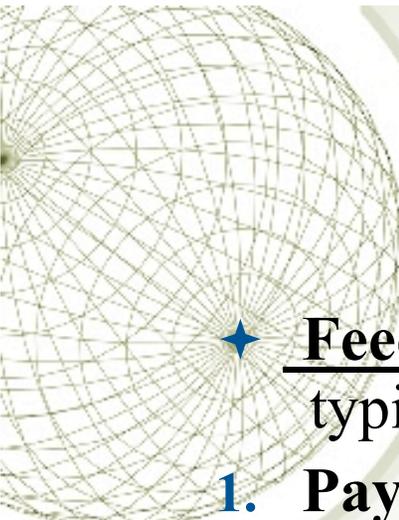


Renewable Energy Feed-in Tariffs: An Analytical View

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Feed-In-Tariff Definition

★ **Feed-in Tariff (FIT)***: A renewable energy policy that typically offers a guarantee of:

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

This revenue may pay for:

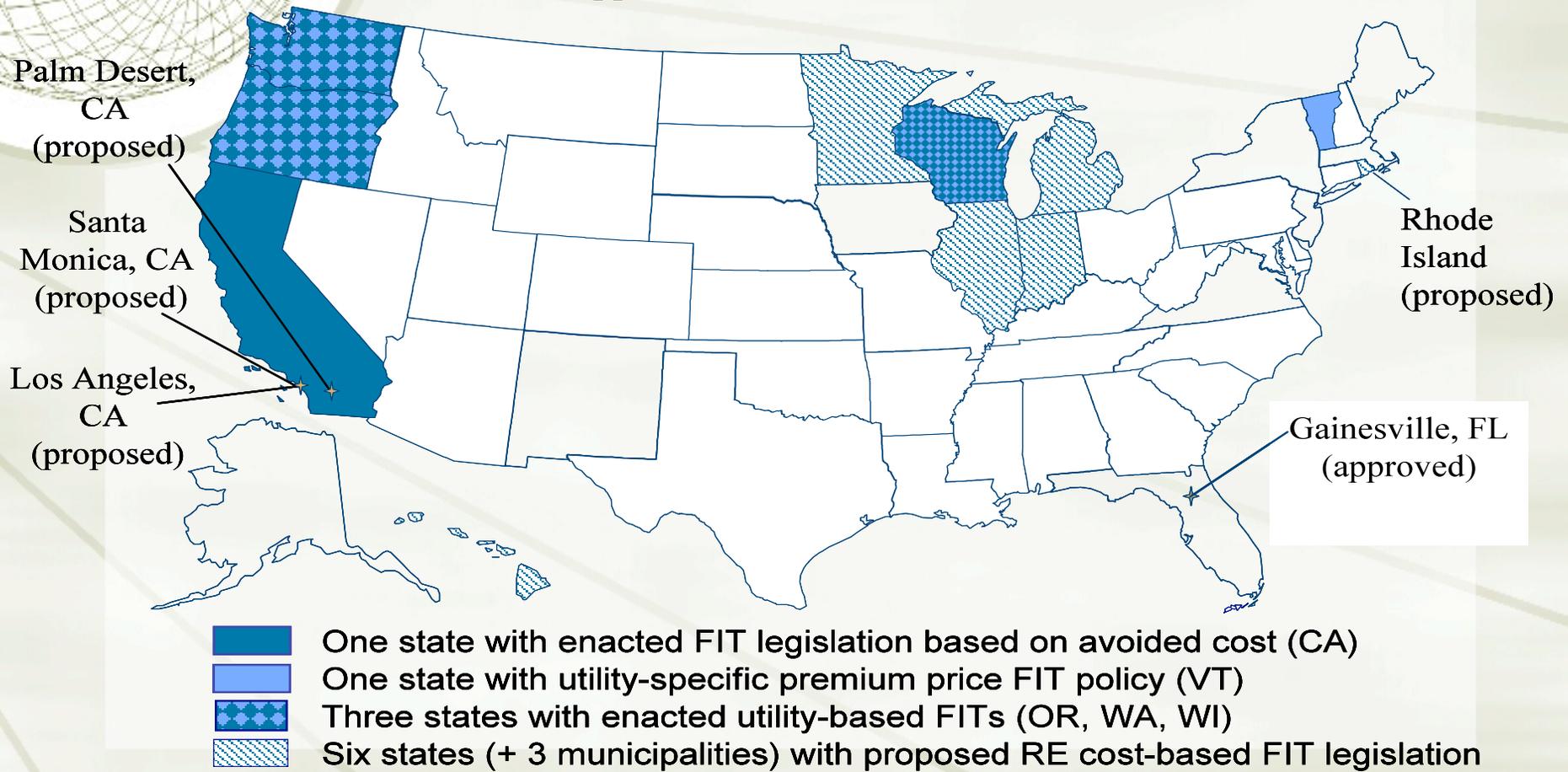
- ★ Electricity sales, or
- ★ Electricity sales + RECs

