



# 2010 Smart Grid Peer Review

November 2-4, 2010



## **Demonstration of a Coordinated and Integrated System: Fort Collins RDSI/FortZED Jump Start**

**Dennis Sumner  
City of Fort Collins**

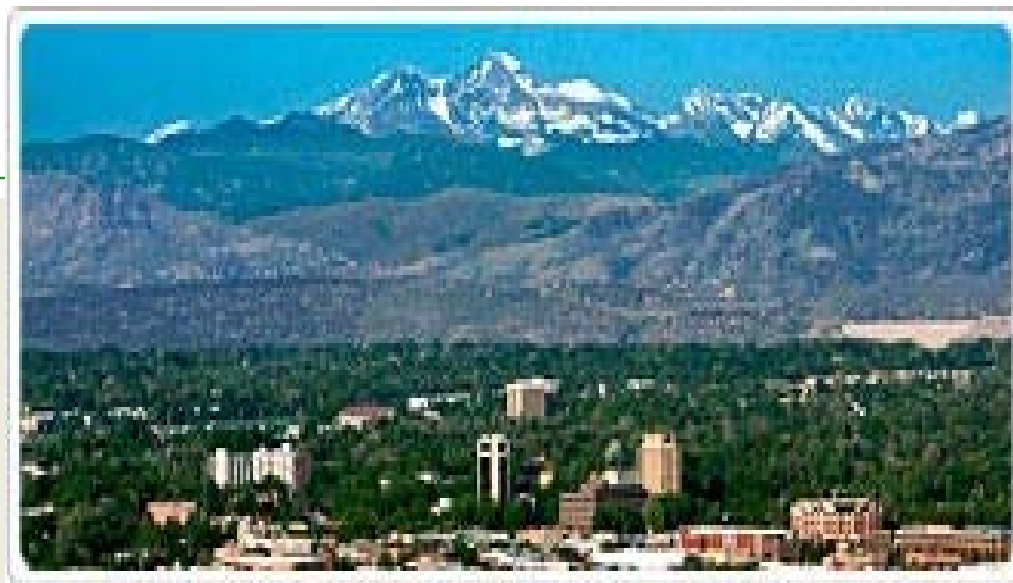
**U.S Department of Energy Smart Grid Program Peer Review  
Golden, CO, November 2-4, 2010**

# Presentation Outline

## Fort Collins, CO

### Report Topics:

- **Project Relevance**
- **Approach & Project Management**
- **Technical Accomplishments, Quality and Productivity**
- **Technological Transfer, Collaborations and Partnerships**



# Fort Collins, CO

- Population: 131,000
- 53 square miles
- Median age 29.4 yrs.
- 48.2% 4+ yrs. of college
- Median Income: \$68,200
- High Tech employers:
  - *HP, Intel, LSI, Avago, AMD, Agilent*
- Clean Energy employers:
  - *Woodward, Advanced Energy, Spirae, Solix*



# Fort Collins Electric Utility



- 62,000 homes and businesses
- 99+% underground system
- Aggressive energy conservation
- Electric Energy Supply Policy goals:
  - *reduced energy bills*
  - *delayed investment in new generation*
  - *cleaner air and reduced global warming potential*
  - *continued high reliability and competitive rates*

