Electric Distributed Generation

Sarah R. Thomas, NARUC

ERRA Legal Regulation Working Group

Tallinn, Estonia, March 19, 2013

Disclaimer

- This presentation represents my views and not those of the California Public Utilities Commission or any of its employees, or of NARUC
- Contact me for questions: sarah.thomas@cpuc.ca.gov

What is Distributed Generation?

- Small-scale power generation technologies located close to where electricity is used (e.g., a home or business); alternative to or enhancement of the traditional electric power system.
  - E.g. rooftop solar, small wind turbines, fuel cell, geothermal well
- Current California programs include customer-side ($\leq$ 5MW; renewables are subsidized) and utility/supply side generation that is sold to the utility at wholesale ($\leq$ 20MW; some feed-in tariffs).
- Not necessarily renewable energy, but California focused on renewables.
- Can involve cogeneration (use of waste heat at manufacturing facilities) – combined heat and power (CHP)

Why Distributed Generation?

- Avoid Transmission costs
- Avoid line losses attributable to transmission
- Potentially lower environmental impact
- Reduce Greenhouse Gas (GHG) emissions (if renewable DG) (in California, electricity sector emits 32% of GHGs)
- Reduce demand for large power plants
- Lower water impacts from using fewer water cooled resources
- Customer bill savings through net metering (payment for excess generation)
- Increase productive use of unused land/rights of way/rooftops, bringing in revenue for government
- Aid renewable integration – compensate for intermittency of wind/solar

Why Distributed Generation? (2)

- Avoid using costly/polluting peaker plants (coal-fired or other old technology) – pay all year just to run a few hours/year
- Save on fuel costs and hedge against fuel cost fluctuations
- Construct quickly with limited time needed for environmental review
- Increase customer control over energy
- Help governments reach renewables targets without having all generation be large utility-scale, with permitting challenges, long/costly construction, high failure rate

Why Distributed Generation? (3)

- Prevent energy sprawl and have buildings – which use large percentage of energy – generate their own energy*
- Energy and national security – power stays on even if grid or transmission lines go down*

*Bronin, S., for Building Renewable Energy and the Case of 360 State Street Symposium, 65 Vand. L. Rev. 1875, 1878, 1889, 1891 (2012).

Concerns

- Interconnection – must have a process to reconcile requests – more requests for interconnection than state needs
- Impact on distribution grid – must ensure safety/reliability not harmed.
- Cost - May need Energy Storage and other upgrades which are very costly
- Tradeoffs - Locating energy generation in urban areas vs. disturbed land outside load center (environmental justice issues in CA)

Concerns (2)

- While customer generating energy may save money, general body of ratepayers funds net energy metering.
- Rate squeeze for ever smaller group of bundled customers vis-à-vis departing load
- Grid operator cannot “see” what is connected to distribution grid (only transmission) – need communications upgrades at distribution level.
  - Places greater burden on distribution utility to balance more complex portfolio of resources
- Conventional generation faces increased competition

California

- DG includes renewables and non-renewables; of renewables, 78% solar
- $2.1 billion in private investment as of 2012
- $747 million in incentives paid
- 430 MW of DG capacity through 1,447 projects since 2001
- Eligibility now based on amount of Greenhouse Gas emissions reductions
- Current focus on generation at customer side of meter and net energy metering (payment to customer for excess generation)

Europe
(Germany, Spain)*

- In both countries, DG is attached to low-medium voltage distribution grid, and refers generally to renewable energy, generally < 20MW
- Germany: unlike California, all DG above 100KW at distribution level must be observable by transmission grid operator; makes incorporation of DG easier in Germany
- Spain: ~8GW wind DG < 20MW in size as of 2010, 3GW solar DG installed at distribution level.

**See generally* Corfee, K. *et al.*, KEMA, 2001, "Distributed Generation in Europe," California Energy Commission. Publication Number: CEC-400-2011-011. Sacramento, Calif. , at 4, 5, 10 available at http://www.energy.ca.gov/2011publications/CEC-400-2011-011/CEC-400-2011-011.pdf

Legal Issues*

- Without a law requiring net metering, electric utilities (and sometimes ratepayer groups) are reluctant to provide it, since it cuts into utility revenues
  - utility company objections to net metering include safety and liability, difficulties with interconnection and maintenance, and overly favorable rate structures for qualifying facilities (aka CHP)
  - Amount utility pays generator – avoided cost vs. wholesale rate
- Land use objections
  - Neighbor complaints about noise, visual impact
  - Concerns about historic preservation of buildings
  - Municipalities often have ordinances prohibiting rooftop installations

*_See_ Bronin, _supra_ slide 6, _passim_.

Legal Issues (2)

- Multiple jurisdictions having conflicting permitting rules
- Airspace/solar rights – party claims that a building addition or tree shadows his solar installation
- Model zoning/building codes and landowner agreements proposed to solve many of these issues*

*Pursely, G. *et al*., Local Energy, 60 Emory L.J. 877, 908 (2011).