



WHAT THE HECK IS A REC?

THE LOWDOWN ON RENEWABLE ENERGY CERTIFICATES

A PRESENTATION TO THE SUSTAINABLE MADISON COMMITTEE

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AVAILABLE PATHWAYS FOR 100% RENEWABLE ELECTRICITY

- Self-supply (behind the meter)
- Purchase output from an off-site renewable project through a utility tariff (MGE's Renewable Energy Rider)
- Purchase green power provided by the local utility (MGE's Middleton shared solar project)
- Purchase renewable energy certificates (from RE project owners)

DEFINITION OF REC'S

- Renewable Energy Certificates (RECs), also known as Green tags, Renewable Energy Credits, Renewable Electricity Certificates, or Tradable Renewable Certificates (TRCs), are tradable, non-tangible energy commodities in the United States that represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource (renewable electricity) and was fed into the shared system of power lines which transport energy.

PUT ANOTHER WAY ...

Power on the grid comes from all sorts of sources: coal, nuclear, natural gas, renewables. Once it's on the grid, it's all blended together. So, as an end user, you can't really tell where that exact megawatt hour you're using comes from. ***RECs are a way for businesses to certify that they have a valid claim to the carbon reductions from a specific project.*** These certificates provide verification that a business' support for renewable energy had an impact on the grid.

From EnergySMART

<https://www.energysmart.enernoc.com/practical-guide-renewable-energy-terms-what-are-ppas-virtual-ppas-and-recs>

REC'S COME IN TWO FLAVORS

Bundled with electricity

(a/k/a "green power")

Example: MGE's Green Power Tomorrow program or shared solar project

Unbundled from electricity

(a/k/a "green tags")

Example: Organic Valley's contract with OneEnergy

UNBUNDLED REC'S ARE ...

- Measurable (1 MWH is the unit)
- Scalable (to the customer's desire)
- Trackable (via M-RETS)
- Tradable
- Verifiable (by a third party)

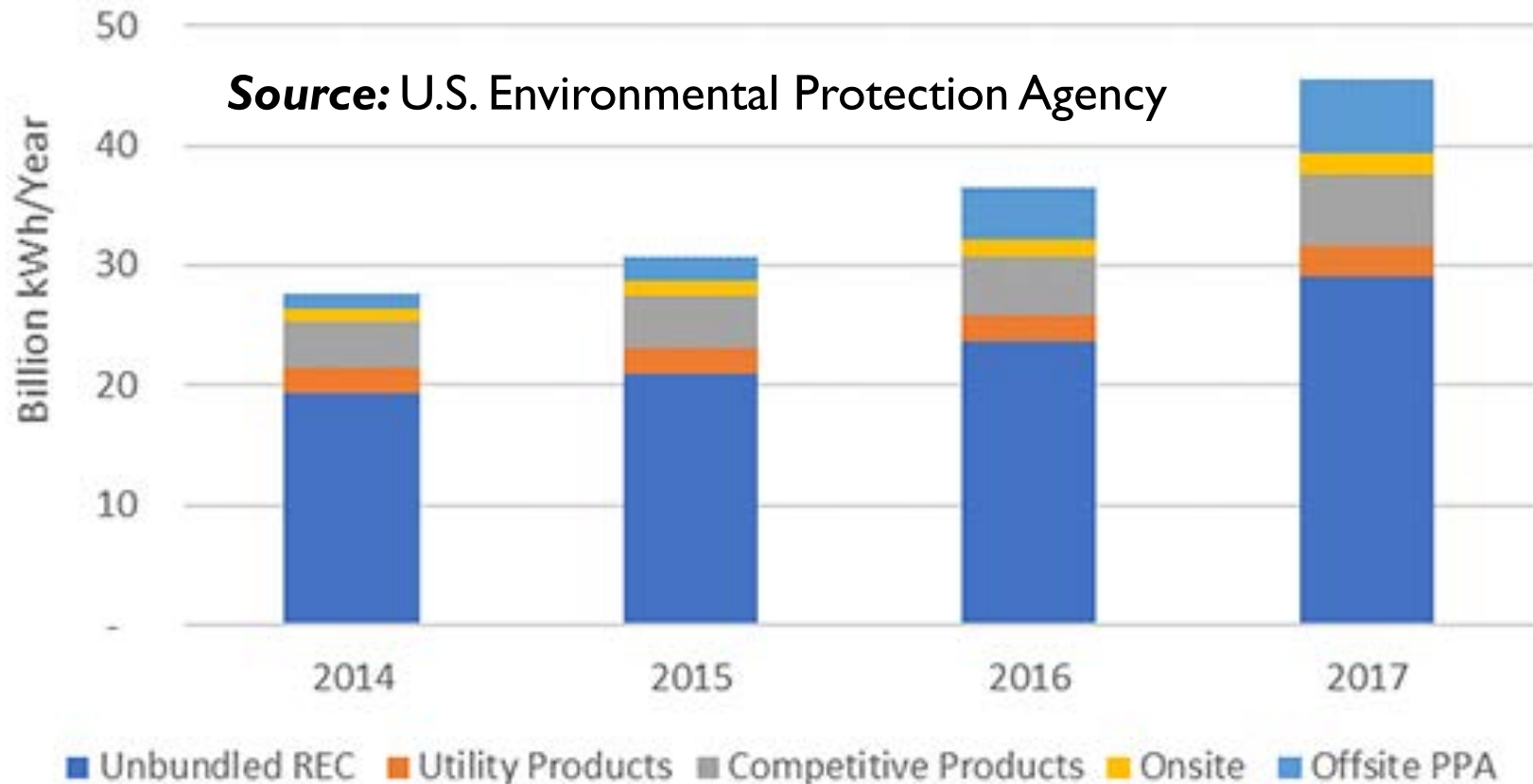
***This is a mature and transparent
commodity market***

