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Partnership for a Better World

Guangdong Energy Efficiency and Environment Improvement Investment Program



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8th Regional Knowledge Sharing Event
GDI and Operational Knowledge
November 2-4, 2016, Chongqing, China



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-  **Brief Introduction**
-  **Development Challenges**
-  **Innovative Project Designs**
-  **Project Implementation**
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Brief introduction

- ◆ Efficiency Power Plant (EPP) — A Virtual Power Plant
 - How does a province with 92 million people and the biggest and fastest-growing economy in the nation increase desperately needed electricity supply for its industries without adding to already severe air pollution by burning more coal and other fossil fuels?
 - Instead of increasing power-generating capacity, the same amount of electricity would be made available to more users by making a wide spectrum of consumers more energy efficient.
 - The energy savings of the EPP to create would amount to a virtual power plant, which has the same effect on power availability as expanding an existing power plant or building a new one. The investments in newer technology to make the efficiencies possible would be recovered through savings on electricity bills and other energy costs from reduced demand.

Brief introduction

- ◆ This was ADB's first large-scale energy efficiency project in PRC that demonstrated a sustainable business model to establish a revolving financing facility for energy efficiency investments in SMEs.
- ◆ All three tranches of Guangdong EPP Program were completed as rated "Highly Successful", and Guangdong EPP model has since been replicated many times.
- ◆ On 16 September 2015, ADB IED recognized the highly successful implementation of the Guangdong EPP program (tranches 1 and 2) with the Sustainability Award 2015.
- ◆ Impact Story of Guangdong EPP Program was included in ADB flagship publication *TOGETHER WE DELIVER 2015*.

Guangdong Energy Efficiency and Environment Improvement Investment Program



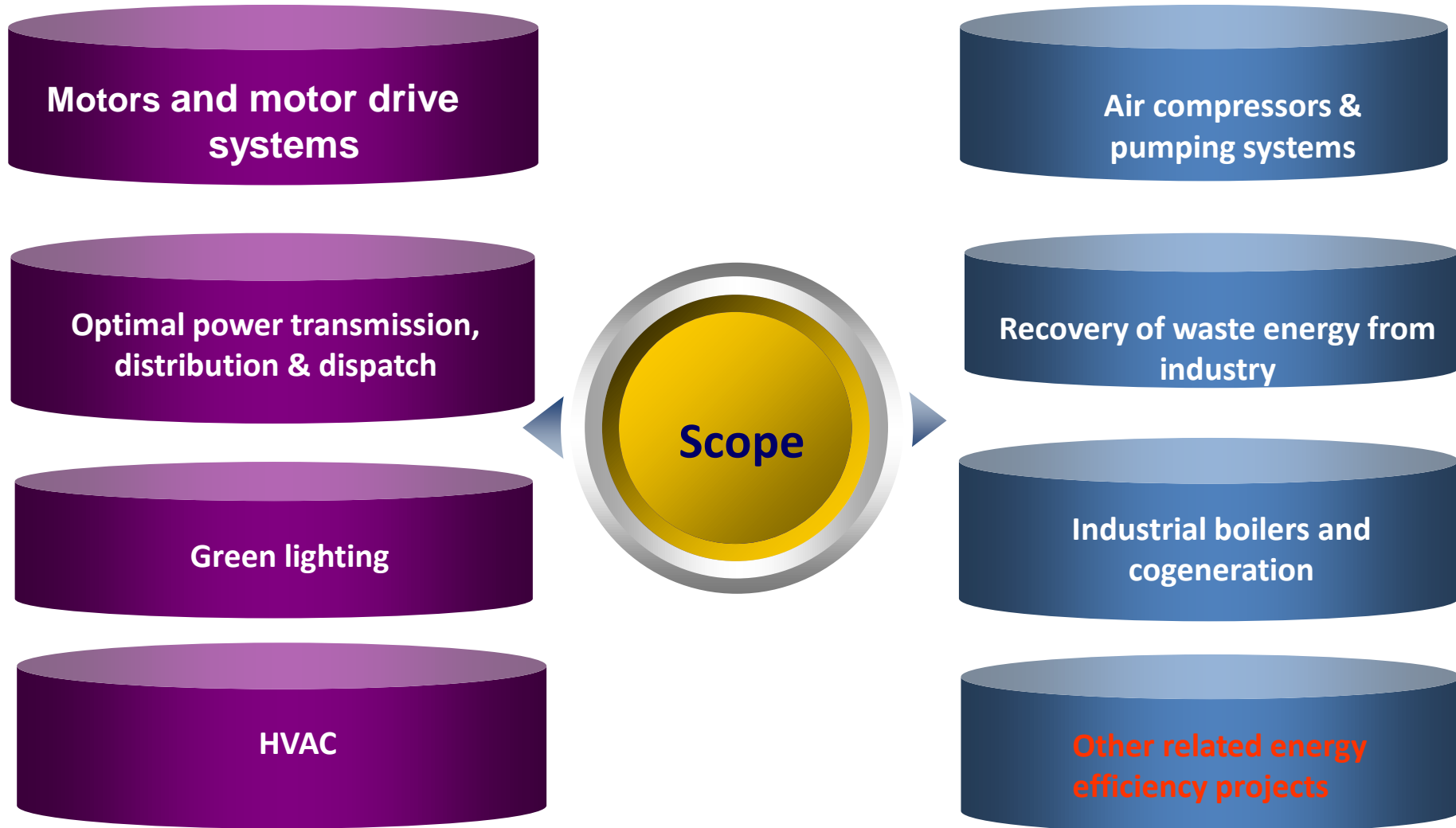
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Major Events

- | | |
|------|---|
| 2004 | Initiated EPP Program research in China (ADB/NDRC/MOF) |
| 2005 | Proposed to carry out EPP program in Guangdong
Started Advisory Technical Assistance (ADB) |
| 2006 | Guangdong was recommended to be pilot province |
| 2007 | Initiated Project Preparatory Technical Assistance |
| 2008 | ADB approved Multi-tranche Financing Facility (MFF) of \$100 million for three tranches |
| 2013 | ADB loan of MFF fully disbursed
MFF three tranches successfully completed |

Subproject Scope



Outcomes of Guangdong EPP Program (3 Tranches)

Items	Actual	Estimate at loan approval
# Subprojects	20	
Energy savings (GWh/year)	1,212	532
EPP capacity (in MW)	242.3	107
Coal consumption avoided (in tce/year)	399,891	175,813
Reduced emissions (in t/yr)		
CO ₂	945,197	415,560
SO ₂	10,906	4,795
NO _x	2,424	1,066
TSP	4,241	1,785

- **Electricity cost savings of about \$117 million per year.**
- **For every dollar invested, about \$4 of energy cost saved.**
- **ADB funded 40% of total investments.**