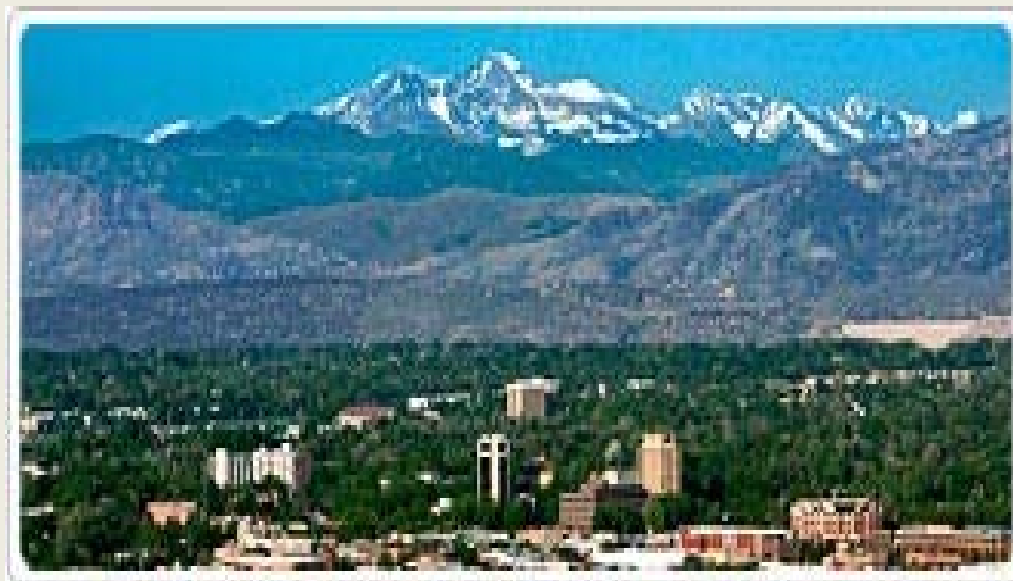


# Presentation Outline



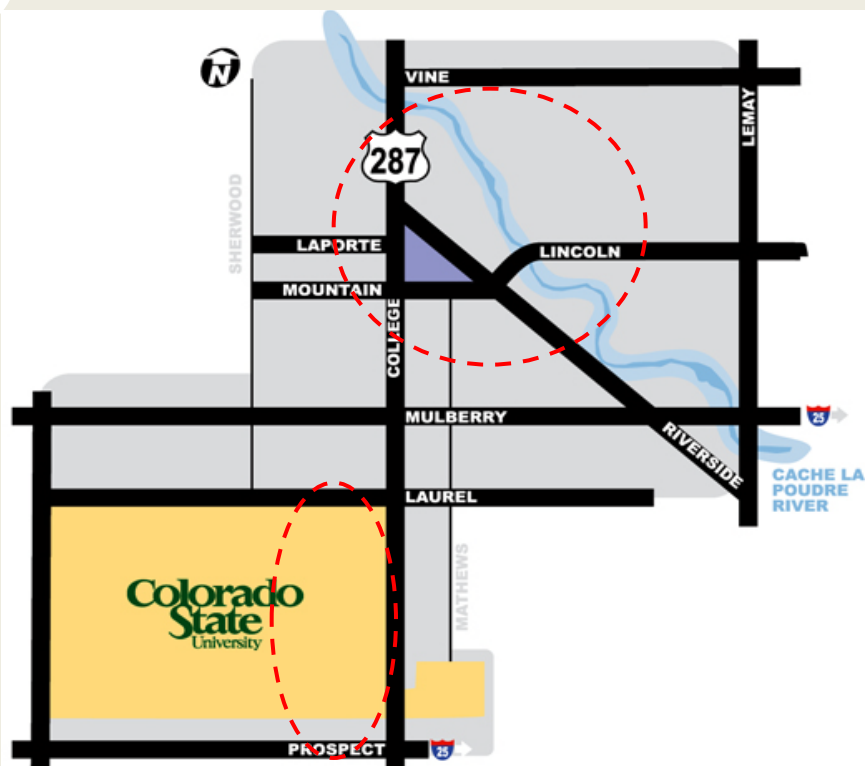
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# Fort Collins RDSI at a Glance

- Two feeders that feed downtown Fort Collins and the CSU campus
- Almost 5 MW of load reduction capability from a variety of asset types
  - load reduction
  - conventional generation
  - renewable energy
- Diverse partner organizations
  - industrial,
  - commercial
  - service sector



