

# Estimating Benefits from Renewable Energy

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# Natsource: At a Glance

- Global reach
  - 125 employees
  - New York, Washington, Ottawa, Calgary, London, Tokyo
- Large energy broker
  - Natural Gas
  - Coal
  - Electricity
- Major environmental commodity broker
  - Among the largest and highest rated SO<sub>2</sub> and NO<sub>x</sub> brokerages
  - Rated as Top REC Broker (*Environmental Finance Magazine Survey, Dec. 2001 & 2002*)
  - Rated as Top GHG Broker (*Environmental Finance Magazine Survey, Dec. 2000, 2001 & 2002*)



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# Natsource Use of EPA Products

- NOx/SO2 allowance tracking system
- E-Grid is significant research resource
  - NOx and SO2 allowance markets
  - Renewable energy
- Data types of particular interest
  - Generation technology
  - Generation/emissions volume
- We love E-Grid!!



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# Why brokers use the data...

- Helps identify potential sellers
  - Often generators do not know what they have
  - Estimate remaining available RECs, NO<sub>x</sub>, or SO<sub>2</sub> allowances
- Emissions displacement calculations primarily encountered in REC and GHG markets



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# “The REC”

- Prevalent REC definition:

“Each unique certificate represents all of the environmental attributes or benefits of a specific quantity of renewable generation, namely the benefits that everyone receives when conventional fuels, such as coal, nuclear, oil, or gas, are displaced.”

- Quantized and vintaged (10 MWh 2003s)
- Sometimes registered (TX, MA...not NJ)



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# How we conceive of REC...



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# Why REC marketers use data...

- Provide purchase rationale
- Guide customer purchase volumes



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# “Benefits” of renewable energy

- Environmental benefits:
  - Reduced mining impacts
  - Transport impacts (spills, diesel emissions)
  - Reduced air emissions from combustion
  - Haz waste disposal
- Energy security
- Price stability
- Employment/local impacts



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# Concerns about displaced emissions benefits concept

- Benefits are important but vague and limited
- Attribute ownership is unclear
- Does renewable energy = clean energy?
  - Should it? Renewable refers to *fuel source*
- Creates multiple sub-commodities
  - Emissions “benefits” are dependent on technology used, location, date/time (but not necessarily RECs)
- Static model, but energy market is dynamic



# Attribute ownership

- Others have claim to indirect reductions
  - Emitters “own” their baseline, thus “carbon offset” is not REC generator’s
  - NOx/SO2 covered by cap-and-trade
  - Both cases lead to double-counting problem
- Is REC seller “short” any attributes it does not own if sales contract uses prevalent definition?
- “Disaggregation” could seriously damage market confidence in REC value



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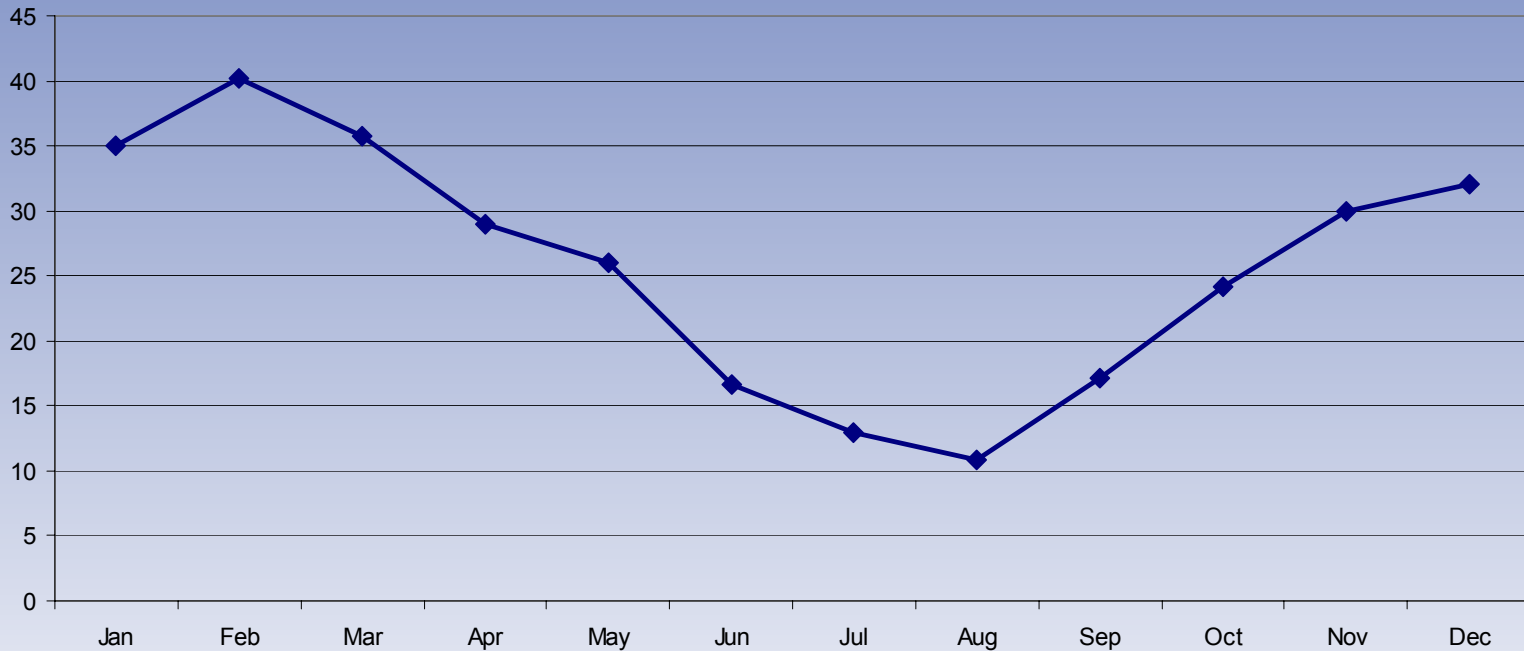
# Attribute Ownership (cont'd)

- Backing into “Disaggregation”
  - NEPOOL looking at reflecting sale of set-aside or other incentives on REC
- Negative benefits? (Avian, viewshed...)
- Claiming “environmental benefits” is not really necessary...and hinders REC market



# Renewables May Be Off-peak

Capacity Factor



Makes different RECs and techs difficult to compare.



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# Alternate definition of “REC”

- Renewable Energy Certificate is unique and exclusive proof that a specified unit of energy was generated from a renewable source
- Inclusion of “environmental benefits” is not necessary and avoids concerns



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# Conclusion

- Calculating environmental benefits from renewables helpful for sophisticated planners...but negative for RECs.
  - Use for planning RPS, set-asides, SIP...
  - Caution against use for green marketing



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# For More Information...

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