



Thailand's New and Renewable Energy Programs and Policies

37th APEC New and Renewable Energy Technologies Expert Group Meeting (EGNRET)

22-23 August 2011, Taipei, Chinese Taipei

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Direction of 11th Plan

(2012 – 2016)

"a happy society with equity, fairness and resilience"

Risks Confronting Thailand

weakness in public administration

Unsustainable Economic structure

threats towards national security

6 risks

declining proportion of working age population

deteriorating in the natural resources and environment

loss of traditional values

Creation of 6 dimensions of resilience

6 dimensions of resilience

- the constitutional monarchy governed the country
- the agriculture as a main source of income and food security
- the development based on knowledge and advanced technology
- the society with good values and culture
- the community as a key effective mechanism in development

Mission

- to promote better income distribution, and fair, harmony and democratic society in order to achieve better quality of life
- to create socio-economic security through strengthening production of goods and services based on knowledge, creativity and environmental friendliness, improving social protection for better coverage, and ensuring food and energy security
- to strengthen resilience to changes and crises and develop human resources

Targets

- Thai society is more peaceful and has good governance
- all citizens acquire social protection
- total factor productivity in every sector is increased
- shares of agricultural and service sectors in the economy are increased
- share of creative economy is increased
- Thailand's competitiveness ranking is improved
- natural resources and environmental quality are improved

6 Development Strategies

- ① Strategy of promoting the just society
- ② Strategy of developing human resources to promote a life-long learning society
- ③ Strategy of balancing between food and energy security
- ④ Strategy of creating the knowledge-based economy and enabling environment
- ⑤ Strategy of strengthening economic and security cooperation in the Region
- ⑥ Strategy of managing natural resources and environment towards sustainability

Roles of development partners

Government/Politic/Private/
Institution/Media/Community/ People

Driving towards implementation

Under participation of development partners

Thailand's Energy Policy

Presented to the Parliament on Dec 30th 2008

Policy **1**

Securing Energy Resources

- Oil
- Natural Gas
- Electricity
- Alternative Energy



Policy

2

Set Renewable Energy as National Agenda

- E85
- Ethanol based oil
- Bio Diesel
- NGV
- Wind /Solar / Biogas/ Biomass/ Small Hydro energy



Policy **3**

Encouraging Energy Conservation

- Conservation Measure
- Efficiency Standard
- Encouraging Private Investment

Policy

4

Ensure Fair Energy Price

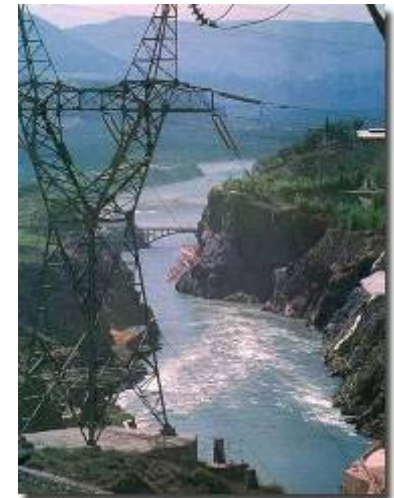
- Price structure reflect its genuine cost
- Develop Services Quality
- Safety in Energy Related business



Policy **5**

Preserving Environment coupled with Energy Development and Consumption

- Green house Emission Reduction
- Support CDM Projects



11th National Economics and Social Development Plan (2012 – 2016)



Commitment to become “Low-Carbon Society”

REDP (2008 – 2022)

- 20% of RE in Total Energy Consumption
- Promotion of LCT
 - S ⇒ Community level
 - M ⇒ Town Level
 - L ⇒ City Level

EEP (2010 – 2030)

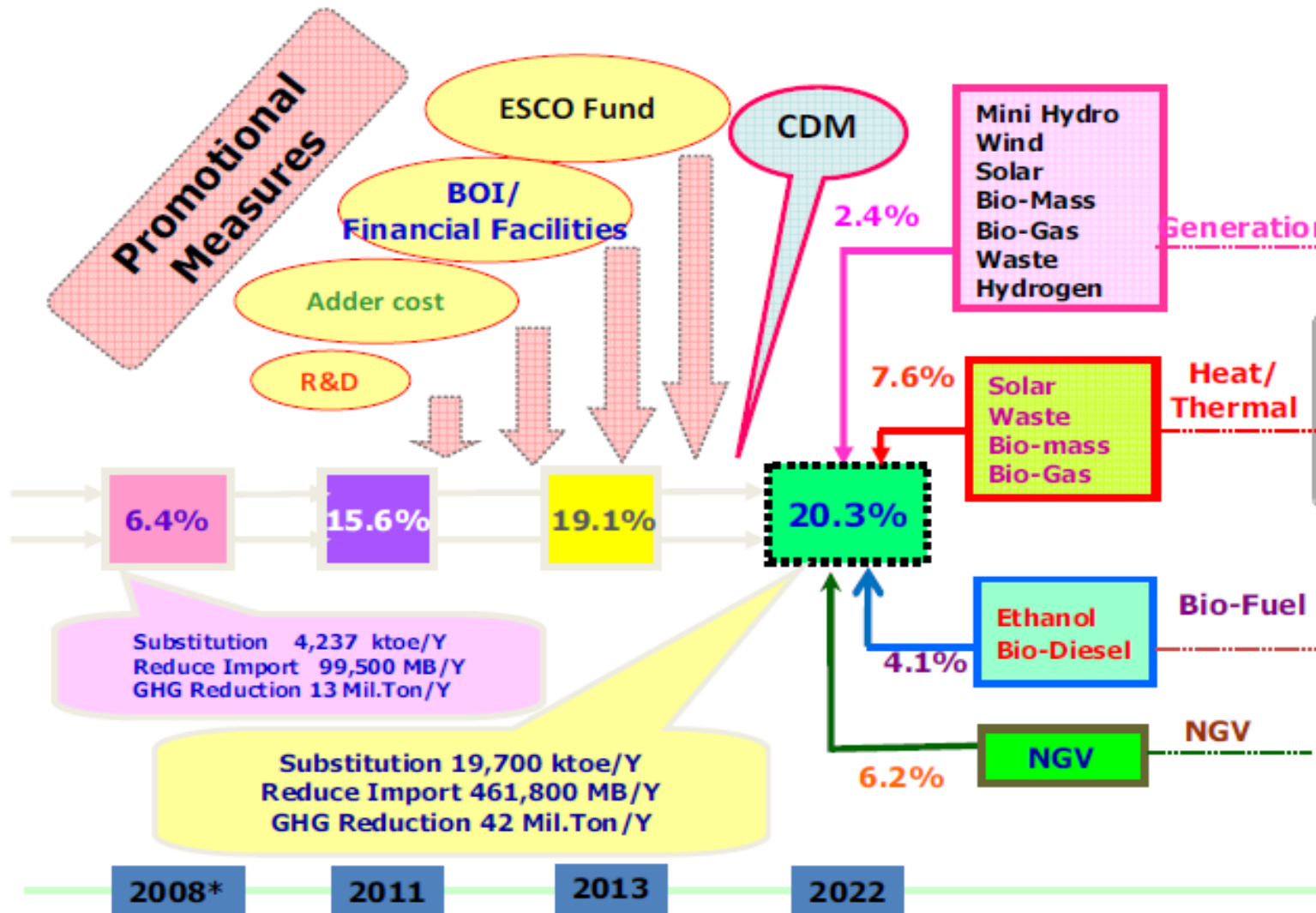
- Reduction of EI 25% by 2030 (based on 2005)
- Green-Building + Pilot Near Zero Energy Building
- EE in Transportation

