SUSTAINABLE URBAN TRANSPORT HERITAGE IN PHUKET





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new urban experience highlighting Phuket's unique heritage
harmony with the natural environment
multi-dimensional project involving multi-level coordination

& HERITAGE IN **PHUKET**

Sustainable mobility in Phuk SUTRHE PROJECT HIGHLIGHTS

To face the challenges of urban growth, pollution and congestion, the authorities of Phuket province and the Thai Government want to develop more sustainable mobility on the island. To support them, this study, which was conducted between February 2020 and January 2021,

aims to propose recommendations for the development of sustainable urban mobility systems in Phuket. This document presents the conclusions of this work. As the country second largest tourist destination, Phuket attracts yearly an increasing number of not only tourists but also new residents. It results in pressure on the basic infrastructures such as water supply, waste management and above all, the transport networks. Indeed, the road network is heavily congested even during regular times, while the motorcycles and private cars are still the dominant and the favourite individual transport modes in Phuket. Public transport in Phuket has in fact slowly developed, thus not yet reach the level to offer an efficient alternative for commuters.



IN PHUKET

Fully aware of the challenge that lies ahead, the Thai Government has been studying the possibility to set up a mass-transit solution in this important secondary city. The Phuket LRT project preparation has started few years ago and currently undergo additional technical fine-tuning before getting final approval. Once implemented, the LRT would be located on the main North-South corridor of Phuket Island, the NH402, where most of the traffic congestions arise.

Developing mass transit corridors typically offers a strategic opportunity for renewing and modernising an entire city, but the implementation of the first corridor often faces numerous challenges.

The Sustainable Urban Transport and Heritage Project (SUTRHE Project) aims to support the Thai Government at preparing a comprehensive mobility project for Phuket, taking into account several key considerations. Indeed, SUTRHE Project is not only a mobility study but also a projected reflection of how the inhabitants of Phuket would live and move in the coming years. How would people commute to work, to schools, to shopping areas in 2030, in safer environment, with an acceptable level of congestion and, possibly, with lower levels of pollution and CO_2 emissions?

Thinkinc

ON A LONG-TERM BASIS

SUTRHE is also a project aiming to highlight how Phuket and other secondary cities facing similar urban sprawl challenges could prepare themselves and take advantage of the future mobility projects, by pondering questions for the longterm vision, such as: how can the urban landscape be improved once the main mobility corridors are implemented? How can the historical and natural heritage be preserved and echo the local identity and attractiveness? What kind of new generation of urban projects might blossom along the mobility corridors? How can life quality increase in the coming years? These important questions have been addressed with concrete examples in this study and most interestingly, SUTRHE has demonstrated how other cost-efficient alternative such as cable car technology could be integrated to complement the existing LRT project. SUTRHE has elaborated a benchmark of international cable car projects. exploring international and operational schemes, in order to draw tailormade proposals for Phuket. It is important to keep in mind that SUTRHE study serves as a proposal to enrich the current ongoing LRT project for Thai authority and the final decision on the LRT implementation remains at the relevant authorities.

French expertise MOBILISED

Learning from international cases, in particular the French know-how and urban integration in tramways and/or LRT projects, which mainly focus on people and heritage preservation as advocated by France and AFD, SUTRHE has shared with all stakeholders involved in infrastructure development in Phuket, through workshops and trainings, insights to develop integrated and multi-dimensional projects.





From a Thai–French partnership TO A MULTI-STAKEHOLDER COOPERATION

AGENCE FRANÇAISE DE DEVELOPPEMENT Agence Francaise de Developpement (AFD) is a public entity which finances, supports and expedites transitions towards a more just and sustainable world. In 2016, Thai authorities expressed an interest to develop a technical cooperation support from AFD addressing important issues in urban planning and mobility. A series of three thematic workshops, co-organised with the Public Debt Management Office (under the Ministry of Finance) were financed by AFD during the years 2016-2017, leading to the preparation of the implementation of the SUTRHE Project for Phuket, launched in 2019 in partnership with the Office of Transport and Traffic Policy and Planning (OTP) under the Ministry of Transport (MoT).



