

Thailand's Renewable Energy Policy: FiTs and Opportunities for International Support

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Topics

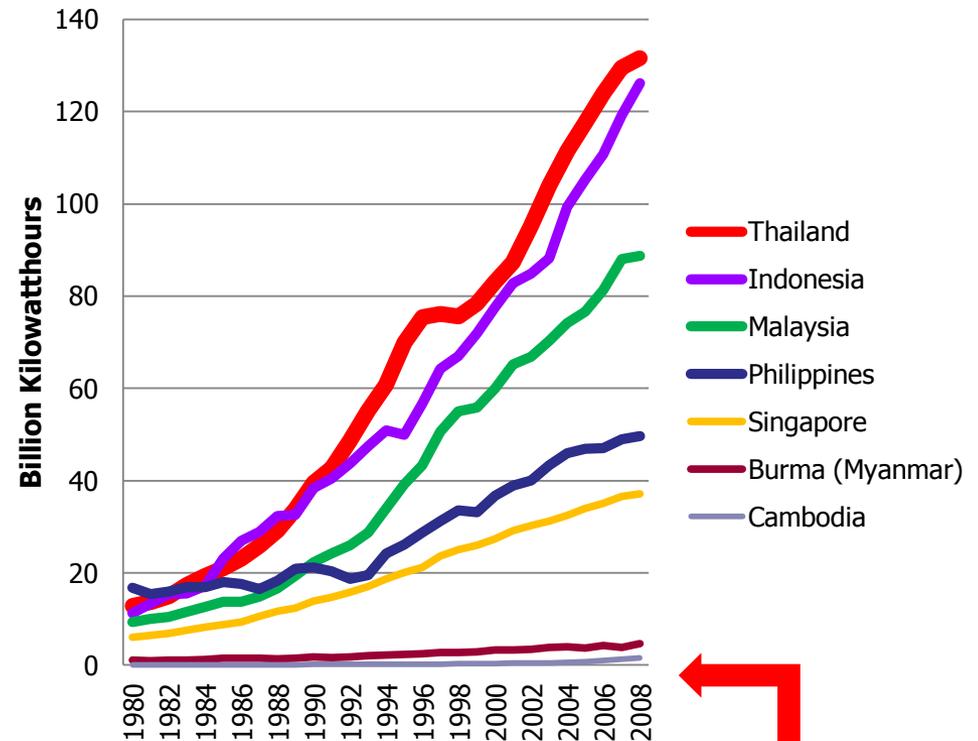
- 1. Introduction**
- 2. The State of Play of Renewable Energy in Thailand**
- 3. Needs and Potential for International Support**
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1. Introduction

Thailand

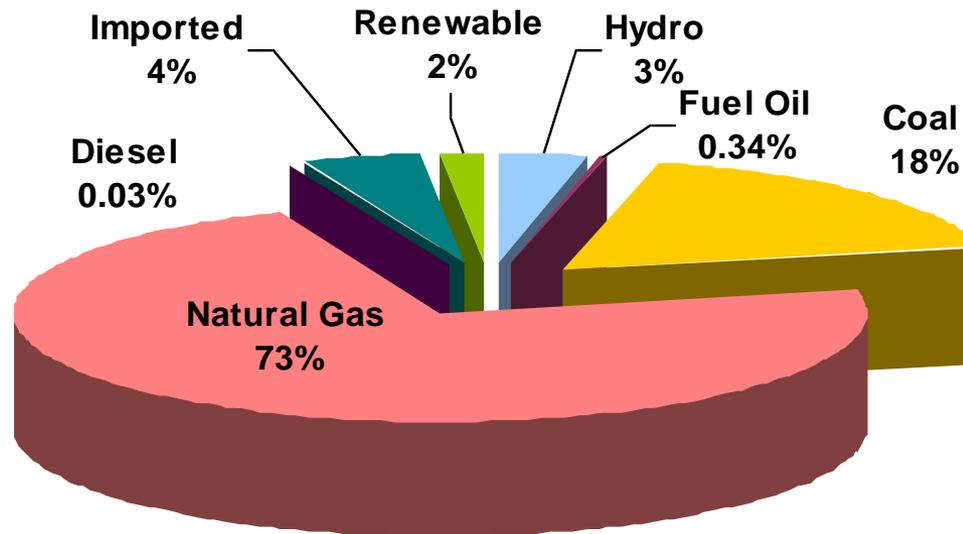


Electricity Consumption by Country 1980-2008



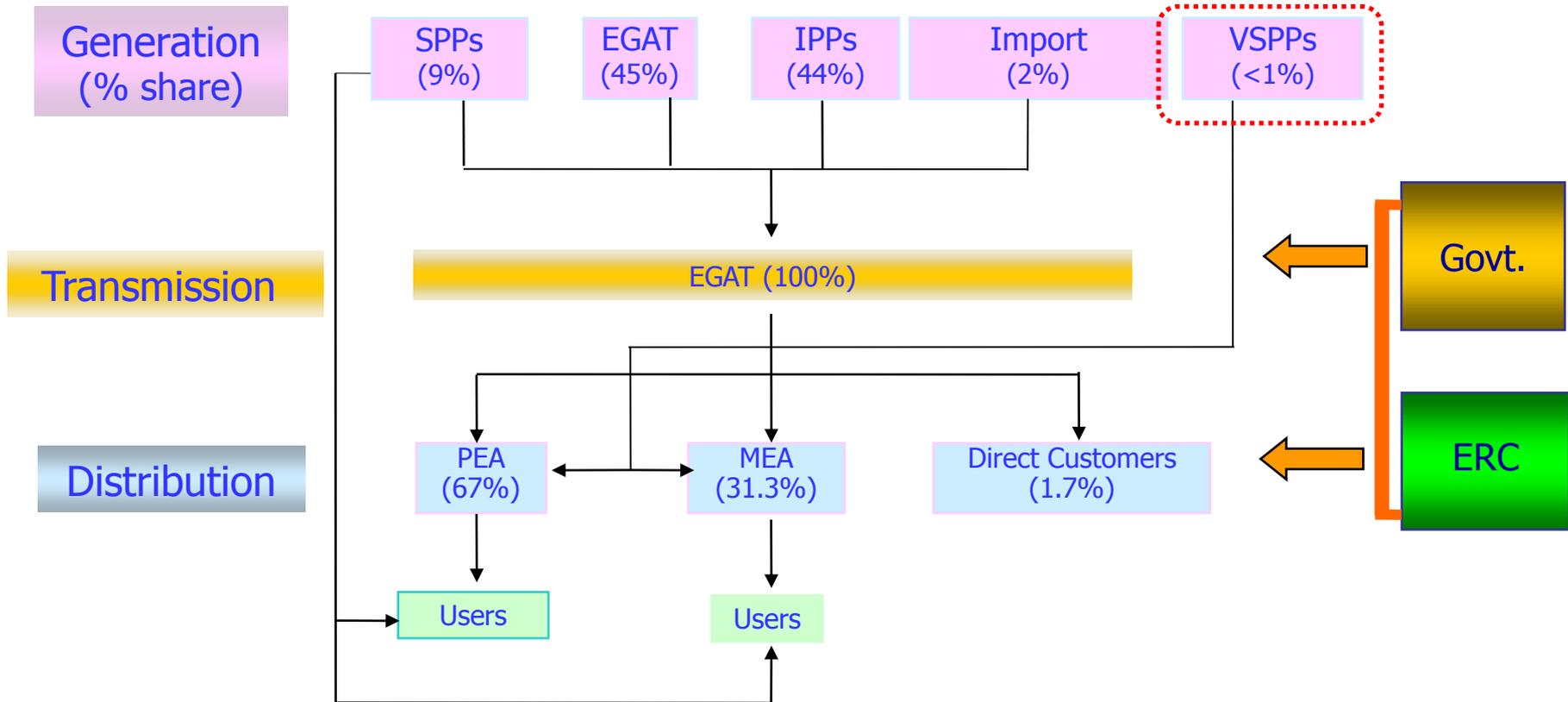
Thailand: an average increase of 3.2% per year over the past 10 years.

