



Analyzing Incentives and Financial Mechanisms to promote High Energy Efficient Buildings in Thailand

Organized by

Thai-German Programme on Energy Efficiency Development Plan (TGP-EEDP)

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Ratchathewi Bangkok

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Review of Incentive Models

1. **Germany's KfW Programs**
 - 1.1 Background and Implementing Strategy
 - 1.2 KfW (EEC&EER) Programs
2. **The Netherlands' Green Fund Scheme**
3. **Thailand's Incentive Programs**
4. **Briefing "White Certificate" Scheme**

Analyzing
Incentive
Schemes
based on Thai
Context

Proposed
Incentive
Scheme

1. Germany's KfW Programs

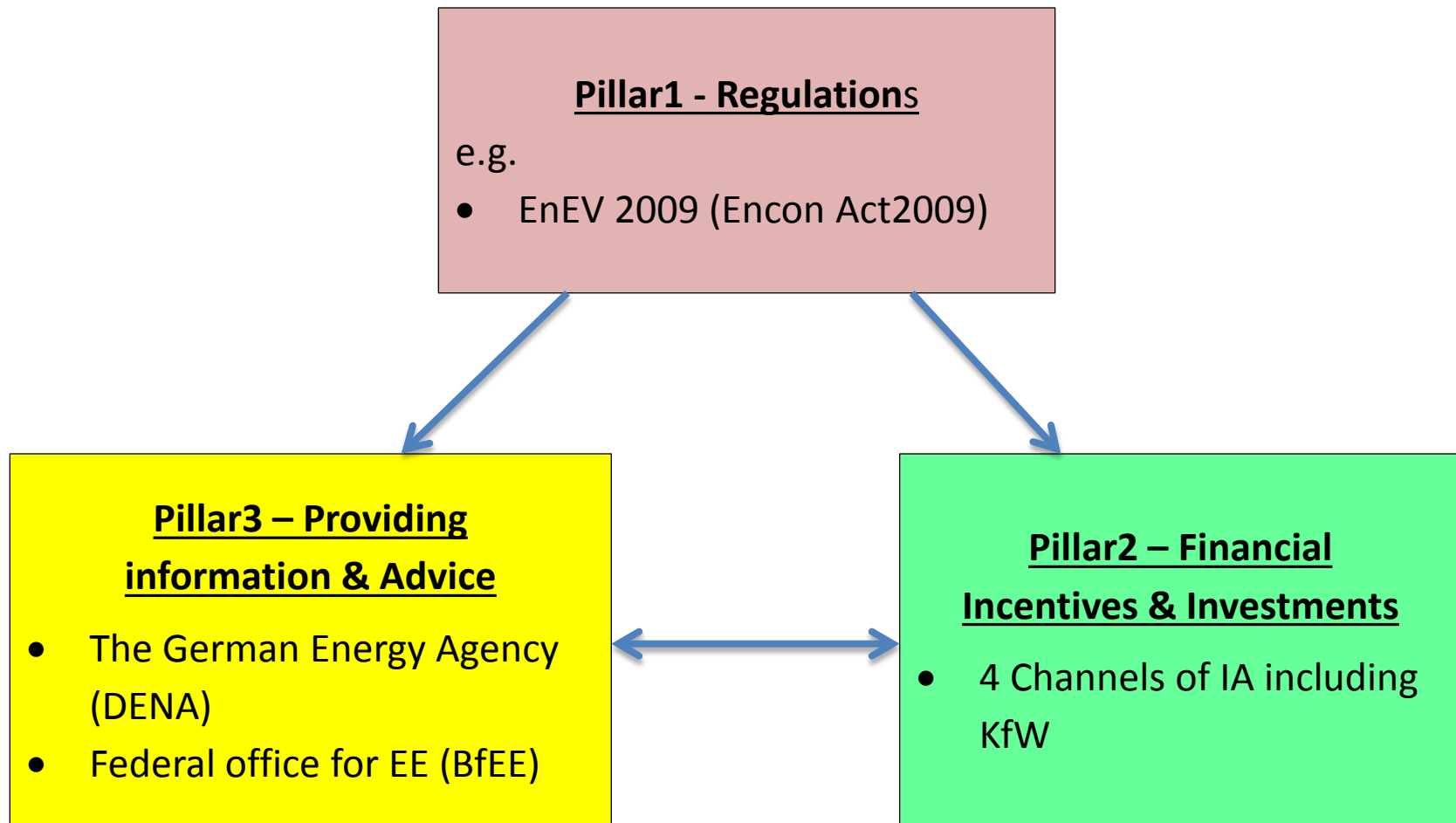
1.1 Background and Implementing Strategy

❖ Implementing Strategy

Deploy three-pillar approach

- ❑ **Pillar1- Regulations:** Law and regulations have been amended and established regularly to be consistent with changing situation. Latest amendment on energy conservation act was in 2009.
- ❑ **Pillar2- Financial Incentives and Investments:** Through 4 channels- KfW bank group, federal government, regional government, and municipalities.
- ❑ **Pillar3- Providing information and advices:** Through two agencies (i) DENA; The German Energy Agency, and (ii) BfEE; Federal Office for Energy Efficiency.

The Three-Pillar Approach



1. Germany's KfW Programs

❑ Energy Efficiency Construction (EEC) and Energy Efficiency Refurbishment (EER) (2009-present)

