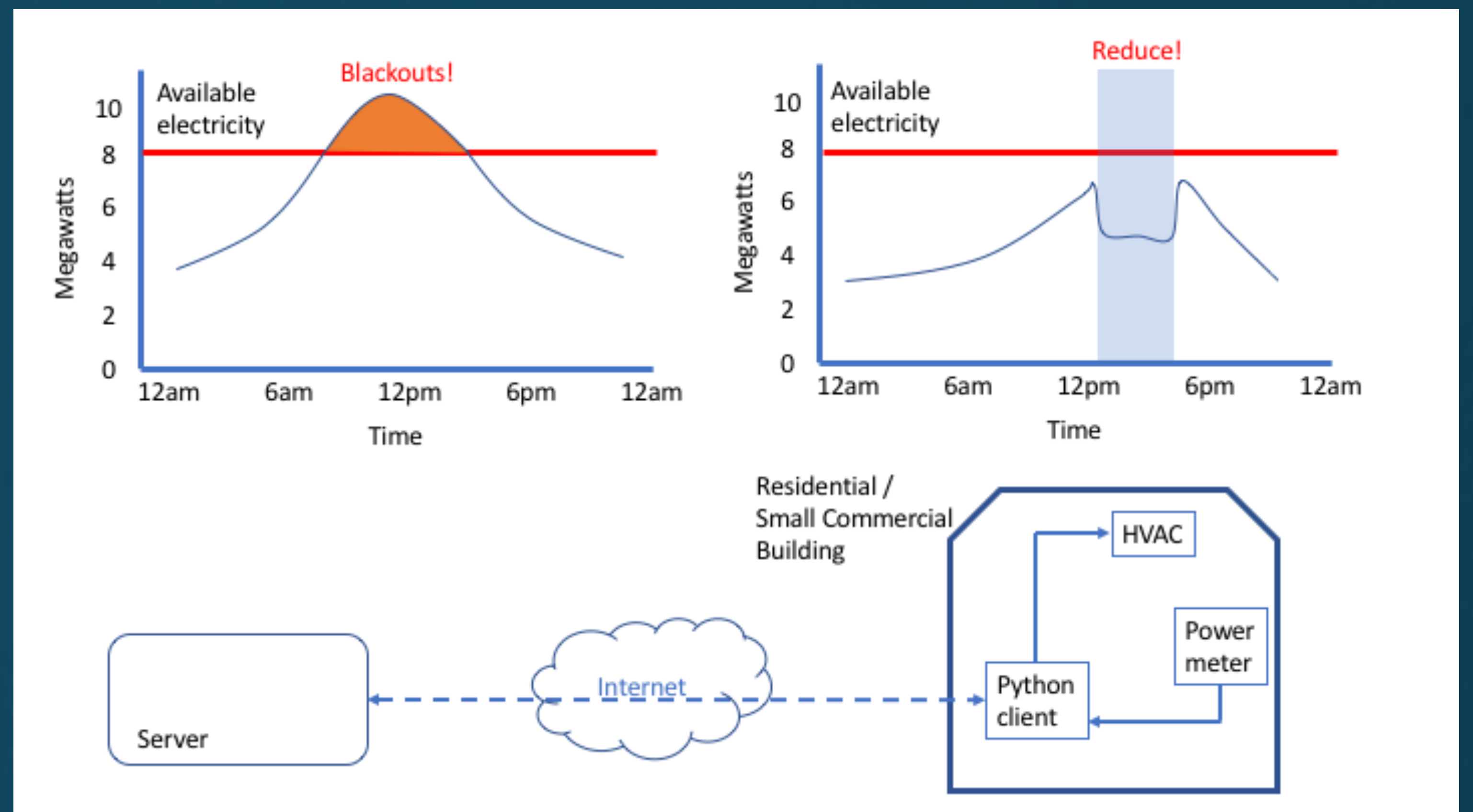


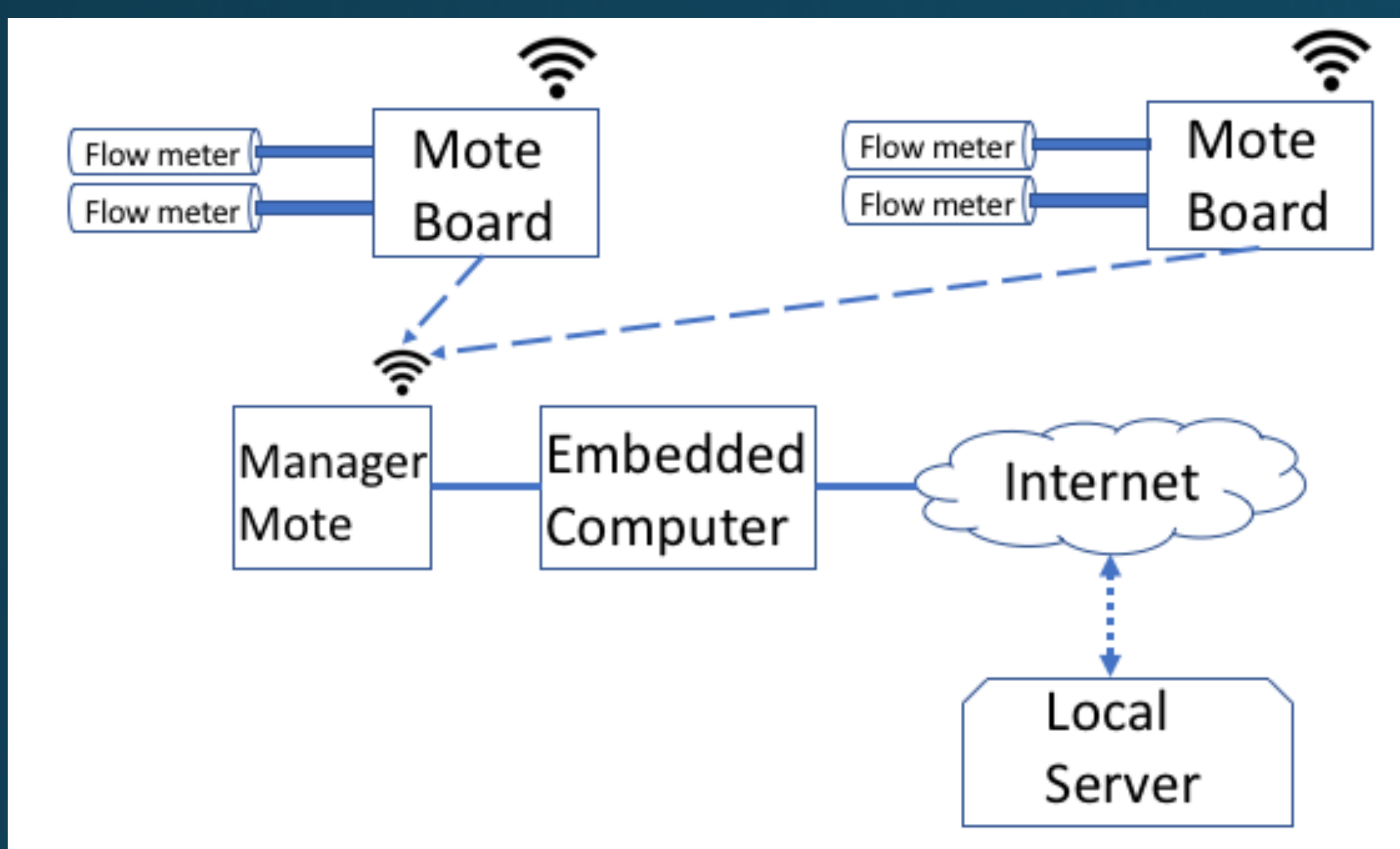
Projects Showcase

FastDR: Low cost device to enable demand response

- Demand Response: curtail loads during high electricity demand (especially on hot summer days)
- Typical cost for enabling site is \$50K
- We demonstrated \$100 prototype with Python on Linux on BeagleBoard

