



Energy Policy
and Planning Office
MINISTRY OF ENERGY

giz Deutsche Gesellschaft
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Zusammenarbeit (GIZ) GmbH

On behalf of:



Federal Ministry
for the Environment, Nature Conservation,
Building and Nuclear Safety

of the Federal Republic of Germany

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)

VIE bar 2nd Fl. YTSB Building, VIE Hotel
Ratchathewi Bangkok

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1. Germany's KfW Programs

1.1 Background and Implementing Strategy

❑ Rationales to promote EE&RE in building sector in Germany

- After first oil-crisis in 1970s, Germany enforced its first energy conservation act in 1976 and followed by the amendment in 1984 as a result of 2nd oil crisis.
- Ambitious CO₂ emission reduction targets after Rio conference in 1992. Agreement to Kyoto protocol by commitment to a 20% reduction of the 1990 CO₂ level by 2008-2012. The actual reduction was 22% in 2007. Long-term goal is 80% by 2050.
- Greatest potential for energy saving in buildings. Over 80% of energy consumption to heat rooms and water while the rest for lighting and other electrical devices.

1. Germany's KfW Programs

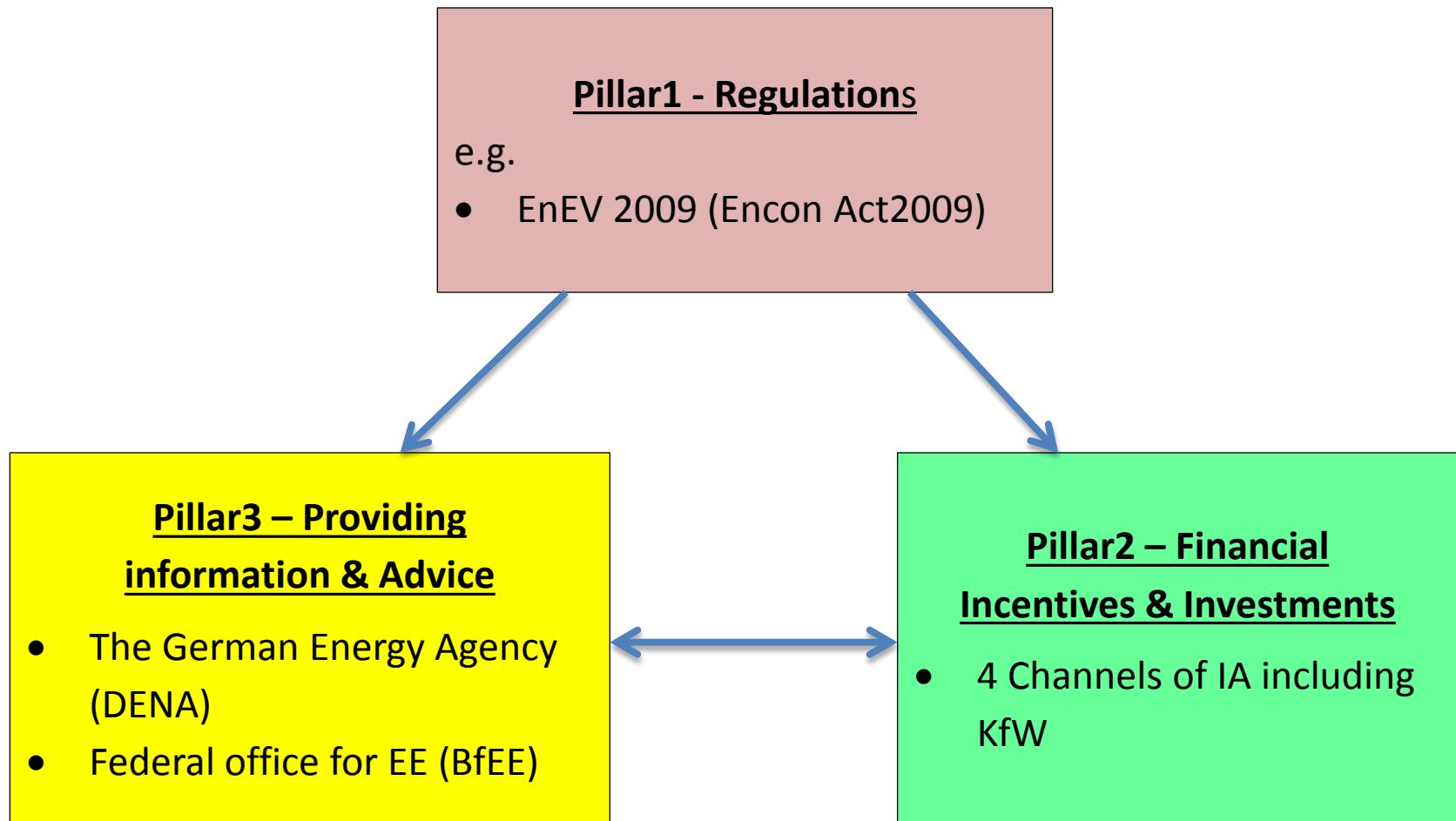
1.1 Background and Implementing Strategy

