

Comparing U.S. and German Policies to Promote Distributed Solar PV Growth: The Triumph of the Feed-in Tariff



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**Why compare the United
States and Germany?**

The Numbers



United States

- Total installed capacity: 4 GW
- Trending towards utility-scale

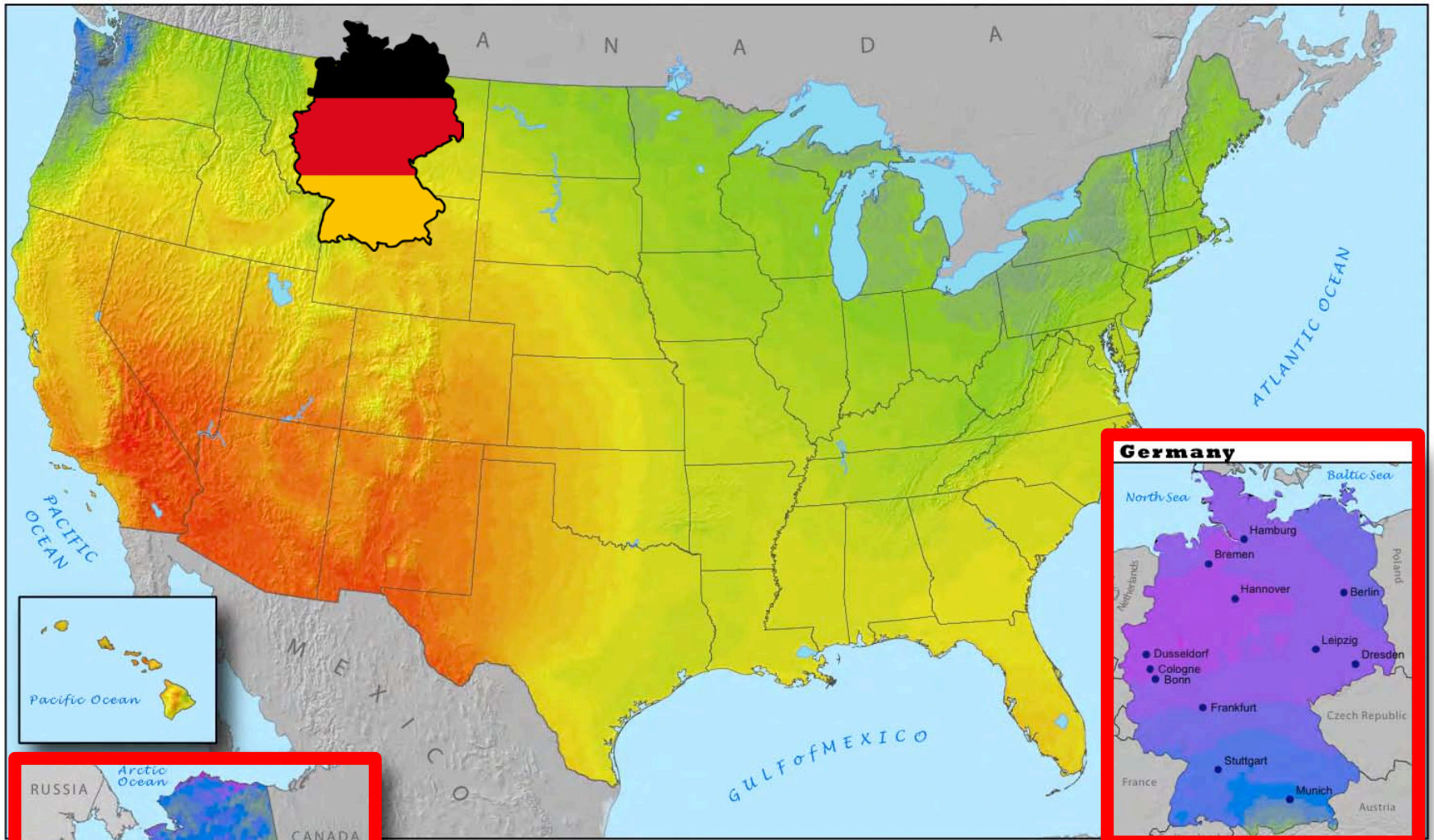


Germany

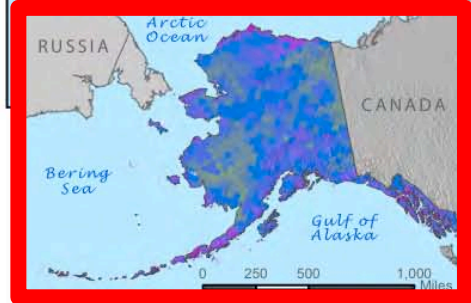
- Total installed capacity: 25 GW
- More distributed



Photovoltaic Solar Resource : United States and Germany



Annual average solar resource data are for a solar collector oriented toward the south at a tilt = local latitude. The data for Hawaii and the 48 contiguous states are derived from a model developed at SUNY/Albany using geostationary weather satellite data for the period 1998-2005. The data for Alaska are derived from a 40-km satellite and surface cloud cover database for the period 1985-1991 (NREL, 2003). The data for Germany were acquired from the Joint Research Centre of the European Commission and is the yearly sum of global irradiation on an optimally-inclined surface for the period 1981-1990.



