

Mobilizing Private Capital for Energy Efficiency through PPP Structures

*ADB's PPP Transaction Support for
the State of Melaka's Large-scale LED
Street Lighting Project, Malaysia*

*8 June 2017
Asia Clean Energy Forum 2017*



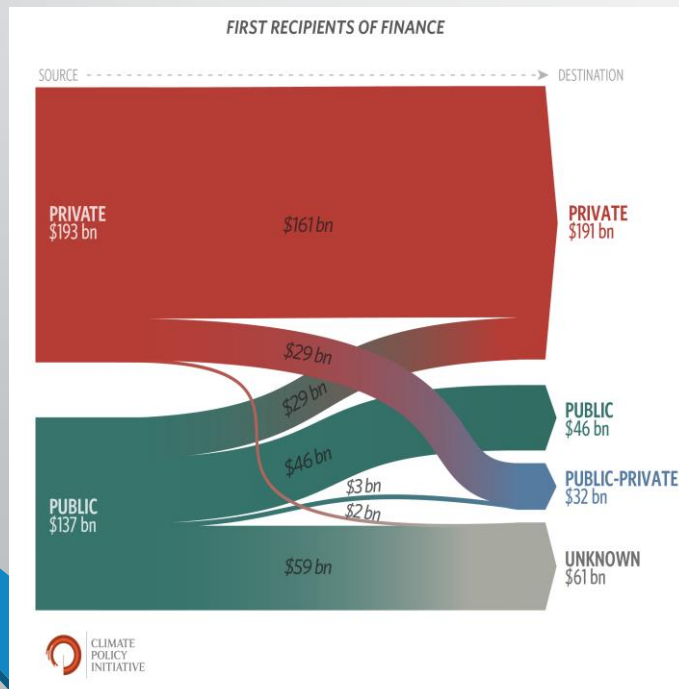
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Private Capital Flows and Energy Efficiency in Developing Asia

- Developing Asia would need USD 4.5 trillion in energy efficiency investments by 2035*
- Private capital flows are and will continue to be the largest source of energy efficiency finance
- Policy frameworks should enable and grow private capital flows to public sector energy efficiency projects through public-private partnerships (PPP) and ESCO performance contracting

