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**Unicom Distributed Energy**

**Overview of Distributed Resource Technologies**

Distributed Resources and Competitive Energy Markets in Illinois Workshop  
May 18, 2000

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**What's the Buzz About Distributed Generation?**

**Wall Street Journal...**  
"Industry officials say new technologies will revolutionize the electricity-service sector much as personal computers did the mainframe-computer industry." (April 19, 1999)

**Business Week...**  
"We have compiled 21 ideas for the 21st century..."

#1 ...Sure, there are still big central generating plants, just as there are big mainframe computers. But the hot trend is 'distributed generation' -- putting generation close to consumption... Check out this baby. It's a microturbine..." (August 23 - 30, 1999)

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**Today's Agenda**

- Benefits of on-site generation
- DG Technologies
- Case study
- Role of self-generation in total energy management

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**Definition: Distributed Generation**

- Small Generators ranging in size from a few watts up to 5 megawatts
- Typically used for economic reasons and/or for reliability improvements - not just standby
- Heat recovery/ cogen is often an option

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**The Next Generation of Power**

Distributed energy can enable the user to

- Eliminate power outage costs and/or improve power availability
- Reduce energy cost
- Control energy load profile
- Take advantage of renewable sources
- Process harmful gasses as free fuel and help the environment

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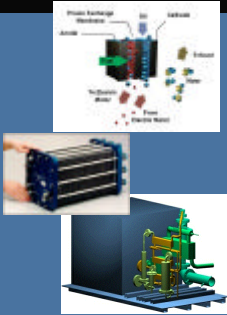
**Reciprocating Engines**



- Known technology - low risk
- Existing service infrastructure
- What's new is packaging and controls

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## Fuel Cells



- Extremely low emissions
- High efficiency
- Fueled by Hydrogen
- High cost
- Current applications are for premium power and residential
- May include heat recovery
- Higher risk

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## Other Technologies




- Niche market applications
- Variable energy supply

STIRLING engine

Wind Generators      Solar Cells

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## Microturbine Generators




- Run on most liquid or gaseous fuels
- Self-contained, compact
- Ultra-quiet
- Ultra-low emissions

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## UDE Current Products

- Honeywell parallon75 microturbine generator
- Generac standby generator sets
- Generac Utility 50 prime power generator set




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## Parallon 75 TurboGenerator Power System

- One unit produces up to 75 kW
- Multiple unit system can produce up to 1 MW
- One moving part - low maintenance
- Small footprint



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## Current UDE Installations



Walgreen's      McDonald's      Westchester Offices


TriState      E&W Services      Rogan Plastics      Heinemann's Bakeries

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## The Next Generation of Power

"If you're able to keep your lights on, you're still in business while your competitor has a closed sign on his door."

-Anthony Spata  
Building Systems Manager  
McDonald's Corporation



\$ 79 1999

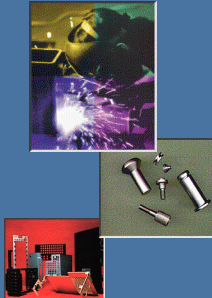
"I think it's really the way of the future."

-Vince Graham, President, Heinemann's Bakeries, Chicago

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## Industrial Customer Case Study

- Metal Fabrication Industry
- Peak electric load: 736 kW
- Energy expenditure: \$246,038 electrical; \$28,760 gas
- Electricity cost: >\$.10/kWh
- Gas cost: < \$3.50/mcf
- Outages: > 2/year, ~2 hours each
- Simple pay back: 3.4 years
- IRR: 27%

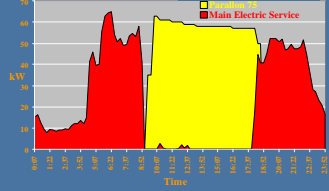


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## New Business Paradigm

### Individual Facilities:


- Total energy supply
- Guaranteed infrastructure
- Transfer of risk



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## New Business Paradigm

Groups of Facilities → **Microgrids**



Distributed Power Generation

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## Opportunities to align utility incentives with distributed generation applications

**Utility**

- Identify constraints in distribution system and open to distributed generation as solution for utility and customers

**Distributed Generation Customer**

- Deploy products, services and solutions that enhance reliability, improve efficiency and save money

**Result**

- Avoided costs for utility
- Improved service and reduced cost for customers
- Reduced strain on system
- Continuous improvement in market applications through technology and service advancements in distributed generation

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## Powerful Alternative in Distributed Energy

- Reduces total energy cost
- Eliminates power outage costs
- Integrates within existing infrastructure to provide a new value offering