□ 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

1.2 KfW Programs

☐ CO₂ Reduction Program (1995-2004):

- KfW provided long-term, low and fixed interest rates loans to those EE investors, i.e. private owners, housing companies, municipalities and districts.
- KfW raised the funds for this program on the financial market and passed the money on via commercial banks. KfW faces low interest in the market because of its public status and the Federal government allocated annual budget to further decrease interest rates.
- Mostly promoted single measures, i.e. the replacement of boilers or provision of external insulation.

1. Germany's KfW Programs

1.2 KfW Programs

☐ CO₂ Building rehabilitation Program (2001-2009):

- Introduction of this program due to large potential energy saving (66%) in existing residential buildings still not explored.
- Similar financial incentive scheme offered by KfW.
- Extending technical measures into 6 pre-defined refurbishment packages.
- Considered as successful programs by IEA. Energy consumption was reduced up to ten-folds from 275 kWh/m²/year to 25 kWh/m²/year.

1. Germany's KfW Programs

1.2 KfW Programs

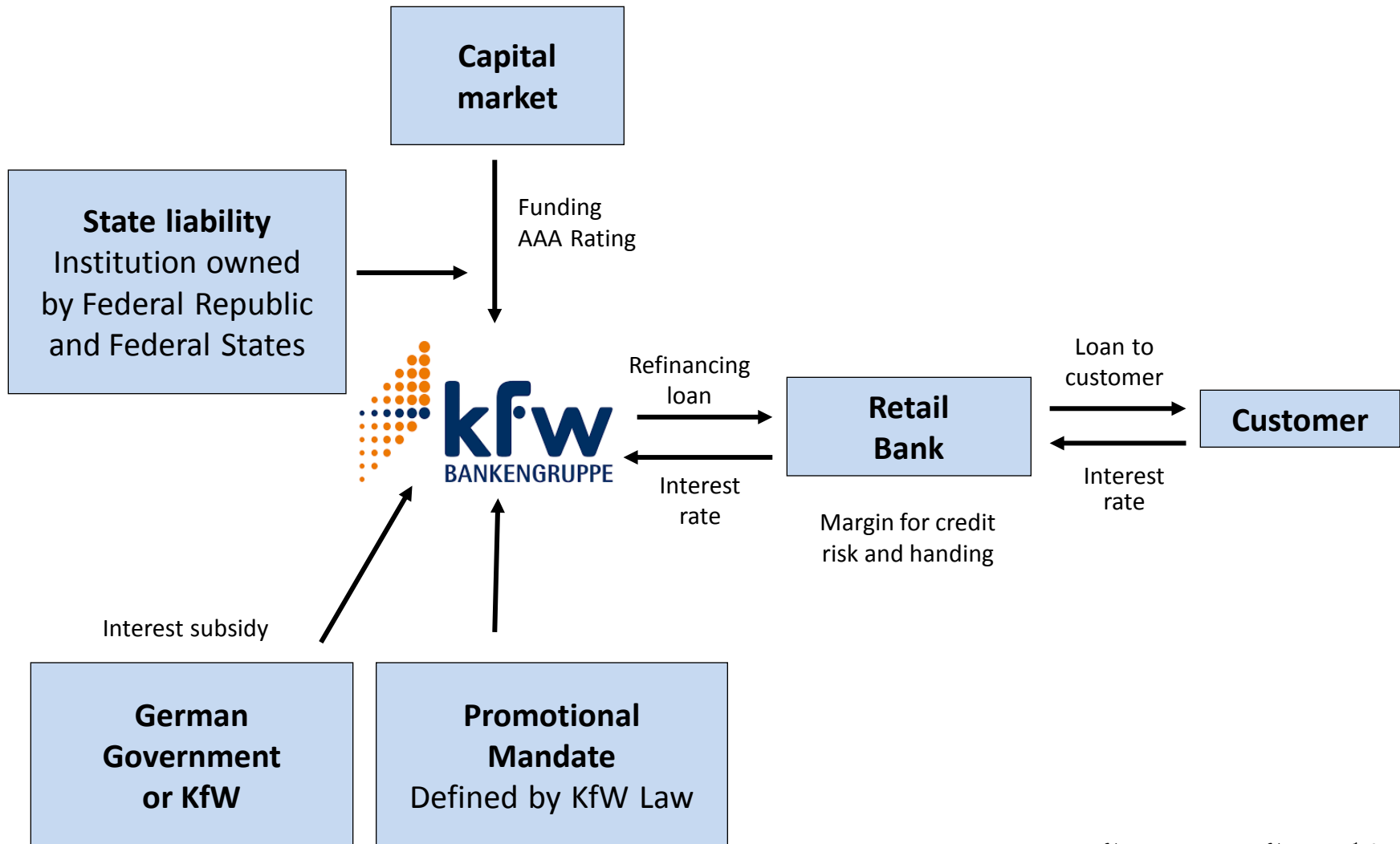
❑ Energy Efficiency Construction (EEC) and Energy Efficiency Refurbishment (EER) (2009-present)

