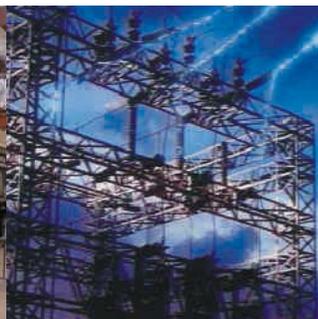


# Office of Electric Transmission and Distribution



## Fiscal Year 2005 Budget Presentation

February 2004



# Office of Electric Transmission and Distribution



## Mission

To lead a national effort to help modernize and expand America's electric delivery system to ensure a more reliable and robust electricity supply, as well as economic and national security



# Strategic Importance

“...it's clear that the power grid needs an overhaul. It needs to be modernized. As we go into an exciting new period of American history, we want the most modern electricity grid for our people... we need more investment; we need research and development...”

President George W. Bush  
September 2003



“We will work to unleash innovation and strengthen our markets to allow entrepreneurs to develop a more advanced and robust transmission system that meets growing energy demand in the years ahead.”

Energy Secretary Spencer Abraham  
May 2002



## August 14th Blackout

### *By-The-Numbers*

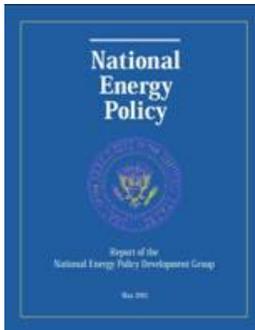
- 1 Canadian Province
- 3 deaths
- 8 U.S. states
- 12 airports closed
- 23 cases of looting in Ottawa
- 250+ power plants
- 9,266 square miles
- 61,800 MW of power lost
- 1.5 million Cleveland residents without water
- 50 million people
- \$4.5-12 billion in economic activity lost



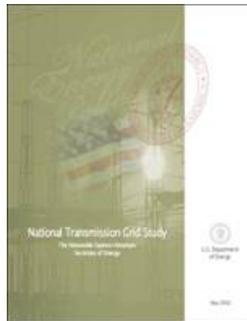
# Leadership from all Levels

**“...It is a plan to modernize our electricity delivery system. It is a plan which is needed now. It is needed for economic security. It is needed for national security...”**

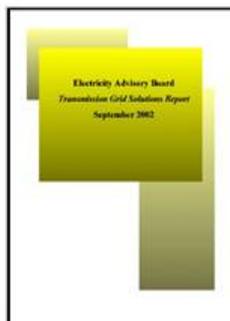
George W. Bush February 6, 2003



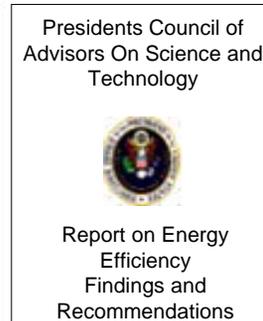
May 2001



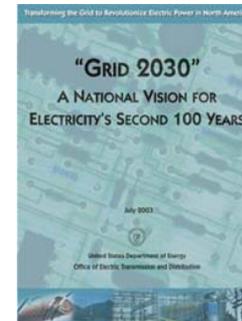
May 2002



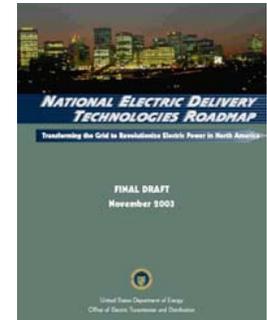
Sept 2002



April 2003



July 2003



Jan 2004

**“When the lights go out, modern life as we know it grinds to a sudden halt. Transportation is interrupted, communications fail, water systems shut down, factory work is disrupted, food spoils, businesses lose money, and people are inconvenienced and even endangered. ”**

Spencer Abraham, September 3, 2003

# Fiscal Year 2005 – “Snapshot”



- **12% increase to programs to increase reliability compared to fiscal year 2004 appropriations**
- **2 new programs as Presidential Initiatives**
  - **“GridWise” – Distribution Reliability Programs**
  - **“GridWorks” – Transmission Reliability Programs**

