



**Public Service Commission**  
Energy, Labor & Economic Growth

Electric Utility Interconnection,  
Net Metering & Feed-in-Tariff  
Michigan Update

Presentation Available @  
[www.michigan.gov/rendocs](http://www.michigan.gov/rendocs)

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Renewable Energy Section  
Michigan Public Service Commission

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## MPSC Background

- Michigan Public Service Commission
  - Three Governor-appointed Commissioners
  - Regulates 16 investor-owned and cooperative (member owned) utilities
  - Regulatory responsibilities for distribution-level electric utility interconnections and the new Renewable Energy Standard (RPS) & net metering program



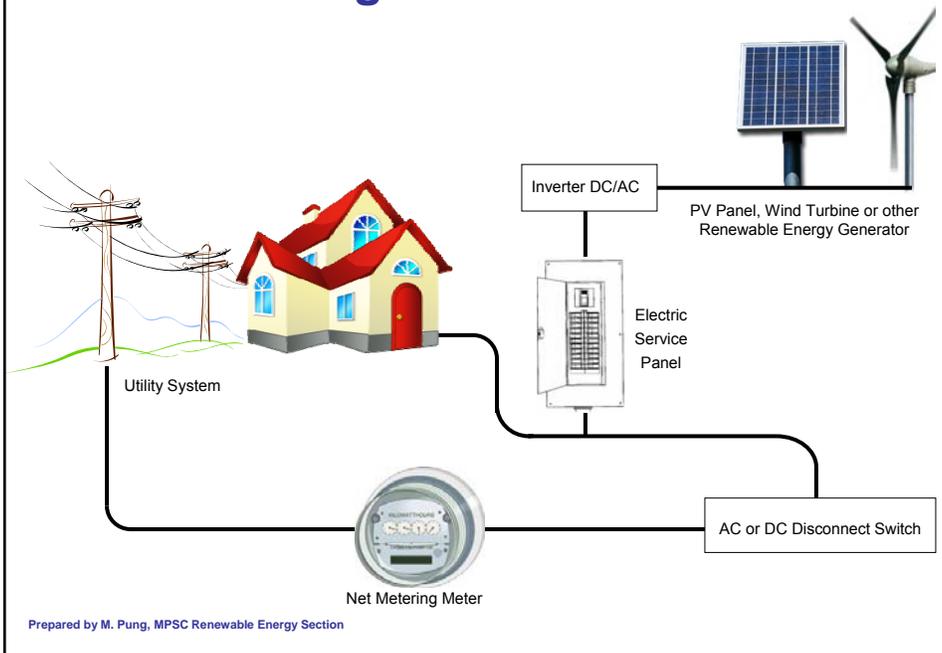
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### Interconnection Process Flow Diagram

#### Category 1 – 20 kW and less, inverter based, UL certified projects

1. Select generator and project installer
2. Complete and submit interconnection application to electric utility with filing fee  
*\$75 for interconnection & \$25 for net metering*
3. Receive application approval from electric utility
4. Receive and review the Interconnection Agreement from electric utility
5. Install your project according to applicable codes and standards
6. Complete the local inspection
7. Utility meter installation, final inspection & testing, final approval from electric utility
8. **Start generating your own electricity!**

## Net Metering for Small Generators



# New PA 295 Net Metering Program Background & Highlights



## Where we were...Pre-Act 295

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- No explicit legislative authority to establish a net metering program
- 2005 program was designed using a voluntary collaborative process
- Very complicated billing – generally not “net” metering for most utilities
- Billing, metering requirements, agreements were not standard across participating utilities
- Low customer participation and satisfaction



## With Act 295...Much Improved Program

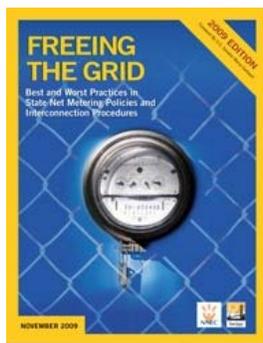
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- Excellent program for small generator projects
- Increased customer interest
- Expands program with a “modified” net metering offering for renewable generators up to 150 kW and methane digesters up to 550 kW
- Standard application and agreement
- See [www.michigan.gov/netmetering](http://www.michigan.gov/netmetering)



## Net Metering State “Grade”

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- *Freeing the Grid* 2009 Edition awards Michigan a “B” grade for new net metering program
  - Improved from an “F” (in 2007 & ’08)
  - Michigan now ranks 15<sup>th</sup> of 44 states with graded net metering programs
- [www.freeingthegrid.com](http://www.freeingthegrid.com)