➤ Key Program design

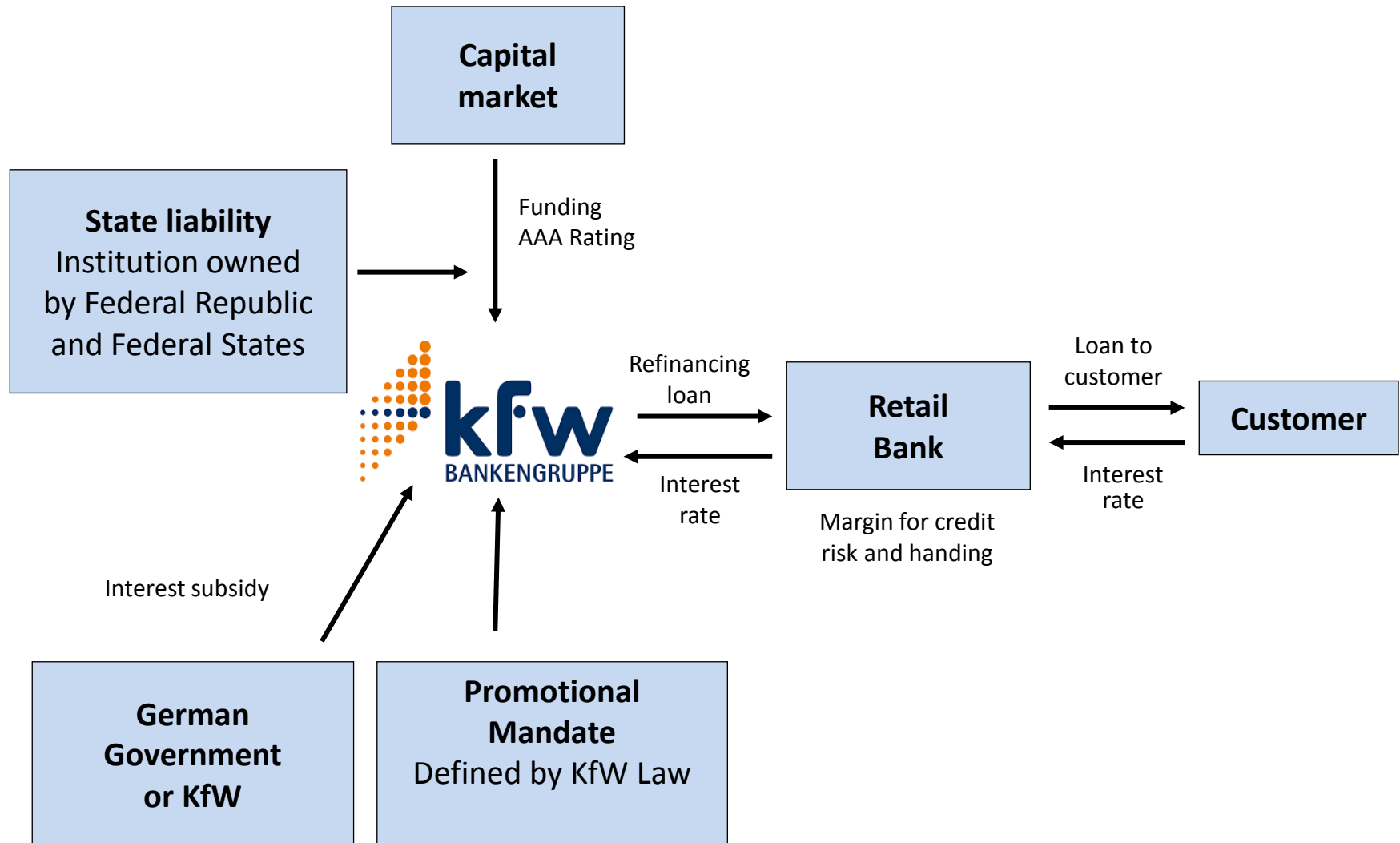
Efficiency House (EH) Scheme with energy performance of buildings classified into different levels that linked with building energy code (reference building).

| KfW EH Rating | Annual primary energy demand in % of the reference building of energy saving ordinance (EnEV) | Transmission heat loss in % of the reference building of energy saving ordinance (EnEV) |
|---------------|---|---|
| EH 40 | 40 | 55 |
| EH 55 | 55 | 70 |
| EH70 | 70 | 85 |
| EH85 | 85 | 100 |
| EH100 | 100 | 115 |
| EH115 | 115 | 130 |
| Monument | 160 | 175 |

Review of Incentive Models

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Funding Structure and Loan Process for EEC and EER Programs

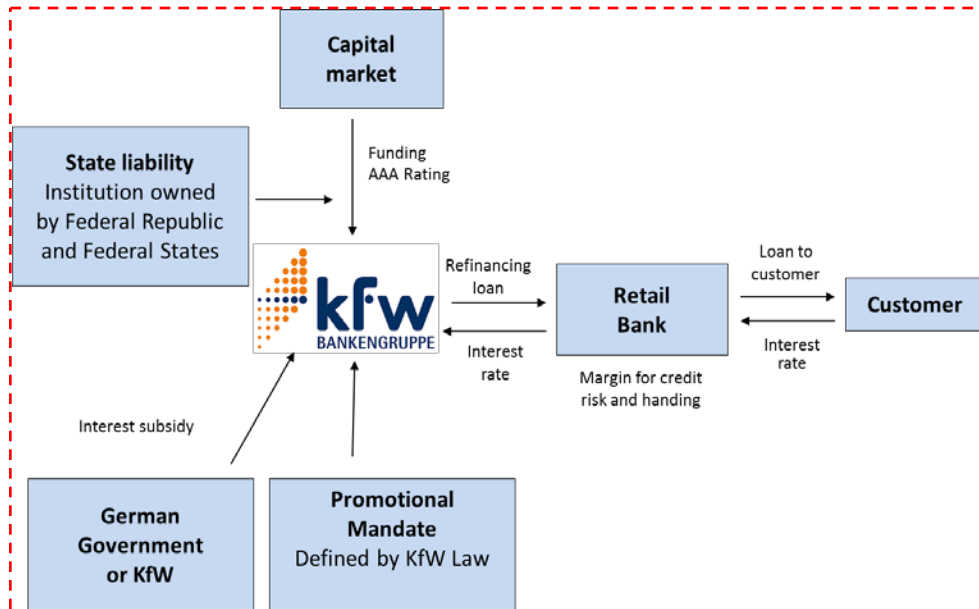


EnEV 2009

(Energy conservation Act amended in 2009)

DENA

- Info Dissemination & Campaign
- Training experts & maintaining database
- Energy Standards & Certification
- Demonstrate pilot project
- Simplifying method



➤ Type/Mode of Financial Models

❖ For EEC Program

- Building type : new residential buildings
- Designated efficiency house ratings EH 40 to EH 70
- Type of financing loans of up to EUR 50,000
- Grace period : up to five years depending on credit period
- Fixed interest rate for the first ten years depending on EH rating
- Grant redeployment depending on EH rating

| Efficiency House Rating |
|----------------------------|
| 40 |
| 55 |
| 70 |

| Interest rate* | Grant redeployment in % |
|----------------|-------------------------|
| 0.75% | 10 |
| 0.75% | 5 |
| 1% | - |

Review of Incentive Models

❖ For EER Program

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Loan option with grant redeployment

- Building type : existing residential buildings
- Designated efficiency house ratings EH 55 to EH 115, plus EH Monument and single measures
- Type of financing : loans of up to EUR 75,000 and EUR 50,000 for single measures
- Grace period : up to five years depending on credit period
- Fixed interest rate for the first ten years depending on EH rating
- Grant redeployment depending on EH rating

| Interest rate* | Maximum grant redeployment in EUR |
|----------------|-----------------------------------|
| 0.75 | 16,875 (22.5% of eligible costs) |
| 0.75 | 13,125 (17.5% of eligible costs) |
| 0.75 | 9,375 (12.5% of eligible costs) |
| 0.75 | 7,500 (10% of eligible costs) |
| 0.75 | 5,625 (7.5% of eligible costs) |
| 0.75 | 5,625 (7.5% of eligible costs) |
| 0.75 | - |

or

Grant option

- Building type : existing residential buildings
- Designated efficiency house ratings : EH 55 to EH 115, plus EH Monument and single measures
- Type of financing : grants of up to EUR 18,750 depending on EH level

| Maximum grant amount in EUR |
|------------------------------------|
| 18,750 (or 25% of eligible costs) |
| 15,000 (or 20% of eligible costs) |
| 11,250 (or 15% of eligible costs) |
| 9,375 (or 12.5% of eligible costs) |
| 7,500 (or 10% of eligible costs) |
| 7,500 (or 10% of eligible costs) |
| 5,000 (or 10% of eligible costs) |

| Efficiency House Rating |
|-------------------------|
| 55 |
| 70 |
| 85 |
| 100 |
| 115 |
| Monument |
| Single measures |

