.





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Lallantop

Bangla

GNT

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INDIA TODAY

APP

HOME MY FEED INDIA WORLD BUSINESS TECH MOVIES SPORTS SCIENCE BEST COLLEGES

News / Technology / News / IIT Alumni Council to develop indigenous systems and software to replace banned Chinese

IIT Alumni Council to develop indigenous systems and software to replace banned Chinese apps

The Council believes that Indian systems and software will rise to the occasion in the global market.

ADVERTISEMENT

Kiran Tare

New Delhi

June 30, 2020 UPDATED: June 30, 2020 20:58 IST

IIT Alumni Council is the largest global body of alumni, students and faculty across all the 23 Indian Institute of Technologies (IITs) and partnering Technical Institutes of Excellence (TieNet).

The Council has been working for the last few weeks with various Technical Institutes of Excellence, research institutions for developing indigenous and cost effective solutions to replace Chinese systems and software. These include an initiative with IIT Roorkee to recycle all the plastic disposables used in the RTPCR process including viral sample tubes, sample plates and pipette tips which are consumed in large quantities adding to bio hazardous waste challenges as well as hard currency imports.

ICT Mumbai is supporting work on designing and piloting an indigenous technology line with indigenous capital goods for mass production of the RTPCR 2.0 test kits to be used in the MegaLab. "IIT Alumni Council is announcing an immediate ban on Chinese systems and software for all its initiatives including MegaLab," stated Ravi Sharma, President and Chief Volunteer of the IIT Alumni Council.

ADVERTISEMENT

"We had already started work on indigenous development of requisite systems and software after the Prime Minister's appeal for 'Atmanirbhar Bharat'. We are very confident that we shall be able to present world class systems and software with support of the global IIT Alumni community as well as the partner Institutions like Mumbai University and ICT Mumbai that are known for their technology supremacy worldwide," he stated.

Pawan Kumar, founder of the branded IIT Alumni movement, stated he is sure that they will not only achieve the goal of self-sufficiency for all their initiatives but would also export their software and testing systems to other parts of the world. "It is well known that the Indian software industry is well geared to win in any market on a level playing field. In the current context I am more than sure that Indian software and system makers will rise to the occasion and soon present indigenous alternatives to the Indian as well as global market."

LIVE TV

The project is also in full compliance with the core values and guidelines of the IIT Alumni Council which include:

- complete ban on any Chinese systems, software or consumables/accessories in any of our projects wef September 2020.
- reliance on indigenous sources with predictable path to indigenisation
- where imports are unavoidable, only the best in class is to be imported
- work with proven indian suppliers and corporates to hit the ground running
- hundreds of partner firms identified and onboarded
- multiple startups funded to meet missing technology pieces in areas like sustainability, AI, energy transition and electric vehicles.





ENERGY

EV manufacturers fined over non-indigenous components: Misappropriation of subsidy or notional loss?

Basic necessities for making an EV battery, like aluminum and copper current collectors, are not available in India. Firms making them are based in Korea, Japan and China



[NEXT VIDEO >](#)

By DTE Staff

Published: Tuesday 09 May 2023

The central government has fined Indian EV manufacturers for misappropriation of subsidies over the claim that they were not sourcing components indigenously as required by the FAME II scheme.

The FAME II scheme in India is a five-year subsidy programme (applicable from April 1, 2019). It aims at escalating the electrification of public and shared transportation (7,000 electric and hybrid buses, half a million electric three-wheelers, 55,000 electric four-wheeler passenger cars, and a million electric two-wheelers) through a budgetary support of 10,000 crore.

It provides electric two-wheelers with a maximum subsidy of 40 per cent on the total cost of the vehicles if the selling cost of goods from the seller's factory is Rs 1.5 lakh per unit and has at least 50 per cent of domestically manufactured components in their vehicles.

But, it is important to consider whether local supply chains and EV manufacturing infrastructure are even available in the country to fit the criterion of the FAME scheme.

The in-use vehicles from these manufacturers were traced and taken apart to check the origins of their components and not for mechanical faults in the vehicle which jeopardise people's safety .

Checks were not conducted beforehand to ensure the OEMs' compliance with FAME II regulations before handing out subsidies to them.

While the government wants to support OEMs with electrification, the EV programme could do with a thorough review of the strategy deployed to achieve these goals.

With over 750,000 operating buses, China has the world's largest fleet of electric buses. Over 90% of all electric buses sold globally are either built in China or with Chinese components. India is working hard to catch up. There is a missing piece in the jigsaw which is the ability to add a serial charger onboard to allow deployment of buses without charging infrastructure.

Based on the findings of the Detailed project report team, these have now been revised as follows: (as of 31.3.24)

- three multimodal transport hubs for 5000 electric vehicles with 500 station Mega chargers and 500 medium capacity chargers and 125 MW captive power generation
- 30 state of the art medical clinics on wheels, emergency and disaster management vehicles
- India's first multimodal transit, parking and utilities payment card
- Project cost of Rs 2450 crores and a land requirement of 65 acres
- To be funded by Rs 750 crores of social impact equity funding, Rs 400 crores of multilateral agency funding and Rs 1200 crores from sponsors /hotels/ commercial leasing.

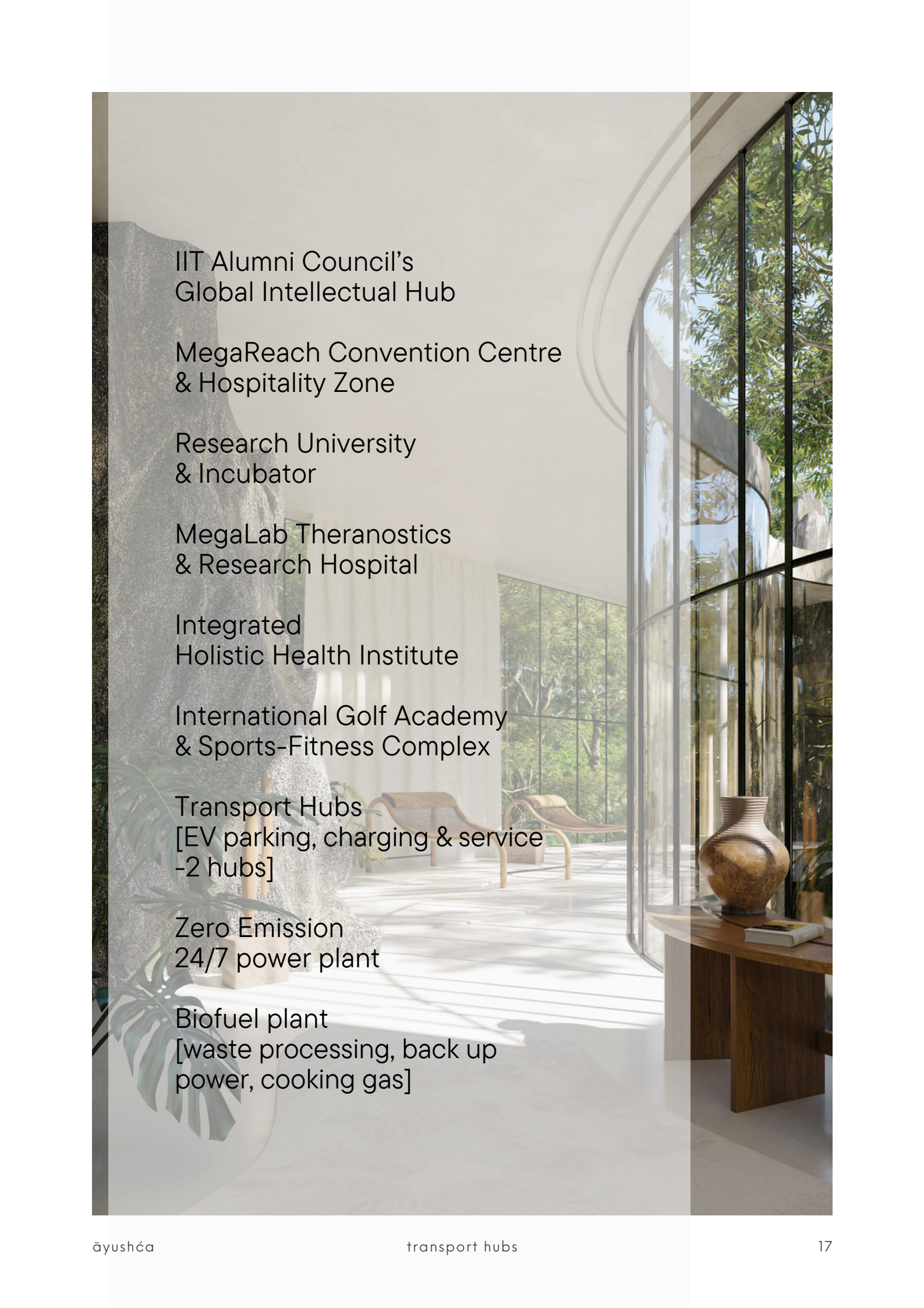


2

āyushća GOA revised financials

Sustainable tourism end-
to-end with a strong link to
the local community



The background image shows a bright, modern interior space. On the right, there is a large, curved glass wall that looks out onto a lush green landscape with trees. In the foreground, a wooden table holds a large, textured, brown ceramic vase. In the background, two wooden chairs with woven seats are visible. The floor is light-colored and polished. The overall atmosphere is clean, bright, and sophisticated.

IIT Alumni Council's
Global Intellectual Hub

MegaReach Convention Centre
& Hospitality Zone

Research University
& Incubator

MegaLab Theranostics
& Research Hospital

Integrated
Holistic Health Institute

International Golf Academy
& Sports-Fitness Complex

Transport Hubs
[EV parking, charging & service
-2 hubs]

Zero Emission
24/7 power plant

Biofuel plant
[waste processing, back up
power, cooking gas]

budgeted project cost

āyushća estate components	Land area acres	MegaFund Equity Cr	Vendor Finance Cr
IIT Alumni Council's Global Intellectual Hub	25	350	150
MegaReach Convention Centre & Hospitality Zone	40	500	200
Research University & Incubator	5	50	-
MegaLab Theranostics & Research Hospital	5	75	-
Integrated Health & Wellness Institute	25	400	-
International Golf Academy & Sports-Fitness Complex	70	160	-
Transport Depots x 2 [EV parking, charging & service]	80	700	800
Zero Emission 24/7 power plant	10	200	200
Biofuel plant [waste processing, back up power, cooking gas]	10	65	150
TOTAL Rs 4000 crores 270 acres plus 30 acre isolation		2500 Cr MegaFund	1500 Cr Vendor Fin.

revised project cost

āyushća estate components	Land area acres	MegaFund Equity Cr	MDB/ Private Contribution
IIT Alumni Council's Global Intellectual Hub	25	290	40
MegaReach Convention Centre & Hospitality Zone	40	640	260
Research University & Incubator	15	80	-
MegaLab Theranostics & Research Hospital	2	35	-
Integrated Health & Wellness Institute	25	250	-
International Golf Academy & Sports-Fitness Complex	70	160	-
Transport Depots x 3 [EV parking, charging & service]	65	950	1400
Zero Emission 24/7 power plant	10	280	320
Biofuel plant [waste processing, back up power, cooking gas]	10	65	75
TOTAL Rs 4845 crores 262 acres plus 30 acre isolation		2750 Cr MegaFund	2095 Cr MDB/ Pvt Fin.

budgeted built area

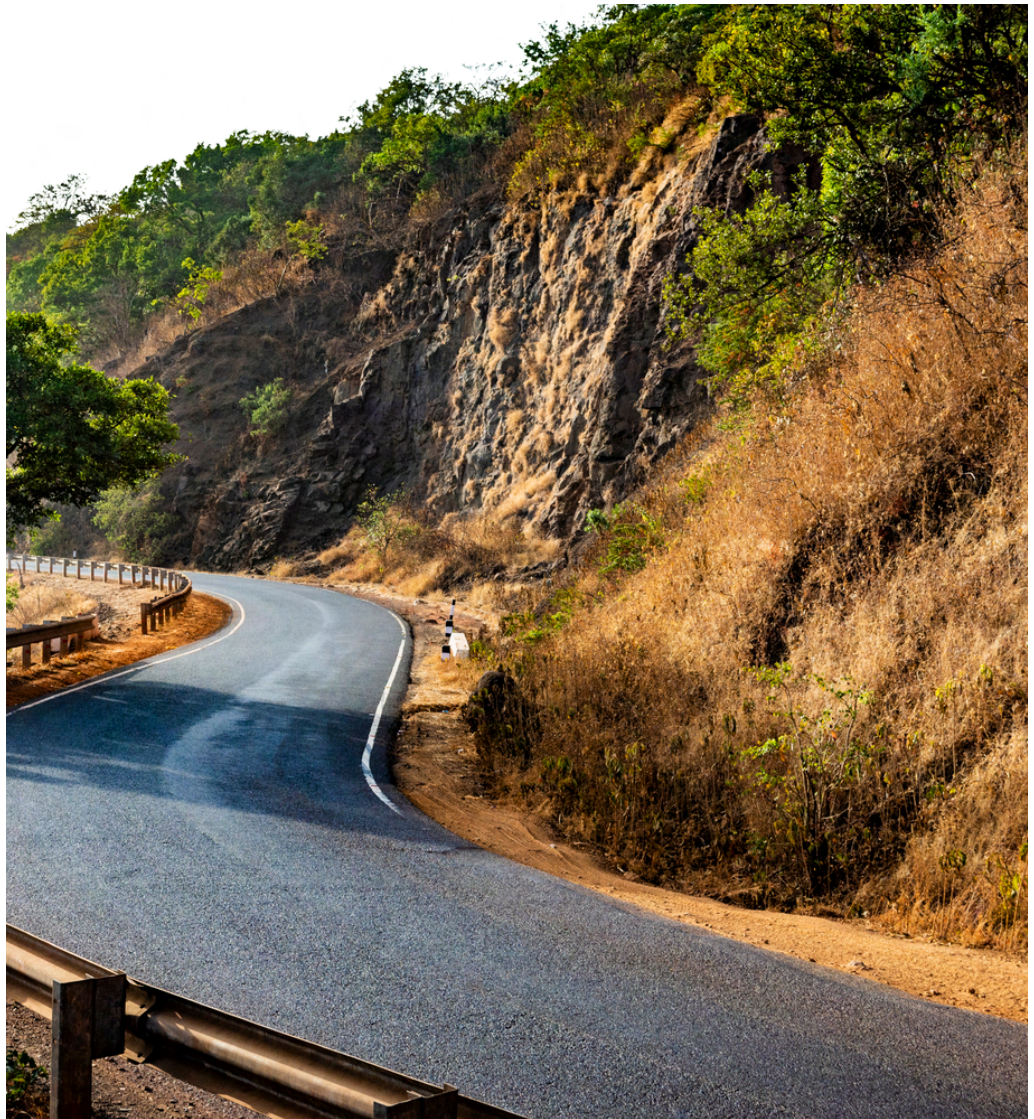
āyushća estate components	Land area acres	Conventional construction sqm	Sustainable construction sqm
IIT Alumni Council's Global Intellectual Hub	25	22000	30000
MegaReach Convention Centre & Hospitality Zone	40	48000	12000
Research University & Incubator	15	5000	15000
MegaLab Theranostics & Research Hospital	2	7000	5000
Integrated Holistic & Wellness Institute	25	30000	15000
International Golf Academy & Sports-Fitness Complex	70	6000	23000
Transport Depots x 2 [EV parking, charging & service]	80	4000	15000
Zero Emission 24/7 power plant	10	2000	3000
Biofuel plant [waste processing, back up power, cooking gas]	10	1000	7000
TOTAL	270 acres land area	125,000 sqm conventional	125,000 sqm sustainable

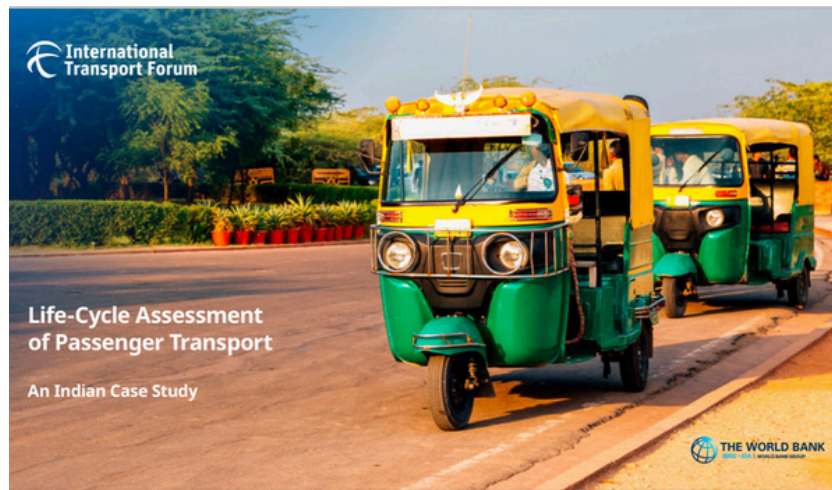
revised built area

āyushća estate components	Land area acres	Conventional construction sqm	Sustainable construction sqm
IIT Alumni Council's Global Intellectual Hub	25	22000	40000
MegaReach Convention Centre & Hospitality Zone	40	68000	12000
Research University & Incubator	15	5000	15000
MegaLab Theranostics & Research Hospital	2	7000	5000
Integrated Holistic & Wellness Institute	25	30000	15000
International Golf Academy & Sports-Fitness Complex	70	6000	23000
Transport Depots x 3 [EV parking, charging & service]	65	100000	15000
Zero Emission 24/7 power plant	10	2000	3000
Biofuel plant [waste processing, back up power, cooking gas]	10	1000	7000
TOTAL 376,000 sqm	262 acres land area	241000 sqm conventional	135000 sqm sustainable

GOA

revitalising public transport





Initiate a shift to buses and prioritise their electrification

Promote electric two- and three-wheelers

Encourage a shift in the car fleet towards shared electric vehicles

Choose corridors with high passenger demand for new metro lines

Mainstream life-cycle assessment into public policy and investment decisions

Accelerate the transition to battery electric vehicles and complement it with the provision of cleaner energy



The current public transport network comprises of:

KTC buses | 450

Private buses | 1150

Other buses | 4500

Goods vehicles | 55000

Taxis | 37000

3 & 2 wheelers | 35000

Almost the entire fleet is fossil fuel powered. The capital cost of electrifying this would be upward of Rs 25,000 crores. If this fleet were to be concurrently charged at night over four hours it would draw more than 500MW of power which is not available from the grid. The State grid supply of 560 MW is already short of peak demand by approx. 100 MW leading to power cuts.





The āyushća project proposes
to accelerate the path to
electrification and upgradation
of the public tourist infrastructure.

As part of the āyushća project, a 300 vehicle fleet was proposed to be supported as per the budgetary proposal of December 2023:

100 Comfort buses | upto 12m
100 Luxury coaches | upto 9m
40 Long haul buses | upto 24m
30 Intra Campus buses | upto 7m
5 Amphibian coaches| 12m
10 Medical Clinics on wheels
5 Emergency Services
5 Support & Standby vehicles
5 Electric hydrofoil boats

These were to be supplemented by standardised 300 luxury EV coaches sponsored by leading hotels to connect their hotels to the tourist route locations using a circular route.



Subsequent to the DPR study, it is now proposed that a 5000 vehicle fleet would be supported with 300 standalone high speed charging stations and 200 embarking gates/ stops with pantograph chargers.:

Phase I:

500 Upgrade buses*

100 Comfort buses | upto 12m

120 Luxury coaches | upto 9m

30 Longhaul metro | upto 24m

400 Hotel coaches| upto 7m

15 Amphibian sightseeing | 12m

15 Mobile clinics | 12m

10 Emergency response | 12m

5 Support vehicles | 20m

5 Water cruisers | 15m

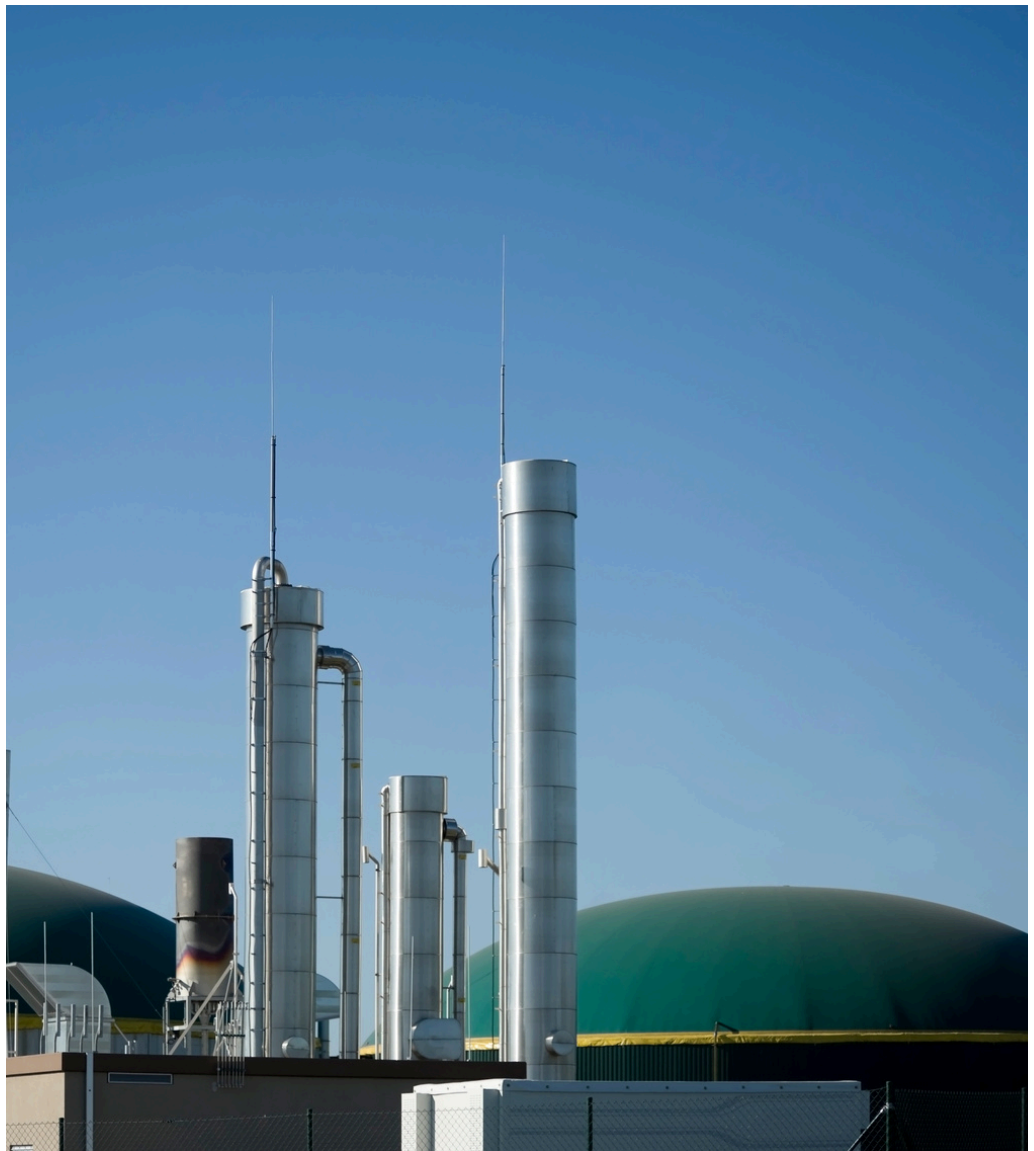
*includes electric cars and luxury cars

Out of these 1200, a total of 400 vehicles would be contributed by partner hotels and restaurants who will also provide parking and charging infrastructure.



GOA

technology
leadership





IIT Alumni Council is now the largest global body of alumni across all the twenty-three IITs and partnering Universities.

The IIT Alumni Council aspires to align Alumni resources towards catalysing India's technological renaissance for a digital society.

We see Goa as a melting pot of cultures and a fusion point for cutting-edge modern technologies with ancient wisdom.

As sustainability technologies evolve and mature – the limiting step is the rate of diffusion and mass deployment. And that is where we see Goa taking a lead.



Ravi Sharma

President &
Chief Volunteer



GOA

strengthening the
startup ecosystem



The essential components of a startup ecosystem traditionally include promoters, academic institutions, angel investors, venture capitalists and incubators.



- interventions like the virtual incubator promoted by the IIT Alumni Council have changed this paradigm. By offering startup's the option to roam across physical incubators in different cities or even different countries, the startups are no longer handcuffed to their home location/incubator
- new incubation models like venture studios and accelerators bring the startups to a location that is convenient from the viewpoint of quality of life, ecosystem suitability, capital access and research infrastructure
- the Global Alumni Hub along with the Innovative Indigenous Technologies Campus in Goa will accelerate Goa's development as a global hub for startups in wellness, sustainability and deep tech.

3

Transport

Zero particulate emission
and net zero carbon





transport hub market study



The passenger transport market broadly consists of two segments - locals and tourists. Locals primarily use two wheelers. Ola and Uber do not operate in Goa. Tourists rely on taxis and self drive vehicles.

The key limiting factor to the growth of tourist numbers is the traffic bearing capacity of the local roads. This will necessitate a shift to shared modes of transport such as electric buses.



Goa Mumbai Highway Route | Source: Times of India

Goa currently gets around 8 million tourists. Around 3 million arrive by air. The rest come by road and rail. By 2029-30, this is expected to rise to 18 million - out of which at least 10 million are expected to arrive by road. This increase in road arrivals is expected to be catalysed by the completion of NH66 between Mumbai and Goa.

It is not possible for Goa to handle this surge in tourist arrivals without taking immediate steps to significantly enhance the capacity of the local bus fleet.

If one assumes four days per tourist and 60% tourist in the four peak months for the 10 million road arrivals, the bus footfall per day in tourist season would be upward of 500,000 with an average trip length of 30 kms yielding 15 million passenger kms. Assuming 5000 passenger-kms per bus per day - this will need 3,000 buses. In contrast Kadamba currently has around 500 ageing buses. Thus in effect Goa needs an indicative 5000 buses including long distance buses.

In order to ramp up from the existing 500 Kadamba Buses to 5000 over 50 months would require the addition of 100 buses per month. In order to attain this kind of penetration - an initial lot of at least 1200 buses would be required in the first 18 months.

In addition, the transport hubs will need to have the capacity to park, charge and maintain the buses. They will also need to have enough floor space to have at least 300 embarkation gates. If the AI engine deems it most optimal to route the passengers through the transport hubs - then the hubs will need to be configured accordingly.





transport hub site study



Transport hub will host multiple electric vehicle technologies including pure electric, hydrogen and serial hybrid with fully automated hands free charging.

Electric vehicle parking, charging & maintenance and repair service stations will be established at the three transport hub locations.



The bus selection has been done in keeping with the turning radius, winding narrow roads and hilly topography of Goa. The core module used is of 9m length with multiple modules articulated to create a virtual metro service on NH66 interconnecting the three hubs at 80 Kph offering end to end travel in under 100 minutes.

The high speed, high capacity fully autonomous virtual metro is targetted for launch in 2025. The longitudinal service will connect the northern tip of the state at Sindhudurg Airport with the Sourthern Hub via the Porvorim Hub in under 100 minutes. The fully AI based system will use white painted tracks on NH66 to lock the wheels accurately to the Rails. To the extent feasible, the virtual rail movement will by synchronised with the traffic lights so that the lights are green when the virtual rail is passing by. This will require a dedicated lane on NH66. The virtual metro technology is well proven and can use 9m coaches.



