

A Presentation for



and

U.S. Department of Energy

DOE Distributed Power Program

July 26, 2001
Washington, DC



The Opportunity

RealEnergy – Commercial Real Estate’s Energy Company

- **Taking advantage of:**
 - **Deregulation**
 - **New generation technologies**
 - **Grid uncertainty**
- **RealEnergy’s existing partners own over 1.5 billion square feet of property**
- **North American commercial real estate market:**
 - **20 billion square feet of space**
 - **\$50 Billion in annual retail energy purchases**



The NREL Project

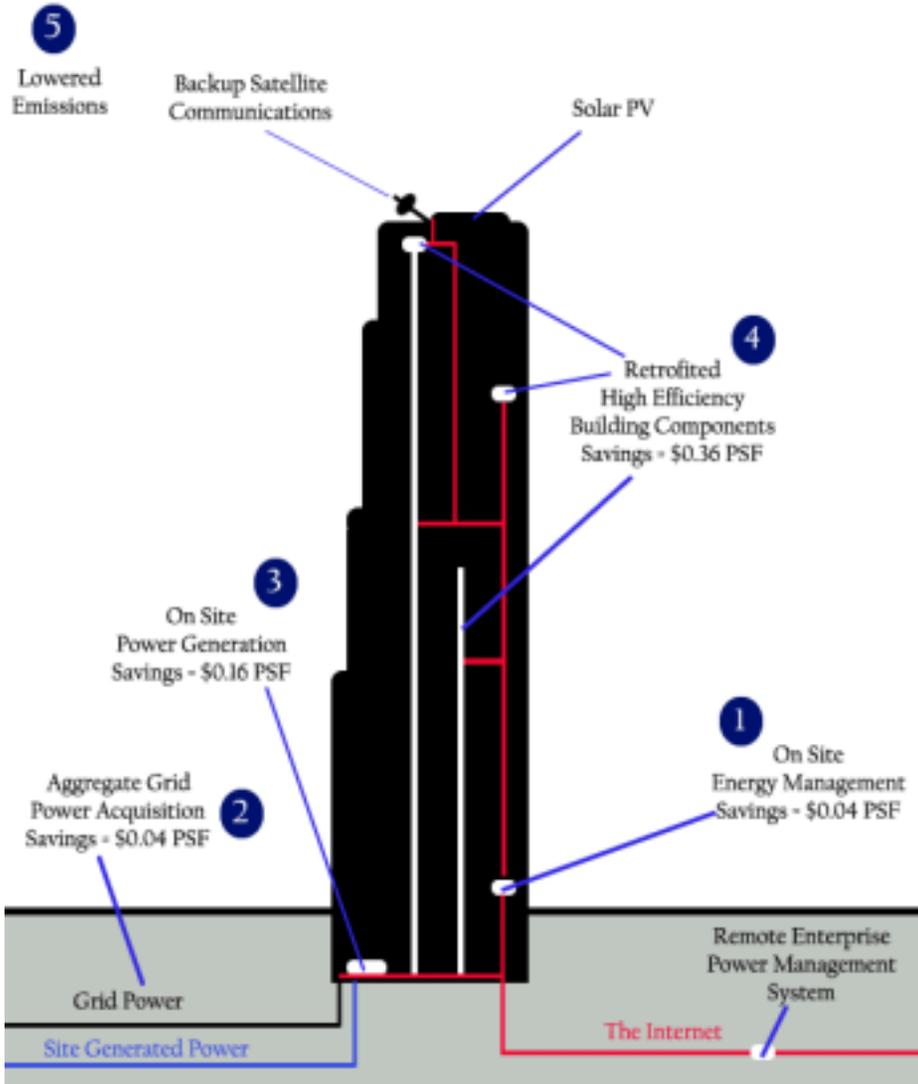
An Enterprise Wide Distributed Energy Infrastructure

- **Installation of 20 MW of DER, primarily CHP, in multiple locations, configurations, and blends of technology**
- **Define the state of the art of optimal control, energy management and communications technologies for the integration and management of distributed power systems into a virtual utility application**
- **Advance the body of knowledge and research on distributed resource markets, regulatory and market barriers, design and operational issues, communications standards and new business models which maximize the value and reduce the cost of distributed power**
 - **Interconnection Standards**
 - **Permitting**
 - **Air**
 - **Building**
 - **Structured Transactions**
 - **Project Financing**
 - **Insurance**
 - **Interaction with commodity markets**