Major Push to Shift Thailand’s Economic Structure to “Less-Energy Intensive” Industries

Bangkok’s Low-Carbon Action Plan

- Target : 15% reduction of GHGs emission by 2012 (7 mil tCO₂ reduction)
- The 5-Year Action Plan for Global Warming Alleviation (2007 – 2012)

Renewable Energy Development Plan (REDP) 2008-2022



Avg. Crude Price Y 2008 = 94.45 US\$/Barrel



Overview of Alternative Energy Development Plan; AEDP

Short term (2008 – 2011)

Emphasis on promotion of commercial alternative energy technologies and high potential energy sources such as biofuels, co-generation from biomass and biogas with fully supports from measures provided.

Mid term (2012 – 2016)

Focus on development of alternative energy technology industry, encourage new alternative energy R&D to achieve economic viability including new technologies for biofuels production and introduce a model development of Green City to communities for sufficient economy and sustainability development.

Long term (2017 – 2022)

Enhance utilization of new available alternative energy technologies i.e. hydrogen, bio hydrogenated (BHD), extend green city models throughout Thai communities and encourage to be hub of biofuel and alternative energy technology exports in ASEAN regions.

Thailand Renewable Energy Development

Committed to the development of low-carbon society

Government Funding On R & D & D Activities

15 years RE-Development Plan

Encouraging Private-Led Investment

Target 20.3 % of RE in Total Energy Consumption By 2022

Solar + Wind

1,300 MW

Small + Mini Hydro

320 MW

Bio Energy

Biomass	Biogas	MSW
4,000 MW	160 MW	120 MW

Biofuels

- Ethanol
 - Biodiesel
- 20% Oil substitution

Supporting Schemes

- Feed-in Premium ("Adder") on top of regular tariff
- BOI Tax incentives scheme (8 yr. Tax holiday)
- Some direct subsidy (10-30%) on Biogas, MSW, Solar-hotwater projects
- Soft Loans for RE+EE investments
- Government Co-investing scheme ("ESCO Fund")

- Abundant Supply
- Market driven
- Pricing Strategy to promote high-RE-Fuels (E10, E20, E85 and B5)

After 3 ½ yrs of implementation, most of the targets are now within reach, some may require new policy adjustment.

Progress on Renewable Energy Development

Category	Unit	Existing ¹ 31 Jan 20010	Goal ² 2011	Expected ³ 2011-12	% ^{1/2} Comparison
• Natural Energy					
1. Wind	MW	5.13	115	200-300	4.5%
2. Solar					
2.1 Electricity generation	MW	38.6	55	145	68.4%
2.2 Water heating	ktoe	0.5	5	5	10%
3. Hydro	MW	67	165	172	40.6%
• Bio Energy					
4. Bio-mass					
4.1 Electricity generation	MW	1,844	2,800	2,400	58.7%
4.2 Process heating	Ktoe	3,071	3,660	3,600	83.9%
5. Bio-gas					
5.1 Electricity generation	MW	79.6	60	≥100	132.7%
5.2 Process heating	Ktoe	201	470	≥500	42.7%
6. Municipal Solid Waste-MSW					
6.1 Electricity generation	MW	5.6	78	77.5	7.2%
6.2 Process heating	Ktoe	1.09	15	15	7.3%
• Bio fuel					
7. Ethanol	ML/day	1.2	3.0	3.00	40.0%
8. Bio-Diesel	ML/day	1.8	3.0	3.00	60.0%
Total electricity	MW	1,839	3,273	3,500+	56.2%
Total heat	Ktoe	3,274	4,150	4,000+	78.9%

2022 Output and Outcome

(1) Economics aspect

- Currency saving on energy import **460,000 M฿/year within 2022**
- Increase investment of private sector **382,240 M฿**
- **Creates 40,000 clean and new jobs.**
- **Opportunity to earn 14,000 M฿/year form Carbon Credit trading.**
- Delay the construction of new fossil fuel power plant 3,800 MW (equivalent to 100,000 M฿)
- Create Country's incomes by exporting biofuels, RE technologies (Gasification, biogas fermentation system).

(2) Social aspect

- Migration mitigation due to job creation in rural areas.
- **Extra income to farmers.**
- Improve quality of life for Thai people.