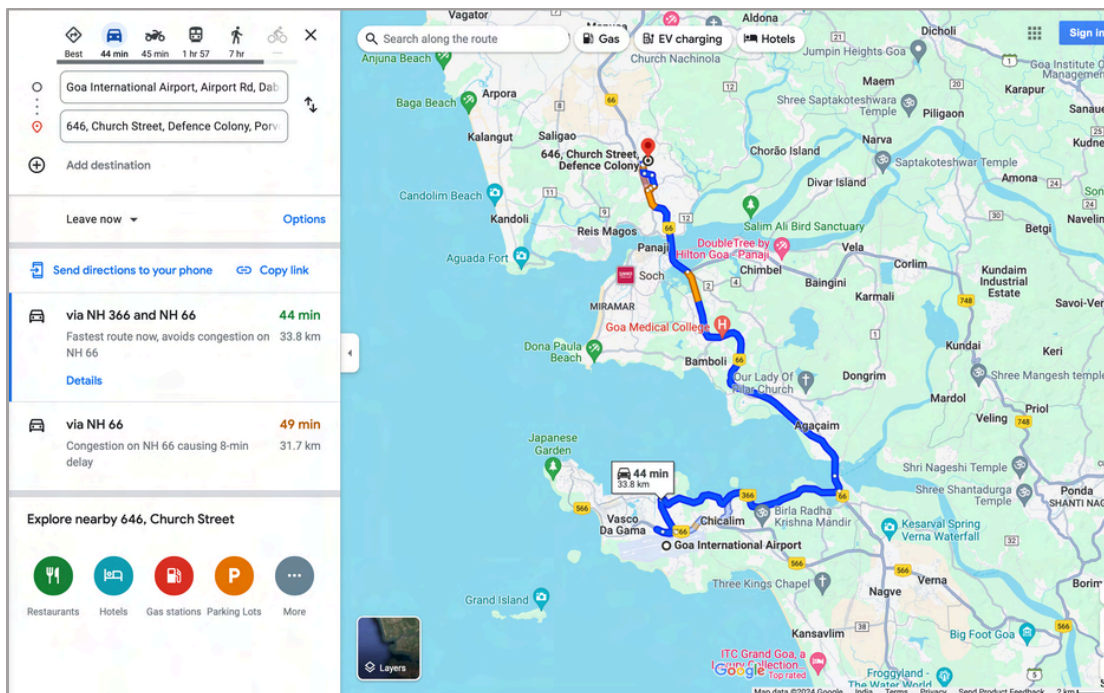
As per interim findings of the DPR study, the following is recommended over the first 18 months starting 15.8.2024:

Total electric buses: 1200

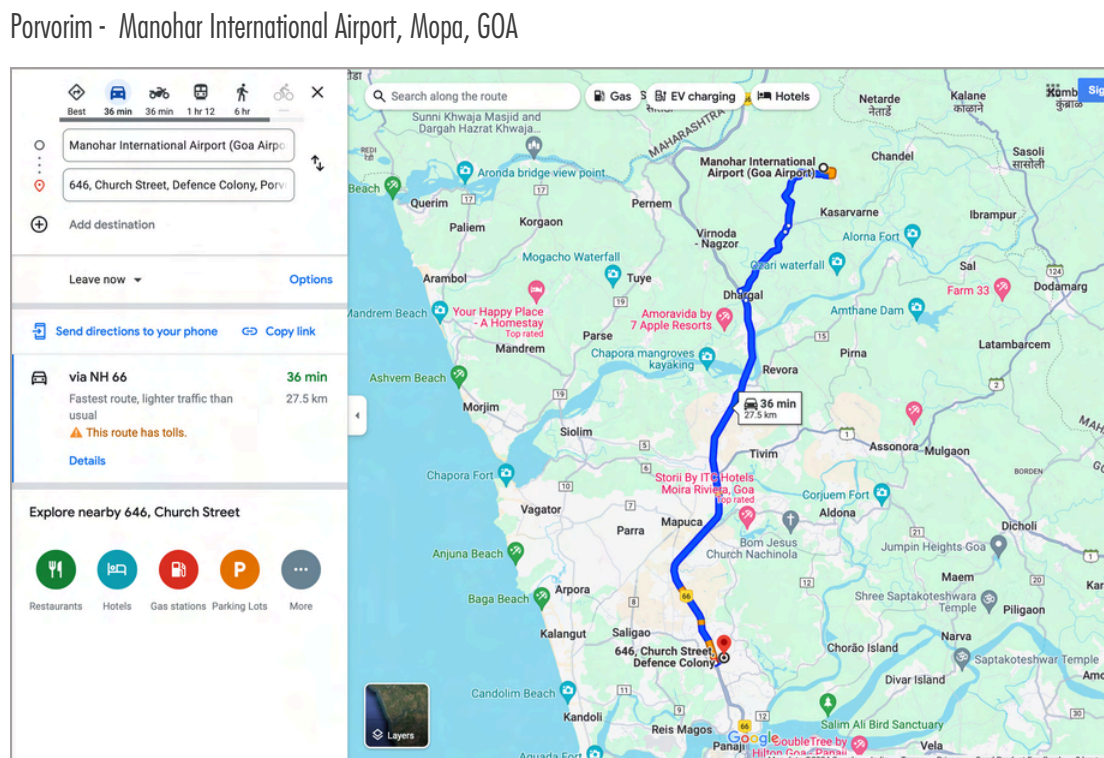
Bus Hubs:

- I. Porvorim (standalone bus port equidistant from various key locations like airports and main station)
2. Northern Hub along NH66 (as part of main 250 acre Global alumni hub)
3. Southern Hub near Concona along NH66
4. (as part of the 50 acre research university campus and incubator)

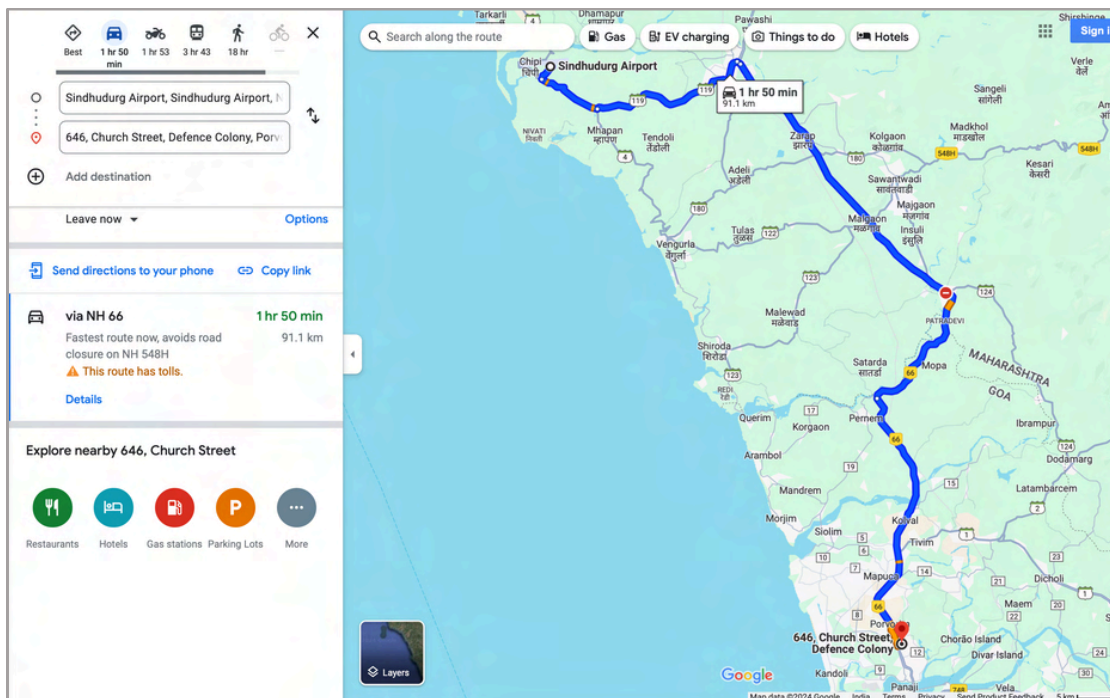
The following pages give the distances of the various locations from the identified bus port location in Porvorim (identified as 646 Church Street). The Northern Hub is identified as Sindhudurg Airport (2 hours away) and the southern hub as Lalit Hotel and Golf Spa (2 Hours away). The airports and station would be under 45 minutes away.



Porvorim - Goa International Airport, Dabolim, GOA

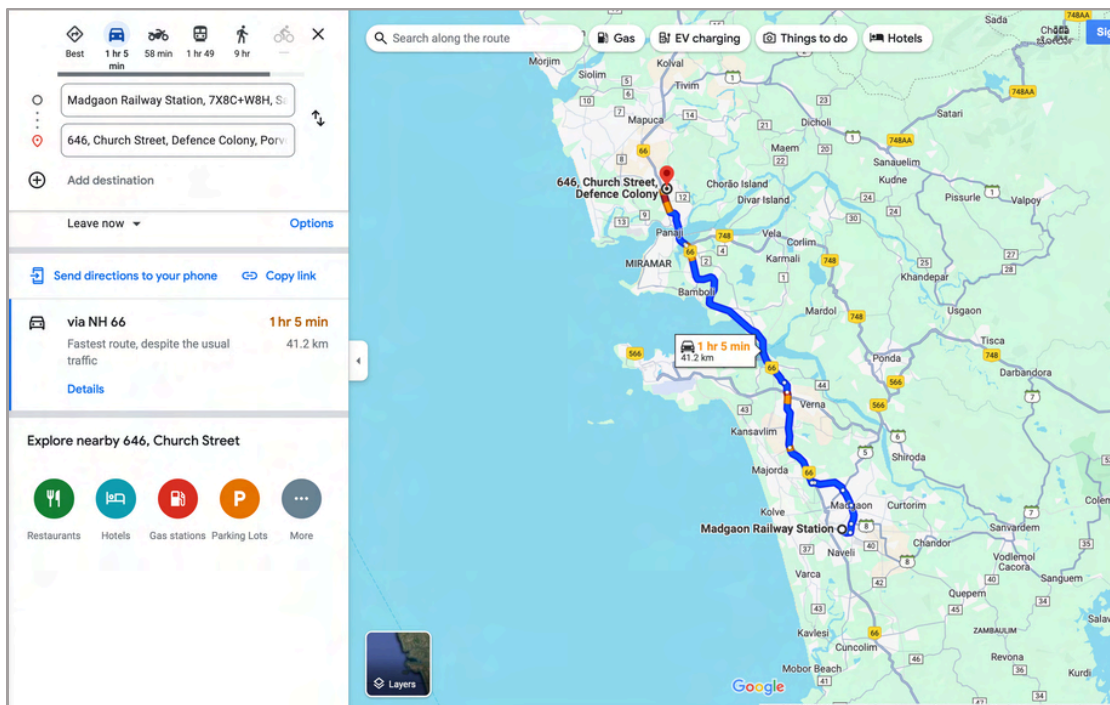


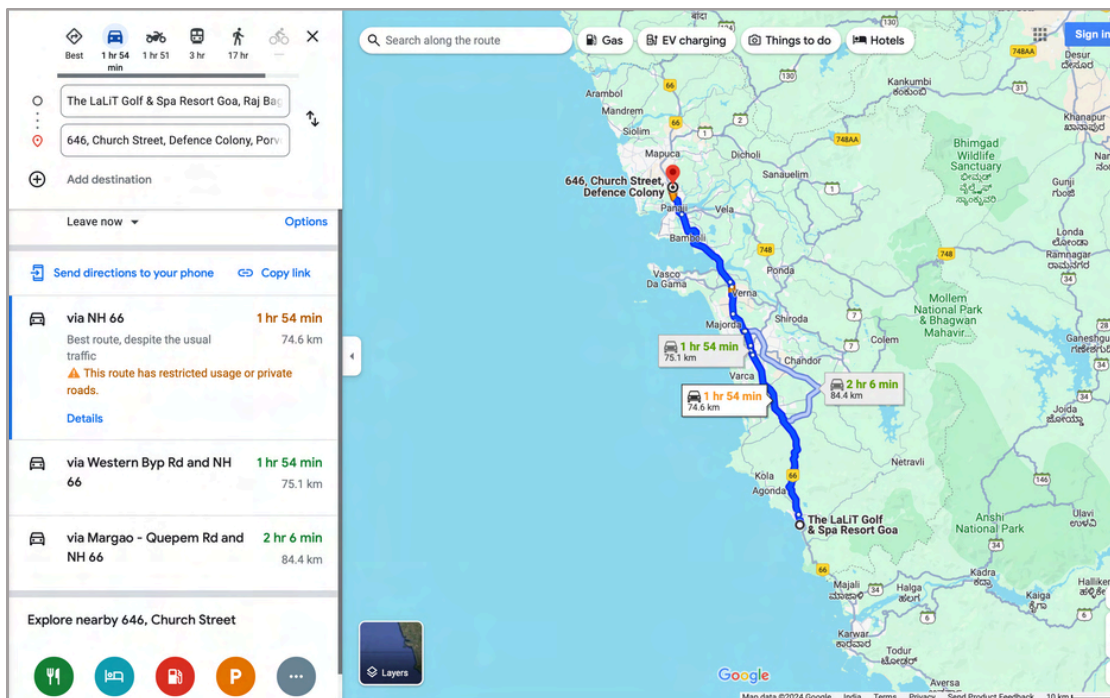
Porvorim - Manohar International Airport, Mopa, GOA



Porvorim - Sindhudurg Airport, Chipi, MAH

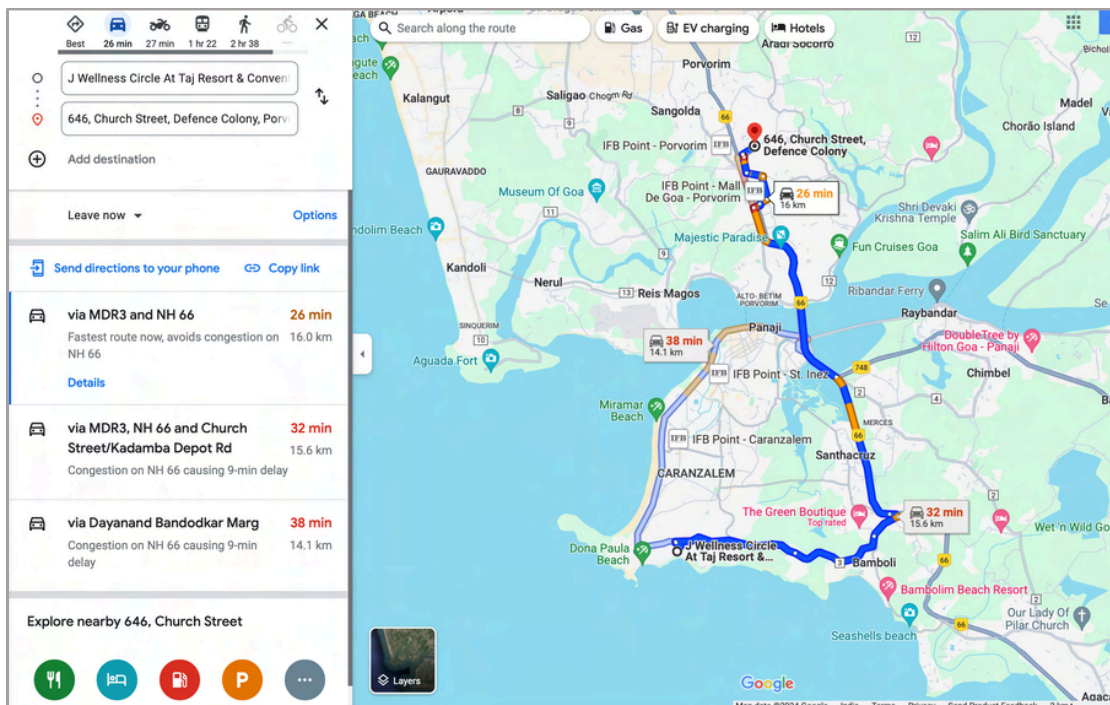
Porvorim - Madgaon Railway Station, Madgaon, GOA





Porvrim - The Lalit Golf & Spa Resort, Canacona, GOA

Porvrim - Taj Resort & Convention Center, Durgavado, GOA



transportation hub

VIRTUAL METRO TERMINUS . BUS TERMINUS . BOAT TERMINUS

A city's transportation infrastructure serves as the cornerstone of productivity and innovation, facilitating the rapid connection of people and ideas while fostering development and progress for the local people. For tourism, quality public transportation enhances the people-carrying capacity of the existing roads, reduces costs, increases convenience and catalyses various related businesses from food and beverages to events and footfalls at tourist venues.

The aim of this hub is to establish a space that seamlessly integrates all modes of transportation, creating a vibrant environment for living, working, and leisure activities, whether individuals are using public transit or not. Furthermore, it will introduce a safe, comfortable 24/7 place for tourists to rest in between visits during monsoon months and at odd hours.

The transportation hubs are being designed by best in any class experts to accommodate a multi-modal centre providing access to virtual metro, buses, water taxis, and flexible tyre vehicles in addition to direct point to point connectivity to all major hotels and tourist attractions. Additionally, the station plans to enhance the surrounding landscape to attract tourists and locals. The largest in the state, multi-dome is envisioned as a lively gathering spot, reviving Goan's eclectic culture and serving as a hub for social interactions, public performances and calendar events



transport hub busport design



Traditionally Bus terminals were designed as bare bone open structures with sun roofs where buses were parked at designated parking slots. Minimal customer facilities were provided and were mostly restricted to some roadside cafes and booking windows.

KSRTC Bus Stand, Hassan



Next on our list is a bus stand in Hassan, Karnataka. This stand was redeveloped and opened in August 2010. As per estimates, the total construction cost was Rs 34 crores, and it can accommodate over 250 buses. Hassan's strategic location makes it a crucial stop for travelers exploring Karnataka's architectural wonders and natural beauty.

Kempegowda bus station, Bengaluru



Known colloquially as the Majestic Bus Stand, Kempegowda bus station in Bengaluru is a bustling hive of activity. Named after the city's founder, Kempegowda I, this terminus is a gateway to Karnataka and beyond. Its sprawling premises accommodate a multitude of buses, catering to both local commuters and long-distance travelers. The iconic red-and-white facade has witnessed countless reunions, farewells, and dreams taking flight.

Mahatma Gandhi bus station, Hyderabad



Hyderabad's Mahatma Gandhi bus station (MGBS) is a blend of tradition and modernity. Named after the Father of the Nation, this station is a nod to India's struggle for independence. MGBS boasts a massive concourse, well-organized platforms, and a central clock tower. The iconic Charminar looms in the distance, adding to the station's allure. As buses depart, they carry with them the echoes of Hyderabad's rich heritage.

Bus terminals evolved over the years starting with mundane parking lots and then shifting to multi storied structures which enabled easy entry and exit of buses. And finally to designs that resembled a railway platform. In recent years the design philosophy has changed to resemble the functionality and convenience of an airport.

Multi-level bus parks

AREA	PROPOSED COST	LEVELS	BUSES
HARI NAGAR			
6.22 acres	₹366.51 crore	5 basement + ground + 2 floors + terrace	389
VASANT VIHAR			
5 acres	To be decided	7 basement + ground + 4 floors + terrace	437

Artist's view of Vasant Vihar depot

Modi inaugurates 'airport-like' bus terminal, promises more

Vadodra: Gujarat Chief Minister Narendra Modi yesterday said that six to eight "world-class" bus stations will be constructed across the state in the near future. He inaugurated a GSRTC Bus Station that has been constructed under

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Delhi's Kashmere Gate ISBT gets 'airport-like' feel

3 May 2013 — Spread over 53,126 square metres, the Kashmere Gate ISBT, set up in 1976, is the biggest and oldest bus terminal in the country. It has 45 ...

Three Ghaziabad bus stations to get 'airport-like' facelift in ₹484 crore ...

9 Dec 2022 — According to officials, the redevelopment is proposed over an area of 24,284qm at ISBT, Kaushambi while an area of 15,000sqm and 10,036sqm has ...

UP bus stations to get airport like facilities soon: Yogi Adityanath

23 Oct 2023 — According to reports, in the first phase, five bus stops will be redeveloped: Kaushambi (Ghaziabad), Vibhuti Khand (Lucknow), Gomtinagar (...

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No, this is not the Rajkot airport, but the city's new bus terminal

The new Rajkot interstate bus terminal is being built at a cost of a whopping Rs 150 crore.

By: **Express Web Desk**

New Delhi | Updated: April 8, 2017 22:52 IST

NewsGuard

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02 /B Vadodra bus station, Vadodra



Inaugurated by Prime Minister Narendra Modi, the Vadodra bus station stands as a testament to modern infrastructure. Its sleek design, efficient layout, and state-of-the-art facilities make it a traveler's delight. With ample parking space, well-maintained waiting areas, and a bustling food court, this station ensures a seamless journey for passengers. Vadodra's strategic location in Gujarat further enhances its significance as a transit hub.

Palanpur to get Rs 113.62 crore new GSRTC bus port, bhoomi puja performed

May 27, 2017

Gujarat

North Gujarat

Road Journey



Modern Bus terminals are being designed to provide all the customer amenities that are typically available in the terminal of an International Airport. This includes boarding gates, digiyatra access, baggage handling, food courts, retail spaces, lounges, prayer room, clean washrooms, medical care, walkathons, large information screens, airconditioned access till boarding gates, public wifi, direct connectivity to other airports/stations etc.

This kind of functionality is best provisioned by using a multi storeyed structure for easy vertical division of spaces and direct flat level access to buses for boarding, deboarding, wheelchair access etc.

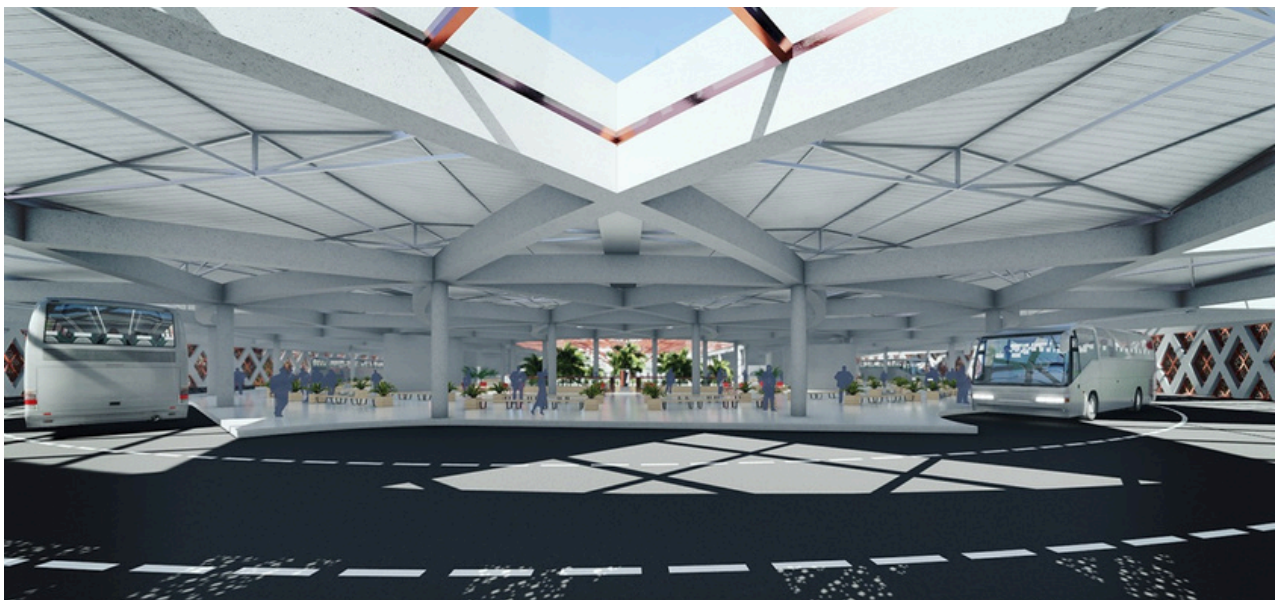






The Porvorim hub spread over close to one million square feet has been conceived of as the main tourism hub with direct loop route connectivity to large hotels, both airports, railway stations, leisure areas, tourism landmarks, beaches etc.

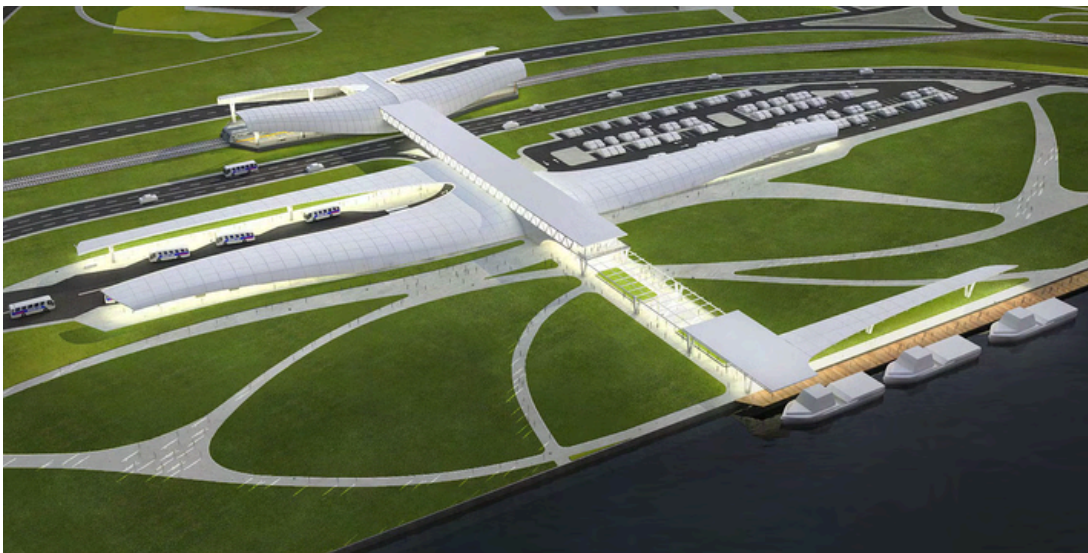
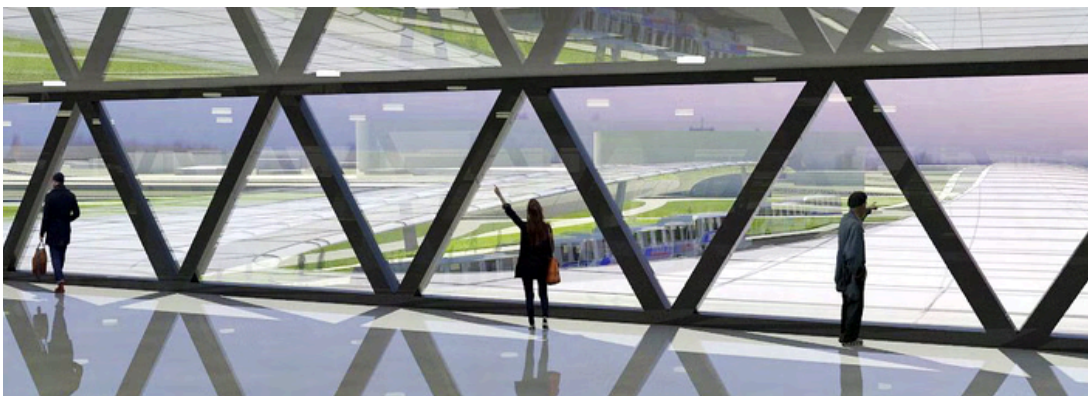






The Sourthern hub, spread over fifty acres near the Lalit Hotel Golf Course and Helipad, has been conceived as a multimodal hub connecting the virtual metro, luxury buses, and water transport.







