# GridLAB-D™ Program
# Existing and Planned Capabilities

October 25, 2007

| ***Capability*** | ***Status*** |
|---|---|
| Distribution grid | **Method**: Phase sequence (Kirsten)<br>**Implemented** : bus, branch, capacitor, fuse, regulator, switch, and transformer, meters<br>**Planned (PNNL)**: diesel generator<br>**Planned (PNNL or others)**: reclosers, non-diesel distributed generators |
| Transmission grid | **Method**: Gauss-Seidel (Kundur)<br>**Implemented**: bus, branch, capbank, fuse, generator, meter, regulator, relay, and transformer, IEEE CDF r/w, model check<br>**Planned (PNNL)**: testing and validation of implemented components<br>**Planned (PNNL or others)**: FACTS, SVC |
| Residential buildings | **Method**: thermal parameters, stochastic load shapes<br>**Implemented** : HVAC, hotwater, washer, dryer, lights, range, microwave, occupancy, plugs (basic)<br>**Planned (PNNL)**: more detailed models for several implemented end-uses<br>**Planned (PNNL or others)**: motor stalling, multifamily |
| Commercial buildings | **Method**: thermal parameters, stochastic load shapes<br>**Implemented** : HVAC, plugs, lights, occupancy<br>**Planned (PNNL or others)**: multi-zone, motor stalling |
| Controls | **Method**: user-defined<br>**Implemented**: programmable controller functionality<br>**Planned (PNNL or others)**: other logic coding methods |
| Climate | **Method**: TMY2 tape player<br>**Implemented**: climate (temperature, humidity)<br>**Planned (PNNL)**: solar<br>**Planned (PNNL or Others)**: wind, weather |
| Tapes/recording | **Method**: CSV<br>**Implemented**: tape players, tape recorders, load shape generators, and data aggregators from/to files<br>**Planned (PNNL)**: expanded file capabilities<br>**Planned (PNNL or Others)**: ODBC, XML, SQL |

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**Additional Desired Capabilities**

| ***Capability*** | ***Needs*** |
|---|---|
| Markets | day/hour ahead energy, ancillary service markets, double auction distribution, transmission capacity, multiple rates |
| Distributed resources | distribution generators, CHP, BCHP, distributed regulation, GFA, storage technologies |
| Distributed automation | switching, black start/post fault recovery, automated islanding |
| Telecommunications | latency modeling, advanced control, cyber-security |
| Utility operations | financing, capital cost, service cost, operating cost, reliability metrics, benefits models, analysis framework, utility back-office model, |
| Other | TBD |