



Integration with the Grid

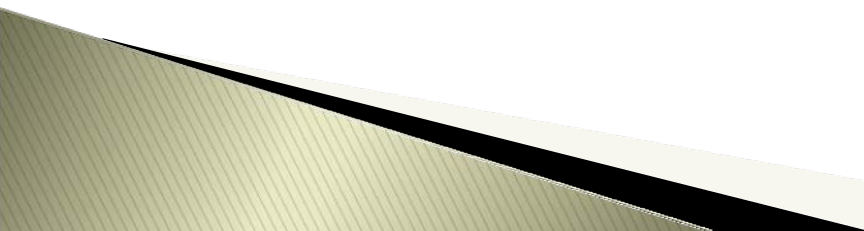
Donald Fournier
Managing Director, SEDAC
Chair, Building Research Council
University of Illinois

Overview

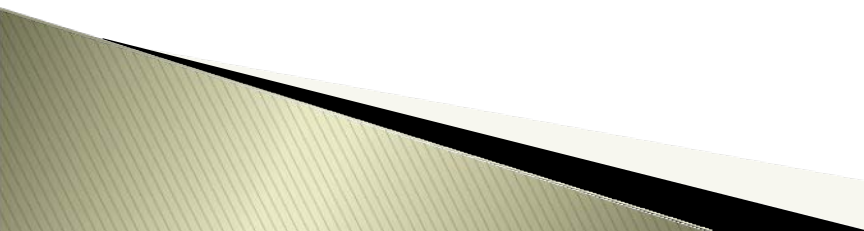
- ▶ Illinois Renewable Energy Portfolio
- ▶ Net Metering
- ▶ Grid interconnection requirements
- ▶ Feed-In Tariffs



Illinois Renewable Portfolio Standard

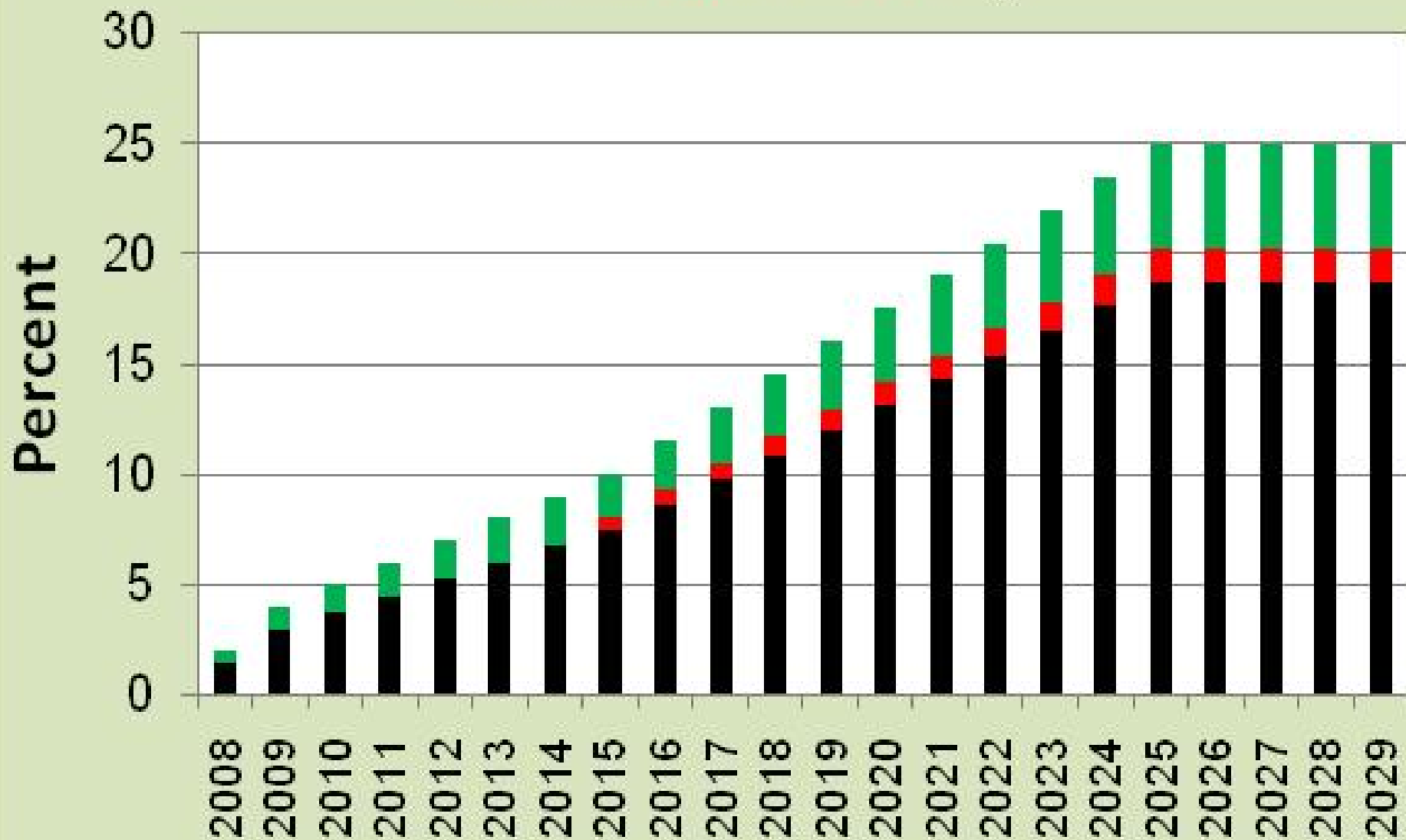
- ▶ Effective 8-10-09, Public Act 096-0159 modified the Illinois Power Agency Act to include the Renewable Portfolio Standard.
 - ▶ Utilities must buy and retire RECs at certain levels from defined resources.
 - ▶ Resources shall be procured from facilities located in Illinois. If not available in Illinois, then they'll be procured in states that adjoin Illinois. If not available in Illinois or in states that adjoin Illinois, then they may be purchased elsewhere.
- 