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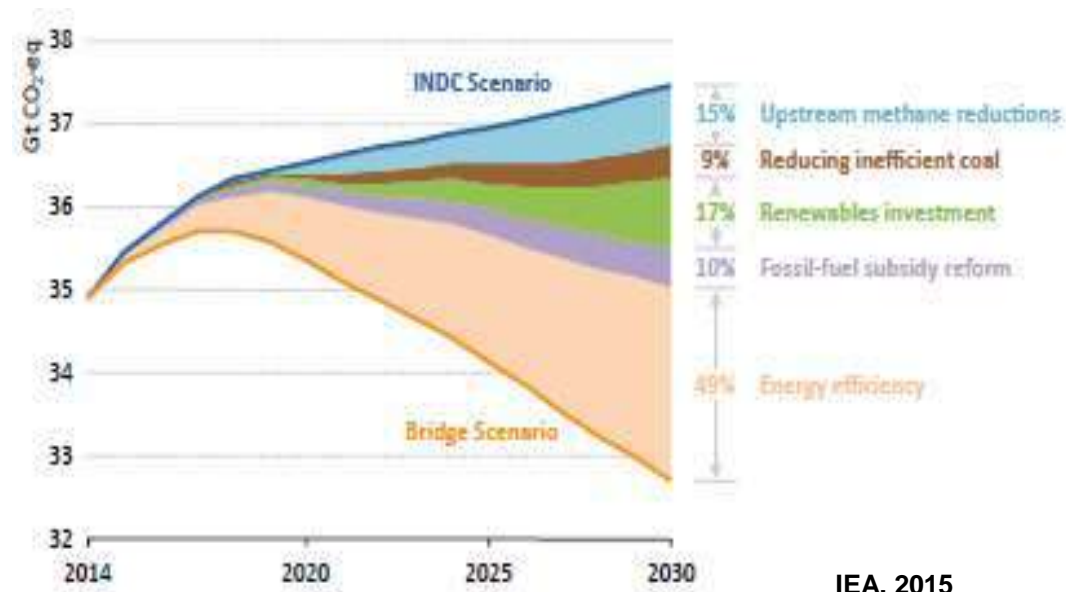
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Development Challenges

Energy Efficiency is Key to achieving ...

- Sustainable energy access for all (SDG 7)
- Limit global warming below 2 degrees Celsius
- Clean air development And so much more!

Annual investment up to 2030 amount to \$380billion, but more than 2/3rds of energy efficiency potential is not yet even targeted.



Guangdong Province Energy Efficiency Status : Key Problems and Constraints

In 2007, in Guangdong Province...

- Engine of growth with 14% GDP growth per year
- High energy import dependency
- 13%/year power demand growth since 1995
- Industry represented 73% of total electricity use
- Energy intensity was about 3.4x the average of OECD countries
- 75% of generation mix based on coal
- Severe power shortages during summer since 2002; 6.3 GW of industrial power demand was shed
- Significant underinvestment in energy efficiency

Why are the investments not happening?



icons from: www.iconfinder.com

- Limited access to financing
- Lack of awareness about energy efficiency technologies
- Focus on output growth
- Weak supply chain of energy efficient products
- Lack of understanding by banks how to evaluate energy efficiency benefits
- Lack of interest by commercial banks

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Innovative Project Design

1

Financing Modality: Multi-tranche Financing Facility (MFF) to accelerate review and approval

2

Project scope: extending EPP to a broader energy-saving spectrum

3

Implementing body: motivate SMEs to become the energy saving key force

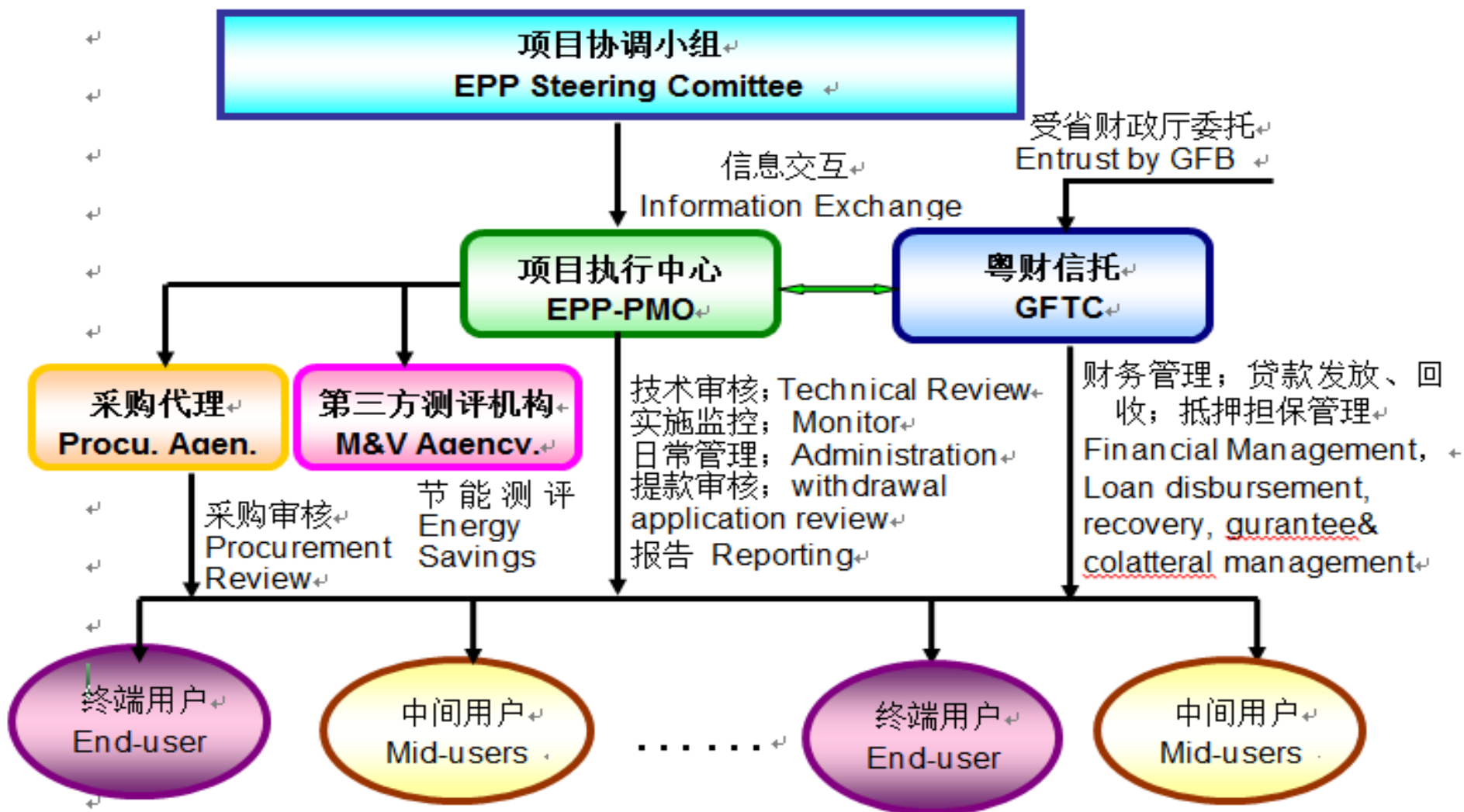
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Revolving Mechanism: an on-lending model to revolve ADB Loan Proceeds

