



Energy Utilization

RD&D to Benefit Society

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Together...Shaping the Future of Electricity

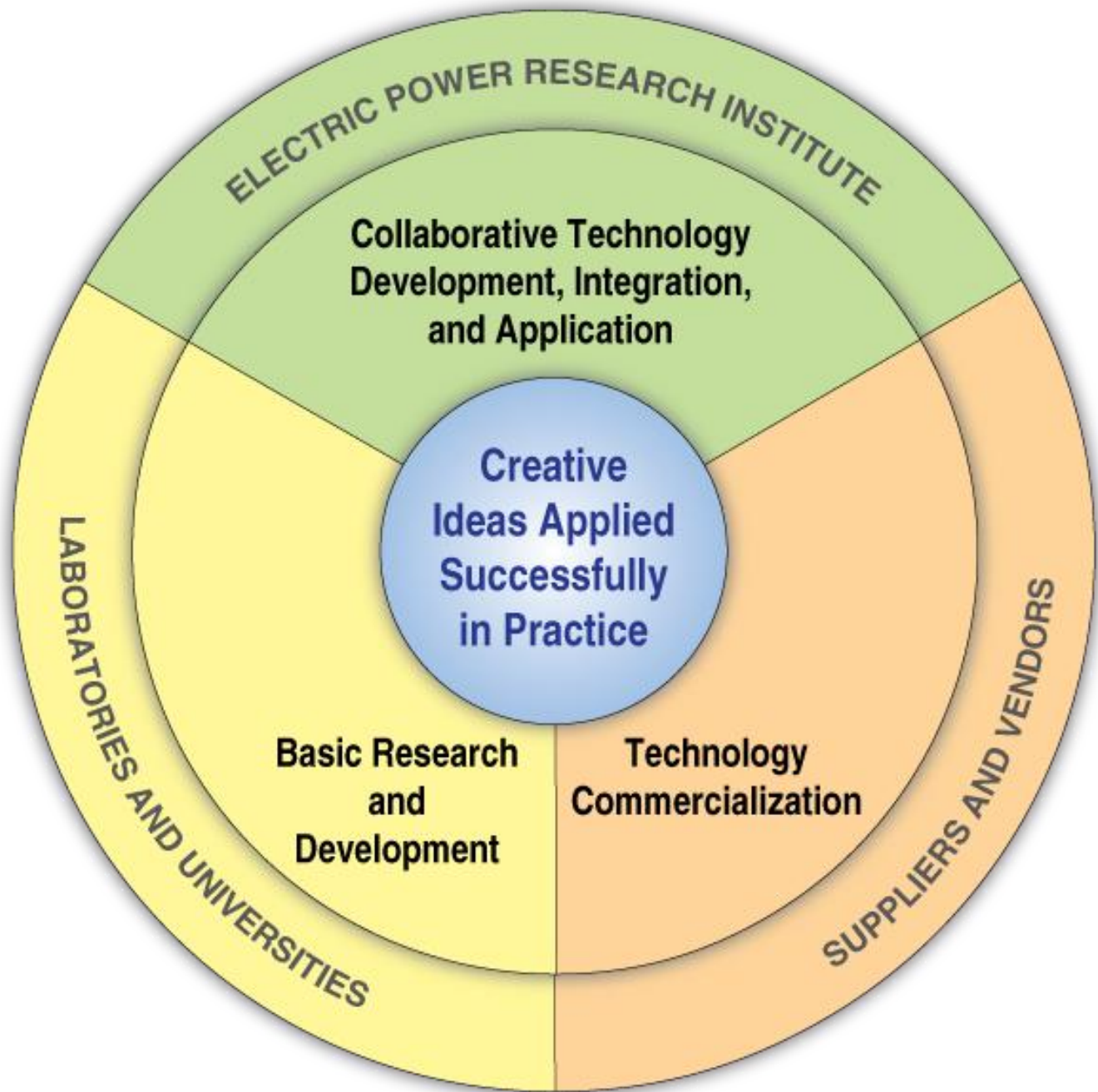
EPRI's Mission

To conduct research, development and demonstration on key issues facing the electricity sector on behalf of our members, energy stakeholders, and society