(3) Environmental aspect

- **Low Carbon Society to mitigate the global warming.**



20 years National Energy Efficiency Plan 2011-2030

- Targets for 2030, compare to 2005 base-line
 - Reduce Energy Intensity by 25%
 - Reduce Final Energy Consumption by 20% (30,000 KTOE per year reduction)
 - Reduce Energy Elasticity from 0.98(1990-2010) to 0.7 (2030)
 - Reduce Carbon Emission by 49 Million Tons /yr.

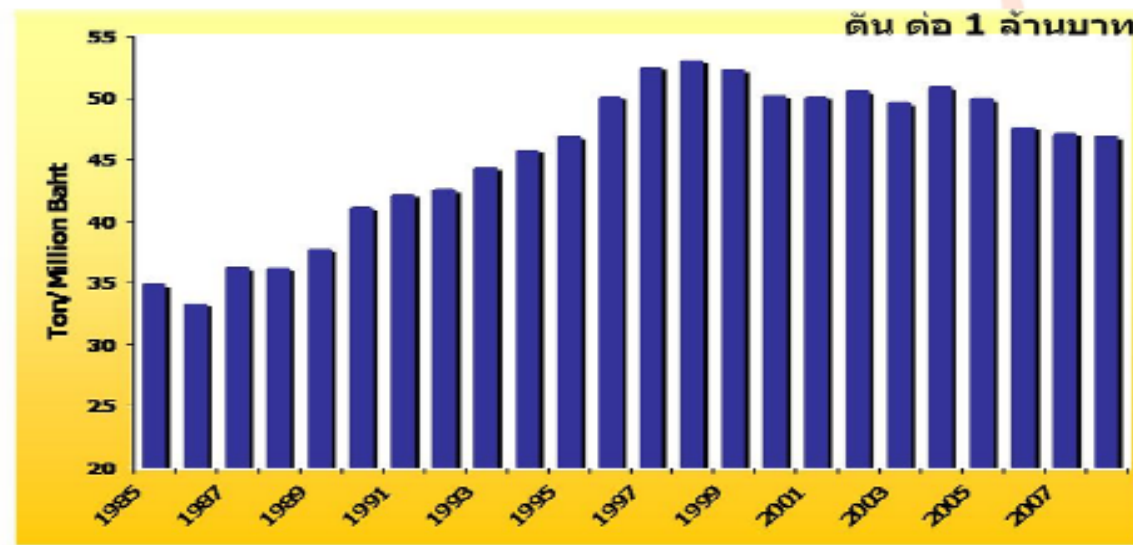


Measures

- Enhanced programs for Energy Efficiency Drives : both Compulsory and Voluntary measures (Energy Efficiency Law 1992, 2007)
- Measures to encourage 'market transformations' ie. EE classification for appliances, automobiles, buildings, Carbon Labeling, Carbon Tax ?
- EERS : Energy Efficiency Resource Standard, compulsory for large energy corporations.
- Technical and Financial Assistance Package for SMEs
- Local Authorities to be empowered to participate in the Low Carbon Society Programs

Current Carbon Intensity 46.7 tons
CO₂/ Million THB GDP ~ 1,410 Tons
CO₂ / M.USD GDP

Thailand Co₂ Intensity (Co₂ emission/GDP)