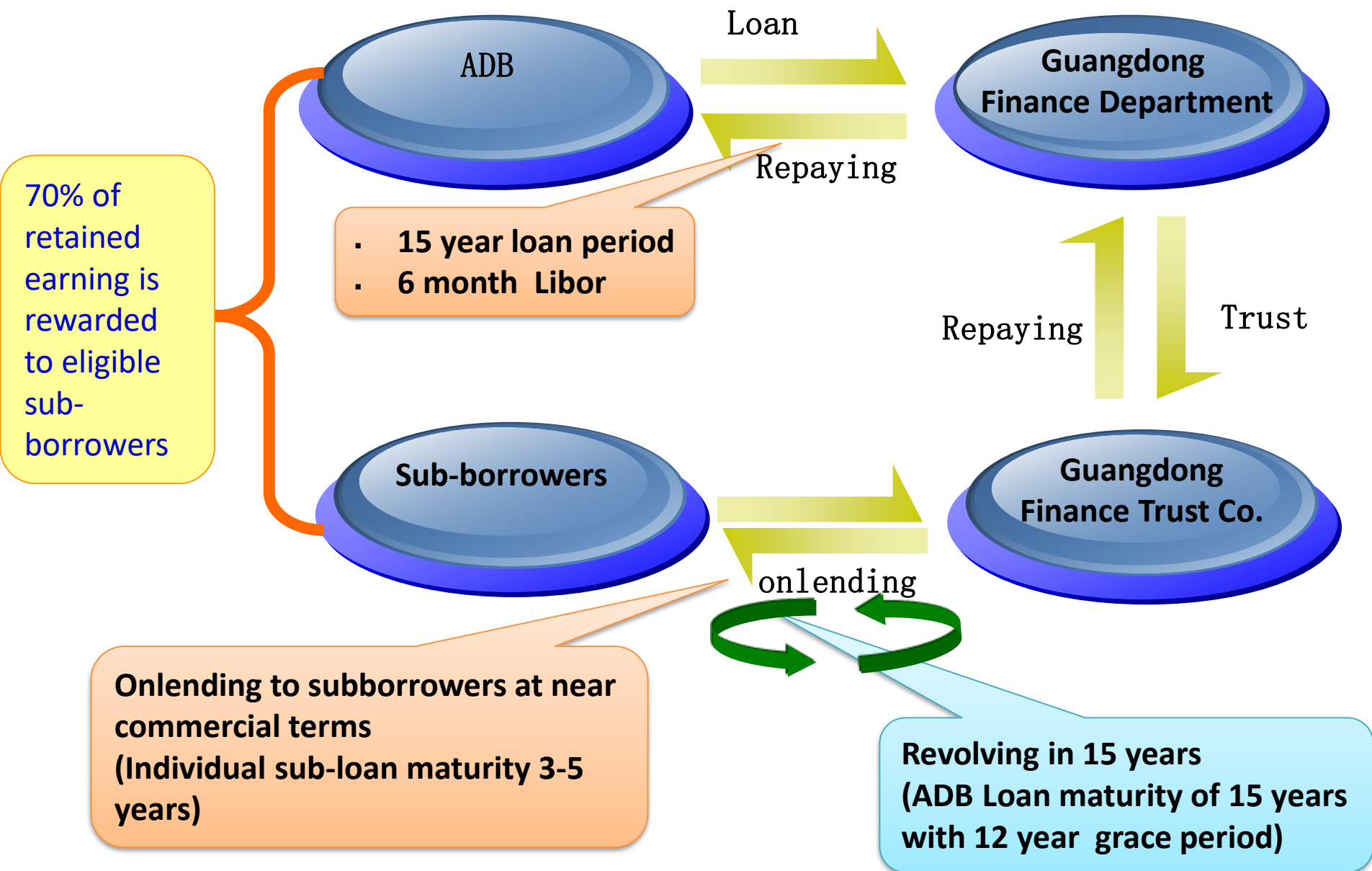
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Energy savings M&V by independent third party agencies