The Northern hub spread over two hundred and fifty acres inbetween Sindhudurg and Mopa on NH66 will house a 18 hole golf course, helipad, main convention centre and Global Alumni Hub. It will also house the main maintenance and servicing area for the bus fleet.





SCHEMATIC DRAWING OF MEGA LAB PROJECT
02: CONCEPTUAL VIEW-2A

ASA A SHARMA ASSOCIATES
8-302, EAST OF KALASH, NEW DELHI-110017
PH: 011-26102000, 26102001 FAX: 26102003
EMAIL: info@asharma.com, www.asharma.com







transport hub business model



Transport hub will host multiple electric vehicle technologies including pure electric and serial hybrid.

Electric vehicles for public transport will follow the same trajectory as solar for power generation. It will need to be subsidised till market forces take over.

transport hub project cost

TransportHub components	Land area acres	MegaFund Equity Cr	MDB/ Private Contribution
-------------------------	-----------------	----------------------	---------------------------

1200 electric vehicles (over 30 months for first 18 months of operation).
Scaleable to 5000 vehicles in 50 months from 15.8.24

0

200

1000

Three Transport Hubs land
Porvorim, Sindhudurg, Concona

45

175

-

Three transport hub terminal buildings with 1,15,000 sqm customer area plus parking area of 85,000 sqm

0

440

200

300 mega chargers and 500 medium capacity chargers with service centre and maintenance bays

20

0

95

Maintenance fleet, medical vans and other utility vehicles and equipment

0

15

-

Power sub station for 125 MW cumm. at three locations with emergency backup

0

14

-

Misc including contingency and WC

-

106

105

TOTAL Rs 2350 crores

65

950 Cr
MegaFund

1400 Cr
MDB/ Pvt Fin.



transport hub means of funding

TransportHub components	MegaFund Equity Cr	MDB/ Private Contribution
1200 electric vehicles (over 30 months for first 18 months of operation). LEASE FINANCE WITH 20% MARGIN	200	1000
Three Transport Hubs land OUTRIGHT PURCHASE OR FOR EQUITY	175	-
Three transport hub terminal buildings FUTURE RENTAL DISCOUNTING OF RS 200 CRORES.	440	200
CHARGERS ON VENDOR FINANCE	0	95
Maintenance fleet, medical vans and other utility vehicles and equipment VENDOR FINANCE FROM JAPAN	15	-
Power sub station for 125 MW cumm. OUTRIGHT PURCHASE OR FOR EQUITY	14	-
ROTATING CONTINGENCY FUND FROM DONOR CORPUS	106	105
TOTAL Rs 2350 crores	950 Cr MegaFund	1400 Cr MDB/ Pvt Fin.





India aims to introduce 50,000 electric buses nationwide by 2027

by [The Economic Times](#) | December 12, 2023



Electric buses will be introduced in 100 cities by 2027, with a target of 50,000 buses nationwide by 2030. The government has announced a plan to introduce 50,000 electric buses nationwide by 2030, with a target of 10,000 buses by 2027. The plan is part of the government's commitment to reduce carbon emissions and promote sustainable transport. The government has also announced a plan to introduce 10,000 electric buses by 2027, with a target of 50,000 buses by 2030. The plan is part of the government's commitment to reduce carbon emissions and promote sustainable transport.

The Joint Transport Minister: Bridging the Gap

The Joint Transport Minister has announced a plan to introduce 10,000 electric buses by 2027, with a target of 50,000 buses by 2030. The plan is part of the government's commitment to reduce carbon emissions and promote sustainable transport. The government has also announced a plan to introduce 10,000 electric buses by 2027, with a target of 50,000 buses by 2030. The plan is part of the government's commitment to reduce carbon emissions and promote sustainable transport.

The key challenges in e-bus financing are:

1. Public charging infrastructure
2. Substantially higher capcost vis a vis diesel buses
3. Financial health of subsidised bus operation PSU enterprises
4. Practical issues including ticket prices/affordability and employment for locals.

These challenges are proposed to be overcome by:

1. Modification of commercially available electric buses to operate with partial battery pack and serial hybrid type onboard charging station.
2. Rapid indigenisation of the drive train and other modules including invertors and control systems
3. Working out subsidised transfer pricing on a per km basis for the buses. Cross subsidising the local buses from premium ticketing on tourist and luxury buses.
4. Transferring the transport hub terminals to a REIT based on rental discounting to unlock capital which can be used to subsidise operations to the extent of around Rs 600 crores.

It is clearly understood that the operations will not be financially viable at current cost levels. And they will require both subsidies and cross subsidising to balance cash flow. However, the core philosophy is not to cut corners even though the operations are not cash positive. And to focus on providing best in any class services in terms of quality of both the terminals as well as the rolling stock.

And to do so without accessing Central Government subsidy schemes such as the FAME framework.



transport hub viability gap funding



We expect the total viability gap funding required to be in the region of Rs 700 to 850 crores for the first phase of the project which involves 1200 buses and three terminals.

Whilst the proposal is to fund this from CSR type of money, it is important to create a framework which can work with only one time funding.

These broad strategy for VGF is as follows:

- One time infusion of Rs 700 crores into the project as social impact equity funding from a SEBI registered Social Impact Fund.
- Two company structure. One for movable assets and another for immovable assets.
- Company with the movable assets would have the following sources of income:
 - Revenue from leasing of comfort buses at a flat rate of Rs 35 per km (which includes capital cost, charging, maintenance). Kadamba has to pay for insurance, driver, marketing etc. Ticketing would be through the app/ digital card.
 - Revenue from operation of luxury tourist buses at premium rates
 - Monthly fee taken from private buses to join the network
 - Digital Card and related fees
 - These revenues are expected to be around Rs 400 crores on a capcost of Rs 1400 crores and operating cost of approx Rs 250 crores. This is at full capacity and the initial years would experience substantial cash bleed.

- Company with immovable assets would have the following sources of revenue:
 - Rental income from kiosks and retail counters at the terminal
 - Hub and facility usage charges from customers and bus operators. The hub would have an entry fee.
 - Charging and parking revenue, maintenance and servicing revenue
 - These revenues are expected to be around Rs 185 crores on a capcost of Rs 900 crores and operating costs of approx Rs 120 crores. This is at full capacity and the the initial years would experience substantial cash bleed.
- We expect the total social impact funding quantum of Rs 700 crores to be adequate for supporting operations over the first 50 months, at the end of which the fleet is expected to increase to 5000 vehicles with all three terminals fully operational.



transport hub electric vehicles



As part of the DPR study, a suitable startup was located and supported to initiate work on adding serial hybrid functionality to standard commercially available euses and to customise them for speciality use.

Suitable infrastructure for assembly of the serial hybrid components and requisite licenses from the SEZ authority, Ministry of Commerce were obtained in March 2024 for importing the luxury buses and hotel vehicles.



comfort buses



IIT Alumni Council proposes to catalyse the creation of a 400+ fleet of comfort buses which will replace the ageing fossil fuel buses currently used by Kadambathur Transport Corporation. These buses would be charged and maintained at the transport hubs. Their movement will also be monitored from the central command station to optimise their use and ensure compatibility with the state wide transit card proposed in the project.

luxury coaches



The luxury buses deployed as part of the network need to have a distinctive look, low cost, bespoke interiors, large glass panels, easy fast charging and low cost. They also need features like easy embarking with heavy luggage and easy disembarking for wheelchair passengers. Such buses have been developed through initiatives of the Council indigenously.



long-haul virtual metro



Conventional articulated buses used for long haul – metro or tram type applications – need a high turning radius. This may not be possible all over the State. Thus low turning radius versions of such buses would be required. Buses suitable for this application are currently under development.



estate buggies



The estate buggies proposed for use inside the āyushća campuses and in the pedestrian zones near tourist attractions. These golf cart type vehicles have been ergonomically remodelled for higher passenger capacity, speed upto 65 kmph, vehicle to vehicle charging and options for doors to enable use during monsoons. .



amphibian sightseeing



The amphibian buses proposed for tourist sightseeing require minimum infrastructure at the jetty end. By using water jet propulsion, they are able to provide safe travel on land or in water. They can also be used for disaster management or in flooded areas during the rainy season. The luxury buses can also be remodelled to have bio toilets, kitchenettes or conference type seating.



mobile clinics



The first set of MegaLab buses were flagged off on May 1, 2020 as an emergency fleet to help manage the covid pandemic in Mumbai and other cities. The bus interiors were modelled using paradigms used by private planes refitted for medical use. The MegaLab fleet was the first electric bus to have a full function digital X-ray and RTPCR lab on board for covid testing.



Photograph of the interiors of the actual MegaLab bus, 2020 version deployed at the NSCI Dome Covid hospital. It was the first covid lab bus in the world. The bus was equipped with digital radiology equipment for remote reporting via telemedicine.

emergency response



Dr. Ramesh Pokhriyal Nishank ✓

6 May at 16:40 · 🌐

IIT Alumni Council launched India's first #COVID19 test bus in Mumbai, that can reduce the cost of testing by over 80% without compromising on the testing capacity.

This bus will move around the city collecting test samples for rapid testing.

Know more: <https://bit.ly/IITB-COVIDTestingBus>



MHRD | Government of India
Ministry of Human Resource Development

#COVID19

IIT ALUMNI COUNCIL

launches a **COVID-19 Test Bus** in
Mumbai — capable of conducting
5 million tests per month





Emergency response vehicles can be designed to have a wide range of functionalities from medical facilities on board to satellite connectivity for communications backup and live video broadcast to hosting remote control rooms.



support vehicles



Support buses are required to handle breakdowns and other maintenance issues including depot to depot transfer for remodelling, battery replacement, change of interiors, software upgrade etc. Some of the features in the luxury buses including partial autonomous driving and remote driving make it difficult to service them on the curbside.



water cruisers



It is now possible to build hydrofoil type high speed yachts. These can be built upto 20m in length and can achieve speeds upto 40 knots. Given the simplicity of design because of electric propulsion, it is possible to cost effectively manufacture these in Goa. The zero pollution boats can take luxury tourism to the next level.



charging infrastructure



Transport hub will host multiple electric vehicle technologies including pure electric, hydrogen and hybrid.

Electric vehicle parking, charging & maintenance and repair service stations will be established at two locations.



The hubs will contain state of the art pantograph type charging stations with 300 concurrent charging bays drawing upto 30MW at each depot.



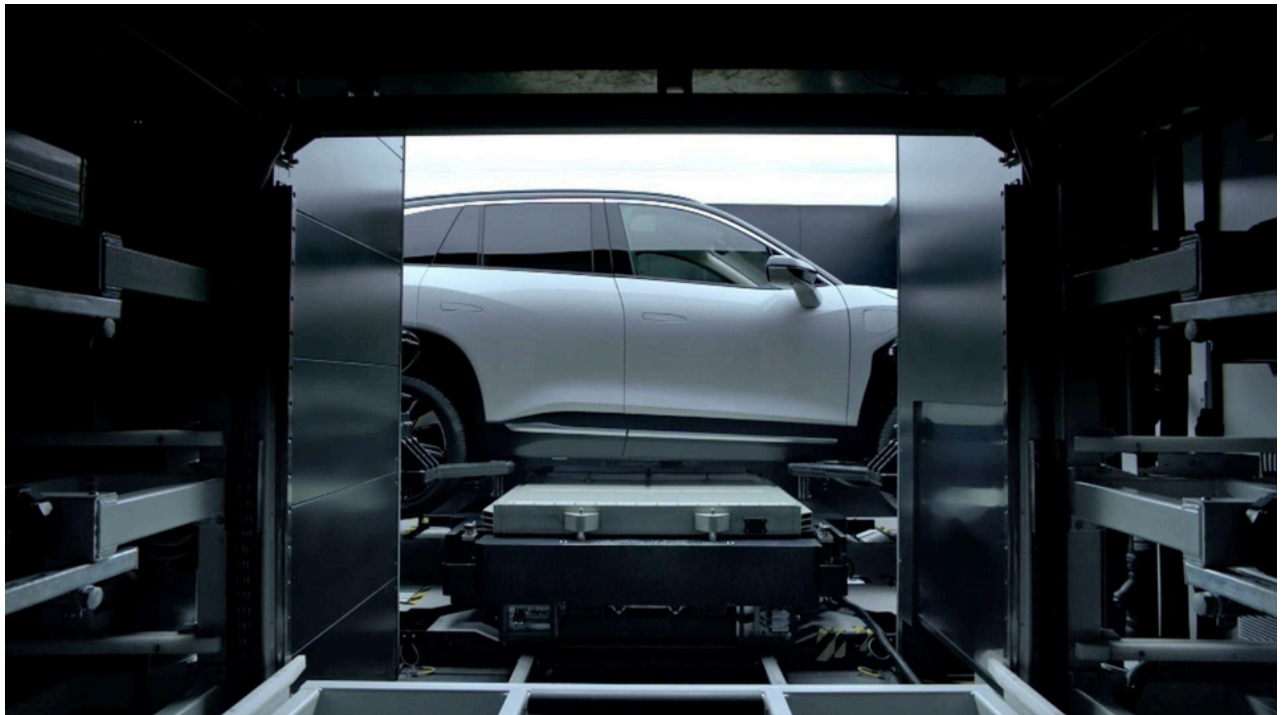


Drive-in swift battery swapping system by Ionique
< 5 minutes





ionique



4

digital

perfectly matching capacity to
demand using AI & digital twins
interfaced to real time 3D maps.





end-to-end single digital card



āyushcā goa card will be a Aadhar or passport linked id smart card based on the India Technology Stack. The card will permit access to and payment on all transport facilities, parking, government services, toll charges, tourist attractions entry charge, use of electric carts in pedestrian areas etc. The card will be compatible with the Kodoy health card for continuous health monitoring.

real time digital twin



by using a combination of drones, specially fitted out cameras and high resolution satellite images, it is possible to create a 3D map of the entire state. This model can then be populated with sensors to track real time movement of buses in addition to GPS tracking based on mobile data networks. This connectivity helps allocate bus capacity to demand in real time eliminating the need for standard bus routes or pre defined frequencies. This approach also allows complete integration with Goa miles and the ability to add any vehicle into the network instantly.



āyushća has tied up with the global partners of Google Street view, Apple Maps and others which are IIT Alumni startups to get access to:

- Specially outfitted airplanes for 3D mapping information.
- Relevant satellite imagery
- Specialised vehicles for photography
- Related software and expertise.

The team has already mapped around 20% of Goa and the balance 80% is in progress. The same team are also doing the digital twins for Mecca, Varanasi, Jaipur and Mumbai city. This 3D map becomes the basis for the ai system and digital operating system which will manage, coordinate and run the electric multimodal transportation system.



state wide digital operating system



āyushća digital backbone will be hosted on the data centre proposed to be located in the Research University module of the āyushća campus. The “born digital” backbone would be “cloud native” so as to provide the lowest possible latency and highest possible responsiveness

5

megaSpheres

quest for quality of life



Transformation through Technology



The quality of life initiative was the brainchild of Ashok Madhukar, a tall leader who played a stellar role in the creation of IIT Alumni Movement.



Late Ashok Madhukar, who passed on in 2021, was a BTech from IIT Kharagpur. He was awarded the Distinguished Alumni by his alma mater. Ashok spent the last three decades of his life in the development sector – first as a part of the Social Fund for Development in Egypt and thereafter as a leading consultant to the government, specialising in the India-Africa corridor and the north east sector.

In 2016, Ashok introduced alumni leaders of the IIT community to the “quality of life” framework. His theory was that if we worked towards deploying technology to address all aspects of quality of life, we could create a blueprint for national progress. It was his strong conviction and passion for creating a nation building organisation that eventually led to the formation of the IIT Alumni Council.

He achieved in his lifetime, what may have otherwise taken decades more – to develop the unique core theme for the IIT Alumni movement. It is thanks to his foresight and guidance that the IIT Alumni Council and related mission organisations shifted focus – inspite of stong opposition from IIT alumni or the IITs, to nation building.

megaSpheres

QUALITY OF LIFE INITIATIVE OF
IIT ALUMNI COUNCIL



The megaSpheres initiative includes three mission organisations, and three mission facilitators synchronised to achieve its goal of accelerated socio-economic progress through technological and financial interventions.

Idea stage ventures are incubated at the INCUBATOR.

FORUM facilitates access to strategic resources & growth capital.

INSTITUTE helps access research resources & indigenous technologies.



.PROFESSIONAL SERVICES.



.STARTUP ACCELERATOR.



.APPLIED RESEARCH .



HEALTHSPAN ENHANCEMENT INITIATIVE

The C19 Task Force was set up by the IIT Alumni Council as a Rs 700 crore initiative to catalyse the national fight against Covid. The C19 Task Force morphed into the MegaLab mission in August 2021.

MegaLab advances preventive health and longevity through a fusion of traditional medicine systems with cutting-edge technologies and artificial intelligence.

megalab.in





GLOBAL ALUMNI OUTREACH & PARTICIPATION

MegaReach for an outreach to IIT alumni around the world who can help in the identification, development and deployment of key technologies involved in the MegaFund's target areas for investment.

megareach.in





SOCIAL FUND REGULATED AS AN AIF FUND BY SEBI

The MegaFund is a consortium of social and venture capital funds with a target corpus of Rs 21,000 crores and a fund life of twenty years. The anchor entity PanIIT Fund is registered with and regulated by SEBI under the Social Impact Fund framework under the AIF Regulations 2012.

The MegaFund promotes the progress of science and technology, advances national health and prosperity and helps to secure and lead in key strategic technologies including climate change.

megafund.in





PROJECT IMPLEMENTATION AGENCY

A central project implementation and compliance platform which implements pilot projects for technology demonstration and validation. The Forum also does esg, environment and concurrent audits for impact assessment studies.

forums.org.in





TECHNOLOGY STARTUP ACCELERATOR

Startup accelerator, which works on a venture studio model to pivot or incubate projects in identified areas with the objective of catalysing the creation of professionally-managed, board-run companies which are build ground-up for early stage listing on a stock market.

incubator.org.in





APPLIED RESEARCH ORGANISATION

A research platform which identifies appropriate resources from industry, research institutions and academia to meet the needs of ventures and projects supported by the various mission organisations and facilitators of the IIT Alumni Council.

institute.net.in





Creating awareness through curated experiences and opportunities for practical learning of healthy habits, nutrition, and lifestyle choices relevant to our personal contexts are essential parts of wellness facilitation. And form the core philosophy of āyushcā.





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This material is prepared by the āyushcā Project Management Team of the Forum. The Forum Council is manned by a group of alumni drawn from various mission organisations of the IIT Alumni Council. None of the Council members has received any remuneration for the services rendered. No sponsorship or fee has been received for the same.

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This is a strictly confidential document which can be shared with members of the investment committee of MegaFund and the various stakeholders and potential partners of the project.

2024@Forum dated 30.1.2024
Document ID: goa.iitcouncil.org



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Report authored by the
āyushā Project
Managment Unit of Forum

forums.org.in



. An IIT Alumni Council initiative .

goa.āyushā.org

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ANYTIME MEDIA
for IIT Alumni Council
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ANNEXURE II

āyushća GOA Report





Innovative
Indian Technologies
Campus

AN INITIATIVE OF



goa.āyushcā.org

āyushcā



Non nobis solum nati sumus

Not for ourselves alone are we born

Marcus Tullius Cicero



IIT Alumni Council proposes to catalyse the creation of a Rs 4000 crore sustainable wellness estate. āyushća GOA will cover a total of 275 acres and house the Institute of Innovative Technologies focused on climate change, sustainable tourism and wellness. A substantial part of the project cost is being allocated to community non-profit projects.



āyush́ca GOA has been conceptualised as a model/concept village/town calibrated to the demands, challenges, and nature of the digital society. It is being sustainably built ground-up to be carbon negative with zero effluent discharge and a negative power requirement.

The intention has been to establish a global role model for sustainable and responsible tourism, wellness travel, slow travel, proactive holistic health, health-span and wellbeing enhancement and a circular economy.

The technologies and best practices proven here can then be emulated to create more such multigenerational living ecosystems, surrounded by and existing in sync with Nature.

These hamlets will preserve and regenerate the ecology, enliven local culture, cuisine and traditions, spread awareness on and offer opportunities to the locals to learn healthy self-care practices and balanced nutrition, and symbiotically thriving with the local communities.

In pursuance of it's objective of contributing to the state in general and to the local communities around the hub in particular, the project includes:

- two multimodal transport hubs for I200 electric buses with 300 station Mega chargers and 60 MW captive power generation
- a pandemic scale Mega lab for population scale pandemic management
- state of the art medical clinics on wheels, emergency and disaster management vehicles
- complete waste recycling and processing unit for biogas production, organic compost and water recovery
- India's first multimodal transit, parking and utilities payment card
- Goa's largest multi-use convention centre
- India's first international golf training academy



proposed project cost

āyushća estate components	Land area acres	MegaFund Equity Cr	Vendor Finance Cr
IIT Alumni Council's Global Intellectual Hub	25	350	150
MegaReach Convention Centre & Hospitality Zone	40	500	200
Research University & Incubator	5	50	-
MegaLab Theranostics & Research Hospital	5	75	-
Integrated Health & Wellness Institute	25	400	-
International Golf Academy & Sports-Fitness Complex	70	160	-
Transport Depots x 2 [EV parking, charging & service]	80	700	800
Zero Emission 24/7 power plant	10	200	200
Biofuel plant [waste processing, back up power, cooking gas]	10	65	150
TOTAL Rs 4000 crores 270 acres plus 30 acre isolation		2500 Cr MegaFund	1500 Cr Vendor Fin.

— built area

āyushća estate components	Land area acres	Conventional construction sqm	Sustainable construction sqm
IIT Alumni Council's Global Intellectual Hub	25	22000	30000
MegaReach Convention Centre & Hospitality Zone	40	48000	12000
Research University & Incubator	5	5000	15000
MegaLab Theranostics & Research Hospital	5	7000	5000
Integrated Holistic & Wellness Institute	25	30000	15000
International Golf Academy & Sports-Fitness Complex	70	6000	23000
Transport Depots x 2 [EV parking, charging & service]	80	4000	15000
Zero Emission 24/7 power plant	10	2000	3000
Biofuel plant [waste processing, back up power, cooking gas]	10	1000	7000
TOTAL	270 acres land area	125,000 sqm conventional	125,000 sqm sustainable

The current tourist areas are now close to saturation. In order to increase the size of the tourism economy, there is an urgent need to increase the:

- land area by creating new tourist attractions and related infrastructure
- international tourist footfalls in the off season months
- per tourist stay and per day spend by developing luxury wellness and premium MICE locations
- size of the startup economy by promoting incubators that incentivise roaming

To achieve the above, āyushća proposes to develop a

- pioneer luxury wellness retreat
- world class convention centre
- large format incubator
- international golf training academy
- related public infrastructure to ensure connectivity with current tourist areas and airport/stations



GOA

Expanding the Tourism Economy



Enabling authentic wellness led by Ayurveda





The All India Institute of Ayurveda is an AIIMS level non-profit institution dedicated to validated and verified Ayurveda practices drawn from the ancient wisdom and healing traditions of India

As the only state of India led by a qualified ayurvedic doctor, the state is well positioned to lead globally in high end medical tourism based on ancient wisdom.



GOA

Strengthening the Startup Ecosystem



The essential components of a startup ecosystem traditionally include promoters, academic institutions, angel investors, venture capitalists and incubators.

- interventions like the virtual incubator promoted by the IIT Alumni Council have changed this paradigm. By offering startup's the option to roam across physical incubators in different cities or even different countries, the startups are no longer handcuffed to their home location
- new incubation models like venture studios and accelerators bring the startup's to a location that is convenient from the viewpoint of ecosystem suitability, capital access and research infrastructure
- as the SME listing framework gains traction, the gap between inception and stock market listing is being continuously reduced

Goa is rightly positioned to lead as the incubator and accelerator location of choice because of a vibrant tourism economy, existing incubators, well known academic institutions and proximity to Mumbai.

GOA Revitalising Public Transport



Life-Cycle Assessment of Passenger Transport

An Indian Case Study

**Initiate a shift to
buses and prioritise
their electrification**

**Promote electric two-
and three-wheelers**

**Encourage a shift in
the car fleet towards
shared electric
vehicles**

**Choose corridors
with high passenger
demand for new
metro lines**

**Mainstream life-
cycle assessment
into public policy and
investment decisions**

**Accelerate the
transition to battery
electric vehicles
and complement it
with the provision of
cleaner energy**



The current public transportation network comprises of:

KTC buses | 450

Private buses | 1150

Other buses | 4500

Goods vehicles | 55000

Taxis | 37000

3 & 2 wheelers | 35000

Almost the entire fleet is fossil fuel powered. The capital cost of electrifying this would be upward of Rs25,000 crores. If this fleet were to be concurrently charged at night over four hours it would draw more than 500MW of power which is not available from the grid. The State grid supply of 560 MW is already short of peak demand by approx. 100 MW leading to power cuts.

The āyushća project proposes to accelerate the path to electrification and upgradation of the public tourist infrastructure.



As part of the āyushcā project, a 300 vehicle fleet would be supported:

100 Comfort buses | upto 12m
100 Luxury coaches | upto 9m
40 Long haul buses | upto 24m
30 Intra Campus buses | upto 7m
5 Amphibian coaches| 12m
10 Medical Clinics on wheels
5 Emergency Services
5 Support & Standby vehicles
5 Electric hydrofoil boats

These will be supplemented by standardised 300 luxury EV coaches sponsored by leading hotels to connect their hotels to the tourist route locations using a circular route.



GOA

Increasing Hotel Capacity



The current hotel room capacity in the state of Goa comprises of :

Category A | 4/5 star

90 hotels | 11,000 rooms

Category B | 3 star

275 hotels | 13,000 rooms

Category C | 2 star with 6+ rooms

3250 hotels | 35,000 rooms

Category D | star rated with <6 rooms

3750 units | 12,000 rooms

Category G | Homestay Gold category

250 units | 1,000 rooms

Category S | Homestay Silver category

1200 units | 3,000 rooms

There are less than 3,000 hotel rooms qualify being 5 star deluxe by global standards. There is no world class wellness resort in Goa even though Goa is now home to the All India Institute of Ayurveda near the Mopa airport. Premium locations are not available in the tourist areas to build new hotels.



As part of the āyushcā project, it is proposed to add a total of around 2,000 five star premium luxury rooms. These include:

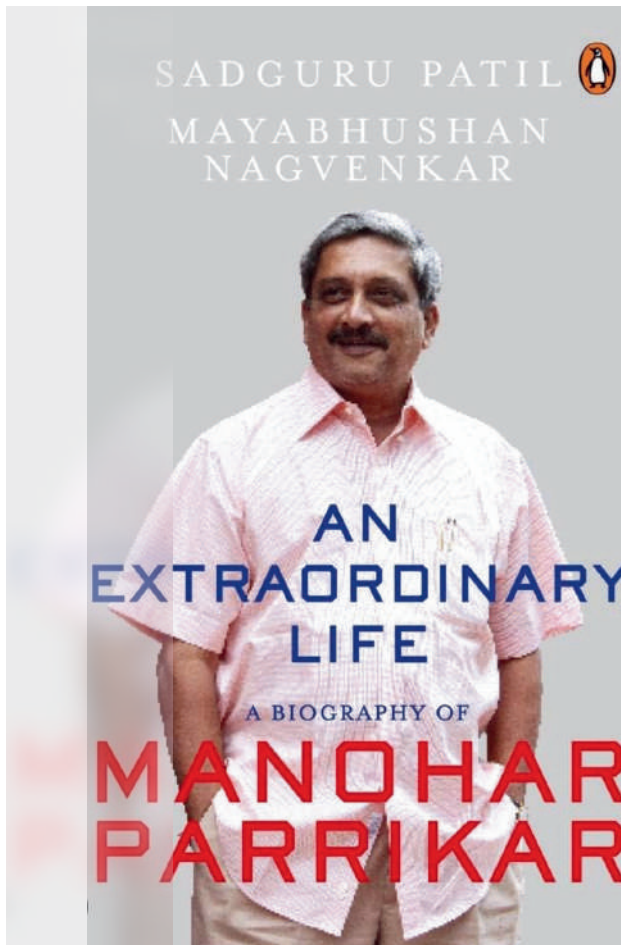
200 Wellness suites
800 keys Hospitality zone
300 Serviced apartments
200 Long stay suites
200 Volunteers' residences
100 rooms Hospital
200 Time share villas
Golf course academy
28,000 sqm Event space

These will be supplemented by direct access to a transport hub for state wide connectivity, 24/7 break free power, a large convention centre and a golf course.