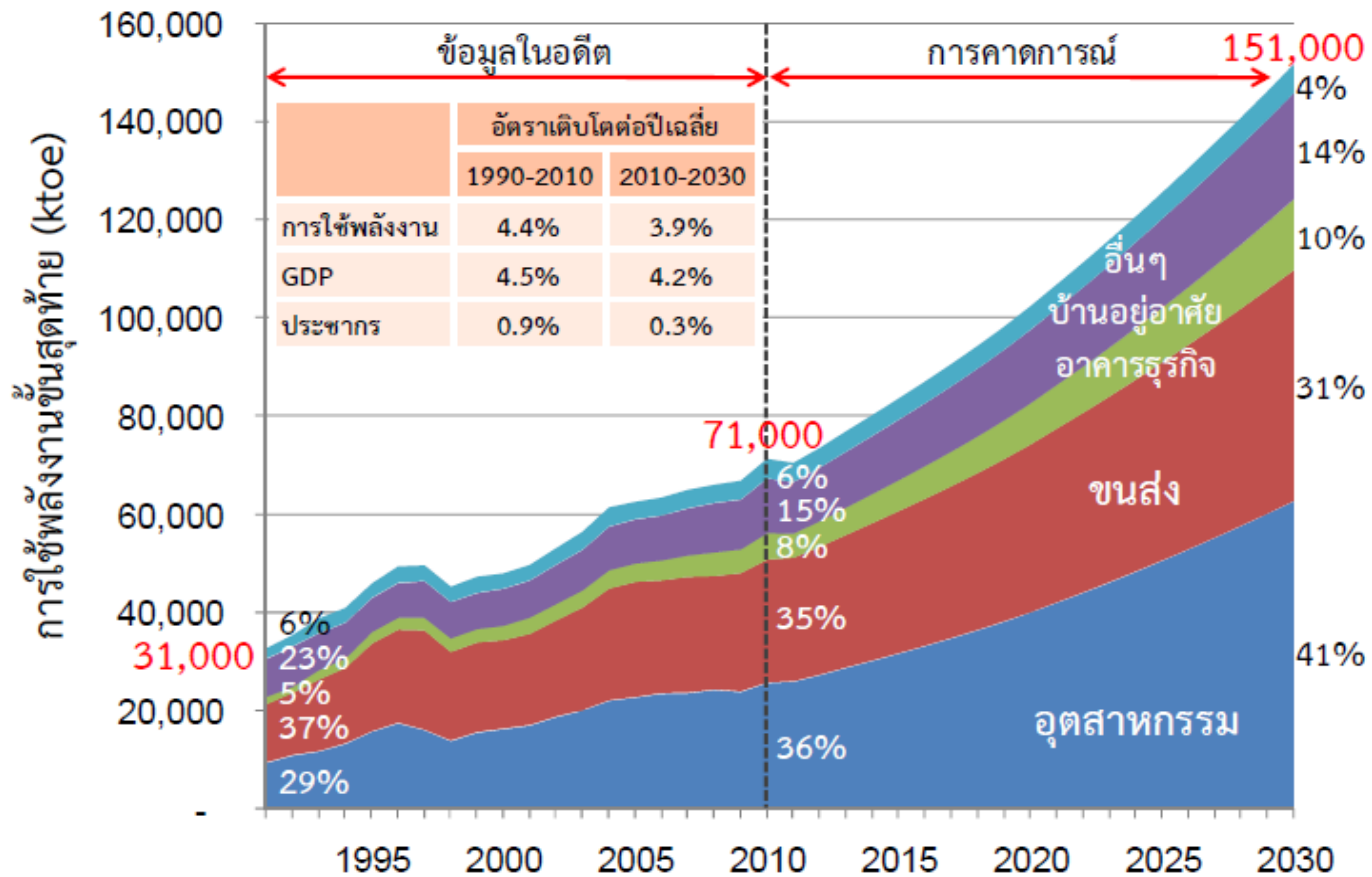
ที่มา : ระบบการวัดของ EPPD-EMS

Unit : Tons/Million Baht

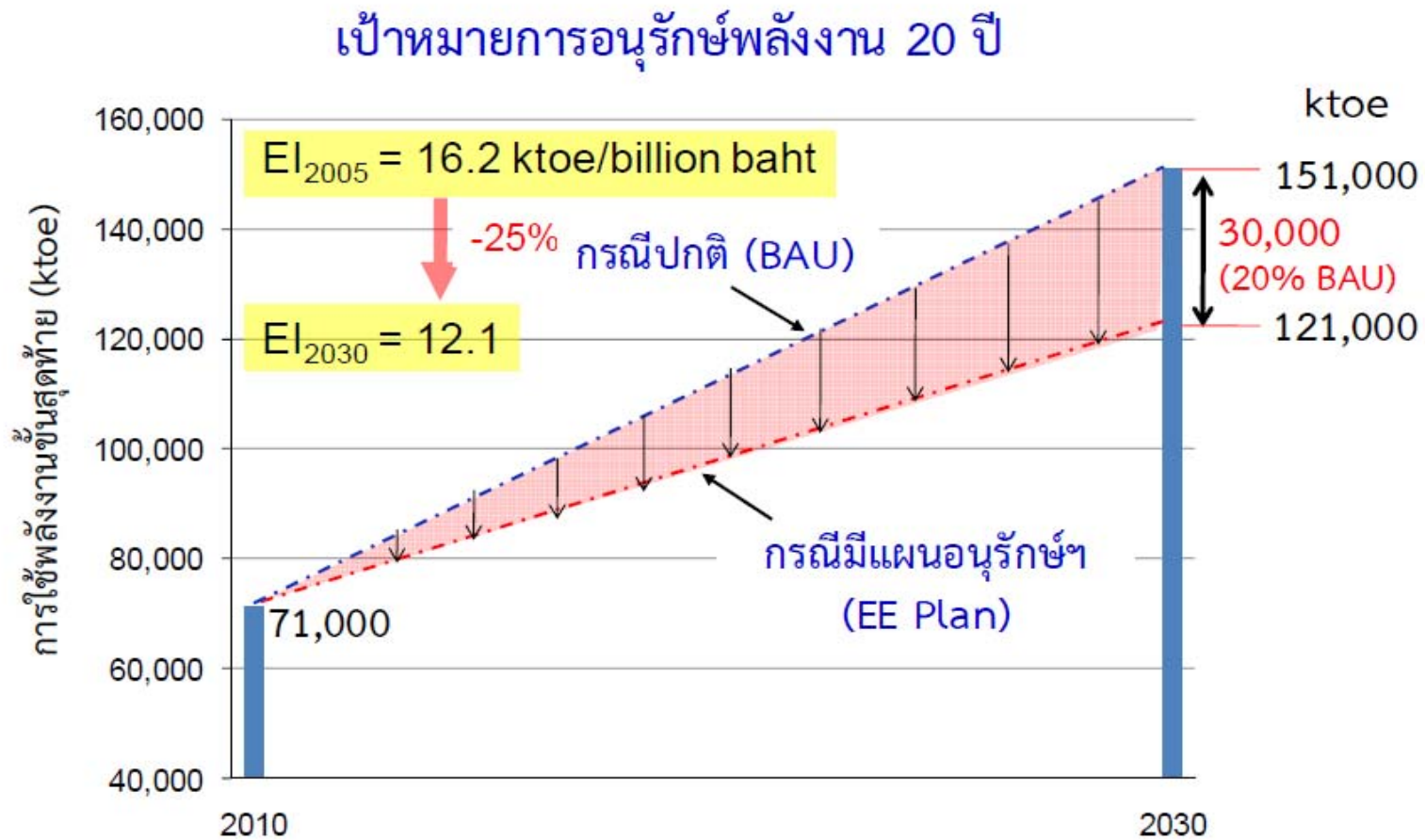
Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
CO ₂	34.84	33.23	36.20	36.04	37.67	41.02	42.03	42.48	44.27	45.63	46.81	40.93
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CO ₂	52.42	52.86	52.15	50.10	49.93	50.50	49.58	50.79	49.89	47.61	47.09	46.88