# RDSI Project Relevance



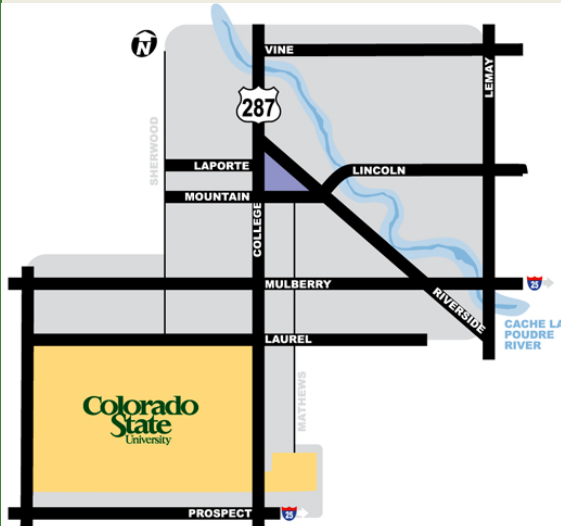
- Targeted Peak(S) Reduction
  - Circuit- distribution level resource
  - System - G&T level resources

## Benefits:

- Modernize electric grid
- Enhanced integration of distributed resources
- System stability and security
- Improved system robustness
- Reduced demand on system and bill savings



# FortZED – Zero Energy District



**A ZERO ENERGY DISTRICT is one that creates as much energy locally as it uses.**

**FortZED** represents 10% - 15% of FCU's system in terms of energy consumption, peak demand, and number of customers.

Class	# of Customers	Energy Consumption (KWh)	Peak Demand (kW)
Residential	5,903	38,969,441	20,962
Small Commercial (<50 KW)	1,264	42,216,865	
Commercial (>50 KW)	88	54,389,657	6,609
Comm/Ind (>750 KW)	2	100,482,920	18,059
<b>TOTAL</b>	<b>7,257</b>	<b>236,058,883</b>	<b>45,630</b>



# Fort Collins RDSI – Project Partners



Project Lead	
City of Fort Collins	Prime Contractor
Fort Collins Utilities	Utility Company
Demo Sites	
Resource	
City of Fort Collins	DG, DSM, PHEV, and Thermal Storage
New Belgium Brewing	Solar PV, DG, and DSM
Colorado State University Facilities	DG, DSM, and Thermal Storage
Larimer County	Solar PV and DSM
InteGrid	Fuel Cell, MicroTurbine, Conventional DG, Wind Sim, SC/SLC and others