Illinois Renewable Energy

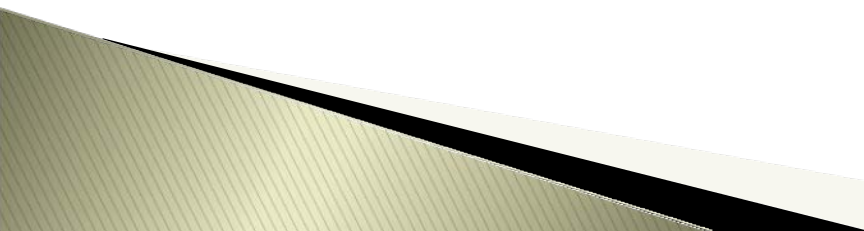
- ▶ IOUs must ramp up to a wind energy component of 18.75% of sales in compliance year 2024-2025.
 - ▶ ARES must also comply with wind requirement and ramp up to 15% of sales in compliance year 2024-2025.
 - ▶ All must ramp up to PV energy component of 1.5% of total sales in compliance year 2024-2025.
- 

Illinois IOU Renewable Portfolio

■ Wind ■ PV ■ Any




Net Metering

- ▶ Net metering is a way to capture the energy used and produced by a renewable energy generator located at a home or small business.
 - ▶ Owners of renewable energy power systems can use net metering to offset traditional utility costs while using cleaner energy.
- 

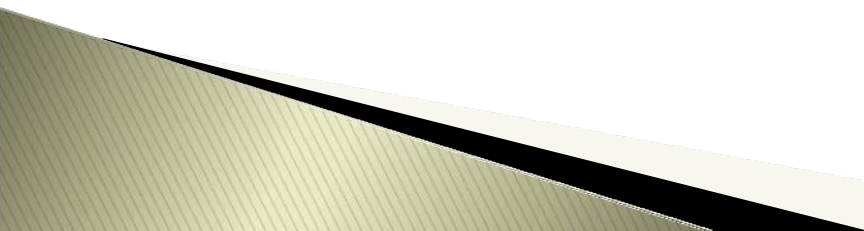
Net Metering in Illinois

- ▶ Illinois enacted S.B. 680 in August 2007, requiring investor-owned utilities in Illinois to begin offering net metering by April 1, 2008 (83 IL Adm Code, Part 465).
- ▶ In Illinois, net metering is available to electric customers that generate electricity using:
 - Solar energy
 - Wind energy
 - Dedicated energy crops
 - Anaerobic digestion of livestock or food processing waste
 - Hydropower
 - Fuel cells and microturbines powered by renewable fuels