Thailand's Fuel Mix for Power Generation (2010)



Total Installed Capacity: 31,517 MW

Thailand's Electricity Industry Structure: The Enhanced Single Buyer Model



Remarks: % Share of Energy as of Dec 2009

2. The State of Play of Renewable Energy in Thailand

Five Separate Energy Plans

- **Power Development Plan 2010-2030 (PDP)**
- **15-Year Renewable Energy Development Plan 2008-2022 (REDP) → updated to AEDP 2012-2021 at the end of 2011**
- **20-Year Energy Efficiency Development Plan 2011-2030 (EEDP)**
- **5-Year Natural Gas Supply Plan**
- **NGV Roadmap**

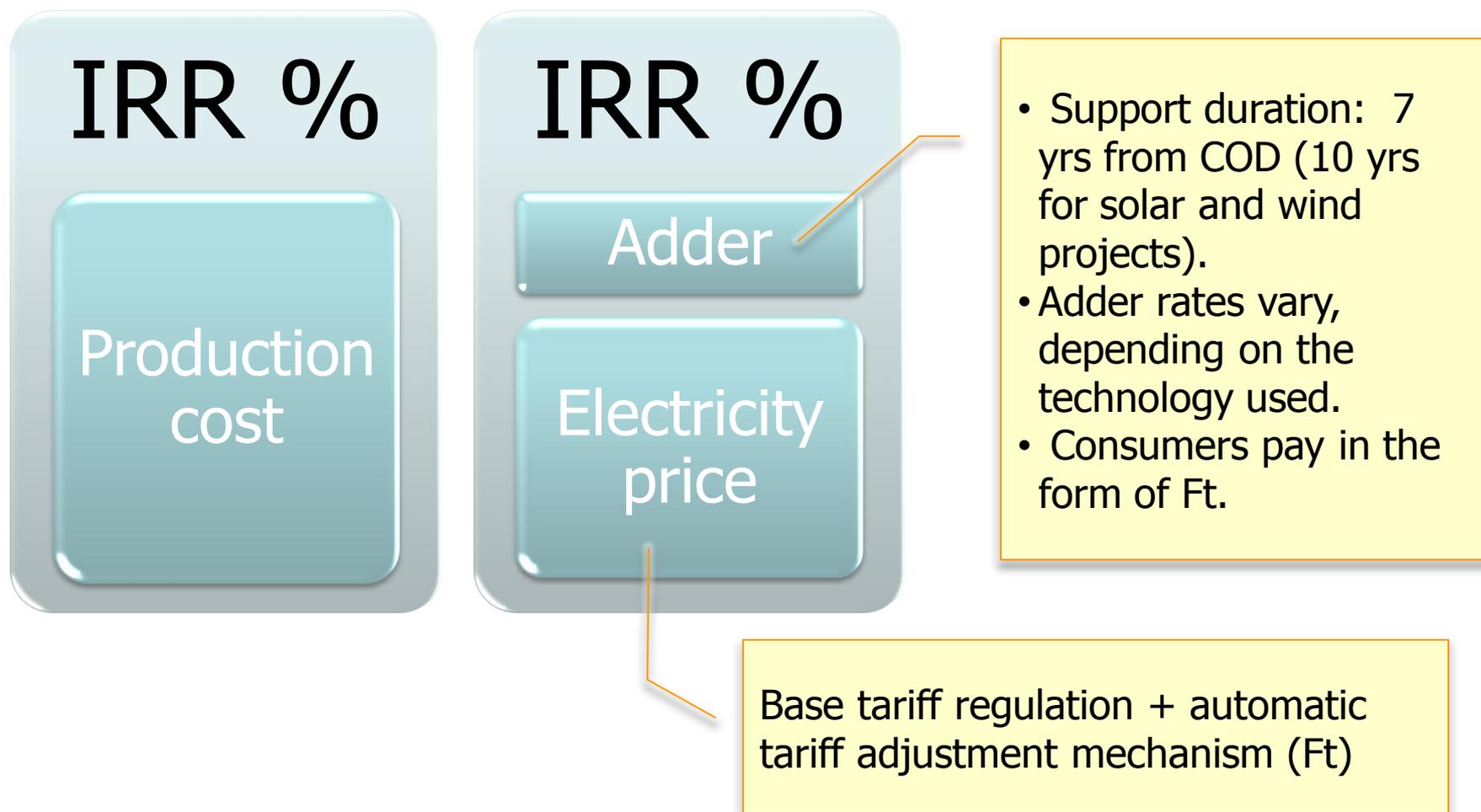
Some observations about the plans

- Prepared by different government divisions
- Not unified into a comprehensive plan
- Prioritizing different policy goals
 - Security of supply
 - Diversification
 - Returns on Investment of Capital (ROIC)
 - Climate Change
 - Economics
- Conflicting targets
(esp. the PDP vs. the REDP; PDP vs. EEDP)
- Limited public participation
- Resource options identified but not evaluated

The Need to Unify Renewable Energy Targets:

Type	REDP 2008-2022	AEDP 2012-2021	PDP 2010 (2010-2030)
Solar	500	2,000	923
Wind	800	1,200	798
Hydro	324	1,608	263
Biomass	3,700	3,630	2,340
Biogas	120	600	121
MSW	160	160	173
Other (hydrogen, tidal, geothermal)	3.5	3	0
Total	5,608 (by 2022)	9,201 (by 2021)	4,617 (by 2030)
% of installed capacity	11% of installed capacity in 2022	19.3% of installed capacity in 2021	6% of installed capacity in 2021

Feed-In Tariffs (ADDER) Program



Thailand's ADDER (FiT) Rates

(in USD/kWh)

Type of RE	Unit: US Dollars per kWh					Years Supported
	2007 Adder Rate	2009 Adder Rate	2010 Adder Rate	Special Adder for Diesel Replacement	Special Adder for Three Southernmost Provinces	
Biomass						
Installed Capacity ≤ 1 MW	0.010	0.017	0.017	0.033	0.033	7
Installed Capacity > 1 MW	0.010	0.010	0.010	0.033	0.033	7
Biogas						
Installed Capacity ≤ 1 MW	0.010	0.017	0.017	0.033	0.033	7
Installed Capacity > 1 MW	0.010	0.010	0.010	0.033	0.033	7
Waste						
Landfill and Digestor	0.083	0.083	0.083	0.033	0.033	7
Thermal Process	0.083	0.117	0.117	0.033	0.033	7
Wind						
Installed Capacity ≤ 50 kW	0.117	0.150	0.150	0.050	0.050	10
Installed Capacity > 50 kW	0.117	0.117	0.117	0.050	0.050	10
Small/Micro Hydro						
50 kW < Installed Capacity < 200 kW	0.013	0.027	0.027	0.033	0.033	7
Installed Capacity ≤ 50 kW	0.027	0.050	0.050	0.033	0.033	7
Solar	0.267	0.267	0.217	0.050	0.050	10

