

TRANSPORT HUB
a CSR initiative of āyushcā GOA



M7 VOLUME THREE

TRANSPORT HUB PRE CONSULTATION



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
Community Outreach of
the āyushcā 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

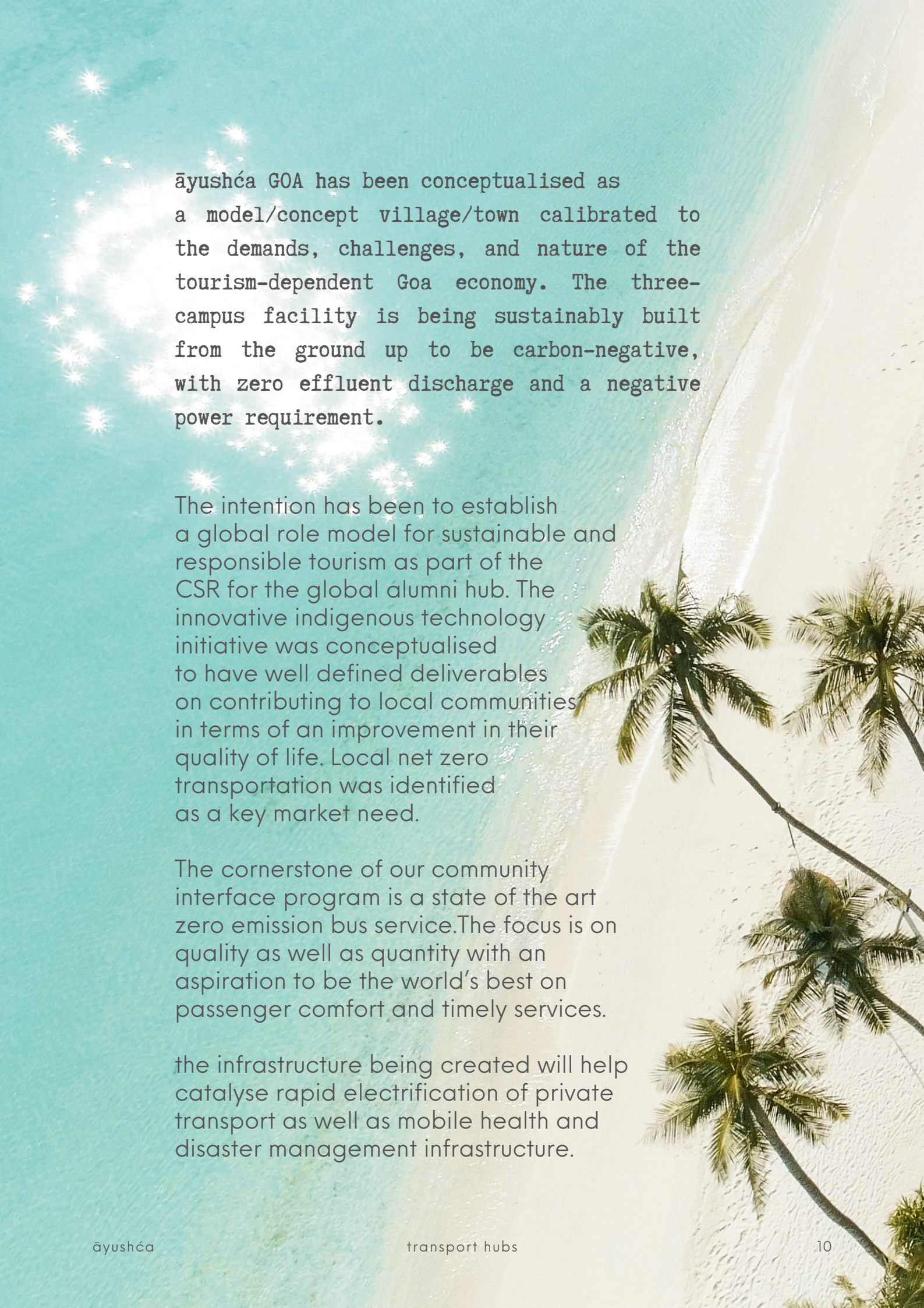
Tentative start date for the project
August 15, 2024

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



āyushcā 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 1500 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.





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.



