



Empowered lives.  
Resilient nations.

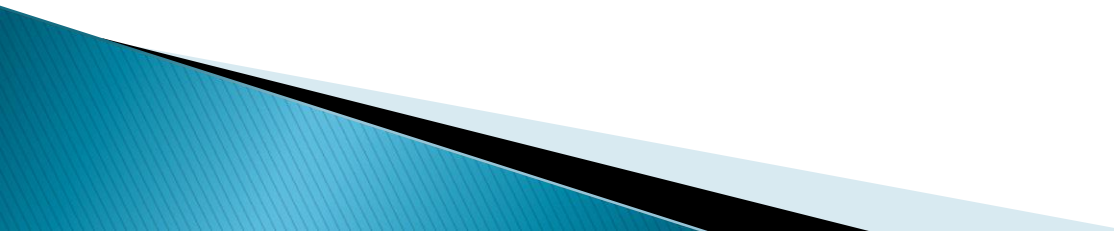


# Bhutan Sustainable Low- emission Urban Transport Systems

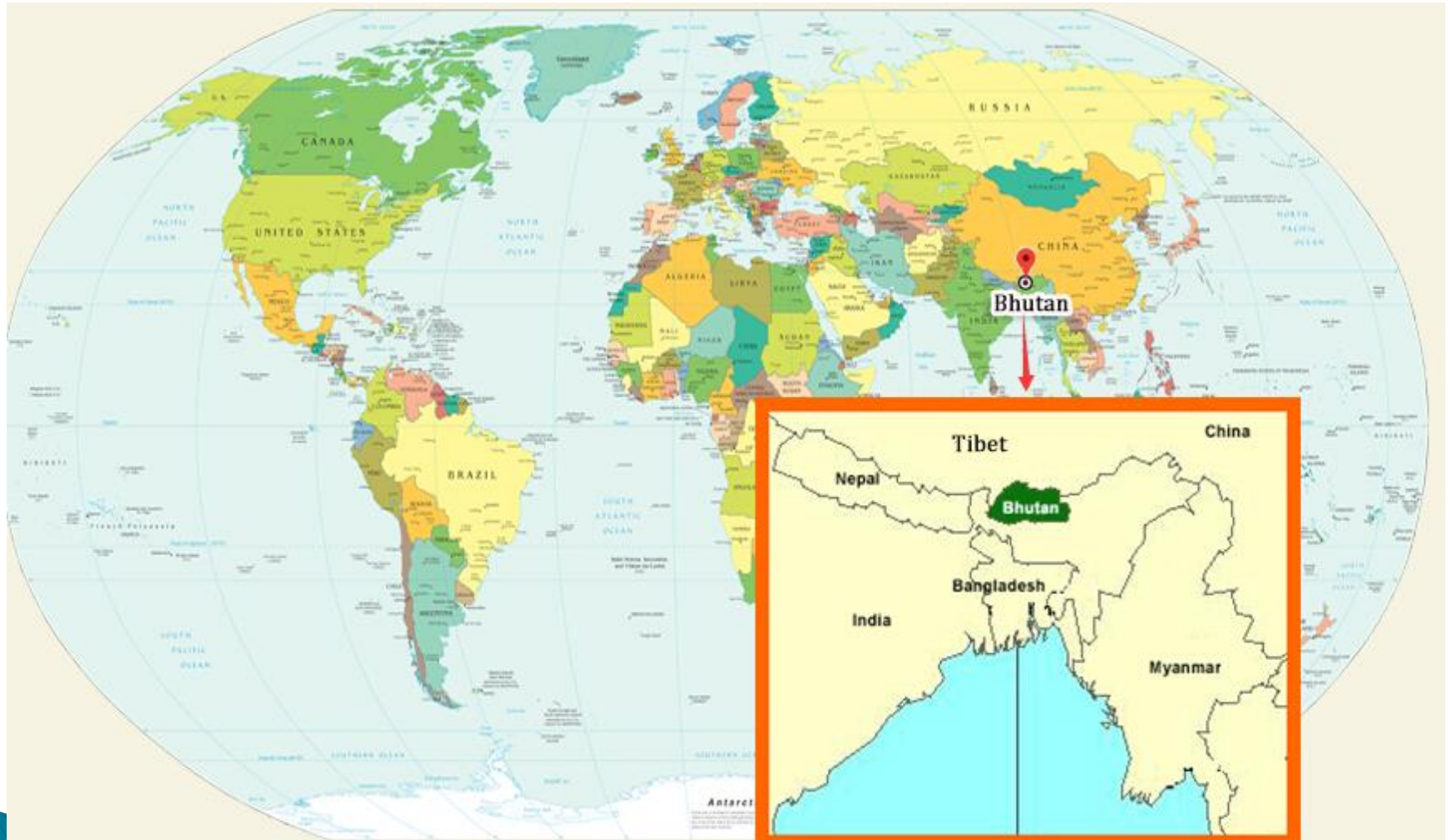
IEA Energy Efficiency in Emerging Economies Training Week  
for Southeast Asia

16–20 July, 2018

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  - ▶ Theory of Change
  - ▶ Key Activities
  - ▶ Implementation Modality
  - ▶ Risks & Mitigation measures
  - ▶ Quality Assurance
  - ▶ Way Forward
- 