GOA Technology Leadership





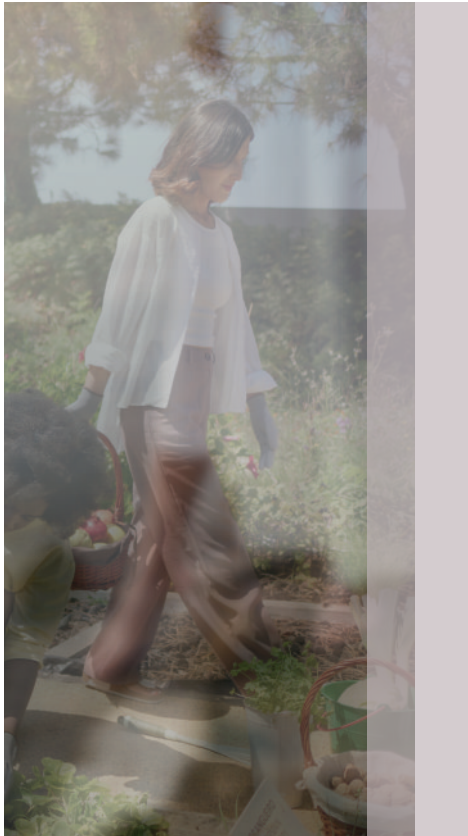
The āyushcā Project was conceived in the IIT Bombay alumni meet in Delhi held under the leadership of Manohar Parikar and Jairam Ramesh in 2017. The alumni group worked with Mr Parikar to conceptualise the waste management and biogas production facility under the PPP framework.

The Goa facility is now considered the best managed waste management units in India and among the best in the world.

Mr Parrikar is the first IIT alumnus to serve as an MLA of an Indian state, the first IITian to become the Chief Minister of a state in India and the first Goan to become a cabinet-rank minister at the Centre. Mr Jairam Ramesh was the first IITian to be a cabinet minister and played a seminal role in creating the regulatory framework for protection of green areas as the cabinet minister for environment and forests.

The āyushća initiatives were handed over to the IIT Alumni Council in September 2020. The objective was to increase the donor base by involving global alumni of all the IITs.

The scope and size of the āyushća project was increased by merging it with the MegaLab mission (www.megalab.in). The objective of the Megalab mission is to improve the healthcare system by enhancing preventive medicine and proactive care and creating future pandemic and disaster management readiness.



The project is supported by requisite capital from the social impact fund of the Council, www.megafund.in. The Forum organisation www.forums.org.in was entrusted with the pre construction studies and being the overall project management consultants. The Forum set up over fifteen global task forces to study global best practices in each of the areas.



The Forum team interacted with the Tech Mahindra team doing the project coordination for the Neom project in Saudi Arabia.

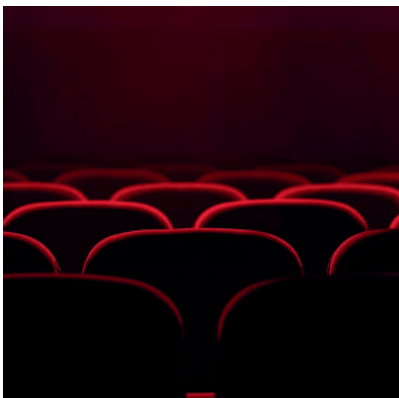
The team members also visited the Spanish resorts of Majorca, Marbella and Barcelona, in addition to leading wellness centres in Germany and river tourism locations like Guilin in China.

The team interacted with leading global architects including Norman Foster (who designed the Apple headquarters in Silicon Valley and the Amaala Wellness resort in Saudi Arabia) and Esteva Spain (who designed Six Senses Vana in Dehradun) in addition to Wellness Lifestyle LLC, Integrated holistic health and wellness operations consultants, considered one of the best globally.

As part of the āyushcā project, it is proposed to add nine key technology elements which could help improve the perception of Goa, enhance the sustainability quotient and improve the air quality levels. These include:

- Multimodal electric transport
- Air taxis like volocopter
- 100% circular waste treatment
- Pandemic scale lab testing
- Location aware audio tour
- All purpose transit card
- Virtual high speed metro
- International golf academy
- 3D virtual stage at main convention hall

Vendors are already in place for all of the above.





the components

of āyushéa GOA





GOLF + ACADEMY
SPORTS COMPLEX
AQUA
TERRA
FARM - BUFFER

CONVENTION & EVENTS
HOSPITALITY ZONE
CULTURAL HUB
PERMACULTURE - BUFFER

INTEGRATED
HEALTH
&
WELLNESS
INSTITUTE

GLOBAL
INTELLECTUAL HUB
ANIMAL ASSISTED THERAPY Paddock
PERMACULTURE - BUFFER

SCHOOL OF HOLISTIC HEALTH
RESEARCH UNIVERSITY
TEAM BLOCK
HOSPITAL
BUS DEPOT ONE
PERMACULTURE - BUFFER

AUTISM +
SUPPORT COMMUNITY

COMMUNITY FARM MARKET
PARKING

The background image shows a bright, modern interior space. On the left, a large, textured, grey stone-like structure is partially covered by a large green plant with broad leaves. In the center, a wooden bench with a curved backrest is positioned. To the right, a large, curved glass wall with black frames offers a view of lush green trees outside. In the foreground, a wooden table holds a large, brown, textured vase and a small white box. The floor is light-colored and polished, reflecting the natural light from the glass wall.

IIT Alumni Council's
Global Intellectual Hub

MegaReach Convention Centre
& Hospitality Zone

Research University
& Incubator

MegaLab Theranostics
& Research Hospital

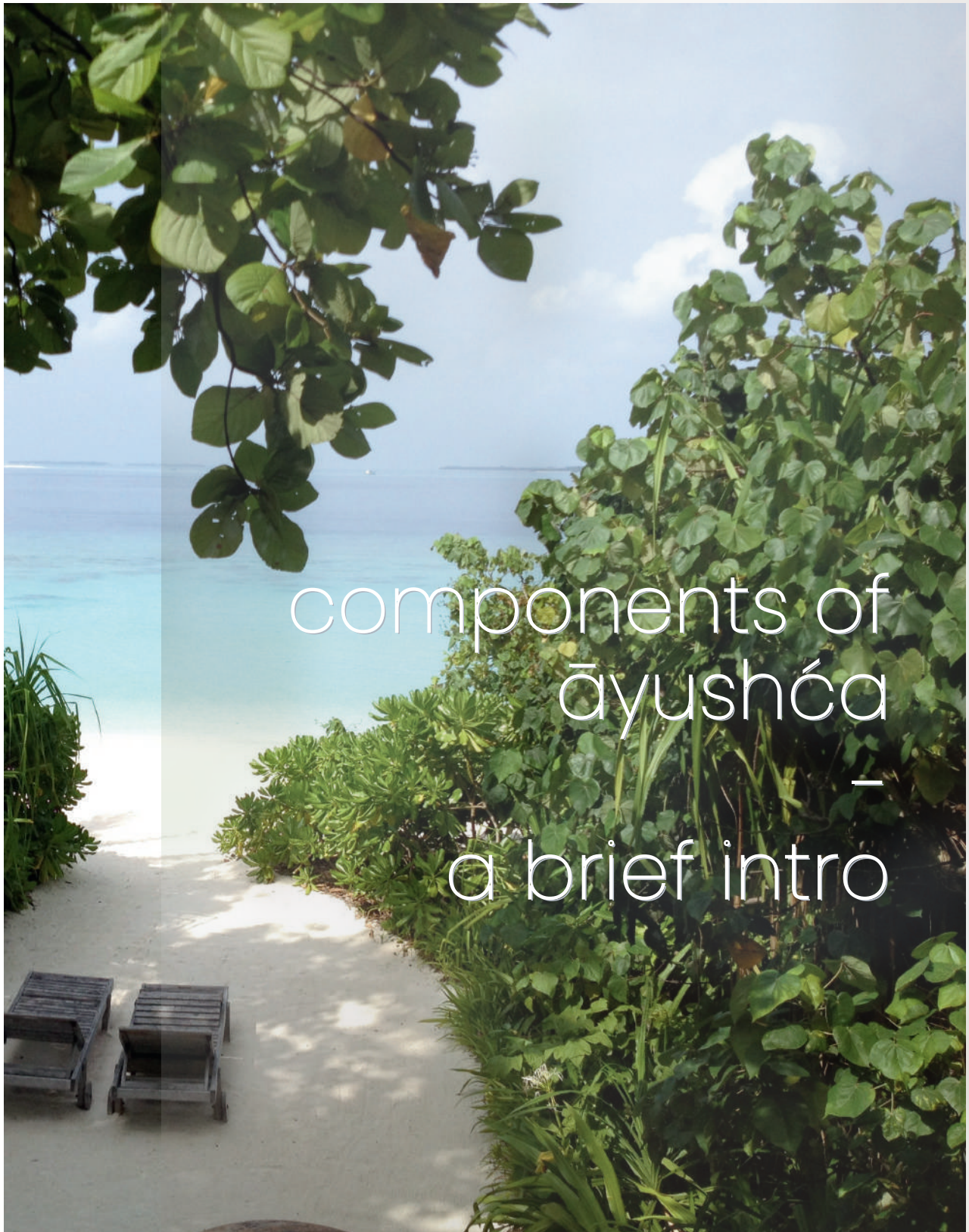
Integrated
Holistic Health Institute

International Golf Academy
& Sports-Fitness Complex

Transport Hubs
[EV parking, charging & service -2 hubs]

Zero Emission
24/7 power plant

Biofuel plant
[waste processing, back up power, cooking gas]





IIT Alumni Council's Global Intellectual Hub



Intellectually stimulating and
wellbeing enhancing stays - to
study, write or just think better.

The intellectual hub is being conceived of
as a global melting pot for IITians from
around their world, their spouses, siblings
and adult children. Members only.

A man with a beard and short dark hair, wearing a blue blazer over a white shirt, is smiling and clinking wine glasses with others at a restaurant table. The background is softly blurred, showing a warm, indoor setting with wooden elements and other diners. The text is overlaid on the lower left of the image.

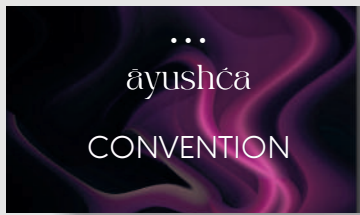
Opportunity to interact
with like-minded
techies, relive college
days, reinvent yourself
or just reskill for the new
paradigm.

Residences & Communities



A vibrant community of residents and team, the āyushća estates would become home to both extended stay residents and shorter stay guests.

When shifting to bio bubble mode, the entire commune would become a long stay zone in the event of a pandemic or biowarfare.



MegaReach Convention & Hospitality Zone



Multi functional and tastefully appointed state of the art event spaces. Largest in India outside Delhi.

Houses virtual reality-enabled auditoriums and meeting facilities. Goa's highest globe in the sky - visible from space.



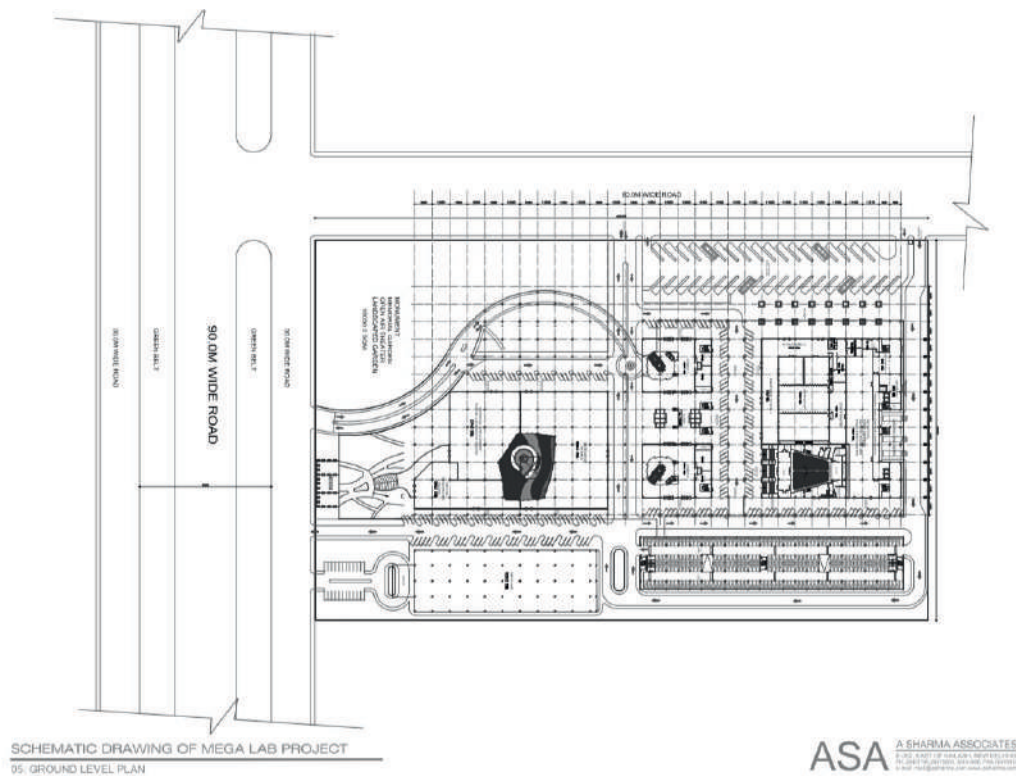
SCHEMATIC DRAWING OF MEGA LAB PROJECT
02. CONCEPTUAL VIEW-2A

ASA A SHARMA ASSOCIATES
E 102, SECTOR 29, Gurgaon, Haryana 122001
Ph. 0120 2211111, 2211112, 2211113, 2211114, 2211115
Email: info@asharmaassociates.com, www.asharmaassociates.com





The main convention
theatre with interactive
3D projection will seat
5,000 viewers.



āyushcā cultural hub

will uphold the Indian soul
and celebrate its geo-cultural
contexts





Research University & Incubator



Each āyushcā estate will house a research centre with a branch of the IIT Alumni Research University And incubator

Industry training and doctoral-level studies with necessary research facilities in areas linked to climate change, health and deeptech. For IIT Alumni.



MegaLab Theranostics & Research Hospital

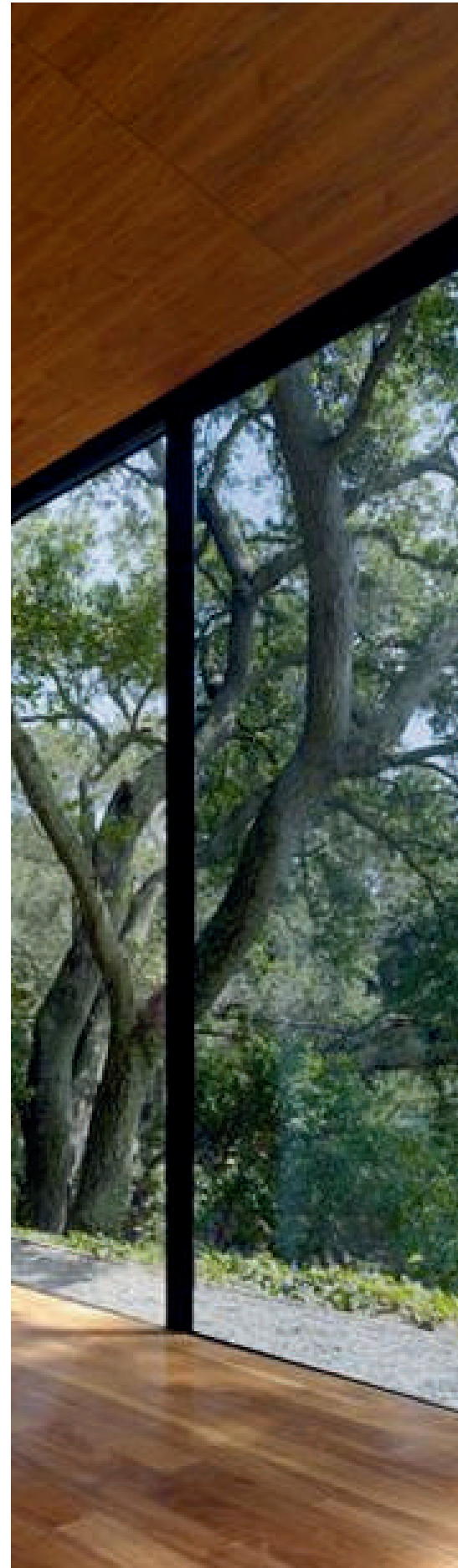


State of the art pandemic scale facilities.
Optimised for clinical trials and drug
discovery research in normal times.

It will catalyse the deployment of
advanced therapies alongside creating
a pandemic scale precision diagnostics
infrastructure. World's largest single
location genetic testing lab.

A wide range of cutting-edge technologies – from regenerative medicine to emerging foundational technologies such as telepresence, autonomous devices, blockchain and hyperspectral imaging. Accelerated clinical trials using digital twins and in-house volunteers would reduce lead time from the invention of the innovation to intervention in disease progression and or reversal.

The core objective is to increase healthspan.





The āyushća megalab features an advanced precision Diagnostics Centre alongside a Research Centre. It will also house a Clinic wing, with ultra-modern facilities and seasoned medical teams for any emergencies besides essential acute care, which is only for in-house needs.



And using the power of their collective resources and determination to access the tools for active longevity and continuous learning.



Integrated Health & Wellness Institute



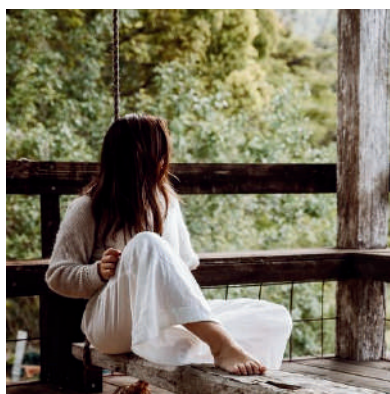
Photo: [Vana, Dehradun, India]

Ancient insights to Artificial intelligence...

The wellness retreat paradigm applies to them all, from the ancient to the futuristic as necessary, to orchestrate the best course for the individual through its personalised and participatory approach.

The Integrated Holistic Health Centre is the fulcrum that will coordinate and work in tandem with the other components of āyushcā. It will adopt a collaborative and cross-disciplinary approach to create personalised health and wellness itineraries that is truly holistic and progressive.

Guided one on one by caring physicians, health experts, coaches, and wellness practitioners, it aspires to offer the best of both worlds – distilled from the timeless but lesser-known past, and that of the future that is yet to become mainstream.



Ayurveda & AYUSH++



Authentic full spectrum Ayurveda, not
just as medicine but as lifestyle
that befits our times, under the
guidance of seasoned physicians

Utmost comfort, personalised care and
quiet luxury will be some of its defining
characteristics.

Organic Farms & Farmers' Markets



'Let food be thy medicine'.

'Farm to fork. 'SLOW'.

In-house organic farming is crucial to stay clear of compromised food chain. āyushća farms will play an important role in ensuring the health of the residents, neighbourhood and the environment.

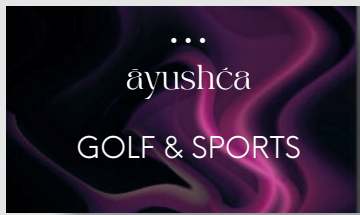
Such preparedness necessitates well-appointed multi-format living spaces that give adequate privacy and freedom to the residents. Self-sufficient utilities, including oxygen enhancement, would be an essential part of the campus.



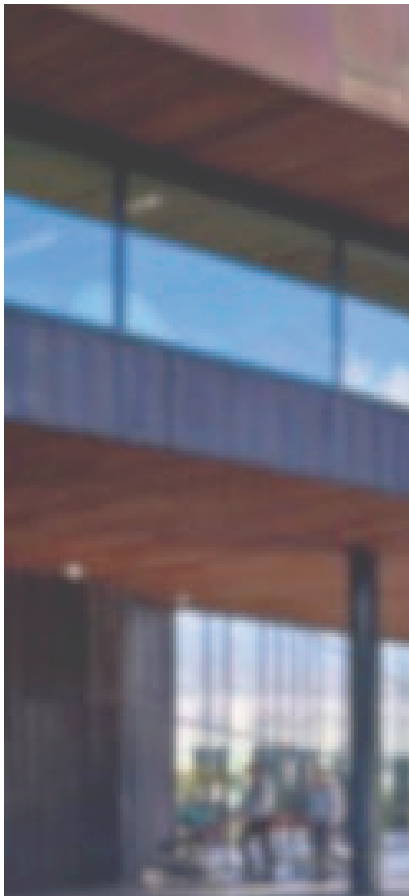


Photos [Visualisation by: Omegarender, Archivibe]





International Golf Academy & Sports-Fitness Complex



Ultra-modern and avant-garde sporting and fitness facilities and grounds with Olympic grade training as the cornerstone

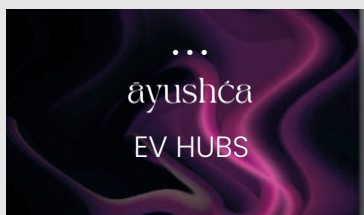
With a robust annual calendar of sporting performance-enhancing clinics by cross-disciplinary health experts, it intends to take sporting calibre to another level.



The residential academy will also foster sports of Indian origin. Polo, kabadi, archery, silambam, golf, kho-kho, chess, kalari payattu (acclaimed as mother of all martial arts)



A hub for international sportspeople, trainers, coaches, sports veterans, novices and enthusiasts.



Transport Hub for Electric Vehicles



Transport hub will host multiple electric vehicle technologies including pure electric, hydrogen and hybrid.

Electric vehicle parking, charging & maintenance and repair service stations will be established at two locations.



The hubs will contain state of the art pantograph type charging stations with 300 concurrent charging bays drawing upto 30MW at each depot.



As part of the āyushća project,
a 300 vehicle fleet would be
supported:

100 Comfort buses | upto 12m
100 Luxury coaches | upto 9m
30 Longhaul metro | upto 24m
20 Campus buggy| upto 7m
15 Amphibian sightseeing | 12m
15 Mobile clinics | 12m
10 Emergency response | 12m
5 Support vehicles | 20m
5 Water cruisers | 15m

These will be supplemented
by standardised 300 luxury
EV coaches sponsored by
leading hotels to connect
their hotels to the tourist
route locations using a
circular route.





comfort buses



IIT Alumni Council proposes to catalyse the creation of a 400+ fleet of comfort buses which will replace the ageing fossil fuel buses currently used by Kadambathur Transport Corporation. These buses would be charged and maintained at the transport hubs. Their movement will also be monitored from the central command station to optimise their use and ensure compatibility with the state wide transit card proposed in the project.



luxury coaches



The luxury buses deployed as part of the network need to have a distinctive look, low cost, bespoke interiors, large glass panels, easy fast charging and low cost. They also need features like easy embarking with heavy luggage and easy disembarking for wheelchair passengers. Such buses have been developed through initiatives of the Council indigenously.

long-haul virtual metro



Conventional articulated buses used for long haul – metro or tram type applications – need a high turning radius. This may not be possible all over the State. Thus low turning radius versions of such buses would be required. Buses suitable for this application are currently under development.



estate buggies



The estate buggies proposed for use inside the ayushca campuses and in the pedestrian zones near tourist attractions. These golf cart type vehicles have been ergonomically remodelled for higher passenger capacity, speed upto 65 kmph, vehicle to vehicle charging and options for doors to enable use during monsoons. .



amphibian sightseeing



The amphibian buses proposed for tourist sightseeing require minimum infrastructure at the jetty end. By using water jet propulsion, they are able to provide safe travel on land or in water.

They can also be used for disaster management or in flooded areas during the rainy season. The luxury buses can also be remodelled to have bio toilets, kitchenettes or conference type seating.

mobile clinics



The first set of MegaLab buses were flagged off on May 1, 2020 as an emergency fleet to help manage the covid pandemic in Mumbai and other cities. The bus interiors were modelled using paradigms used by private planes refitted for medical use. The MegaLab fleet was the first electric bus to have a full function digital X-ray and RTPCR lab on board for covid testing.



Photograph of the interiors of the actual MegaLab bus, 2020 version deployed at the NSCI Dome Covid hospital. It was the first covid lab bus in the world. The bus was equipped with digital radiology equipment for remote reporting via telemedicine.

emergency response



Dr. Ramesh Pokhriyal Nishank ✓

6 May at 16:40 · 🌐



IIT Alumni Council launched India's first #COVID19 test bus in Mumbai, that can reduce the cost of testing by over 80% without compromising on the testing capacity.

This bus will move around the city collecting test samples for rapid testing.

Know more: <https://bit.ly/IITB-COVIDTestingBus>





Emergency response vehicles can be designed to have a wide range of functionalities from medical facilities on board to satellite connectivity for communications backup and live video broadcast to hosting remote control rooms.



support vehicles



Support buses are required to handle breakdowns and other maintenance issues including depot to depot transfer for remodelling, battery replacement, change of interiors, software upgrade etc. Some of the features in the luxury buses including partial autonomous driving and remote driving make it difficult to service them on the curbside.



water cruisers



It is now possible to build hydrofoil type high speed yachts. These can be built upto 20m in length and can achieve speeds upto 40 knots. Given the simplicity of design because of electric propulsion, it is possible to cost effectively manufacture these in Goa. The zero pollution boats can take luxury tourism to the next level.



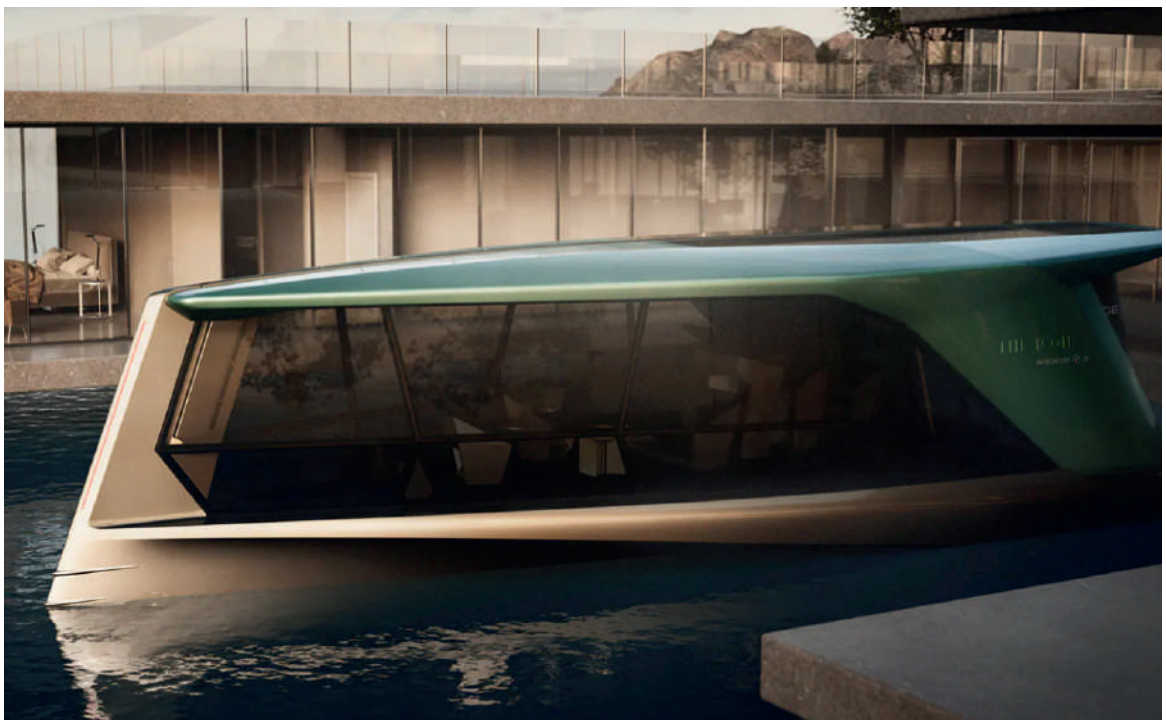
Photograph of the interiors of the actual MegaLab bus, 2020 version deployed at the NSCI Dome Covid hospital. It was the first covid lab bus in the world. The bus was equipped with digital radiology equipment for remote reporting via telemedicine.