Net Metering in Illinois

- ▶ Systems up to 40 kilowatts (kW) in capacity that are intended primarily to offset the customer's own electrical requirements are eligible and receive a one-to-one retail rate credit.
 - ▶ These customers will be compensated for excess electricity generated by their renewable energy systems at the same rate that they pay when buying electricity from their utility, including time of use rates.
 - ▶ These credits will be carried over month-to-month, with the annual period running from May to April, or November to October, at the customer's discretion.
- 

Net Metering in Illinois

- ▶ For systems up to 40 kW in capacity, any net excess generation (NEG) during a billing period is carried over as a kilowatt-hour (kWh) credit to the following billing period.
 - ▶ At the end of an annualized period, any remaining NEG credits in the customer's account expire.
 - ▶ All net-metering customers (and dual-metering customers) hold ownership and title to all renewable-energy credits (RECs) and greenhouse-gas credits associated with customer generation.
- 

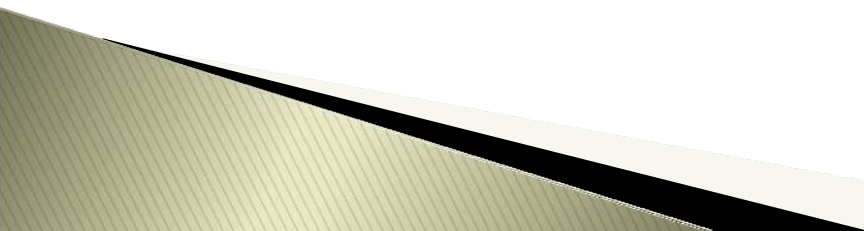
Net Metering in Illinois

- ▶ Customers with eligible renewable generators between 40 kW and 2 MW will receive credits equal to the utility's avoided cost for their excess generation. However, customers who are "time of use" customers are compensated at time-of-use rates.

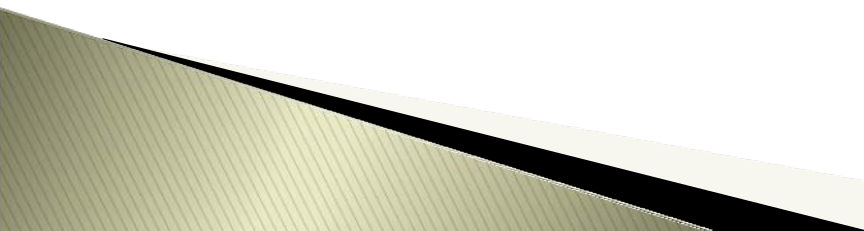
Net Metering in Illinois

- ▶ While Illinois's investor-owned utilities and alternative retail electricity suppliers must offer net metering, the state's municipal utilities and electric cooperatives are not required to do so.
- ▶ For nonresidential customers, net metering is typically accomplished through the use of a dual meter. Dual metering is required for nonresidential customers with systems greater than 40 kW but not greater than 2 MW.

Net Metering in Illinois

- ▶ The utility must provide the necessary metering equipment for systems up to 40 kW in capacity, while customers with systems greater than 40 kW but less than 2 MW must pay for the costs of installing necessary metering equipment.
 - ▶ Net metering and dual metering are not available to systems greater than 2 MW.
- 

Net Metering in Illinois

- ▶ Credits for NEG may be used to offset other charges assessed by the electricity provider.
 - ▶ Each utility must provide net metering and dual metering until the load of its net-metering customers and dual-metering customers equals 1% of the total peak demand supplied by the utility during the previous year.
- 

Net Metering in Illinois

- ▶ Before you install a net metering system, it is important to ask the following questions:
 - Are there tax incentives or rebates for installing a renewable energy system available in your area?
 - Are there zoning laws or building ordinances that restrict what kind of system you can install in your area?
 - Are there licensed contractors in your area to install the system you want?
 - What is the process for connecting your system to the local electrical grid?

