National Renewable Energy Laboratory
Innovation for Our Energy Future

Feed-in Tariff Policy Design: Innovations, Lessons Learned and Future Direction

Clean Energy States Alliance and
RPS Collaborative webinar

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Presentation Overview

- NARUC – DOE Solar Partnership
- Feed-in Tariff (FIT) Policy Overview (EU and US)
- FIT Policy Design Options
- Implications of FERC July 2010 Order

NARUC – DOE Solar Partnership

FIT Task Goals: State utility commissions/staff asked NREL for technical assistance to understand:

1. State-federal **jurisdictional** issues (Jan 2010)
2. Cost and **payment methodology** (fall 2010)
3. **Interconnection** policy best practices (fall 2010) and
4. State-specific **FIT policy design options** (ongoing)

   (technical assistance to participating states – CO, HI, MI, WA)

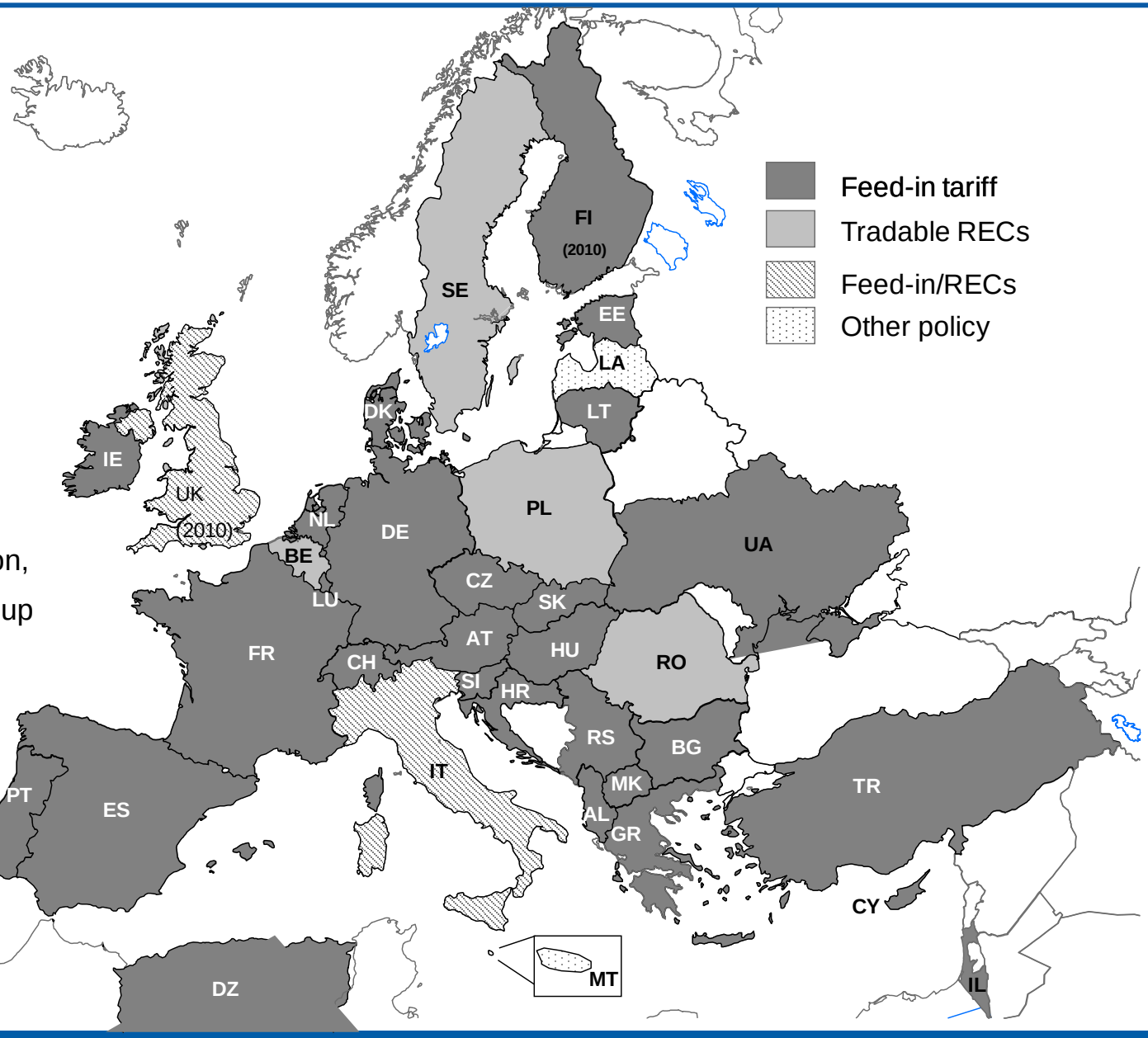
Feed-in Tariff definition