➤ 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

Funding Structure and Loan Process for EEC and EER Programs

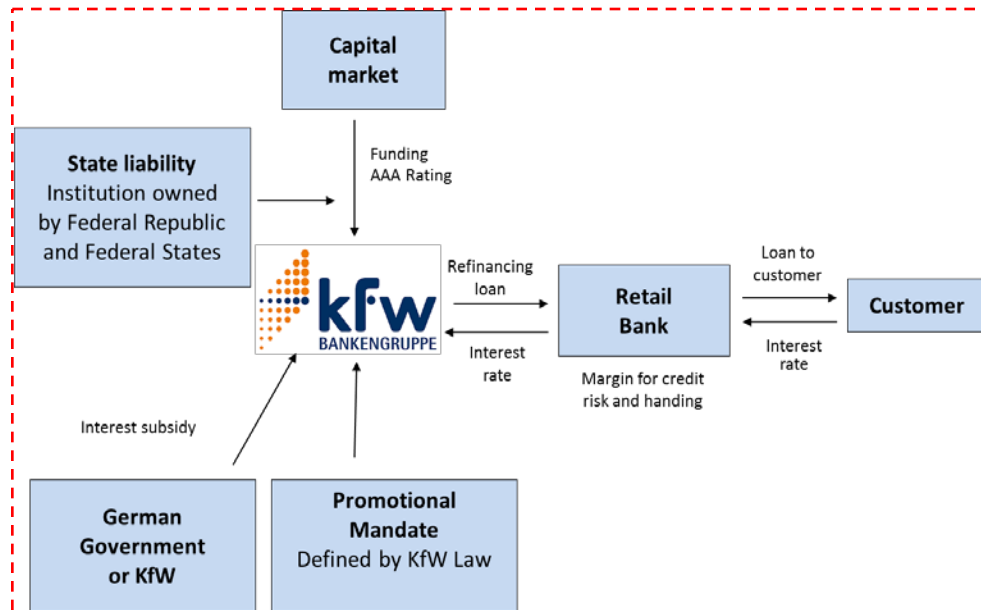


EnEV 2009

(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%	-

❖ For EER Program

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 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 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 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.

□ Reasons for Success

- 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 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.