EPRI's Role

Stimulate innovation and help accelerate technology to commercial development



Research Areas

Power Delivery and Utilization

- Transmission and Substations
- Grid Operations and Planning
- Distribution
- Energy Utilization
- Cross-Cutting Technologies

Nuclear

- Advanced Nuclear Technology
- Chemistry, Low-Level Waste, and Radiation Management
- Equipment Reliability
- Fuel Reliability
- Long-Term Operations
- Materials Degradation/Aging
- Nondestructive Evaluation and Material Characterization
- Risk and Safety Management
- Used Fuel and High-level Waste Management

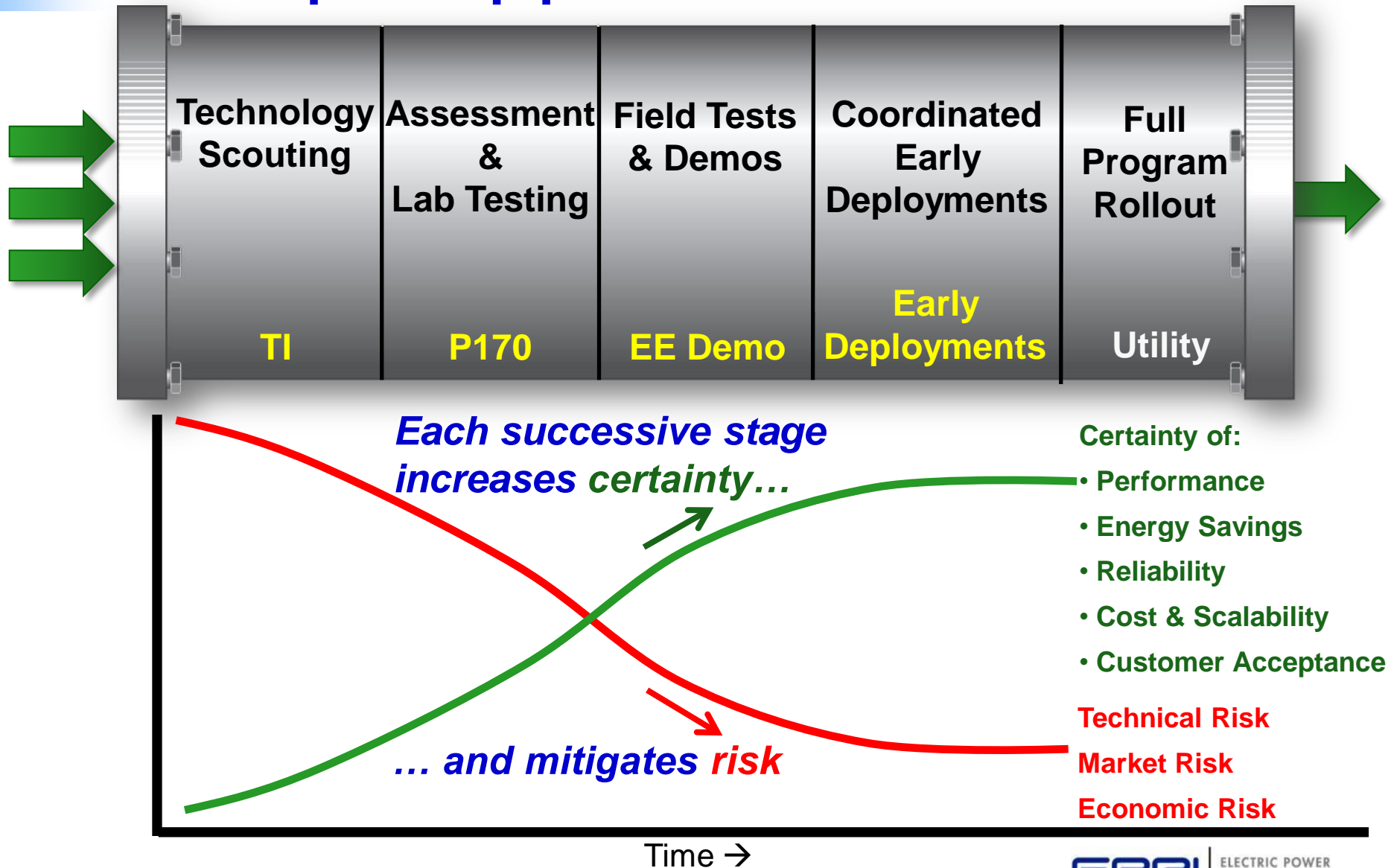
Generation

- Advanced Coal Plants, Carbon Capture and Storage
- Combustion Turbines
- Environmental Controls
- Major Component Reliability
- Materials and Chemistry
- Operations and Maintenance
- Power Plant Water Management

Environment & Renewables

- Air Quality
- Energy and Environmental Analysis
- Land and Groundwater
- Occupational Health and Safety
- Renewable Energy
- T&D Environmental Issues
- Water and Ecosystems

EPRI is advancing EE & DR technology through the development pipeline



Sampling of End Use Technologies Under EPRI Evaluation – Current Snapshot

Technology Scouting

Thin Film Electrochromic Windows



Phase-Change Wallboard Materials



Wireless Lighting



Non-intrusive load monitoring



Low torque, high speed motors



Micro-scale DR Aggregation



Next generation Heat Pump Water Heater (Res)