## Status of Electric Interconnection & Net Metering Standards

- New Electric Interconnection & Net Metering Standards implementing Act 295 became effective on May 27, 2009
- Uniform, statewide application forms & contractual agreement forms
- [www.michigan.gov/customergeneration](http://www.michigan.gov/customergeneration)



## Net Metering Small Projects 20 kW and Under

- Generally, residential customer projects
- Customer is billed based on net usage
- Customer receives a credit equal to the full retail rate for all excess kWh
- Credit is applied to kWh charges in future months and unused credits carry forward indefinitely
- Customer will pay monthly customer charge or system access fees
- No study, testing/inspection or interconnection fees
- Generally approved in under 14 days



## Modified Net Metering Projects from > 20 kW to 150 kW

- Typically, agricultural, commercial, industrial, or institutional customer projects
- Customers pay the full retail rate for electricity deliveries from their electric provider and are credited at the generation portion of the retail rate or a wholesale rate for deliveries of excess generation to the grid
- No charge for the engineering review for interconnection
- Customers pay all interconnection costs, distribution study fees and any required distribution system upgrades
- Customers with generators up to 150 kW can use their generation on-site (behind the meter) without paying a standby charge



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## Modified Net Metering Methane Digester Projects

- Typically, on-farm projects
- For projects >150 kW up to 550 kW
- Nearly the same as the >20 kW to 150 kW program
- Customers pay the costs of any additional meters, plus “standby charges” equal to imputed distribution charges as if they bought all their energy from the utility



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## Summary of Michigan Interconnections Projects Completed by Generator Size

Types of Energy	Number of Projects	20 kW and under	>20 kW to 150 kW	>150 kW to 550 kW	>550 kW to 2 MW	>2 MW
Wind	135	133	1	0	0	1
Solar	78	78	0	0	0	0
Other*	21	0	4	0	5	12
<b>Total</b>	<b>234</b>	<b>211</b>	<b>5</b>	<b>0</b>	<b>5</b>	<b>13</b>

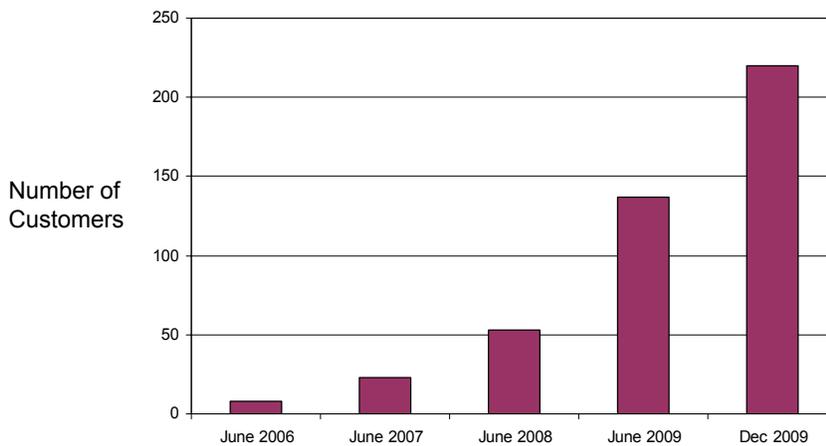
Other category includes: landfill gas, dynamometers, diesel & methane digesters  
 Data includes projects from approximately 2005 until September 30, 2009.

MPSC-regulated providers only. Does not include municipal utilities or member-regulated cooperatives.



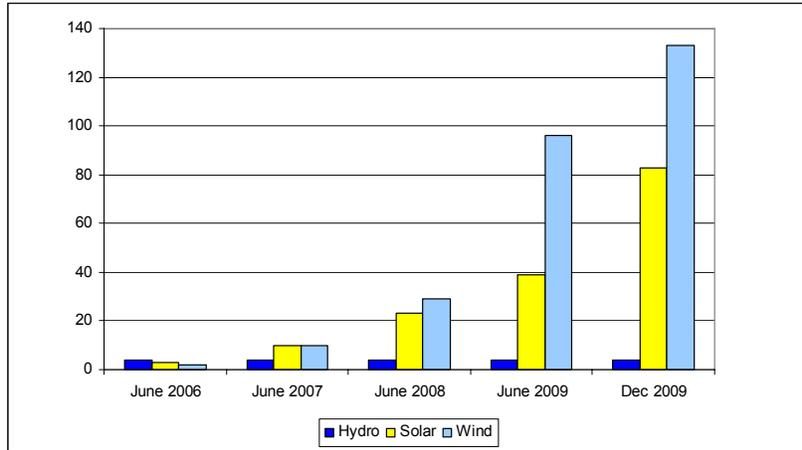
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## Michigan Net Metering Cumulative Installations - December 2009