The Office of Transport and Traffic Policy and Planning (OTP) is the planning agency in charge of preparing strategic transport and traffic plans and formulating transport policies. OTP was responsible in 2013 for conducting the Feasibility Study of the tourism railway system in the Southern regions of Surat Thani, Phang Nga and Phuket, including the Phuket Mass Transit System. This first investigation enabled to assure the Thai authorities towards the choice of the LRT for Phuket. In 2019, OTP launched an official request to AFD seeking its continuous support to Thai authorities on Phuket LRT project towards a global and integrated sustainable Phuket mobility project. OTP is the focal point

for SUTRHE project, and MoT set up and chair a dedicated Steering

A multi-stakeholder

STEERING COMMITTEE



Committee gathering all relevant stakeholders.

Evolution towards the shaping

MARCH

Creation of a Steering

Steering Committee #1.

Creation of a Technical

include OTP, MRTA, AFD

LRT feasibility study and

integrate the two studies.

Working Group that

to join forces on the

and consultants,

Committee.

OF AN INTEGRATED MOBILITY PROJECT FOR PHUKET



Regular meetings gathering all the stakeholders involved in mobility and urban planning of Phuket.



DECEMBER

Steering Committee #4.

Decision to refine the ambitious scenario with the study of the LRT between the Airport and Chalong and the East-West corridor linking Phuket Town and Patong.

JUNE

- Decision to focus SUTRHE work on the downtown section of the LRT project.
- Deliverable #2 Transport
 System Definition –

part 1 I Confirmation of the relevancy of LRT system and cable car system for Phuket.

AUGUST

- Workshop with local stakeholders.
- Steering Committee #2.
- Airport-Chalong LRT
 public hearing organised
 by MRTA in Phuket.

OCTOBER

• **Training sessions** on heritage protection and tactical urbanism.

FEBRUARY

 Settlement of the local coordinator for SUTRHE and on-site mission of french experts. First technical meetings with local stakeholders. Official launch of SUTRHE Project.

APRIL

Deliverable #1 Context
 Report I Understanding of
 the context in regards with
 the other mobility projects
 considered on the territory.

JULY

 Traffic counts and origin and destination **surveys** at different intersections. Household surveys on 2,423 persons spread over the island of Phuket.

SEPTEMBER

- Deliverable #3 Data Collection Report | Analysis of all the surveys conducted in July.
- Steering Committee #3 which was a special session convened by the request of Permanent Secretary of MoT focusing on cable car institutional and regulatory frameworks and heritage conservation in Phuket Old Town.

NOVEMBER

• Deliverable #4 Transport System Definition – part 2 I Comparison of mobility

scenarios in terms of impacts on traffic, possible ridership, GHG emission, impacts on the affordability for the households, and impacts on urban developments.

- Training sessions on LRT atgrade operation and cable car systems.
- Workshop with local stakeholders. Presentation of 3 possible mobility scenarios for the future of Phuket: a Business-As-Usual scenario, an alternative scenario, an ambitious scenario.

JANUARY

- Deliverable #5 Final integrated
 Project | Refined study of the
 preferred scenario.
- Training sessions on TOD principles and update of the Traffic Forecast Model.
- Workshop with local stakeholders presenting the outcomes of the comprehensive study.
- Steering Committee #5. Closure of SUTRHE project.

A CONTINUOUS PARTICIPATORY PROCESS

- 4 WORKSHOPS
- 5 STEERING COMMITTEE MEETINGS
- 6 TECHNICAL TRAINING SESSIONS
- 2423 PERSONS SURVEYED

Cars and motorbikes

All modes included, it can be observed that the NH402 drains the major amounts of traffic flows, confirming its role of backbone of the island.

- 88% of the daily trips are made by private motorised vehicles. A strong dominance of personal cars is observed, except for the downtown areas of Phuket Town, Kathu and Patong where motorbikes become the principal mode.
- Change these figures in favour of public transports.
- On the East-West corridor between Phuket and Patong, the exchanges are mainly local.
- Develop a public transport system like a cable-car to capture some of the traffic flows.
- The traffic flows located on the LRT alignment in the Northern part of the island are spread over the territory.
- Develop an efficient network of feeder lines to complement the LRT project.
- The traffic flows located on the LRT alignment in the Southern part of the island are concentrated locally.
- They can easily be captured by the LRT project.
- Children and teenagers using public transport to go to school are an asset to be strengthened.
- Younger adults can be targeted as potential future clients of public transport.
- Families earning up to B10,000 per month spend 16% on average of their monthly income for transportation.
- Necessity to offer affordable public transport solution, especially for the lower income people.