Assessment & Lab Testing

Variable Speed Circulation Pumps



Eco-cute Heat Pumps



Process Heating Electrotechnologies



Efficient, DR-Ready Products



Plasma Lighting



Desiccant Dehumidification



Dimmable CFLs and LEDs



Virtual Audits



R&D Field Tests/Demos

Integrated Whole Building



Variable Capacity Space Conditioning



HPWH Commercial



Voltage Optimization



Controllable High Bay Lighting



Data Centers Immersion Technology



Evaporative Pre-Cool for Rooftop Air Conditioning



Automated DR and Energy Management



Early Deployments

Data Center Dynamic Power Management and Efficient Power Supplies



Data Center Airflow Management



Data Center DC Power



VRF Heat Pumps

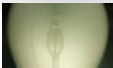


Heat Pump Water Heaters



Program Rollout

2X Incandescent



LED Street and Area Lighting



High Efficiency Refrigerators



Addressing Key Industry Challenges

Advance Emerging EE & DR Technologies



Coordinate Cross-Functional DR Research



EPRI

Rejuvenate Load Research



Enhance Productivity via Electrification



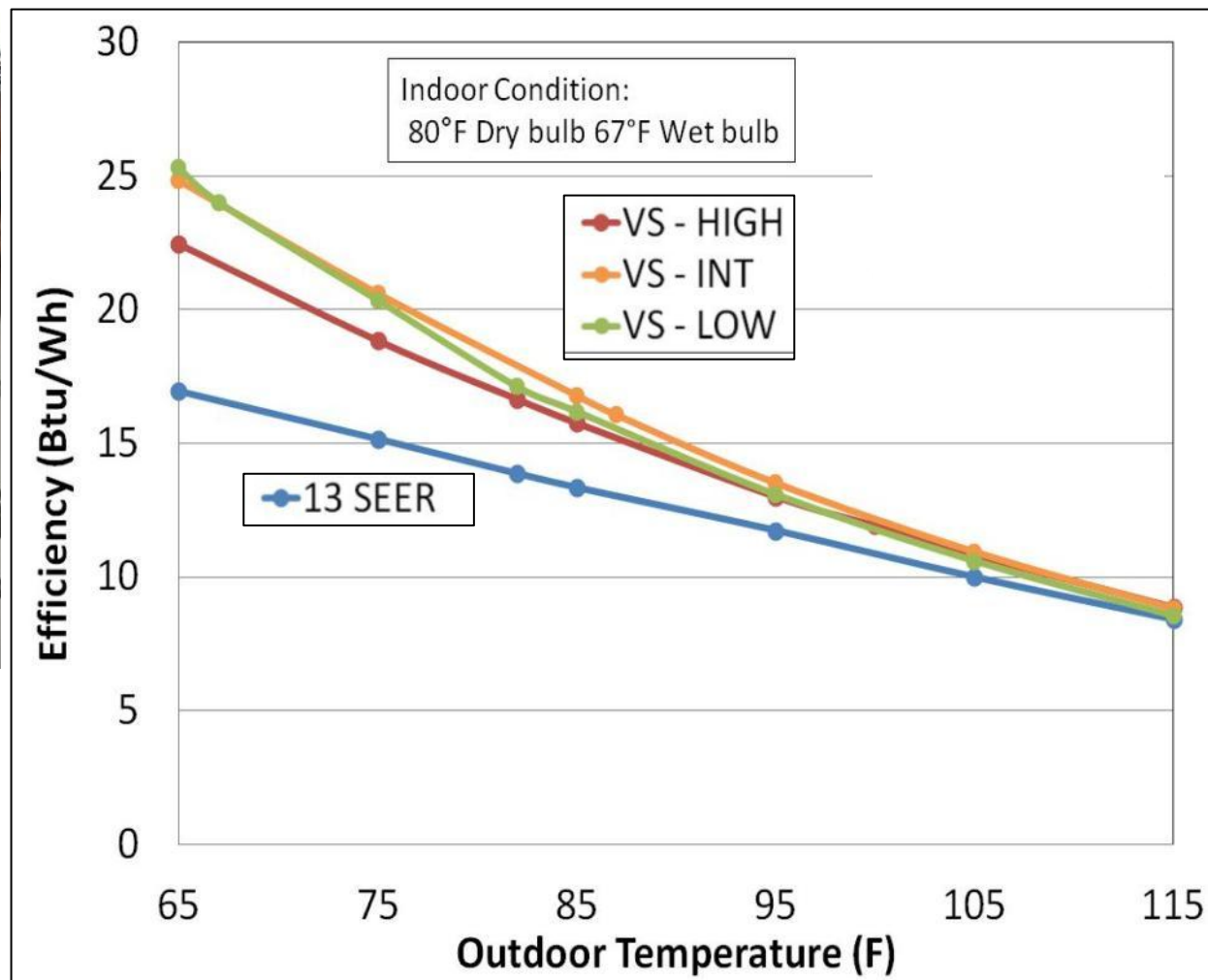
Variable-Capacity Space Conditioning