Project Management Structure



Simplified Onlending Arrangements



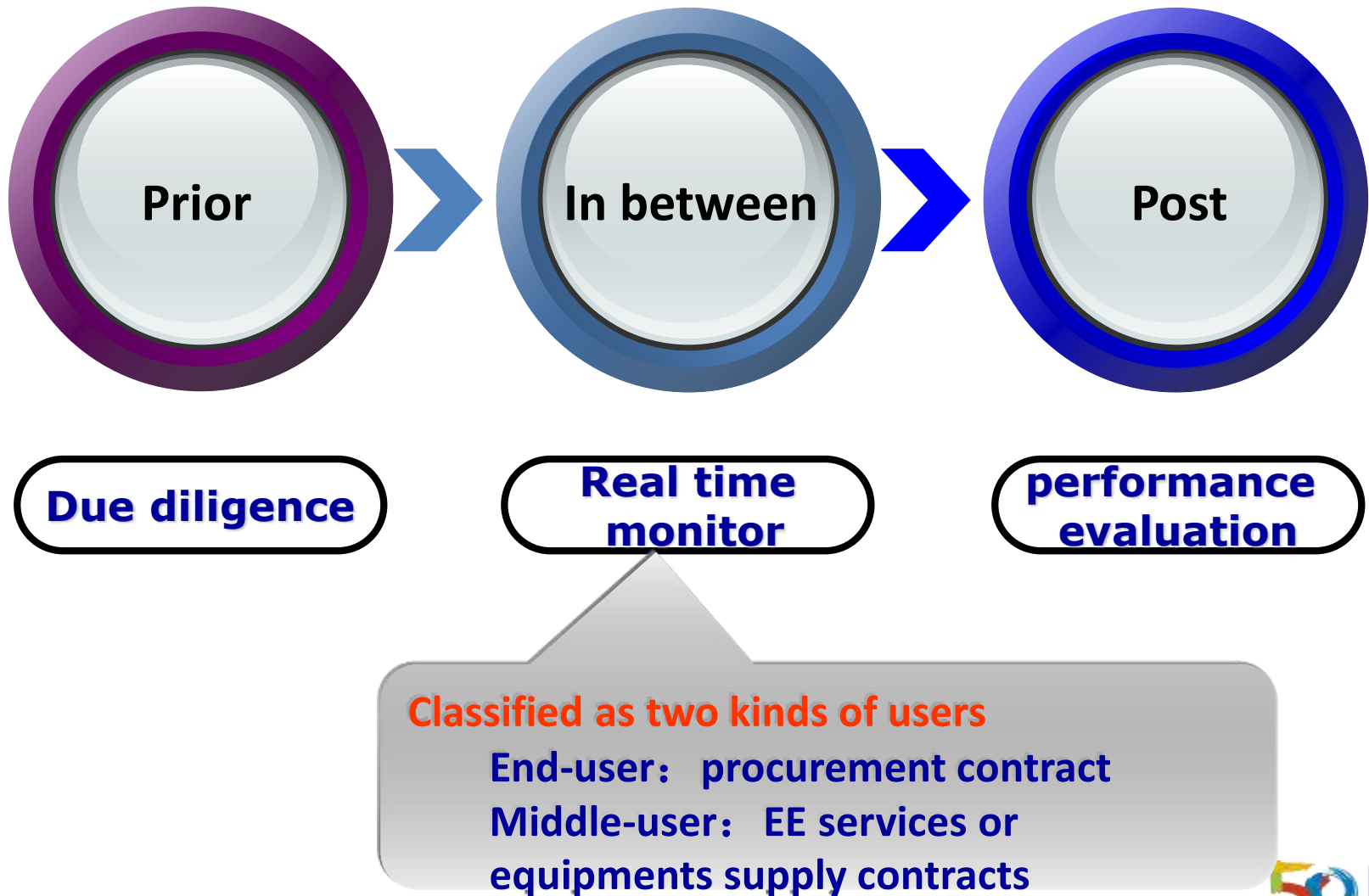
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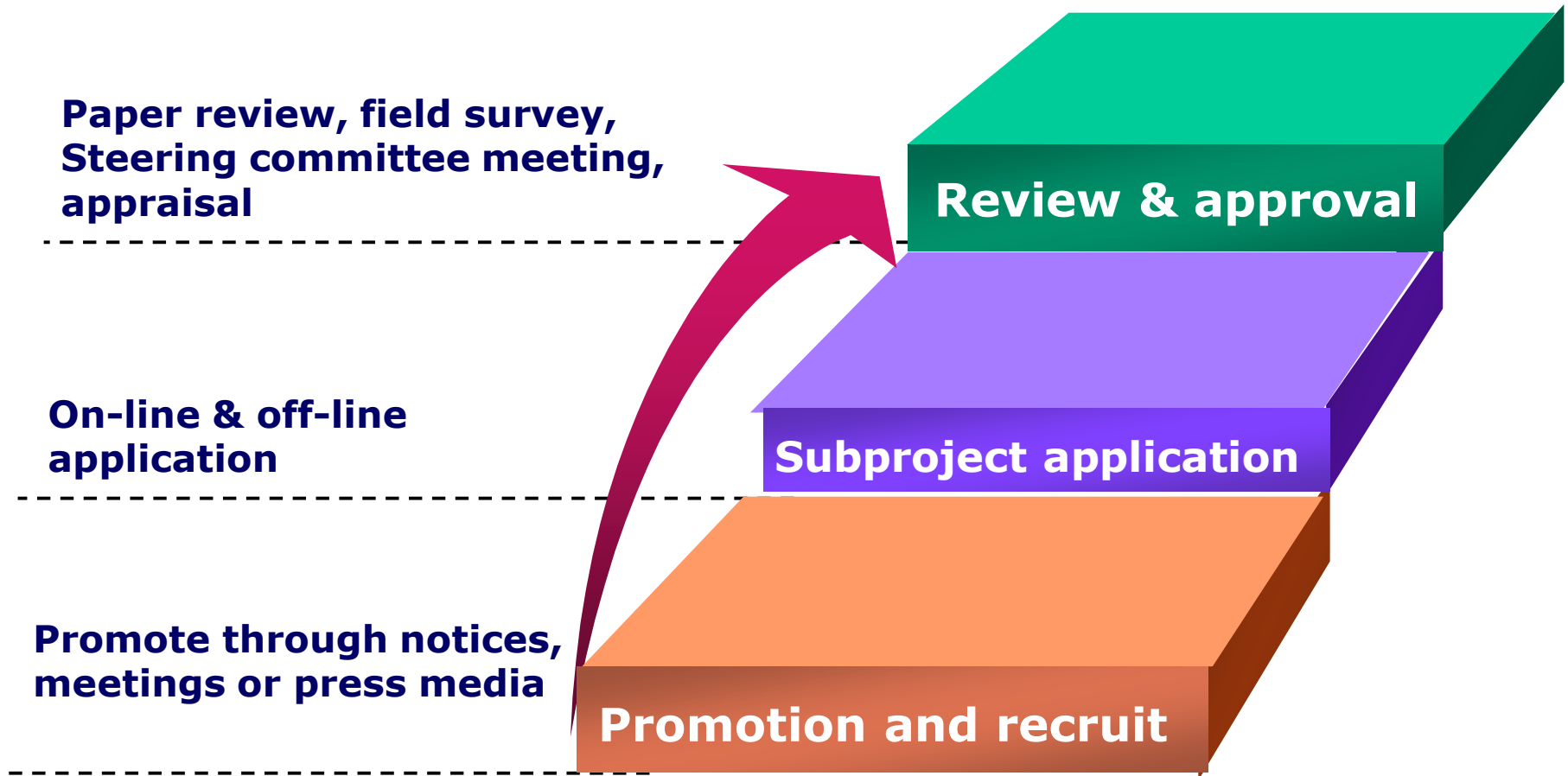
Good Practices in Project Implementation

- ◆ Great support of the government and cooperation of various departments of the government have created a favorable environment and conditions
- ◆ Creative and practical mechanical arrangements have ensured a smooth implementation and sound management
- ◆ Technical professional of EPP-PMO has been joined by financial professional of GFTC. The two independent and complementary expertise together have ensured a regulatory and professional management
- ◆ Capacity building through trainings to shareholders is important for improvement of the management capacity of all shareholders and the successful and sustainable implementation of the EPP Program
- ◆ Government bears project management cost, which reduces cost of the sub-borrowers