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## Michigan Net Metering - by System Type December 2009

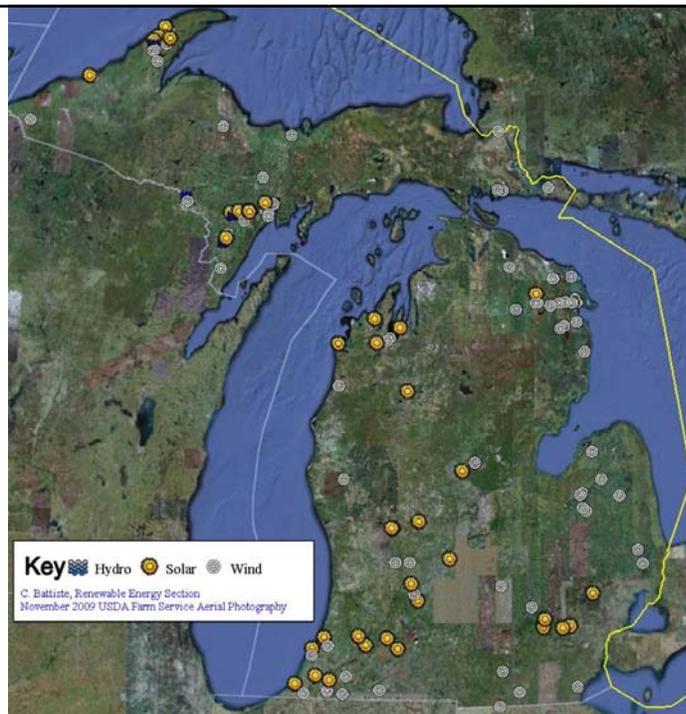


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## Locations of Michigan Net Metering Customers

(Cumulative  
installations  
through  
June 30, 2009,  
by Zip Code)



# Experimental/Pilot Programs for Small-Scale, Distributed Renewable Generation Supporting Michigan Utility PA 295 RPS Plans



## Detroit Edison SolarCurrents Pilot Program

- Available to Detroit Edison retail net metering customers
- Limited to 5 MW capacity; solar PV only; At least half reserved for residential customers
- Contract term of 20 years
- Up-front payment of \$2.40 per watt (estimated 25% of total system cost, including modest ROI) plus annual payments of 11¢/kWh for RECs (estimated ~25% of total system cost).
- Net metering program allows customer to receive an economic value of remaining 50% cost
- Estimated \$25 million program, out of \$2.2 billion total
- [www.dteenergy.com/solar](http://www.dteenergy.com/solar)



## Consumers Energy Experimental Solar Program

- Participating customers may not enroll in net metering
- Limited to a total of 2 MW of solar PV, 500 kW reserved for residential customers
- Estimated \$10 million program, out of ~\$3.1 billion, 20-year spending on renewable energy
- Prices paid range from \$0.65/kWh to \$0.375/kWh
- RECs belong to the utility
- Contract term is up to 12 years



## 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 vs. Quotas (RPS)

Quota models, like Michigan's Renewable Portfolio Standard, mandate growth rates and let the market set the price.

- Pros
  - Mandatory introduction of renewables into energy infrastructure.
- Cons
  - Technology biased in that "cheap" technology is chosen first.
  - Delayed costs: Prices accelerate after "cheap" technology has fully saturated market.

ART models set price and let the market determine growth.

- Pros
  - Small manufacturers are profitable and able to compete encouraging early breakthrough development that could potentially help lower the cost of these technologies. "Learning Curve"
  - Guarantees investments, easing lender worry.
- Cons
  - Can provide unnecessarily high payback if not adjusted according to market.

