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The Perfect Storm?

Distributed Power: Reliability, Renewables and Regulation

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The Rising Storm

. . . the pull of demand . . .

- Power ain't what it used to be
- The demand for *reliability*
- McDonalds and Starbucks -- the new high quality power user
- Where power = information and information *is* the business
- 21st Century Office space -- 90 MW for Lake Side Tech
- The demand for *quality*

Value of Reliability

- Distributed power avoids a series of measurable customer costs associated with outages
- Costs from outages affecting computer systems vary widely in the range of $20,000 to $200,000 per hour in the retail, media and transportation industries
- Costs can be much higher in the financial services, medical and other industries
- Outage protection also mitigates the risk of additional damage such as loss of customer goodwill.

. . . the push from supply . . .

- New value to old technologies
- Falling costs of new technologies
  - » Microturbines
  - » Fuel cells
  - » CHP
  - » Photovoltaics ("PV")
  - » Wind
  - » Gas reciprocating engines

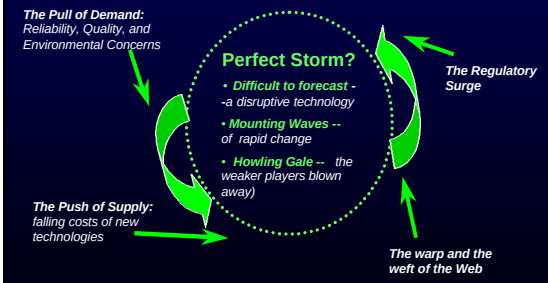
. . . the regulatory surge . . .

- The open-access revolution, from 436 to 636; from 888/889 to 2000
- Kyoto and heightened environmental concerns
- The retail revolution -- and regulatory mandates for renewable portfolio standards
- Net metering

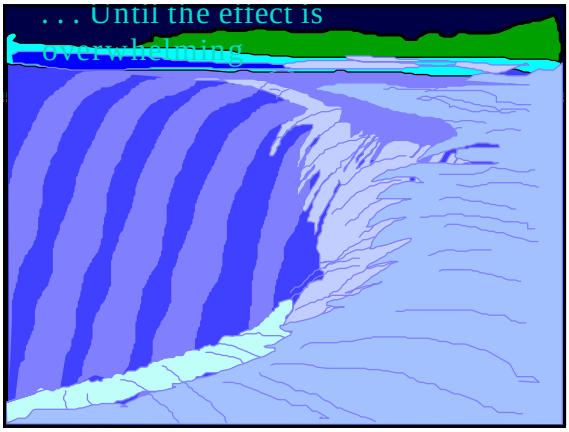
. . . and the warp and the weft of the Web

- Integrated information management
- E-commerce trading platforms for supply -- and now demand
- Power parks
- The outline of the “virtual utility”

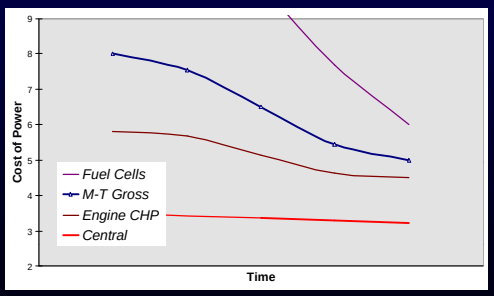
Each trend reinforces the next . .



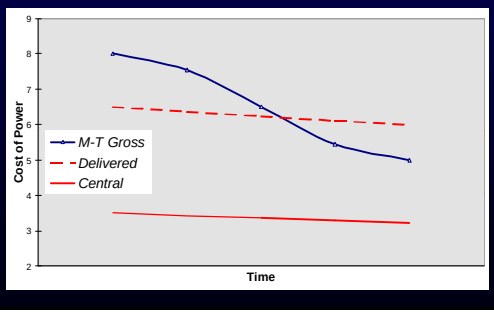
. . . Until the effect is overwhelming



DG costs likely to remain above central station generation at the busbar



But DG technologies do or will beat the delivered cost of power.