Features of Thailand's ADDER Program (First phase: 2007-2010)

- **Eligibility:** non-utility power producers, (using solar, wind, biomass, biogas, hydro, MSW):
 - ≤ 10 MW: **VSPP Program** (connected to the distribution grid of PEA or MEA)
 - 10-90 MW: **SPP Program** (connected to the transmission grid of EGAT)
- **Cap:** None; but continued support subject to corresponding impacts on electric rate (Ft)
- **Designed by:** Ministry of Energy
- **Administered by:** utilities (EGAT, MEA, PEA) and ERC
- **Approval criteria:** distribution or transmission availability
- **Structure of the Program:**
 - 1) Must-take dispatch for connected projects
 - 2) Contract length: 7-10 years
 - 3) Bonus payment on top of regular electricity rates
 - 4) Simplified, streamlined pre-approval process through VSPP regulations
 - 5) No post-approval process for VSPPs
- **Years Supported:** 7-10 years from COD
- **Funding mechanism:** pass-through to ratepayers through Ft mechanism

How Adder Rates were Determined (1)

CORY ET AL. (2009):

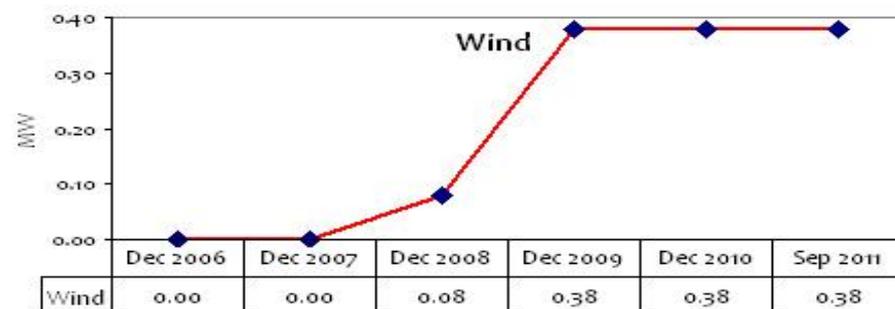
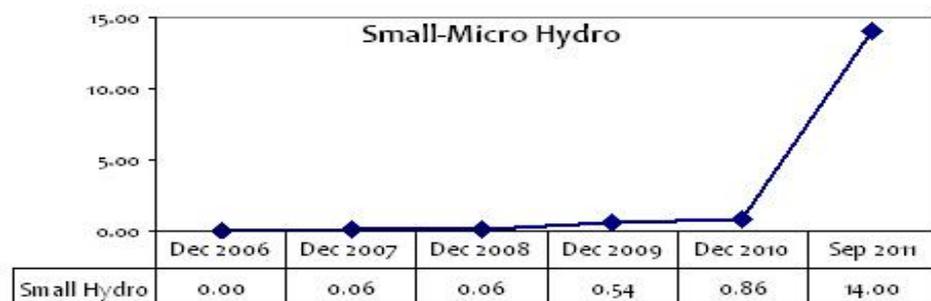
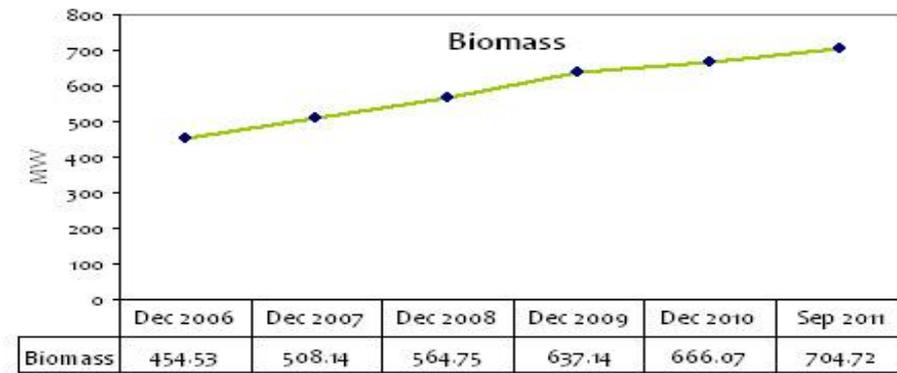
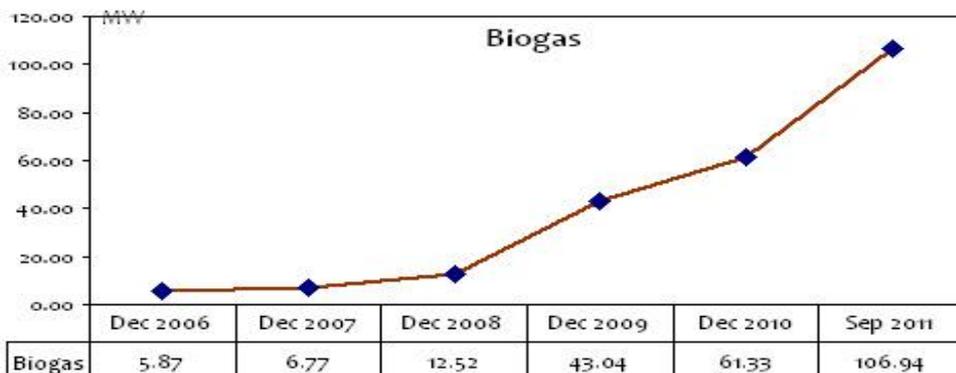
- Value of renewable energy generation
 - to society (e.g., internalizing externalities)
 - to utility (avoided cost)
- Levelized cost of electricity generation+reasonable IRR
- the result of an auction or bidding process
- A fixed price incentives unrelated to the actual levelized cost of electricity generation or the value of renewable energy generation

**THAILAND HAS UTILIZED A COMBINATION
OF THESE METHODS as
INPUTS INTO POLICYMAKING**

Key Features of Thailand's ADDER Program

- Attractive rates based on the cost of energy production and reasonable returns on investment
- Guaranteed payment period (10 years for solar & wind, 7 years for other RE)
- Long-term must-take contracts
- streamlined application procedures
(in the first phase only)
- Uniform interconnection standards.

On-grid RE Capacity: Before and After Adder



Criticisms

POLICY:

- (1) A lack of unified policy packages:** Impressive results from the Adder program is not used as an input into long-term power supply procurement plan.
- (2) Rapid changes to the policy:** The adjustment of the solar adder rate came without public warning.

IMPLEMENTATION:

- (1) Transparency:** in the queuing and approval process
- (2) Regulatory barriers:** increasing uncertainties for investors after regulatory changes in 2010; redtape and bottlenecks

The Evolution of Thailand's ADDER Program (1)

1992-2009:  laying the foundation for the ADDER program

1992

-Regulations for Power Purchase from SPPs (10-90 MW) approved → EGAT was allowed to purchase power from SPPs using non-conventional energy (RE & Cogeneration) as fuel.