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

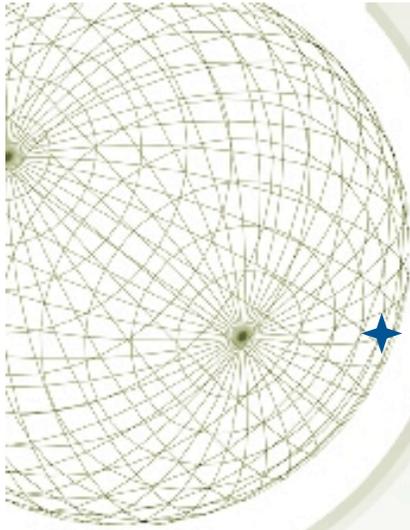


FIT Policy: Application in the U.S.

Note: As of Feb 2009, no US states have implemented FITs based on the RE project cost. Gainesville Regional Utilities, has approved the first U.S. cost-based FIT for solar PV.



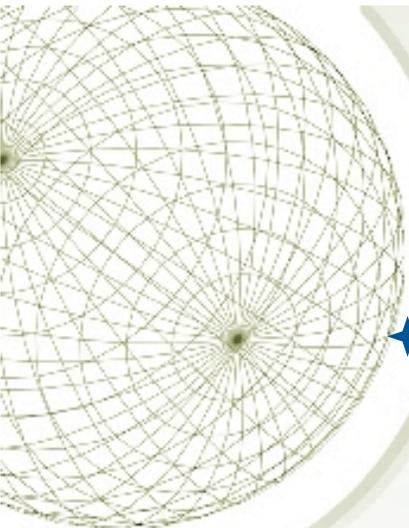
Source: Adapted from Gipe www.wind-works.org, NREL Feb 2009



Key differences: U.S. & EU

- ★ **1. In general, U.S. FIT policies have not been based on the cost of generation (plus a reasonable profit)**

- ★ **2. EU FIT policies can be used by everyone**
 - Res, Com & Ind customers
 - Fed., state, local govt.
 - Non-profit organizations
 - AND utilities



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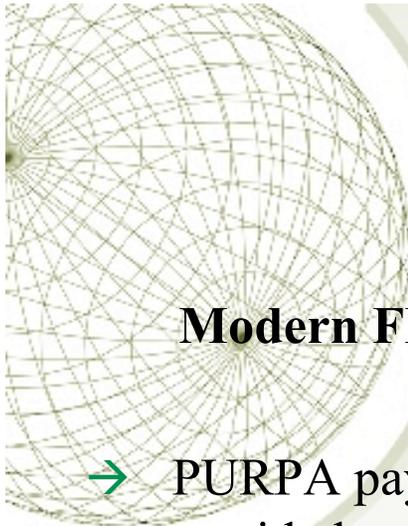
- ★ **3. U.S. FITs impose numerous caps (e.g. project size, program capacity or total cost) typically on an annual basis**
 - U.S.: focus tends to be on annual increment
 - EU: longer-term goals/caps are set (10-20 years)
 - Longer-term caps provide investor and developer certainty