# Brief Background



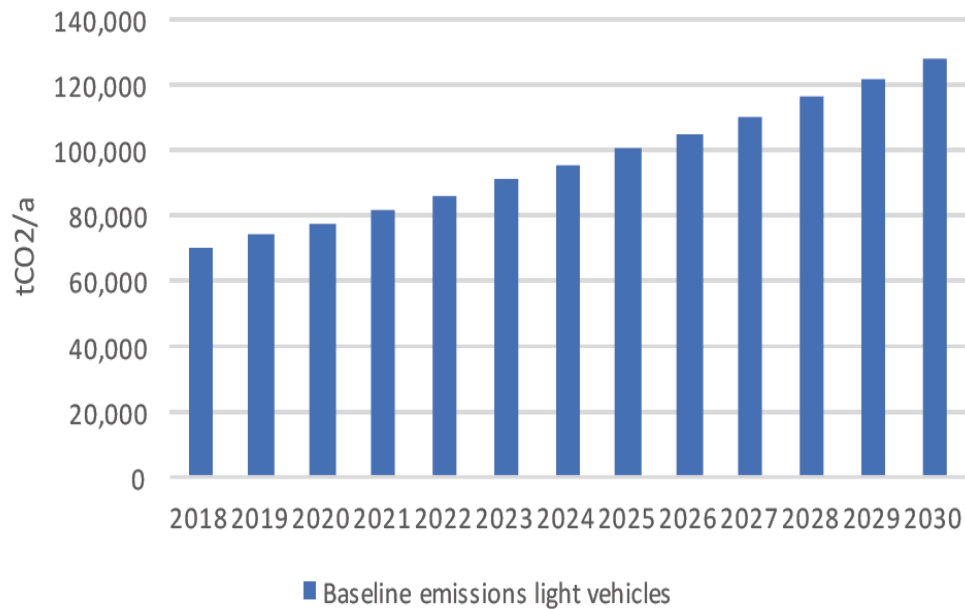
# Contd...

There is a car for every eight people in the country



# Contd...

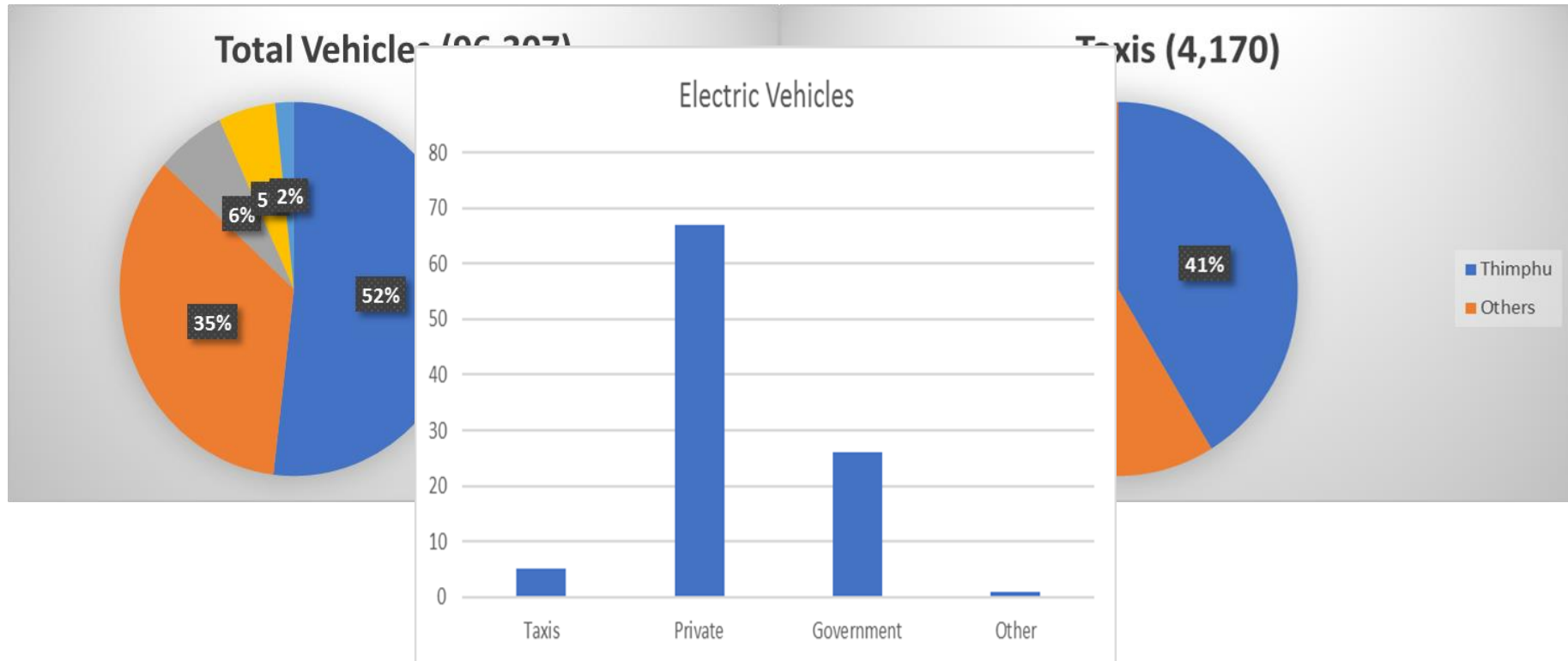
50 % of the country's vehicle  
fleets to clean and eco-  
friendly technology by 2030