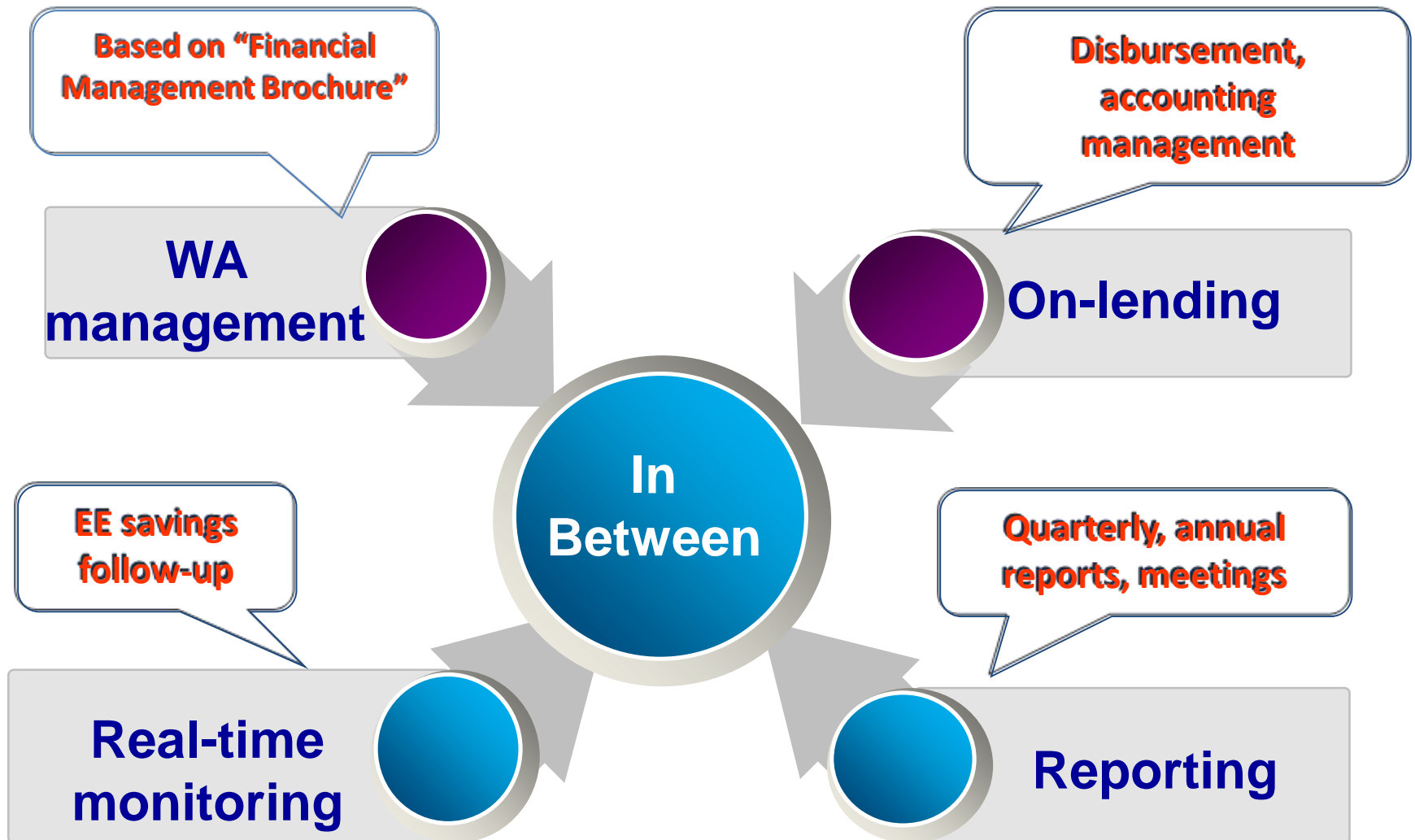
Project Management



1. Prior Management



2. In-between Monitoring



3. Post Management

**Completion & acceptance:
Each subproject in every tranches**

**Program audit:
ADB & domestic audit**

**Account maintainance and liquidation :
Trust earnings**

**Program
Acceptance**

Implementation Update

Tranche 1

Tranche 2

Tranche 3

Revolving Fund

**ADB loan:
\$35mil;
8 subloans.
Completed**

**ADB loan:
\$22.06mil;
6 subloans.
Completed**

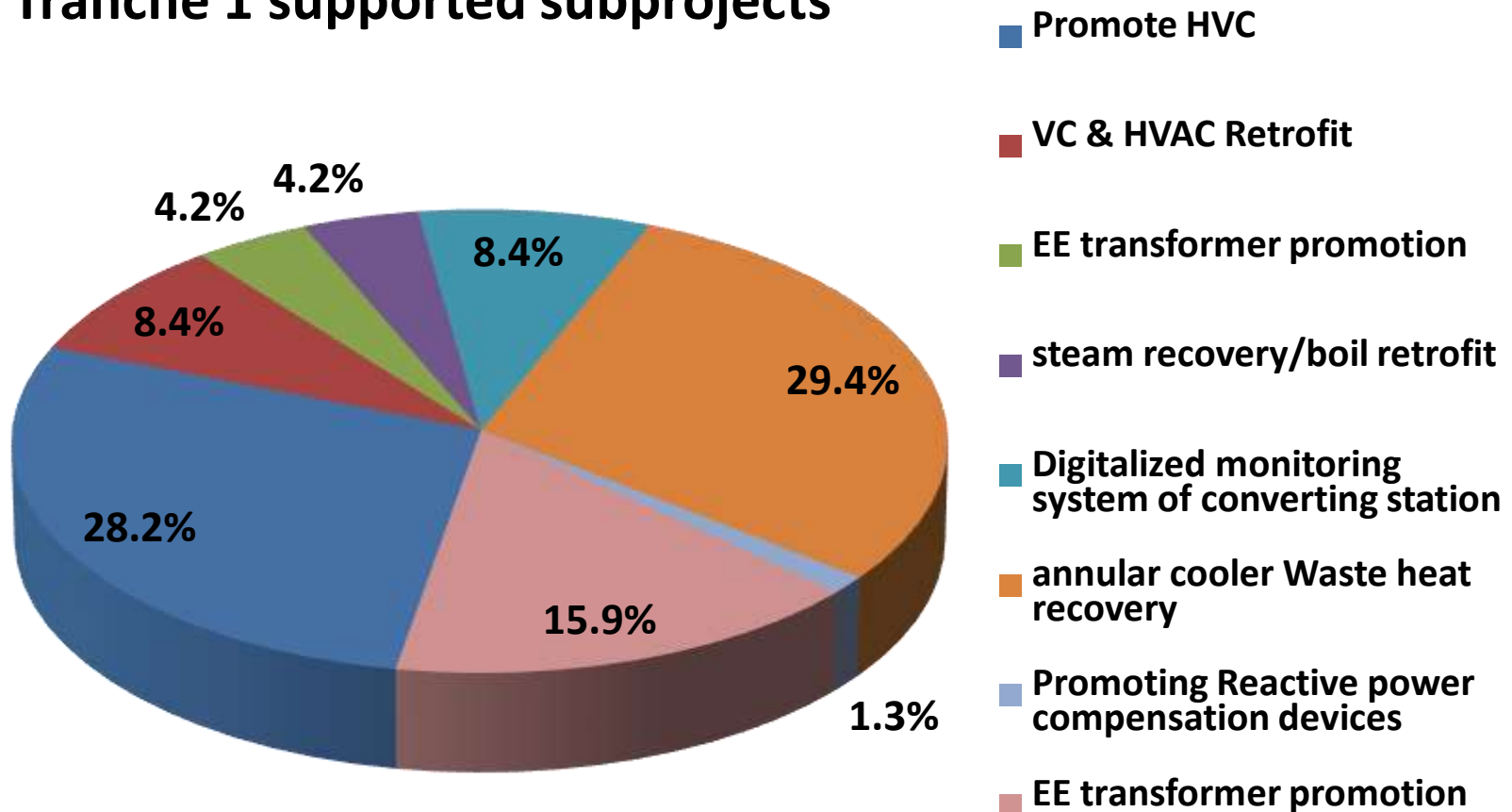
**ADB loan:
\$42.94mil;
6 subloan.
Completed**