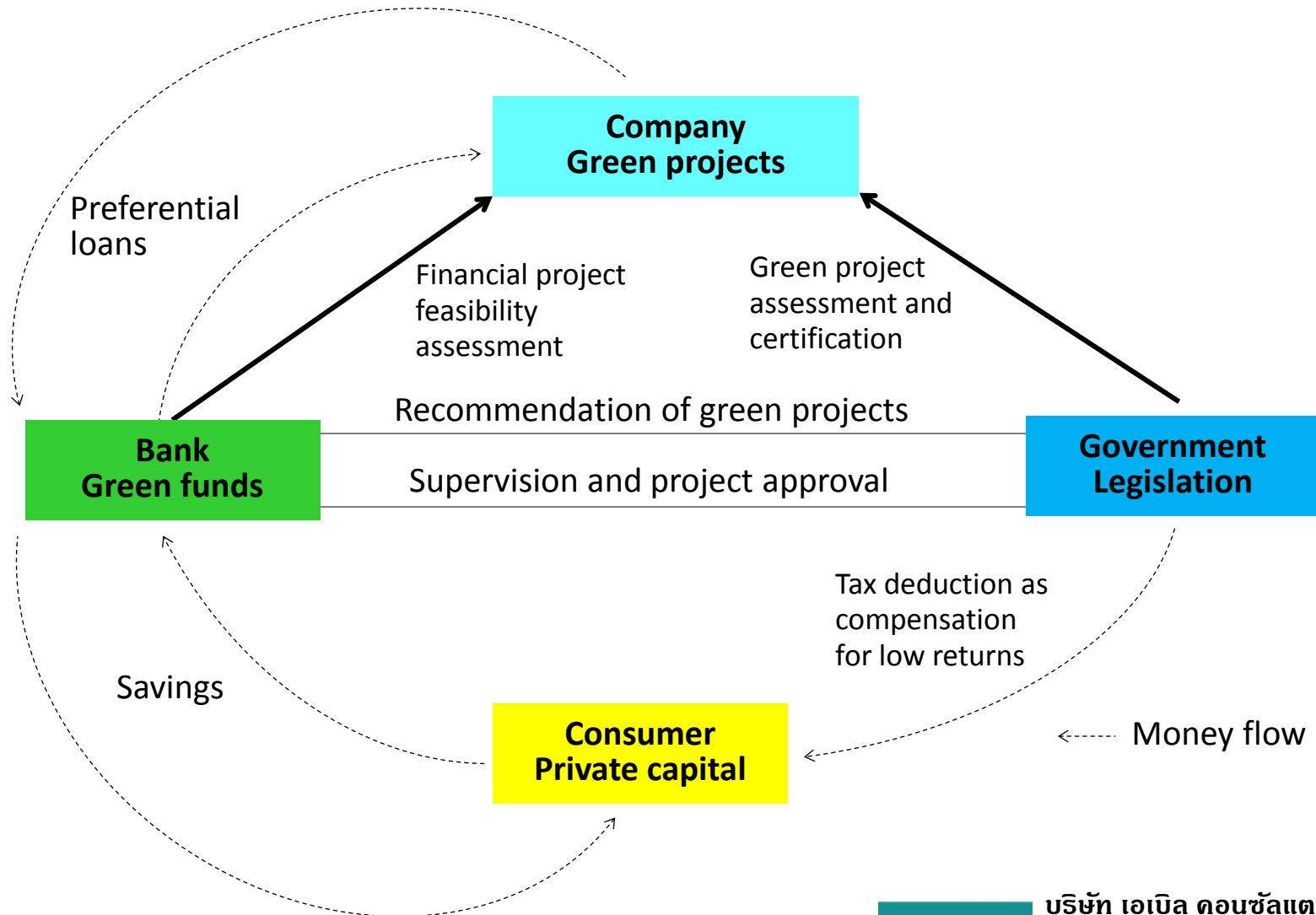
2. The Netherlands' Green Fund Scheme

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



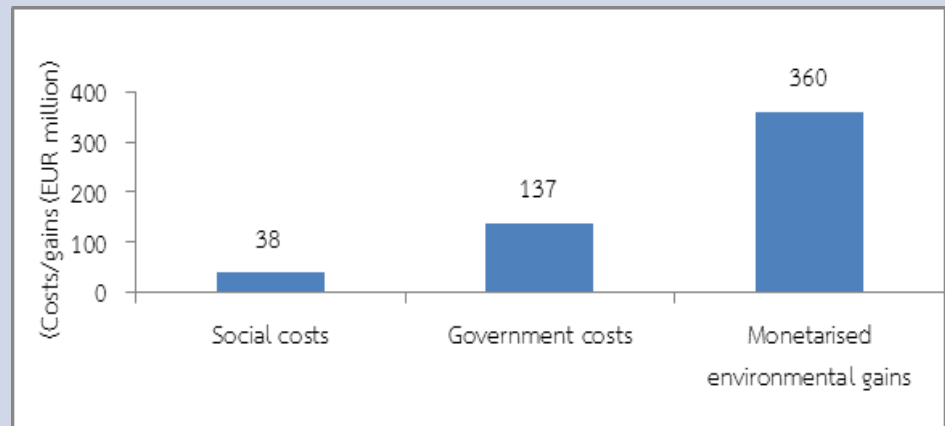
2. The Netherlands' Green Fund Scheme

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.**