2002

-VSPP Regulations drafted, based on net-metering regulation in the U.S., approved by **Cabinet**, applicable to generation sized <1MW.
-Applicable to renewable and co-generation facilities
-up to 1 MW contracted capacity
-Tariffs set at avoided cost (wholesale or retail tariff + Ft)

2006

-contracted capacity of VSPP extended from 1 MW to 10 MW
-Feed-inTariffs ("ADDER") program approved by **Cabinet**

2007

-ADDER program implemented by utilities
-ADDER rate bidding for biomass SPPs, 7 biomass projects chosen
-ADDER rates for wind power projects increased and support period for wind & solar projects extended from 7 to 10 years
-ADDER rates for three southernmost provinces introduced

2009

-ADDER rates adjusted to encourage smaller-scale installations and diesel offsets
-Some rules and regulations adjusted (bid bond, dispatch, and rooftop solar)

The Evolution of Thailand's ADDER Program (2)

2010-2011:  ADDER Program Reviewed and Revised

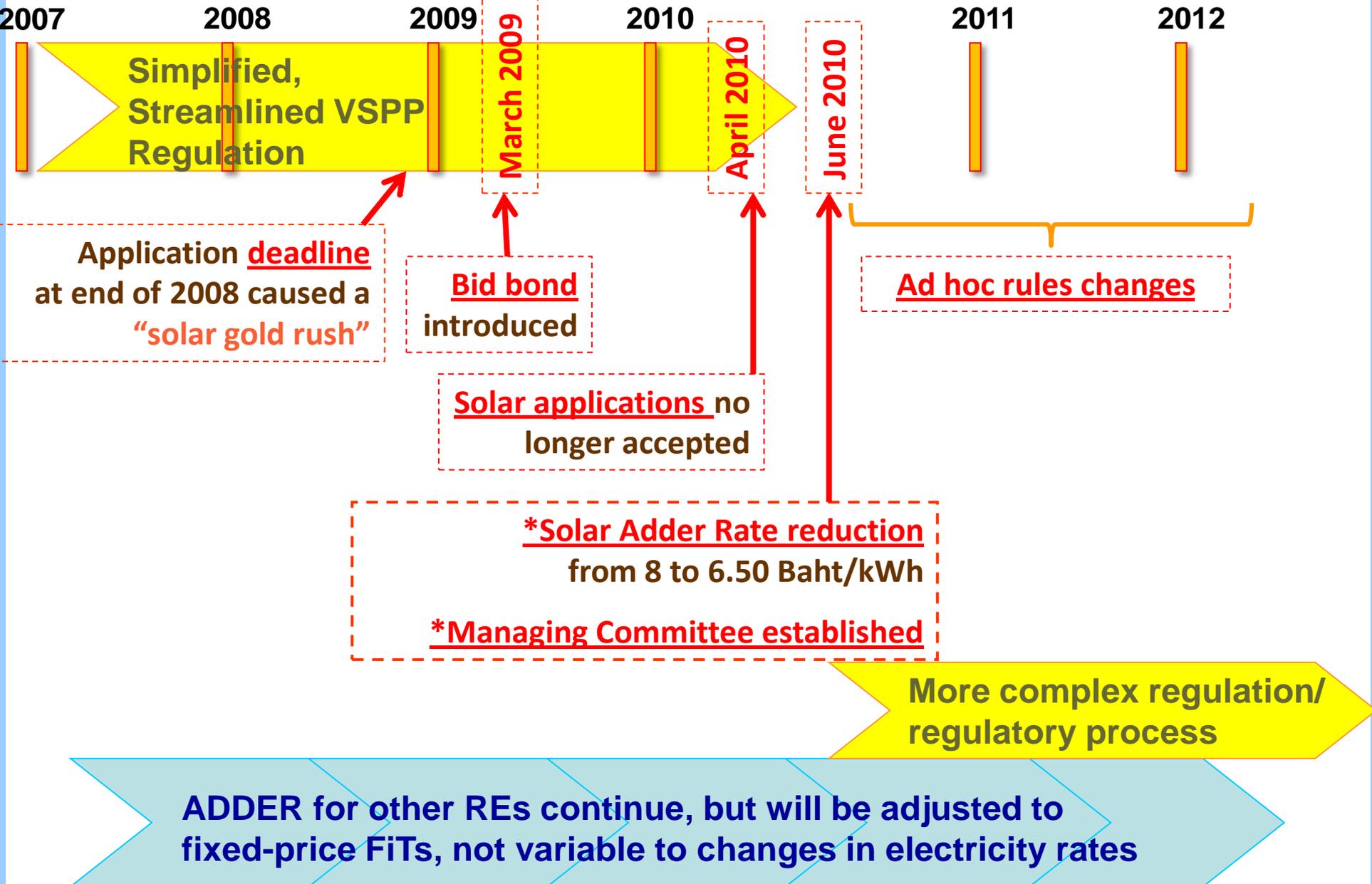
2010

- Solar application acceptance temporarily closed
- Policy to focus solar FiTs on rooftop systems only
- Post-approval regulations become more stringent for all technologies
- Rate structure to be changed from adder to fixed feed-in-tariff
- “Managing Committee” established to coordinate, regulate the program and approve projects