Stated preference surveys were conducted in Phuket in order to get the local inhabitants' opinion regarding mobility planning options for the future.



Current

situation

8.5%

50%



The elaboration of a tailormade mobility project **FOR PHUKET ISLAND**

ENHANCING PHUKET SUSTAINABLE MOBILITY

- LRT network is composed of a first line linking the Airport and Chalong and a second line linking Central Festival and Thalang
- Cable car system with 4 stations between Patong and Central Festival
- Bus network integrated to the new mass transit system
- More space dedicated to pedestrians and bicycles

ADVOCATING FOR QUALITY OF LIFE

 $\circ~$ Reducing traffic and pollution in the island by 8% in 2030 ~

- $\,\circ\,$ Less cars and more nature in Phuket Town
- Historical heritage in the spotlight
- More activity and innovative development projects Transit Oriented Development (TOD)





A LRT line between THE AIRPORT AND CHALONG

SUTRHE vision on the LRT line between the Airport and Chalong

MAIN FEATURES

o 41.6 km

- 24 stations
- 2 elevated sections and 5 underground sections along NH402
- Limited shared lanes on 1.5 km, single track on 3.6 km
- A limited fleet of 20 vehicles at the opening

OPERATION AND SERVICE TO THE USER

- High commercial speed of 32.7 km/h
- Guaranteed trip duration of 45 min for Phuket-Airport as compared with 90 minutes in private car in 2030
- o 1h16 for Airport-Chalong as compared with 1h53 in private car in 2030
- Daily operation from 6 AM to 10 PM
 - A train every 10 minutes on peak hours

DEMAND

- o 25% of the inhabitants directly served by the LRT
- 1 university / 4 hospitals / 3 international transport hubs served by the LRT
- Possible ridership of 50,000 in 2030 and 72,500 in 2040
- o Average length trips of 20 km



The tramway of Bordeaux is integrate in the UNESCO heritage are

IMPACTS

- Less traffic. Reduction of 5% of vehicles*km on the roads compared to a BAU scenario
- Time saving. Reduction of 10% of the time spent in traffic on average
- Less pollution. Reduction of air pollution linked to road traffic by 5% at the island scale
- Highly polluted areas such as Thalang (NH402 x Road 4030) will experience a decrease of 10% in road traffic, and the pollution will consequently decrease, allowing to come back to levels under WHO recommendations of 25 µg/m³
- Useful and efficient new mean of transport for local people and for airport users
 Iconic project showing Phuket as the forefront province in the ecological transition

INSTITUTIONAL SET UP

- A sustainable financial profit leading to a possible PPP
- A private partner taking care of the financing of the rolling stock and taking advantages of a 30-year long operation contract would benefit of an acceptable IRR. However, international experience shows that it may be preferable to public interest to restrain the private partnership to the operation only for a shorter period of time (5-10 years)

BENCHMARKING

DEFIRED - STOCK.ATDOBE.CO.

- Bordeaux, France 750,000 inhabitants: a high quality LRT project with important components of heritage protection and valorisation, and pedestrianisation
- Porto, Portugal | 800,000 inhabitants: a successful PPP project on a vast territory which boosted the transformation of the city during the last decade
- Rabat, Morocco | 2,500,000 inhabitants: a high ridership and a fine urban integration for the capital city of Morocco

 Kaohsiung, Taiwan | 1,200,000 inhabitants: a good example of at-grade LRT in an Asian context

COSTS

- B27B according to the extension of civil works excluding the insertion of underground or elevated sections
- Operation cost: B510M per year
- 12.5 million annual passengers
- Revenues:financial sustainability could be ensured with an average fare of B63

Thalaı

Two-Heroines

Koh Kae

A cable car to link PATONG AND PHUKET TOWN

A potential complementary East-West corridor to enrich the current LRT project.

