Smarter Grid, Smart Planning

DistribuTECH 2014
Siemens Power Technologies International
## Siemens PTI
### Our Portfolio

#### PTI Consulting
- T&D system planning
- System dynamics and disturbance analysis
- Generator and load interconnections
- Insulation coordination and transients
- Energy markets, regulation, and rate impact
- NERC compliance
- Market Analytics
- Smart Grid, communications planning and microgrid

... full range of consulting competences

#### Software Solutions
- PSS®E
- PSS®SINCAL
- PSS®ODMS
- PSS®MUST
- MOD®

... transmission system planning
... utility and industry system planning
... enterprise data integration and management
... power transfer capability analysis
... centralized planning projects coordination

#### Siemens Power Academy TD
- Standard training courses
- Customized training courses
- University accreditation

... meeting your needs
Siemens PTI – Power System Consulting

Background

Siemens PTI Consulting provides power system analysis and planning insight that enables our clients to make technical and economic business decisions regarding the performance, operation, and expansion of their systems.

- Founded in 1969
- 40+ Power Engineering Consultants
- Consultants average over 20 years of power system experience
- Majority have advanced engineering degrees
- Offices in: Schenectady, New York; Houston, Texas; Mountain View, California; Denver, Colorado; Minneapolis, Minnesota; Burlington, Ontario
- Siemens PTI has conducted consulting business in over 125 Countries
- Served 1,200+ Customers: Electric Utilities, RTOs/ISOs, Power Generators, Power Marketers, Manufacturers, Government Agencies, Industrial Customers and Architect Engineers
“Do you have any reliability concerns?”

“Are you looking for an alternative peak demand solution?”

“Do you want to optimize system configuration?”

“Are you interested in improving energy efficiency?”

“Are you concerned about profitability?”

“Do you need help on adoption of new technologies?”
How Siemens PTI Helps Answer Your Distribution Automation Questions

What does Siemens PTI do for you?

Power System Consulting:
• Distribution planning and optimization
• Steady state analysis
• Protection coordination
• Energy efficiency analysis (losses)
• Optimized control
• Techno – economic evaluation
• Knowledge of SG applications

Siemens Smart Grid Applications
• CVR
• IVVC/CVVC
• SDFA - FDIR/FLISR
Siemens PTI – Power System Consulting
Demand Response

“Are you looking for alternative peak demand solution?”

“Expensive investment plan to address future peak demand?”

“Do you have any demand response programs in place?”

“Which DR program should I implement?”

“Are you concerned about profitability?”

“Will my DR program still be effective in 10 years time?”
How Siemens PTI Helps Answer Your
Demand Response Questions

What does Siemens PTI do for you?

Power System Consulting:

- Short to long term peak load analysis and classification
- Technical evaluation of alternative solutions
- Demand Response strategic planning
- Economic evaluation (cost/benefit)
- Demand Response program assessment

Siemens Smart Grid Applications

- Wide area DR
- DRMS 2.0 – Surgical DR
“What are the positive (and negative) impacts of DG on the overall T&D system?”

“What is the best reactive power control methodology?”

“What is the most DG a feeder can take?”

“Does the DG meet the interconnection standards i.e. IEEE 1547?”

“How to plan for large amounts of intermittent DG infeed to feeders designed to serve loads only?”

“How to calculate the total economic benefits of DG?”

“Can energy storage provide a solution?”
How Siemens PTI Helps Answer Your Renewable Integration Questions

What does Siemens PTI do for you?

Power System Consulting:

• Technical and economical studies for the T&D system:
  • Perform time series steady state analysis, short circuit, protection coordination, transient stability, harmonics, grounding and EMT studies
  • Perform analysis on actual or standardized set of feeder topologies
  • Analysis of entire region DG development strategies
  • Problem identification and solutions for existing DG installations (PQ, Dynamics)
  • DER Consulting – Business strategy for utilities

Siemens Smart Grid Applications

• Decentralized Energy Management System (DEMS)
• Virtual Power Plan (VPP)
“What are the economic and reliability benefits of a microgrid?”

“What capacities and location of DG and energy storage are the most optimal?”

“How can we optimize dispatch of controllable DG and energy storage considering intermittent DG?”

“How do we ensure success switching from grid to island operation maintaining frequency and voltage?”

“Does the microgrid design comply with the latest standards?”

“How can we coordinate the protection schemes, no longer simple over current?”
What does Siemens PTI do for you?