It is also possible to design jetties on water channels that are extended inland from the waterfront. This can enable waterfront establishments to host their private jetties to anchor small yachts.



Since the entire propulsion is on a skateboard type architecture, it is possible to build a variety of ship bodies with bespoke functionalities.



Once a design is perfected, it is also possible to produce the same design in different sizes ranging from 5m to 20m in length. The power system can be further optimised using solar roofs.



Biofuel plant

[waste processing, back up power, cooking gas]

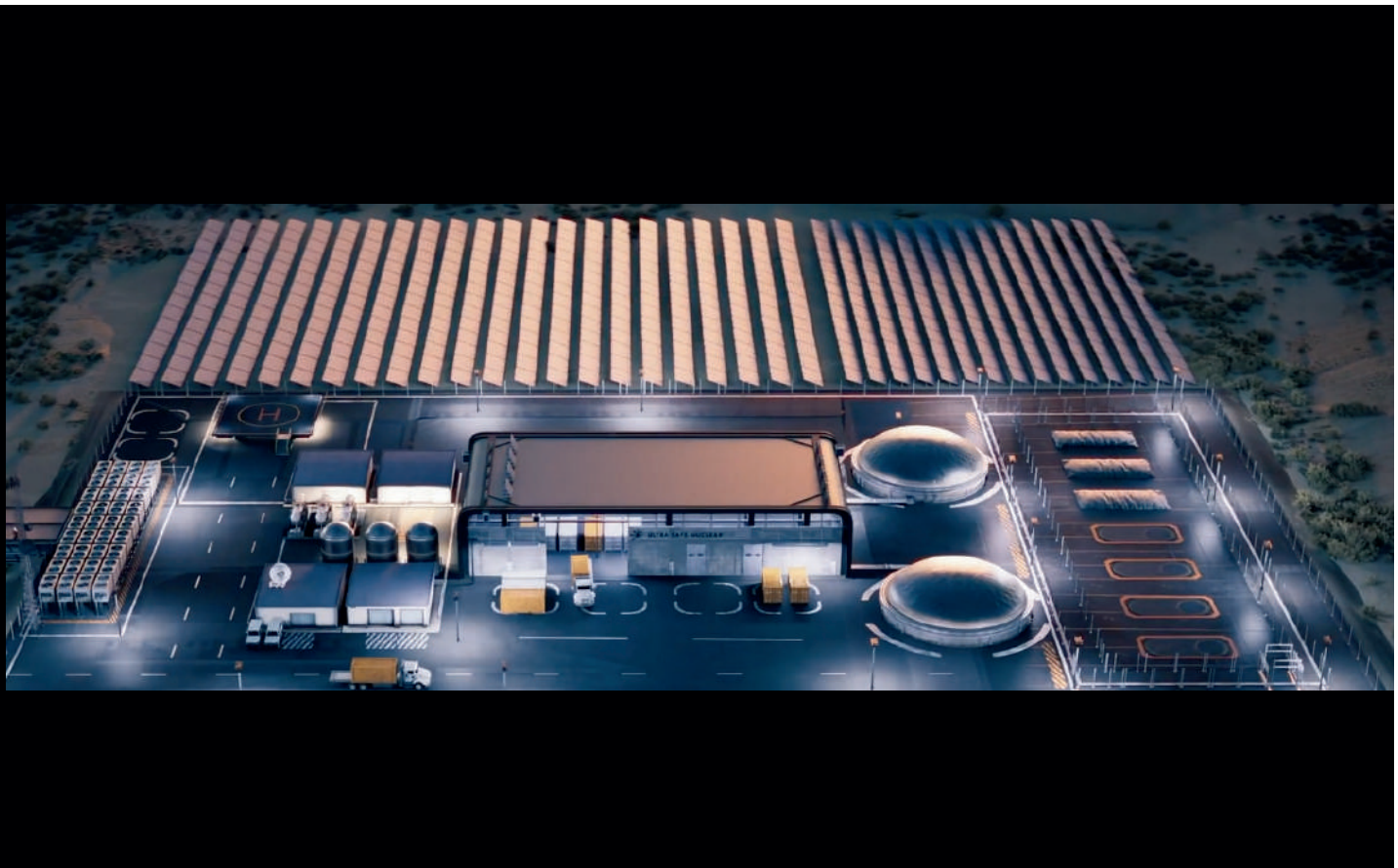


Kitchen waste and sewage are disintegrated microbially to produce CNG, biofertiliser, power, hydrogen etc

The multi feedstock microbial digesters can take a variety of inputs including animal manure, coal and biomass to produce biofuels.

...
āyushā
POWER PLANT

Zero Emission 24/7 power plant



The three stage power plant comprises of solar photovoltaic generation, biofuel based power and thorium based heat source for 24/7 airconditioning and power.

The power plants will have a cumulative generation capacity of 60 MW at the peak hour.



Thorium type heat sources can provide close to perpetual power to drive heat cum electricity for applications like chilled water for central air conditioning and supplementation to biogas derived electricity.



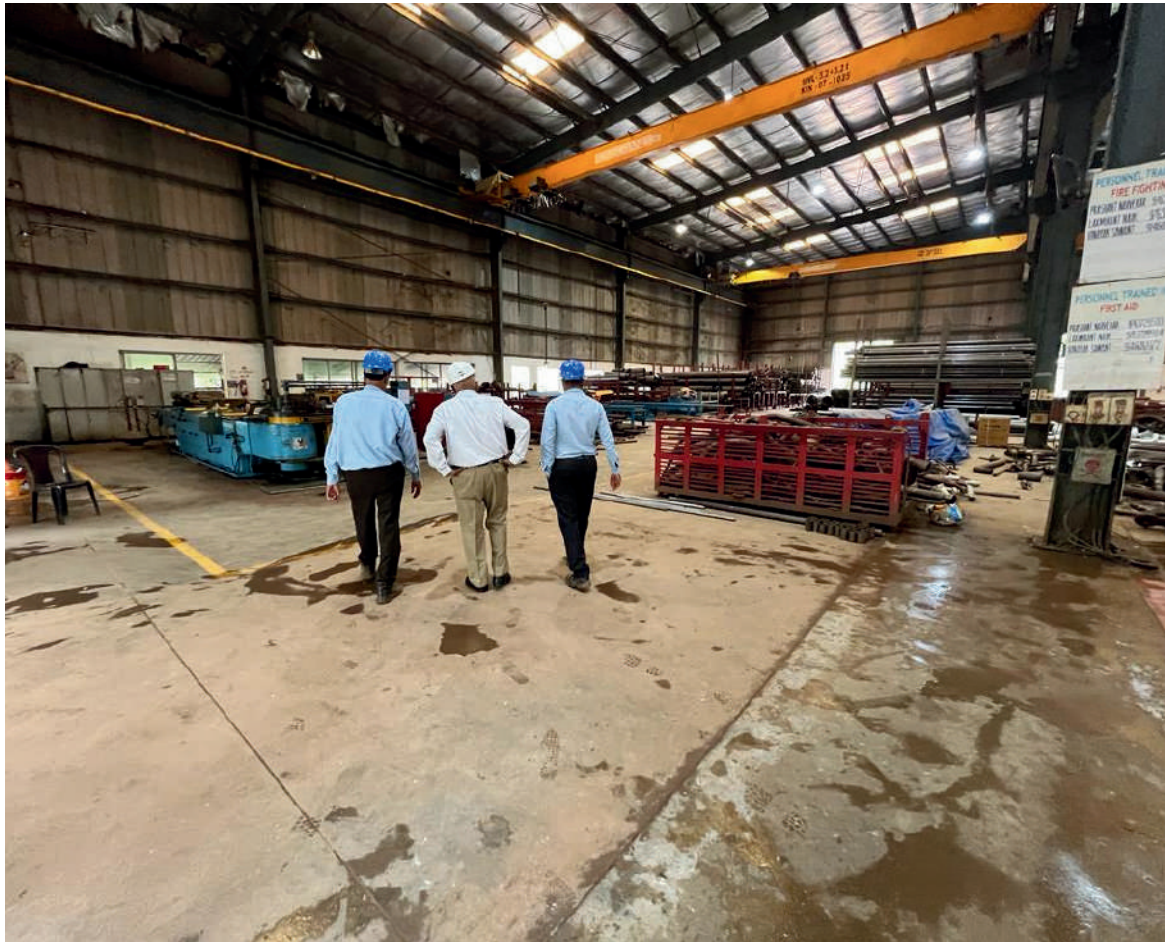
GOA study visits

by the IIT alumni council



Members of the various āyushcā task forces have made around fifty study tour visits to Goa over the last three years. Over 3,000 man days have been spent on these visits. The team has visited several of the startup incubators, educational institutes, waste management units, biogas plants, bus depot, luxury hotels, ship building units etc.









The fifteen task forces appointed for the project include:

- I. Wellness & traditional medicine
2. Travel & tourism
3. Alumni Relations
4. Sustainable habitats
5. Biofuels & renewables
6. Academic Board
7. Power Generation
8. EV and charging
9. Fintech card platform
- IO. Nutrition & farming
- II. Theranostics & vaccines
- I2. Sports training & Fitness
- I3. Artificial intelligence
- I4. Decision Support & Market
- I5. Project Finance



annexures

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Membership

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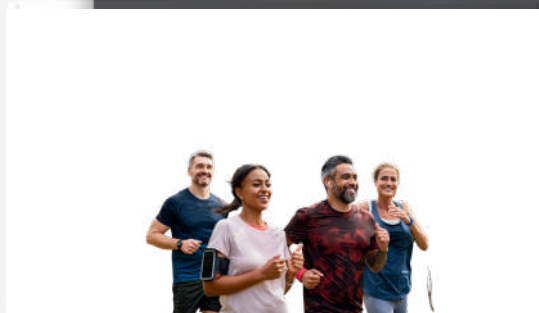
9 a 73
Philosophy

As a start point – led by a cross-section of the IIT alumni, āyushća is building a world class campus to demonstrate the key technologies and paradigms required for sustainable luxury wellness tourism.

The campus will be owned and built by a Section 8 non profit company primarily funded by social impact funds.



āyushća membership



a global interactive community



The āyushcán estates aspire to provide opportunities for interaction between the community members and experts from around the world who are working in the startup, climate change and healthy longevity domain.

āyushća residential members

āyushća residential membership is exclusive and is 'By invitation' that will be extended only to IIT Alumni Council donor members and their affiliate entities.



āyushća members
would be a 50:50
blend between
residents and NRIs



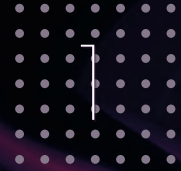


comparators

There is no equivalent competitor with such an extensive and truly integrated offering that encompasses a vast array of systems from the ancient to the cutting edge technologies that is focussing on proactive health.

Stand-alone comparators for the various components could include ...

IIT Alumni Centre & Hospitality spaces	Marriott InterContinental Four Seasons
Ayurveda & Naturopathy Luxury Hospital	Kalari Kovilakam SwaSwara Amal Tamara
Integrated Holistic Health Centre	Vana Canyon Ranch Rakxa
Theranostics & Critical Care Clinic	dasa, São Paulo MD Anderson John Hopkins
Convention & Exhibition Complex	Pragati Maidan Sunteck Hannover Messe
Residential Commune & Cultural hub	Lodha One World DLF Camellias Jaypee city
Organic farm & Farmers' market	The Farm Green Sense Farms Whole Foods
Sports & Fitness Complex	Siri Fort complex Augusta National Golf Club PGA Academy
Research University & Startup Accelerator	IISC Bangalore Stanford University Y Combinator



brand

attributes and positioning



āyus arises from 'āyus (sanskrit) = longlife'
Gleaning wisdom from the ancient yet timeless systems of 'Swastha' (wellbeing), āyus in āyushća represents a long, healthy, balanced, wholesome and purposeful way of living.

h stands for the Holistic treatise of Health, wellbeing and lifestyle, and Harmony. It stands for being a bridge that connects multiple aspects into a seamless whole

ć implies application of Cutting-edge technologies as well as Community and Connections.

a represents application of Artificial Intelligence and Advanced Engineering in areas such as healthcare to habitats, as well as stands for Authenticity and Altruism

3 dots . . .
represent drawing insights from the past and employing the best of the advancement of the present, for a long, healthful and dignified lifespan into the future – of the current and the future generations.

purple
illustrates the harmonious continuum and synergy āyushća intends to create, just like it connects the opposite ends of the visible spectrum, the violet with the red.

white
denotes light, purity and inclusiveness.





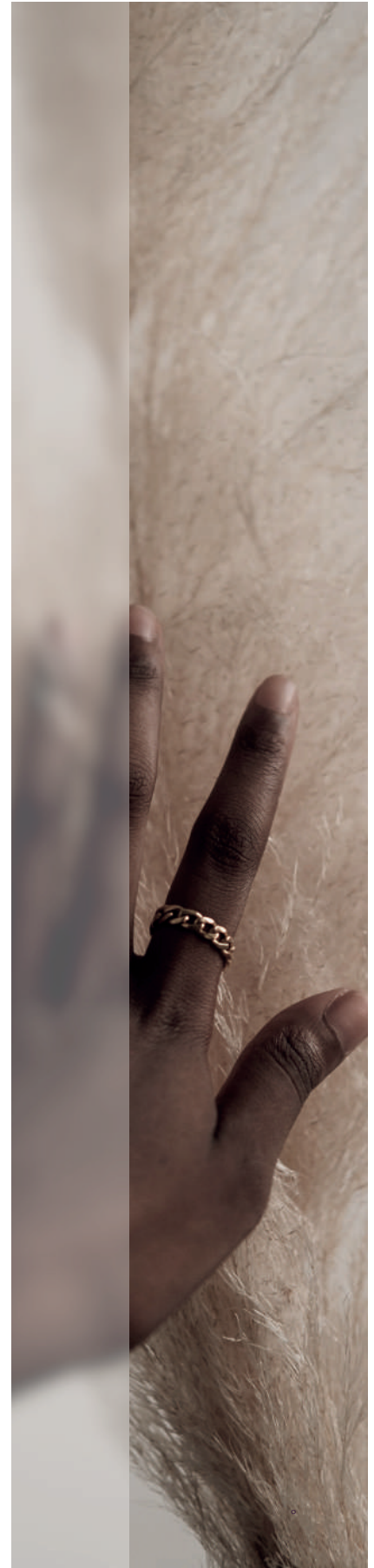
an ecosystem

The brand and the logo stands for,
and reflect that āyush́́a
is a multi-dimensional ecosystem,
a catalyst and an explorative
journey in itself, to healthful and
active longevity...

The harmony and interplay of all
the components of āyush́́a,
including its natural environment,
become the catalyst to healthy and
long life, 'āyush' (Sanskrit). Brand
āyush́́a reflects this theme.

The ecosystem of āyushća estates will mindfully orchestrate ancient wisdom traditions with the contemporary, complementary and alternative health systems and practices from around the world as well as modern medicine and technologies, through a collaborative and cross-disciplinary approach.

āyushća is built ground up for this with integrated organic farming, advance theranostics and holistic and wholesome living.





At the infrastructure layer, āyushcā proposes to support creation of the larger longevity ecosystem at pandemic scale, such as research labs, diagnostic centres, convention centres, state of the art hospitals with residential facilities.

The brand will represent the cutting edge technology element of the project

sustainability

- • • Renewable resources

Each āyushća estate will host its own solar power plant, effluent treatment, rainwater harvesting and biodynamic farming acreage.

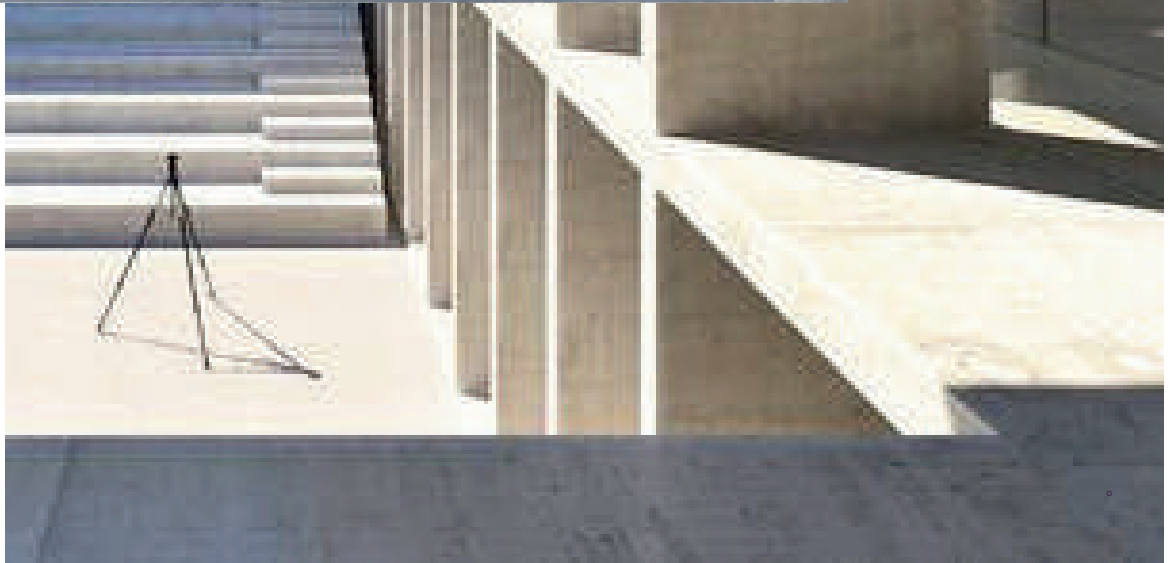
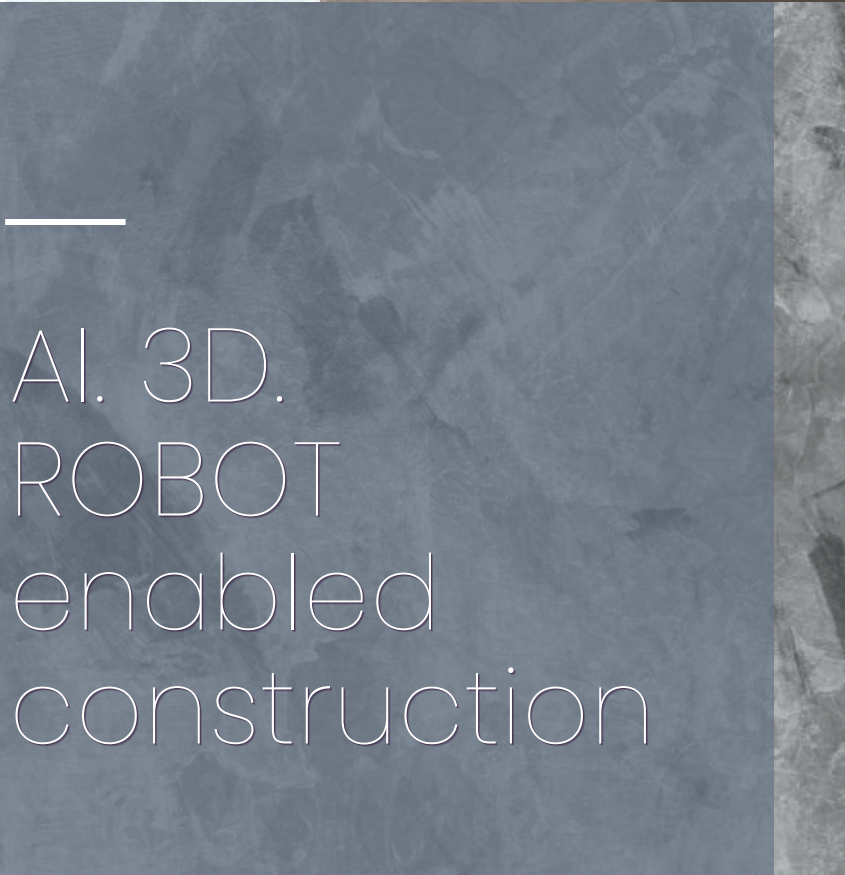
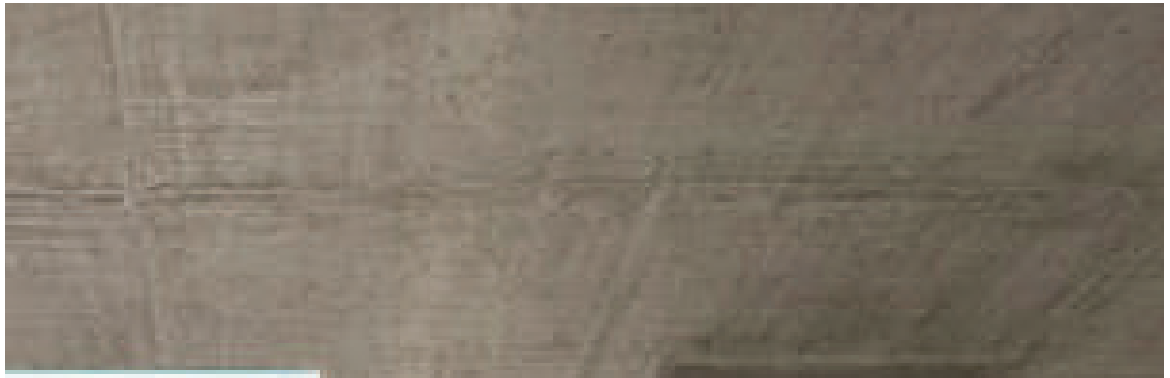
- • • CO2 emissions.
- • • Net 0

We expect the co2 emissions from the estates to be 70% lower than other prevalent formats. Carbon sequestration techniques would make it net zero.

- • • SDGs

- • • To operationalise these Sustainable Development Goals, we have clubbed them in six main categories: biodiversity, community, health, materials, water and energy.

The brand will encapsulate these sustainability targets





In pursuance of the sustainability theme, the designers will use modern tools from artificial intelligence to 3D printing and robot-enabled construction, according to the geo-climatic context of the estates. This will create a thoroughly analysed and well-thought-out inner and outer spaces and structures, with the most appropriate, wellbeing enhancing, climate-friendly and global warming-ready solutions.





The brand will represent the
cutting edge technology
element of the project.

2

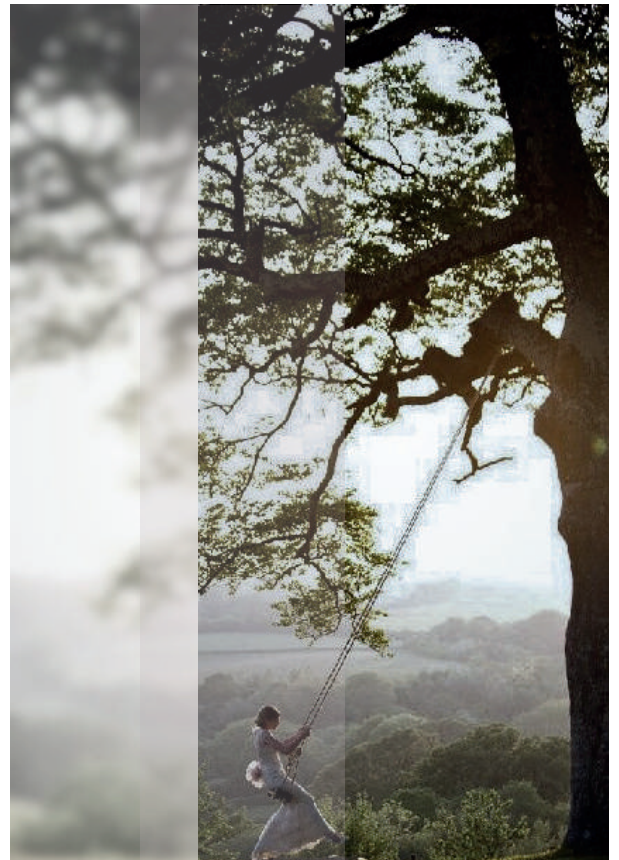
guiding principles

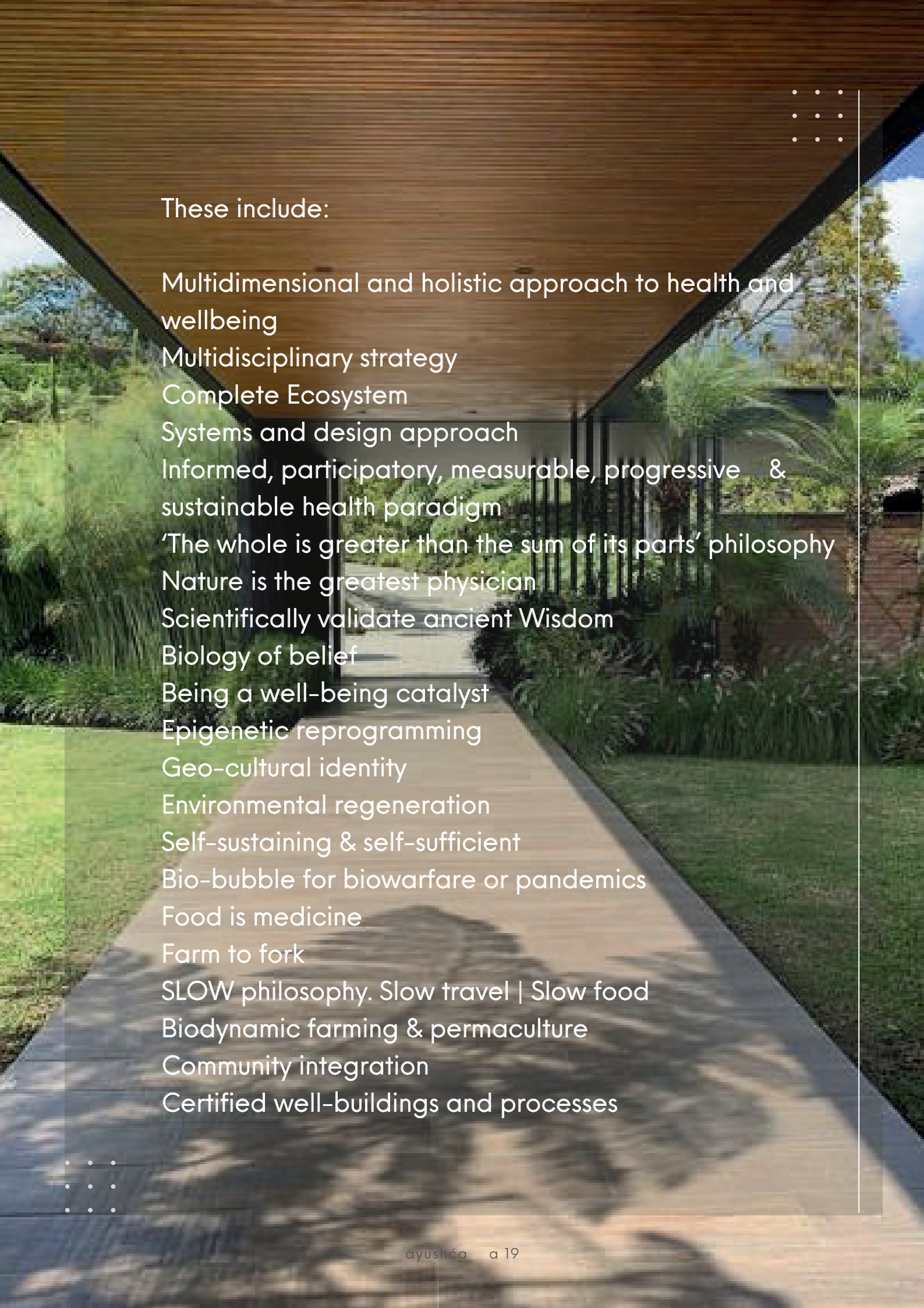
of āyush́a estates



āyushća epithets

encapsulate the
philosophy and the
values. Like a compass,
they guide and help to
recalibrate, to stay on
the course - true to
its founding intent.