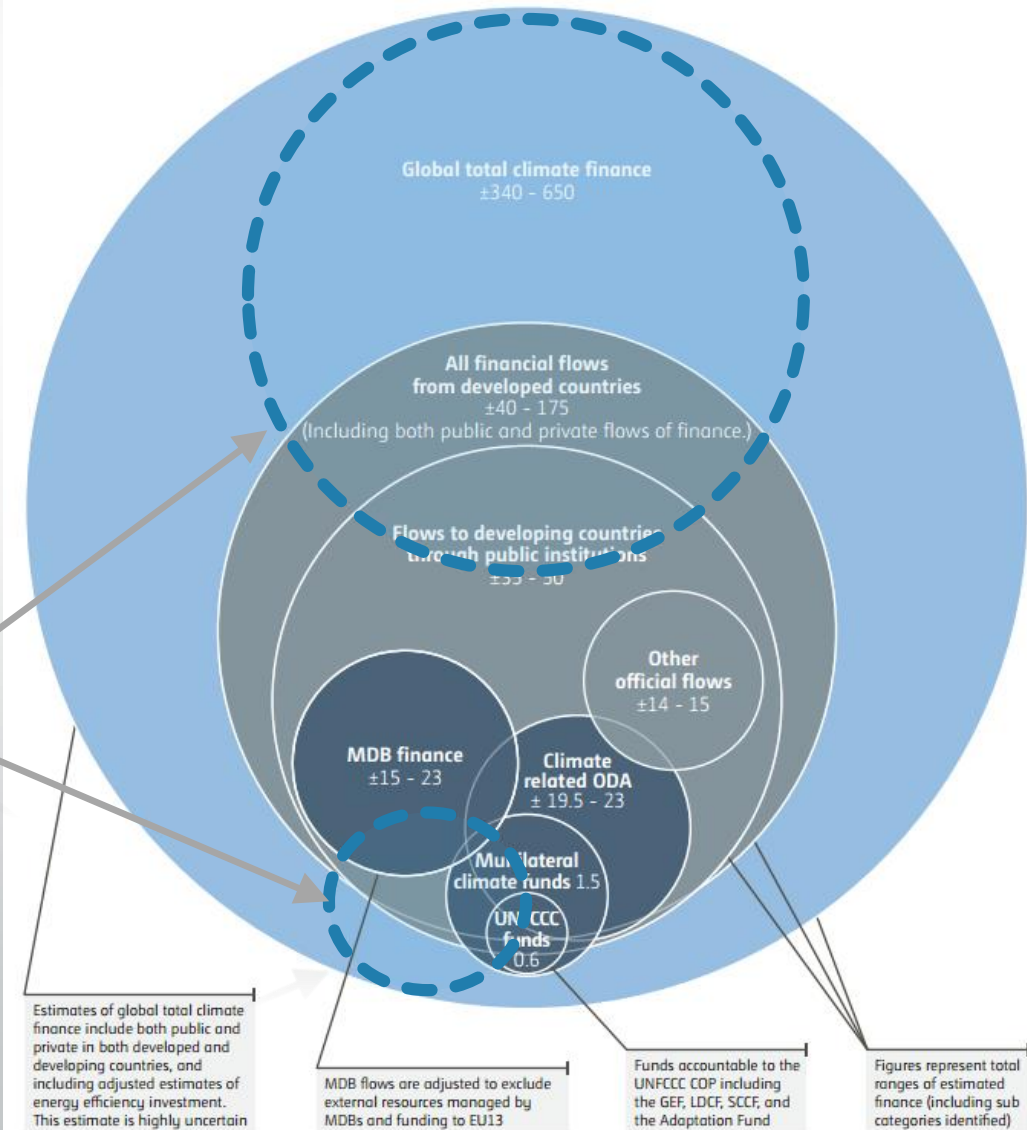


* Derived by A. Ablaza from data of IEA WEO 2012, McKinsey & Co.

Energy Efficiency Finance
(author's estimate)

Chart Sources: UNFCCC Standing Committee on Finance 2014 Biennial Assessment and Overview of Climate Finance Flows Report; Climate Policy Initiative Global Landscape of Climate Finance 2014

Climate finance flows (USD billion and annualized)



Project Overview

Project Description

- The objective of the project is to upgrade the road lighting system of the State of Melaka using energy efficient LED lamps to:
 - reduce CO₂ emissions;
 - lower the cost of road lighting; and
 - improve road safety
- About 100k HPS luminaires will be replaced with an LED system at an estimated cost of \$45-\$60 million
- The capital cost of the project can be partially recouped through energy and maintenance savings generated in the operation phase
- The client is the Melaka Green Technology Corporation, an organization owned by Melaka state government and tasked to implement environment-friendly projects in the State
- It is the intention that the pathfinder project will be replicated across other states in Malaysia and other countries in Asia