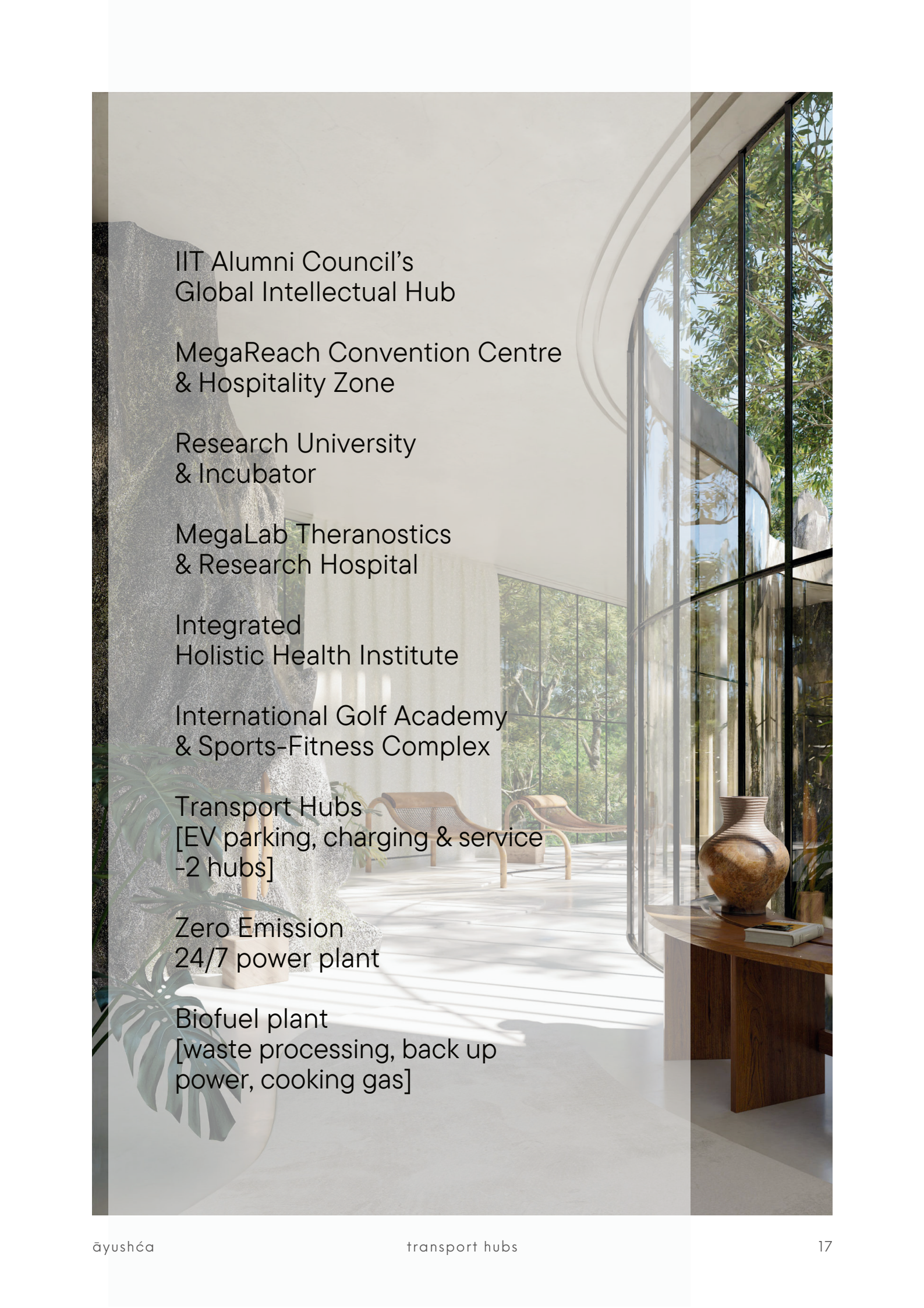
2

Revised financials

āyushća GOA

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's a curved wall with large glass windows that look out onto greenery. In the foreground, a wooden table holds a large, textured brown vase. The floor is light-colored and reflective. The overall atmosphere is clean and architectural.

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.



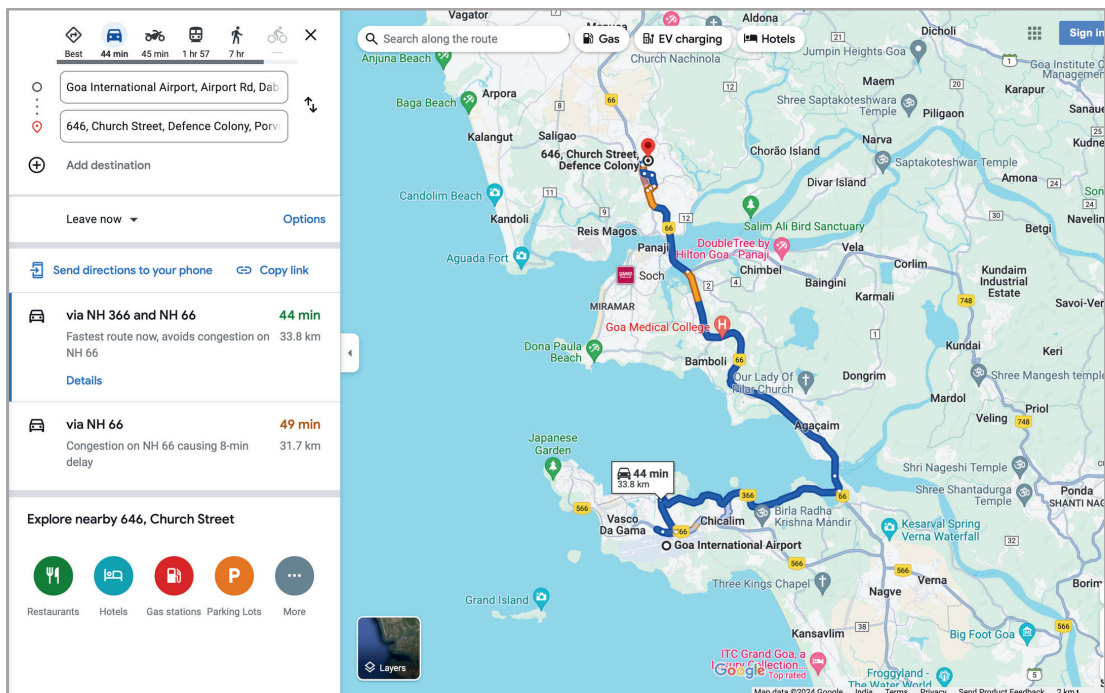
As per interim findings of the DPR study, the following is recommended over the first 18 months starting 15.8.2024:

Total electric buses: 1200

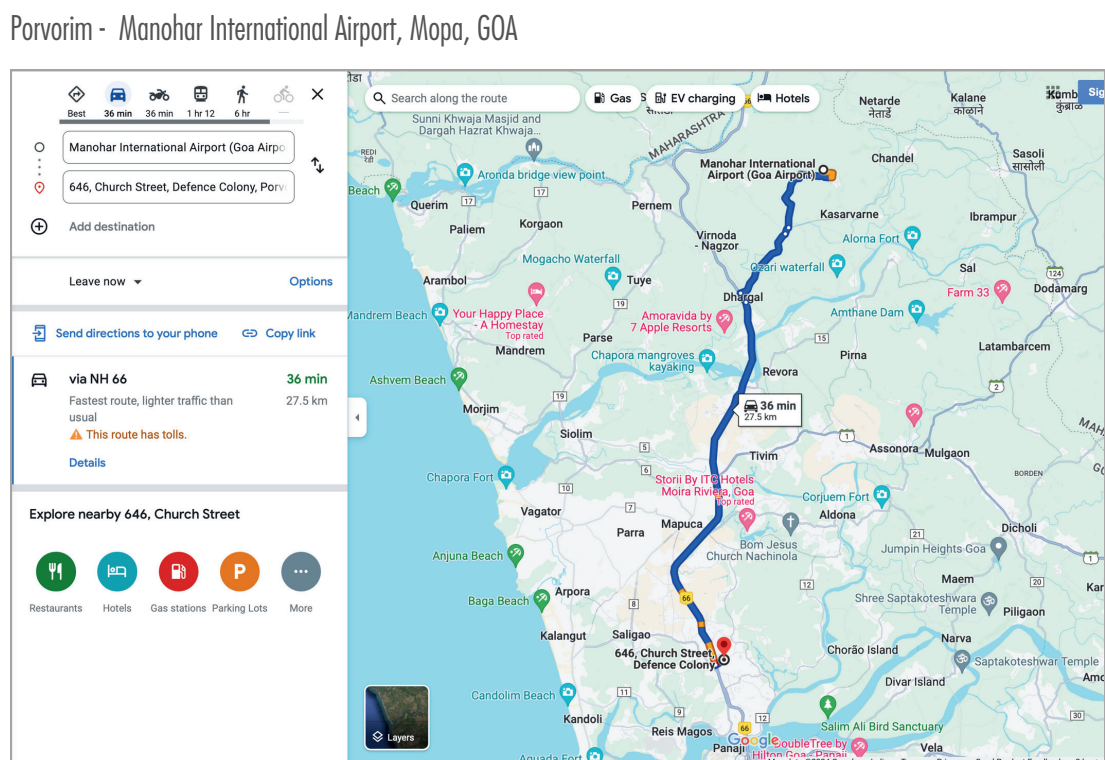
Bus Hubs:

- 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)

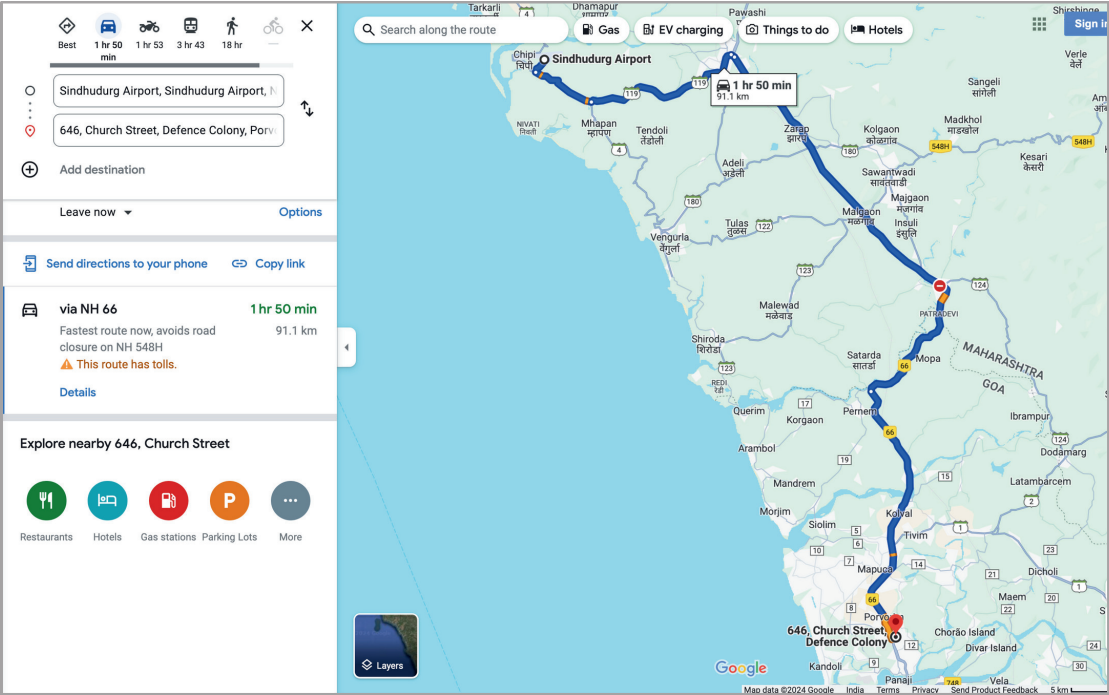
The following pages give the distances of the various locations from the identified bus port location in Porvorim (identified as 646 Church Street). The Northern Hub is identified as Sindhudurg Airport (2 hours away) and the southern hub as Lalit Hotel and Golf Spa (2 Hours away). The airports and station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