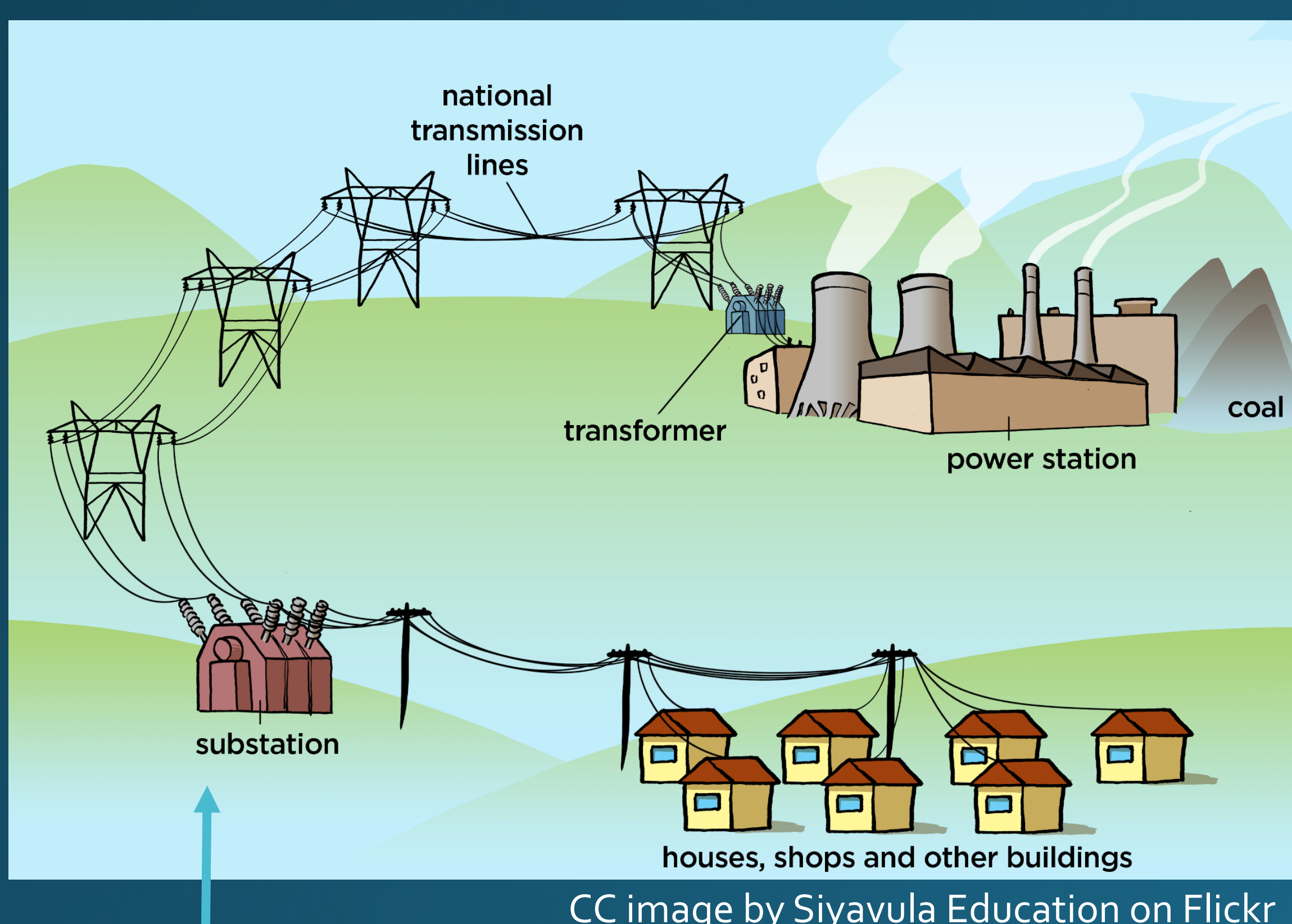


Performance Monitoring of Residential Hot Water Systems

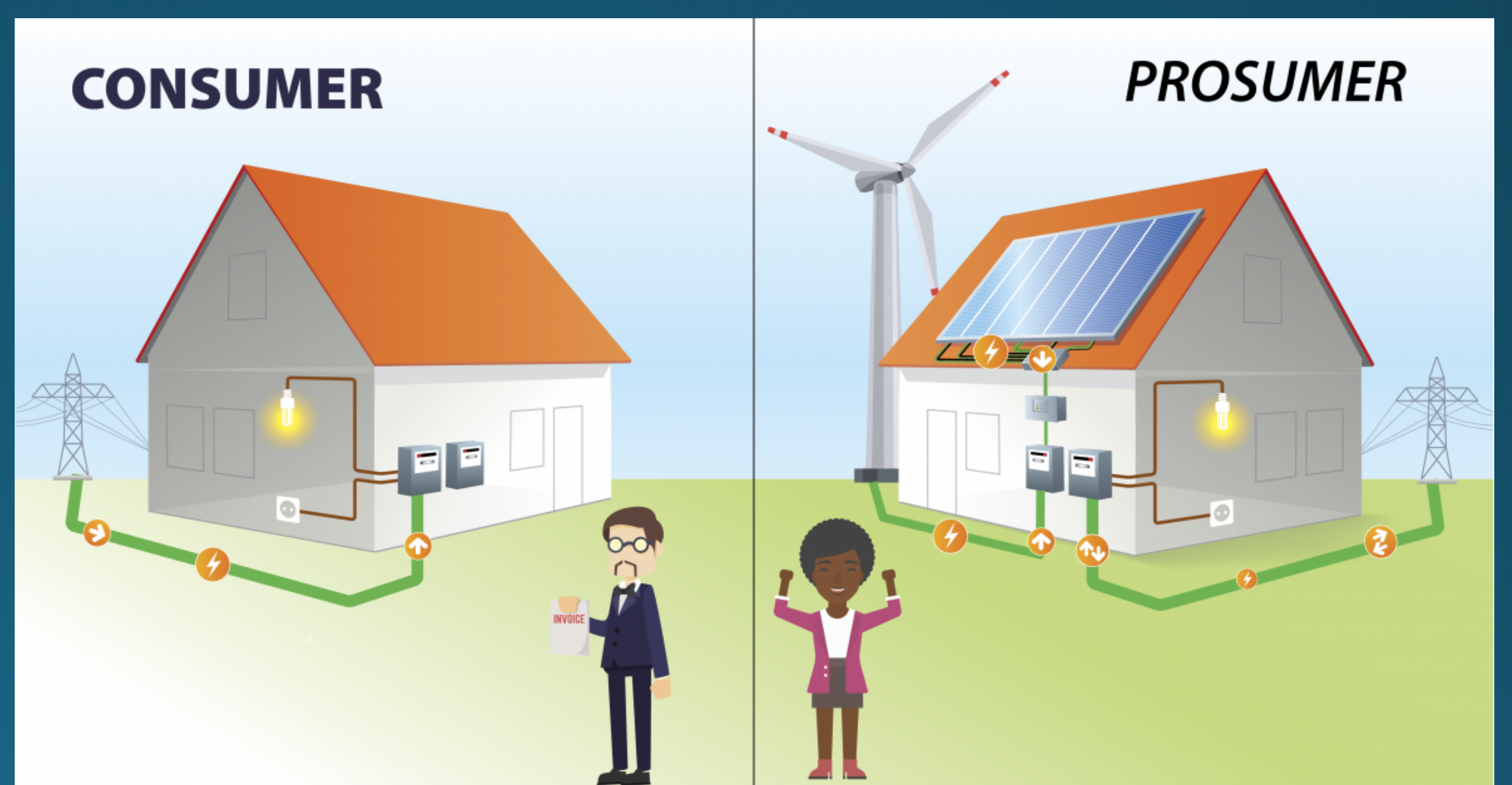


- Measure water flow and temperature at all indoor water end uses
- Model energy and water waste in hot water distribution systems