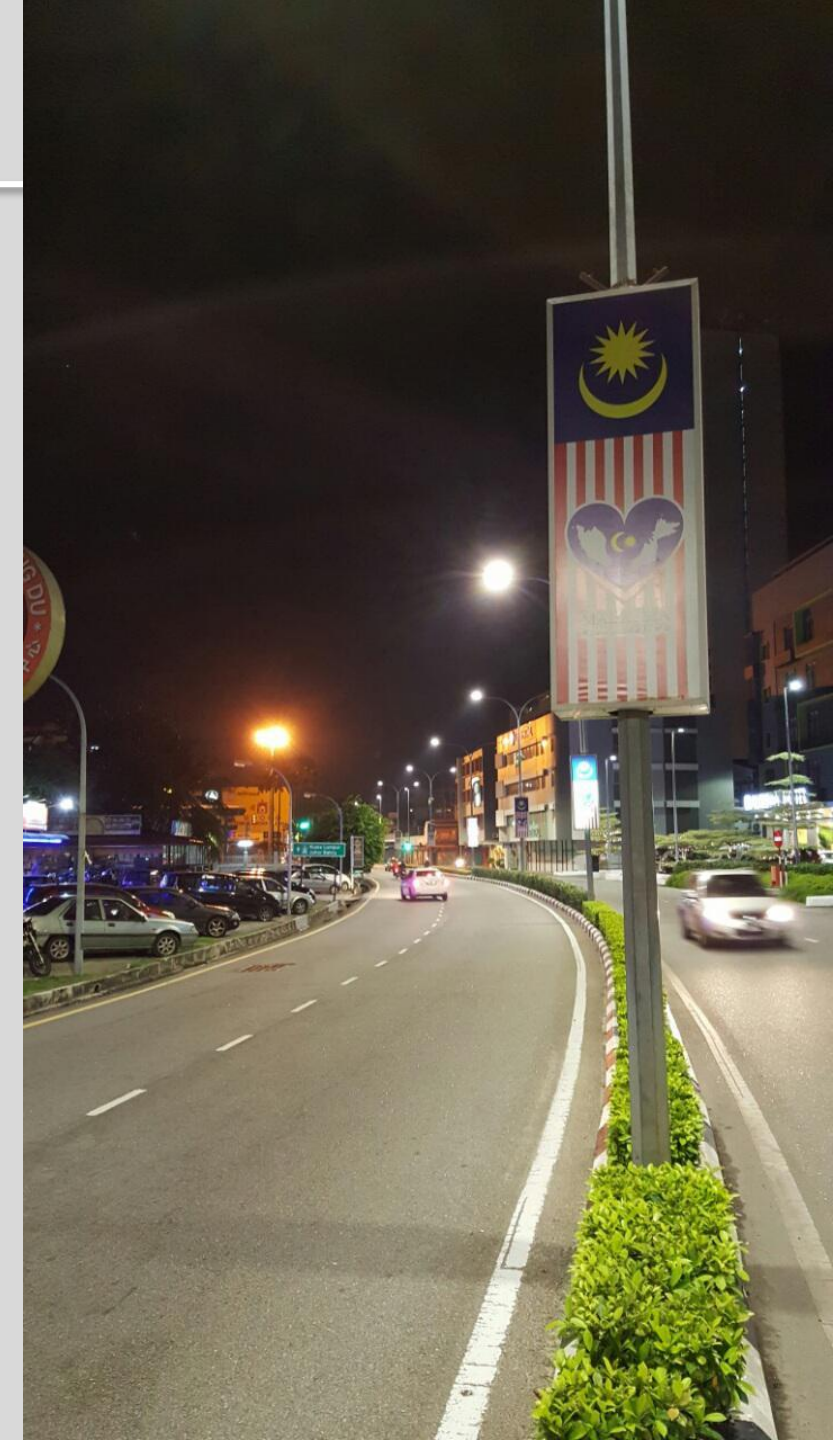
Project Status

- ADB (Southeast Asia Dept and Office of PPP) and the State of Melaka agreed to implement the project using a 2-phase approach :
 - Phase 1: Scoping study
 - Phase 2: Transaction structuring and tender process
- Phase 1 was completed in 4Q 2016
- Phase 2 kicked off in March 2017
- Phases 1 and 2 are financed by ADB TA-8240: REG



Phase 1 Scoping Study – Findings (1/2)

- Replacing the existing high pressure sodium luminaires with LED luminaires would reduce electricity consumption by 42-44 GWh/year (approx. 55% of the total electricity used for lighting the roads of Melaka)
- Project has the same impact as building a 10 MW peaking power plant; able to defer CAPEX requirements for generation, transmission and distribution capacity upgrades
- The project would reduce CO2 emissions by approximately 30,000 tons per year
- Very strong interest from private investors and from other states in Malaysia and other countries in Asia to replicate this model



Phase 1 Scoping Study – Findings (2/2)

- ESCO (pay-through-savings) scheme not viable given savings level and private sector requirements on expected returns
- Recommended commercial models that provide greater certainty (e.g. a lease-to-own or PPP model).
- Market Sounding:
 - Single counterparty required to act as an “integrator”
 - Private investors require an equity return of 15% - 20% for the Project if returns are at risk of savings
 - Require some form of guarantee or underwriting from the State to enhance the Project’s credit risk
- Lease-to-own model as a preferred structuring model.

