



# *Renewable Energy Feed-in Tariffs: An Analytical View*

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Toby D. Couture  
*Energy and Financial Markets  
Analyst*

FIT Policy Analyst

California Energy Commission FIT  
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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:**

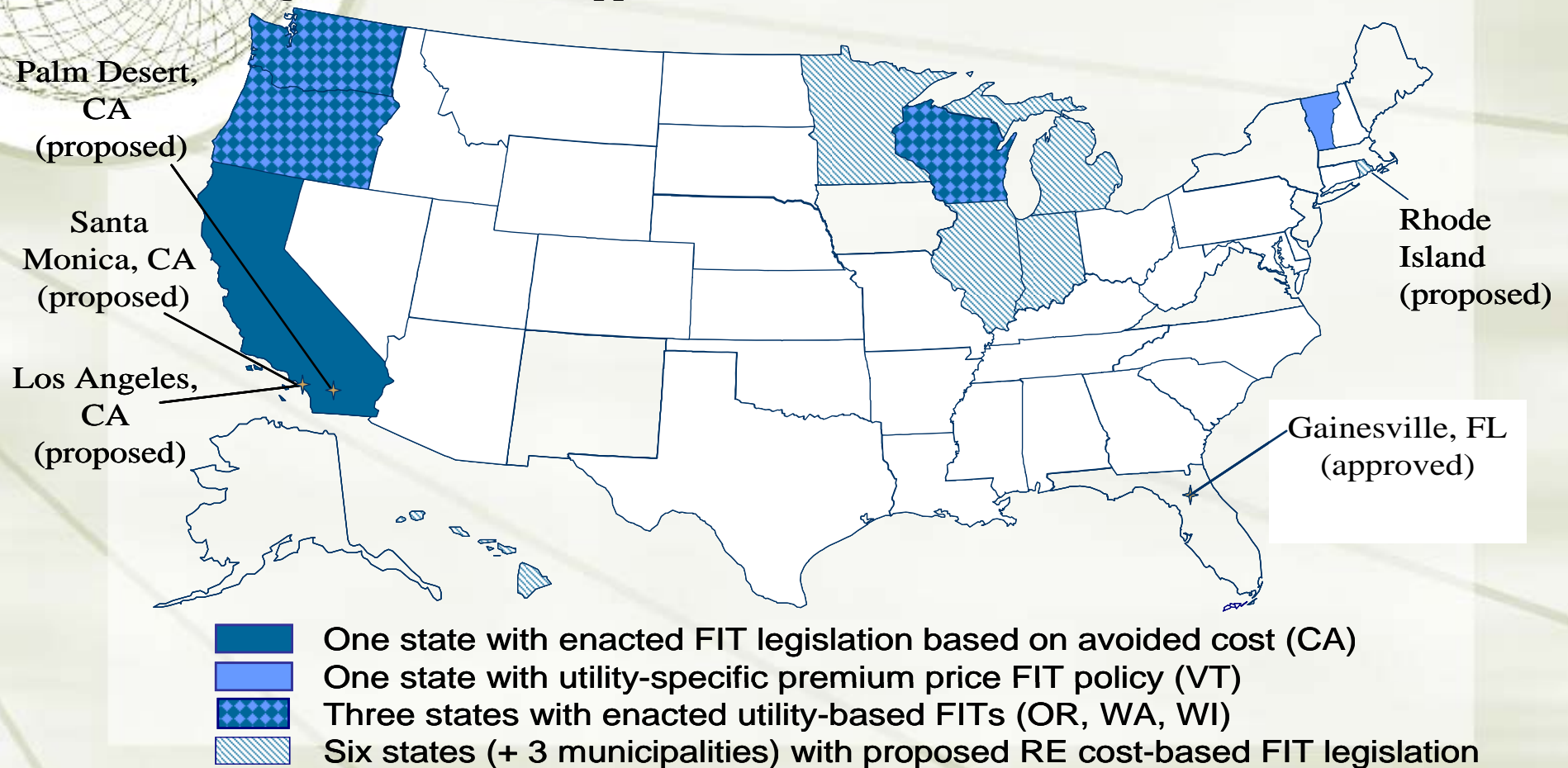
- ★ Electricity sales, or
- ★ Electricity sales + RECs

\* 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](http://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