BAU Final Energy consumption by Sectors

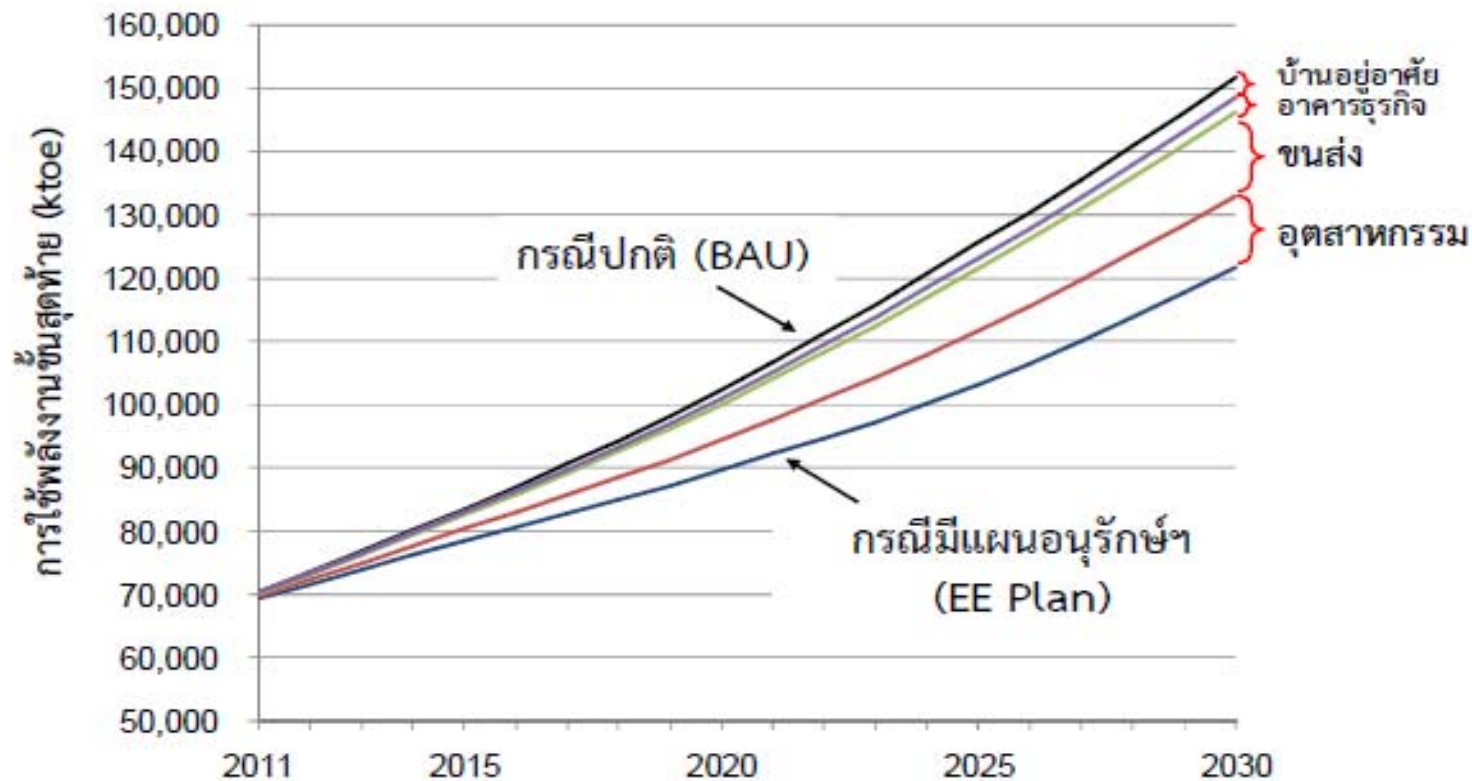
การใช้พลังงานในอดีตและแนวโน้มความต้องการในอนาคตกรณี BAU



Targets of 20 years EE plan 20% Reduction from BAU



KTOE Reduction Targets by Sector, Largest by 'Transport'



รูปที่ 4.1 เป้าหมายการอนุรักษ์พลังงานรายภาคเศรษฐกิจ

Expected Outcomes : 49 M.Tons CO2

Sector	KTOE reductions/yr	CO2 reductions M.tons/ yr	Expense reductions million USD /yr
Transport	6,400	20	4,700
Industry	5,500	17	2,900
Buildings			
- large	1,100	6	667
- SME, residential	1,500	5	800
Total	14,500	49	9,067

Financing Mechanisms

Revolving Fund

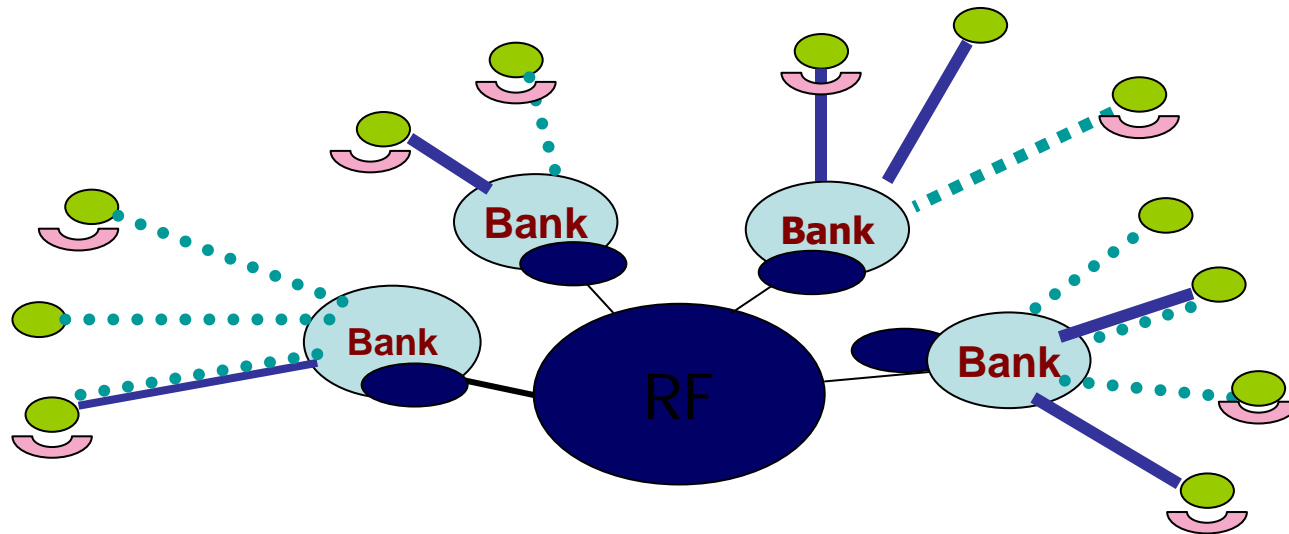
- **Soft Loans**
- **through commercial banks**
- **Jan 2003 – present**