Porvorim - Goa International Airport, Dabolim, GOA

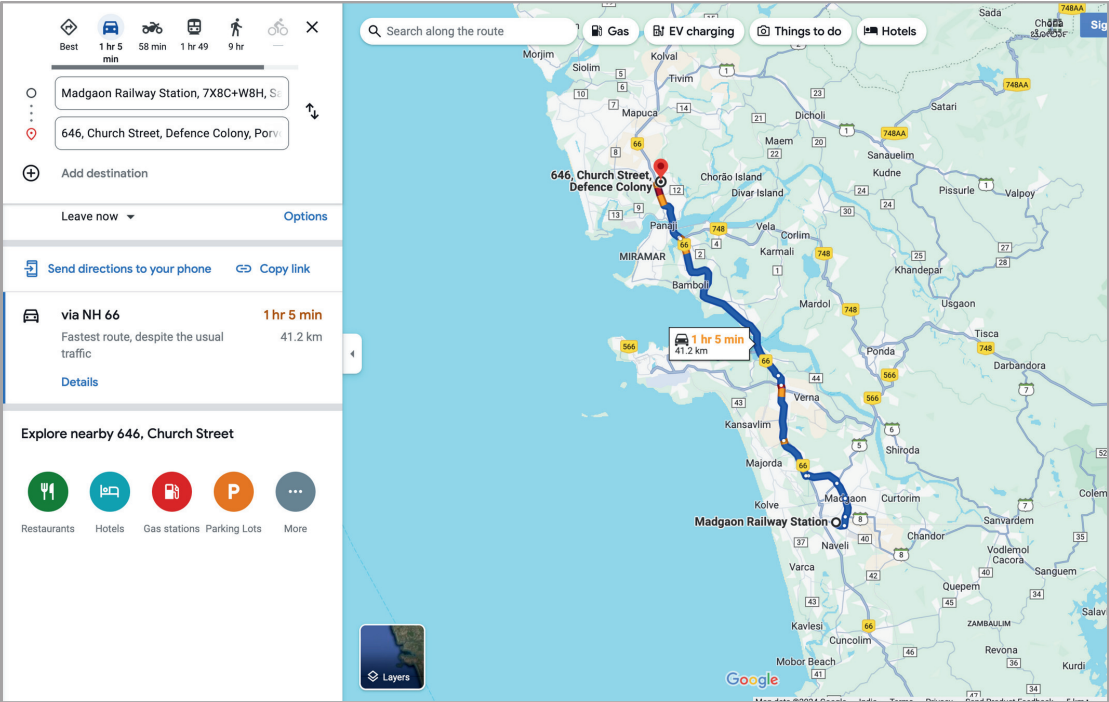


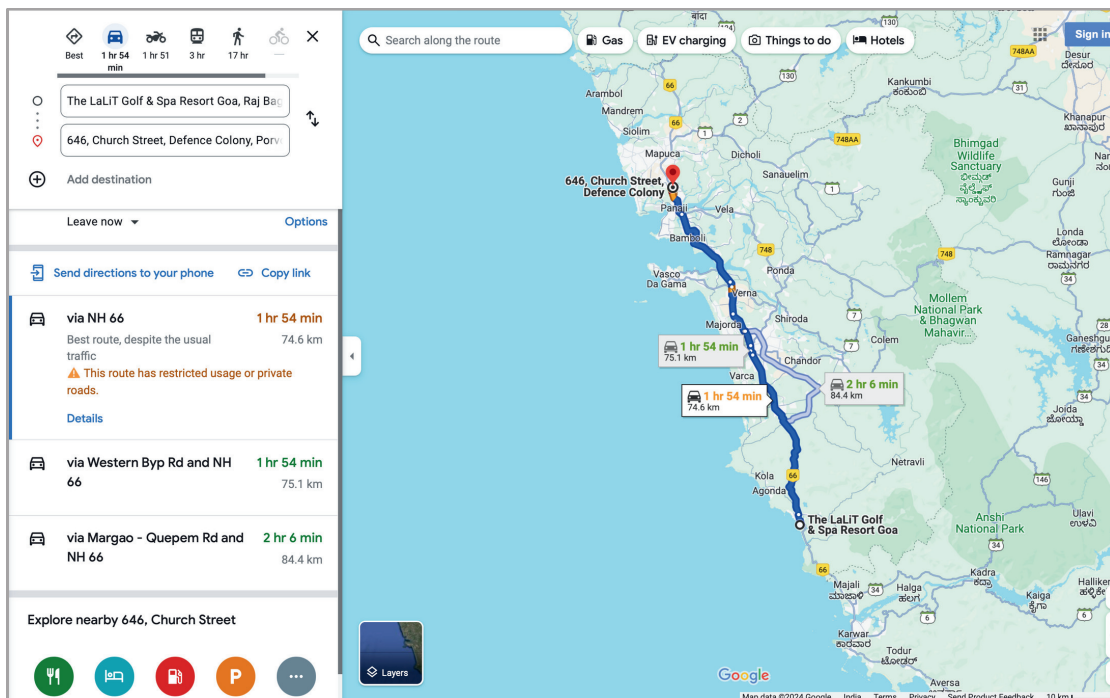
Porvorim - Manohar International Airport, Mopa, GOA