# Fiscal Year 2005 Funding Profile



(\$000)

Activity	FY02	FY03	FY04	FY05 Req.
Superconductivity	31,991	38,801	34,129	45,000
Transmission Reliability	18,257	21,576	11,760	10,720
Electric Distribution	10,791	11,072	14,563	5,459
Energy Storage	9,098	8,990	9,015	4,000
Electricity Restructuring	2,840	4,816	6,925*	5,000
GridWise	-	-	-	5,000
GridWorks	-	-	-	5,500
Exports	-	-	-	1,201
Construction	-	-	736	-
Program Direction	-	3,129	3,690	9,000
<b>Totals</b>	<b>72,977</b>	<b>88,384</b>	<b>80,818</b>	<b>90,880</b>

**Congressionally Directed**

FY02 – 23,750  
 FY03 – 30,437  
 FY04 – 25,750

\* Includes 4,905  
 for blackout  
 studies

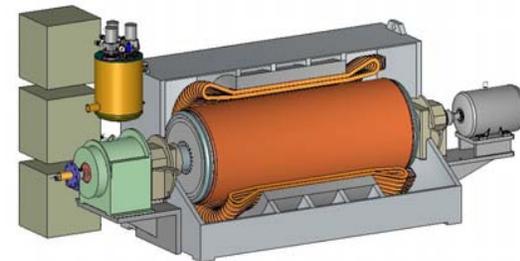
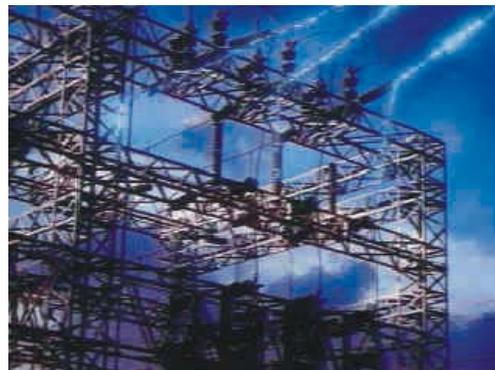
# "GridWorks"

*Accelerating market acceptance  
from the lab to field testing and  
operations*



Funding Request: \$5.5 million

Thrusts	Why Act Now
Advanced conductors	Quicker, cheaper way to increase capacity with no new rights-of-way
Substations and auxiliary equipment	Accomplish stock turnover with more secure, modular equipment
Grid monitoring and controls	Better reliability through accelerated field testing and deployment
Power electronics (advanced materials)	Will revolutionize power quality/reliability



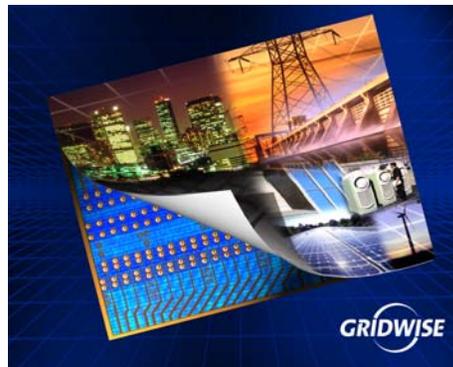


# *Communication and control for a modernized transmission and distribution system*

## "GridWise"

Funding Request: \$5 million

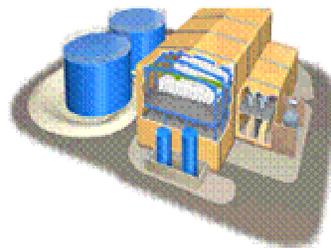
Thrusts	Why Act Now
Reference system architecture and standards	Converge national standards for Grid 2030
Low-cost, modular interconnection devices	Allow plug-and-play interconnectivity
Distributed intelligence and control	Forecast power failures and provide self-corrections
Virtual utility integration demonstration	Enable distributed energy and customer loads to participate in an integrated electric/market operation