Feed-in Tariff*: A renewable energy policy that typically includes three key provisions:

1. **Payments** to project owners for total kWh of renewable electricity produced;
2. **Access to the grid**; and
3. Stable, **long-term contracts** (15-20 years)

* Also called standard offer contract, fixed-price policies, minimum price policies, feed laws, renewable energy payments, renewable energy dividends or advanced renewable tariffs.

FIT Policy: Application in Europe



Source: Wilson Rickerson, Meister Consultants Group Jan 2010

MEISTER CONSULTANTS GROUP

FIT Policies and Proposals in the U.S.

3 states enacted FIT policies based on RE project cost
(VT, HI, ME (but with a payment level cap)) (*Date passed*)

1 state enacted FIT policies based on avoided cost
(CA- subsequently updated in 2008, 2009) (*Date passed*)

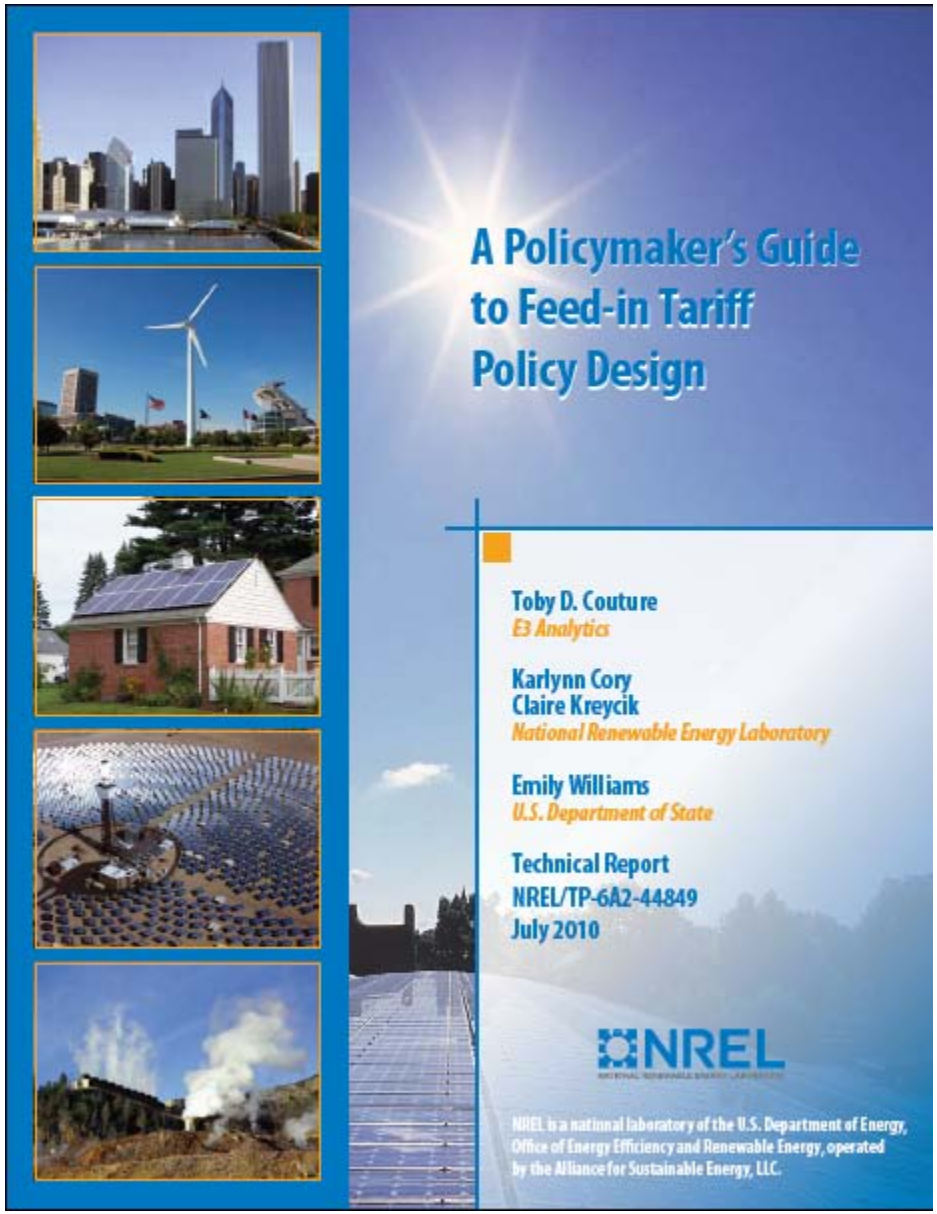
10 states proposed FIT legislation based on RE project cost
(CA, FL, IL, IN, MI, MN, NY, RI, WA, WI) (*Year last proposed*)