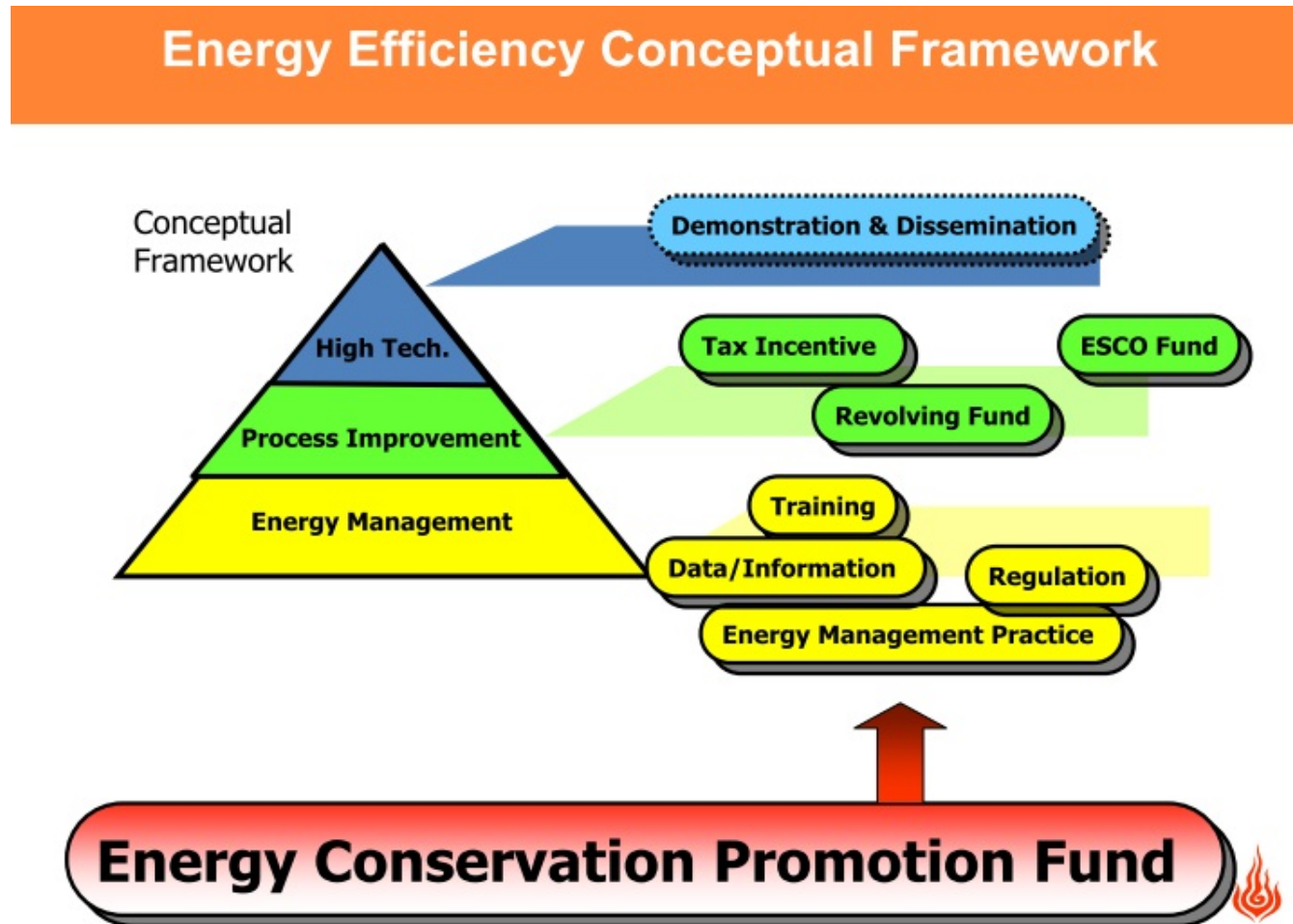
2. The Netherlands' Green Fund Scheme

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

- ☐ ENCON Fund
- ☐ Thailand EE Revolving Fund

3. Thailand's Incentive Programs



3. Thailand's Incentive Programs