Porvorim - Sindhudurg Airport, Chipi, MAH

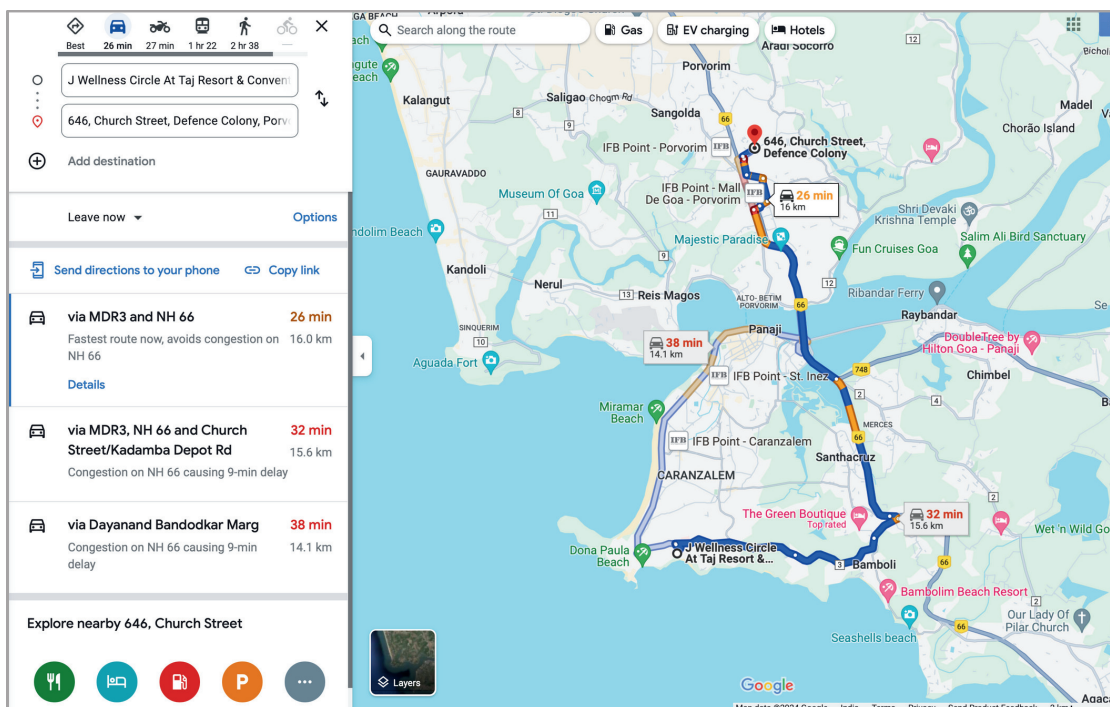
Porvorim - Madgaon Railway Station, Madgaon, GOA





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

Porvorim - 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

Vadodara: 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

Follow us on Google News

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 24,284sqm 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 (...

Welcome to BSABT, BHUBANESWAR

BSABT, Bhubaneswar

Babasaheb Bhimrao Ambedkar Bus Terminal
Government of Odisha

Home About Us Facilities Information Center Tourist Places Notice & Advertisement Media Contact Us Live Bus Schedule Book Tickets

Welcome to BSABT, BHUBANESWAR

The Indian EXPRESS
JOURNALISM OF COURAGE

Subscribe Sign In

Home ePaper Cities India Explained Opinion E

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

Follow Us



02 /B Vadodara bus station, Vadodara



Inaugurated by Prime Minister Narendra Modi, the Vadodara 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. Vadodara'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.