ESCO Fund

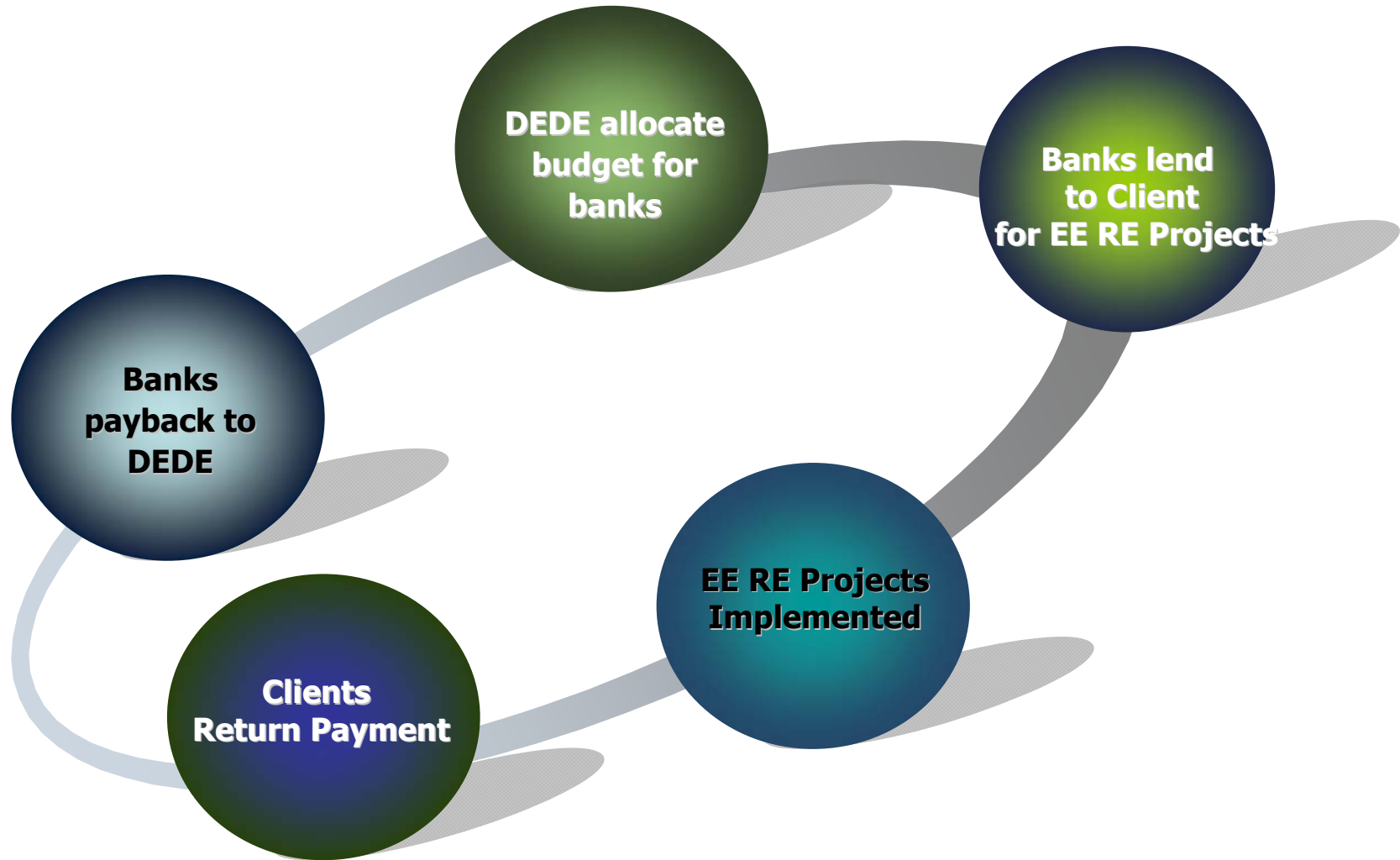
- **Equity Financing and Venture Capital**
- **Carbon Credit investment**
- **Leasing**
- **start october 2008**

Revolving Fund's Objectives

- ✚ **Stimulate and leverage commercial investment for EE Improvement**
- ✚ **Familiarize commercial banks with EE, RE lending market and opportunities**



RF Work Process



RF Terms and Conditions

Size of Revolving Fund	125 Million USD
Loan Period	7 years maximum
Eligible Borrowers	Facilities' Owners, ESCOs and Project Developers
Eligible Projects	EE improvement or RE development and Utilization
Loan Size from RF	Up to 100% less than 1.25 million USD
Interests	Not more than 4% (negotiable)

1 USD = 30 Bath

11 Participating Banks

- Bangkok Bank (BBL)
- Bank of Ayudhya (BAY)
- Bank Thai (BT)
- Thai Military Bank (TMB)
- Siam City Bank (SCIB)
- Siam Commercial Bank (SCB)
- Thai Farmers Bank (TFB)
- Exim Bank (Exim)
- Krung Thai Bank (KTB)
- SME Bank (SME)
- UOB