□ ENCON Fund

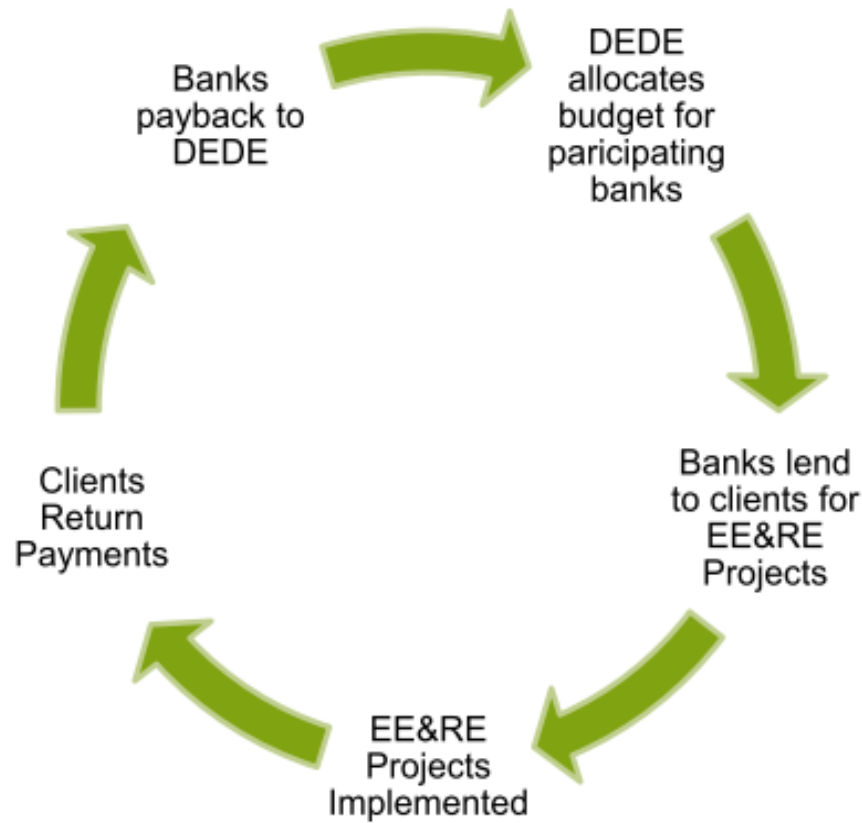
Energy efficiency incentive schemes supported by ENCON Fund

- Revolving fund incentive for energy conservation and renewable energy
- 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