These include:

Multidimensional and holistic approach to health and wellbeing

Multidisciplinary strategy

Complete Ecosystem

Systems and design approach

Informed, participatory, measurable, progressive & sustainable health paradigm

'The whole is greater than the sum of its parts' philosophy

Nature is the greatest physician

Scientifically validate ancient Wisdom

Biology of belief

Being a well-being catalyst

Epigenetic reprogramming

Geo-cultural identity

Environmental regeneration

Self-sustaining & self-sufficient

Bio-bubble for biowarfare or pandemics

Food is medicine

Farm to fork

SLOW philosophy. Slow travel | Slow food

Biodynamic farming & permaculture

Community integration

Certified well-buildings and processes



- • • ecosystem –
- • • systems approach

āyushća commune comprises of all its residents, guests and the team. āyushća will take a systemic approach involving a holistic view, for the greatest benefit of the community it serves.

- • • the whole is greater than
- • • sum of its parts

āyushća is modelled after the belief that the whole is greater than the sum of its parts. Therefore, every component of the āyushća ecosystem, its functions and role is recognised as imperative and respected for its contribution to the grand scheme of things, irrespective of the mainstream views.

- • • conducive and catalytic to
- • • epigenetic re-programming

Favourable epigenetic re-programming for health and longevity is possible through a conducive and coordinated environment, for rapid results and to jumpstart a conscious health-promoting way of living. Choice of geographical location, design and development, and coordinated multi-speciality systems reflect this philosophy.

- • • environmental
• • • regeneration

Restoration, reparation, re-wilding and regeneration goals go beyond mere sustainability and self-reliance to include bio- dynamic and conservation farming methods, permaculture, clean and renewable energy.

- • • community
• • • integration

Integration into the local community, adapting local cuisine elements, seasonal produce, supporting local arts and crafts and the artisans' work and livelihood and much more will be at work.

- • • certified buildings
• • • and processes

The estates, the buildings and its operations will be certified LEED platinum, WELL buildings and other relevant ones.

- • • biobubble –
• • • pandemic ready

The estates are designed to be isolated and self sufficient in terms of food, water, power and internet for survival in the next pandemic or biowarfare type situation.

3

community interface

of āyushća estates





Healthcare is evolving from reactive sickness-disease care to proactive health care that is predictive, preventive, personalised and participatory. Holistic healing systems like Ayurveda do that much better than western medicine does.

At the same time, climate change and pollution are compounding the ill effects of a compromised food chain. Our cities are choking. This necessitates a new format for holistic living, which helps improve health space.

Habitats, as we know them, are in need of reinvention. These habitats must go beyond just providing a roof above the head with climate control and shared amenities.



The habitats must provide an ecosystem that can nullify and counter the ill-effects caused by accumulated toxicity - from everything we eat and ingest through our skin, indoor and outdoor pollution, compromised lifestyle choices, prolonged undue stress and so on.

āyush́ca was
conceptualised as part of
the megalab mission of the
IIT Alumni Council to meet
the need for safe and
healthspan-enhancing
infrastructures in a post-
covid age



This sustainable township concept set in the lap of Nature will integrate ancient wisdom with futuristic theranostics (therapeutics + diagnostics) and AI (artificial intelligence) for healthy and active longevity

The estates are
essentially
configured as Centres
of Learning,
Development and Life
Enhancement.



.. The experiential & residential format spurs developing and expanding our potential, specifically in three areas:

1. Well-way of living by applying the ancient wisdom sciences with modern cutting-edge technologies. Think of Dinacharya, Ritucharya (as per ayurvedic principles) & modern bio technology.
2. Higher studies and Research on relevant subject matters on health, communities, theranostics.
3. Excellence in competitive sports at Olympic level.

āyushća, redefining sustainable tourism





āyush́ca estates could very well be considered as the rite of passage to a world of social support and social intimacy, a true luxury in the digital age.

They are envisaged to be developed as communes and retreats, for eclectic and discerning individuals. Set against the backdrop of warm and impeccable hospitality with personalised care and attention to detail, these estates will exude elegance and conscious luxury.



āyushéa estates

The megaLab mission is now set to transform preventive health and precision medicine by bringing new technologies across prophylactics, diagnostics and therapeutics to the market. The only way to lead in this market is to invent the future, and that is the DNA being built ground up in all the megaLab consortium entities.

The āyushéa Estates are a Rs 50,000 crore initiative that envisages the provision of a secure bio-bubble for future pandemics in each state of India. The āyushéa Estates will collectively host over 10,000 Ayurveda hospital beds and over 50,000 residential keys.

For regular times, this will create a global-scale medical tourism infrastructure focused on healthy longevity by fusing the principles of traditional healing systems like Ayurveda with cutting-edge technologies. With a rapid response design to reconfigure the spaces into a bio bubble."



Satish Mehta

Convenor

MEGAFUND

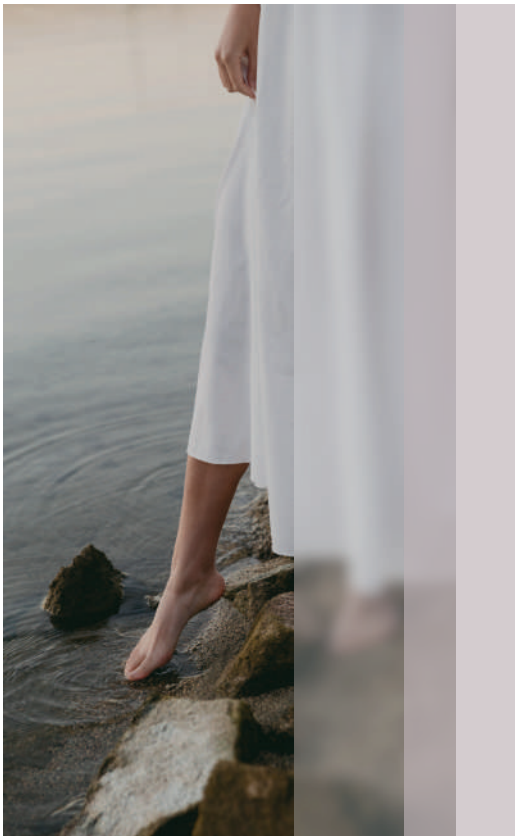
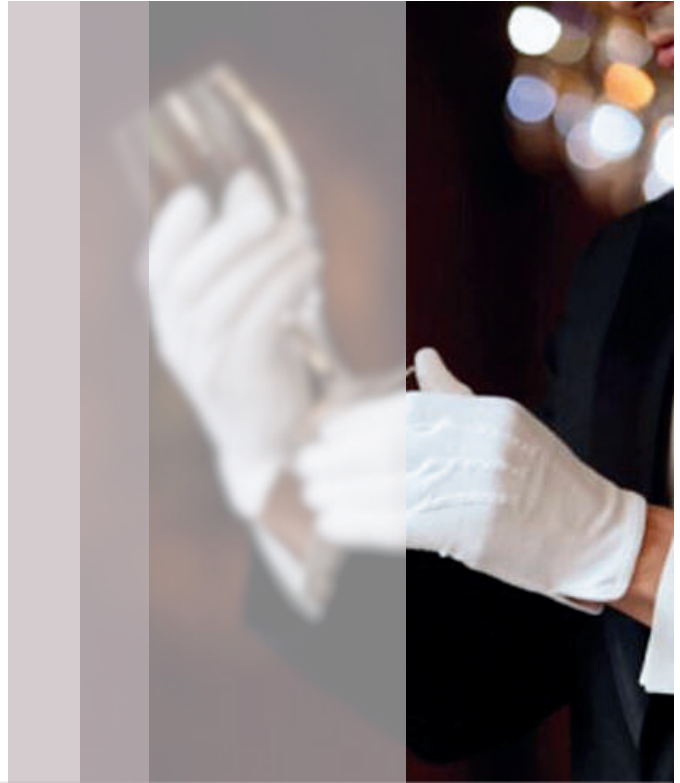
Alumni Council

Board Member

Patron Member

āyushéa

āyush́ca
will resonate with,
and meet the needs of
the discerning and
healthspan and
wellness seekers...

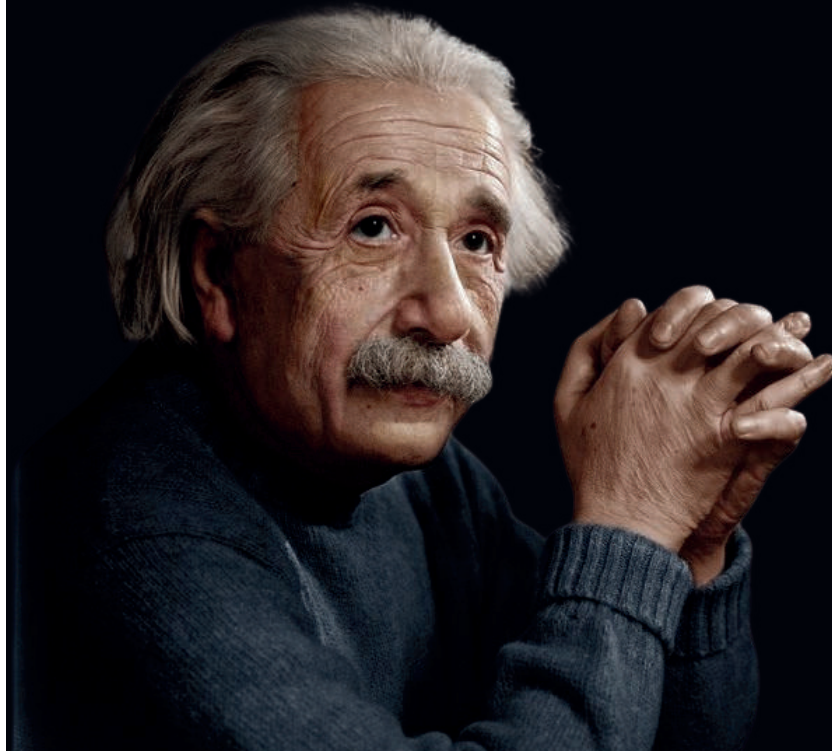


...
keenly aware of and pursue
proactive healthcare, active
and wholesome lifestyle, and
longevity
as a serious pursuit.

willing to devote time,
energy and resources in that
pursuit.

wanting to access the latest
theranostics to achieve and
optimise health and
longevity markers.

Think of the
āyushća community
like an extended family
of affluent and eminent
intellectuals pursuing
active longevity and
lifelong learning as a
serious hobby.



And using the power of their
collective resources and
determination to access the tools
for active longevity and continuous
learning.



Concierge-guided, privileged access to global intellectual clubs such as the Oxbridge Club in London is one of the membership benefits.

annual retreats -reboot protocols



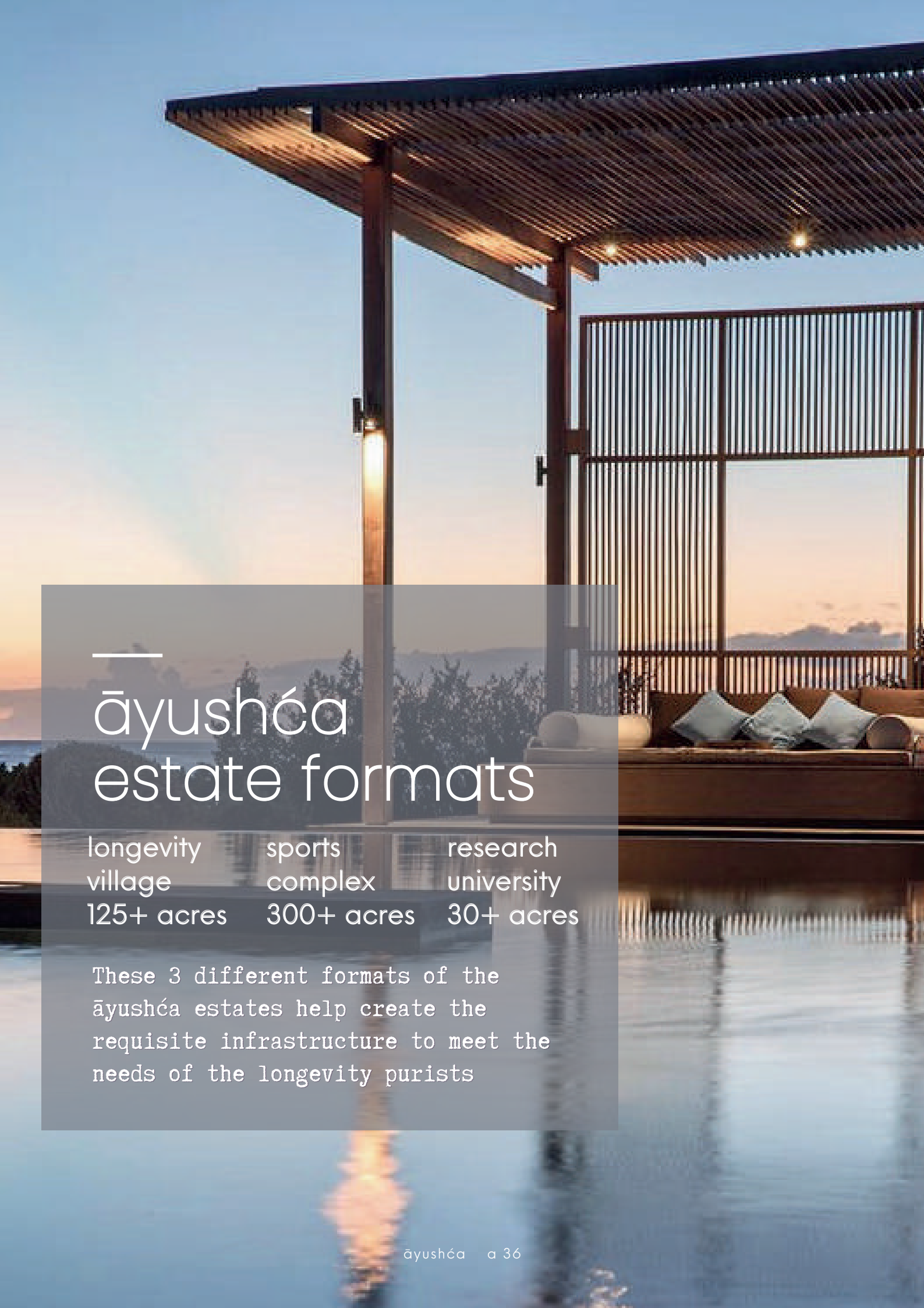
Each āyushća member will be encouraged to retreat 3-4 weeks annually to reverse the cumulative, chronic and harmful effects of compromised food, depleted soil, environmental pollution and undue stress, diseases and disorders, to build immunity, reclaim vitality and promote longevity.



estate formats

of āyush́a estates





āyushća estate formats

longevity
village

125+ acres

sports
complex

300+ acres

research
university

30+ acres

These 3 different formats of the āyushća estates help create the requisite infrastructure to meet the needs of the longevity purists

Each of the āyushća estate formats- the Longevity village, Sports complex and Research university – is a microcosm of the nine essential components that constitute an āyushća. But curated with varying focus and different proportions.





estate formats & max. density

30 acre/ 125000 sqm format | G+3

Plinth area to plot 0.47

Conventional construction to plot area 0.66

Sustainable construction to plot area 1.24

Total density 1.89

125 acre/500000 sqm format | G+2

Plinth area to plot 0.15

Conventional construction to plot area 0.16

Sustainable construction to plot area 0.3

Total density 0.45

300 acre/1250000 sqm format | G+1

Plinth area to plot 0.09

Conventional construction to plot area 0.07

Sustainable construction to plot area 0.12

Total density 0.19



The estates will provide the perfect ecological canvas based on epigenetic principles to work on reversing illness, ageing related decline, preventing future illness and aiding active longevity - in the current context of global warming, mounting and all pervasive pollution, prolonged stress, social disruption and shifting paradigms.

megaSpheres

quest for quallity of life



Transformation through Technology



megaSpheres

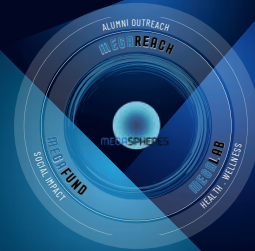
QUALITY OF LIFE INITIATIVE
OF IIT ALUMNI COUNCIL

The megaSpheres initiative includes three mission organisations, and three mission facilitators synchronised to achieve its goal of accelerated socio-economic progress through technological and financial interventions.

Idea stage ventures are incubated at the INCUBATOR.

FORUM facilitates access to strategic resources & growth capital.

INSTITUTE helps access research resources & indigenous technologies.



. IIT Alumni Council initiatives .

FORUM

.PROFESSIONAL SERVICES.

INCUBATOR

.STARTUP ACCELERATOR.

INSTITUTE

.APPLIED RESEARCH .



megaLab

healthspan enhancement
initiative

megalab.in



The C19 Task Force was set up by the IIT Alumni Council as a Rs 700 crore initiative to catalyse the national fight against Covid. The C19 Task Force morphed into the MegaLab mission in August 2021.

MegaLab advances preventive health and longevity through a fusion of traditional medicine systems with cutting-edge technologies and artificial intelligence.



megaReach

global alumni outreach
& participation

megareach.in



MegaReach
for an outreach to IIT alumni
around the world who can help in
the identification, development
and deployment of key
technologies involved in the
MegaFund's target areas for
investment.



megaFund

social fund regulated as an AIF
fund by SEBI

megafund.in



The MegaFund is a consortium of social and venture capital funds with a target corpus of Rs 21,000 crores and a fund life of twenty years. The anchor entity PanIT Fund is registered with and regulated by SEBI under the Social Impact Fund framework under the AIF Regulations 2012.

The MegaFund promotes the progress of science and technology, advances national health and prosperity and helps to secure and lead in key strategic technologies including climate change.

glide path



The Alumni Council is pursuing a technology intensive model which uses paradigms from the startup and venture capital world to disrupt the social sector. For the supported entities to be self sustaining and internally fuelled in the long term – the focus is on ventures where benefit created is captured in the long term revenue – either as profitability or as valuation in the startups. āyushcā follows this theme.

Videos



[The United States imports smart people from India](#)

YouTube · Dia Asmar
31-May-2018



[Indian Institutes of Technology - IITs on CBS 60 Minutes](#)

Facebook · Indian Institutes of Technology
07-Dec-2008

The quality of life initiative was the brainchild of Ashok Madhukar, a tall leader who played a stellar role in the creation of IIT Alumni Movement.



Late Ashok Madhukar, who passed on in 2021, was a BTech from IIT Kharagpur. He was awarded the Distinguished Alumni by his alma mater. Ashok spent the last three decades of his life in the development sector – first as a part of the Social Fund for Development in Egypt and thereafter as a leading consultant to the government, specialising in the India-Africa corridor and the north east sector.

In 2016, Ashok introduced alumni leaders of the IIT community to the “quality of life” framework. His theory was that if we worked towards deploying technology to address all aspects of quality of life, we could create a blueprint for national progress. It was his strong conviction and passion for creating a nation building organisation that eventually led to the formation of the IIT Alumni Council.

He achieved in his lifetime, what may have otherwise taken decades more – to develop the unique core theme for the IIT Alumni movement. It is thanks to his foresight and guidance that the IIT Alumni Council and related mission organisations shifted focus – inspite of strong opposition from IIT alumni or the IITs, to nation building.



IIT Alumni Council is now the largest global body of alumni across all the twenty-three IITs and partnering Universities.

The IIT Alumni Council aspires to align Alumni resources towards catalysing India's technological renaissance for a digital society.

The member alumni actively participate in social ventures that are configured to solve key national challenges through the deployment of appropriate technologies using the well-proven venture capital funded start-up format.



Ravi Sharma

President &
Chief Volunteer





megaLab

a health mission of megaSpheres



how it all
began...



As an emergency response to the covid pandemic, the IIT Alumni Council set up the CI9 Task Force in March 2020.



Over 25,000 IIT Alumni rallied
resources for a solitary vision
- to beat the Sars Cov2 virus

- • • Based on their learnings from
- • • handling 20,000+ covid patients
- • • and enabling millions of RTPCR tests, they vowed to engineer a new approach to health and longevity by preventing illness and age-related degeneration.
- • • Organised as the C19 Task Force,
- • • the group addressed challenges in
- • • testing and treating covid.
- • • The C19 Task Force morphed
- • • into the megaLab initiative on
- • • 15th August 2021.

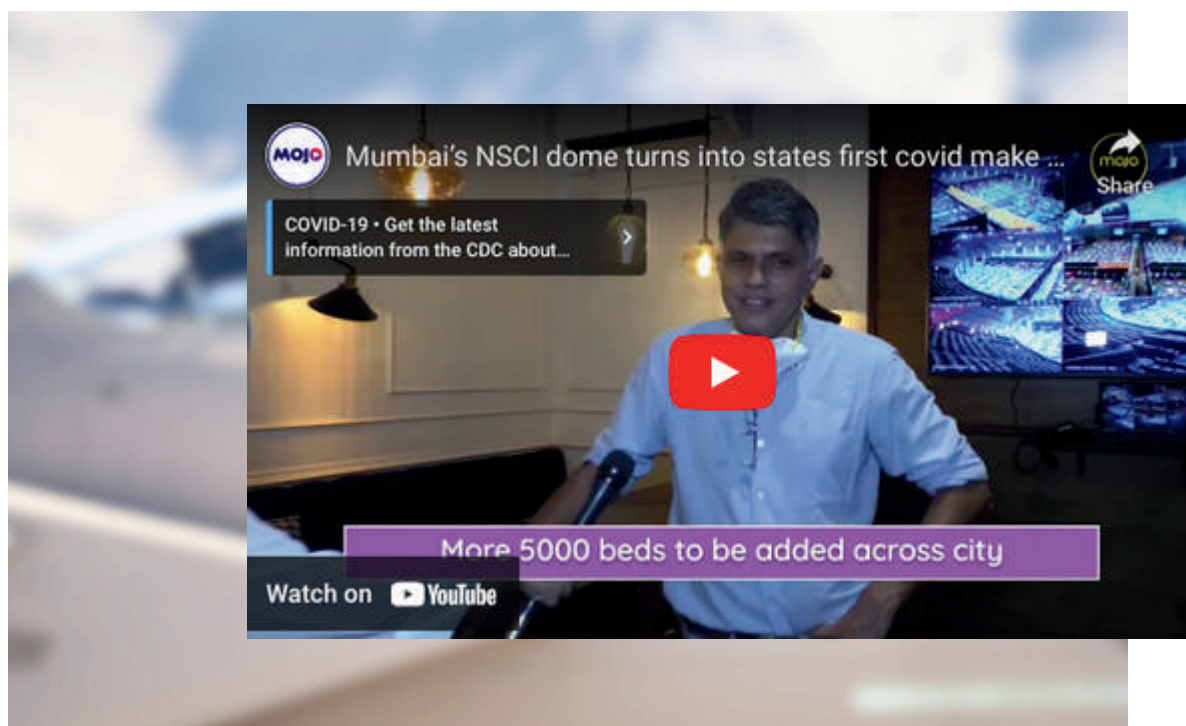
**The āyushća Estates are
a part of the megalab
ecosystem**



blitz of 100-hour projects



Set up with a target outlay of Rs 700 crores, the C19 Task Force – under the chairmanship of Dr Vijay Raghavan and Dr Arindam Bose, helped create 100-hour projects faster than anywhere in the world.



Mumbai's NSCI Dome turns into
the state's first Covid makeshift hospital helmed by a
world famous weight-loss specialist surgeon



infrastructure & support systems galvanised

The megalab mission also facilitated the swift creation of supplementary infrastructures such as Covid test buses, oxygen facilities and testing laboratories.



The megalab bus was transformed from a regular passenger bus taking inspiration from private aircraft interiors. Within 100 hours.

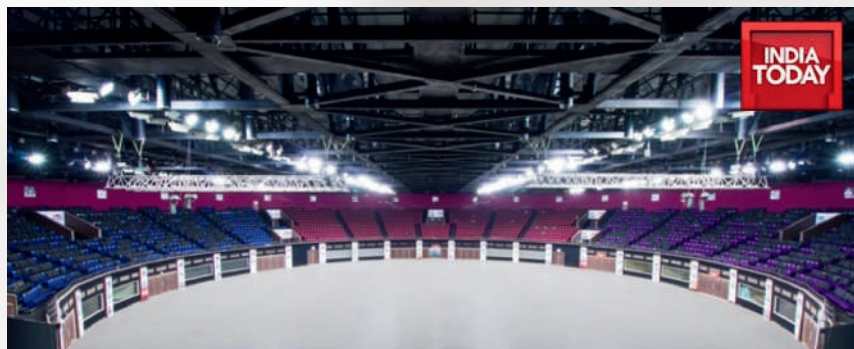


ground zero NSCI dome

One doctor.
Eighty volunteers.
Eight hundred beds.
and, AI

NSCI Dome was a contactless Covid hospital with containerised ICU beds.

A sports stadium was transformed within hours into a covid hospital with paper beds, designer bed sheets, live entertainment and fully computerised operations all unlike any conventional hospital.



COVID19 CRISIS

NSCI DOME NOW QUARANTINE CENTRE



NSCI dome visuals...



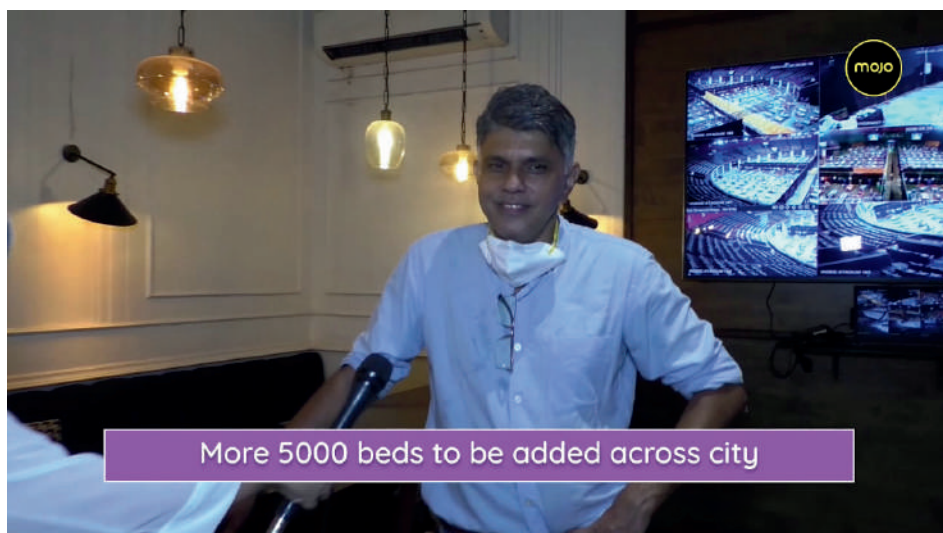
A range of simple innovations ranging from paper beds with designer bed sheets helped set up a hospital in hours whilst regular hospital beds made their way in time.