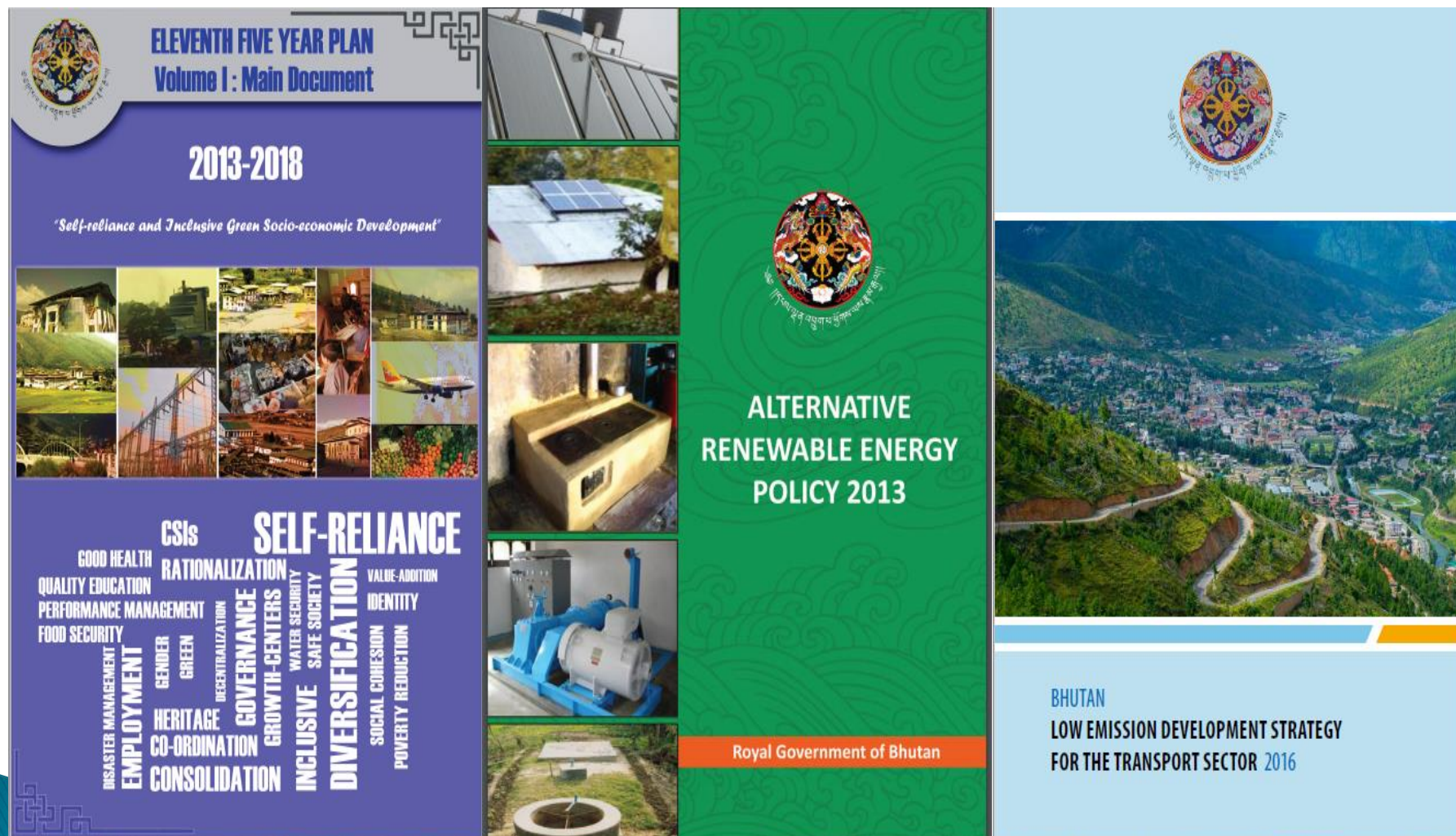
National Transport Policy of Bhutan, 2017

Ministry of Information & Communications  
Royal Government of Bhutan

# Contd...



# Linkages with the Priorities



Just, Harmonious and a Sustainable Society  
through Enhanced Decentralization



Gross National Happiness Commission  
P. O. Box: 127, Tashichhodzong  
website: [www.gnhc.gov.bt](http://www.gnhc.gov.bt)