1. Germany's KfW Programs

1.2 KfW (EEC&EER) Programs

□ Products/ Activities covered

- Comprehensive measures for new residential buildings (EEC)
- Comprehensive and single measures for existing residential buildings (EER)

□ Budgets

- An annual gov't budget combined with loans raised at capital market by KfW.
- As of 2012,
 - KfW raised loans at capital market EUR 8.4 billion
 - gov't budget EUR 1.5 billion
 - **Total EUR 9.9 billion**

1. Germany's KfW Programs

1.2 KfW (EEC&EER) Programs

□ Results achieved

- Evaluated annual energy saving from 2012 data through both programs exceeded 2,600 GWh/ year.
- **Two programs leveraged EUR 27 billion of investment. (2012)**
- Over 2006-09 KfW programs retrofitted 1 million existing homes with energy-efficient products, and 400,000 highly energy-efficient new homes were built, and 250,000 jobs per year.
- Other benefits such as increase business opportunity to commercial banks.

1. Germany's KfW Programs

1.2 KfW (EEC&EER) Programs

□ Reasons for Success

- The three pillars of the German approach-a clear legal framework; strong subsidy and loan programs; and promotional information, advice, and support
- The combination of generous subsidies and low-interest loans with highly ambitious standards.
- Germany has taken a comprehensive approach. Almost all domestic buildings are eligible for subsidy/ for retrofit. The only exclusions are applicants with low credit-worthiness or who propose over costly measures for the eligible finance.

- Energy savings targets are aggressive with respect to both new and existing homes and inspire innovation in energy technologies and building practices.
- **KfW, a publicly supported investment bank group, is a powerful government funding tool to all regions of Germany.**
- A step-by-step approach using pilot projects develops standards and promotes program in specific areas before extending throughout the country.
- **DENA's can access to experts (architects, engineers, planners, researchers), who in turn influence clients. Their guidance and expertise reach a very large audience via local agencies.**

1. Germany's KfW Programs

1.2 KfW (EEC&EER) Programs

□ Limitations

- The German legal framework for energy-efficient buildings is apparently complex, requiring considerable policy support and strong enforcement.
- Sizeable program budget and large amount of leveraged funds from private sectors make it difficult for program application in other economies.

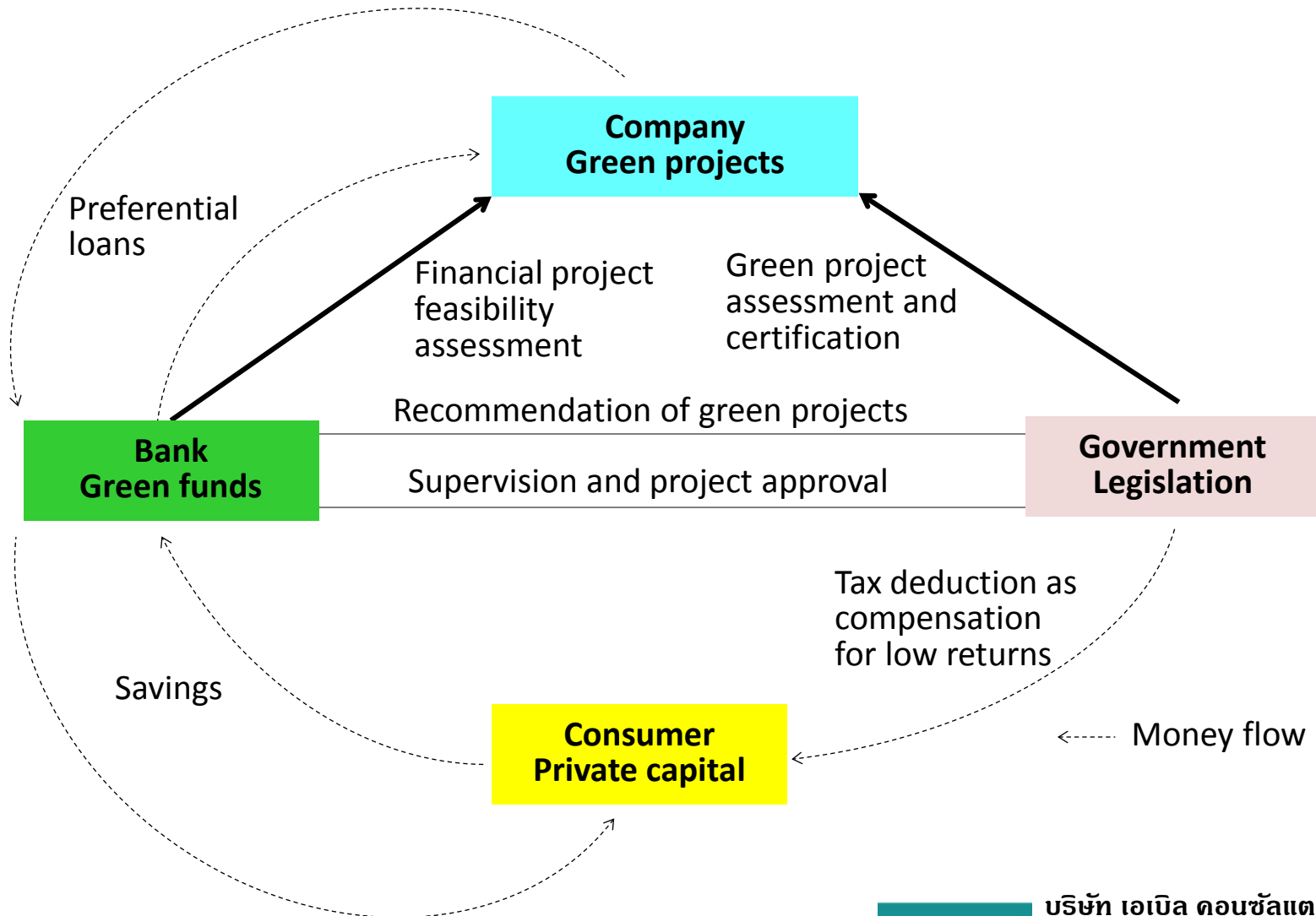
2. The Netherlands' Green Fund Scheme

| Items | Green Funds Scheme (GFS) |
|--------------------------------------|--|
| Country | The Netherlands |
| Sector/Target groups | <ul style="list-style-type: none">• All sectors |
| Objective | <ul style="list-style-type: none">• To promote access to financial sources for environmentally sound projects |
| Key Program Design | <ul style="list-style-type: none">• Provide environmental tax credits to investors in GFS to compensate for lower than market interest rate that investors receive.• On the other hand, the banks charge green projects a lower interest rate and, hence, provide them with financial resources they otherwise would have to borrow at a higher cost. |
| Mode of Financial/Fiscal Instruments | <ul style="list-style-type: none">• Tax credit (Tax deduction) |

