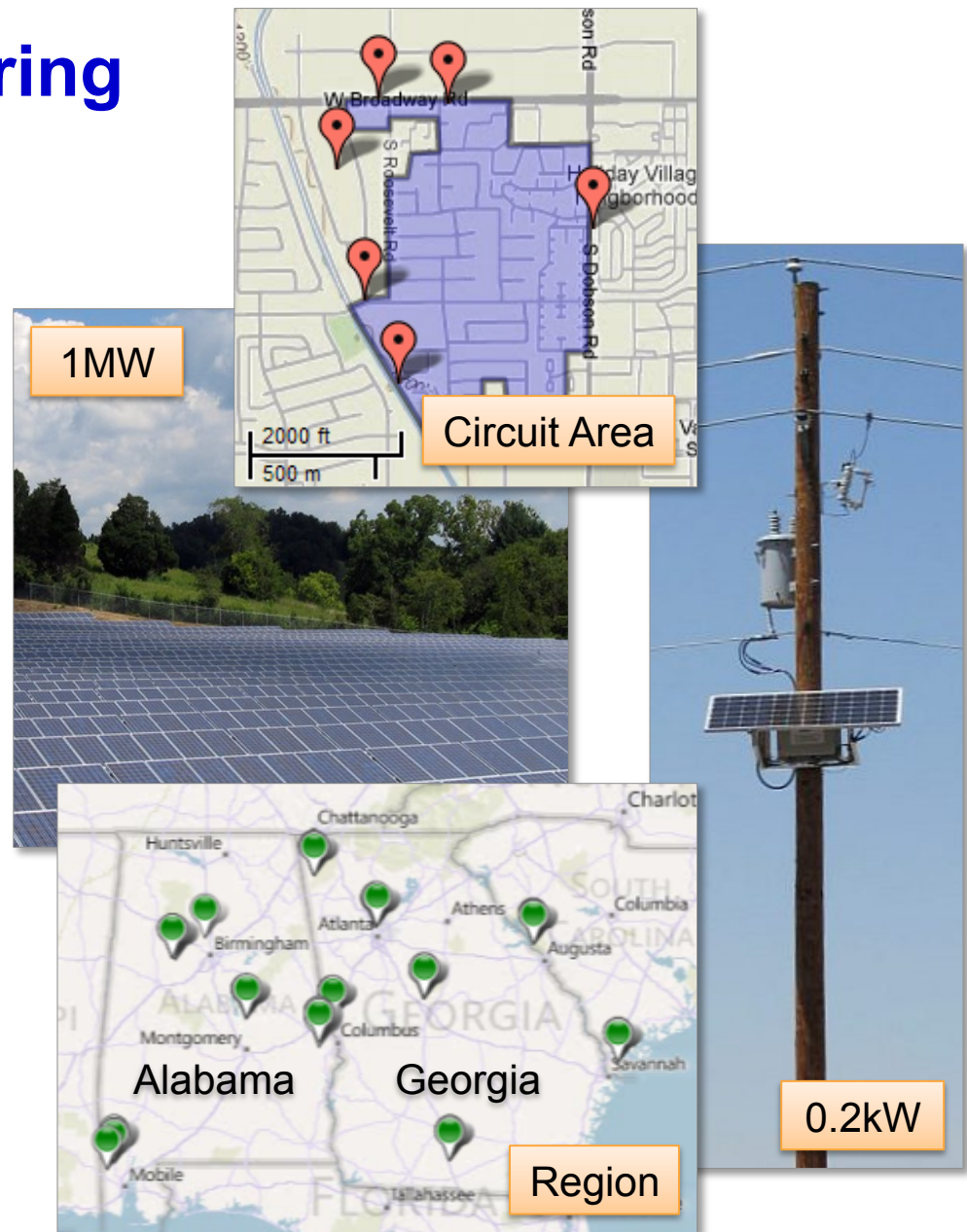


Distributed PV Monitoring

An EPRI Research Project

Field monitoring to characterize PV system performance & variability

- **Utility interactive PV systems**
 - ✓ Single modules on poles
 - ✓ 1MW plants
 - ✓ 200+ sites committed nationwide
- **Field measurements for 1+ years**
 - ✓ AC power meter
 - ✓ Plane-of-array pyranometer
 - ✓ Module surface temperature
 - ✓ ...More sensors on select sites
- **Data acquisition**
 - ✓ 1-second resolution
 - ✓ Time synchronized
 - ✓ Automated uploads to EPRI
 - ✓ Structured data storage at EPRI



Simulation Platform -- OpenDSS

- Open source of EPRI's Distribution System Simulator
 - developed in 1997
 - open sourced in 2008 to collaborate with other research projects
- OpenDSS designed from the beginning to capture
 - Time-specific benefits **and**
 - Location-specific benefits
- Differentiating features
 - full multiphase model
 - numerous solution modes
 - “dynamic” power flow
 - system controls
 - flexible load models
- Needed for analysis of
 - DG/renewables
 - energy efficiency
 - PHEV/EV
 - non-typical loadshapes