2011

- The study of fixed feed-in tariffs for all technologies in process

2.3 Regulatory Changes: Evolution of the Adder Program

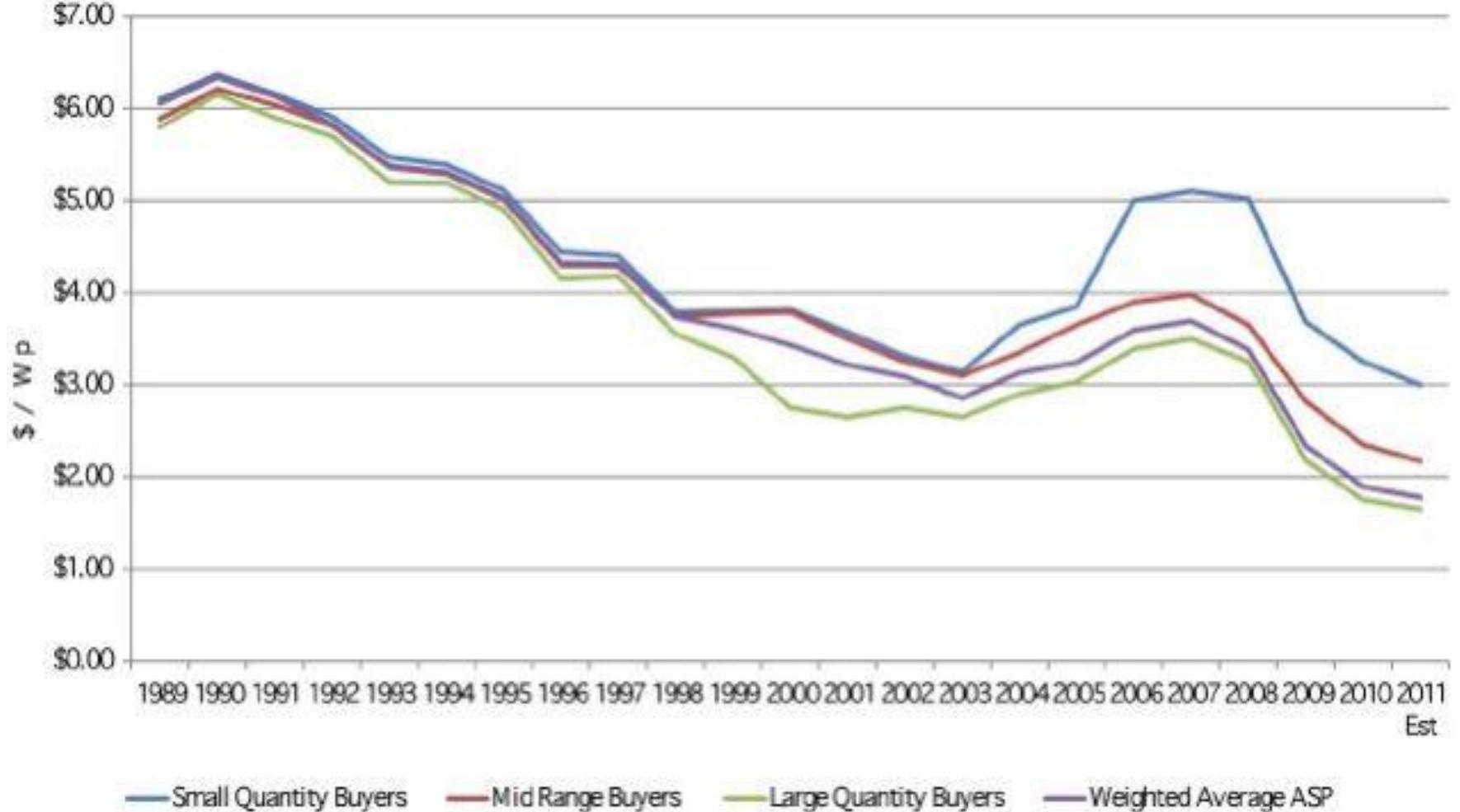


2010: Thailand's ADDER Program Reviewed

Factors that have triggered the review:

- 1. Changing market conditions*
- 2. Impacts on ratepayers*
- 3. Implementation problems*
 - applied vs. actual megawatts*

(1) Changing Market Conditions: PV Price Trend



Source: Paula Mints, Navigant Consulting (2011)

(2) Rising electricity rates & impacts on ratepayers

Payment to generators

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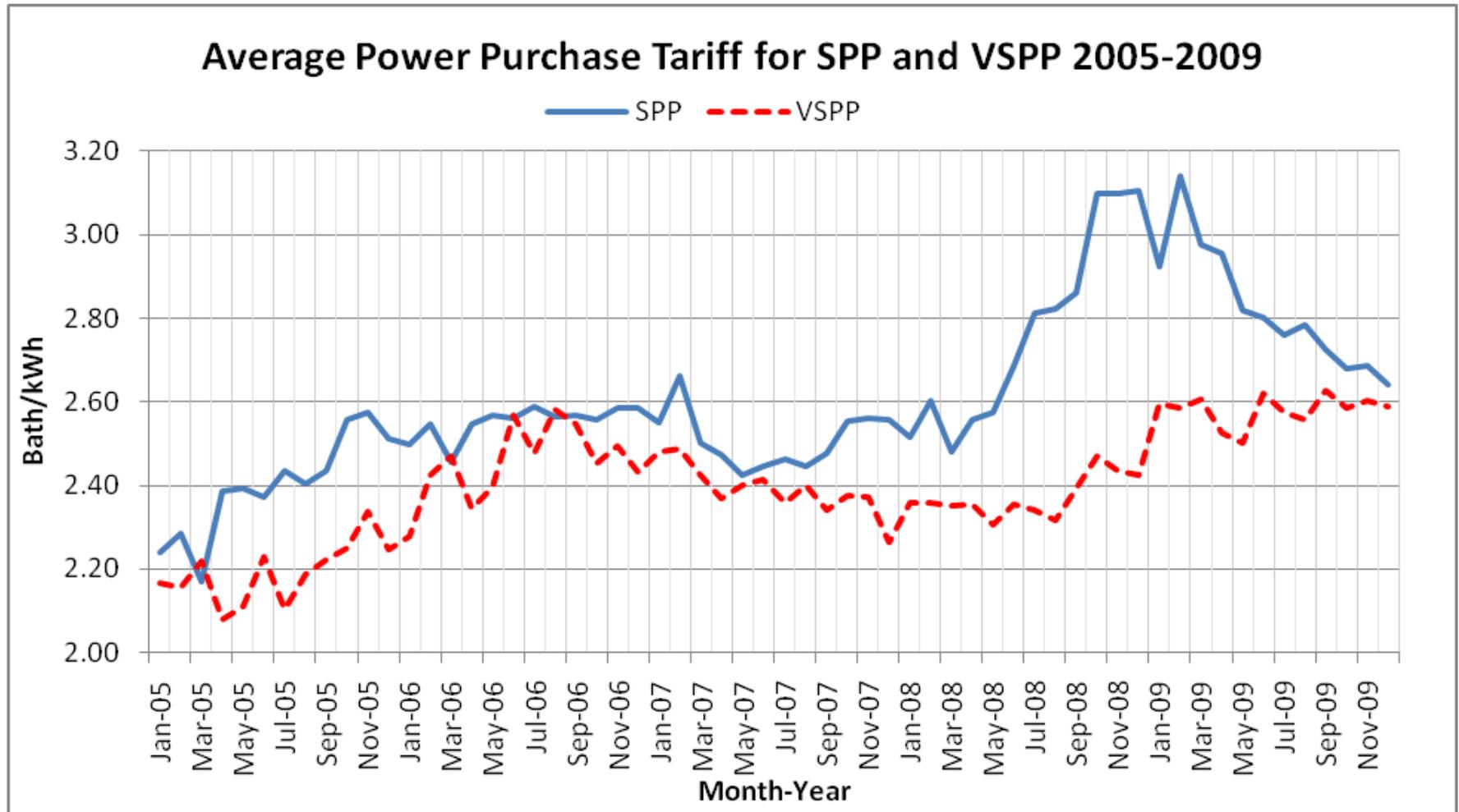
Base tariff

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Fuel Adjustment (Ft)