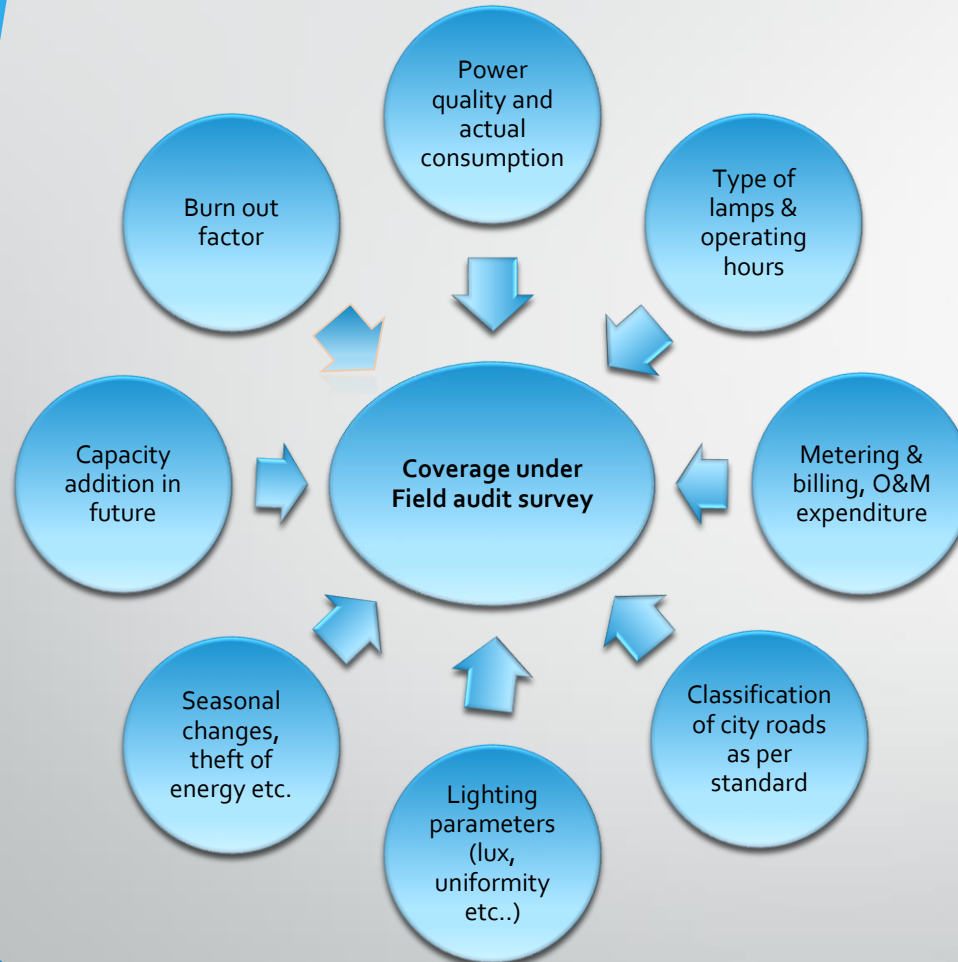


Phase 2 Scope of Work

ADB and the State of Melaka continue working together to prepare the PPP structure through Phase 2

Phase 2 Tasks		
Technical	Financial	Legal
<ul style="list-style-type: none">• Investment Grade Audit (IGA) for the Project• Finalize PPP options analysis and update technical specifications including cost estimates• Develop the technical specifications for the tender documents• Provide technical advice in support of marketing and tendering phases• Provide technical advice in support of negotiations and project award	<ul style="list-style-type: none">• Update options analysis based on updates from investment grade audit and technical specifications• Finalize financial model to allow for determination of VfM proposition and budgetary requirements• Optimise risk allocation to ensure VfM outcome• Assist the client in seeking necessary internal approvals for the recommended transaction structure and appropriation of budget for sovereign support.	<ul style="list-style-type: none">• Legal due diligence - applicable legal and regulatory framework in Malaysia.• Evaluate key risks and mitigants for the Project and determination of the optimal risk allocation.• Bid preparation and development of tender documents.• Negotiation of the project development agreement/PPP contract and award of the project to the preferred bidder.
<ul style="list-style-type: none">• Detailed / formal market testing• Securing required government approvals• Provide technical advice in support of securing required government approvals• Tender process - Bid preparation, marketing, tendering, negotiations and selection of preferred bidder		