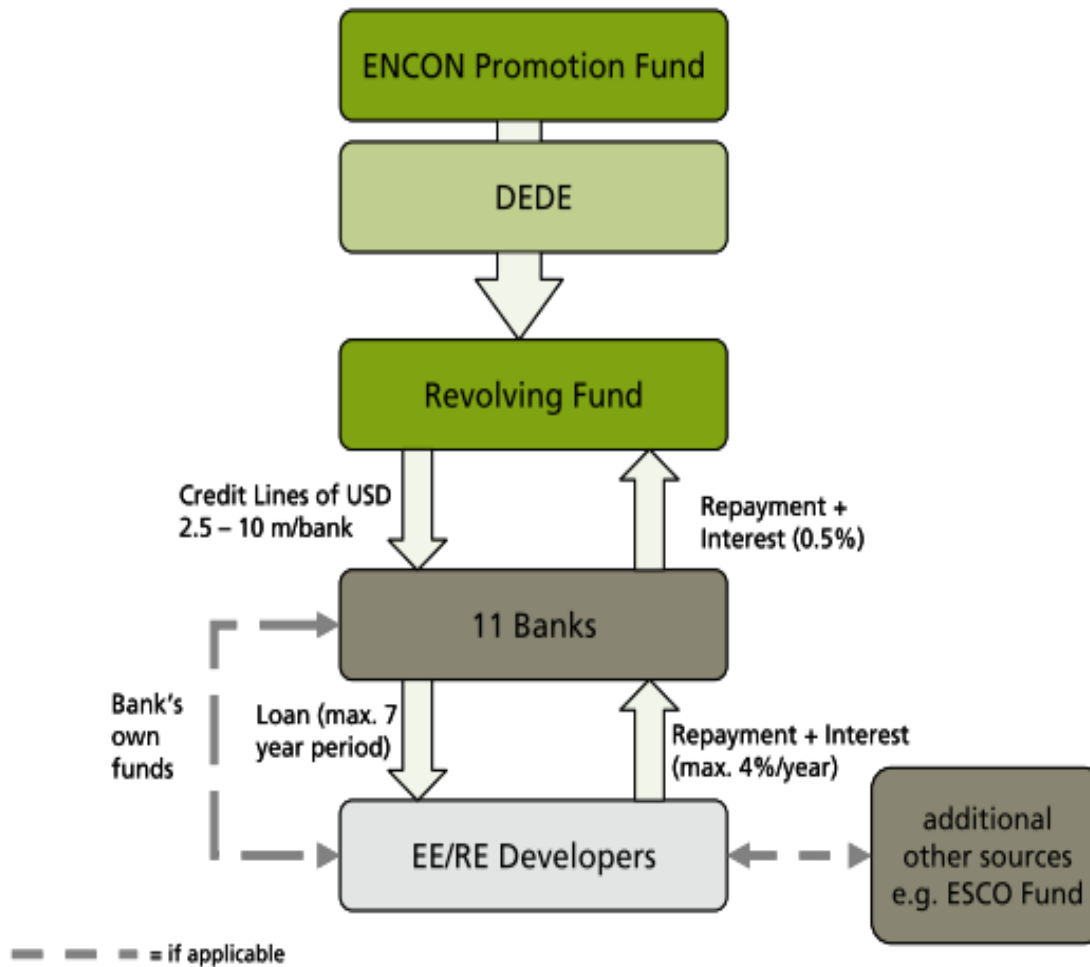
□ Thailand EE Revolving Fund

General Design of the Process



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

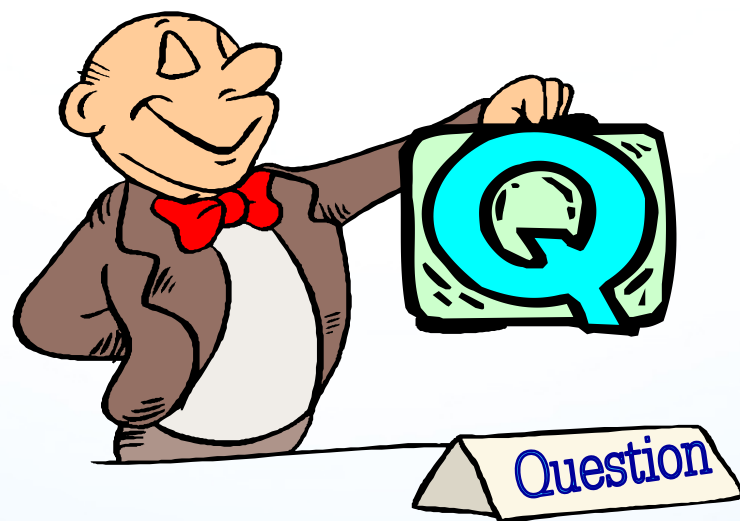
Energy Savings (2003-2015)

- 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.



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