Power System Consulting:

- Perform time series steady state analysis accounting for intermittent DG and load profiles
- Ensure successful switching from grid to island operation by performing protection coordination and transient stability studies
- Generate detailed cost vs. benefit analysis over a given period accounting for: installed equipment costs (with Siemens product knowledge), O&M, DR, subsidies and CHP savings and reliability improvements
- Analysis of entire region microgrid deployment strategies
“Do you want to optimize the communication system configuration?”

“Worried about…?”
- Response time & reliability
- Coverage & spectrum
- Interoperability & protocols

“How to ensure power system design satisfies SG requirements while still meeting budgetary & headcount constraints?”

“How to map business & operational objectives into power system requirements?”

“How to share common power systems for multiple applications without sacrificing performance?”

“How to calculate the total economic benefits of my communication deployment?”
How Siemens PTI Helps Answer Your 
*Communication* Questions

What does Siemens PTI do for you?

**Communications:**
Siemens is the only company among utility consultants and telecom vendors who has the tools and expertise to make sure you get your planning right the first time, and protect your investment.

Siemens performs advanced simulation and modeling that unlocks the following benefits:
- Minimizes risk and guesswork
- Maximizes cost savings and asset maximization
- Advanced simulation technology to justify all recommendations
- Telecom Model is reusable

**Siemens Smart Grid Applications**
- Substation Automation
- Distribution Automation
- Smart Metering
- SG – CAT Tool

© Siemens AG 2014 All Rights Reserved.
Smart Grid Compass Roadmap

How Do We Support You on the Path to a Smarter Grid?

With a proven 3-step method:

**Orientation**
- Where is North?
  - Getting oriented in the world of smart power grids
  - Exploiting Siemens’ global experience to improve the “future grid” vision

**Destination**
- Where do you want to go?
  - Growing the “future grid” vision
  - Using the vision to derive the structure for a value improvement program

**Routing**
- How do you get there?
  - Completing the value improvement program based on the existing structure
  - Generating a quantitative business case to facilitate decision-making

A proven approach to help your vision become reality
Smart Grid Compass
*We Have the Answers to Your Questions*

“Where do we start from?”

“Where is our investment focus?”

“What technologies do we need?”

“With what strategy?”

“What steps do we take?”

“How can we measure our success?”
Navigate your Smart Grid
Smart Grid Compass

What is the Siemens Smart Grid Compass?

A tried-and-tested approach for building and expanding your Smart Grid

- Smart network operation
- Smart customer service
- Smart asset and work management
- Smart energy

A comprehensive examination – step-by-step improvement
Siemens PTI – Software Solutions

PSS® Product Suite

Description

Comprehensive software analytical tools for transmission and distribution power system planning and data management.

Products

- PSS®E - transmission power system planning
- MOD® - project modeling and data management for PSS®E
- PSS®MUST - transmission transfer capability calculation
- PSS®ODMS - CIM-based model management and analysis for operations and planning
- PSS®SINCAL - utility and industry network planning
- PSS®NETOMAC - dynamic system analysis
- SIGUARD® DSA - dynamic security assessment

Benefits

- Extensive analysis based on advanced engineering calculations
- Network data management through one line diagrams
- Intuitive graphical user interfaces with workflow management
- Comprehensive data management and IT integration options
Siemens PTI – Training Solutions
Siemens Power Academy TD

Description
• Complete scope of training courses related to T&D
• Classes in our Training Centers or customized courses at your premises

Scope
Complete scope of training courses related to all transmission and distribution technologies
• Protective Relaying
• Substation Automation
• Software Education
• Power Quality
• MV-switching technology
• HV-switching technology
• Transformers
• Asset Services
• Innovative concepts, e.g. FACTS
• Power Engineering courses

Customer Benefits
• Hands-on training and small groups
• Latest methodological and educational finding
• Customized delivery available
The Smart Grid Professional Series is a 3-day course that covers concepts, terminology, trends and technology, including:

- Physical & Financial Grid
- Grid Objectives & Challenges
- Understanding DS & Grid Performance
- Performance Measures & Challenges
- Current & Future DS Equipment
- Communications
- Smart Grid ROI
- Software Demonstration
The Smart Grid – Distribution Automation (DA) Analysis is a 4.5-day course that covers concepts, terminology, trends and technology, including:

- Review of Current system
- Smart Grid, how DG fits into SG
- Software Tools
- SG Hardware & Management Systems
- Communications
- SG Economics
Thank you for your attention!