**Revolving fund:
CNY 732 mil;
21 subprojects.
more
subprojects...**

Guangdong EPP Program – Tranche 1

Total inv. CNY 605.42 mil., CNY 238 mil from ADB loan

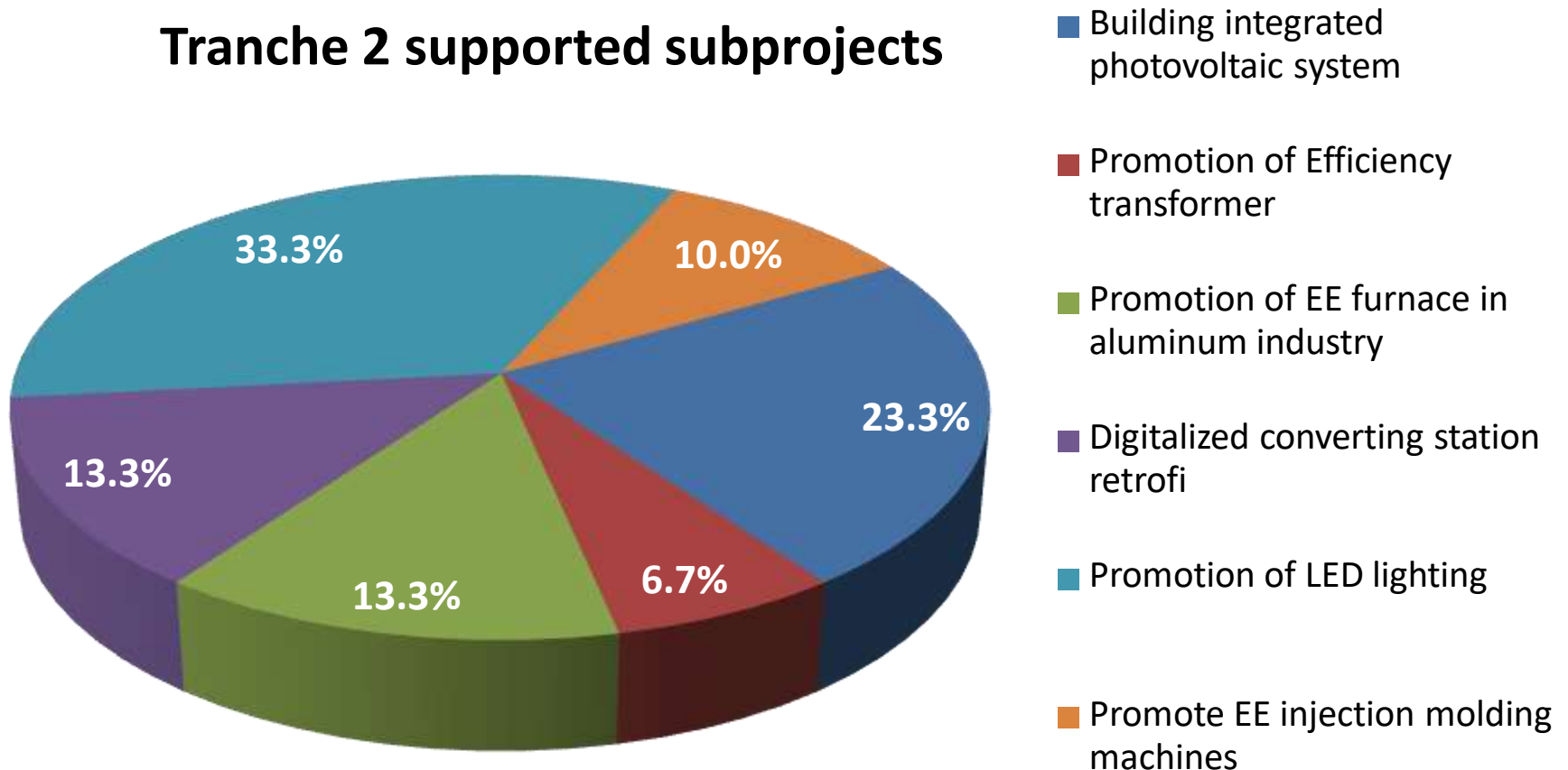
Tranche 1 supported subprojects



Guangdong EPP Program – Tranche 2

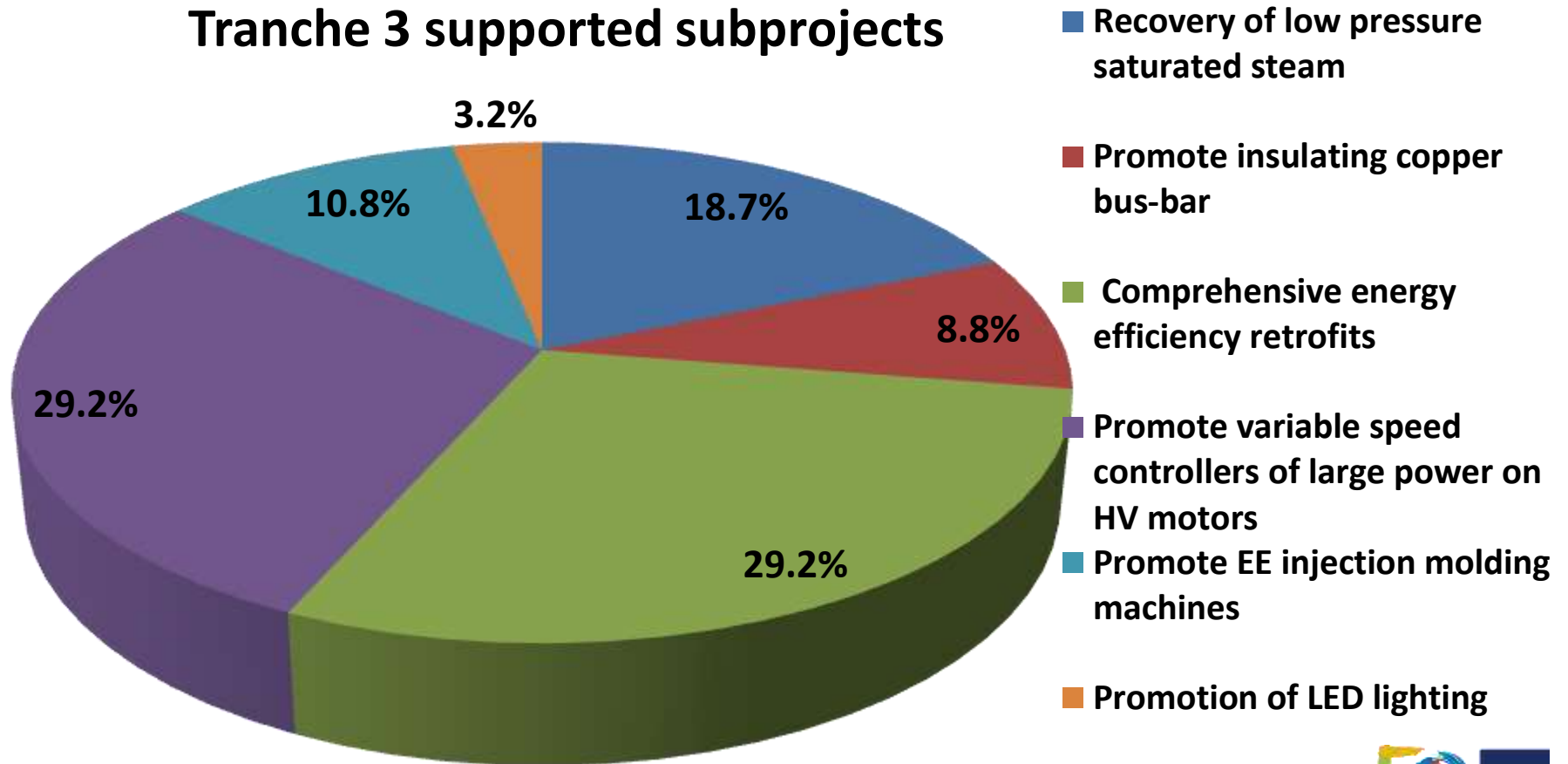
Total inv. CNY 415 mil, 22.06mil. USD from ADB loan