Solar FIT policies approved by municipal utilities (*Date introduced*)

Sources: Adapted from DSIRE 2010, Gipe 2010, Oregon PUC 2010.

As of June 2010

New NREL Report (July 2010):



What is a FIT?

What are the **payment design options**?

What are the **implementation options**?

How to **control FIT policy costs**?

➔ Lessons applicable to other RE policies

Fundamental FIT Policy Design Options - 1

Long-term policy stability

- **Predictability vs. pre-determined payment levels**
- **Capital markets and manufacturers prefer degree of predictability**

(1) Differentiation

Primary: technology, project size, project location, and sometimes resource quality

Secondary: Degression (pre-determined or responsive), inflation adjustment, front-end loading, time of delivery

(2) Bonus payments: target "smart grid" principles and optimization

- High-efficiency systems; specific fuel streams; repowering existing facilities; specific ownership structures (*e.g. community owned*); innovative technologies (*e.g. advanced grid integration, emerging tech*); installation vintage

(3) Distinction between fixed payment vs. premium payment

Fixed-payment

Premium-payment

Constant (premium over spot market)

Sliding (to react to market prices/conditions; can be bounded)

Fundamental FIT Policy Design Options - 2

(4) Implementation Options

Eligibility Criteria	Contract elements	Forecast obligation
Purchase Obligations	Policy adjustments	Transmission & Interconnect.
Non-utility purchases	Caps (program size, project size, program cost)	

(5) Controlling costs

- If FIT policies are unbounded, FIT costs may be higher than expected
- To limit overall costs, some policy design enhancements can help:
  - Caps on program size, individual project size, program budget or caps specifically for costlier technologies
  - More frequent adjustments to payment levels (capacity based, or more than once a year)
  - Auction-based mechanisms to determine payment levels (experimentation)

(6) Funding a FIT policy

- Ratepayer funded, taxpayer funded, supplementary funds
- Inter-utility cost sharing

FIT Policy Challenges

Up-front capital need: Does not directly offset the need for substantial capital to pay for up-front project costs

- But L-T contracts ⬆ investor confidence

Setting payment level is challenging: if set too low, little new RE development; if too high, surplus profits to developers

Policy design challenge: Tracking technological improvement and cost reduction accurately over time

Complexity: Usually many levels of differentiation

Cost: supporting emerging and higher-cost technologies can lead to upward pressure on electricity costs (and rates)

- Can be designed to limit support for such technologies

Jurisdiction issues: is it possible for states to structure SOC/FIT payments so that they are not in conflict with FERC's jurisdiction over wholesale rates, or PURPA requirements?