Germany's Policy: EEG

- Erneuerbare-Energien-Gesetz (“EEG”), or Renewable Energy Sources Act
 - Law since 2000
- Creates feed-in tariffs
 - Requires fixed term contracts between electricity suppliers and renewable energy system owners at rates offering a guaranteed and reasonable return on investment
 - EEG sets 20 year contract terms

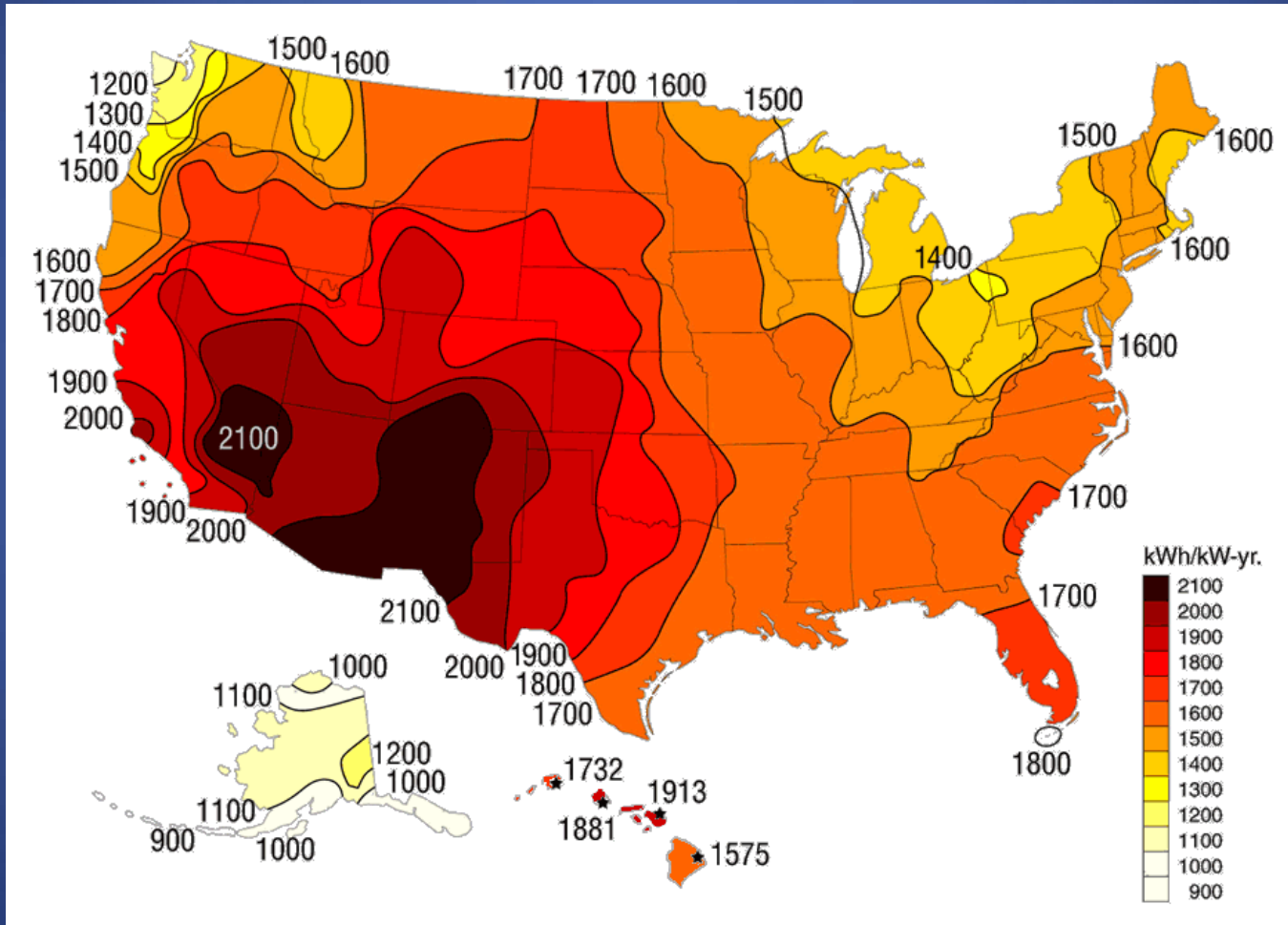
Erneuerbare-Energien-Gesetz

- Different rates for electricity consumed on site and sold into grid
 - Section 33(1): tariffs based on system size of rooftop installations selling electricity into the grid
 - Smaller installations get more per kWh than larger installations
 - Section 33(2): tariffs for electricity consumed on site.
 - Less than Section 33(1)
 - Owners more than through the tariff under section 33(1), after taking in account money saved on taxes and electricity costs
 - Designed to smooth integration of distributed solar PV into grid
- Owners could pick and choose between sections 33(1) and 33(2)
- As of April, 2012 at least 15% must be consumed on site (but OK because of high retail rates)