Selected Companies Offering Micro-Power Supplies

- GPU Advanced Resources
- PSEG Energy Tech.
- Onsite Sycom
- Unicom Distributed Energy
- Williams Distributed Power

Distributed Generation: T&D Focus

- Unsettled issues:
  - Disco cost avoidance
  - Impacts of price caps
  - PUC policy interest
  - Unresolved interconnection and auxiliary rate details
  - Threat to T&D assets
  - Renewables generation opportunities
  - Retail green power demand
- Utility Concerns:
  - Threat to *T&D business*
  - Potential to increase or decrease *T&D rates*
  - Potential to structure price caps to introduce profit opportunity
  - One of few opportunities to expand regulated or affiliate business to allow revenue growth
  - All upside for gas utilities

The New Context for Distribution Planning and Operations

- PBR and price cap regulation create a new paradigm for utility planning and operations: management of risks and rewards
- Industry restructuring places more focus on distribution company operations
  - the Disco becomes the focus of utility regulation
  - customers' expectations for service are high

"Both sides now"-- the Judy Collins Matrix

	DG as Threat	DP as Opportunity
DG as Monopoly Function	"DG is a threat to the phyical stability and reliability of the distribution system." Seek PUC classification of DG as reg's function. Use tight st's to discourage interc. Increase demand & other standby charges to deter private DG investments. Use occasional DG as small part of new T&D investments where cost red's provide PBR profits.	"DG is an opportunity for financial profit for the distribution company." Increase PBR profits by using DP to cut T&D costs. Maintain T&D planning & dispatch as revenue source. Expand T&D system to accommodate complex 2-way power flows & design rates to recover expansion costs.
DP as Competitive Function	"DG is a threat to the financial viability of the distribution company." Use incentives to direct private DP investment, if there are areas where T&D costs could be reduced. Use demand & other standby charges to protect T&D revenue. Retain dispatch rights & charge mktrs. for the service.	"DG is an oppportunity for financial growth for the parent holding company." Create/buy competitive ventures for growth, selling DP equipment -- or output and other attributes (PQ, thermal) -- possibly bundled with commodity and load management. Charge for dispatch services thru regulated or competitive entities.

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Services for EDC's: strategy to respond to both DP threats & opportunities

- Protect the T&D system from instability,
- Protect the distribution company and its ratepayers from serious financial impacts,
- Reduce regulated T&D costs,
- Increase distribution revenue with additional services,
- Facilitate development of a sound competitive market, and
- Invest in competitive DG ventures for further corporate growth.

Selling DG into the Retail Market??

- But, why limit our view of the potential market for DG by ignoring the rest of the customers?
  - » Someday, on each utility distribution feeder, there will be many DG units, constituting a "*distributed power market*."
  - » Today, the 'green' power market is constrained by limited 'new' green power resources of the kind most desirable for green consumers.
  - » Many of these desirable resources, especially PV, are more appropriate for siting at a consumption point than in large central station power plants.

Proposed Principles for On-Site DG --

- Data on feeder power conditions should be "e-distributed" on a real-time basis to operators of distributed resources
- Distribution rates and PBR mechanisms should give customers incentives to invest in distributed generation that is economically efficient compared to utility T&D investments
- Policy should be based on the full range of public policy goals, including
  - » energy efficiency and diversity
  - » avoidance of adverse effects on the global environment; and
  - » equity among all classes of ratepayers
- Customers select level of onsite capacity they wish to back up

Proposed Principles for On-Site DG (con't)

- Standby Rate principles:
  - » reflect physical and economic benefits to the T&D system
  - » avoid uneconomic "islanding"
  - » provide incentives to minimize grid use during times of peak T&D load
  - » charge capacity costs only for on-site generation outages that occur at the distribution system peak
  - » credit customers for arranging load reduction within the affected portions of the T&D system which offsets generator outages
- Rates should reflect the diversity of generating resources on each feeder
- Interconnection standards should assure safety and reliability, without interfering with the power market

Distributed Power Market Paradigm

- Familiar Paradigm
  - » Open access to transmission for central generators
  - » 1-way flow from generators to users
  - » Limited CHP applications for large turbines, gas engines
- New Forces
  - » Small generators with remote monitoring and dispatch
  - » Customer power: new option for on-site redundancy
  - » New suppliers & outsourcing

Moving to the New Paradigm

- *A Distributed Power Market*
  - » Open access to distribution for customer-generators
  - » Multi-directional distribution system
  - » Virtually unlimited potential market for DG

Is it "Win-Win" or a Zero-Sum game?