2. The Netherlands' Green Fund Scheme

| Items | Green Funds Scheme (GFS) |
|--------------------|--|
| Activities covered | <ul style="list-style-type: none">• The Dutch government provided necessary legislation, supervises the banks issuing green funds or offering green savings and ensures that green projects are properly assessed against the ecological criteria set by the government.• Investors invest in GFS and receive below average return but later compensated by tax credit. The banks supply cheap loans to projects under Green Projects Scheme.• All projects applying for loans have to pass a sustainability test and subsequently awarded "Green Certificate".• The technologies supported by the GFS must be new and have a low market penetration of about 5 to 10%.• The banks are obliged to put at least 70% of the money they receive into certified green projects. They may invest the remaining 30% elsewhere to diversify risk and to compensate for commercially profitable projects.• The criteria for the green projects are adjusted regularly . |
| Level of Policy | National |
| Start/ End Year | 1995 - ongoing |
| Budget | <ul style="list-style-type: none">• In 2010, the Dutch gov't provided EUR 150 million in tax incentives for GFS. |

2. The Netherlands' Green Fund Scheme



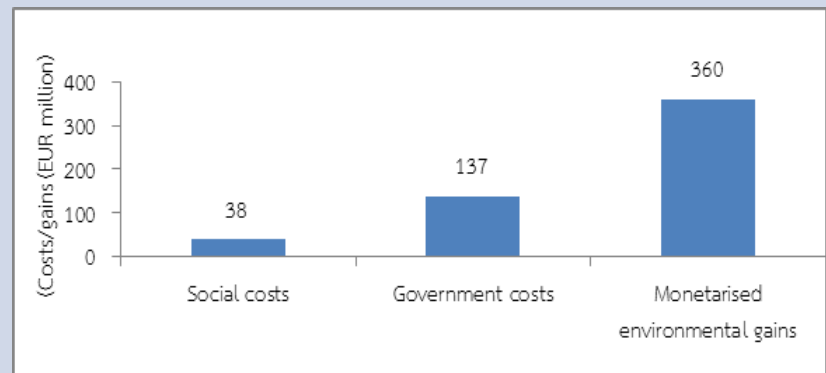
2. The Netherlands' Green Fund Scheme

Items

Green Funds Scheme (GFS)

Results Achieved

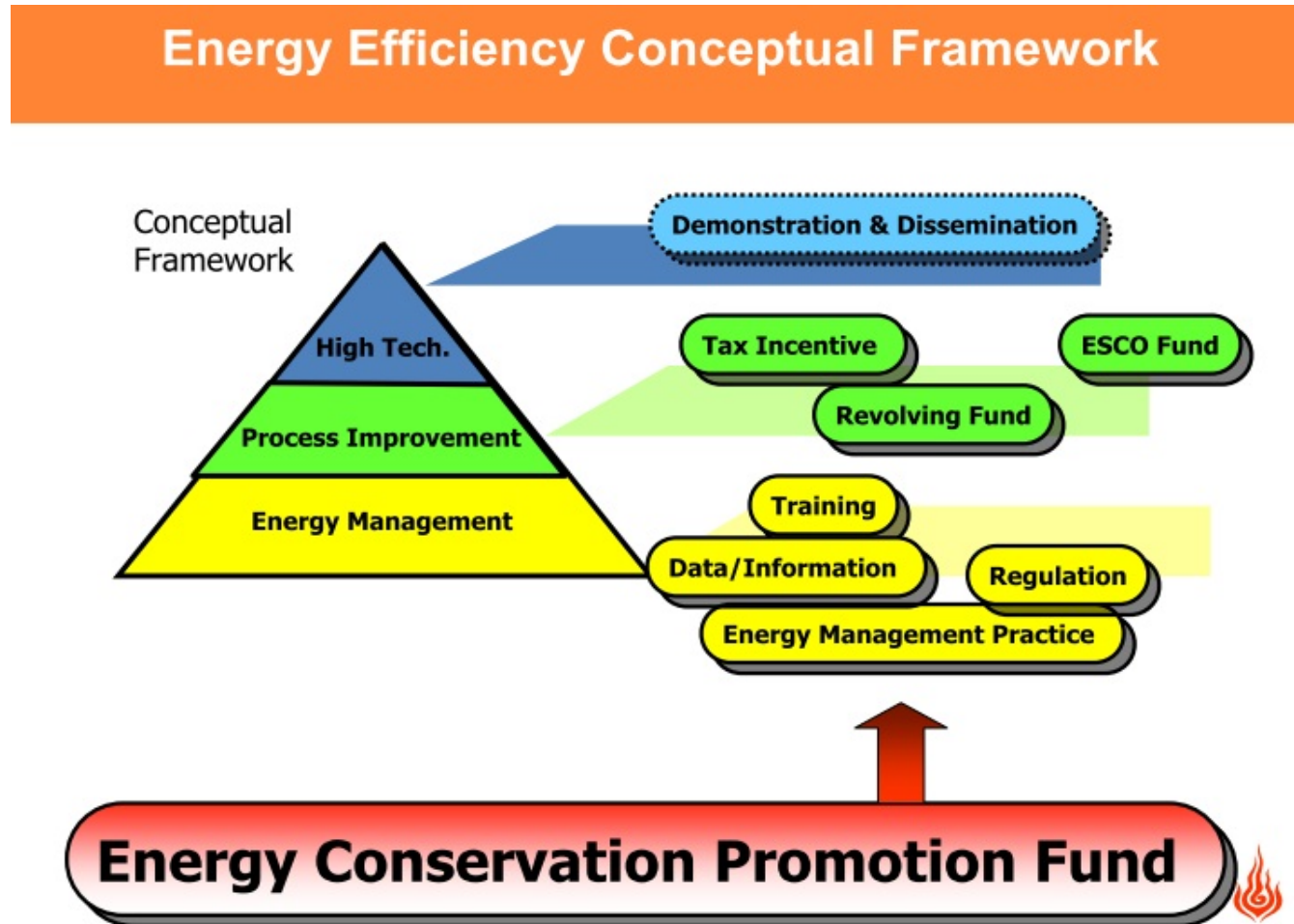
- The Green Funds Scheme does not formulate explicit goals. Therefore, the impact of the GFS cannot be assessed in relation to concrete targets.
- From 1995 – 2009, around 5,000 green projects have been engaged with total allocated project capital of EUR 8.8 billions.
- In 2006, almost 230,000 people invested around Euro 6 billion in GFS which corresponds to approximately Euro 25,000 per investor.
- **In 2010, the provided tax incentives of EUR 150 million by the gov't generated EUR 6 billion in "Green" investment. LEVERAGE RATIO = 1:40**
- **In 2013, the gov't cost of the GFS was EUR 175 million has gained monetarized environmental benefits of EUR 360 million.**