Some researchers believe the most efficient policy will be one that combines FIT and Quotas



## Goals & Objectives: Whose? Which? for Whom, What, Where, When, & How?

- Compliance cost savings
- Encouraging resource diversity and securing opportunities for small-scale systems
- Offering standard contracts, for simplicity sake
- Faster (optimum?) growth in RE production and use
- Support manufacturing attraction efforts



## *Existing North American FITS:*

### Vermont

- Sustainably Priced Energy Development Program (SPEED)
- Program launched September 30, 2009
- Prices range from \$0.12 for biogas up to \$0.30 for small solar.
- Program cap of 2.2 MW for individual systems and 50 MW total (4.4% of 2008 capacity).
- 20-year contracts
- <http://vermontspeed.com/standard-offer-program/>
- Program oversubscribed on first day



## *Existing North American FITs:*

### Ontario, Canada

- Program launched Sept 24, 2009
- Prices (in Canadian \$) range from \$0.104 for biogas and up to \$0.802 for small solar
- Open, unlimited participation, 20-year contracts
- <http://fit.powerauthority.on.ca/>
- \$9 billion of contracts just signed
- 694 large and midsize contracts signed to date representing 2530 MW (8% of total capacity)
- 3000 microFIT (10 kW or less) conditionally approved
  - 8424 applications received totaling 76 MW



*Existing North American FITs:*  
**Gainesville, Florida**

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- Program launched March 1, 2009. Filled by April 2009.
- Limited to Solar from \$0.19-\$0.32 depending on contract year and panel mounting.
- Program cap of 4 MW (~1% of total)
- 20-year contracts.
- [www.gru.com/OurCommunity/Environment/GreenEnergy/solar.jsp](http://www.gru.com/OurCommunity/Environment/GreenEnergy/solar.jsp)
- Capacity “maxed out before program begins”
- To be revisited for 2011...



*Existing North American FITs:*  
**California**

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- Program initially approved September 2006; most recently amended October 2009.
- Available to generators (up to 3 MW) in service territory of all investor owned utilities and publicly owned utilities with 75,000 or more customers.
- Rates range from \$0.08-\$0.31, depending on time of generation using CPUC market-price referent table. Higher rate for solar generating between 8 a.m. & 6 p.m.
- 10-, 15-, and 20-year contracts.
- <http://www.cpuc.ca.gov/feedintariff>



## *Existing North American FITs:*

# Oregon

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- July 2009, Oregon legislation establishes pilot feed-in-tariff for solar PV systems.
  - Aggregate capacity for pilot program is 25 MW (0.2% of 2008 capacity), with individual system limit of 500 kilowatts (kW).
  - Oregon PUC must still devise final rules. Same bill (HB 3039) also created a multiplier for solar in Oregon's RPS, and requires electric utilities to develop 20 MW of solar PV by 2020.
- [www.leg.state.or.us/09reg/measpdf/hb3000.dir/hb3039.en.pdf](http://www.leg.state.or.us/09reg/measpdf/hb3000.dir/hb3039.en.pdf)



## *Existing North American FITs:*

# Georgia Power

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- Green Power Program revised in July 2009.
- Georgia power buys solar PV generation at \$0.1831/kWh.
- 1.5 MW program cap (<0.001% of total).
- RECs are transferred to utility.
- <http://www.generationpartners.com>



## *Existing North American FITs:*

### Hawaii

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- Order filed on September 25, 2009 by Hawaii's PUC in Docket #2008-0273
- For all 3 investor owned utility service territories
- Rates will be set in "phase 2"
- Individual system cap up to 5 MW
- Program cap is 1% of each island's load.
- <http://www.dsireusa.org/documents/Incentives/HI29F.pdf>



## Actively Considering FIT

### Wisconsin

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- Numerous Wisconsin Utilities have proposed FITs to the Public Service Commission of Wisconsin (PSCW)
- At least two have modest experimental net metering + green rate FITs
- January 2009 PSCW opened docket #5-EI-148 to investigate ARTs
- <http://www.dsireusa.org/documents/Incentives/WI57F.pdf>



## Introduced FIT Legislation

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- Washington – HB 1086 introduced January 8, 2009
  - [apps.leg.wa.gov/documents/billdocs/2009-10/Pdf/Bills/House%20Bills/1086.pdf](http://apps.leg.wa.gov/documents/billdocs/2009-10/Pdf/Bills/House%20Bills/1086.pdf)
- Minnesota – HF 3537 introduced February 28, 2008
  - [www.revisor.mn.gov/bin/bldbill.php?bill=H3537.0.html&session=ls85](http://www.revisor.mn.gov/bin/bldbill.php?bill=H3537.0.html&session=ls85)



## Introduced FIT Legislation (2)

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- Illinois – HB 5855 introduced March 14, 2008
  - [www.ilga.gov/legislation/96/HB/PDF/09600HB5855lv.pdf](http://www.ilga.gov/legislation/96/HB/PDF/09600HB5855lv.pdf)
- Rhode Island – H 7616 introduced February 26, 2008
  - [www.rilin.state.ri.us/billtext08/housetext08/h7616.htm](http://www.rilin.state.ri.us/billtext08/housetext08/h7616.htm)
- **Federal Legislation** – H.R. 6401 (Inslee Bill) introduced June 26, 2008,  
entitled *Renewable Energy Jobs and Security Act*