Lab Analysis of Performance










Lab Test of 2-ton Air Source Heat Pumps

- Single Speed 13 SEER
- Variable Capacity 19.5 SEER



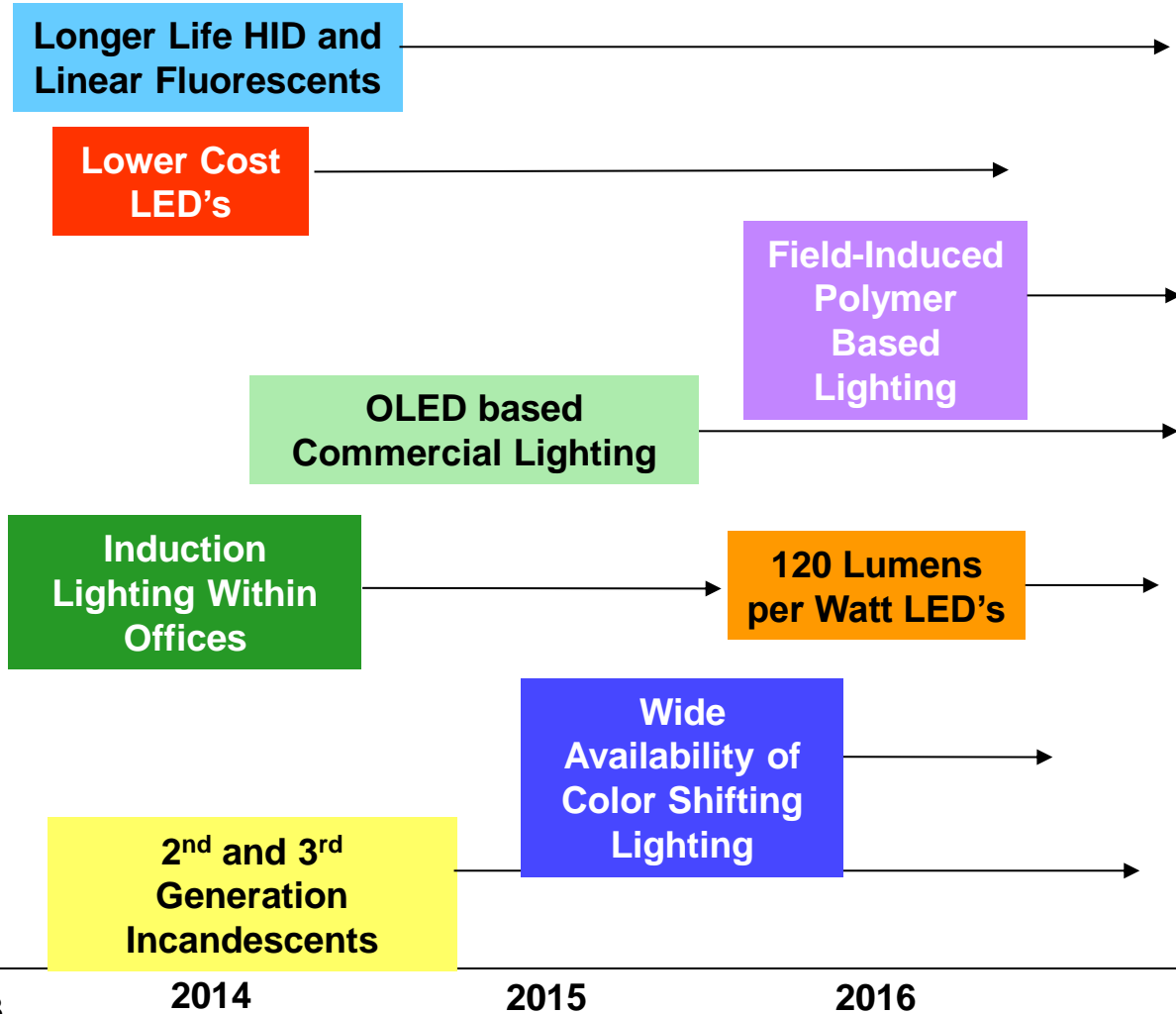
Variable Capacity Heat Pumps Yield Greater Efficiency and Energy Savings at Most Ambient Temperatures

Advanced Lighting Technologies

2013 Research		
Residential		LED Screw-In
Res & Com Specialized		Ceiling Mount LED
Office		Edge-Lit Office LED
Manufacturing / Assembly		LED Troffer
Warehouse / High Bay		High Bay LED
Unique Technology		Liquid-Cooled LED
Unique Technology		Backlighting LED