Tranche 2 supported subprojects



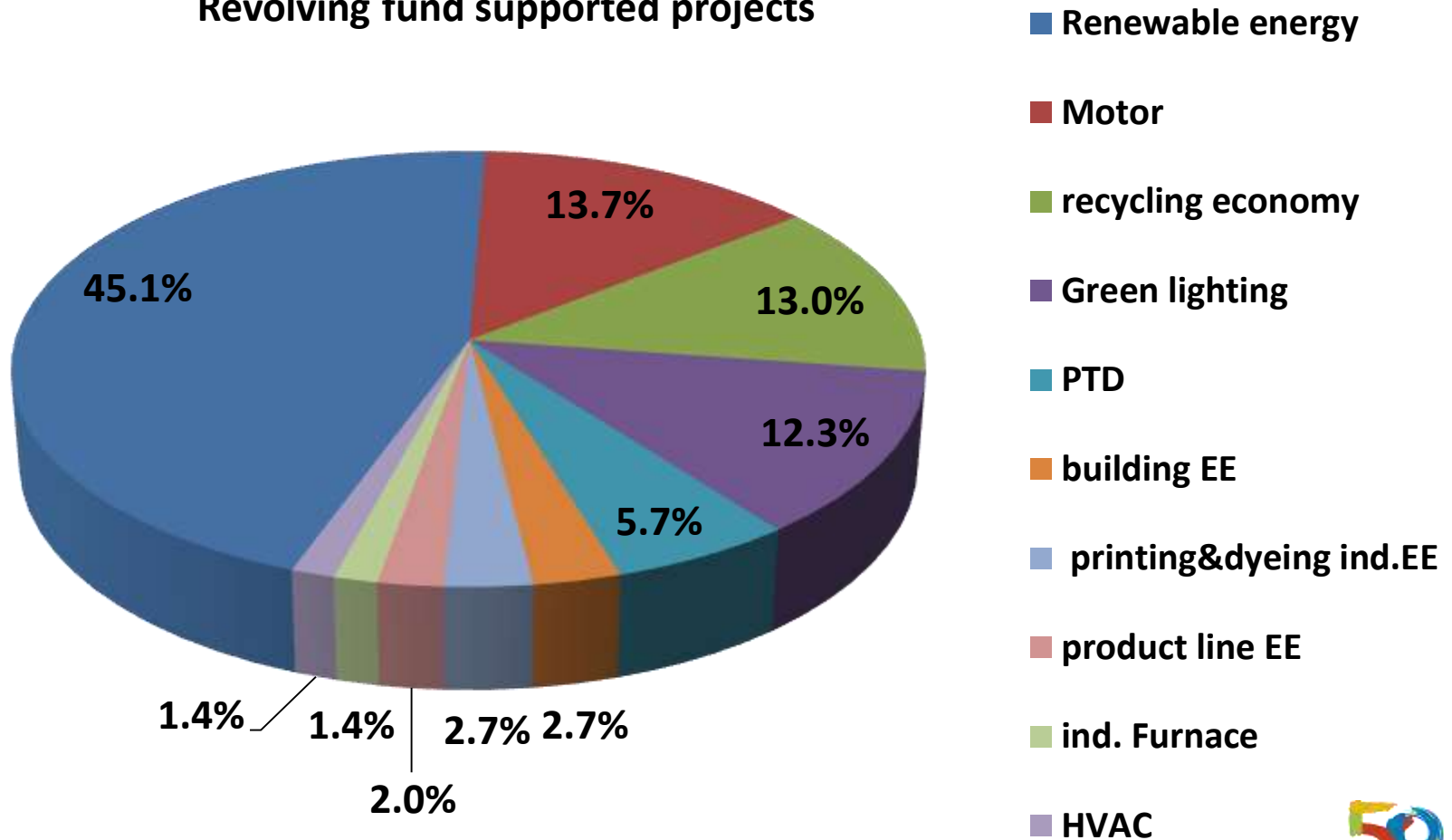
Guangdong EPP Program – Tranche 3
Total inv. CNY 655.91 mil, ADB loan 42.94 mil. USD