ADVANTAGES OF REC PURCHASES

- Inexpensive way of accessing RE
- Speedier acquisition process
- Purchaser can target resource type, location
- Not regulated by Public Service Commission

Green Power Use by Supply Option

Source: U.S. Environmental Protection Agency



Unbundled REC's account for two-thirds of the renewable electricity marketplace.

WHO SELLS OR TRADES REC'S?

- RE project owners
- Utilities (in accordance w/ state RPS's)
- National aggregators (Arcadia Power)

ENVIRONMENTAL ATTRIBUTES OF CLEAN ENERGY FOLLOW THE REC'S



CAN REC PURCHASES LEVERAGE NEW GENERATION?

Yes. Depending on the contract structure, REC purchases can provide a revenue stream that makes a solar or wind project financeable.



Downsville, WI

WHAT WOULD THE CITY OF MADISON LOOK FOR IN A REC PURCHASE?

ADDITIONALITY



DEFINITION OF ADDITIONALITY --

But for the purchase of REC's associated with a particular project's output, that project would not have been built.



WISCONSIN'S NO. 1 PURCHASER OF RENEWABLE ENERGY CERTIFICATES

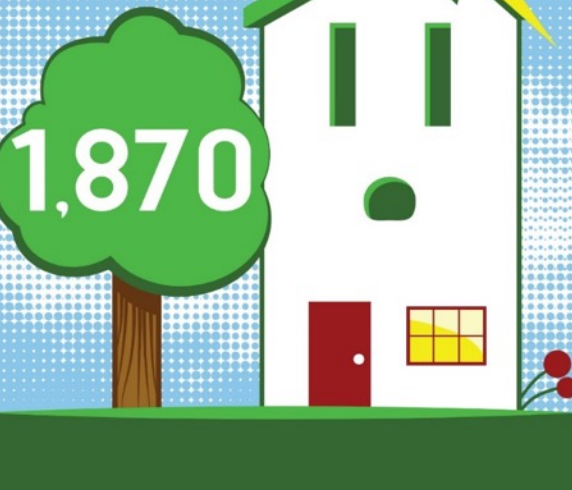
Organic Valley distribution center, Cashton, WI