- ★ **4. U.S. FITs have yet to fully differentiate FIT payments**
 - Different project costs based on technology, size of project, quality of resource and other locational factors

FIT Policies: Addressing Misconceptions

- **FITs are not a “foreign” policy**
 - U.S. utilities get cost-recovery + profit for conventional generation
- **FITs are not the same as PURPA** or net metering
- FITs are compatible with (and compliment) RPS mandates
- All FITs are production-based, but **not all PBIs are FITs**
- If the goal is jobs, econ development, states (and not utilities) should execute FITs





Feed-in Tariffs vs. PURPA

Modern FITs are different from PURPA:

- PURPA payments to RE projects were based on inaccurate projections of avoided costs

- In reality, actual electricity prices diverged greatly from forecasts

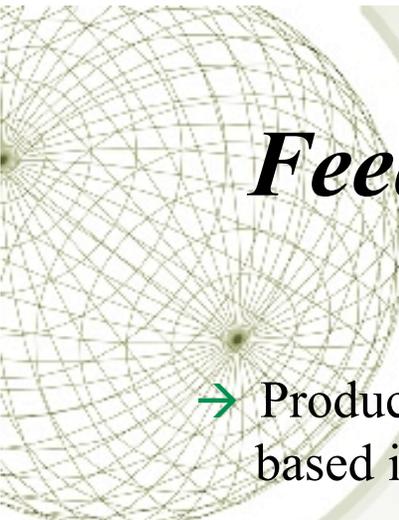
- **In contrast: successful FITs* are based on RE project economics (plus reasonable return)**
 - Not usually tied to fossil fuel/electricity prices (some exceptions)
 - Most often, payments are levelized (perhaps small escalator)
 - Price hedge, if payment is fixed or bound with cap & floor

* ***Successful FIT: Results in substantial RE MW and GWh, quickly***



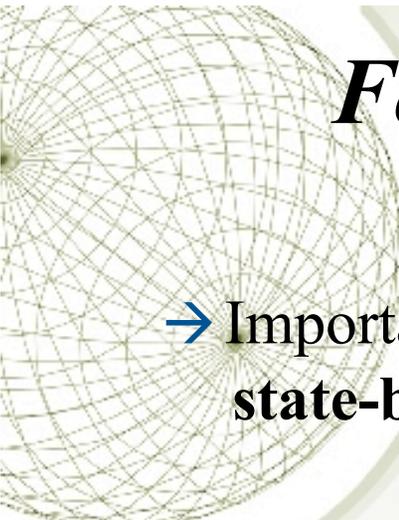
FITs and RPS: complimentary policies

- **FITs replace competitive solicitations (i.e. RFPs), NOT RPS policies (EU countries use FITs to achieve RE goals)**
- **A FIT policy can be compatible with an RPS mandate**
 - Project financing support through ratepayer backing
 - Cost-effective procurement
 - All eligible projects are typically assured a utility contract
 - Hedge against project delays and cancellations
 - Open to all end-users, including utilities
 - Focus on “reasonable” cost renewables (not least cost)
 - Assured support for emerging technologies



Feed-in Tariff vs. Production Incentives

- Production-based incentives (PBIs) are distinguished from capacity-based incentives (\$/W)
- PBIs generally offer a per kWh payment without regard to production costs
 - all US FITs technically fall under this category, with the exception of Gainesville, FL
- **Successful FITs are based on project economics**
 - i.e.: they ensure that the revenue streams cover total project costs, plus a reasonable return



Feed-in Tariff vs. Utility Policies

→ Important to distinguish between **utility-based FIT policies** and **state-based FIT policies**

→ PG&E, SCE, Xcel, MGE et al., all have “FITs”

→ - None are cost-based

→ - None are meant to stimulate large amounts of RE

→ - None are meant to create jobs

→ ...but that's not utilities' role

ALSO: FIT pays for total generation, unlike net metering (a credit only for *excess* generation)

How can FITs help meet US State goals?