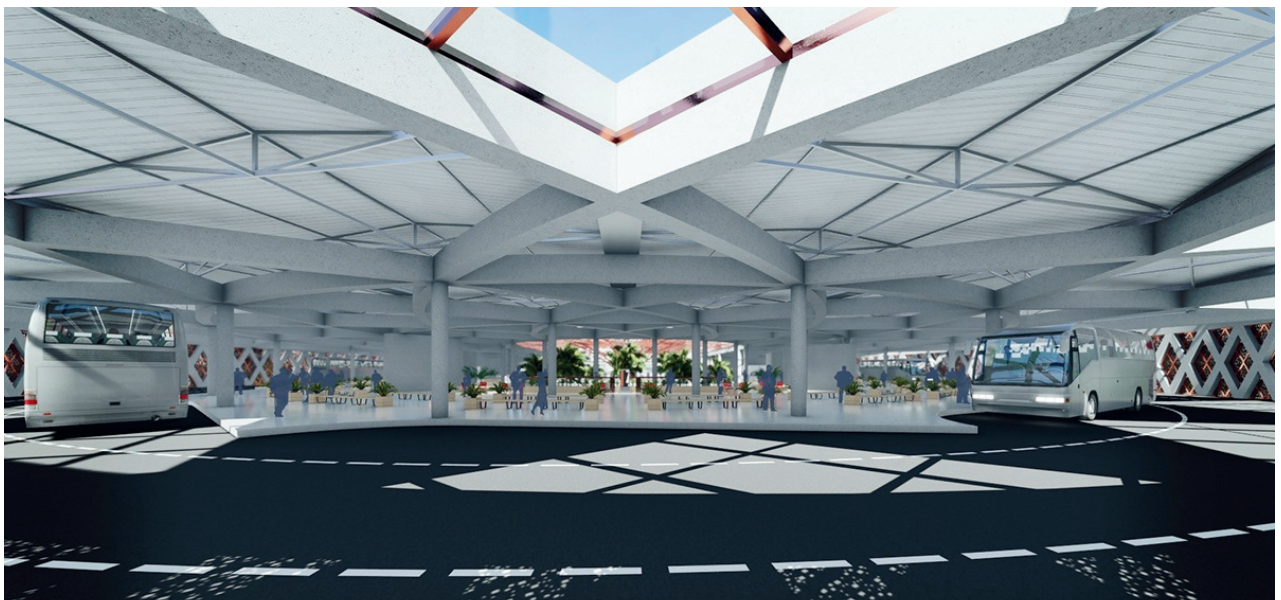
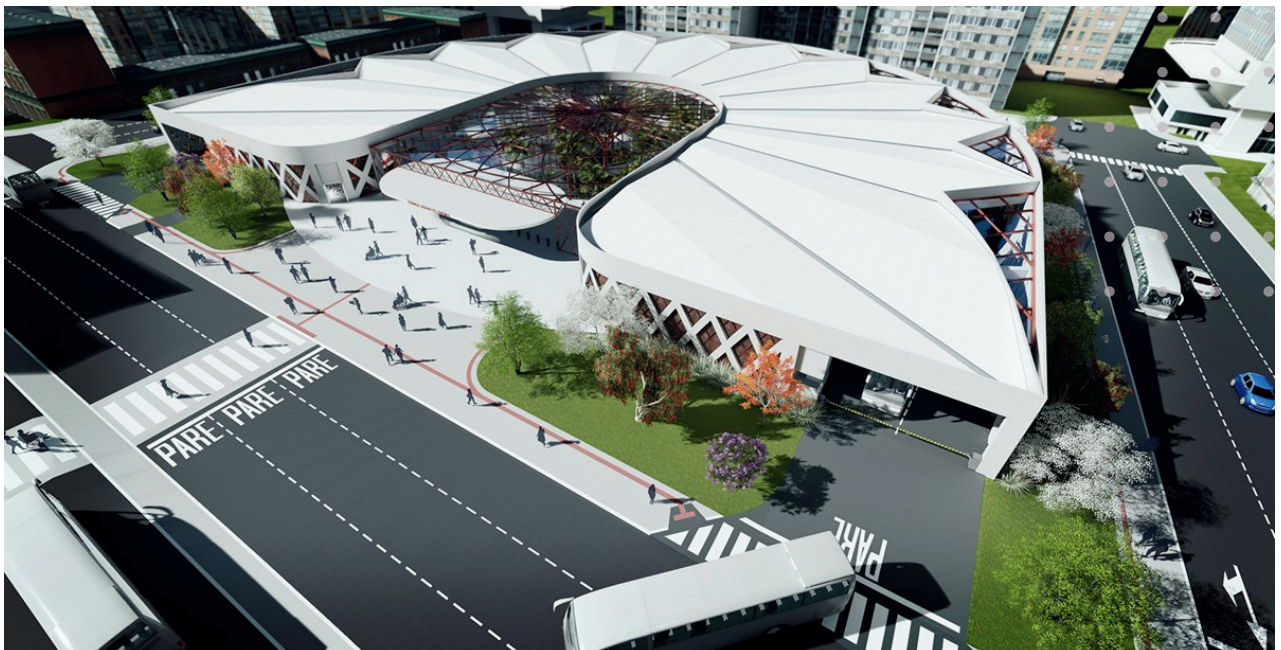






The Porvorim hub spread over close to one million square feet has been conceived of as the main tourism hub with direct loop route connectivity to large hotels, both airports, railway stations, leisure areas, tourism landmarks, beaches etc.

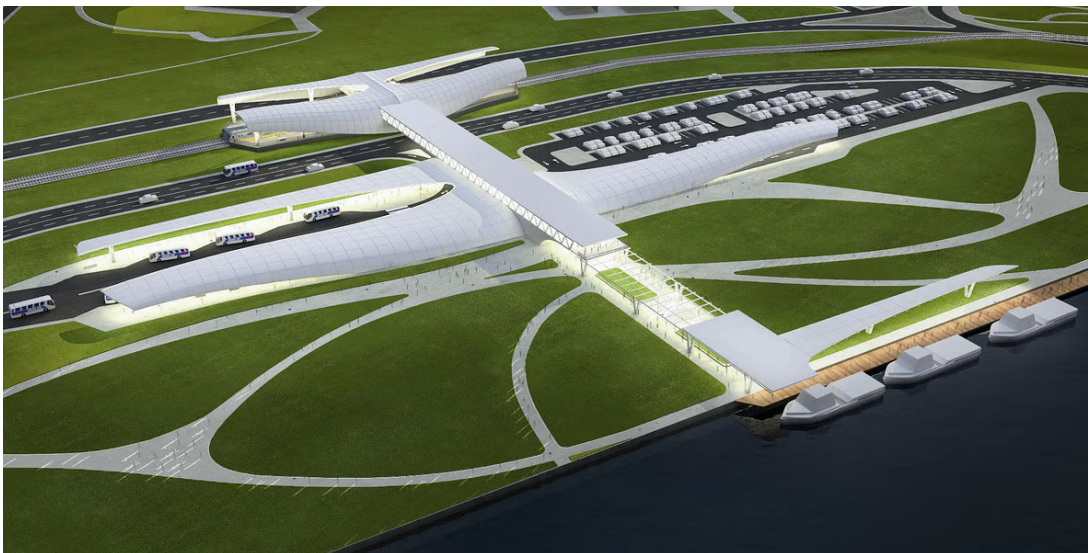






The Sourthern hub, spread over fifty acres near the Lalit Hotel Golf Course and Helipad, has been conceived as a multimodal hub connecting the virtual metro, luxury buses, and water transport.