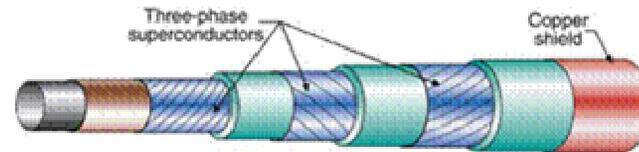
# OETD RD&D Portfolio



**Advanced Conductors**



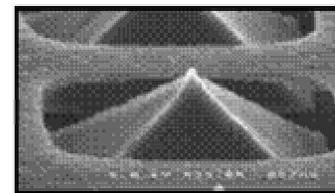
**Novel storage concept**



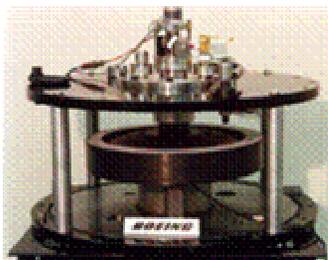
**HTS tape to HTS cable**



**“Grid-friendly” Appliance**



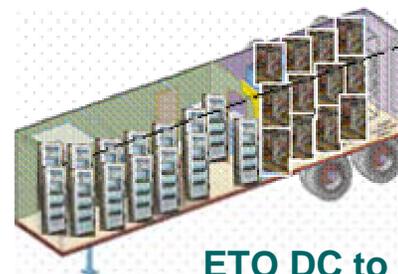
**Diamond Sensor**



**2kWh Superconductor Flywheel Demonstrator**

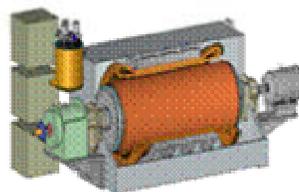


**Superconducting Substation**

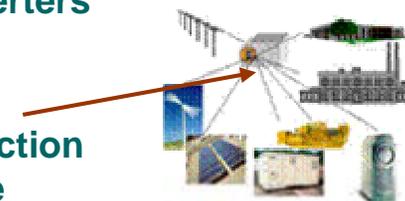


**ETO DC to AC inverters**

**Supervar System**



**Interconnection Device**





# Supporting Materials

# State of the Union - 2004



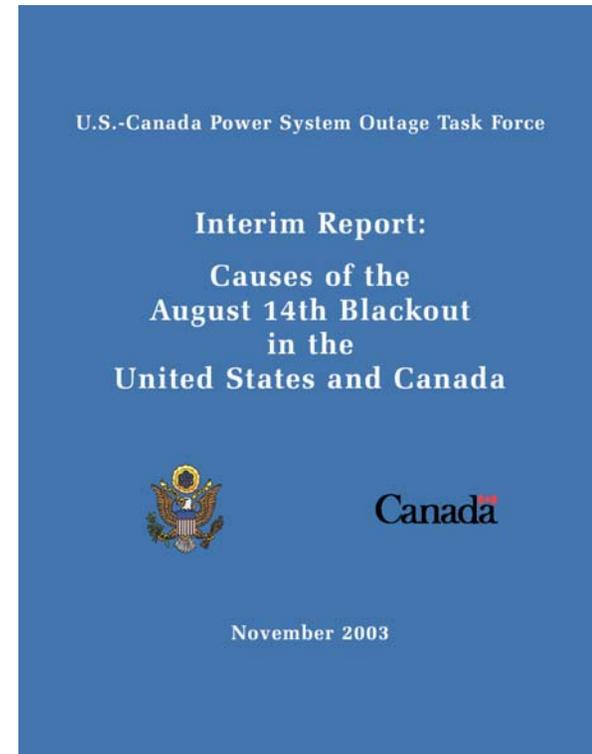
“Consumers and businesses need reliable supplies of energy to make our economy run -- so I urge you to pass legislation to modernize our electricity system, promote conservation, and make America less dependent on foreign sources of energy”.