Three Reasons for Success

- Reason 1: EEG tariff rates ensure a reasonable rate of return to investors in a granular fashion (6–8% ROI)
- Reason 2: EEG creates certainty through 20-year contracts set at the tariff rates at the time of contract formation
- Reason 3: EEG allows for unlimited system sizes, such that all electricity generated does not need to be consumed on site

What's holding back the states?



Short Answer:

The current federal-state relationship makes it difficult for states to achieve these three factors

Federal Power Act

- The Federal Power Act of 1920 (“FPA”) gives the Federal Energy Regulatory Commission (“FERC”) jurisdiction over wholesale electricity rates. States have jurisdiction over retail rates.
- FERC must approve wholesale transactions as “just and reasonable”
- Constitutional basis of jurisdiction:
 - The Commerce Clause
 - All wholesale transactions within interconnected grid are in interstate commerce, even if transaction wholly intrastate

One Exception:

Qualified Facilities

(small solar included) under the
Public Utilities Regulatory Policies
Act of 1978 (“PURPA”)

PURPA

- Avoided Cost: “the cost to the electric utility of the electric energy which, but for the purchase from such ... small power producer, such utility would generate or purchase from another source.”
- Price utilities would have paid for electricity, had the QF not sold electricity into the grid
 - Usually set by cost of natural gas generated electricity
- Issue: avoided cost not enough

California AB 1631

- Waste Heat and Carbon Emissions Reduction Act.
- Passed in 2007, attempted to bypass FERC's jurisdiction.
- Required utilities to “offer to purchase” at pre-specified rates electricity from combined heat and power (“CHP”) facilities meeting efficiency requirements
- Main idea: FERC would still need to approve

California AB 1631

- In brief to FERC, CPUC argued federal law should not preempt its regulations “due to the compelling nature and urgency of reducing GHG emissions.”
- **FERC found it constituted impermissible wholesale rate-setting by CPUC**
- FERC: while it “appreciate[d] that the ... feed-in tariff program is intended to reduce GHG emissions, the arguments concerning the environmental considerations ... do not excuse the Commission from its statutory obligations.”

California AB 1631

- FERC Clarification:
 - States can create multi-tiered avoided cost rate structures for QFs.
 - “Where a state requires a utility to procure a certain percentage of energy from generators with certain characteristics, generators with those characteristics constitute the sources that are relevant to the determination of the utility’s avoided cost for that procurement requirement.”
- Issue: avoided cost to utilities is less than renewable provider’s cost
 - Unbundled RPS laws allow utilities to pay less than cost required for renewable generation
 - Net-metering operates outside of wholesale market

PURPA's Bottom Line

- States cannot create the same, target tariff rates as EEG.
- Avoided cost is an inaccurate proxy for offering distributed solar owners a reasonable return on their investments

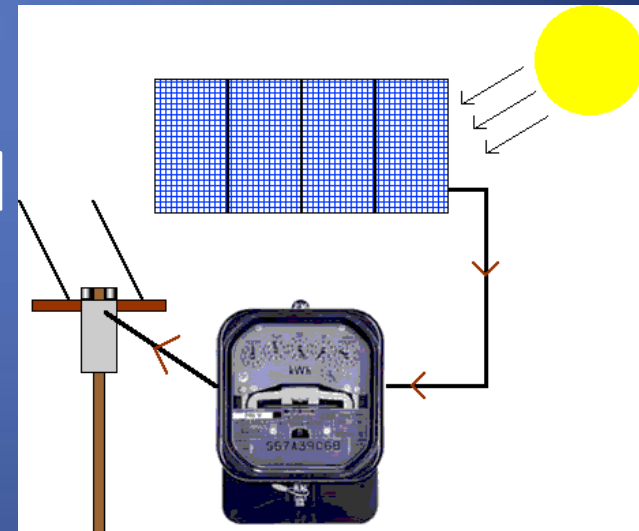
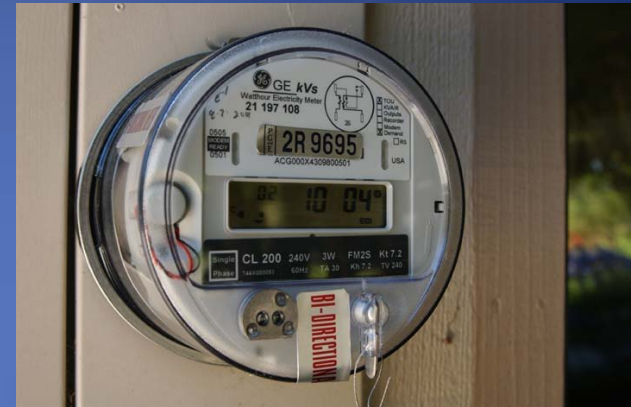
State Solutions:

Net-Metering and Renewable Portfolio
Standards

Net-Metering

Net-Metering

- 43 states + DC
- Meter runs backwards when electricity delivered into grid
- Receive retail rate, which is greater than wholesale/avoided cost
- Loophole: FERC order (94 FERC ¶ 61,340) found acceptable because state laws regulate retail, rather than wholesale transactions



Select Net-Metering Issues

- System Size Caps
 - Incentive limited to what can be consumed on site
 - Often include hard size caps
 - Prevents unlimited sizes of EEG
- Retail Rate Inaccurate Proxy
 - Retail rates change
 - Retail rates often inadequate
 - Even in Los Angeles, which employs time of use retail pricing, solar is not cost-competitive without other incentives
 - Unlike EEG, variable and not targeted

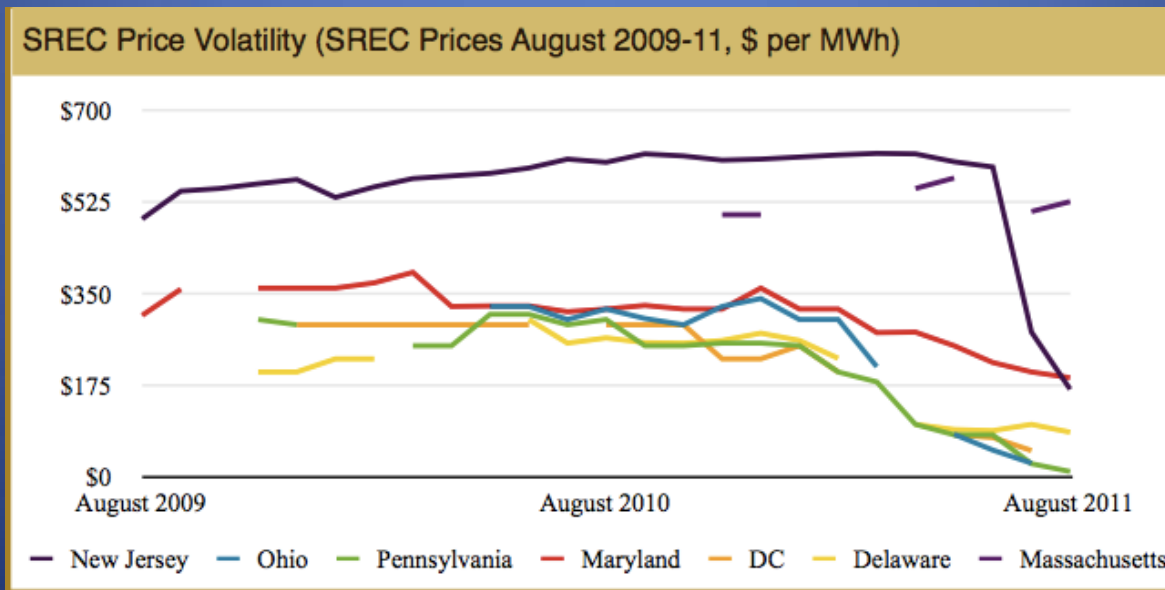
Renewable Portfolio Standards

Renewable Portfolio Standards

- 35 states + DC
- Many create solar renewable energy credits (SRECs) which utilities must purchase
- Phase in over time
 - MD General Assembly accelerated recently, now 2% by 2020; used to be 2022.
- Loophole: FERC order (105 FERC ¶ 61,004) found acceptable because RECs represent “environmental attributes” of electricity generated and not electricity itself
 - *But see* 139 FERC ¶ 61,061 (April 2012) – jurisdiction over *bundled* (but not unbundled) RECs

Select RPS Issues

- Price Volatility
 - SRECs are market commodities
 - Oversupply leads to price drop
 - Occurred in New Jersey, Pennsylvania, Ohio, Delaware, DC, and Maryland
 - Creates uncertainty, uncertainty requires higher returns



Final Thoughts

- Huge potential in US
- FPA and PURPA limit growth, states unable to create fixed price, targeted feed-in tariffs that allow for unlimited system sizes like under EEG
- Solutions:
 - Federal feed-in tariff
 - Return authority to states
 - Local level



Thank you.
Questions?

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