Interconnection

- ▶ The Illinois Distributed Generation Interconnection Standard applies to generation facilities operated in parallel with an electric public utility distribution company in Illinois and meeting the following criteria:
 - The nameplate capacity of the distributed generation facility is equal to or less than 10 MW;
AND
 - The distributed generation facility is not subject to the interconnection requirements of either the Federal Energy Regulatory Commission (FERC) or the applicable Regional Transmission Organization (RTO).

Interconnection Requirements

- ▶ Must submit an interconnection request to the EDC that owns the electric distribution system to which interconnection is sought.
- ▶ EDCs shall specify the fee by level that the applicant shall remit to process the interconnection request.
- ▶ The interconnection equipment must be in accordance with IEEE Standard 1547.1 and comply with the appropriate codes and standards.

Standards and Codes for Interconnection

- ▶ IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems (including use of IEEE 1547.1 testing protocols to establish conformity);
- ▶ UL 1741 Inverters, Converters, and Controllers, and Interconnection System Requirement with Distributed Energy Resources; and
- ▶ 2008 National Electrical Code, National Fire Protection Agency (2008), 1 Batterymarch Park, Quincy, MA 02169-7471. This incorporation does not include any later amendments or editions.

Interconnection Levels

- ▶ There are four levels of interconnection:
 - Level 1 – 10 kW or less, equipment certified, and no construction required by EDC.
 - Level 2 – 2 MW or less, equipment certified, interconnection is to a radial distribution circuit, and no construction required by EDC.
 - Level 3 – 50 kW or less, lab certified equipment, reverse power relays (no export), not served by a shared transformer, and no construction by EDC required.
 - Level 4 – 10 MW or less and not all interconnection equipment lab certified.

Interconnection Requirements

- ▶ To learn more about interconnection, view the general rule at:
<http://www.ilga.gov/commission/jcar/admincode/083/08300466sections.html>
- ▶ Electric Interconnection of Distributed Generation Facilities, Code Citation: 83 Illinois Adm. Code, Part 466

Contacts

▶ Ameren Illinois Utilities:

- http://www.ameren.com/ILChoice/ADC_NetMetering.asp
- RenewablesIllinois@ameren.com

▶ ComEd:

- <http://www.comed.com/sites/customerservice/Pages/SelfGenerated.aspx>
- Application Fees:
 - Level 1: \$50
 - Level 2: \$100 plus \$1/kVA
 - Level 3: \$500 plus \$2/kVA
 - Level 4: \$1,000 plus \$2/kVA
- Frank Blacker, 1-877-426-6331

Contacts

- ▶ MidAmerican – Illinois:
 - <http://www.midamericanenergy.com/rates7a.aspx>
 - 888-427-5632 for additional distributed generation information