2. The Netherlands' Green Fund Scheme

| Items | Green Funds Scheme (GFS) |
|---------------------|--|
| Barriers to success | <ul style="list-style-type: none">• The instrument is more difficult to implement and operate than e.g. subsidies.• Conflicting of interests between environment ministry and ministry of finance.• If the government ceased the GFS before loan term ends, the banks would have to bear the losses generated by the remaining projects receiving the cheap loans.• Knowledge of the scheme among the general public is not adequate. |

3. Thailand's Incentive Programs



3. Thailand's Incentive Programs

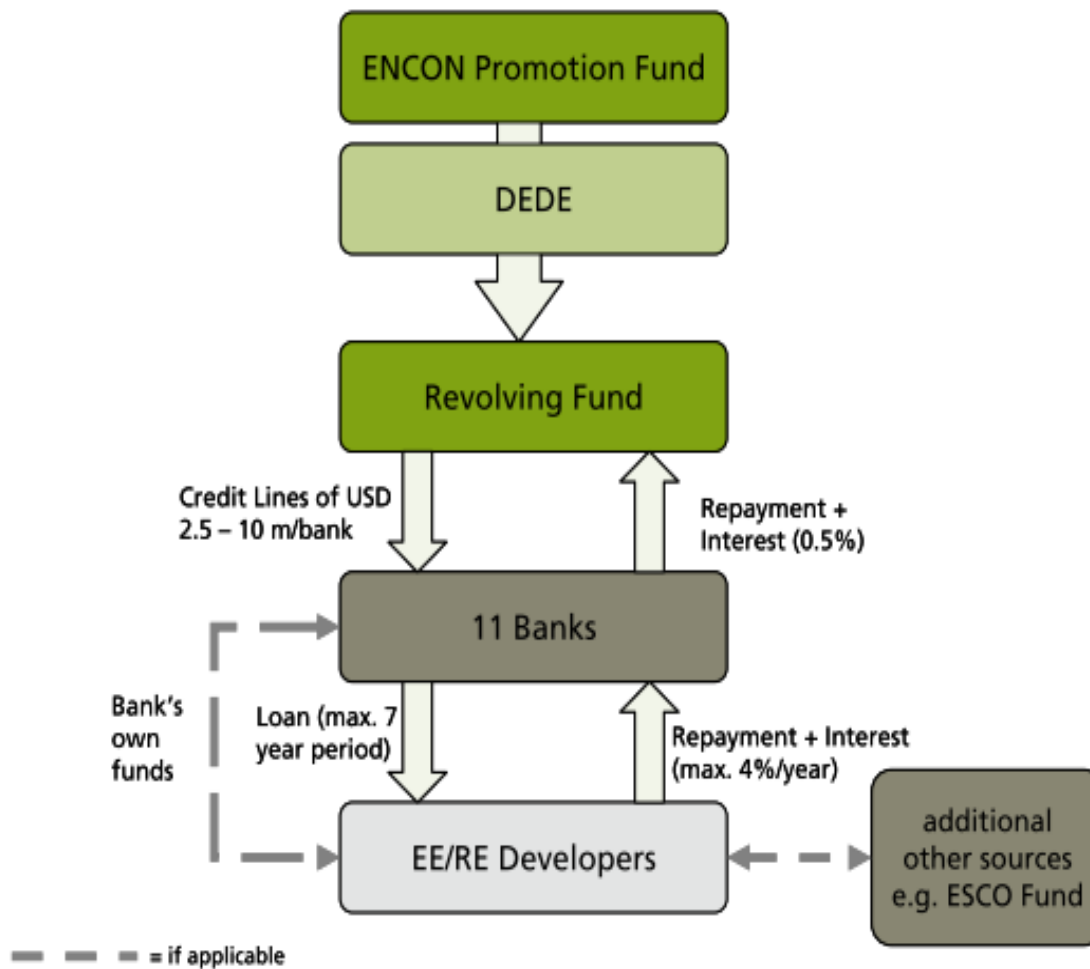
□ ENCON Fund

Energy efficiency incentive schemes supported by ENCON Fund

- Revolving fund incentive for energy conservation and renewable energy (Thailand Energy Efficiency Revolving Fund: TEERF)
- Energy service company (ESCO) revolving fund
- Tax incentive via the department of revenue
- Subsidy incentive for machinery replacing investment (70:30, 80:20)
- Standard Offer Program : SOP

3. Thailand's Incentive Programs

□ Thailand EE Revolving Fund



3. Thailand's Incentive Programs

| | |
|--------------------------|---|
| Loan period | Not more than 7 years |
| Loan channel | Via the financial institutes who participate in the project to ENCON Fund. The institutes must be responsible to repay total loan. |
| Eligible Parties | Designated building/industry under the Energy Conservation Promotion Act B.E. 2535, or the other building/industry, including ESCO who is interested in energy efficiency investment. |
| Limit | Not more than 50 million baht per project |
| Interest rate | Not more than 4% per year |
| Eligible projects | Energy efficiency and conservation project, under the Energy Conservation Promotion Act B.E. 2535: article 7 and 17 |

3. Thailand's Incentive Programs

Financial Results (2003-2015)

- Total amount approved by DEDE= THB 6,963 million.
- Additional loans provided by the Banks = THB 7,680 million
- Total investment in TEERF = THB 14,643 million.
- In other words, the loan funded under the TEERF leveraged more than 100% increase in EE investment or the leverage ratio of 1:1.1

Energy Savings (2003-2015)

- Electricity savings = 1,108 GWh/year valued = THB 2,772 million
- Petroleum fuel savings = 231.2 mil. Litre/year valued = THB 2,191 million

3. Thailand's Incentive Programs

Key Results

- Shifting responsibility for implementation mostly away from DEDE to the Bank
- RE and cogeneration projects shared largest part of investment while EE projects are mostly single measures with small volume of investment.
- The Thai EERF has **been successful in promoting and encouraging the banking sector to be more confident and familiar with EE investments** as many banks are currently providing many products in terms of financial credits.

4. Briefing “White Certificate” Scheme

Centre for International Economics Canberra & Sydney, defined that

- A white certificate represents a reduction in energy use. A certificate is issued in return for verified or verifiable improvements in energy efficiency. This commoditizes energy savings into a tangible product which can be traded and can sit within a broader strategy to reduce GHG emissions.

Paolo Bertoldi, European Commission, Directorate General, Joint Research Committee (JRC), Dec 2011

- A white certificate is an accounting tool, which proves that a certain amount of energy has been saved in a specific place and time.
- It is also a tradable commodity which belongs initially to the implemented a project that owns the rights to these savings, and then can be traded according to the market rules, keeping one owner at the time.

4. Briefing “White Certificate” Scheme

Five key elements of white certificates schemes:

- I. The creation and framing of the demand (government set the overall target and its apportioning to obligated actors).
- II. Institutional infrastructure and processes (e.g. M&V) to support the scheme.
- III. The cost recovery mechanism, in some cases.
- IV. A system of sanctions (or penalty) in the case of non-compliance.
- V. The tradable instrument (certificate) and the rules for issuing and trading.