## United Nations Development Assistance Framework

Bhutan One Programme 2014-2018

Thimphu  
2014



## Preparation of Year Plan

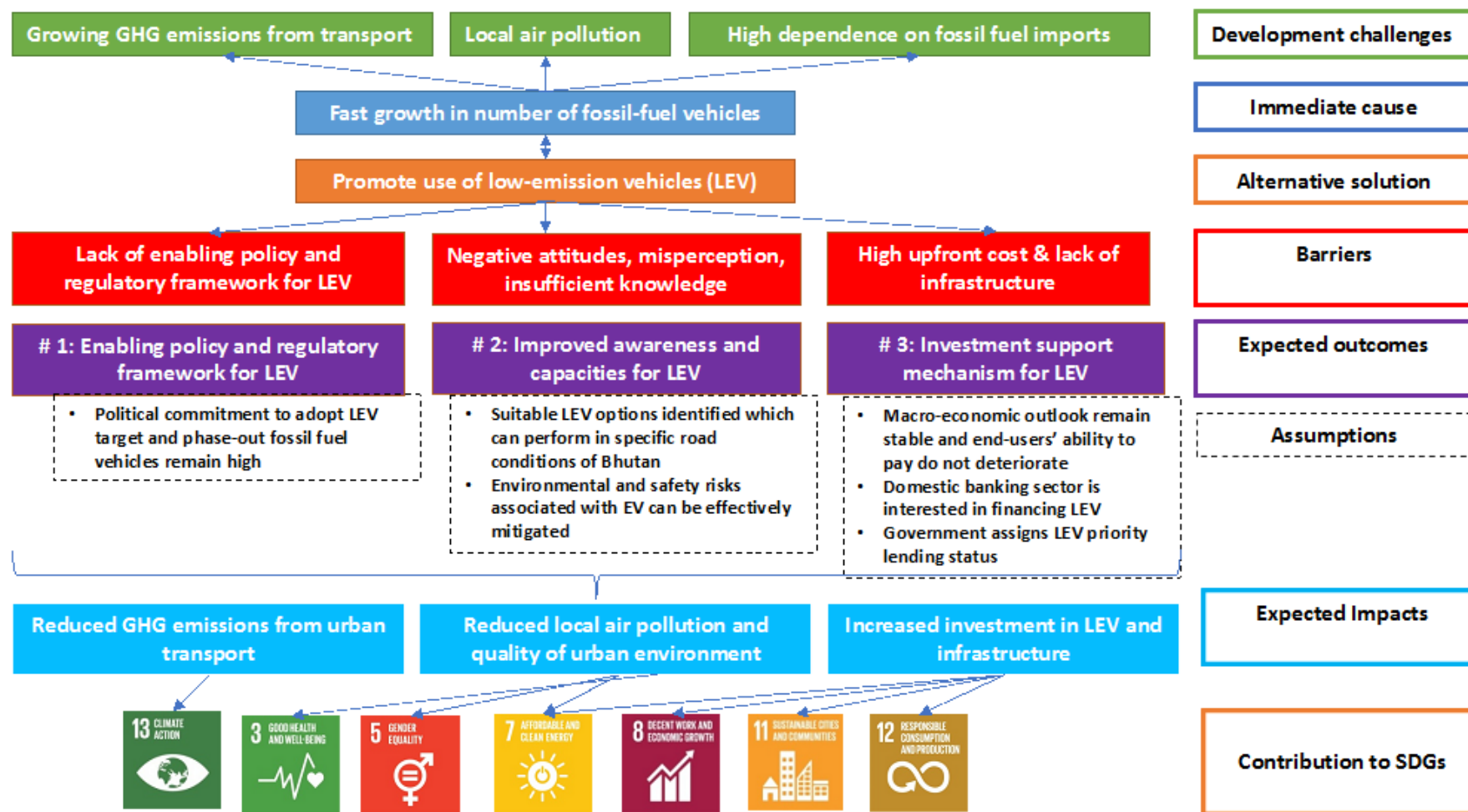
2023

9. Infrastructure, Communications; and Public Service Delivery Improved	13. Democracy and Decentralization Strengthened
10. Gender Equality Promoted, Women and Girls Empowered	14. Healthy and Caring Society Enhanced
11. Productive & Gainful Employment Created	15. Livability, Safety and Sustainability of Human Settlements Improved
12. Corruption Reduced	16. Justice Services and Institutions Strengthened

**a Sustainable Society  
in Decentralization'**

FINANCIAL COMMISSION  
2016

# Bhutan Sustainable Low-emission Urban Transport Systems – Theory of Change



# Objective and Outcomes

*Promotion of low emission public transport  
(e.g. hybrid and electric) systems as the  
preferred choice for urban mobility in  
Bhutan*

Strengthened policy  
environment

Strengthened capacity in  
the adoption and  
implementation of low  
emissions transport plans

Increased investments  
and private sector  
participation

# Key Activities

## Selection Criteria for EVs

Table 8 Technical requirements and **criteria** for EVSE

Criterion	Description	Thresholds	Possible importance
B1	Suitable for operating conditions of Bhutan (e.g. climate (temperature, humidity), altitude)	<u>n.a.</u>	[Yes / No]
B2	Equipment age <i>We assume EVSE should be new.</i>	New	[Yes / No]
B3	Compatible with selected EV and its fast charging protocol and mode of communication	<u>n.a.</u>	[Yes / No]
B4	Capability of fast charging (DC) <i>All EVs should <u>be capable of using fast charging</u> to be suitable for taxi service operation.</i>	<u>n.a.</u>	[Yes / No]

# Charging infrastructure

Type	AC level 1 charging	AC level 2 charging	DC fast charging
Range	3–8 Km per 1 hour of charging	16–32 Km per 1 hour of charging	100–130 Km per 20 minutes of charging
Voltage	120 volt (V) AC plug	240V (residential) and 208V (commercial)	208–480 V. Requires three phase input

Source: Alternative Fuels Data Center (2017),  
McDonald (2016)



Contd...