- For Electric Distribution Companies
  - » Gains:
    - – distribution cost deferral/avoidance
    - – increased revenues from new services
  - » Losses:
    - – reduced revenue from self-generators

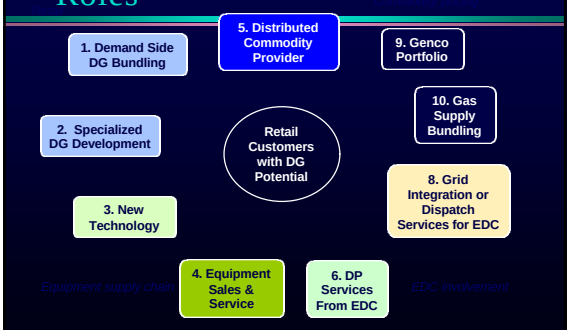
What about for those who don't self-generate?

- Gains
  - » reduced T&D rates, improved reliability
    - – reduced line losses
    - – environmental improvement
- Losses:
  - – distribution costs shifted from self-generators

Multiple DG Revenue Streams

- Base Electricity Commodity Value
- Environmental Attributes
- Additional Host Benefits
  - » On-site Peak Load Reduction
  - » Reduction in T&D or Other Utility Charges
  - » Reliability
  - » Power Quality
- Distribution Utility Benefits
  - » Reliability
  - » Lower Costs
  - » Lower Losses

Distributed Power Market Roles



State Regulatory Developments

- Progress in bell-weather state regulatory proceedings:
  - » CA
  - » NY
  - » Others.
- Regulations determining market viability for:
  - » fuel cells,
  - » key renewables.

New Regulatory Challenges

- Allocation of Cost Responsibility
- Air emission quandry for combustion DG
  - » system benefits across the netwwork
  - » potential localized impacts

Key Regulatory Issues

- Exit Fees (special CTCs for DG)
- Interconnection Standards (connecting DG to the grid)
- Standby Rates (backup power rates)
- Net Metering
- Other Issues

Staying Current

- Distributed Power Marketplace Update from XENERGY
- A Bi-weekly News Service
- Available electronically at:

www.xenergy.com/dp

Tracking Market Developments

- **Competitor Update**
  - » GE and Kubota Sign Agreement to Launch Fuel Cells in Japan
  - » Long Island Power Authority to Buy 28 Additional Plug Power Fuel Cells
  - » Mitsubishi to Market Ultra-Low Emission Capstone Microturbines in Japan
  - » Honeywell's Microturbines Making Moves in Canada
- **Regulatory Update**
  - » Arizona Becomes First State to Require Sun Power
  - » Ohio Net Metering and Interconnection Rules Set
  - » Washington State Net Metering Law Expanded and Clarified
- **Stock Update**
  - » Plug Power Stock Tumbles amid Uncertainty on Fuel-Cell Deal with GE
  - » Ballard Losses Fuel Stock Slide; Significant Cash Reserves Remains

Tracking Capital

Stock Update

Company	Market	Stock Symbol	Latest Close	Last Week's Close	52-Week Range
AstroPower	NASDAQ	APWR	20 1/16	18 1/4	10.87 - 49.37
Avista Corp.	NYSE	AVA	28 1/2	31 7/8	14.62 - 68.00
Ballard Power Systems	NASDAQ	BLDP	73 1/8	72 1/8	22.37 - 144.93
DCH Technology	OTC Bulletin Board	DCHT	5 1/32	7	0.25 - 16.50
FuelCell Energy	AMEX	FCL	38 1/8	39 11/16	5.83 - 95.50
Mechanical Technology	NASDAQ	MKTY	12	16 3/4	3.83 - 33.66
Plug Power	NASDAQ	PLUG	56 1/4	62 7/8	15.00 - 156.50
SatCon Technology	NASDAQ	SATC	16 3/16	17 1/8	4.50 - 44.75

Other Distributed Power Issues

- Treatment of DG in evolving ISO rules
- New regulatory developments: environmental as well as ratemaking
- Opportunities for PBR and D-IRP
- Moderated DG REM discussion group

Questions

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