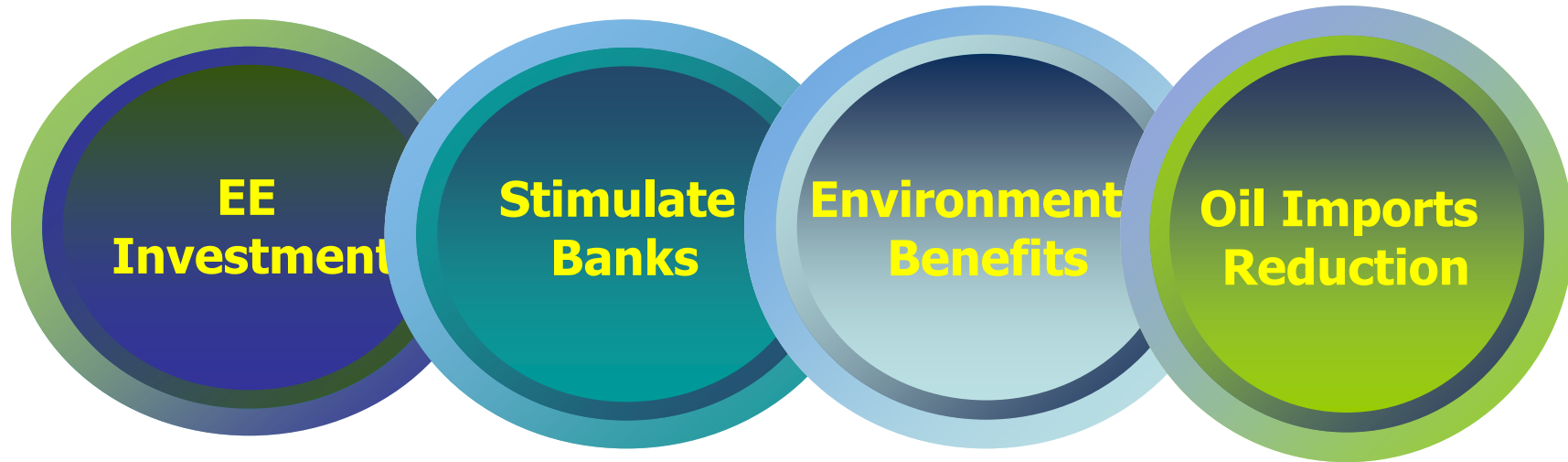


Eligible Investment Costs

- **Equipment and Installation costs**
- **Consulting Costs – design, control, supervision, guarantee fees**
- **Civil works, piping, or necessary components specifically and necessary for the project**
- **Associated Costs necessary – removal of existing equipment, transportation, taxes, VATs**

Not Eligible: Land Costs, Land Improvement Costs, building construction,
Costs not specifically needed for the project e.g. main transformers

Achievements of EE Revolving Fund



Reduce oil imports
Reduce Power Demand



ESCO Fund

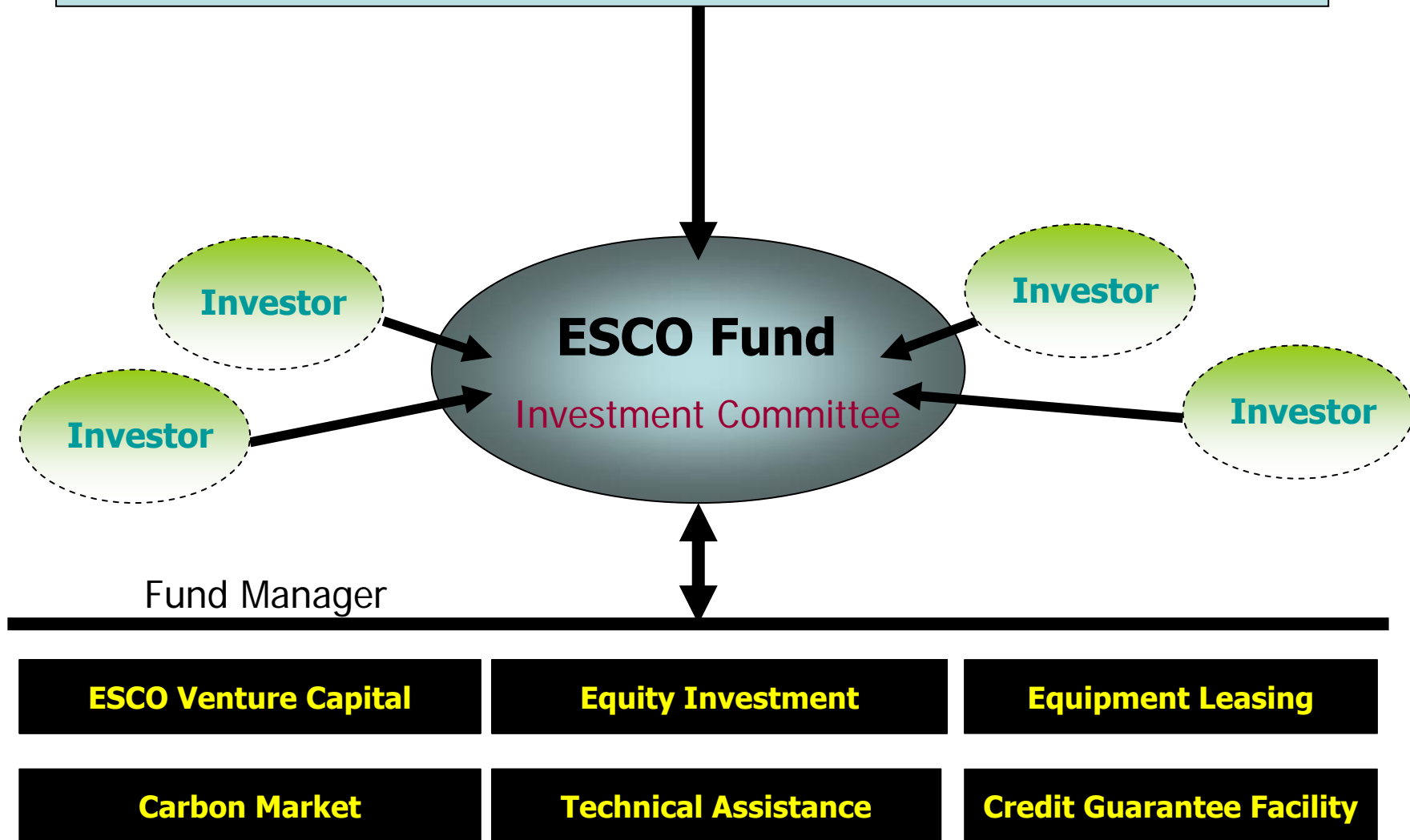
Initial Budget of 500 MB
Starting October 2008