1. Job creation (both up & downstream)
2. Meeting RPS targets
3. Fossil fuel price hedge
4. Stimulate rapid market growth in RE
 - Create stable investment environment
5. Foster cost-efficient RE development
6. Target distributed generation
7. Diversify energy supply
8. GHG reductions
9. Foster local ownership (greater economic multiplier effects)



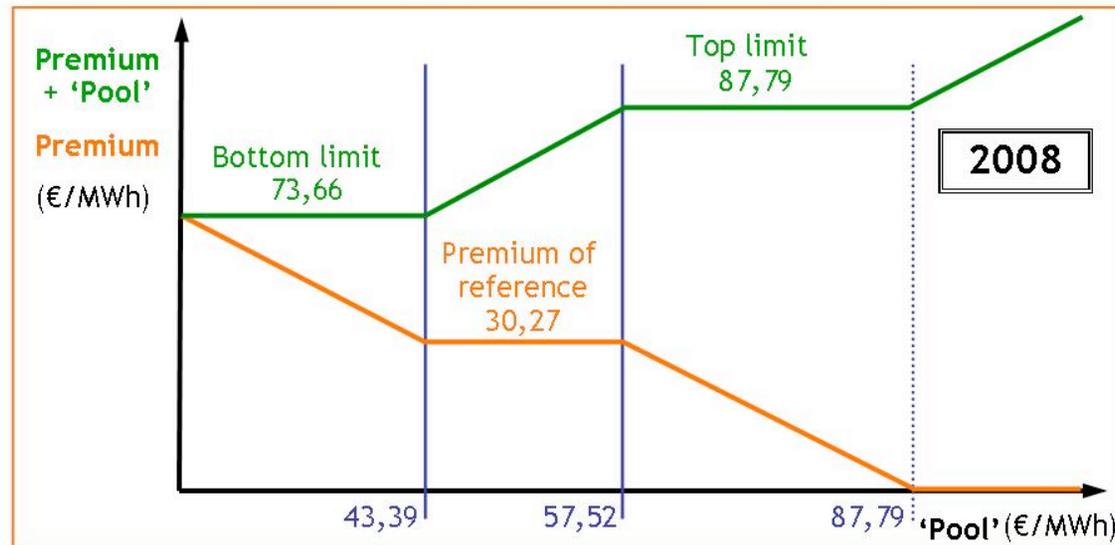
FITs in the Financial Crisis

- U.S. is down to ~ 4 tax equity investors (*Jan '09*)
- FITs facilitate project financing through guaranteed, long-term contract for output
- **Help attract capital**
- Can reduce dependence on tax equity
- Proven mechanism to stimulate new industries, create jobs, if generous caps
- **FITs provide the opportunity for low-risk returns on local energy investments**