Investment Grade Audit

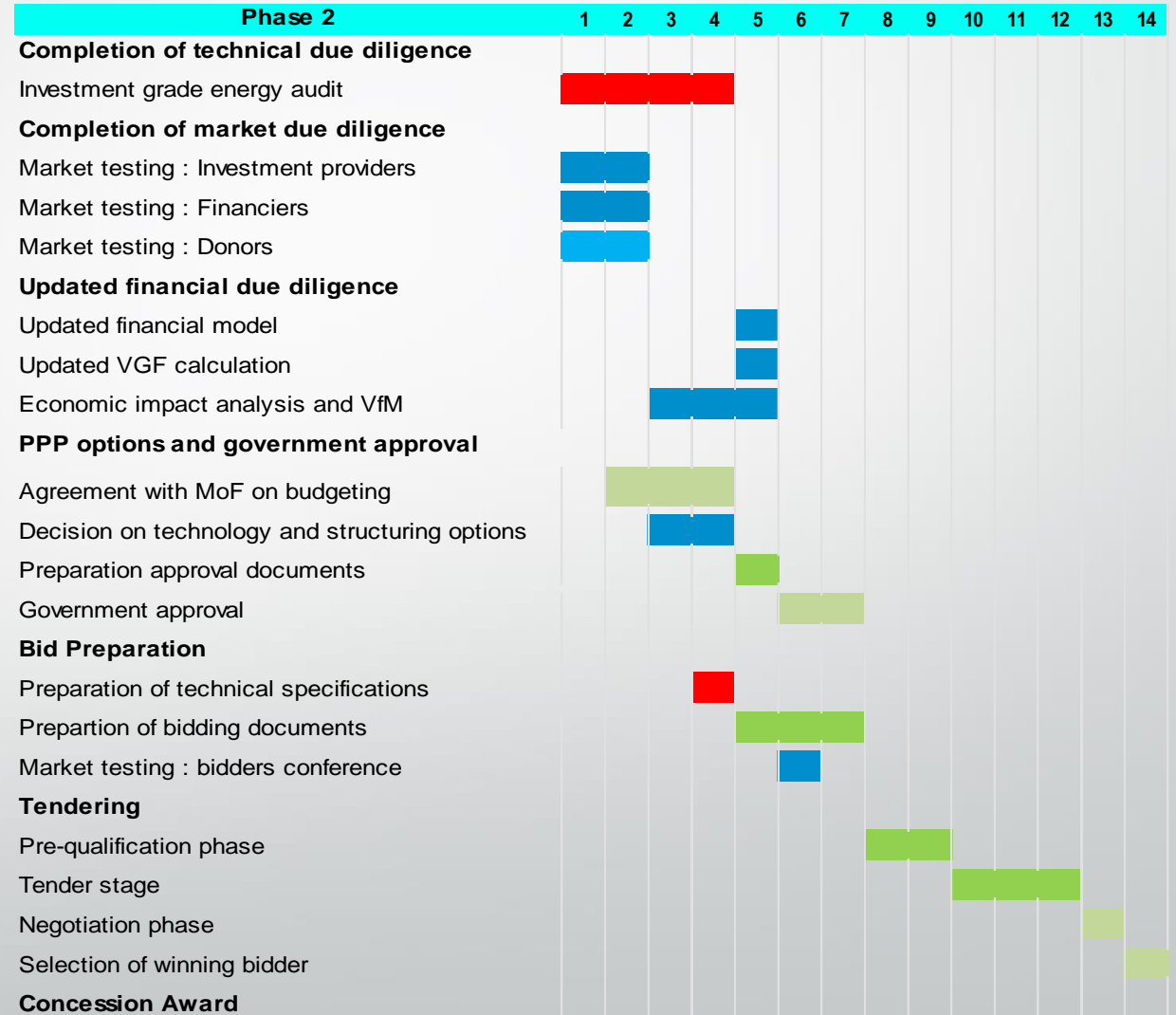


- **Preparation of road and asset inventory for the selected sample of street lights**
 - To ascertain the **total connected load** (by type and wattages) of the street lights and tentative **energy consumption**
 - Recording of **pole infrastructure** (pole heights, lamp mounting height pole type etc.), pole to pole spacing, road widths and road infrastructure, classification of roads
 - **Distribution network mapping with location of switching points** (with help of GPS/GSM system), length and size of cable, condition of metering and cabling
 - To ascertain **actual O&M cost per pole**
 - Mapping the **electrical safety requirements**
- **Metering and performance of all street lighting system**
 - **Feeder wise** number of **metered street lights**
 - Establishing actual energy consumption and performance by **measurement of electrical and lighting parameters**
 - Analysis of **electricity bills, energy prices**
 - Establish and identify number of **non-metered street lights**
 - Ascertain the **theft and losses in energy**
- Recommendation for **CAPEX and Energy Efficiency** measures

Phase 2 Objectives and Timelines

The main objectives of phase 2 will be to:

- Complete technical due diligence on the project including a detailed technical audit of the road lighting system
- Conduct additional market testing amongst financiers, donors and investment providers
- Update financial due diligence based on the findings of the detailed technical audit and market testing
- Prepare a PPP options analysis and the documents required for government to approve the project
- Prepare bid documents (Project Agreement, RfP, RfQ, etc)