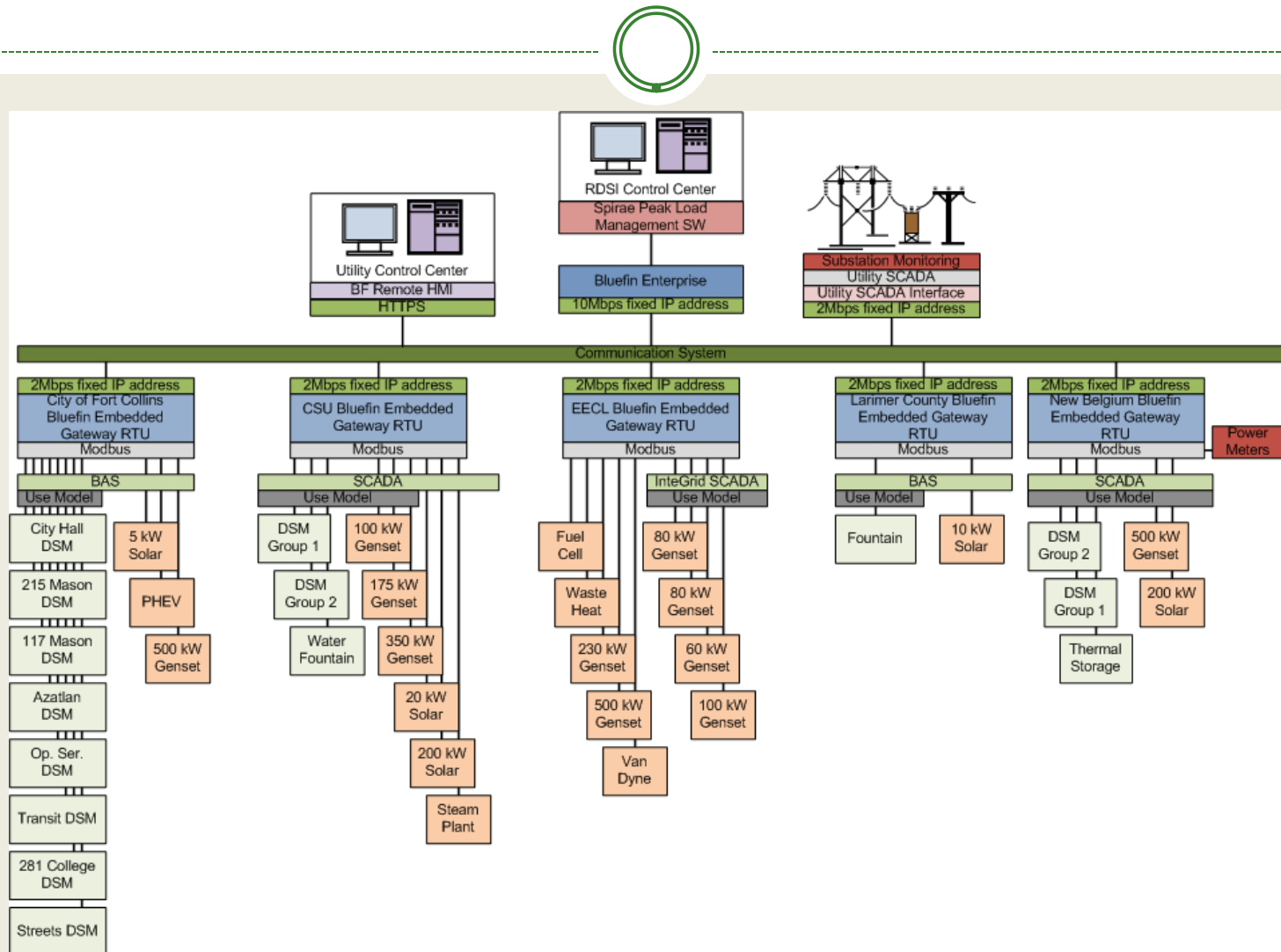
# Fort Collins RDSI – Project Partners



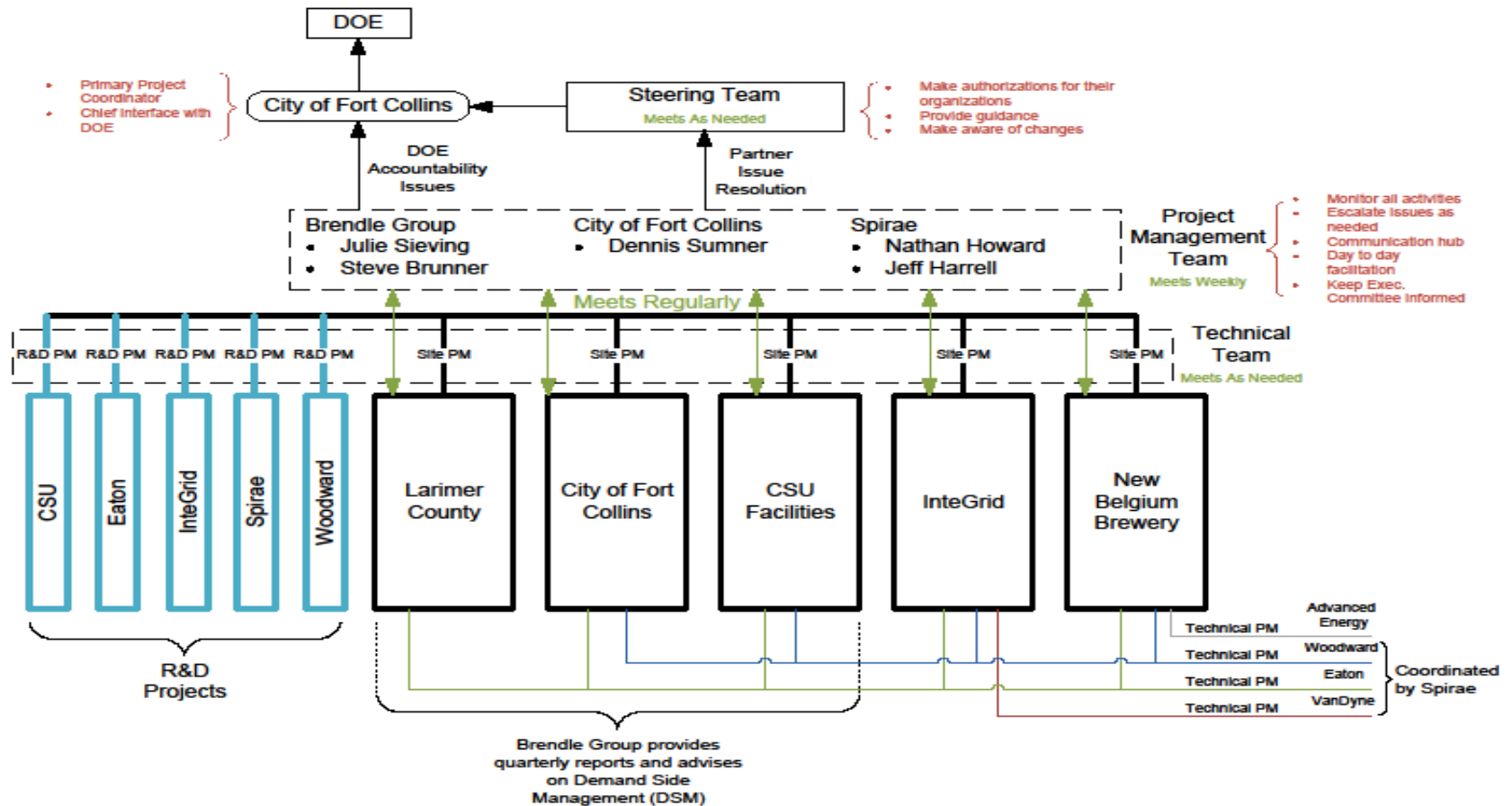
Tech Partner	Contribution
Spirae	Smart Grid Platform – DER/Power Management System
Brendle Group	Demand Side Management and Program Development
Colorado State University	Robust Controls and PHEV R&D
Advanced Energy	Photovoltaic Inverter
Woodward Governor	Power Management and Mixed Fuel R&D
Eaton	Switchgear/Power Components and Small Generator Switchgear R&D
VanDyne Super Turbo	Diesel Gensets for added project Power
InteGrid	Platform for Controls R&D, DER Integration and Simulation



# Fort Collins RDSI – System Overview



# Project Management Structure



# Project Management at Work



## Barriers, Risk, Mitigation, and General Coping Skills

- Evolving asset mix
- Impacts from economic downturn
- Utility requirements and standards
- Strong project acceptance and support!



# Achievements to Date



## Highlights

- Distribution system in demonstration configuration
- Baseline feeder data collection implemented
- Communications and control architecture has been deployed
- Majority of all assets are in place and operational
- Control strategies have been defined and agreed to by partners
- Fort Collins RDSI story being shared with community and beyond
- January 3, 2011 - Project Kick-off with Governor Ritter

# Technology Transfer



- Technology provided by Woodward and Eaton have enabled integration of existing back up generation resources at multiple partner sites
- Research at EECL has enabled the inclusion of emerging technologies like PEVs and Fuel Cells as well as the evaluation of advanced control strategies
- The core control solution provided by Spiraе enables a diverse array of assets to be leveraged to achieve the project goals
- The analysis and outreach provided by the Brendle group will enables the outcomes and lessons learned from the project to be clearly communicated



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**Questions and Answers**

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