2013

Next 3 Years of Progressive Research

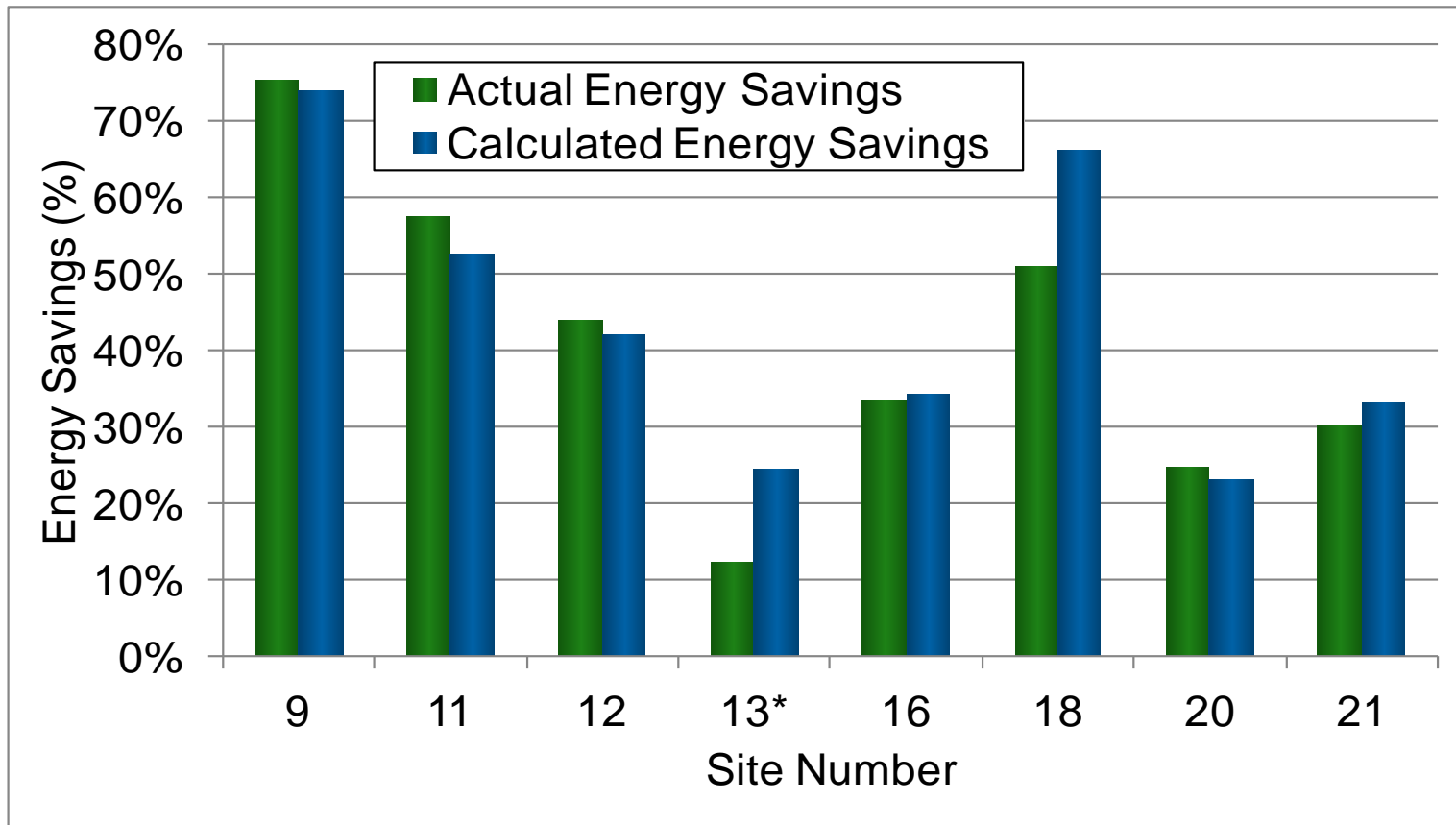


2014

2015

2016

LED – Energy Savings of 25 – 70 %



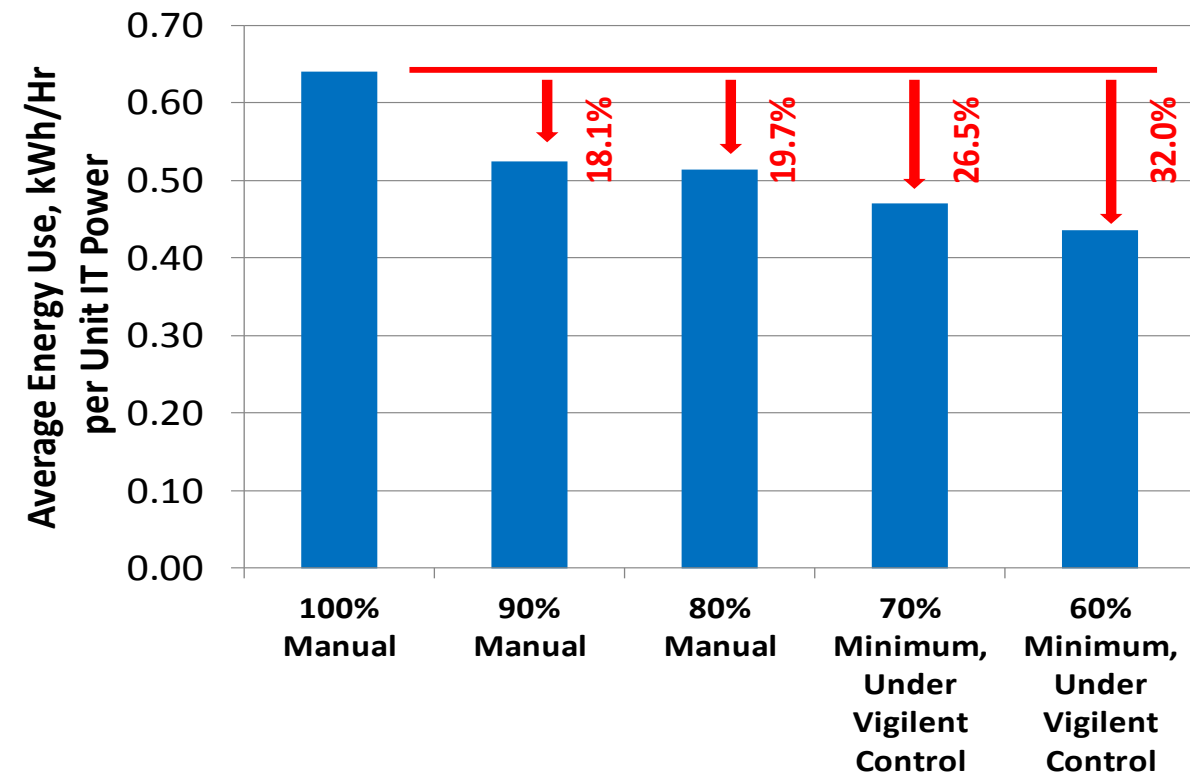
**Ready for Early
Deployment?**

☒ **Yes**

☐ **No**

*Site 13 uses estimated usage values for actual energy savings. The other sites use an initial measurement from the first site visit.

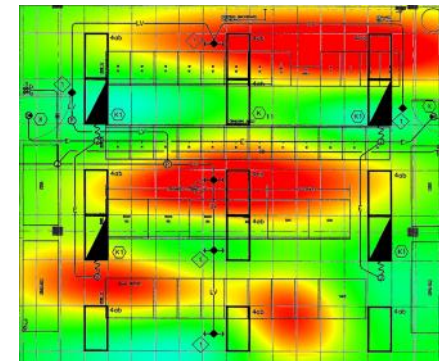
Efficient Data Centers – 2012 Test Result



Total Data Center Cooling Energy Use versus Fan Speed per Unit of Computing Power