## ***Key differences: U.S. & EU***

- ★ **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***

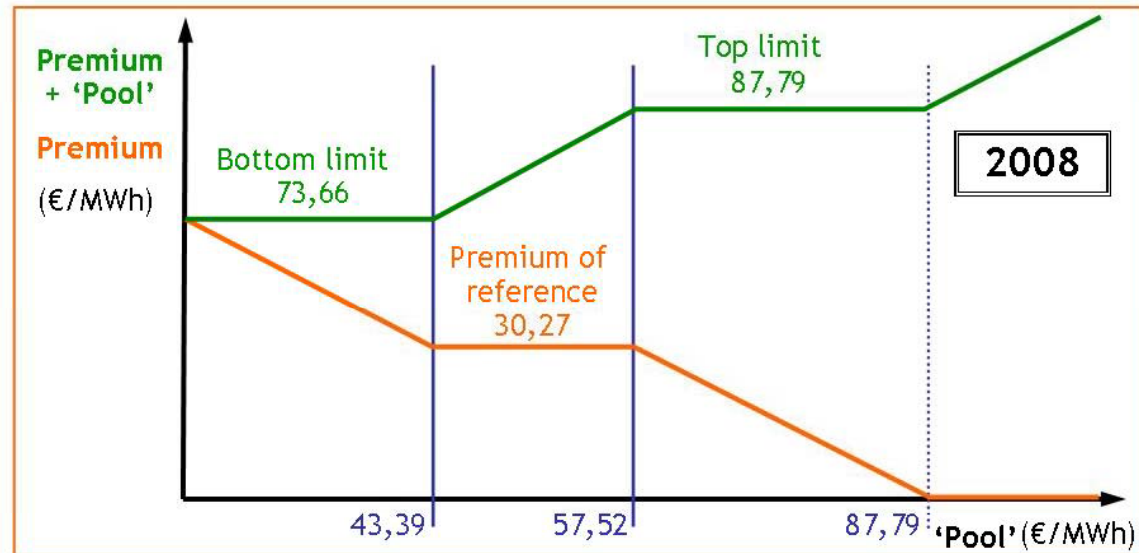
- U.S. is down to ~ 4 tax equity investors (*Jan '09*)
- FITs facilitate project financing through guaranteed, long-term contract for output
- **Help attract capital**
- Can reduce dependence on tax equity
- Proven mechanism to stimulate new industries, create jobs, if generous caps
- **FITs provide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





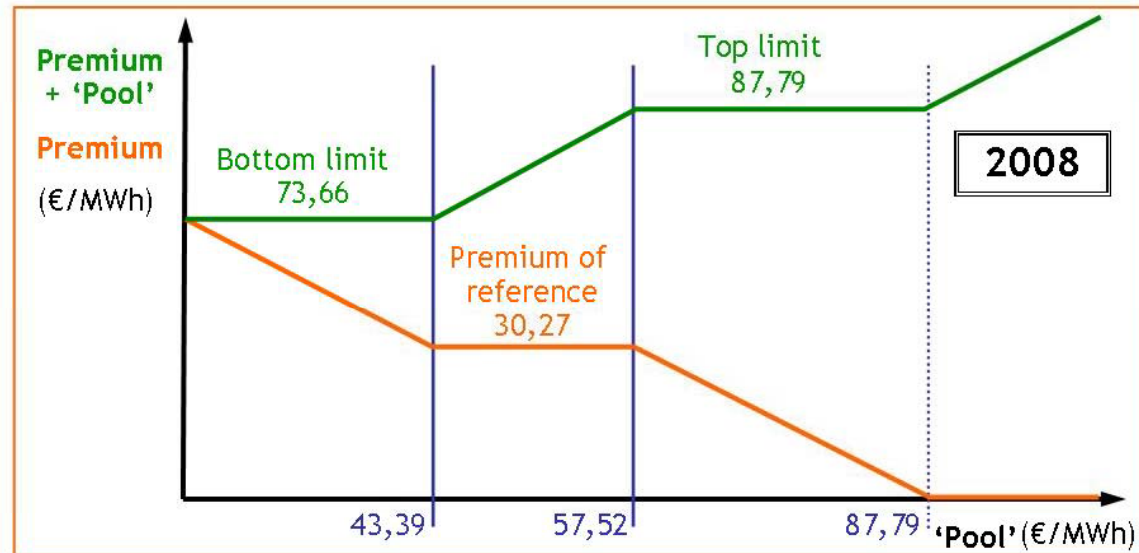
# *Future Option for FITs in California*

- ★ 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**

**Toby D. Couture**  
*Energy and Financial Markets Analyst*

**FIT Policy Analyst & Consultant with the**  
*National Renewable Energy Laboratory*

Ph: 506-292-3585  
Email: [toby.energyanalytics@gmail.com](mailto:toby.energyanalytics@gmail.com)