- Launch and run an open transparent tender



PPP Advisory Team

Office of Public-Private
Partnership (OPPP)



Southeast Asia
Department (SERD)

ICLEI-South Asia



Investment-grade
[energy] audit (IGA)

Establish energy
consumption baseline
for RFP documents

Alexander Ablaza



Oversee IGA and
update technical
options accordingly

Support market
sounding and
government approval
process

Provide technical
inputs for tender
preparation,
evaluation and
negotiation

David Ng



Update financial and
commercial analyses
based on IEA
outcomes

Support market
sounding and
government approval
process

Provide financial /
commercial inputs for
tender preparation,
evaluation and
negotiation

Martin David



Undertake legal due
diligence for project
approval and
implement

Support market
sounding and
government approval
process

Provide legal inputs
for tender
preparation,
evaluation and
negotiation

Technological Options

The PPP advisory team has developed a high level financial model to evaluate financial outcomes of the four technological options proposed

Option 1: LED / Stand-alone

Replacement of the full identified portfolio with LEDs - the **least cost** option

Option 2: LED / Full Point-to-Point Digital Connectivity

Replacement of the full portfolio with LEDs and built-in point-to-point connectivity that allows for a highly flexible and customisable monitoring system that tracks performance of individual light points - the **highest cost** option

Option 3: LED / Group Connectivity

Replacement of the whole portfolio with LEDs and built-in group connectivity that allows for a less flexible and customisable monitoring system (as compared to Option 2) that tracks performance of clusters of light points