4. Briefing “White Certificate” Scheme

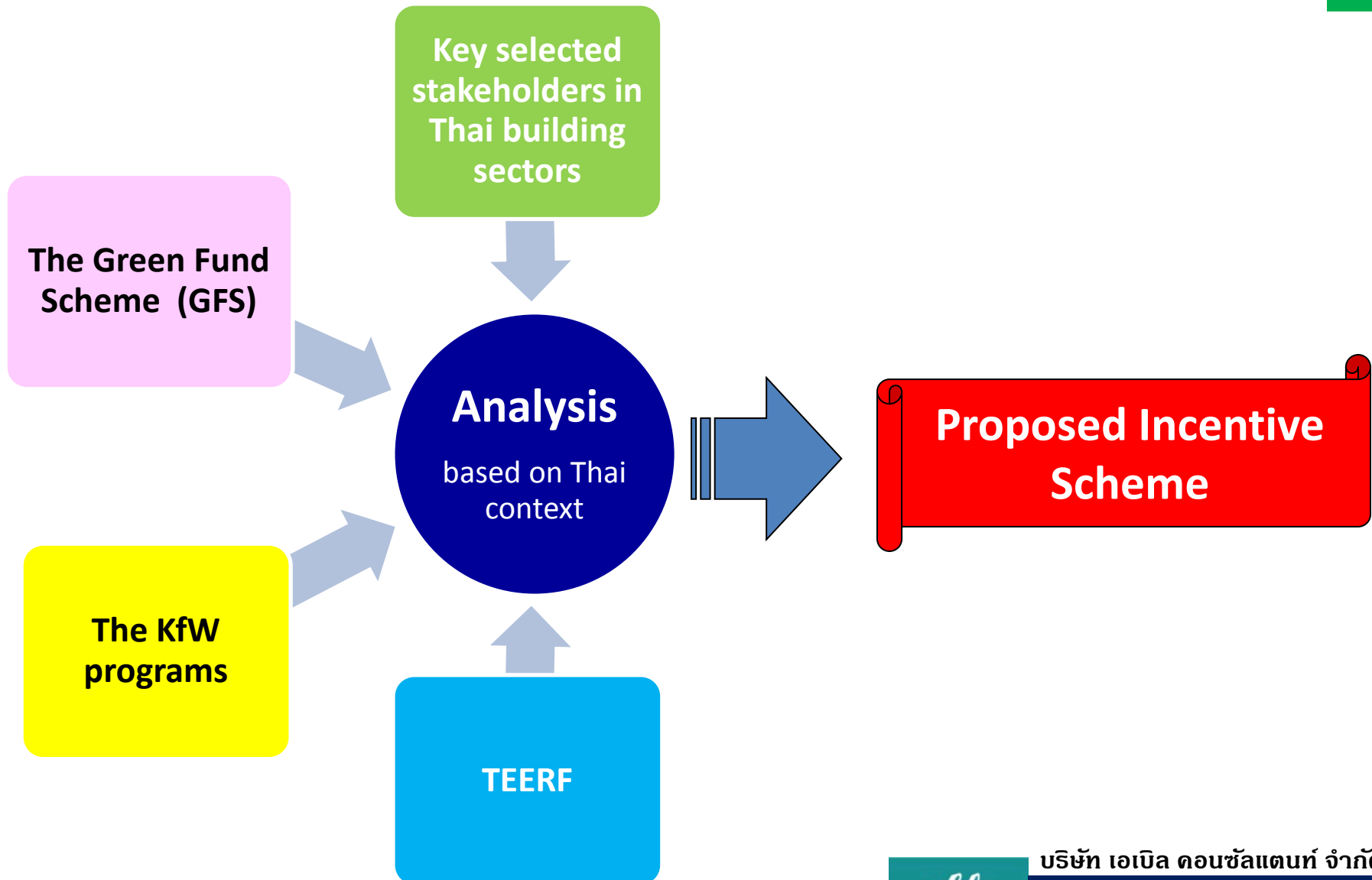
Global Experiences with Energy Savings Obligations:

- Australia 3 States - New South Wales, Victoria, South Australia
- Around 25 US States (“EE Resource Standards” or EERS)
- Europe: 5 Member States or Regions; France, Italy, Belgium (Flanders), Great Britain, Denmark
- Minimum expenditure obligations: 中国: “Efficiency Power Plants”, Brazil: 1% for public purposes, ½ for EE
- Other nations: e.g., Canada, Uruguay

In Thailand, as an EERS is expected to be enforced by 2023 among the 10-measures as stipulated in our EEP 2015, then “white certificate” model can be utilized as one market-based tool under EERS measure to drive EE investment by utilities in customer projects.

Analyzing Incentive Schemes based on Thai Context

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German's KfW Programs

Legislations/Regulations

- Adequate legislation framework.
- Weakness has been on enforcement, especially on BEC
- Large potential in reducing energy usage in residential buildings
- Accelerate improvement on coordination and cooperation among public and private sectors.
- Continuation and consistency of policy implementation.

Strategy Contexts

- The three-pillar approach strategy used in German's KfW model is one of the key success factors
- Similar practices in Thai context but roles and functions are not clear and sometime overlapping.

German's KfW Programs

Source of funding

- Availability of ENCON Fund and capability of Thai commercial banks as practice in TEERF program.
- Possible to initiate similar program to KfW model.
- Incentives should consist of both soft loans and grants.
- Long term funding and sufficient amount of allocated fund .
- sufficient credit guarantee facility should be created
- Additional facilities; technical assistants, credit guarantee facility to increase accessibility to loan, and PR information campaigns.

German's KfW Programs

Adaptation of KfW Program design

- High possibility due to EEP 2015 aims to effectively enforce BEC and intensively promote the high EE buildings.
- KfW financial incentive model and building labeling can be tools to overcome financial barrier & accelerate to have net zero energy buildings by the year 2036.
- Continuous long term policy should be strongly suggested.

Readiness of key stakeholders

- Investors, building owners/developers and banks, are ready to invest in high EE buildings if the project can meet loan assessment criteria.
- The bottleneck is on limited access to funding due to inadequate collateral assets for some specific customers.
- Strengthening ESCO business to effectively facilitate investors
- Technical assistants, credit guarantee facility to increase loan accessibility, as well as PR campaigns and information dissemination, could be supplements to financial mechanisms

German's KfW Programs

Implementing Agency and Channels

- DEDE has experiences and suits to be IA
- Intensive discussion on this issue is necessary.

Social and Environmental Context

- Different technical research and application of building improvement technologies.

The Netherlands' Green Fund Scheme (GFS)

Legislations/Regulations

- Substantial legislation framework and regulations are required.
- Take long lead time for development together with strong willingness from political body and policy makers.