MAIN FEATURES

o 7.7 km

- 4 stations
- Very limited land acquisition

OPERATION AND SERVICE TO THE USER

- o Attractive commercial speed of 22 km/h
- Guaranteed trip duration of 30 min from Central Festival to Patong as compared with 35 minutes in private car in 2030
- Daily operation from 6 AM to 10 PM
 A cabin every 72 seconds

DEMAND

- o 15 200 inhabitants directly served by the cable car
- o 1 university / 2 shopping centres / Touristic sites
- Direct connection to Patong Beach
- Possible ridership of 14,200 in 2030 and 16,800 in 2040
- Both used by locals (56%) and tourists (44%)
- Average length trips of 7 km

IMPACTS

- Less traffic. Reduction of 8% of traffic on Road 4021 between Phuket and Patong compared to a BAU scenario
- Time saving between Patong and Phuket Town: 35 min in private cars in 2030 as compared with 30 minutes in cable car
- Possible improvement of air quality in Patong area. Levels of PM 2.5 area rather high even during Covid period (25 µg/m³), close to the risk level identified by WHO
- Useful and efficient new mean of transport for local people and a new tourist attraction

The urban cable car of Medellin i an efficient public transport mea.

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INSTITUTIONAL SET UP

- o A high level of profitability leading to a possible PPP
- A private partner taking care of the financing of 25% of the whole system with a 30-year long operation contract would benefit of a high level of IRR
- However, the international experience shows that most recent cable car projects were financed by the public sector.

BENCHMARKING

- Santo Domingo: a cable car project in connection with the metro network, highly used by daily commuters
- Medellin: a whole network of cable cars in connection with metro and LRT systems, used both by local residents and tourists
 - Hong Kong: a successful example of a modern and touristic cable car in an Asian context

COSTS

- o Investment costs of ₿3,200M
- Operation cost of ₿72M per year
- o 2.5 million annual passengers in 2030
- Fare revenues: \$220M, with an average fare of \$32 for residents and \$100 for tourists, very profitable operation

🕺 Thalano

Two_Heroin

An efficient complementary public transport network

COVERING THE ENTIRE ISLAND

A SECOND LRT LINE TO LINK THE CABLE CAR AND THE NORTH-SOUTH CORRIDOR

- 2.9 km of new LRT infrastructure between Old Town and Central Festival
- An additional service between Thalang and Central Festival, passing through the Old Town
- A vehicle every 10 minutes on the new LRT infrastructure and every 5 minutes between Old Town and Thalang
- A possible ridership of 85,400 daily passengers on the LRT system in 2040
 - Investment costs: ₿3.7B



A REVISED BUS NETWORK

• A reorganisation of the lines in order to avoid overlapping with the mass transit system

(LRT / cable car) while maintaining the coverage rate to the public transport network

- An increase of the commercial speed to propose an attractive service, thanks to possible segregated bus lanes
- A replacement of the photong by mini-buses or midi-buses, with universal access, more comfort and safety
- A total of 14 bus lines connecting all the major points of interest of the island
 - Investment costs: B466M



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A new urban experience HIGHLIGHTING PHUKET'S UNIQUE HERITAGE



REDUCTION OF URBAN SPRAWL

- Concentration of new urban development inside the public transport corridors
- Less consumption of natural resources

TRANSIT ORIENTED DEVELOPMENT (TOD)

- Opportunity to create large areas of new urban developments in Phuket Town centre (Floor area of 485,000 sq.m), Saphan Hin (890,000 sq.m), Patong (290,000 sq.m) and Witchit area near Central Festival (485,000 sq.m)
- Within a walking distance to public transport hubs for a new lifestyle in the city
 - Opportunity to develop new economic centres

OLD TOWN AS A SUPER BLOCK

- Motorised traffic diverted on peripheric streets
- Creation of a vast pedestrian-friendly area (140 Rai) integrating patrimonial, commercial and natural resources
- 1650 m of pacified streets (Phuket Road, Thalang Road, PhangNga Road)
- A new central square around the LRT Old Town station with a shaded green corridor along the river canal

HERITAGE IN THE SPOTLIGHT

- Opportunity to improve the visibility of significant monuments
- Opportunity to refurbish old fasades along the corridor
- Possible creation of a patrimonial network combining architectural assets in Phuket Town, industrial heritage in Kathu and natural landscapes of Patong

& HERITAGE IN **PHUKET**

In harmony with THE NATURAL ENVIRONMENT



NATURAL AREAS PRESERVED

- Concentration of new urban areas encouraged along the future transport corridors
- Enhancement of the natural heritage of Phuket such as coastal areas of the island, mangrove ecosystem near Saphan Hin, water canal in Old Town, rain forests in the mountains, etc.