Objective

To promote investment in energy conservation and alternative energy and facilitate carbon market



Energy Conservation Promotion Fund



Investment Committee

- Set investment policy and criteria
- Approve project investment and exit
- Supervise the program implementation

Component

- DEDE
- EPPO
- DIW
- Federation of Thai Industry
- Energy and Finance Experts

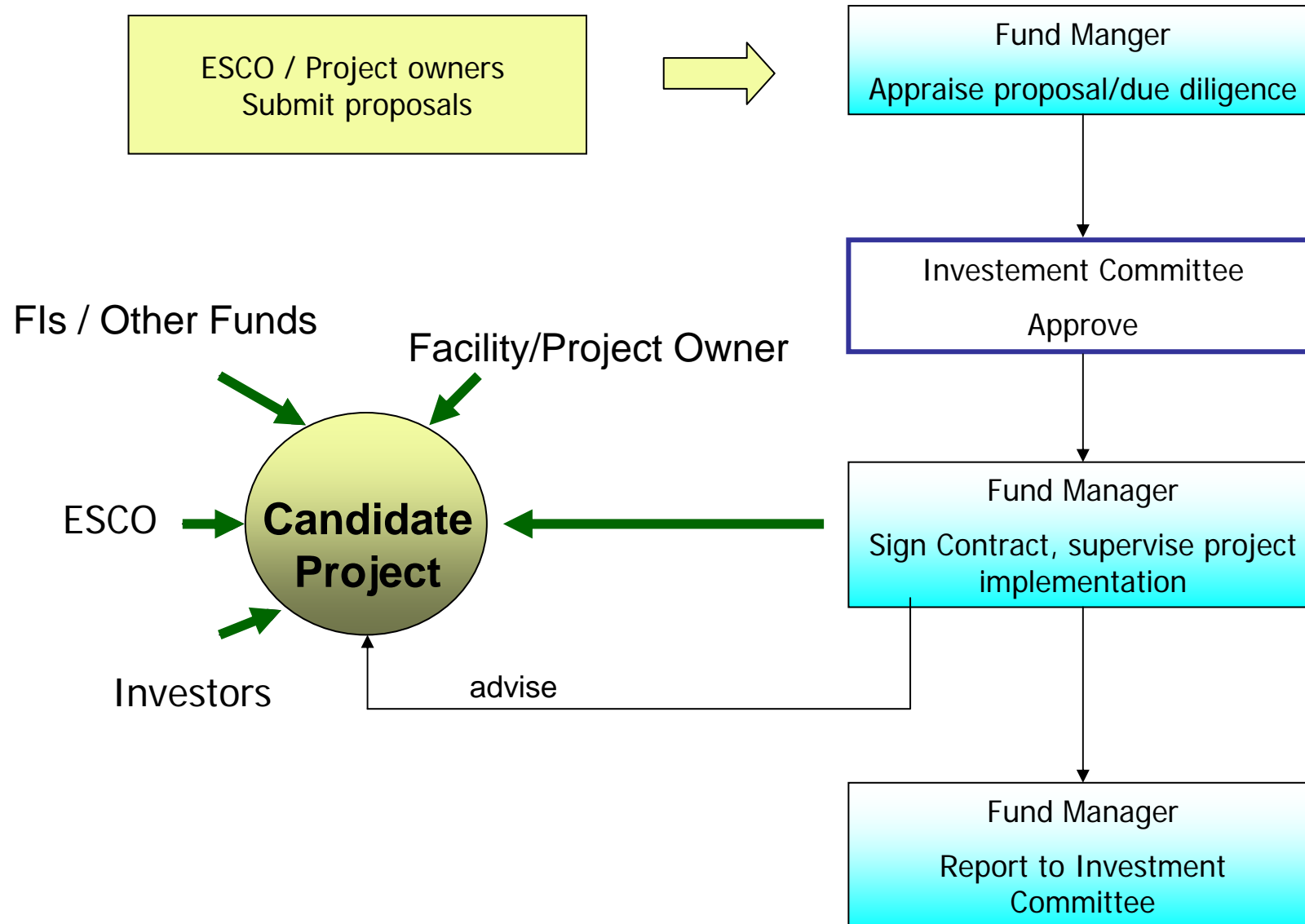
Fund/Project Manager

- Marketing and Project Development
- Appraise projects, Due diligence
- Coordinate with financial institutes, Funds, other investors
- Sign contractual agreements
- Advice project clients
- Portfolio and Risk Management

Component

- Manager
- Technical staff
- Finance staff
- Legal / Accounting
- Marketing team

Typical Work Flow



Investment Criteria

- Equity Investment; 10-50 % maximum of 50 MB; 3-7 years
- ESCO Venture Capital; 10-30 % of registered capital; maximum of 50 MB; 3-7 years
- Equipment Leasing; maximum of 10 MB; within 5 years payback period
- Carbon Credit;
- Technical Assistance;
- Guarantee Facility

Appraisal Issues

- In line with Investment Policy
 - Target Groups
 - Technologies
 - Investment size
 - ESCO
- Opportunity and Risks
 - Technical
 - Management
 - Financial and Market/Industry trends
- Exit strategies

To Support (not commercial minded)
Self Sufficiency Financially



Algae Activities in Thailand

- **“Renewable energy projects from microalgae”**, in collaboration with Faculty of Engineering Prince of Songkla University. Supported by Energy Conservation Promotion Fund. The project's main focus is to be able to use microalgae as a source of raw materials for renewable energy in the future.



- **Research and Development to produce oil from algae.** selection strain and innovation of research on alternative energy. PTT has partnered with Mahidol University, Chulalongkorn University, King Mongkut's University and BIOTEC.

- **Research on seaweed farming industry for biodiesel** by Faculty of Technology, Khon Kaen University.



Thank You Very Much for your attention

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