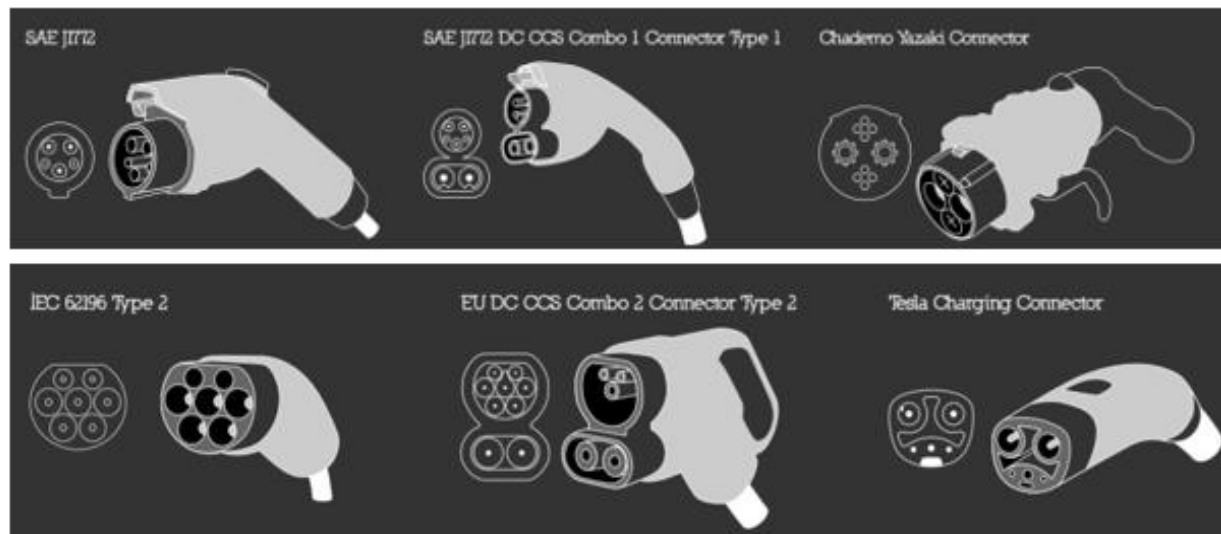
## Single

Only one  
only one  
time

## Multi-standard

## Multi-port/vehicle

Figure 14: Different connector types



Only one  
Cheapest

is charged at the same time at  
one location

standards are supported  
Proposed for current project!

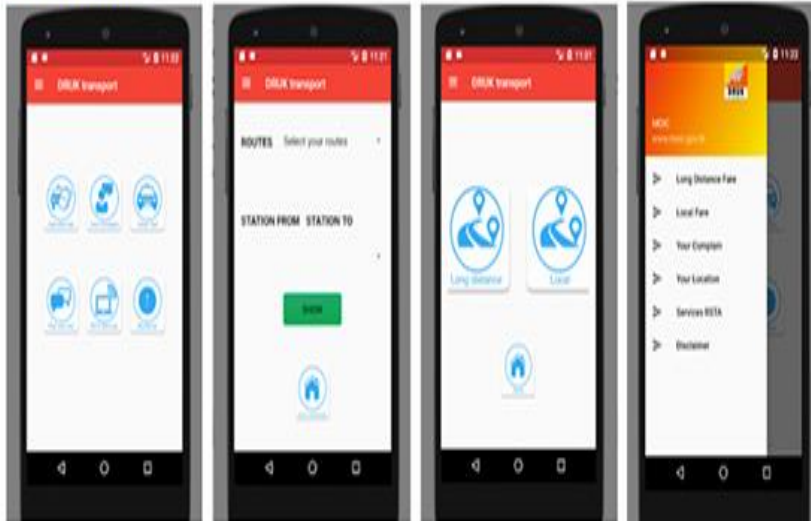
supported  
charging  
several EVs of the same standard  
at one location