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
E-302, EAST OF KALASH, NEW DELHI-65
PH: 011-26175020, 26175030, FAX: 26175011
e-mail: 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.

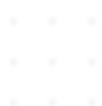
transport hub project cost

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



GOVERNMENT TARGETS TO REPLACE 10,000 DIESEL BUSES WITH ELECTRIC ONES BY 2027 The green mobility outlined in the National Electric Bus Program (NEBP) launched in 2021, garners international support, being a key part of India's push at the India Pavilion, Shanghai for the 2024 World Urban Mobility Summit. The NEBP is a collaborative finance mechanism, a \$100 million fund designed to support the expansion of the green mobility sector.

The Joint Finance Mechanism: Bridging the Gap

The \$100 million fund aims to provide crucial financial support for manufacturers, helping to expand electric production. By offering loans, the fund mitigates risks for those to invest in electric buses, fostering the growth of electric vehicle (EV) sector in India. This joint initiative is made possible through a collaboration between the 28 member governments, with \$100 million contributed by the 28 governments and other strategic groups, complemented by \$100 million from the Indian government.

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 ebuses 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



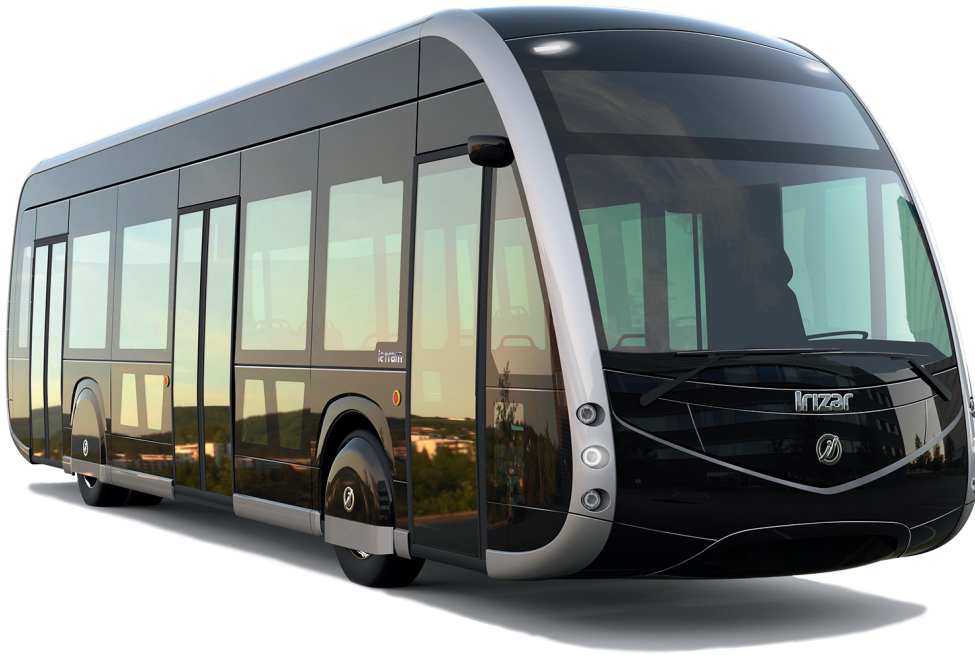
IIT Alumni Council proposes to catalyse the creation of a 400+ fleet of comfort buses which will replace the ageing fossil fuel buses currently used by Kadambathur Transport Corporation. These buses would be charged and maintained at the transport hubs. Their movement will also be monitored from the 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.