# U.S.-Canada Power System Outage Task Force



- **Interim Report released November 18, 2003**
- **Final Report to be released in early March 2004**
- **Recommendation Types:**
  - **Technical**
  - **Policy**





# Superconductivity

## *Accelerating HTS second generation wire development*

### Thrusts

Co-invest with DOD wire production

Focus on cryogenic and other enabling equipment

Relieve major congestion areas through HTS cable projects

Work with industry, labs, and universities

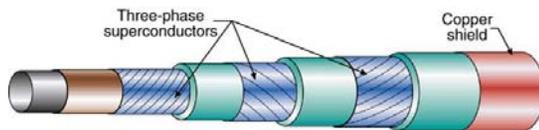
### Why Act Now

Dual use with partnership applications

Gets industry ready to adopt systems sooner

Improves market on real bottlenecks

Faster technology development and transfer



From HTS tape to HTS cable...



... to Superconducting Substation...



... to the National Backbone

# Transmission Reliability

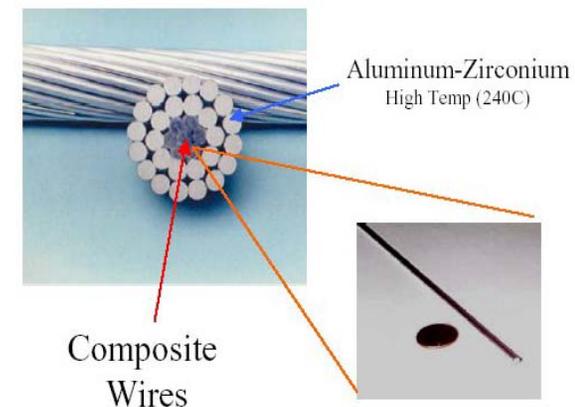


## Strategic Goal

- Develop technologies and technically-based policy options to enhance the reliability and economic efficiency of the Nation's electric power delivery system under competitive electricity markets

## Areas of Activity

- Real Time Grid Reliability Management
- Reliability and Markets
- Load as a Resource
- Reliability Technology Issues and Needs Assessment
- National Transmission Test Center
- Advanced Conductors

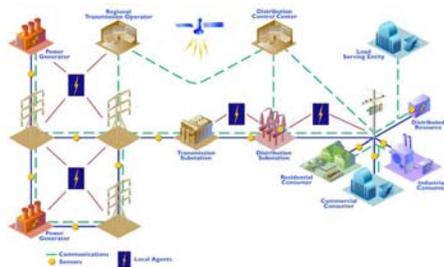


# Electric Distribution Transformation



## Strategic Goals

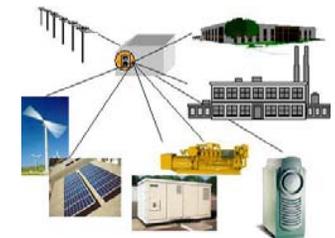
- **Create reference distribution system architecture and associated standards to enable integration with electric market operations**
- **Achieve viable business models for distributed energy resources**
- **Develop advanced modular interconnection technologies that allow plug-and-play interconnection of distributed energy equipment**
- **Achieve an overall interconnection cost reduction of 30%**