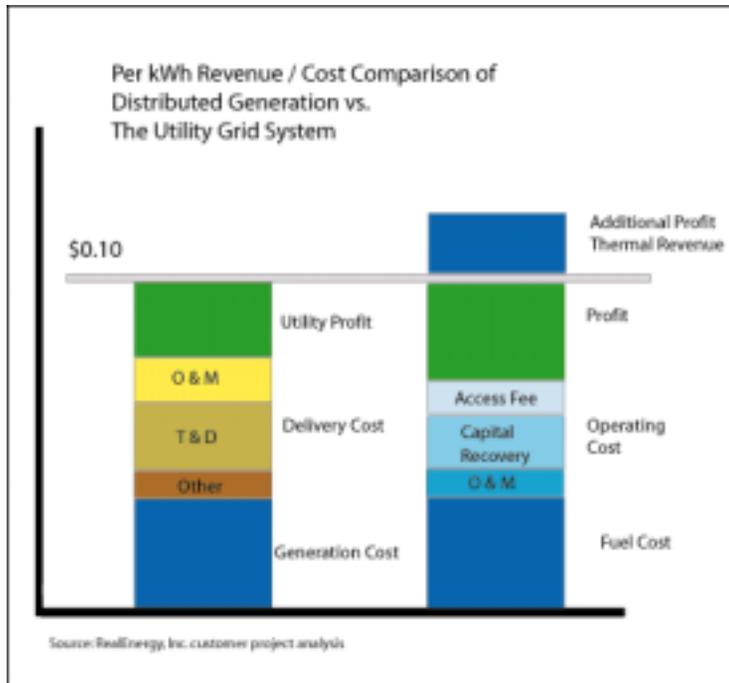
Elements of Power Management



Cost Savings Measures per Square Foot

1	On Site Energy Management	\$ 0.04
2	Aggregated Shaped Power	\$ 0.04
3	On Site Power Generation	\$ 0.16
4	Efficiency Retrofits	\$ 0.36
5	Lowered Emissions Credits	\$ -
6	Reliability and PQ	\$ -
	TOTAL	\$ 0.60

RealEnergy's Economic Model



RealEnergy's Economic Model

- RealEnergy designs owns and operates generators in commercial properties owned by our customers.
- RealEnergy competes with delivered price of electricity
 - Avoided transmission & delivery cost
 - Improving micro generation efficiency
 - Combined Heat and Power creates additional economic advantage over grid power
- Potential for Premium Power upgrade with increased margin for RealEnergy (and customer)



RealEnergy's Current Status

- **Customer contracts in place covering over 10 million square feet and 10 MW**
 - 6 projects @ 1.5 MW online 8/1/01
 - 12 projects @ 4.1 MW online 9/1/01
 - 20 projects @ 10 MW online 11/01
- **Customer contracts for additional 20 MW pending**
- **Energy Information System (EIS)**
 - 4 vendors selected
 - Each product evaluated in next 6 months
 - Find solution for today- dispatch off tariff
 - Find solution for market price signals in future
- **Overcome Barriers**
- **Create Scalable Enterprise**



NREL Contract

- **RealEnergy is defining and creating business transaction models across multiple market segments and locations**
- **RealEnergy is developing DER standardized technical solutions for commercial real estate**
- **DTEET and Silicon Energy are developing the next generation DER web based management and control technology**
- **The NREL contract will contribute to the development and evaluation of the technology and business models necessary to implement its deployment**



Portfolio Energy Management Services

- **Several web based applications form the foundation of RealEnergy's energy information service**
- **RealEnergy uses these technologies to perform:**
 - **Billing**
 - **Commodity purchasing data**
 - **Distributed Resources operation and control**
 - **Energy optimization information**
 - **Portfolio energy information services (energy data management)**
 - **Rate and Tariff Audit and Analysis**



NREL Contract Scope of Work

- **Define and develop business transaction models and standards**
- **Define information and communications requirements**
- **Develop command and control algorithms and code**
- **Determine interconnection/transaction requirements**
- **Test software and hardware**
- **Provide data monitoring and analysis**
- **Install DER**
- **Field test entire system and evaluate performance**