# Improving Safety and Capacity Building



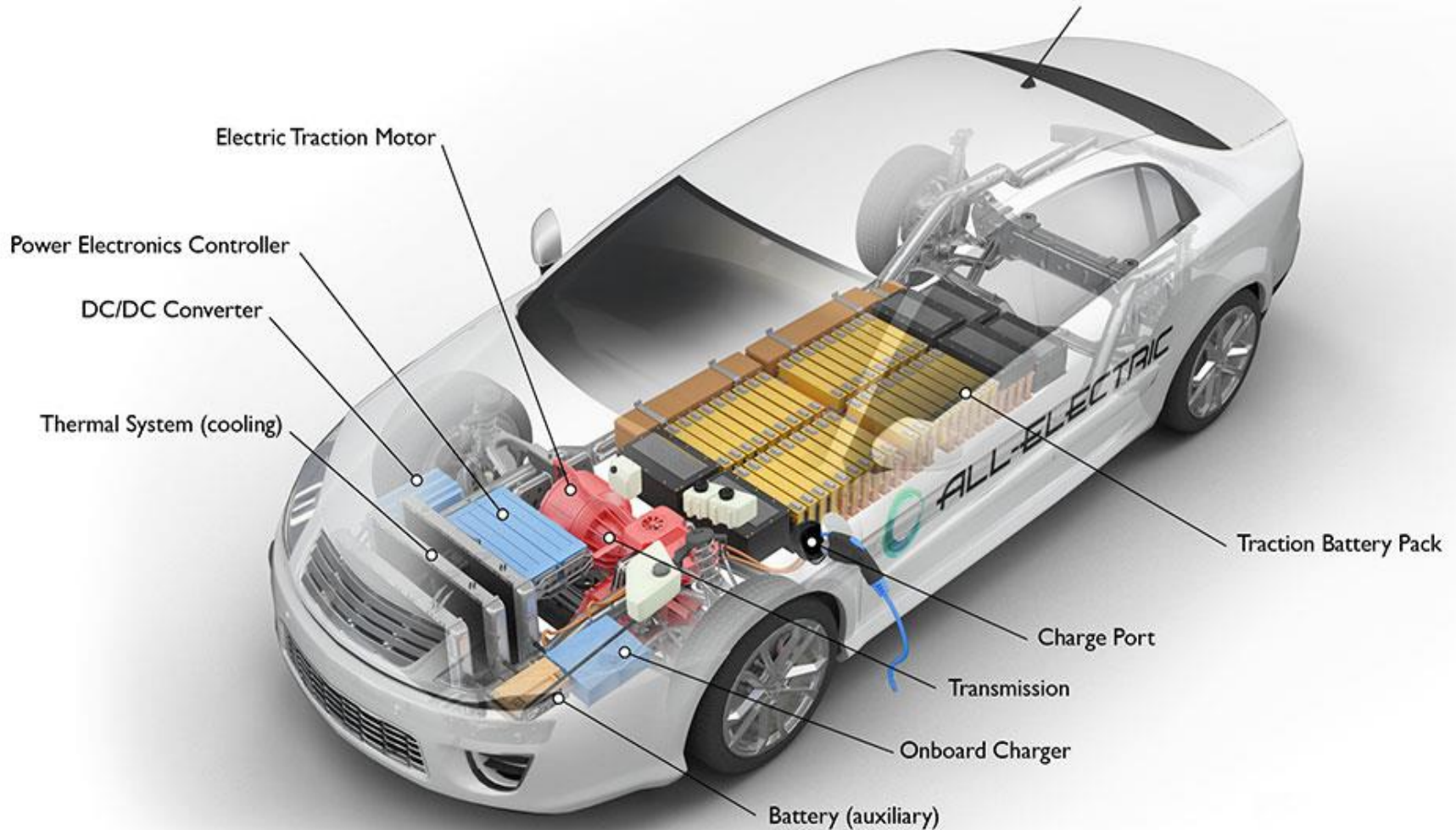
DRUKtransport

Department of Information Technology & Telecom Travel & Local

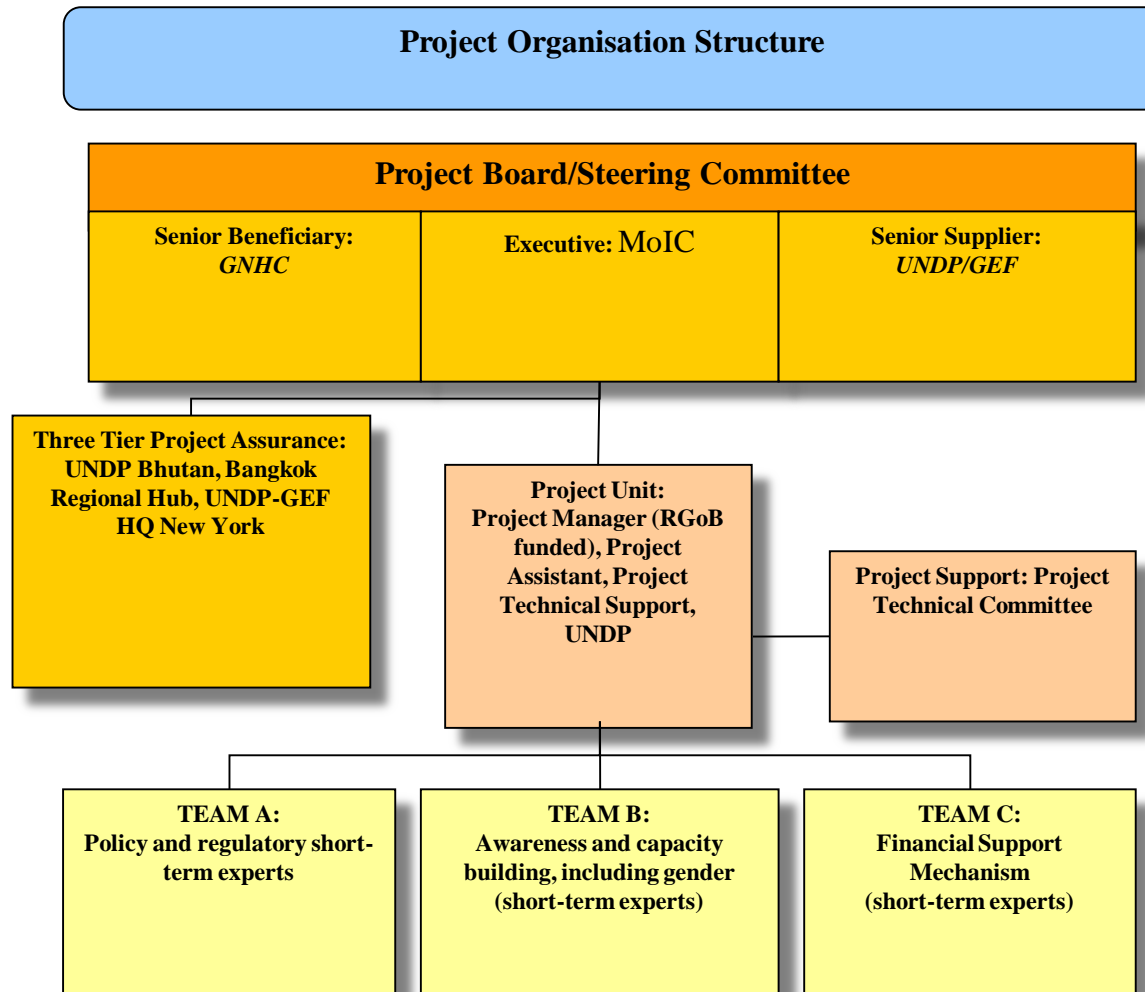


# Battery Waste Management

All-Electric Vehicle



# Implementation Modality



## Proposed Project Board Members

Ministry of Information & Communication

Gross National Happiness Commission

Ministry of Finance

Road Safety and Transport Authority

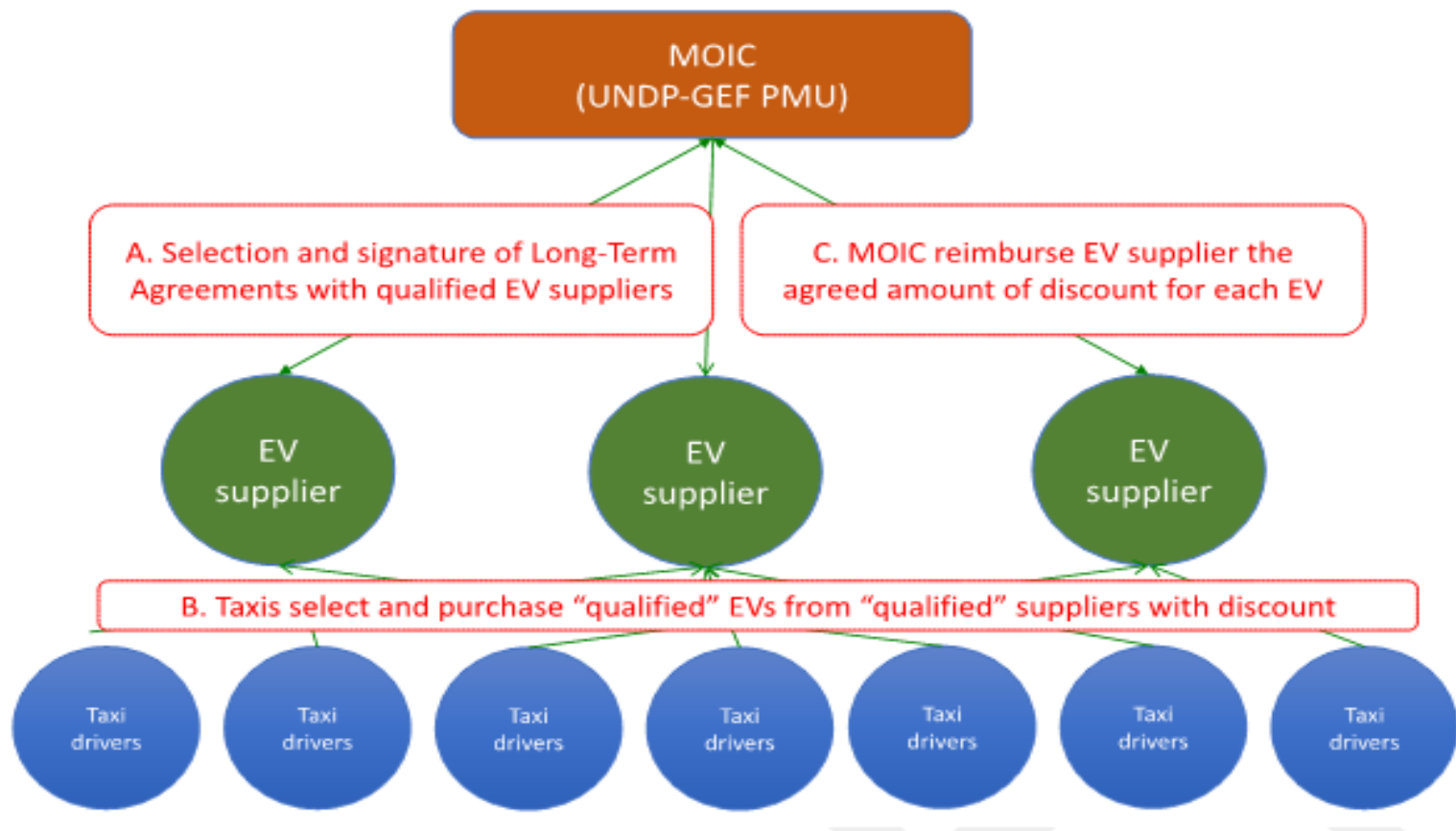
National Environment Commission

Thimphu Municipality

Bhutan Power Corporation

# Contd...

**Figure 7 Process diagram for implementation of the financial support mechanism**



# Risks & Mitigation measures

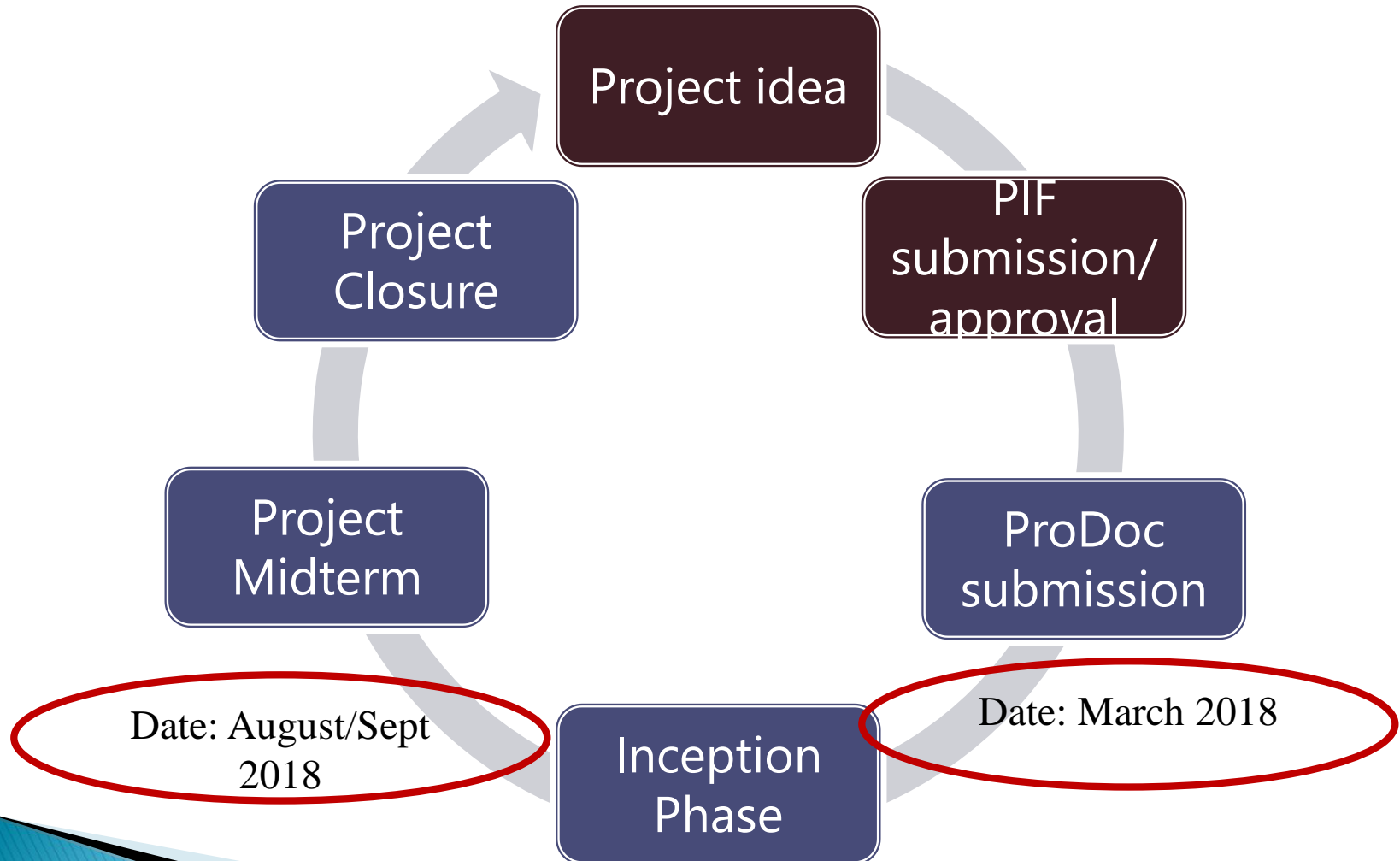
Sl. No	Risks	Type	Measures
1	Inadequate E-waste management & disposal of used batteries	Env	Enabling regulation on e-waste management and its enforcement
2	EV Technology failure	Operational	The project will introduce technical qualification criteria for qualified EV suppliers
3	Low uptake of financial support mechanism	Market	The project proposes staged approach to EV Discount

1. Strategic
2. Relevant
3. Social and Environmental Standards

4. Management & Monitoring
5. Efficient
6. Effective
7. Sustainability and National Ownership

Quality Rating Level	Requirements for overall project rating	Actions if overall project rated at this level
Exemplary [●●●●●]	All criteria rated high. At least three criteria rated exemplary.	-Proceed with project
High [●●●●○]	All criteria rated satisfactory or higher	-Proceed with project
Satisfactory [●●●○○]	At least six criteria are rated satisfactory or higher.	-Proceed with project, with minimal revisions if necessary.
Needs improvement [●●○○○]	At least three criteria rated satisfactory or higher.	-Proceed only if substantial remedial action is taken to improve quality. -All issues requiring management action must be addressed
Inadequate [○○○○○]	One or more criteria rated inadequate	-Do not proceed with project (rejected, suspended until action is taken/cancelled).

# Way Forward



Thank You