Distributed Sensing, Intelligence, & Control Technologies



Distribution Systems

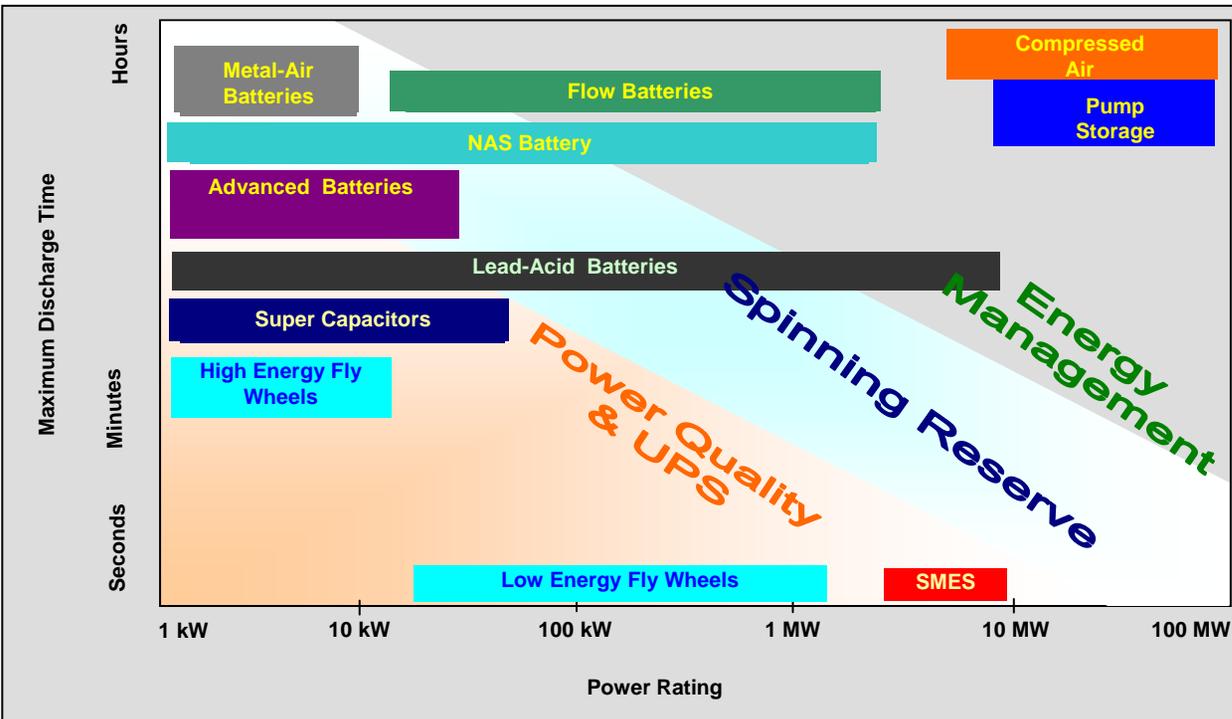


Interconnection of Distributed Generation

# Energy Storage

## Strategic Goal

Develop advanced electricity storage technologies, in partnership with industry, for modernizing and expanding the electric supply. This will improve the quality, reliability, flexibility and cost effectiveness of the existing system.



6 MW / 8hrs Sodium-Sulfur at Ohito



20 MW / 14 MWhr Puerto Rico

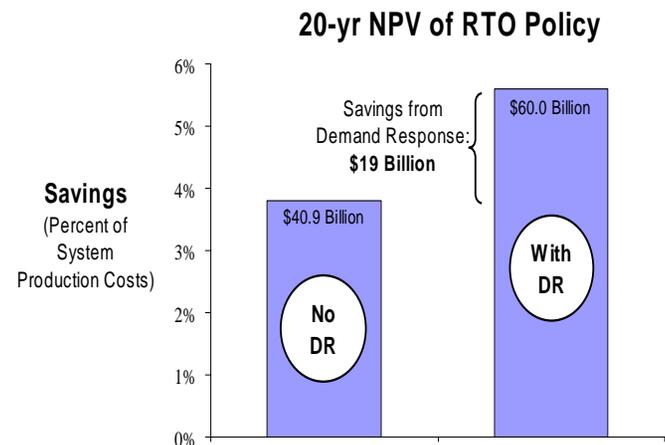
# Electric Restructuring

## (Markets Analysis and Technical Assistance)



### Strategic Goals

- Enactment of state/regional policies, market mechanisms and programs that facilitate competitive, reliable, clean, and customer-friendly electric markets
- Analysis of electricity policy mechanisms and identification of congested grid corridors



# Electricity and the Economy



“If the energy structure of this country is inadequate or in some way excessively costly, it will undermine economic growth, and is therefore a major issue that must be addressed.”



**Alan Greenspan**  
**Chairman, Federal Reserve Board**  
**January 25, 2001**