Strategy context

- Similar to LTF and RMF, tax incentive scheme for investment in energy efficiency programs seems to be possible.
- Government intervention is needed by establishing EE building fund. And attract investors by providing tax incentives.

The Netherlands' Green Fund Scheme (GFS)

Implementing Agency and Regulator

- It is recommended to scope down the project to focus only on energy efficiency and renewable energy (EE&RE) programs.
- Then size of the program will be smaller and easier to manage and responsible agency is solely on Ministry of Energy.

Readiness for Implementation

- Banks seem to be ready to finance greens or EE project if it is financially feasible and lender is creditworthy.
- Technical assistances and certifications should be from government agency.

Rationale

Energy Consumption share in building sector has risen to 22% of total final energy consumption

BEC enacted by law in 2009 but has not been enforced

EEP 2015 aims at supporting high efficiency building (Net Zero Energy Building)

Financial measure have good record in effectively promote high efficiency buildings

Financial Measures Formulation Approach

Strategy

1. Apply existing best practice models with modification to fit local context for immature market
2. Employ innovated models suit for transformed market

Key considerations

1. Public-private participation on win-win basis
2. Public role/intervention (entry/exit)
3. Environment factors/stakeholders readiness/perception
4. Behavior and culture differences

Proposed Incentive Scheme

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Short-Term

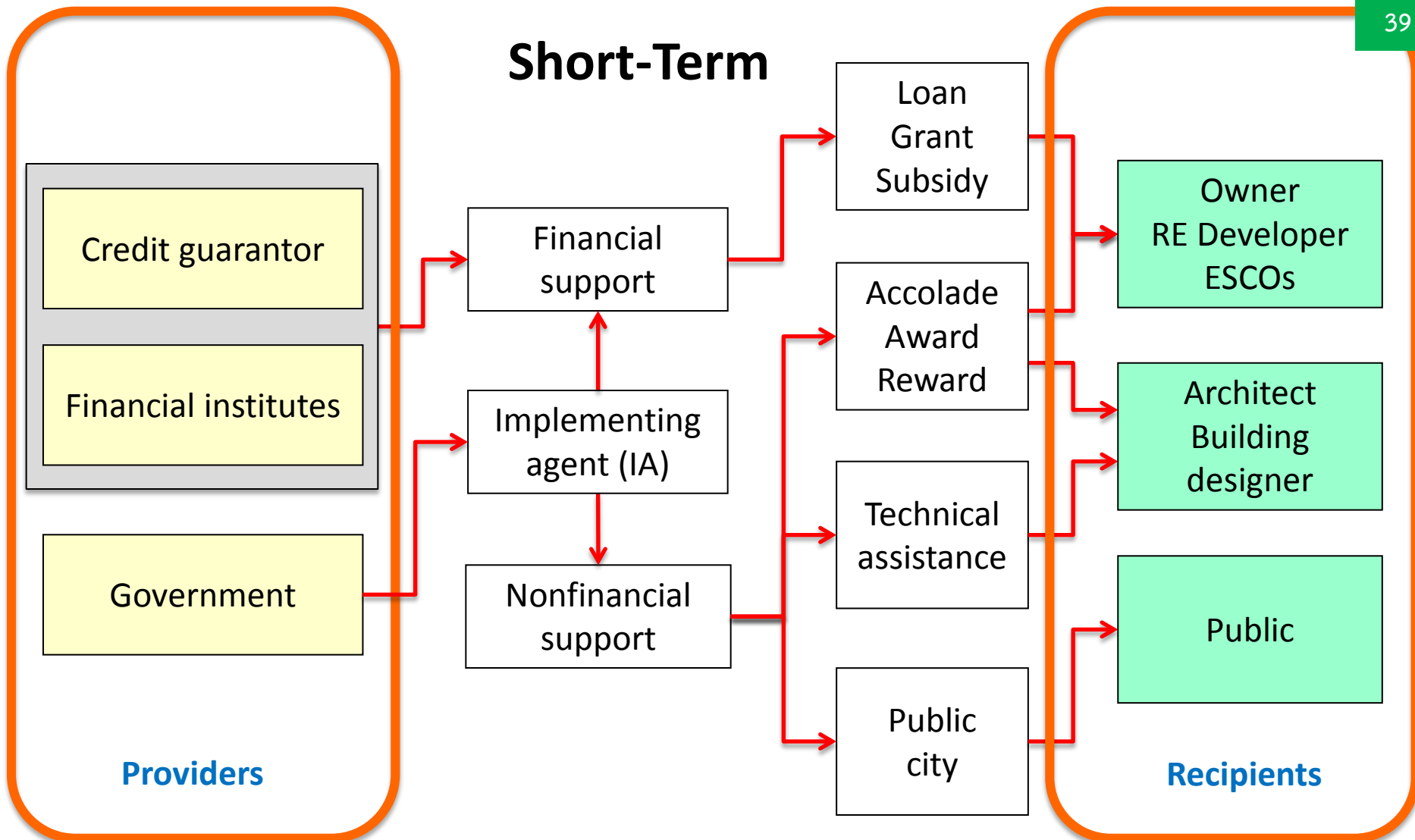
**Employ KfW model financed
by ENCON Fund (TEERF) and
Financial Institute to test
market and familiarize
stakeholders**

Long-Term

Employ mixed model
KfW, Green Fund and
White Certificate financed
by public-privaton participation
fund for matured market