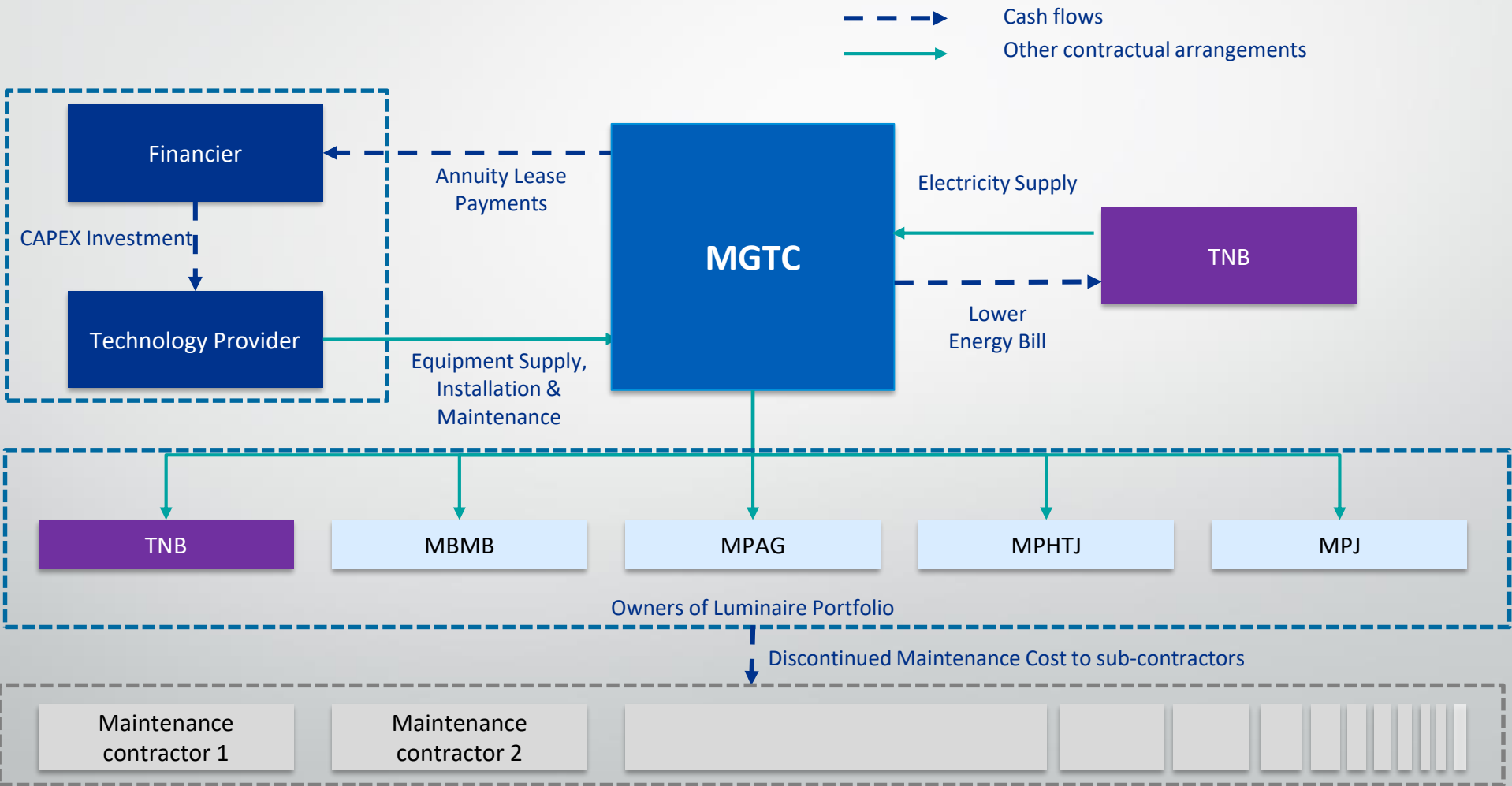
Option 4: LED / Partial Connectivity

Replacement of HPS lamps of 70W, 100W and 150W with stand-alone LED luminaires and HPS lamps of 250W and 400W with LED luminaires and built-in point-to-point connectivity

LED performance specifications will require new LED luminaires to match or exceed luminous performance of existing HPS luminaires, with $\geq 100,000$ h rated life, ≥ 108 lm/W luminaire efficacy, receptacles for easy add-on of communication/control nodes later on stand-alone luminaires, and full 10-year product warranty

Emerging Commercial Structuring

LEASE-TO-OWN CONTRACTING MODEL



Key Considerations

Cash flow risk

Issue: The risk arises from (1) market volatility in electricity pricing and the attendant subsidy and (2) the Government's future policy position with respect to electricity tariff.

Basis: Lease-to-Own model offers the greatest certainty to the payment streams and hence the lowest risk to the investors. The payments are conventionally premised on neither fluctuations in electricity tariff nor the actual savings generated.

Credit risk

Issue: The risk arises from (1) the complex interface among the key stakeholders, (2) complications in finalising the contractual payments and (3) constraints in government budget.

Basis: (1) A single-party integrator simplifies the contractual structure (2) Annuity lease is straight-forward and less susceptible to dispute (3) the State Government face less uncertainty in the budget setting and disbursement process.

Project return

Issue: Project and equity returns under the current base case assumptions are significantly below the level required by the equity investors.

Basis: Lease-to-Own model is a well-understood contracting model that has been well-received through market testing. The Project team is also exploring a PPP arrangement under an availability payment model premised on service performance.

PPP for Public Sector EE - Replication



LED street lighting retrofits in other states, other countries



Portfolios of public building energy efficiency improvements



LED traffic signal retrofits



Refleeting with electric buses, trucks and light vehicles



Water, wastewater and irrigation pumping replacements

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