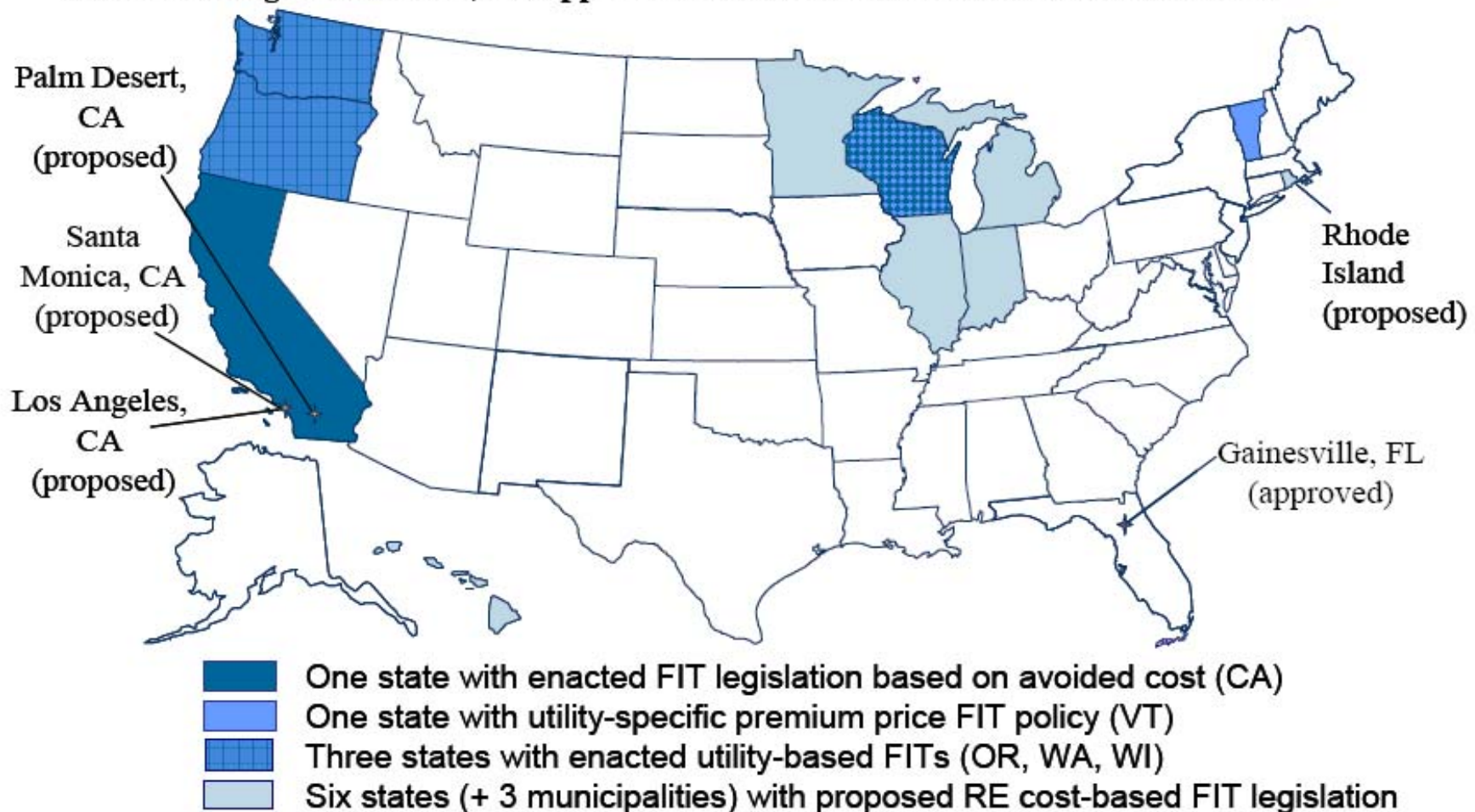
Feed-In Tariffs*

- ▶ Used in Europe and other continents to spur renewable energy resources.
- ▶ Fixed price with a long term commitment for renewable energy.
- ▶ Generally used for PV, but can also apply to other renewable energy sources.
- ▶ Prices can be as high as \$0.32/kWh.
- ▶ Used in the US in California, Florida, Hawaii, Oregon, Washington, Wisconsin and Vermont.

*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

Feed-In Tariffs

- ▶ Tariffs may be differentiated by technology – there may be one price for wind energy, another price for solar, and so on.
 - ▶ Tariffs within each technology can also be differentiated by project size or, in the case of wind and solar energy, by the productivity of the resource.
 - ▶ Tariffs for new projects may be subject to periodic review to determine if the tariffs are sufficiently robust to meet the targets desired in the time allotted.
- 

Feed-In Tariffs (FIT)

- ▶ A feed-in tariff guarantees a flat rate-payment for every kilowatt hour produced.
 - ▶ FIT replaces net metering and is a much greater incentive for commercial customers to participate.
 - ▶ FIT has a greater potential to spark economic growth, develop renewable energy sources, and create green jobs.
 - ▶ FIT convinces investors that building RE installations are a prudent business move and the FIT rate is designed to provide an investment worthy return.
- 

Feed-In Tariffs

- ▶ FITs are compatible with (and complement) RPS mandates.
- ▶ FITs replace competitive solicitations (i.e. RFPs), NOT RPS policies (EU countries use FITs to achieve goals).
- ▶ 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).
- ▶ We will see a stronger push towards renewables and FITs may be part of the solution.



Illinois Smart Energy Design Assistance Center

Web site: www.sedac.org

Contact: info@sedac.org

1-800-214-7954