The paper beds also allowed various sensors to be embedded in the bed allowing for remote monitoring of various parameters using software speed developed by a wide range of startups.



NSCI dome

As part of this endeavour, an 800-bed covid hospital with ICU at the NSCI Dome in Mumbai.



Salient Features



Contactless procedures for safety of healthcare staff and patients. Built on state-of-the-art architecture for quick medical response.



This is also the first centre to use X-ray and artificial intelligence which can help predict whether the disease is likely to worsen, as well as detect who is more likely to contract the infection in the quarantine period. The technique enables doctors to swab-test the right patients, even when they are asymptomatic.



The NSCI is also one of the first facilities to use remote monitoring of pulse, BP, temperature, oxygen saturation, blood sugar, cloud based investigation, diagnostics, and medication or vital monitoring.

contactless, AI, remote monitoring ...

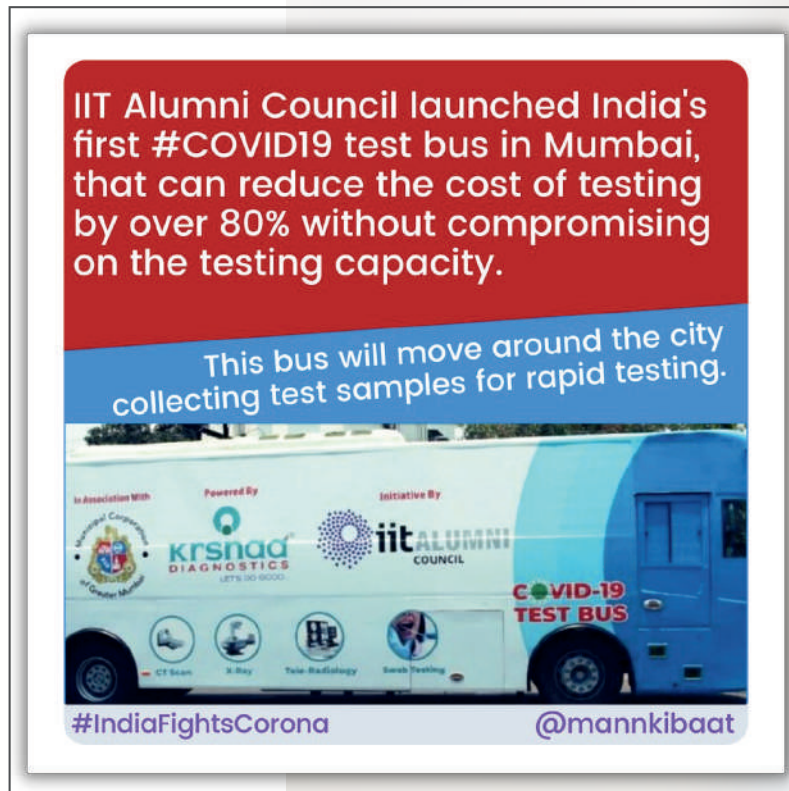
media coverage

The mass genetic testing initiative
of the C19 Task Force helped
create cost-effective indigenous
testing capacity.





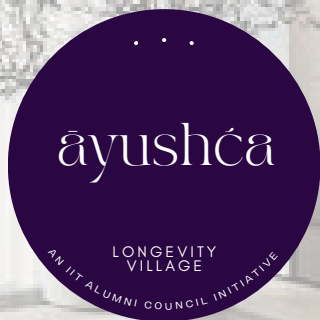
The original idea of placing a test lab on a bus and a mobile ICU in a shipping container came from the IIT Alumni Council task forces. As did the idea of pooled testing and covid variant tracking using Nanopore sequencing.

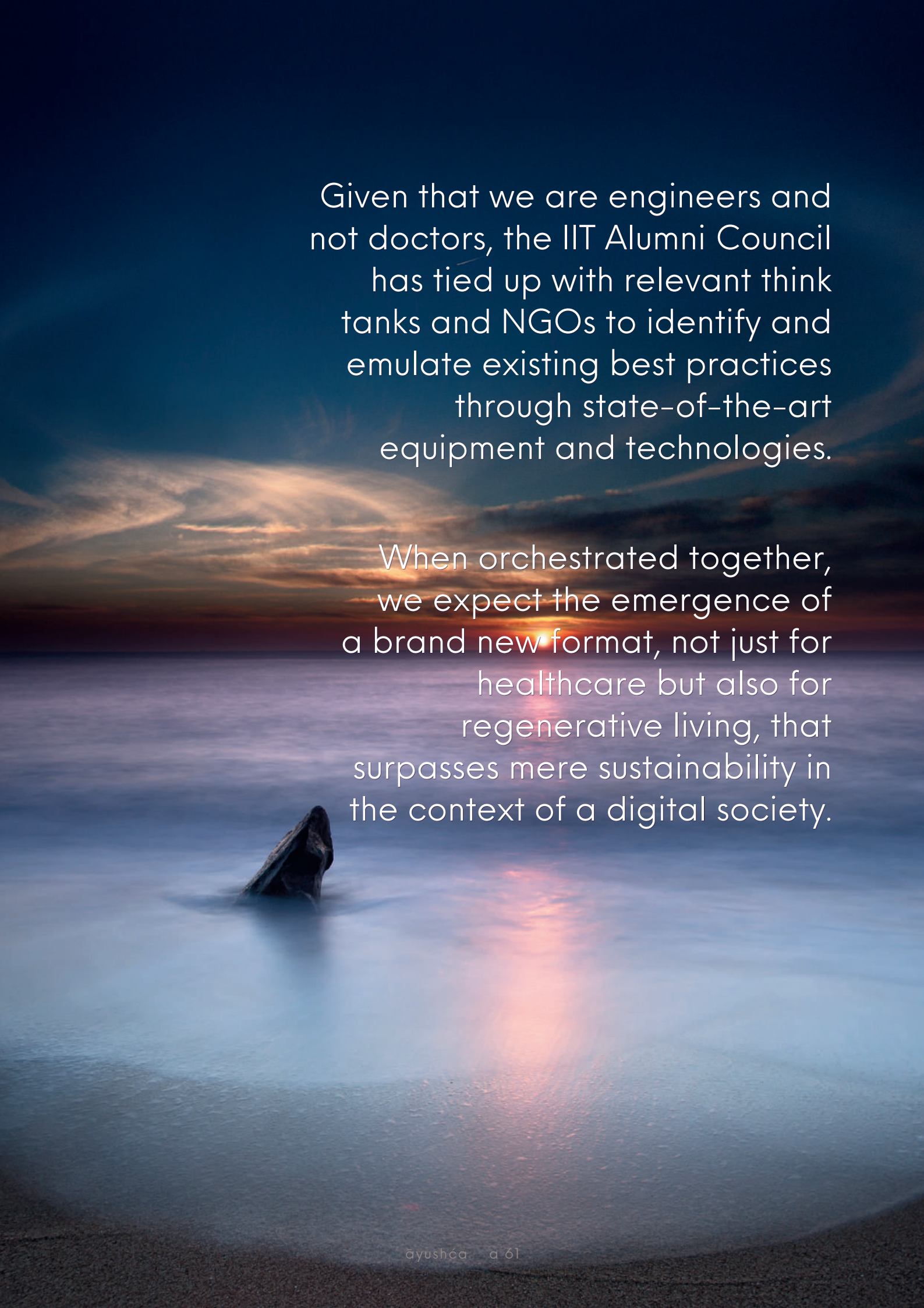


horizon broadens

megalab vision and scope
broadened in August 2021
to address the unmet need
for healthy and active
longevity among the top 2%
of the emerging country
(BRICS) population and the
top 10% of developed
country populations.

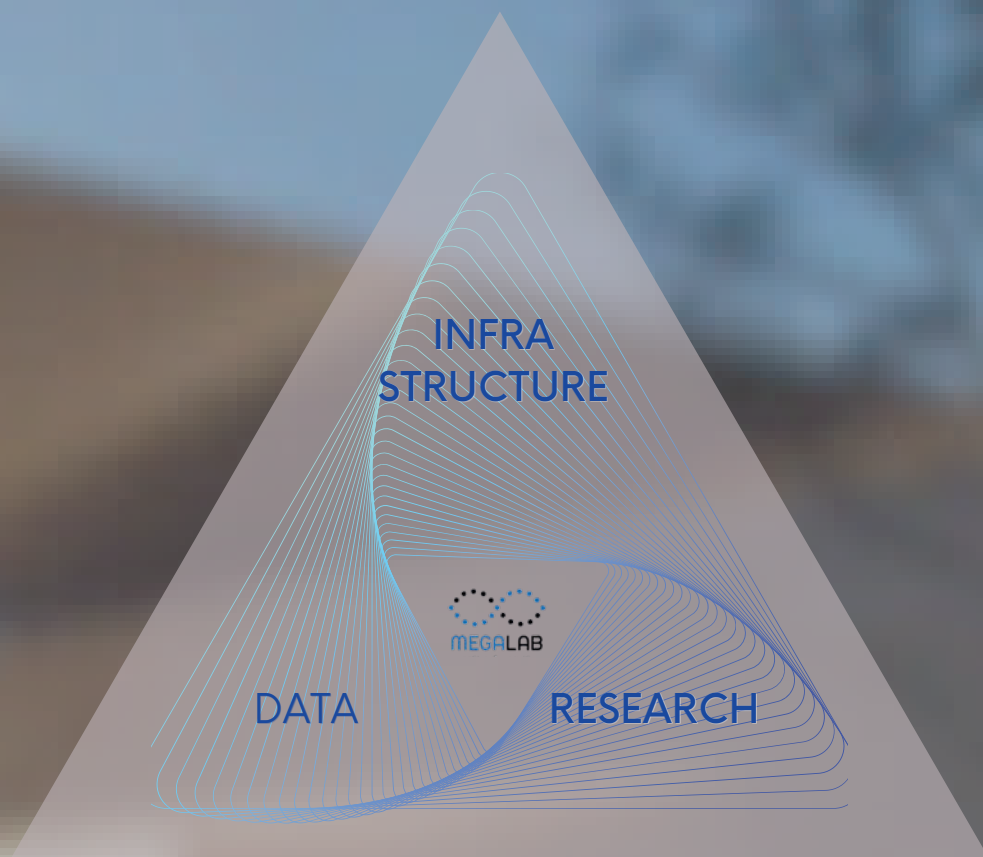
āyushcā estates are
under the overall
purview of the
megalaab mission



The background image is a long-exposure photograph of a sunset or sunrise. The sun is a bright, glowing orb on the horizon, partially obscured by clouds. Its light creates a vibrant orange and yellow glow that reflects down the center of the water. The sky is a deep blue with wispy, light-colored clouds. In the lower-left foreground, a dark, jagged rock sits in the water, its reflection visible. The overall mood is peaceful and contemplative.

Given that we are engineers and not doctors, the IIT Alumni Council has tied up with relevant think tanks and NGOs to identify and emulate existing best practices through state-of-the-art equipment and technologies.

When orchestrated together, we expect the emergence of a brand new format, not just for healthcare but also for regenerative living, that surpasses mere sustainability in the context of a digital society.



megalab
comprises of
these three key
segments



multi-pronged collaborative strategy

The effectiveness of the covid activities was further enhanced through multiple measures

MoUs with government research establishments like the CSIR IGIB, which became the nodal centre for tracking virus variants and mutations.

MoUs with various academic institutions from IIT Ropar to ICT University Mumbai to the 950 college Mumbai University.

Alliances with a consortia of startups from related health fields to create the megaLab Consortium.

These included a hyperspectral vision company, an ayurvedic proteomics startup, an infectious disease prophylactic manufacturer and a biologics company.



Taking charge of
one's own health
is the first step to
longevity.

- • • The starting point for the longevity seeker is to take control of one's own health
- • • Next, you need to be part of a powerful self help group.



Such a community of life-minded intellectuals does not exist in India among the longevity seekers

A group of young people are shown in a festive setting, likely a party or celebration. In the foreground, a young man with dark hair, wearing a black tuxedo jacket, a white shirt, and a black bow tie, is smiling broadly with his mouth open. He has his right arm raised in a celebratory gesture. Behind him, a young woman with long, wavy brown hair is also smiling. To the right, another young man in a dark blue suit is clapping his hands and smiling. The background is filled with other young people, some of whom are also smiling and cheering. The lighting is warm and festive, with some blurred lights in the background.

Tomorrow's elderly could look and feel younger and be as energetic. That said, this is not a journey to embark on only after a certain age. Today's youth also should start now. Proactive care should start now for all, irrespective of one's chronological age. The paradigm of old age being linked to illness and disability needs to be revisited.



In addition to the data platform, you
need a powerful, trusted and
continuously updated information
source - available directly to the
longevity seeker.



The principle enabler of a pro active approach is timely access to accurate data and continuous analysis, updation and tracking of that data.



digital

a health mission of megaSpheres



end-to-end single digital card



āyushcā goa card will be a Aadhar or passport linked id smart card based on the India Technology Stack. The card will permit access to and payment on all transport facilities, parking, government services, toll charges, tourist attractions entry charge, use of electric carts in pedestrian areas etc. The card will be compatible with the Kodoy health card for continuous health monitoring.



end-to-end audio tour



āyushća goa app will facilitate virtual walk through the entire state using a virtual reality headgear like apple/oculus. It will also be possible to hear a running audio commentary in 65 languages from the app as a tourist moves around the state on foot, by cycle or in a motorised vehicle. The audio guide will describe the sights and stories connected with the location of the device.



state wide digital operating system



āyushća digital backbone will be hosted on the data centre proposed to be located in the Research University module of the āyushća campus. The “born digital” backbone would be “cloud native” so as to provide the lowest possible latency and highest possible responsiveness



competition

a health mission of megaSpheres

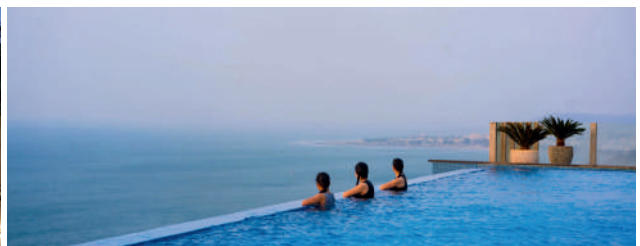




The āyushcā task force members studied a range of existing models – both domestic and international – in healthcare, alternative healthcare, wellness and hospitality in India and overseas.

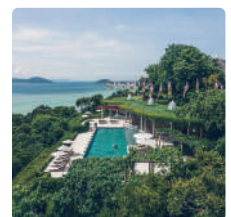
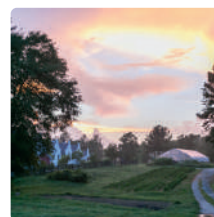
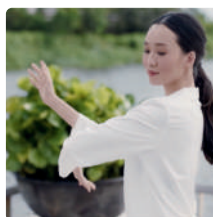
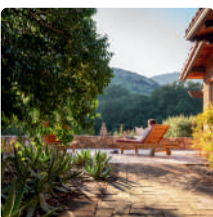
alternative health & wellness – India

Ananda, Rishikesh
Atmantan, Pune
Ayurvedagram, Bangalore
Indus Valley Ayurveda Centre, Mysore
Jindal Health farm, Bangalore
Kalari Kovilakam, Palakkad
Patanjali, Haridwar
Pema, Visakhapatnam
Shreyas Ayurvedic Rejuvenation Retreat
Six Senses, Fort Barwara
Somatheeram, Trivandrum
Soukya, Bangalore
Vana, Dehradun (now Six Senses Vana)
Vedic village, Kolkata



alternative health & wellness – international

Canyon Ranch, USA
ChivaSom, Thailand
Kamalaya, Thailand
Lanserhof, Germany, Austria
Naked Retreats, China
Rakxa, Thailand
Rancho La Puerta, Mexico
Serenbe, USA
Sha Wellness, Spain
The Vivamayr, Austria
Y01 (Yuvan Health) USA



hospitality

Four Seasons, Mumbai

Lodhi, Delhi

JW Marriott, Mumbai

Ritz Carlton, Pune

Taj Palace, Mumbai

Taj Rajkutir, Kolkatta

Taj Rishikesh, Rishikesh

The Oberoi, Rajvilas

The Oberoi & The Trident, Mumbai

The Oberoi, Delhi

The Oberoi, Kolkatta

The Oberoi, Sukhvilas

The Roseate, New Delhi

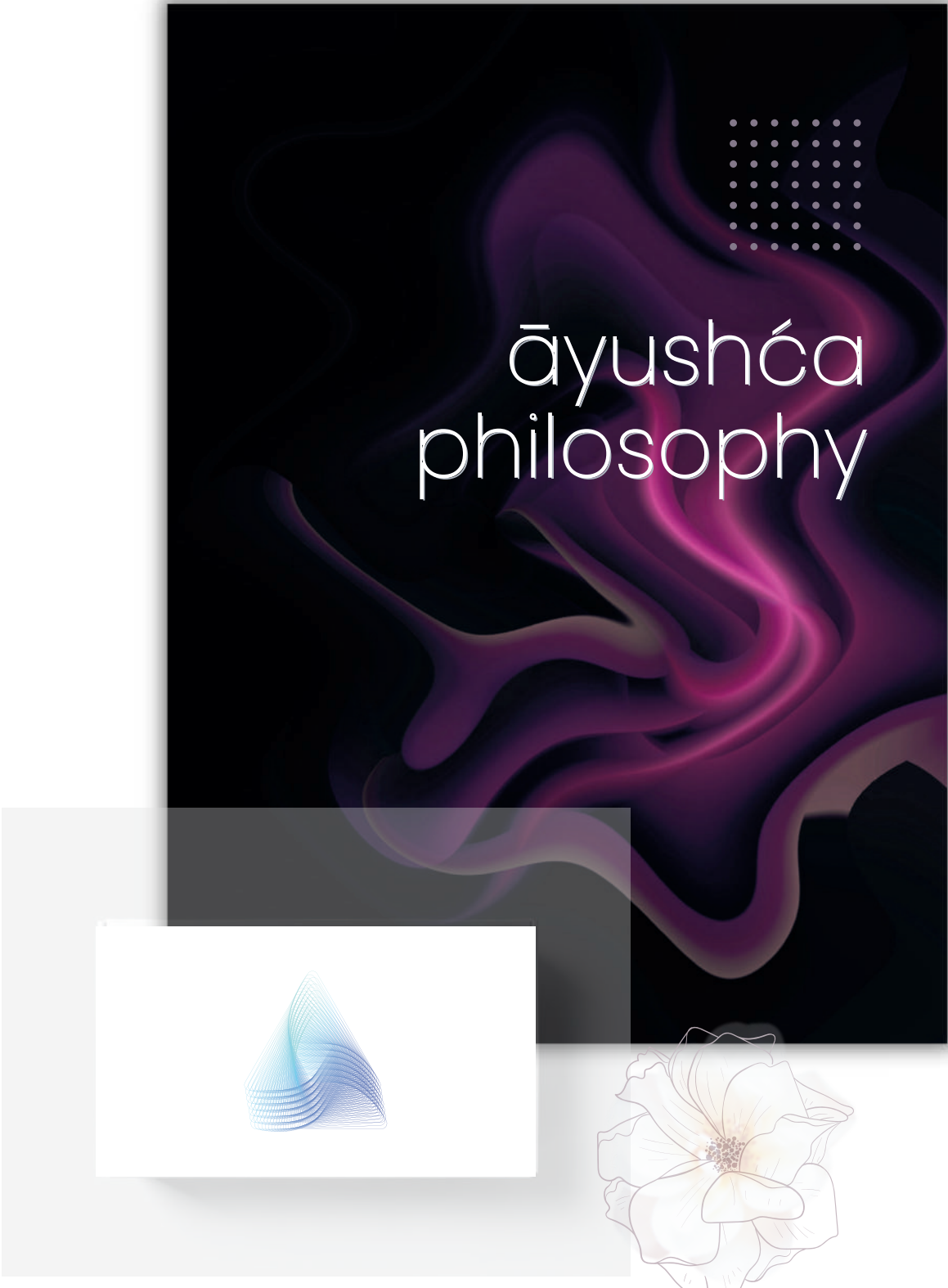
The Roseate Ganges, Rishikesh

healthcare

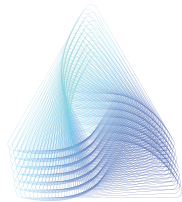
Bumrungrad, Thailand

John Hopkins, USA

Mayo, USA



āyush́ca philosophy

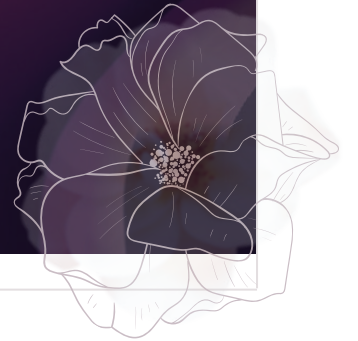


wellbeing / *swastha*

|| Samadoshahsamaagnishchasamadhathumalakriyah
Prasannaathmendriyamanaahswasthaithyabhidhiyathe ||

is a state of equilibrium [sama]
of the bio-energies [doshas]
tissues/organs [dhatu]
metabolism [agni]
metabolites [malakriyas]
and a state of
contentment and radiance [prasanna]
of the soul [atma] senses [indriyas]
and heart/emotions [mana]

. Sushruta Samhita.
Ayurveda text 600 BCE



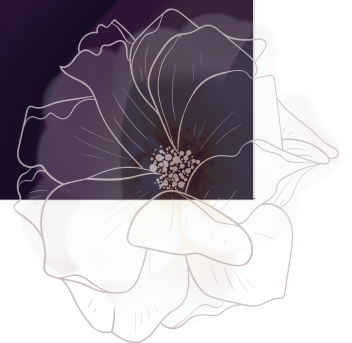


āyush́cas are conceptualised as
comprehensive ecosystems that are
conducive to wholesome living for
its communities

...

āyushcā's paradigm of
health/wellbeing is
multidimensional.

It includes physical, mental,
spiritual, social and
environmental dimensions.





a wellness approach to life

It is a dynamic process
of pursuing well-informed choices
and lifestyles that enhance our
holistic health and well-being.
It is to function optimally in
our own contexts.

It is rather our attitude to the gift of
life, and taking responsibility for our
health – to live it purposefully and
well.

Not selfishly, but honouring our
interconnectedness with other
beings, nature, and earth, our home.
It is a way of conscious living.



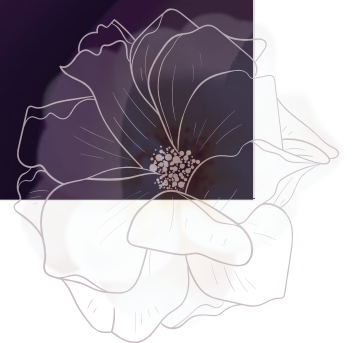
the differentiator



From the vantage point of authentic wellness, we can identify the crucial differentiator for the state's wellness positioning:

- Provide access to clinical-level therapeutics and data platforms to analyse the same
- help adopt healthy habits and practices to improve and sustain multidimensional health
- address all the aspects of wellness
- authentic experiences that connect to local community and culture responsibly

Creating awareness through curated experiences and opportunities for practical learning of healthy habits, nutrition, and lifestyle choices relevant to our personal contexts are essential parts of wellness facilitation. And form the core philosophy of āyushéa.





Legal disclaimer.

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This material is prepared by the Ayushca Project Management Team of the Forum. The Forum Council is manned by a group of alumni drawn from various mission organisations of the IIT Alumni Council. None of the Council members has received any remuneration for the services rendered. No sponsorship or fee has been received for the same.

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This is a strictly confidential document which can be shared with members of the investment committee of MegaFund and the various stakeholders and potential partners of the project.