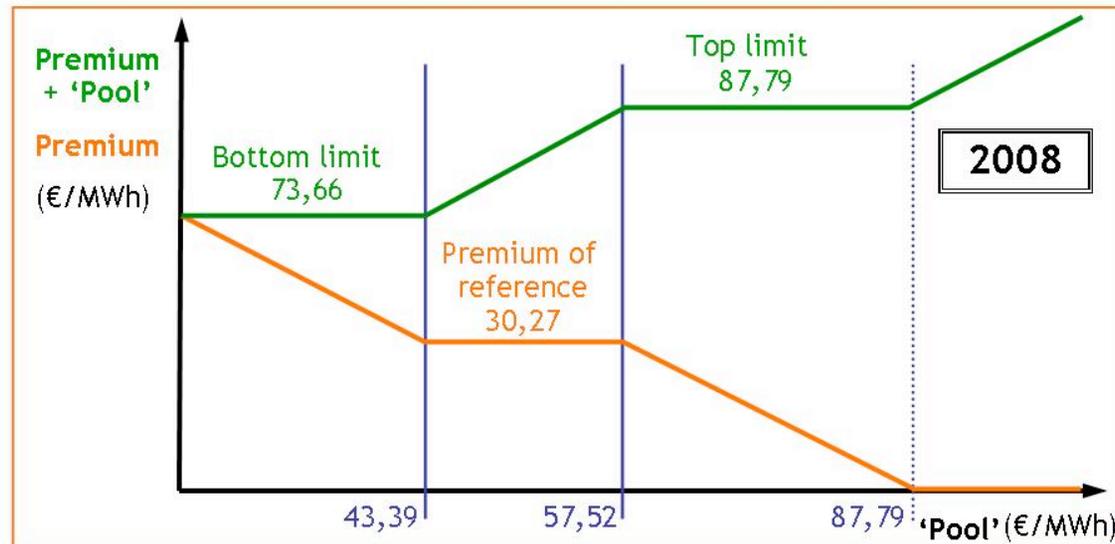
Future Option for FITs in California

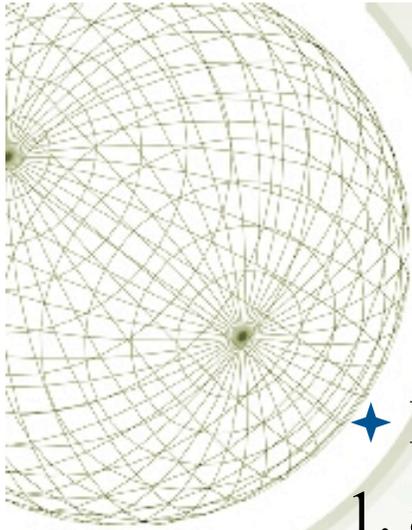
- ★ Market-based, **premium price option** retains market price signals
- ★ Retains incentive to produce in times of peak demand
- ★ Aggregate policy costs = sum of premium payments



Future Options for FITs in California

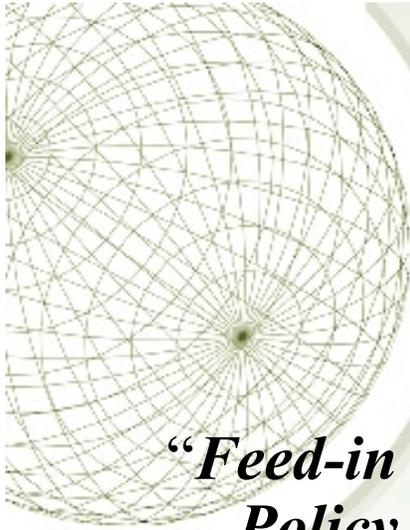
- ★ Variable premium keeps a lid on policy costs
- ★ Can be differentiated by technology type
- ★ Better adapted to restructured electricity markets





Future U.S. FIT Policy

- ★ **Best practices suggest that successful FITs :**
 1. are in place over a long period of time to provide policy stability and reduce uncertainty
 2. are methodologically based on RE project costs (+ reasonable return)
 3. are differentiated by project size, resource quality and technology type
 4. involve long-term contracts (15-25 years)
 5. include built-in decreased payments to drive innovation and cost-reduction over time (degression)



FIT Analytical Reports

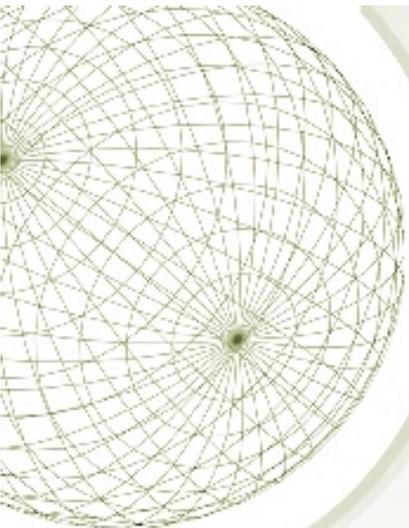
“Feed-in Tariff Policy: Design, Implementation, and RPS Policy Interactions” NREL, March 2009

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

FORTHCOMING:

“Feed-in Tariff Policy Design and Implementation: Comprehensive Best Practices Guide” NREL, 2009

<http://www.nrel.gov/docs/fy09osti/44849.pdf>



Thank you

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