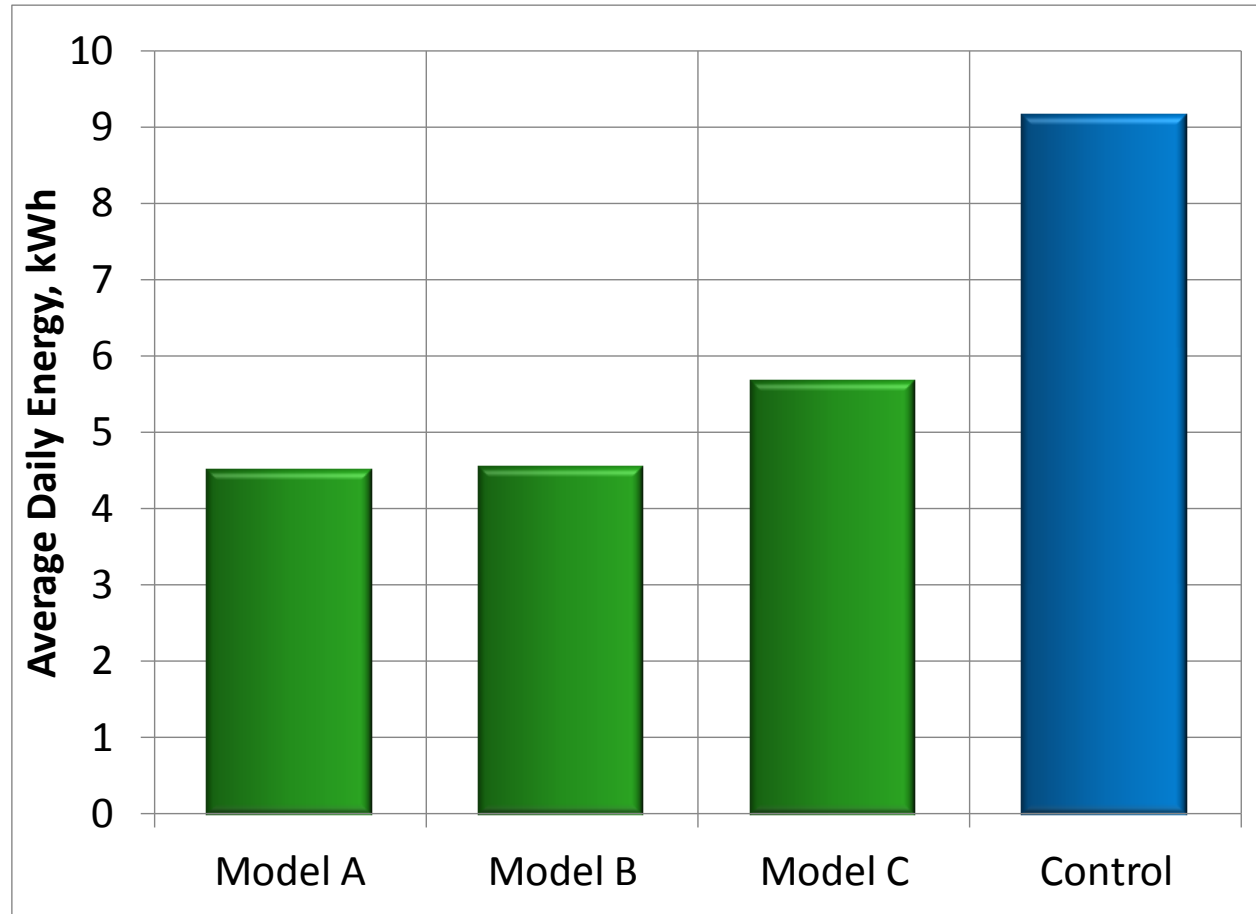
Results

- Significant energy savings in data center cooling with variable-speed fans
- As expected, compressor power reduces with reduced fan speed
- Temperature control mapping and automated control compounds energy savings



Residential Heat Pump Water Heaters

– Energy Savings of 50% for 2 Models



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☐ **No**

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