2024@Forum dated 30.1.2024
Document ID: goa.iitcouncil.org



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Report authored by the
āyushā Project
Managment Unit of Forum

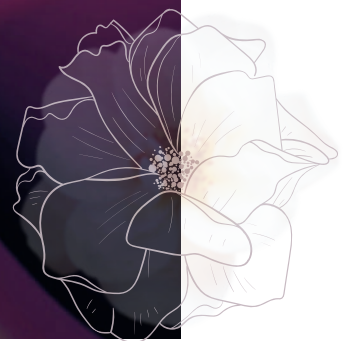
forums.org.in



. An IIT Alumni Council initiative .

goa.āyushā.org

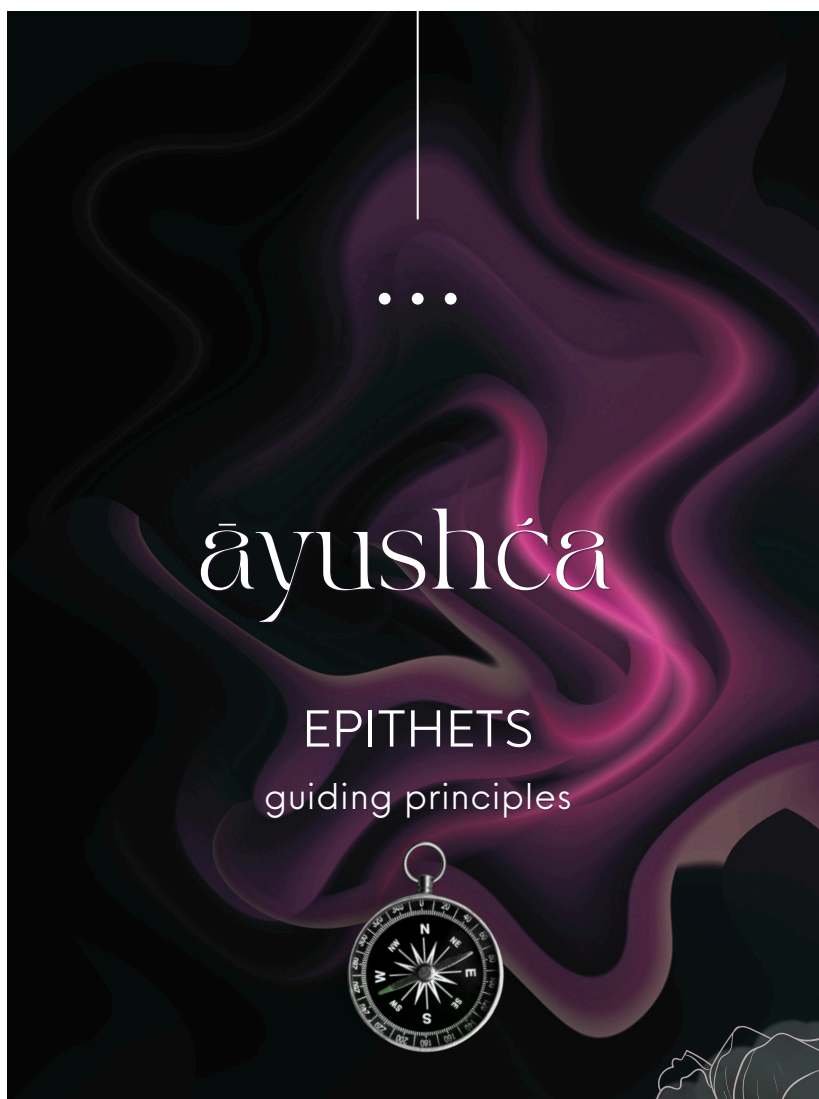
Designed by
ANYTIME MEDIA
for IIT Alumni Council
anytimemedia.in



ANNEXURE III

āyush́ca Epithets





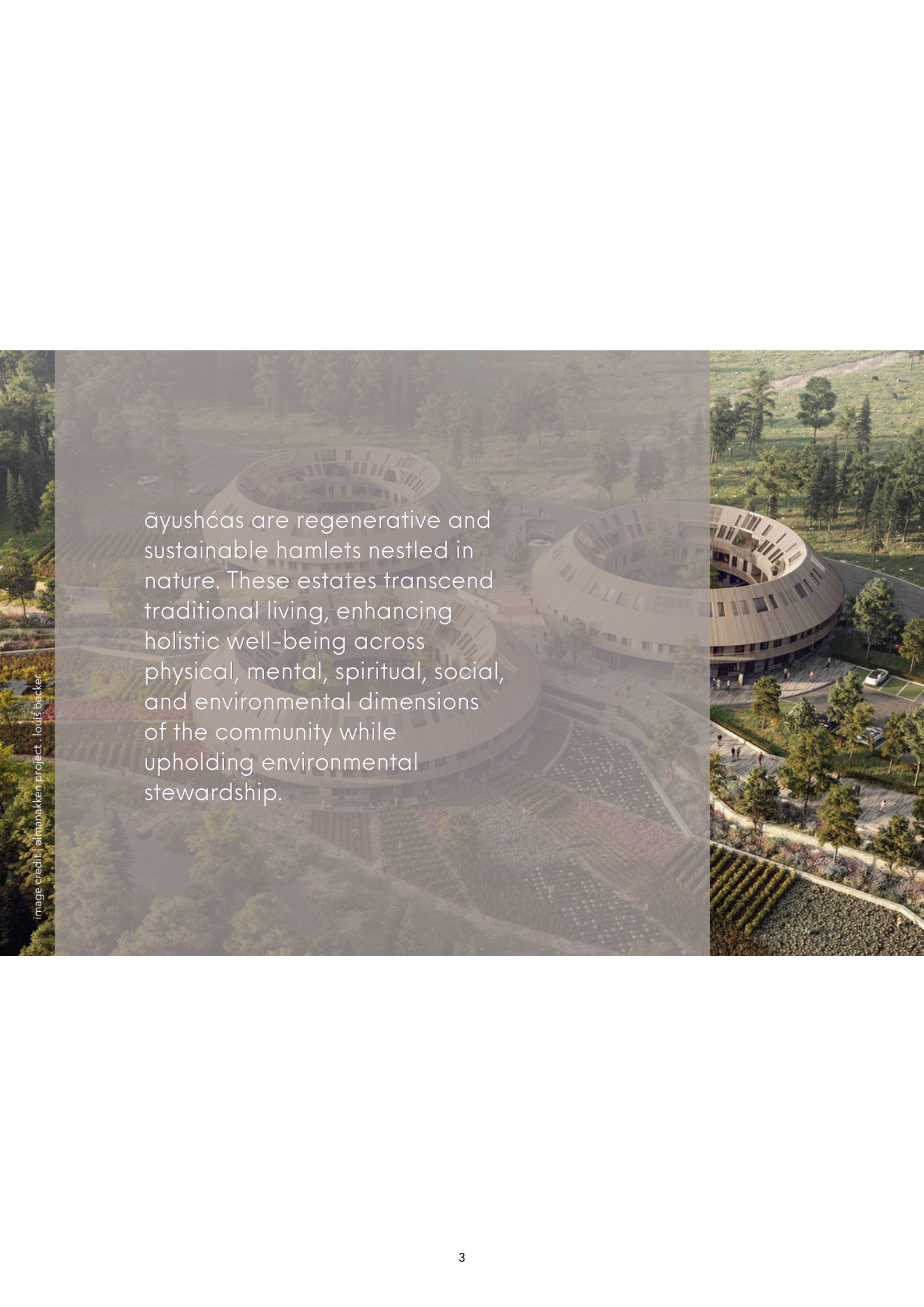


Non nobis solum nati sumus

Not for ourselves alone are we born

Marcus Tullius Cicero





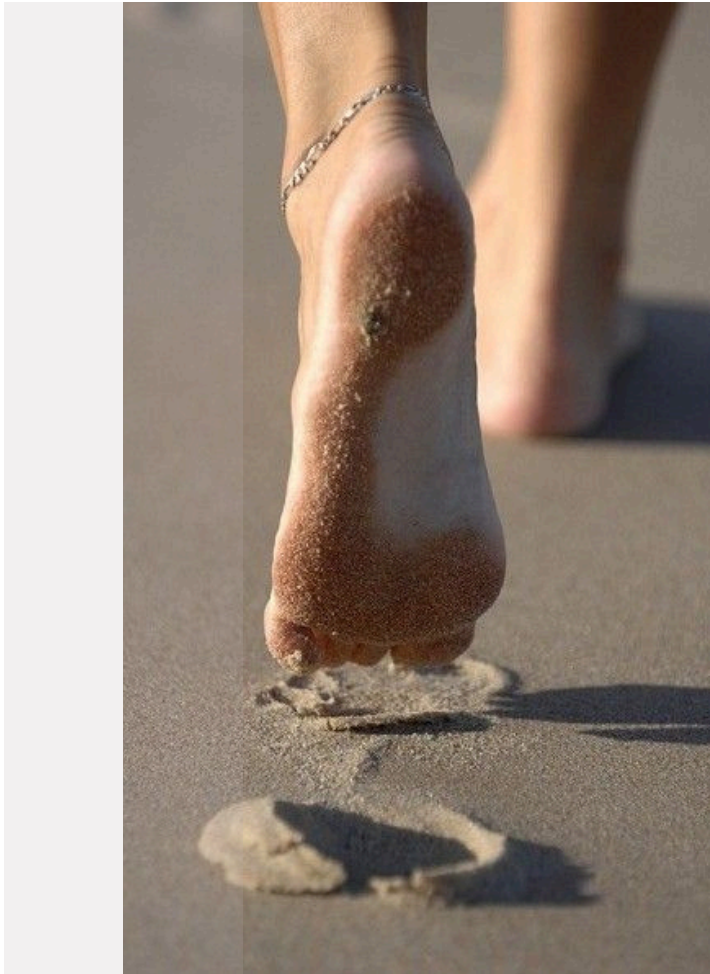
āyushcās are regenerative and sustainable hamlets nestled in nature. These estates transcend traditional living, enhancing holistic well-being across physical, mental, spiritual, social, and environmental dimensions of the community while upholding environmental stewardship.

image credit | almanakken project : louis becker



āyushća was conceptualised as part of the megaLab mission of the IIT Alumni Council to meet the need for safe and healthspan-enhancing infrastructures in a post-covid age.





Each hamlet is
thoughtfully designed
to enrich the lives of
everyone who dwells
within and around –
whether as guests,
residents, staff, or
local populace, living
in harmony with nature.



āyushća's wellbeing philosophy encompasses the physical, mental, spiritual, social, and environmental dimensions of life, their nuances and interconnectedness.

...

The core components of āyushća are designed to support these dimensions through dedicated zones, facilities, resources, and expert teams.

Each of them provide a unique experience, reflecting its distinct character, function and purpose; while maintaining a symbiotic relationship with others,



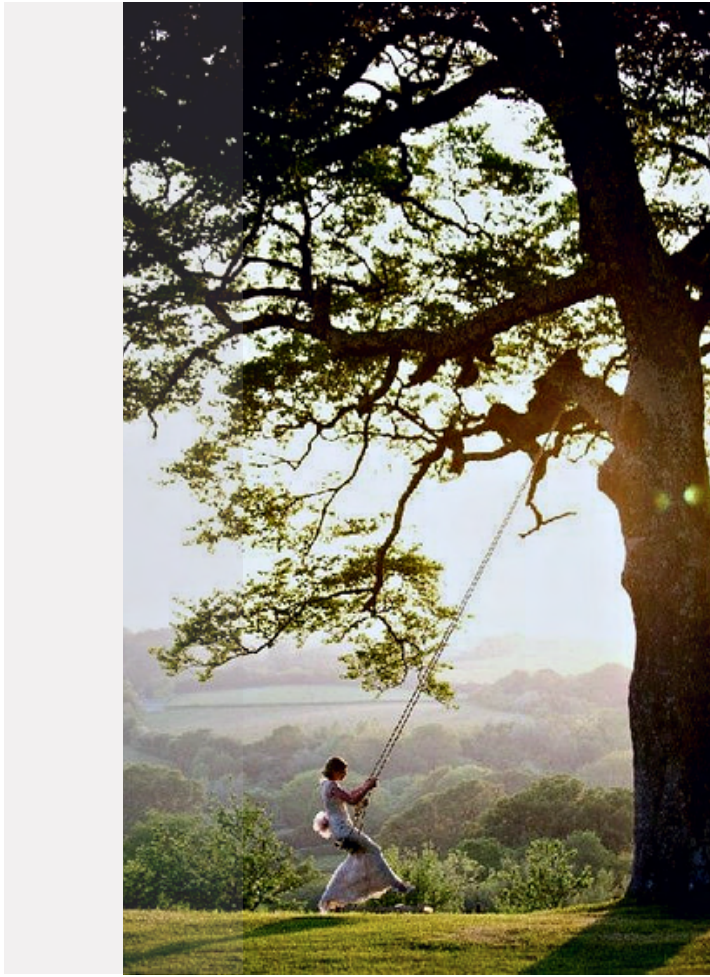
an ecosystem

The brand and the logo stands for, and reflect that āyushća is a multi-dimensional ecosystem, a catalyst and an explorative journey in itself, to healthful and active longevity...

The harmony and interplay of all the components of āyushća , including its natural environment, become the catalyst to healthy and long life, 'āyush' (Sanskrit). Brand āyushća reflects this theme.



āyushća estates intend to be
the rite of passage to a world
of social support & social
intimacy, a true luxury in our
disjointed digital age.



āyushća epithets

encapsulate its
philosophy and guiding
principles. Like a
compass, they guide and
help to recalibrate, to
stay on the course - true
to its founding intent.

These include...

Geo-cultural identity
Multidimensional
Multidisciplinary
Ecosystem
Systems design
Informed & participatory
measurable & progressive
Holistic
Nature
Microcosm
Ancient wisdom
Scientific validation
Regeneration
Self-sufficiency
Biology of belief
Well-being catalyst
Epigenetics
Bio-bubble
Food is medicine
Farm to fork
SLOW philosophy
Biodynamic
Community inclusion
Certified well-buildings

Geo-cultural identity: Celebrating local heritage, traditions and practices.

Multidimensional approach: that considers all spheres of existence (physical, mental, spiritual, social & environmental) for holistic living.

Multidisciplinary strategy: Integrating various systems and disciplines for higher levels of wellness.

Informed, participatory, measurable, progressive, and sustainable health paradigm.

The whole is greater than the sum of its parts, Embracing synergy and connectedness.

Nature as the greatest physician: Honouring the healing power of nature.

Respect for interconnectedness: Recognising the integral relationship between individuals, communities, and the environment.

Complete ecosystem: Self-contained.

Systems approach: Utilising holistic methods weaving in multiple areas.

Respect for ancient knowledge, validated by its historical and timeless resilience.

Augmenting ancient wisdom with cutting-edge technologies.

Commitment to scientific exploration for unvalidated traditional methods.

Holistic care combines modern science with time-tested wisdom.

Biology of belief: Recognising the impact of mindset on well-being.

Being a well-being catalyst: Conducive space and processes for positive transformation.

Epigenetic reprogramming: Enhanced health span through a nurturing environment.

Food as medicine: Role of nutrition in health.

Farm to fork and SLOW philosophy: Supporting sustainable, local food practices.

Environmental regeneration and stewardship: Commitment to ethical conservation, preservation and regeneration.

Biodynamic, natural farming & permaculture: ensuring sustainable food supply.

Fully self-generating, self-sufficient & resilient communities.

Cultural preservation and stewardship: Protecting and valuing traditions.

Community inclusion and integration: Fostering belonging and participation.

Certified well-buildings and processes: Ensuring high standards in wellness environments.

Bio-bubble for biowarfare or pandemics: Ensuring safety and sustenance.

**ecosystem -
systems approach**

āyushća commune comprises of all its residents, guests and the team. āyushća will take a systemic approach involving a holistic view, for the greatest benefit of the community it serves..

**the whole is greater
than sum of its parts**

āyushća is modelled after the belief that the whole is greater than the sum of its parts. Therefore, every component of the āyushća ecosystem, its functions and role is recognised as imperative and respected for its contribution to the grand scheme of things, irrespective of the mainstream views.

**conducive & catalytic
to epigenetic
repgromming**

Favourable epigenetic reprogramming for health and longevity is possible through a conducive and coordinated environment, for rapid results and to jumpstart a conscious health-promoting way of living. Choice of geographical location, design and development, and coordinated multi-speciality systems reflect this philosophy.

**environmental
regeneration**

Restoration, reparation, re-wilding and regeneration goals go beyond mere sustainability and self-reliance to include bio-dynamic and conservation farming methods, permaculture, clean and renewable energy..

**community inclusion
and integration**

Integration into the local community, adapting local cuisine elements, seasonal produce, supporting local arts and crafts and the artisans' work and livelihood and much more will be at work.

**certified buildings
and processes**

The estates, the buildings and its operations will be certified LEED platinum, WELL buildings and other relevant ones.

**biobubble -
pandemic ready**

The estates are designed to be isolated and self sufficient in terms of food, water, power and internet for survival in the next pandemic or biowarfare type situation.

āyushća the smart estates

āyushća is the umbrella brand for a series of smart estates being created globally by the IIT Alumni Council.

The āyushćas hold carefully curated infrastructure, systems and services which could serve as role models for other sustainable communities to learn from, follow and emulate.

āyushća residents are typically wellness seekers who respect, value and actively seek to be part of a community that is consciously, responsibly and symbiotically integrated with its surroundings, environment, nature and the community.

āyushća the essentials

An āyushća is a world in itself life-enhancing and fully self-sufficient. Every āyushća is configured to host and support infrastructure from health and research to water and connectivity. Thus, each āyushća is a test bed for diverse technologies and best practices, incorporating ancient wisdom to cutting-edge technologies. It is capable of being a self-defending bio-bubble in the event of any catastrophic event – planned or otherwise, with water, food and energy security.

An āyushća is designed to serve as a country-level nucleus for the growth of a sustainable habitat format that enables a high quality of life for its occupants. At the same time, it would help mitigate and reverse the adverse effects of climate change and global warming. We expect each āyushća to be the pride of the host country – serving as a role model and hotbed of innovation in wellness, climate change and sustainable communities.

āyushća the bigger picture

Whilst the short-term objective is to create an āyushća in each state of India and in each nation on the planet (195 Global āyushća).

Each āyushća is thus a test bed of diverse technologies and best practices – incorporating ancient wisdom as well as bleeding-edge technologies – in a wide range of application areas ranging from desalination and renewable energy to organic farming and perpetual power.

āyushća the locations

While each āyushća is distinct by its geo-cultural identity, they are perfectly aligned in its adherence to the vision, mission and philosophy of āyushća .

āyushća locations are currently categorised into three types: coastal, mountainous, and forested. Coastal āyushća locations, for instance, use seawater through innovative desalination techniques. This sustains the estate and enables natural and vertical farming and caters to various water requirements for a high quality of life, including thalasso pools and aqua circuits.

Each āyushća is being configured to be a role model – an important step forward in the reinvention of human habitats and a definitive reconfiguration of communities. The design at its most fundamental level resonates with the need for human survival in the face of adversities caused by climate change and global warming. Potential āyushća locations must meet these criteria.

In āyush́a hamlets, environments are meticulously cultivated to promote comprehensive health, encourage vibrant social interactions, inspire active contributions, and ensure active health span and longevity.

They deeply respect and integrate local heritage, arts, occupations, and cultural practices, all the while embedding advanced sustainable technologies and responsible methods that actively regenerate and revitalise the local ecosystems. This results in thriving, self-sufficient communities that stand as testaments to sustainable development.



At āyushća, we are profoundly committed to fostering economic sustainability. By working closely with local communities, we aim to strengthen their economic, educational, and cultural foundations.

We provide access to health and wellness resources and facilities, ensuring that every āyushća hamlet positively impacts its residents and the surrounding environment. Our initiatives are dedicated to preserving local traditions and biodiversity, assuring a prosperous future for all.

By nurturing resilient and environmentally conscious communities, sustainability and environmental stewardship, āyushća habitats are paradigms to protect and cherish our Earth for future generations.



“ dr ashok khosla

We must redefine growth to include the well-being of people and the planet, not just economic expansion.



Ashok Khosla is one of the world's leading environmental and sustainable development experts.

His work and insights emphasise the importance of integrating environmental stewardship with social equity and economic viability, advocating for a balanced and inclusive approach to development that benefits both people and the planet.

In 2002, he received the Sasakawa Prize, widely considered as the Nobel prize for environment.

As the founder of Development Alternatives, a social enterprise dedicated to promoting sustainable livelihoods, Dr Khosla has made significant contributions to environmental policy, sustainable technology, and resource management. He has also served as co-chair of the United Nations Environment Programme's (UNEP) International Resource Panel and President of the International Union for Conservation of Nature (IUCN). He is listed in the UN's prestigious Global 500 Roll of Honor.

Dr Khosla served on the boards of several global environmental organisations, including the Club of Rome, the International Institute for Sustainable Development and the World Union for Conservation. He was president of the Environmental Planning Commission of the International Union for the Conservation of Nature. He advised the United Nations Development Program, the World Bank, the World Resources Institute, the International Council of Scientific Unions and the Ministries of Environment, Science and Technology and Rural Development of India.

In addition to being the Founding Director of the Office of Environmental Planning and Coordination of India, Dr Khosla is the author of more than 300 professional papers, articles, and reports, including 30 official UNEP documents. He earned a PhD in experimental physics at Harvard University, USA.



The following quotes encapsulate his vision for sustainable development:

Sustainable development is not just an option; it is an imperative for our survival.

Sustainable development must be inclusive, ensuring that the benefits reach the poorest and most marginalised sections of society.

The true measure of development is not how much we produce, but how much we can enhance the quality of life without degrading our environment. Each of us has a responsibility to ensure that our actions today do not compromise the ability of future generations to meet their needs.

Appropriate technology is about finding solutions that are environmentally sound, economically viable, and socially acceptable. Innovation for sustainability must focus on creating systems that use resources efficiently and equitably. Empowering local communities with the tools and knowledge to manage their resources sustainably is key to long-term development.

Effective environmental policies require a holistic approach, integrating economic, social, and environmental objectives. Good governance is essential for sustainable development, as it ensures transparency, accountability, and participation from all stakeholders.

“



gunter
pauli

Let us not demand
more of the earth.
Let us do more with
what the Earth
provides.

Renowned entrepreneur and author, best known for his work in sustainable development and the creator of the Blue Economy concept.

It is an economic model whereby companies generate multiple benefits for business and society, taking inspiration from and contributing to nature's evolutionary and symbiotic path. Over recent years, Pauli has collected thousands of stories and examples of concrete initiatives, paving the way for a new generation of business leaders.



The following quotes encapsulate Gunter Pauli's vision for sustainable development and the creation of habitats that are in harmony with the natural world.

Sustainable habitats are not just about minimising harm; they are about creating a positive impact on the environment and society. In the pursuit of sustainable habitats, we must embrace a holistic approach that integrates economic, social, and environmental dimensions.

We must move from a model of scarcity and competition to one of abundance and collaboration, where sustainable habitats provide more than they take.

The most innovative solutions for sustainable habitats often come from observing and learning from nature's own systems and processes. The future of sustainable habitats lies in designing systems that work with nature, not against it, harnessing the power of local resources and biodiversity.

By rethinking how we design our living spaces, we can create habitats that support not only human life but also the ecosystems that sustain us. Sustainable habitats should be resilient, adaptable, and regenerative, ensuring that they can withstand and thrive amid environmental and social changes.

True sustainability in habitats is achieved when waste becomes a resource, energy is renewable, and communities thrive in harmony with their environment.

Our challenge is to create habitats that not only meet the needs of today but also preserve the potential for future generations to meet their own needs. Creating sustainable habitats is not just an environmental imperative; it's a moral and ethical responsibility to ensure a better quality of life for all.

“ dr hubby mathew

Our future depends on a collective journey, moving from fragmented actions to integrated, holistic strategies for planetary wellbeing.



Rev Dr Mathew, committed to social work and well-being, has been providing care and support to socially excluded and vulnerable communities for over four decades. Under his visionary leadership, Peermade Development Society came to known as a role model in social work.

He has developed several scalable community-led models for livelihood, enterprise development, skill development, organic cultivation, rural technology promotion, and Ayurveda healthcare, among other things. His extensive and far-reaching work has transformed the lives of individuals, families, groups, and communities in various contexts.

“



christina
watson

Each one of us can
play our part to
bridge the divide,
to heal and build
our collective
wellbeing.

As a seasoned wellness professional, Christina focuses on places that enhance the well-being of individuals and communities. She develops authentic wellness offerings, including personalised health programs and adaptable systems, integrating global expertise with local insights.

Through projects undertaken by WellnessLifestyle, she brings this valuable perspective, fostering connections to nature. Christina promotes a harmonious balance between people and their environment, offering innovative solutions that support overall wellness and conscious living.



A wellness establishment in whichever form, however big or small, cannot exist in isolation. Genuine care and engagement with its residents, team, community and environment play an essential role. Its authenticity and success also lie in making the neighbouring communities and its immediate environment better off than before.

This, to me, is a mark of a true wellness place or a destination.

Beyond the confines of studies and statistics exists the essence of creating a one-of-a-kind wellness facilitating model. It envisages a community not just as it is but as it could be. It demands an unwavering conviction against all odds, a willingness to break free from the ordinary and challenge the norms, all with a touch of altruism.

The āyush́ca estates are configured to provide pandemic-scale infrastructure to counter future pandemics or biowarfare. They are designed to act as a bio bubble with its own basic infrastructure for sustenance such as solar power, water systems and organic farming.

It is proposed to build an āyush́ca Estate in each state of India. The estates would collectively host over 10,000 Ayurveda + (AYUSH) beds for medical tourism with a focus on preventive medicine and healthy longevity. We aspire to build over twenty five estates over the next ten years.

The estates would house state-of-the-art theranostics along with essential and critical care. In normal times, the āyush́ca Estates are strictly for members. Membership is by invitation only.



The estates will provide the perfect ecological canvas based on epigenetic principles to work on reversing illness, ageing related decline, preventing future illness and aiding active longevity - in the current context of global warming, mounting and all pervasive pollution, prolonged stress, social disruption and shifting paradigms.



Simply 'being' with oneself & other beings in nature







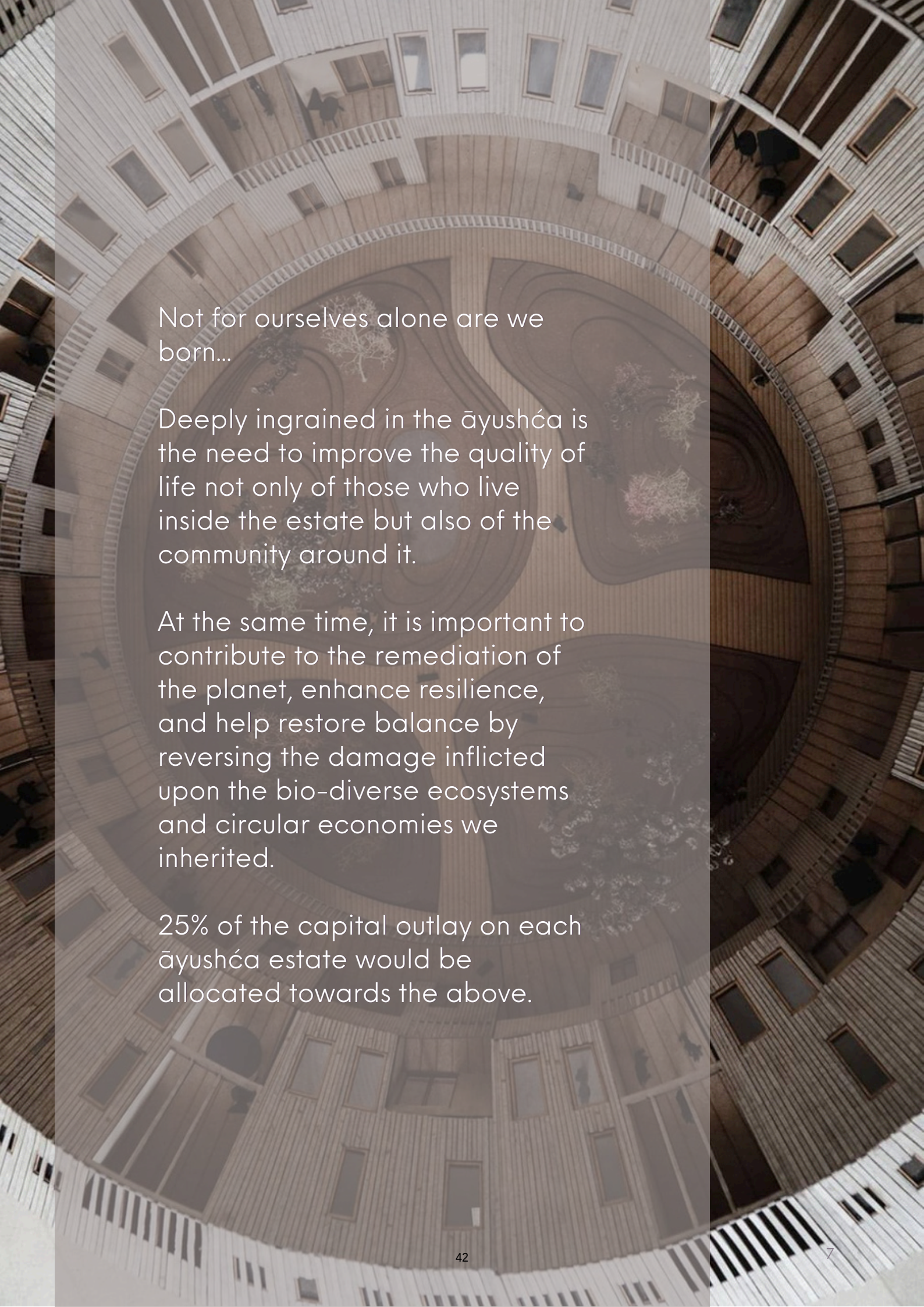


Non nobis solum nati sumus

Not for ourselves alone are we born

Marcus Tullius Cicero





Not for ourselves alone are we
born...

Deeply ingrained in the āyushcá is
the need to improve the quality of
life not only of those who live
inside the estate but also of the
community around it.

At the same time, it is important to
contribute to the remediation of
the planet, enhance resilience,
and help restore balance by
reversing the damage inflicted
upon the bio-diverse ecosystems
and circular economies we
inherited.

25% of the capital outlay on each
āyushcá estate would be
allocated towards the above.

In the case of ayushca by the Sea being built in Goa, the core community mission of the estate is to make a measurable impact on the quality of life for both locals and tourists by improving the quality, efficiency, accessibility and affordability of the public transport service.

This will help decongest the roads, improve the air quality index, and enhance the revenue of local businesses. It will also help attract more tourists and thus increase the state's tourism-related GDP.

Using state-of-the-art technologies, it will be possible to introduce congestion and fossil fuel vehicle tolls to generate the revenues required to support a highly cost-effective transportation service.