NREL Reports – Additional Resources

"***Feed-in Tariff Policy: Design, Implementation, and RPS Policy Interactions***" **NREL, March 2009**

http://www.nrel.gov/docs/fy09osti/45549.pdf

"***State Clean Energy Policies Analysis (SCEPA) Project: An Analysis of Renewable Energy Feed-in Tariffs in the United States***" **NREL, May 2009 (revised June 2009)**

http://www.nrel.gov/docs/fy09osti/45551.pdf

"***A Policy Makers Guide to Feed-in Tariff Policy Design***" **NREL, July 2010**

http://www.nrel.gov/docs/fy10osti/44849.pdf

An Update on FERC Activities….

State – Federal Jurisdiction Issues

Question: How can states use the law to implement FITs?

1. No subsequent approvals by FERC required (FPA doesn't apply):
   - Municipal utilities
   - Electrical islands (Alaska, Hawaii, TX/ERCOT)

2. Under PURPA

   Outside FERC jurisdiction

   - QFs can receive: avoided cost + (RECs, SBC funds, state tax credits)
   - Issue: Utilities can apply for exemption from PURPA (EPAct 05)

3. Under state law (contracts subject to FERC FPA)
   - FERC must approve (1) every contract or (2) suppliers w/o market power
   - Q: Are supplements (RECs, SBC) also outside of FERC jurisdiction under FPA as well?? Unclear in law and regulations.

State – Federal Jurisdiction Issues - 2

Other possible paths forward:

1. FERC investigation and rulemaking/declaratory order
   - At FERC's initiative, or as requested by outside party
   a) Change FPA precedent so QFs <20 MW are exempt from avoided cost limit
   b) Establish "safe harbors" or guidance for "price caps" for purchase prices for specific technologies, projects, or regions

2. Congress could take action
   - Draft language in Waxman/Markey is a start – needs clarity

Hempling, Scott, Carolyn Elefant, Karlynn Cory, and Kevin Porter. 2010. "RE Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions." NREL Technical Report (NREL/TP-6A2-47408). January. http://www.nrel.gov/docs/fy10osti/47408.pdf

Thank you for your attention!

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FITs and RPS: complementary policies

- **RPS: sets the goal vs. FIT: supply procurement**
- **FITs replace/complement RFPs, NOT RPS policies (e.g. EU countries use FITs to achieve goals)**
- **Options for implementation**
  1. FITs for distributed generation (only)
     - RFPs left to target utility-scale systems
     - DG often not winners/participants in RFPs
     - Allow wider variety of project owners (than just IPPs)
  2. FITs used for utility-scale projects
     - Legal issues under investigation (described later)
     - Used ***between*** infrequent competitive solicitations
     - May ***replace*** utility RFPs

FITs and REC markets – why both?

Not all RPS policies target solar and/or DG

- FITs can fill a gap for solar, emerging tech. and DG
- Other options: set-asides or multipliers

Are all end-users able to participate in REC markets?

- If not, on-site generation may not be economic for small cust.
- FITs allow all end-users to have on-site generation – alternatively, could open up REC markets to small end-users