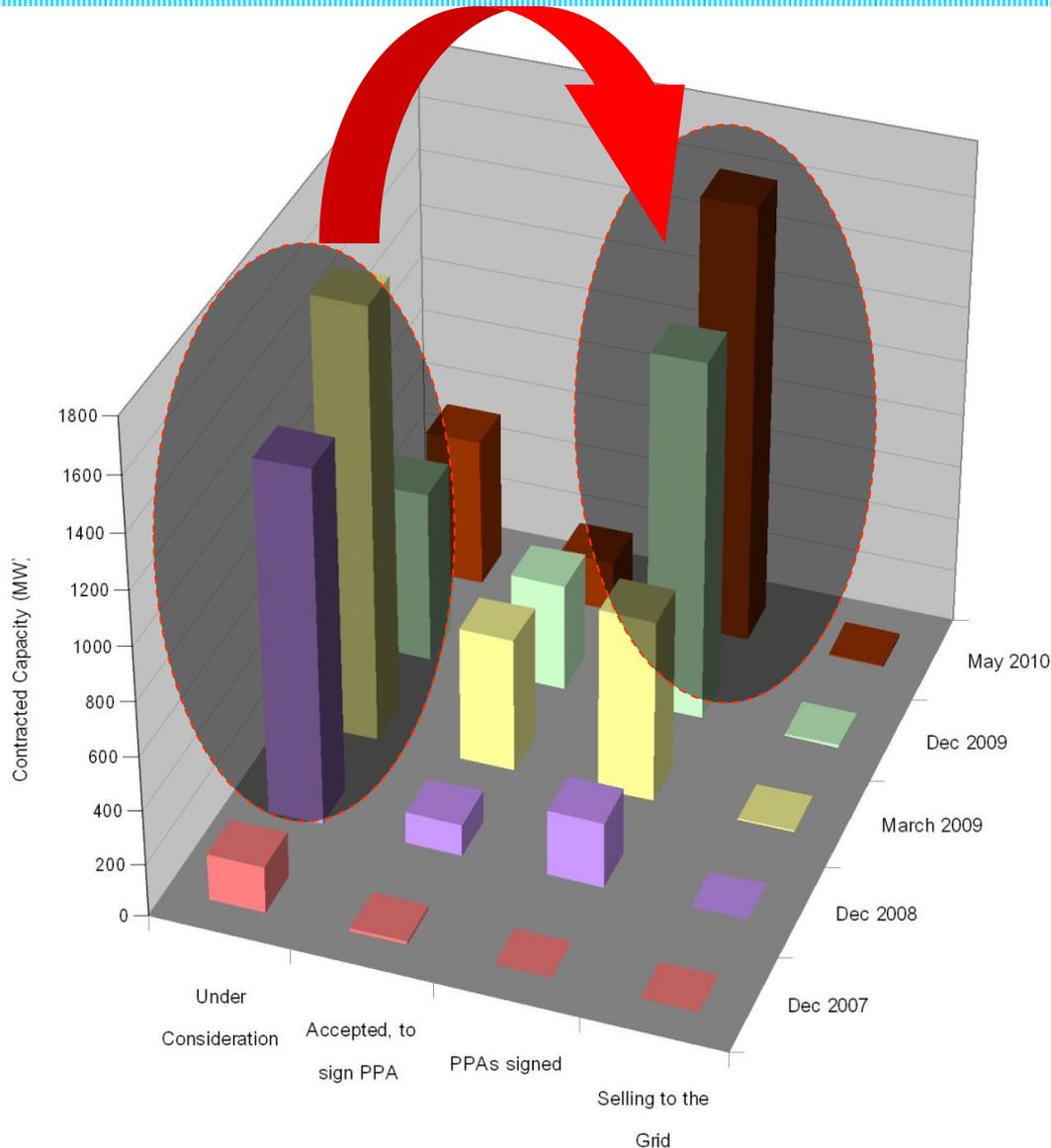
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ADDER



While the base tariff has been constant since 2005, the fuel adjustment component (Ft) of the tariff has seen an upward trend since 2008.

(3) Implementation Problems: Applied vs. Actual Megawatts



Solar VSPP capacity 2007-2010

- Rush of applications at the end of 2008
- In two and a half years, 1,620 MW worth of contracts have been signed, but only 6.77 MW have materialized (connected and selling to the grid).
- The rest of the projects are still under development (seeking loans, investors, etc.)
- Measures to discourage speculators passed starting March 2009, implemented October 2009.

June 2010: Cabinet's Resolutions

- A halt to solar application acceptance
- A reduction in solar adder from 8 Baht/kWh to 6.50 Baht/kWh (about 22 cents/kWh) for projects that had not signed PPAs
- A change in pricing structure from ADDER to Fixed-Price Feed-In Tariff (the total price per kWh is independent of base tariff and Ft)
- A change in pass-through mechanism from Ft to base tariff
- A formation of a new committee that will oversee the regulation of RE projects in the pipeline.

Comprehensive Measures to Address Speculation Problem: 2009-2011

APPLYING

- a bid bond requirement of 200 Baht/kW (~3USD/kW) for project sized >100 kW
- applicable retroactively to projects without PPAs before August 2009

UNDER CONSIDERATION

- Utilities' acceptance criteria no longer based solely on technical availability of the grid
- **Additional criteria:** projects' readiness in four aspects – land, loan, technology, and permits from other agencies

ACCEPTED (to sign PPAs)

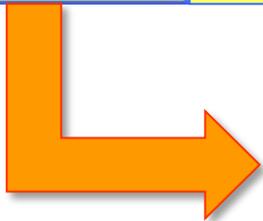
- more stringent enforcement– failure to sign PPAs within the specified time period results in the termination of the application process

PPA SIGNED

- to submit progress reports within the 6 months before the SCODs
- After the PPA has been signed, any SCOD postponement request will be assessed based on the 4 aspects of project's readiness; extension is allowed up to 6 months.

SCOD

- a 6-month grace period for projects that cannot meet the SCOD deadline and are still in contact with the utilities
- Contract termination for projects that are not in contact with the utilities



-NEW RULES INTRODUCED IN A PIECEMEAL AND NON-TRANSPARENT MANNER, CAUSING CONFUSION AND LOSSES OF INVESTORS' CONFIDENCE

Some questions on transparency

-queuing and approval process

-Who gets ahead in the line?
Any preferential treatment?
-What is the timeframe for project approval and PPA signing?

-approval criteria

-What criteria are used for project approval and PPA signing?
-Are these criteria announced to the public?

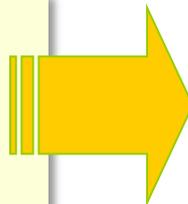
-applicability of the reduced adder

-Which projects should the reduced adder be applied? -What about the projects without PPAs that already got in the line?

-acceptable level of pass-through costs

-What is the official ceiling of the pass-through costs to ratepayers (\$\$/kWh)

-high uncertainty
-high transaction cost
-low transparency



-Process susceptible to bribery and graft

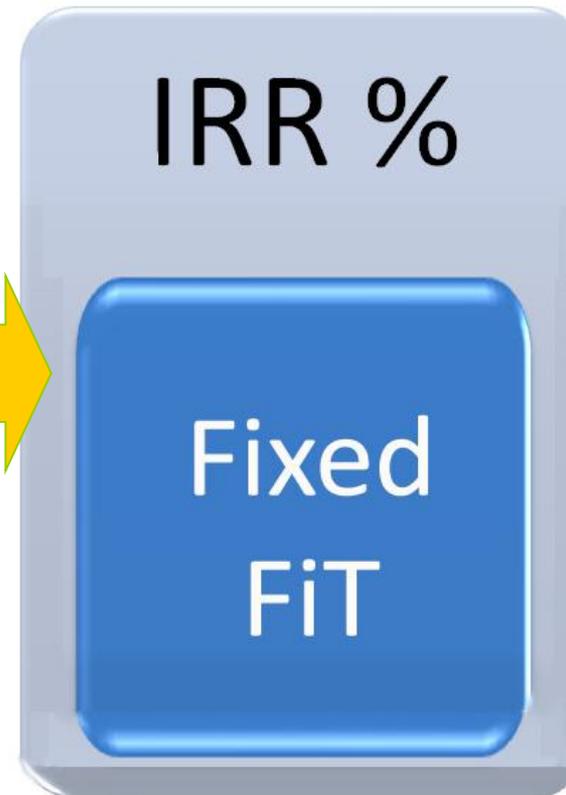
Policy Revision: from ADDER to Fixed-Price Feed-In Tariff

June 2010: approved by the Cabinet:



Premium-price FiT:

- *Total tariff rate varies with Ft+base tariff
- *increases over time



Fixed-price FiT:

- *Tariff rate independent of market price
- *Constant over a fixed period of time

Not yet proposed to the gov.