"Our future demands **bold new thinking about our sources of energy**, and there is nothing more natural to a farmer than harnessing the power of the sun and the wind, so our cooperative is committed to achieving 100 percent renewable power, and doing it **in partnership** with the rural **communities where we live and work.**"

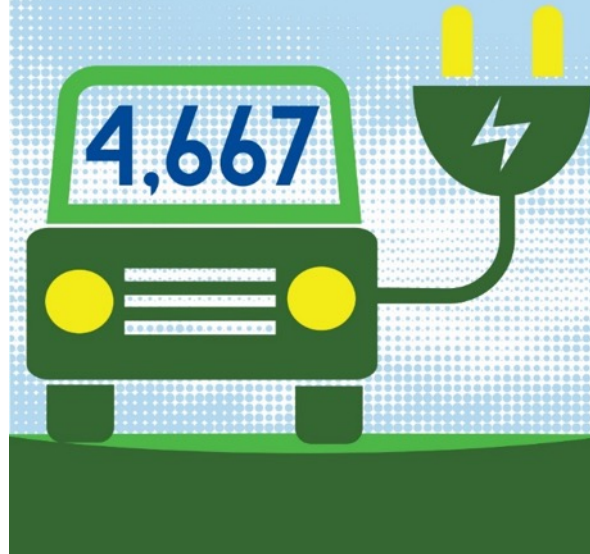
George Siemon – Organic Valley CEO

NUMBER OF HOMES'
ELECTRICITY USE
FOR A YEAR

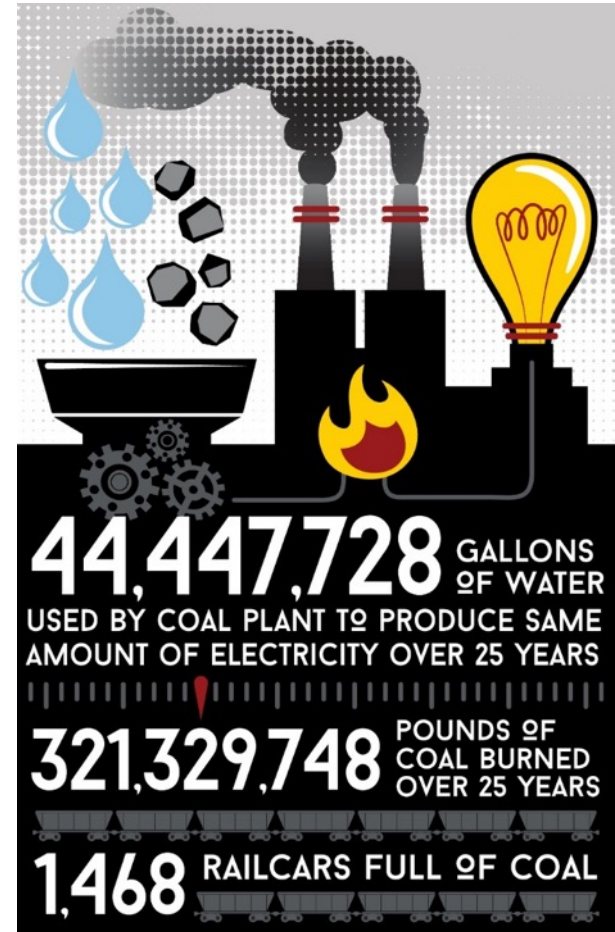


(Annually)

ELECTRIC VEHICLES
DRIVEN FOR A YEAR



(Annually)



(25 years)