Roadmap of the proposed incentive scheme

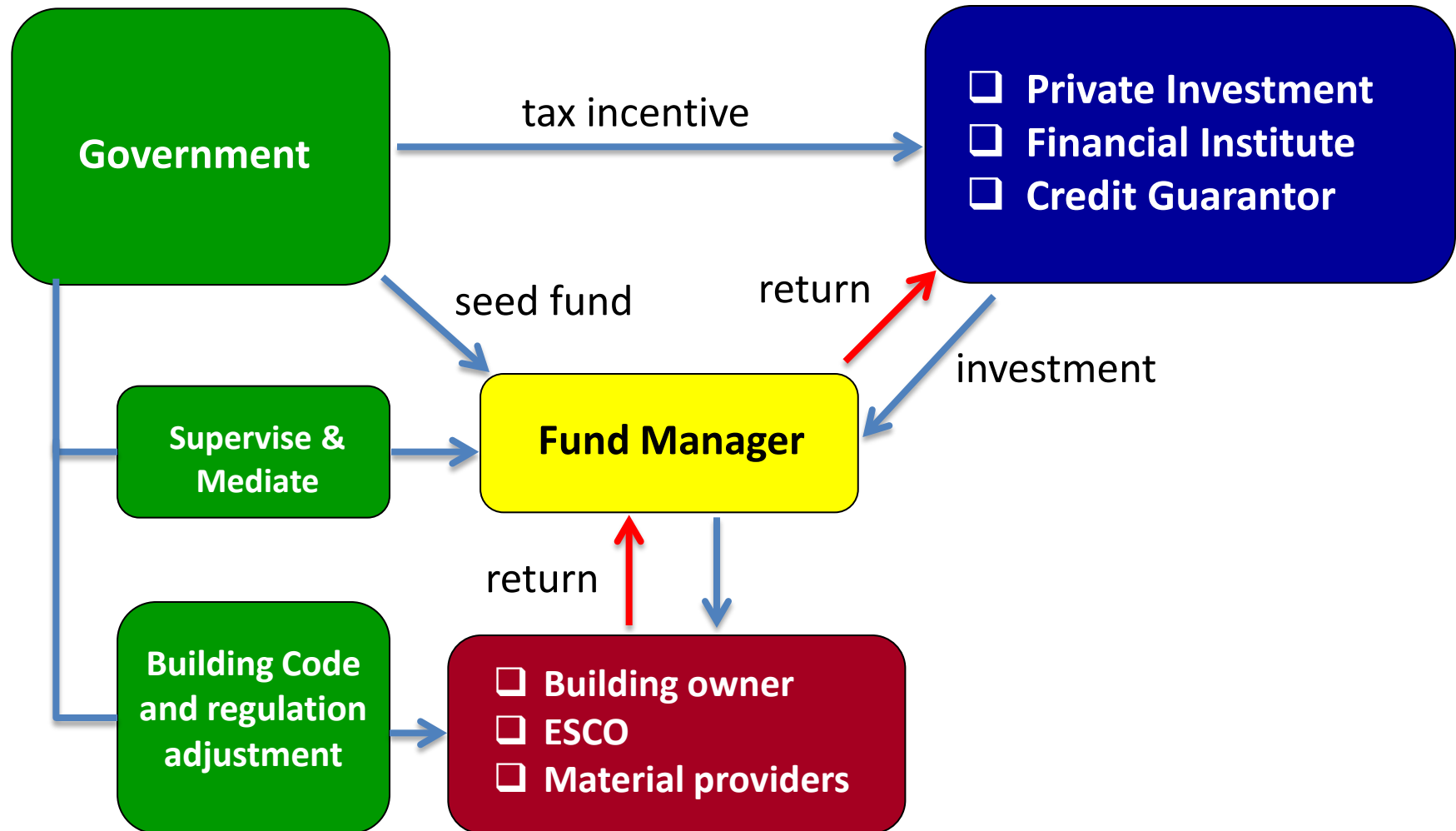
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Roadmap of the proposed incentive scheme

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Long-Term



Is it feasible to adapt TEERF as funding scheme for KfW incentive model and set as pilot program for short-term?

- ❑ Deploying TEERF structure and criteria
- ❑ Fund should be specifically allocated for promotion of high energy efficient building program only.
- ❑ Advantages and disadvantages
 - ❖ Maximum loan size of 50 million Baht per project is sufficiently high for small and medium buildings but not sufficient for larger projects.
 - ❖ Risk is allocated away from government to banks and project owners.
 - ❖ Technology assessment is required from support agency to help lending institutes on validating the proposed measures.
 - ❖ As simple pay- back period of TEERF project is at no longer than 7 years, this is a problem for large building projects which have longer pay-back period.

Should incentives be designed as grants for building designers and soft loans for building owners?

- ☐ Grant is more attractive for building designers.
- ☐ Lack of accurate information to set the baseline payment.
- ☐ Soft loans to building owners: loan process should be simplified and faster

Which organization should be assigned as implementing agency (IA)?

- ☐ DEDE should be responsible as IA because of the experiences from TEERF implementation.
- ☐ According to banks, technical assessment is essential as a preliminary certification of the project.
- ☐ Technical assessment by independent organization such as professional association e.g. Council of Engineers of Thailand is optional.

Result from stakeholder focus group workshop on long-term initiatives.

| Preparation steps proposed | Expected results | Responsible agencies | Timeline |
|---|--|---------------------------------------|---------------------------|
| 1. Enforcement on BEC regulations | <ul style="list-style-type: none"> • Strong enforcement expected • Increase compliance rate • Increase building projects on energy efficiency | DEDE in cooperation with DPT and ONEP | 3-5 yrs. |
| 2. Promotion building EE programs by incentives/PR campaigns/Rewards/Awards etc. | <ul style="list-style-type: none"> • Increase building EE projects • Increase banks' financial products and clients | Ministry of Energy (MOEN) | 3-5 yrs. |
| 3. Establish fund together with fiscally-facilitated incentives by regulations. <ul style="list-style-type: none"> • Seed funding required from Gov't) • GFS initiative created | <ul style="list-style-type: none"> • Energy efficiency –purpose fund created • Building trusts between government sector and banks • Tax incentive schemes • Regulation for funding allocation should be e.g. for EE projects etc. | MOEN & Ministry of Finance (MOF) | From year 6 th |
| 4. Initiate monitoring& reporting system of building energy consumptions including building data base | Transparent building energy data | MOEN, MEA and PEA | Ongoing |
| 5. Creating measurement, verification and evaluation (MV&E) system | Quantitative, qualitative data and other information for evaluating the successfulness of the programs and policies | DEDE | Ongoing |

Additional Comments and Recommendations

- ☐ Comments and suggestions from Ministry of finance MOF are required.
- ☐ Since ROI from EE projects is not high enough to widely attract investors, it requires seed funding from government in establishing EE fund.
- ☐ Tax incentives could be seriously considered to be in effect at the same time when fund establishment is initiated.
- ☐ Large potential in reducing energy usage in residential buildings, as such promotion of high energy efficient buildings in this sector is strongly suggested.

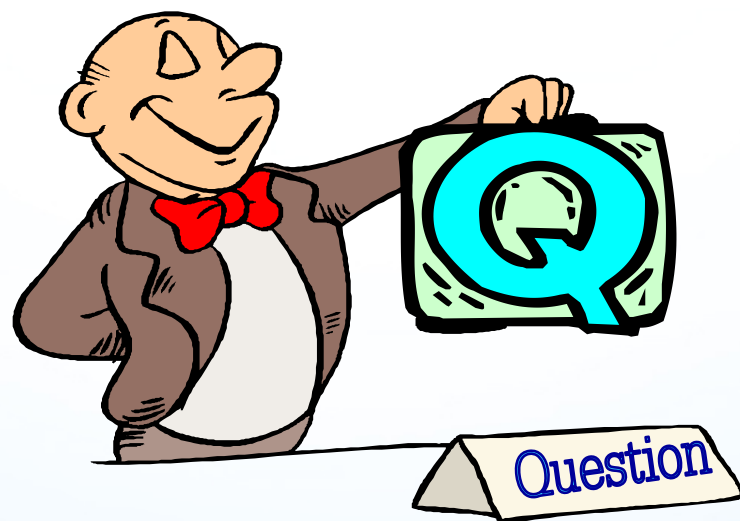
**ENERGY EFFICIENCY IS “FIRST FUEL”
NOT HIDDEN FUEL**

**WHY NOT MISSION INNOVATION
FOR ENERGY EFFICIENCY ?**



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