Military Microgrid Applications

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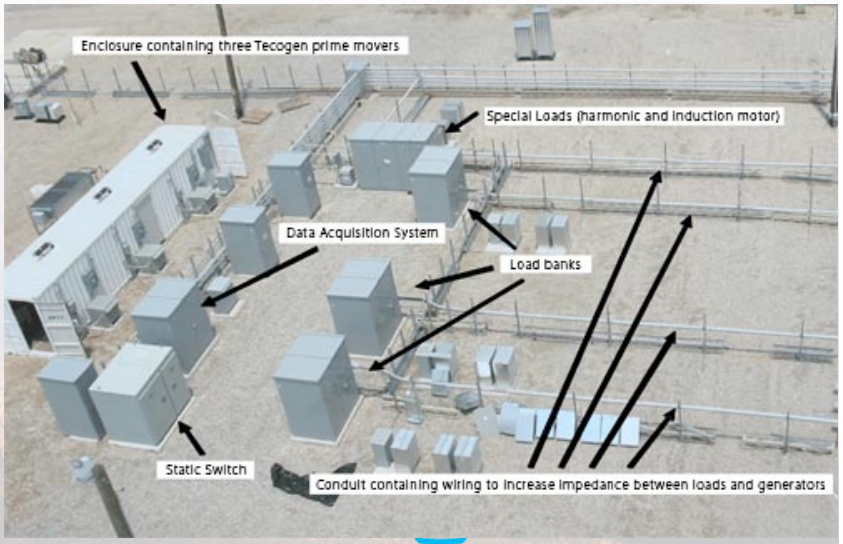
Sandia National Laboratories Microgrid Background

- **Founding member of Consortium for Electric Reliability Technology Solutions (CERTS)**
  - Co-author of The CERTS Microgrid Concept: http://certs.lbl.gov/pdf/50829.pdf
  - Participant/Manager of the CERTS Microgrid Test Bed Demonstration with American Electric Power



Sandia's Energy Surety Microgrid™ (ESM™)

- **Internally funded development of ESM™**
  - Concept and design methodology
- **A microgrid composed of dispersed loads and sources**
- **Key features of ESM™**
  - Improved energy surety
  - Facilitates integration of renewable resources and other DG
  - Offers opportunities for CHP – greater fuel use efficiency
  - *Reliability stated in terms of mission impact*
    - Applicable to both military and non-military application

Design Approach for Military Applications

- **Utilize existing backup generation capacity**
- **New generation sources as needed for creating a microgrid interconnecting mission critical facilities**
- **Two approaches:**
  - Traditional, central command/control of all generation sources of the microgrid
  - CERTS autonomous control of generation sources

CERTS Design Implementation

- **Two buildings; 400 yards apart; combined load 900 kW**
- **Two existing diesel generators**
- **One new Tecogen Inverde 100; 100 kW inverter-based generator**

- **Design challenges:**
  - Modify controls of existing diesels to work with CERTS droop of the new Tecogen unit
  - Demonstrate stability of microgrid in a grid connected and island mode without central controls

- **Project at 60% design completion stage**

- **Operational results at next Microgrid Symposium**

Long-term Implications

- **Enables modifications of a large population of existing backup generators**
  - Easier integration of renewables and other inverter-based DG
  - Eliminates central command/control architecture and infrastructure
  - *Enables Plug-and-Play*

Thank you!

Questions?

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