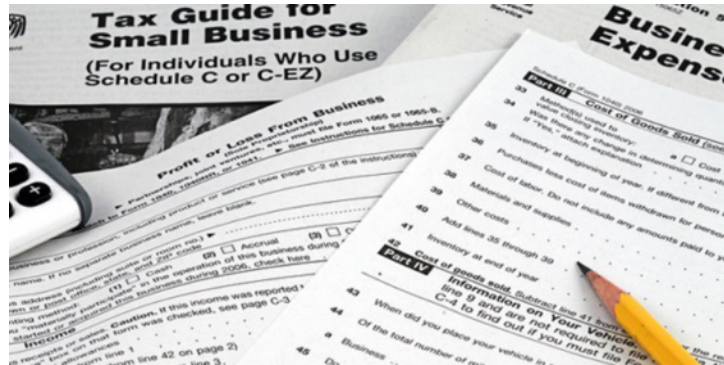
PAST INVESTMENT IN RENEWABLES



WHY THIS APPROACH?



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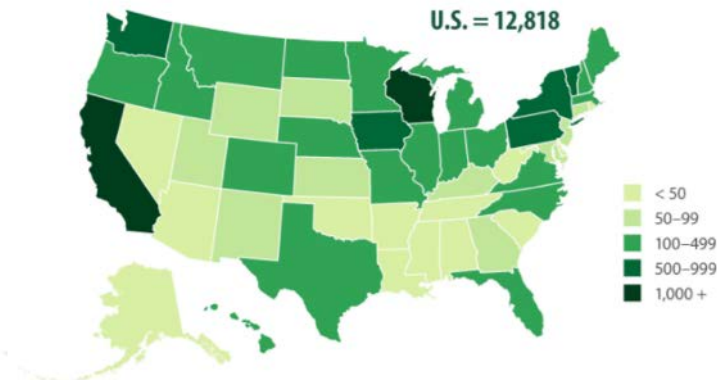


- Rapid deployment of more solar than we could implement alone
- Going from 300kW- 12,000kW+ *required* new approach
- **Not just a target/goal, but a path to get there**

WHY THIS APPROACH?

Number of Certified Organic Farms, by State, 2015

California and Wisconsin had more than 1,000; South had few



Source: USDA NASS 2015 Certified Organic Survey



United States Department of Agriculture
National Agricultural Statistics Service

Find out more at www.nass.usda.gov



OPPORTUNITY FOR CITY OF MADISON TO PARTICIPATE

- We have retained flexibility in our final portfolio ***to allow other partners to select projects they are interested in*** (e.g., City of Madison)
- Eliminating Risk, Capital Expenditure, & Operations + Maintenance
 - Earned support of our board/executives for a 25-year commitment
 - Includes signage & direct project connection/naming rights
 - Potential to prepay at a discounted rate.

WHY THIS APPROACH--SUMMARY

- This structure allows us to deploy much more rapidly and less expensively than behind the meter or previous projects.
- Limitations to what is possible due to PSC regulations in WI (direct PPA not seen as viable)
- Inability to capture tax benefits as a cooperative (same for city)
- Ability to partner with rural communities
- Locating projects where they make sense for the regional and distribution grid(s).
 - Our individual utility couldn't feasibly take all 12-13MW

REC PURCHASES CAN BE OFFSET THROUGH EFFICIENCY

City of Madison's electric consumption

- 53 million kWh/year – 53,000 MWH/year

Annual cost of electricity

- X 12 cents/kWh = \$6,360,000

Annual savings from 1% reduction in electricity use

- 1% of 53 million kWh = 530,000 kWh/yr
- At 12 cents/kWh, a 1% reduction in energy use saves \$63,600/yr

REC Purchases

- 1 REC from OneEnergy = \$4/MWH or \$0.004/kWh (similar price to what Organic Valley will pay each year over a 25-year period).

HOW MANY RECEC'S CAN MADISON PURCHASE WITH \$63,000 ANNUALLY?

$$\$63,600 / \$4 = 15,900 \text{ MWH (15,900,000 kWh)}$$

$$15,900 / 53,000 = 0.30$$

Therefore, a 1% reduction in energy use produces savings that offset a REC purchase covering 30% of City of Madison's electricity use!