As of Nov. 30, 2011

Overall Assessment of the Adder Program: Strengths and Weaknesses

Strengths

- simple FiT rate structures
- attractive FiT rates that induce investment
- secured contracts to purchase electricity for 5 years with automatic renewal
- special rates for diesel substitution and for areas with political unrest
- other supporting measures quite attractive, esp. for large-scale projects

Weaknesses

- Not backed up by the law
- Weak regulatory support
- lack of program cap in combination with deadline for application filing
- lack of public discourse on acceptable pass-through costs to ratepayers
- Increasing redtape and bottlenecks in application processing... raising questions of transparency
- Lack of consumers' interest

2.4 Attractive Financing Options

Existing RE Policies: International Comparison

Country	Feed-in tariff	RPS	Capital subsidies, Grant, rebates	Tradable RE certificates	Net Metering	Public investment or Loan	Competitive Bidding
Denmark	√		√	√	√	√	√
Germany	√		√		√	√	√
Japan	√	√	√	√	√	√	
Philippines	√	√	√		√	√	√
Malaysia	(to be launched in 2011)					√	
Indonesia	√						
China	√	√	√			√	√
Thailand	√ (SPP) (VSPP)	√	√		√	√	√ (SPP)

Source: "Renewables 2010 Global Status Report", www.ren21.net

Financial Mechanisms for RE Support

Low-Interest Loan: Revolving Fund

Venture Capital: ESCO Fund

Tax Incentives: BOI privilege

Feed-in tariff: ADDER

Revolving Fund

- Provided via financial institutions for investment in:
 - Energy efficiency improvement projects
 - Renewable energy development and utilization projects

11 local financial institutions have participated.



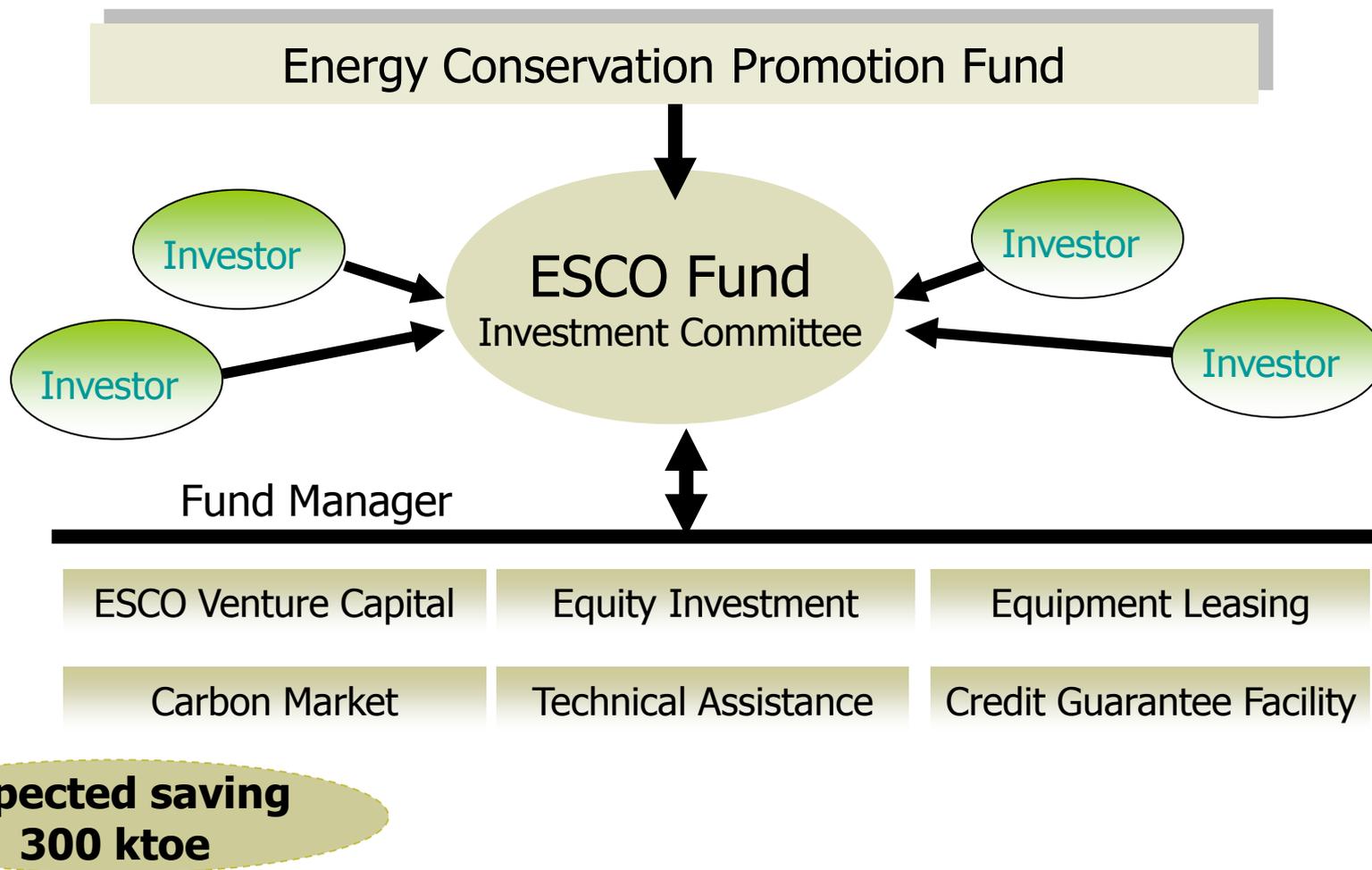
Max. interest rate: 4%
Max. loan period: 7 years

January 2003 – present
7000 M Baht

- The ENCON Fund imposes 0.5% interest rate on financial institutions, starting from Phase 2 onwards.
- Results:
 - Reduce oil imports of over 400 million litres/yr.
 - Reduce power demand over 200 MW

ESCO Fund

A source of venture capital for ESCOs to jointly invest with private operators in energy efficiency & renewable energy projects. The program targets SMEs & small projects.



Tax Incentives

Thailand's Board of Investment (BOI)'s tax incentives for renewable energy projects:

- Corporate income tax holidays up to 8 yrs. Additional 50% reductions of corporate income tax for 5 yrs
- Import duty reductions or exemptions on equipment and raw materials
- Double deduction of public utility costs
- Deductions for infrastructure construction/installation costs

1. RE Intermittency and Implications for Grid Planning and Operation

- Lack of body of knowledge that assesses RE's impacts on the Thai grid and potential solutions**
- Lack of platform to strategically optimize increasing grid-connected RE capacity**

2. Building up technical human resources availability

- Human resource needs for equipment manufacturing, project design, commissioning, maintenance, decommissioning.**

2.6 Summary of the State of Play

Lack of Strategic Integration
of policies and measures

FiT could be framed as the central part of a long term strategy to meet energy policy goals

Need for stronger and more
transparent regulatory support

Transparent and forward-looking regulation is needed for successful FiT implementation

Financing Options

Available but may not reached small investors yet

Supportive technical
environment

eventual technical limits in the absence of utility-level planning to accommodate increasing RE grid penetration.