Tranche 3 supported subprojects

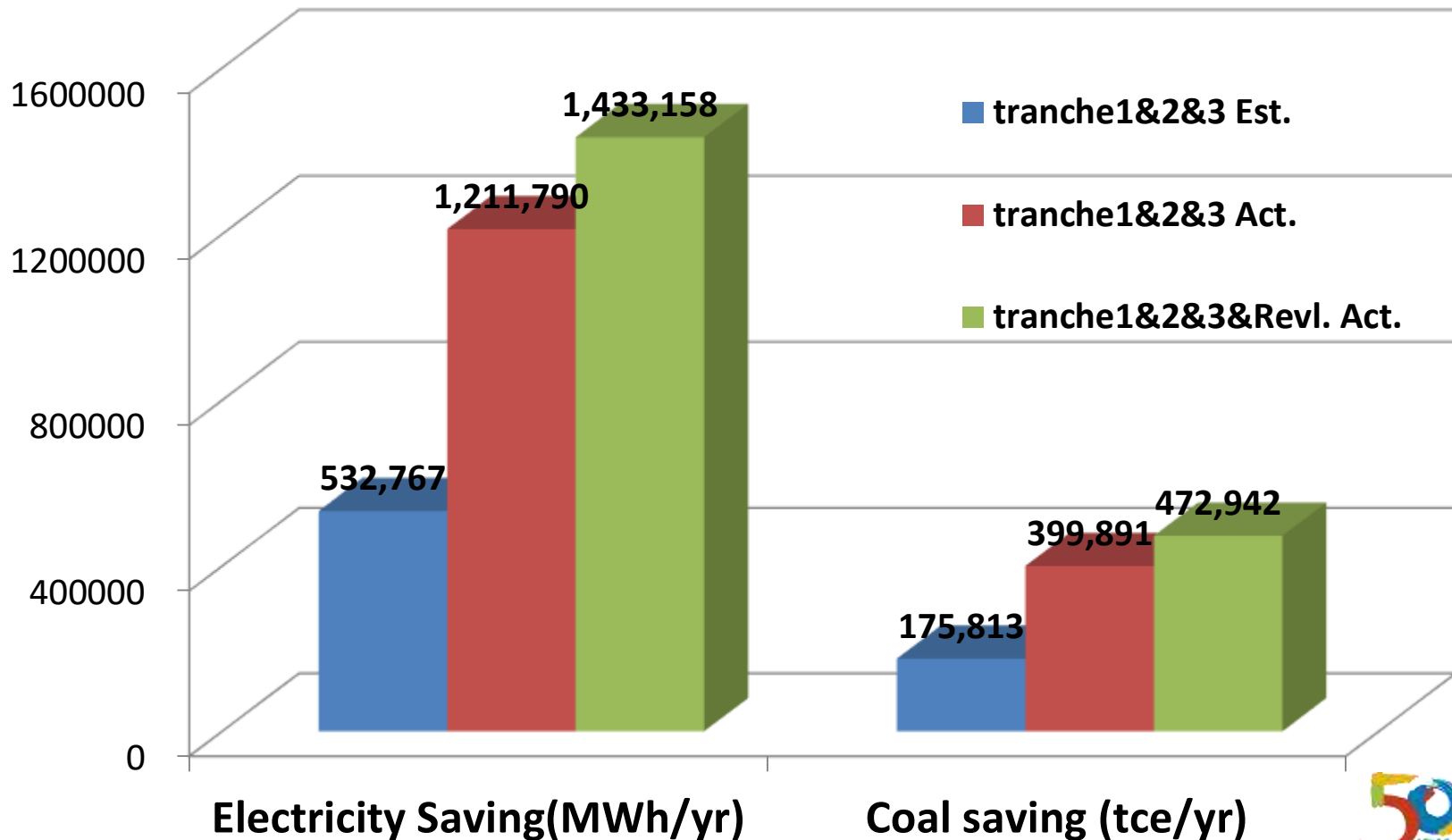


Guangdong EPP Program – Subprojects supported by Revolving Fund CNY557mil. to 21 sub-proj., total inv.CNY2,236mil. CNY732mil.

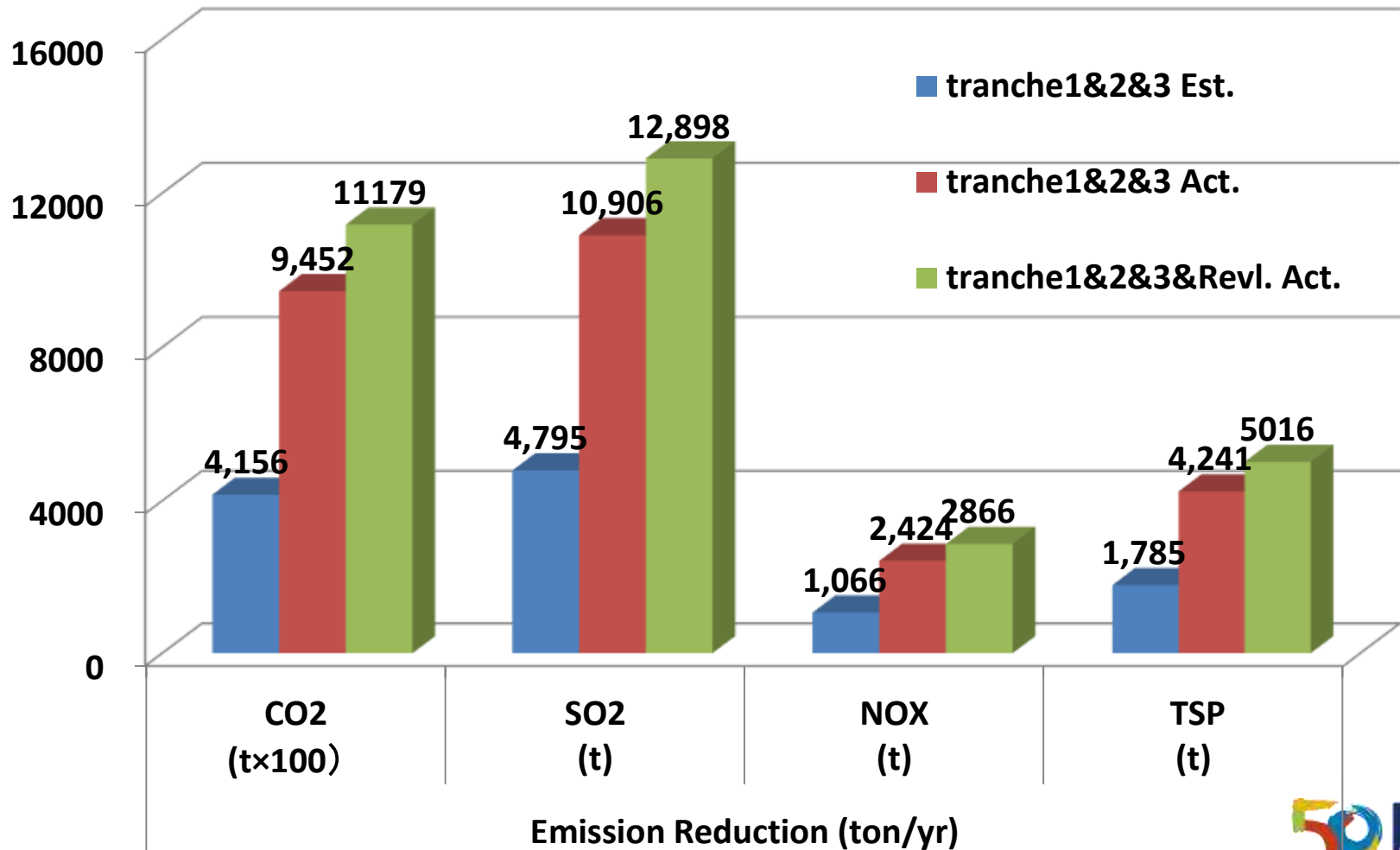
Revolving fund supported projects



Energy Efficiency Benefits (Actual vs Estimate)



Emission Reduction Benefits (Actual vs Estimate)



Delivery Challenges

How to enhance the EPP Program attractiveness ...

- Government bears project management cost
- No foreign exchange risks by sub-borrowers
- Government bears the cost of third party energy savings M&V
- Flexible sub-loan collaterals and guarantees
- Reward mechanism measures for participating subprojects

Benefits for Sub-borrowers

1

Low cost financing, with long maturity period

2

Increased cash flow, enhanced competitiveness

3

improved reputation and banking credit

4

Improved enterprise management

5

Potential energy-saving rewards and allowance

6

Learning international best practices

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Lessons Learned

- ADB finance can leverage several times its value in private funding that would otherwise not have been mobilized by co-financing projects and otherwise building private sector confidence
- EPP projects are more complex to implement
- Executing/ implementing agencies and financial institutions require capacity building
- Cost reflective energy pricing and regulatory incentives are essential to encourage energy efficiency investments—strong leadership by government is needed
- Energy efficiency champions can intensify awareness of energy –savings and their long-term benefits

A replicable Model to Promote EE

- Successful implementation of the Guangdong EPP serves as a model for promoting and undertaking EPP programs in other parts of the PRC.
- Shandong and Hebei provinces have replicated Guangdong model and carried out their own EPP projects with \$100 million ADB loan each province since 2011.
- In 2015 ADB approved a Chemical Industry Energy Efficiency Project to reduce energy consumption, phase out mercury use, and cut greenhouse gas and toxic emissions in its chemical industry which also replicates many of the features, but developed it further to foster some important innovations.
- Proposed Shaanxi Accelerated Energy Efficiency and Environment Improvement Financing Project, which was negotiated on 13-14 Oct 2016, will be approved in November 2016.
- The Guangdong EPP model is widely recognized as the pioneer in stimulating energy efficiency investments and continues to provide many valuable lessons for other provinces and enterprises.

Thank you!

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