International practice and experience with Energy Efficiency Resource Standards (EERS)

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The Wuppertal Institute for Climate, Environment and Energy

- President: Prof. Dr. Uwe Schneidewind
- Foundation of the institute: 1991 under Prof. Dr. Ernst Ulrich von Weizsäcker
- Legal form: Non-Profit-Organisation
- Owner: North Rhine-Westphalia
- Approx. 200 employees
- Approx. 150 -170 projects per year for UN, EU, ministries, industry, NGOs
Role of the Wuppertal Institute in the TGP-EEDP project

- Scientific support
- Provision of international experiences

Tasks:
- Ex-ante evaluation of the economy-wide benefits of the Thai EEDP
- Energy Efficiency Resource Standards (EERS)
- Standard Offer Programmes (SOPs)
- Energy Service Companies (ESCOs)
- NAMAs and MRV
What is EERS?

EERS is

- a saving target for utilities (electricity and/or natural gas, oil)
- target needs to be achieved through customer energy efficiency programs
- adopted through legislation or regulation

EERS is also called Energy Saving Obligations or White Certificate Schemes
Advantages of EERS

- Achievement of the energy savings target is relatively certain
- Relatively low burden on public budgets
  → may lead to higher stability than other EE policies
- An EERS scheme can stimulate the development of ESCO markets
- EERS schemes are particularly well suited for standardised EE measures in the residential sector or for SMEs
Why utilities?

Utilities are well suited for implementing EE programs due to:

- existing customer relations
- availability of energy consumption data
- advice infrastructure & expertise in energy efficiency
Benefits for utilities

- Delayed needs for additional power plants/avoided difficulties with population acceptance
- Avoided or postponed T&D network upgrades due to peak load reductions
- Development of new markets in the field of energy services
- Improved reputation
- Strengthened customer relationship
Energy efficiency activities provided by utilities to customers

- Financial incentive payments
- Low-interest loans / interest-free loans
- On-bill financing / energy performance contracting
- Free direct installation / equipment replacement
- Energy audits / energy saving advice / information campaigns
Basic EERS design (I)

**Responsible Agency**
- Defines saving target
- Defines eligible measures and calculation methods
- Certifies achieved energy savings
- Monitors and evaluates the EERS

**Certified energy savings**
- Obligated party X
- Obligated party Y
- End-users

**Implementation of measures**
- Obligated party Y
- End-users
Basic EERS design (II)

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**Obligated party X**
- Implementation of measures
- Certified energy savings

**ESCO X**
- Implementation of measures

**End-users**
- Implementation of measures

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**Obligated party Y**
- Implementation of measures
- Certified energy savings

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Certified energy savings
EERS design elements

- **Target setting:** typically between 0.5 and 2% of final energy consumption annually

- **Obligated parties:** energy suppliers, distributors, integrated utilities

- **Eligible EE measures:** smaller, standardised measures in the residential or SME sector are well suited, but also more complex measures are possible

- **Implementation and supervision:** regulation agency responsible for M&V, penalties, cost-recovery

- **Monitoring and verification:** list of standard measures, calculation methods, compliance reports

- **Incentives and penalties:** performance based financial incentives for overperformance as well as penalties for underperformance

- **Cost-recovery:** cost recovery mechanism for obligated utilities necessary in regulated energy markets
EERS design: cost recovery (I)

Costs for obligated utilities for meeting the energy savings target:

- Costs for implementing EE programs (financial incentives, marketing, administration, evaluation etc.)
- Lost revenues due to reduced energy sales

→ Obligated actors need to receive the possibility to fully recover their costs

In regulated energy markets:

- Regulator needs to establish regulatory mechanisms allowing to recover the cost of meeting the energy saving target and possibly providing compensation for reduced sales

In competitive energy markets:

- Obligated energy providers pay the cost of meeting the obligation and freely adjust the energy prices to recover their costs
EERS design: cost recovery (II)

1. Obligation on regulated utilities or energy distributors
   - Cost recovery via tariff regulation to compensate for actual program costs and possibly lost revenues
   - Many US states (e.g. California), Denmark

2. Obligation on energy suppliers in competitive energy markets
   - Unitary (technology-neutral) cost recovery rate per unit energy saved
   - Italy (in 2009: 100€/toe or 1.7 €cent/kWh)
   - Pass-through of program costs (and net lost revenues) in energy prices
   - UK, France, New South Wales (Australia)

Funding
1. Regulatory authority allows surcharges on regulated tariffs and/or funding directly through governmental budget (if energy price increases should be avoided)
2. Energy suppliers pay the costs of meeting the obligation and adjust their energy prices to recover the costs
EERS is a well-proven policy instrument in several countries worldwide e.g. EERS exist in 28 states in the USA (experience over 30 years), UK (since 1994) and Denmark (DSM programs since 1990s & EEO since 2005). The number of countries with EERS schemes is growing.
California (since 2004)

- **Who is obligated?** Electricity and gas utilities (investor- and publicly owned)
- **Target:** 0.85% of electricity sales annually, demand reduction of 4,541 MW and natural gas consumption reduction by 619 gross million decatherms over the period 2012-2020
- **Funding:** Public Goods Charge (PGC) on customer utility bills of about 0.3 cents/kWh for EE
- **Activities:** Financial incentives, free direct installation, on-bill financing, audits, education and training
- **Measures:** Lighting, HVAC, building retrofits, appliances, new construction, industrial processes
United Kingdom (since 1994)

- **Who is obligated?** Electricity and gas retail suppliers with more than 250,000 customers (operating in competitive market)

- **Target:**
  - CERT (2008-2012): 293 MtCO2-e (494 TWh) lifetime savings in residential dwellings (40% in low-income households)
  - ECO (2013-2015): Provision of measures worth around £1.3 billion per year to low-income households (funded by energy suppliers)

- **Funding:** Cost pass-through in final energy prices

- **Activities:** Financial incentives, free direct installation by contracting installers or directly working with home occupants, on-bill financing

- **Measures:** Insulation, lighting, appliances, heating, windows
China (since 2011)

- **Who is obligated?** State-owned network (distribution) companies (New DSM Rule for “State Grid Corporation of China” and “China Southern Grid Company”)

- **Target:**
  - Annual energy savings of 0.3% of electricity sales (≈11 billion kWh)
  - Load reduction of 0.3% compared to maximum load in the previous year
  - All sectors and measures eligible

- **Funding:** Public utility surcharge, revenue from differential electricity prices and public budget (special DSM fund)

- **Activities:** incentives for pilot and demonstration projects, subsidies for efficient products, retrofits and for establishment of load management system, education/ training, research and promotion etc.

- **Measures:** Energy storage, lighting, boiler upgrades, heat pumps, waste heat, EE transformers, AC motor frequency control, line-loss reductions etc.
Conclusions

- EERS have been successful policy instruments in a variety of countries and market conditions without substantial relying on governmental budget.
- But there are significant variations in how EERS are designed and implemented, e.g. regarding target setting, sectors, obligation of network or supply companies, cost recovery.
- Existing experiences with EERS should be used to design and implement an EERS scheme tailored to Thailand conditions.
- Policy makers need to assess and decide which EE potentials and measures they want to address through an EERS scheme.
- Interactions with other policies need to be considered when designing an EERS scheme.
- Establishment of robust MRV system, incentives & penalties and cost recovery scheme will be necessary.
Thank you very much for your attention!

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References