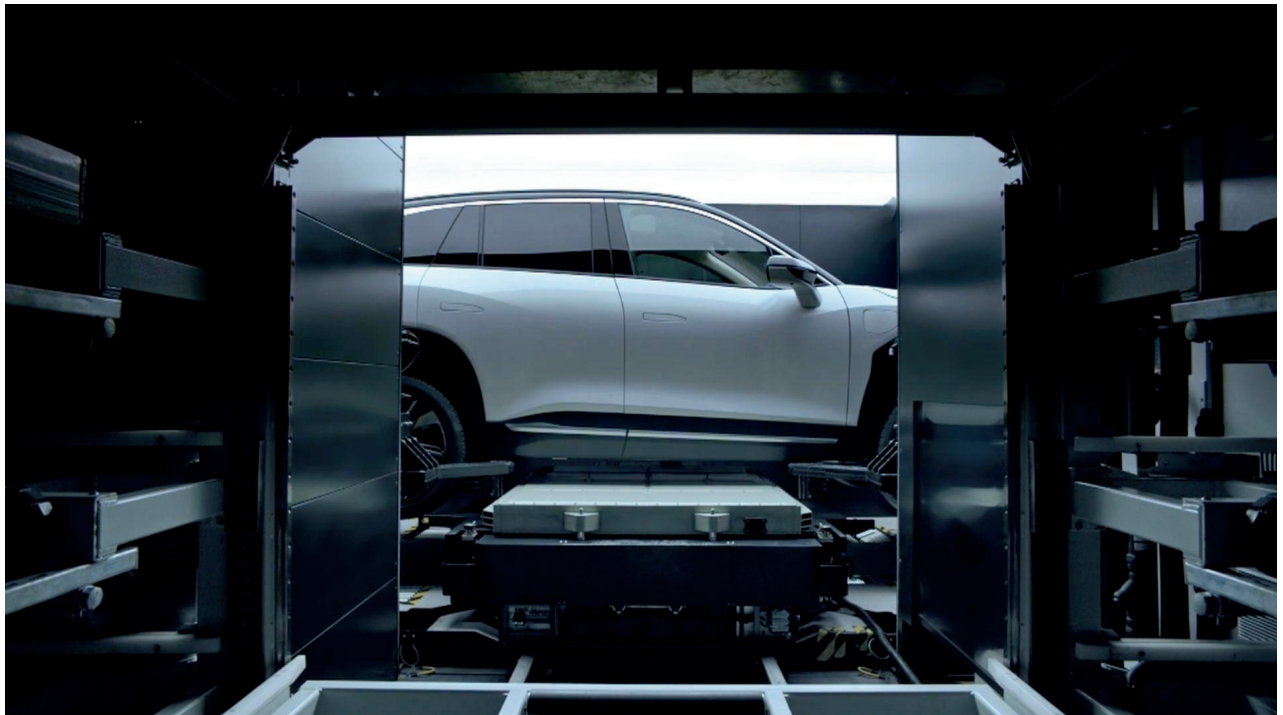


Drive-in swift battery swapping system by Ionique
< 5 minutes





ionique



4

digital

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





end-to-end single digital card

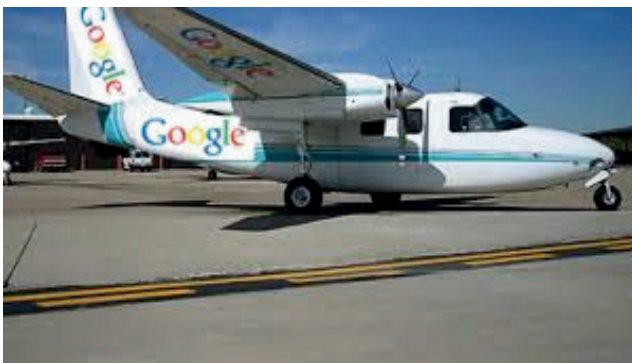


āyushcā goa card will be a Aadhar or passport linked id smart card based on the India Technology Stack. The card will permit access to and payment on all transport facilities, parking, government services, toll charges, tourist attractions entry charge, use of electric carts in pedestrian areas etc.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

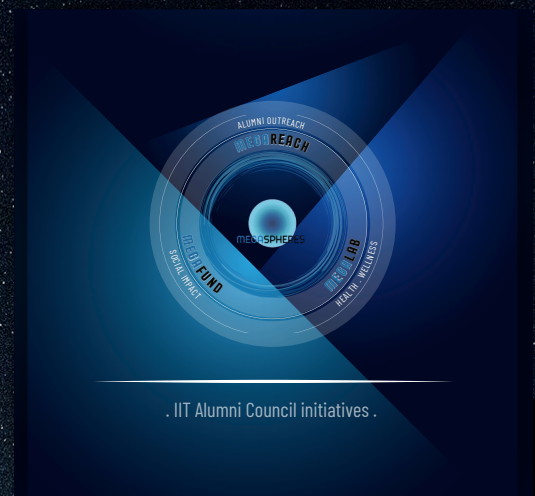


The megaSpheres initiative includes three mission organisations, and three mission facilitators synchronised to achieve its goal of accelerated socio-economic progress through technological and financial interventions.

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



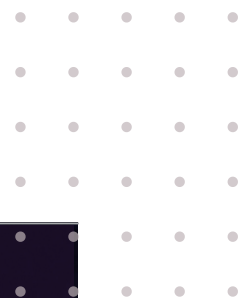


APPLIED RESEARCH ORGANISATION

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 āyushća.





LEGAL DISCLAIMER

Forum refers to PanIIT Forum, an Indian non-profit company registered under Section 8 of the Companies Act, its network of partner member firms, charter members and their related entities. Forum and each of its member firms are legally separate and independent entities.

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.

This material (including any information contained in it) is intended to provide general information on a particular subject(s) and is not an exhaustive professional opinion of any kind. The document has been published by Anytime Media Pvt Ltd on behalf of the Forum. This is a confidential document and is only intended for the use of the recipients to whom it is marked. It may not be copied, reproduced, printed or distributed without the written consent of the Forum.

This document contains pictorial representations which are solely for the purpose of illustration. They may not be actual images of any location, product or site. This document is based on a preliminary study and the data contained herein including financial estimates may undergo substantial changes based on the detailed project report. The project is yet to obtain requisite approvals which may include but are not limited to building plan approvals, land allotment and registration, investment committee final approvals, regulatory approvals etc.

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



Report authored by the
āyushcā Project Management Unit
of Forum

forums.org.in



. an IIT Alumni Council initiative .

[goa.ayushcā.org](http://goa.ayushca.org)

Designed by
ANYTIME MEDIA
for IIT Alumni Council
anytimemedia.in