3. Needs and Potential for International Support

Most Important Barriers

- **Planning barriers**
may result in interruptions in RE support
- **Weak regulations and lack of transparency**
create an atmosphere of uncertainties for investors and unfair advantages for some investors
- **Technical barriers**
create an eventual limit to RE penetration
- **Lack of a public discourse**
on acceptable pass-through cost to electricity rates
- **Supply-side orientation & absence of consumers' demand**
for clean energy and direct benefits to consumers

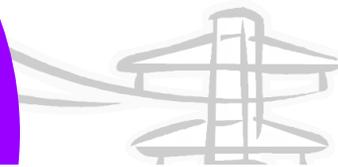
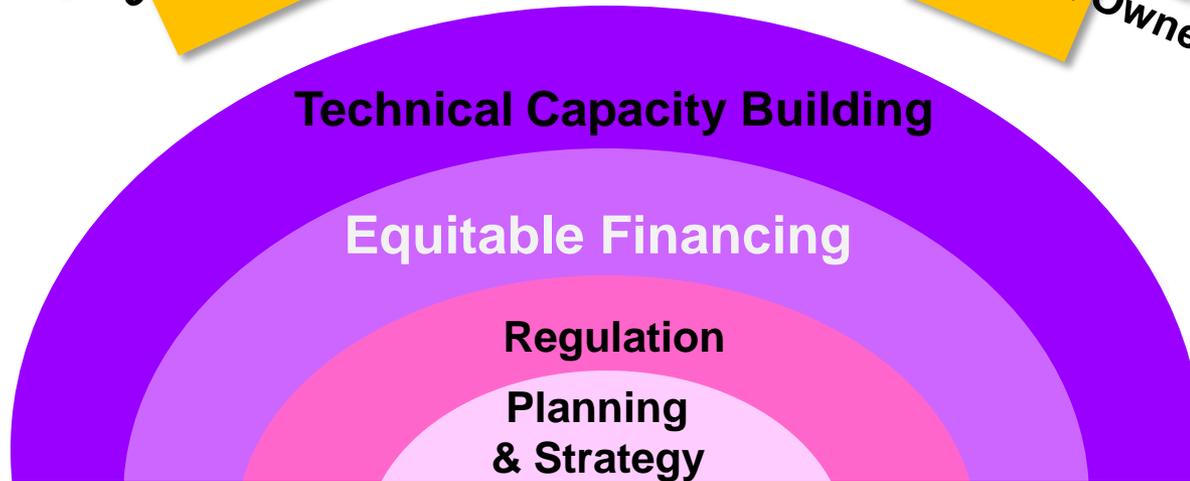
PUSH-PULL STRATEGY

CONSUMERS PULL

governance monitoring & creating demand for clean energy and better governance



Enabling Environment



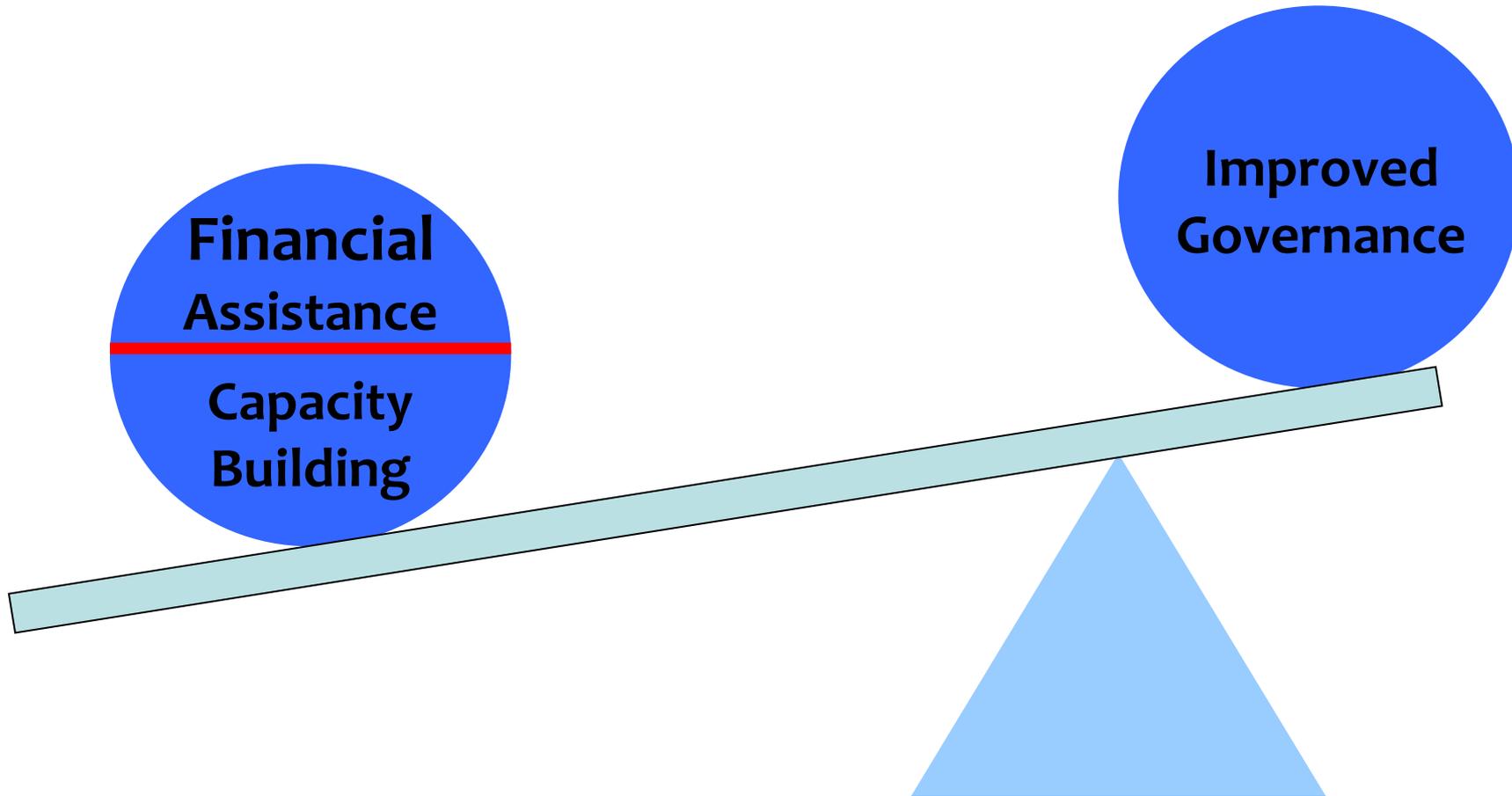
MOE/
ERC/ADB

Utilities/MOE/ADB

TRF/ADB

POLICY PUSH

Potential Areas for International Support: Conceptual Idea



International support as a form of leverage for improved governance –
essential to continued success of program.

Conclusions and Further Recommendations

- Successful FiT programs require more than “getting the prices right.”
- Governance problems have to be sorted out first before RE can be rapidly scaled up
- In the long run, rapid expansion of RE is going to become a greater burden for poor consumers and hence some financial assistance will be needed for FiT program.