## Actively Considering FIT Michigan

- Michigan – HB 4137 introduced February 4, 2009 Spondored By Representative Gonzales
  - [www.legislature.mi.gov/documents/2009-2010/billintroduced/House/pdf/2009-HIB-4137.pdf](http://www.legislature.mi.gov/documents/2009-2010/billintroduced/House/pdf/2009-HIB-4137.pdf)
- Representative Gonzales to introduce substitute FIT bill
- Reprsentative Huckleberry to introduce open FIT bill



*For the future?*

## Two Scenarios to Consider

- ① Work within existing RPS, to meet RPS compliance goals at lower cost
- ② Unconstrained German- or Ontario-Style



## FIT Policy Details TBD

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- Price setting method (cost of generation, value to utility system, or hybrid)
- Tariff differentiations (technology type, system size, resource quality, location)
- Further differentiations or eligibility criteria to encourage specific qualities (e.g., peak production, C-BED, energy efficiency, brownfield redevelopment, CHP)



## FIT Policy Details TBD (2)

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- Tariff degression & adjustments for resource quality
- System eligibility, vintage
- Contract duration
- Electric supplier purchase obligation, interconnection & grid access priority
- Interconnection cost sharing
- Source of subsidies (ratepayers, taxpayers)



## FIT Policy Details TBD (3)

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- Program Caps By:
  - Program
  - Utility/supplier
  - Individual project size
  - Technology type
  - Ownership
  - Location



## Learn more about FITs

- Mendonca, Miguel (for World Future Council). *Feed-In Tariffs: Accelerating the Deployment of Renewable Energy*. London: Earthscan, 2007; [www.earthscan.co.uk/?tabid=298](http://www.earthscan.co.uk/?tabid=298).
- Hempling, Scott, et al. *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*. National Renewable Energy Laboratory, 2010; TP-6A2-47408; [www.nrel.gov/analysis/publications.html](http://www.nrel.gov/analysis/publications.html).
- Cory, Karlynn, Couture, Toby, Kreycik. *Feed-in Tariff Policy: Design, Implementation, and RPS Policy Interactions*. National Renewable Energy Laboratory, 2009. <http://www.nrel.gov/analysis/publications.html>.
- [MI-FIT@googlegroups.com](mailto:MI-FIT@googlegroups.com)



## Questions?

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Renewable Energy Section  
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Michigan Public Service Commission



## Net Metering

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- Net metering program size can grow to at least 1% of each provider's peak load
- The 1% is allocated among three net metering categories, based on generator size
  - 0.5% for  $\leq 20$  kW
  - 0.25% for  $> 20$  kW up to 150 kW
  - 0.25% for  $> 150$  kW up to 550 kW (methane digesters only)



## Net Metering Customers Own Their MI Renewable Energy Credits

- Michigan Renewable Portfolio Standard (RPS) compliance is based on Michigan Renewable Energy Credits (MIRECS; [www.mirecs.org](http://www.mirecs.org))
- One REC is created for every megawatt-hour (MWh) of renewable energy generated (1 MWh = 1,000 kWh)
- REC price will be market based. REC price estimates range from 1.5 to 7 cents per kWh



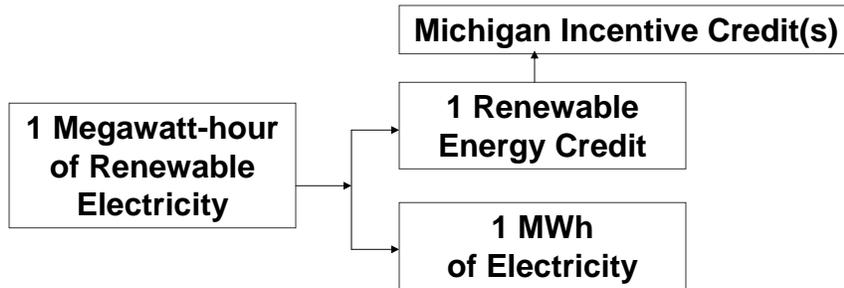
## Michigan Incentive RECs are like extra credit

- Solar earns two extra RECs per MWh
- Michigan Manufactured Components
- Installation by Michigan workforce
- On-peak generation (not wind)
- Off-peak energy stored in an advanced storage facility and then used to generate on-peak



# MIRECs Explained

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**Renewable Energy Credit  
can be sold separately from the electricity.**