Most RECs transacted through bilateral contracts or RFPs

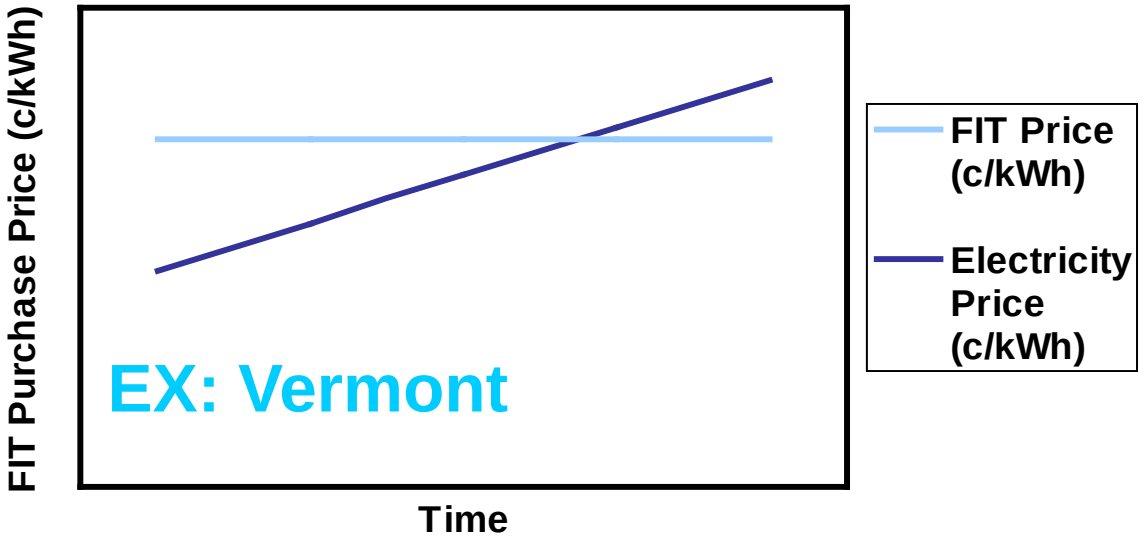
- Without an active spot REC market (with price transparency) it is challenging for end-users to participate

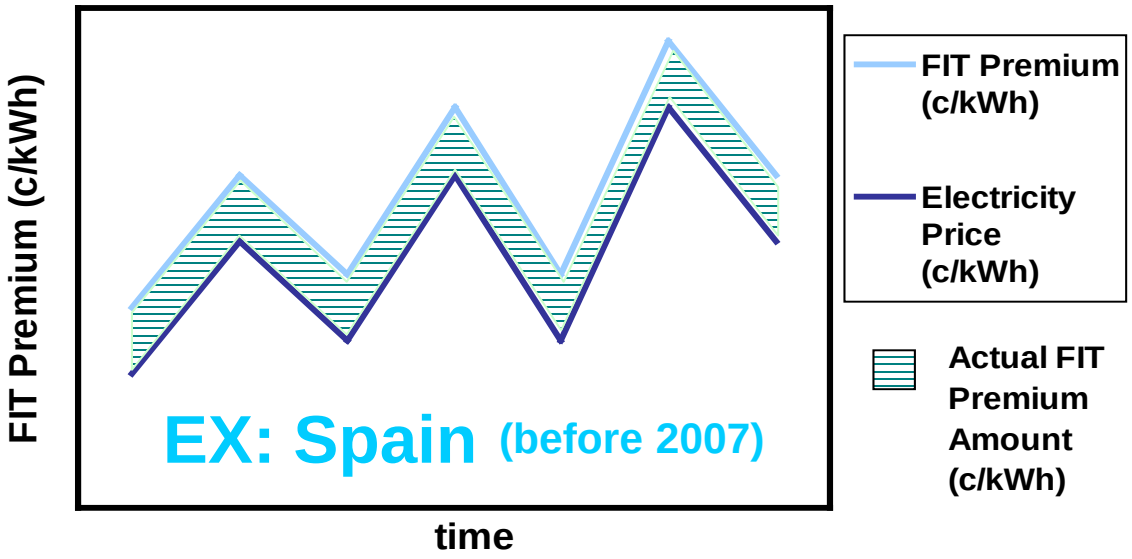
FIT Payment Structure - 1

(1) Fixed Price Payment
(can include escalation)

Most countries use fixed-price FIT payments

(2a) Premium Payment
(above spot market)





FIT Payment Structure - 2

(3) Spot Market Gap Model (above spot market)

EX: Switzerland