

IMPEDIMENTS TO EFFICIENT DEPLOYMENT OF DISTRIBUTED RESOURCES

COMMODITY COSTS \$/KW OR \$/KWH

- Capital cost of equipment
 - internal combustion engines
 - gas turbines
 - micro turbines
 - fuel cells
 - photovoltaics
 - wind turbines
- Operating costs

Internal Combustion Gen Sets

- Installed capital costs are high
- Non-fuel operating costs are high
- Fuel costs are high
- Limited on-site thermal sales opportunities

Gas Turbines

- Installed capital costs are high
- Fuel costs are high

Micro Turbines

- Installed capital costs are high
- Fuel costs are high
- Operating costs are high
- Technology unproven

Fuel Cells

- Evaluated on the promise of substantially lower annual operating costs
- High capital costs
- Expected stack life of fuel cells is relatively short and require significant replacement capital costs

Solar and Wind

- Availability of resources
- Availability of land

Commodity Cost Main Point

- On a commodity dollars per kilowatt-hour or per-kilowatt basis against established coal and natural gas fired generating plants, DR faces *an uphill battle.....*

Interconnection Issues

- Interconnection
 - Access charges to distribution system
 - System upgrades
- Operation and dispatch
- Reliability issues
- Worker safety

Other Issues

- Environmental concerns
- Local citing issues
- **Standby charges**
- Fuel supply

PRICING OF STANDBY POWER

- Cost of service perspective
 - 100% of DG load usually req'd to be reserved
 - Supplier must stand ready to meet the potential requirements of all its customers
 - Provider of last resort concept
 - Insurance concept
 - Transmission & distribution cost recovery
- Market based approaches

Potential Benefits From Distributed Resources

- Wider customer choice
- Potential to supply 100% of end user needs
- Potential for improved power quality and reliability in conjunction with host utility service

Likely Role For DR In Competitive Generation Environment

- Primarily “niche” markets
- Short term fix for distribution system constraints
- Uninterruptible Power Supply (UPS)
- Green Markets
- Isolated locations

Biographical Sketch

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Current responsibilities at Ameren Services include market modeling, resource planning including non-utility generation analysis/coordination, load analysis and forecasting and load research. Prior positions at Ameren include: Interconnection Arrangements, Rate Engineering, Power Operations, Fossil Fuel Procurement and Engineering and Construction.

Academic background includes a B.S. in Mechanical Engineering from the University of Missouri-Rolla and a MBA from St. Louis University. I am a registered professional engineer in the state of Missouri.