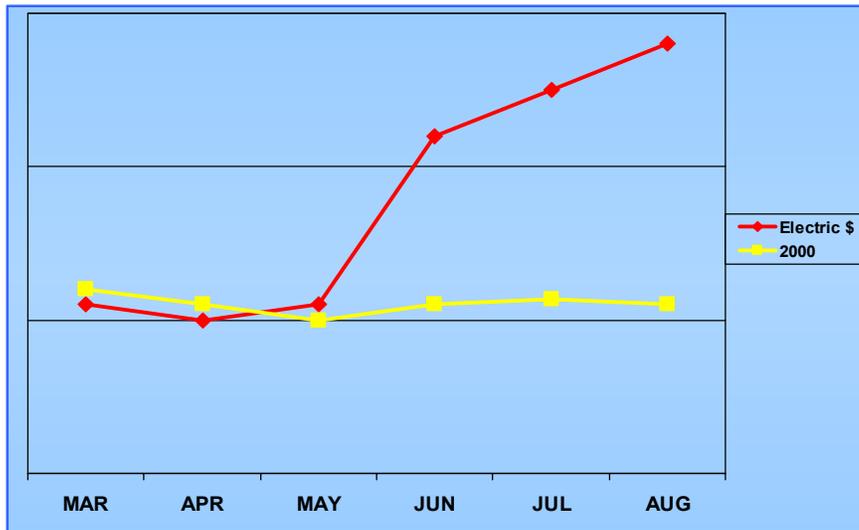
NREL Contract Schedule

- **Command and control algorithms and code expected completion by August 2001**
- **Determine interconnection requirements completion by August 2001**
- **Communications hardware analysis completion July 2001**
- **Phase I DER hardware installed July - Sep 2001**
- **Business transactional models expected completion July 2001**
- **Phase I software and hardware test expected completion by Sep 2001**
- **Phase II field test entire system and evaluate performance expected completion by January 2002**





Arden - Imperial Bank Building



- 250% increase in electrical costs over three months (June – August 2000)
- Vintage full service office tower totaling over 540,000 SF
- SDG&E electric (single 12 kv); Two 600 ton and one 165 ton chiller and towers
- Scheduled \$1.3MM HVAC retrofit 2001
- Three (3) 200kW Natural Gas Fired Internal Combustion Engines
- Heat Recovery Unit
- 180 TON absorption chiller
- Cooling Tower

CalPERS/CW & DER



The Client

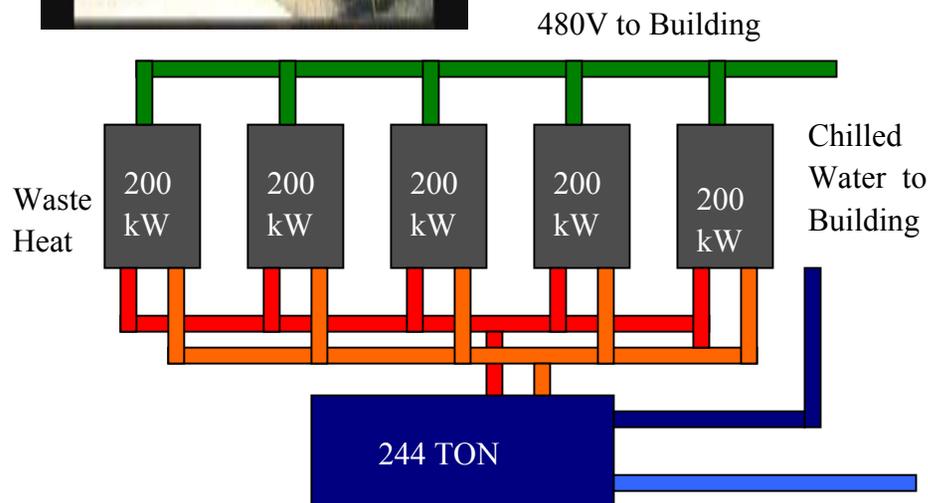
- The California Public Employees Retirement System (“CalPERS”)

The Building

- 750,000 SF, two 15-story office towers w/ 20M SF floor plates Building & systems circa 1981
- Building Served by Southern California Edison and central plant (800 Ton York/550 TON Trane)
- 1400 kW/480v/3-phase Detroit Diesel Backup Generator – Potential for partial or total elimination of this high emissions backup generator

RealEnergy System

- 1,000 kW Natural Gas Fired Internal Combustion Cogeneration System meeting all required air quality standards
- 244 TON absorption chiller
- 3,500 annual kW hours (40%)
- **Peak Demand Reduction of over 1.2 MW**
- Access Fee = \$75,000 annually



Current Prognosis

- **EIS Technology**
- **EIS technology is at the stage where PC software was in the early 1980's- fragmented**
- **Who will be the EIS Microsoft?**
- **Very little market price signal variability, most dispatch is relative to tariff structure**
- **Focus of command and control technology should be on robust hardware performance and seamless integration of simple functions**



Current Prognosis

- **Barriers**

- **Transactional barriers are huge- non-core / end use customer deployment is not commercially feasible**

 - **Gas Supply**

 - **Interconnection**

 - **Building Permits**

 - **Finance**

- **The development of business transactional standards and models is critical to the successful deployment of DER on an industry wide basis**



Conclusion

- **The NREL contract provides the opportunity for RealEnergy, DTEET, Silicon Energy and other market participants to develop and test the application of a networked enterprise wide distributed energy infrastructure**
- **DER can provide a substantial contribution in offsetting the demands of growth and technological change on the centralized generation and T&D grid.**
- **The development of integrated business systems command and control technology is critical to the successful deployment of DER on an industry wide basis**
- **The development of business transactional standards and models is critical to the successful deployment of DER on an industry wide basis**