REDUCTION OF POLLUTION

- In the scenario proposed by SUTRHE, CO₂ emissions might be contained to a level of 256,000 tons in 2040, or 237 kg generated per inhabitant, which represents -20% compared to a Business-As-Usual scenario
 - Air pollution levels are expected to decrease alongside the decrease of the road traffic at the island scale



A CULTURE OF NATURE

- Integration of natural components in the urban areas, with more trees and green areas, especially in the future public squares to be implemented around the stations
- [Re]development of a culture of non-motorised transportation for short distance trips. Secured and shaded walkways and bicycle paths will encourage these sustainable habits
- New form of tourism through the LRT or cable car usage, more eco-responsible

Bicycle lanes and large footpaths to be mplemented near the LRT corridor.

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A multi-dimensional project INVOLVING MULTI-LEVEL COORDINATION

To make it happen, the involvement of different stakeholders is necessary, as well as strong coordination among them. Transport projects such as the LRT and cable car projects should be implemented under the responsibility of MRTA, with a financial set up involving public and private partners partner. AFD is at the disposal of the Thai authorities to pursue the cooperation on this project alongside MRTA and to provide financial support to its implementation.

In the meantime, a clear and comprehensive roadmap for the development of mobility projects should be elaborated at the scale of the island. A public entity playing the role of local Public Transport Authority could prepare the comprehensive mobility plan and supervise then the good integration of the transport projects. This role could be assured by the Province of Phuket which seems to be the most relevant public stakeholder to play this role. A supervision at the national level should also be ensured by the Ministry of Transport.

The municipalities should actively participate in the implementation of the urban projects proposed along the mass-transit corridors, possibly by bringing private investors. The concept of Super Block in Phuket Old Town requires, of course, the support of Phuket Town Municipality.

All together, local and national stakeholders can join forces towards the development of sustainable mobility for Phuket.

MOBILITY MAN Possible financing from International donors PROJECT 89 Elaboration of a Sustainable Urban Mobility Plan **Province of Phuket Development of an** GEMEN integrated heritage policy Supervision of the **Municipalities** integrated transport network (LRT + cable car + bus) **Province of Phuket** Development of urban projects (TOD) **Municipalities Private Partners (ex : PKCD)** Supervision at national Level **Ministry of Transport** Implementation of a Super Block in Phuket Town **Phuket Town Municipality**

RANSPORT PROJECT

MRTA

Private Partners for possible PPP

(LRT and Cable car)

Public entity

Financing entity

Private entity

For more information



AGENCE FRANCAISE DE DEVELOPPEMENT Transport & Mobility Division

35 / F Exchange Tower - unit 3501-02 388 Sukhumvit Road, Klongtoey Bangkok 10110 | Thailand afdbangkok@afd.fr #WorldInCommon | www.afd.fr



DES VILLES ET DES HOMMES Consultants for sustainable mobility

87 Quai des Queyries, 33100 Bordeaux | France +33 (0)5 47 50 05 93 www.dvdh.fr



EGIS RAIL Imagine create and achieve a sustainable future

• FRANCE

170 Avenue Thiers 69455 Lyon Cedex 06 | France +33 (0)4 37 72 40 50 www.egis.fr

• THAILAND

1126/2 Vanit Building 2, 24th Floor New Phetchaburi Rd, Makkasan, Ratchathewi 10400 Bangkok | Thailand +66 (0)22 541 636 www.egis-group.com



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16 Avenue d'Ivry 75013 Paris, France +33 (0)1 57 27 15 00 www.arep.fr | www.arepgroup.com