Event Detection and Diagnosis of the Distribution Grid



CC image by Siyavula Education on Flickr



U.S. Department of Energy

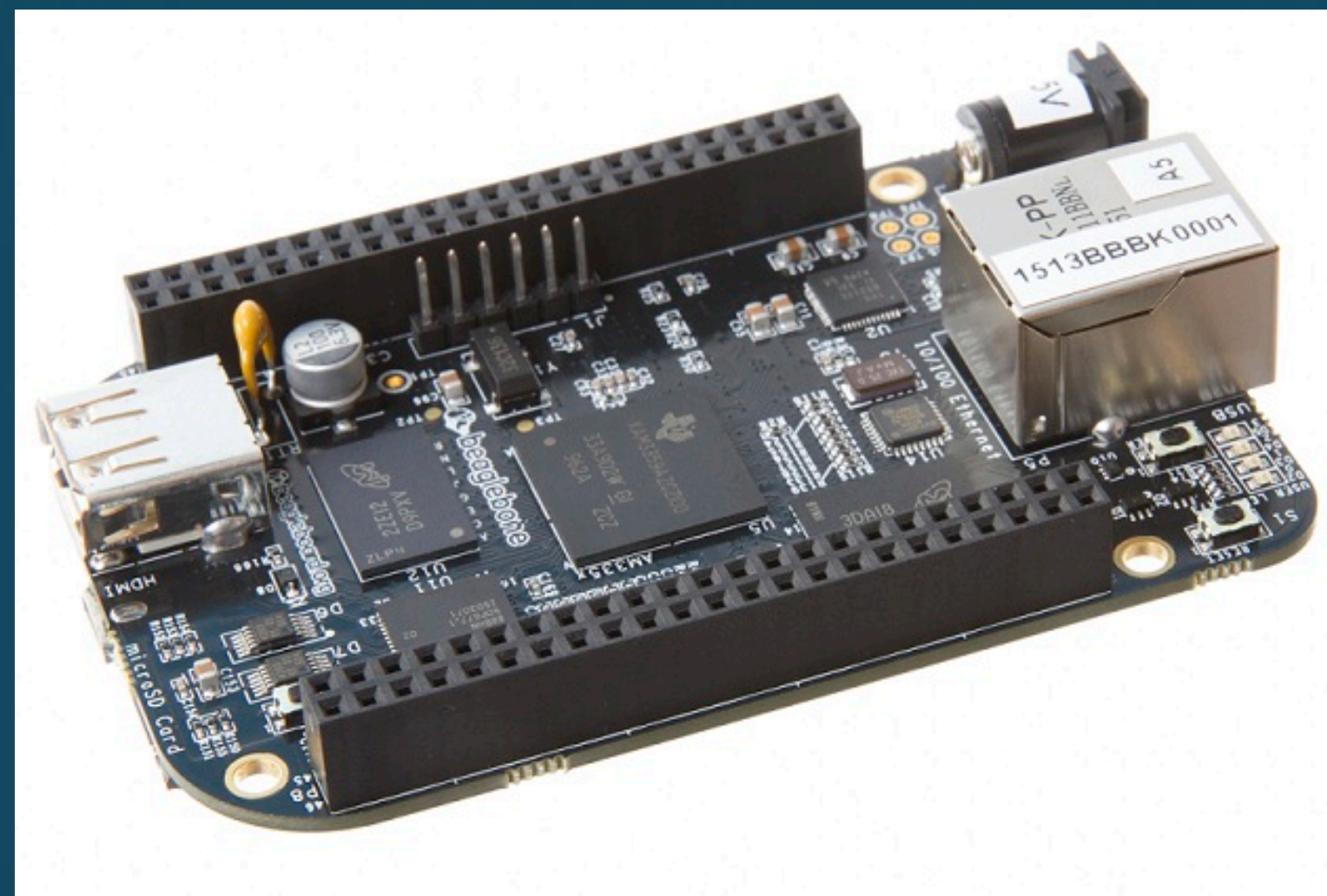
More insight and monitoring on distribution

- Renewable electricity and electric vehicles causing additional dynamics at distribution.



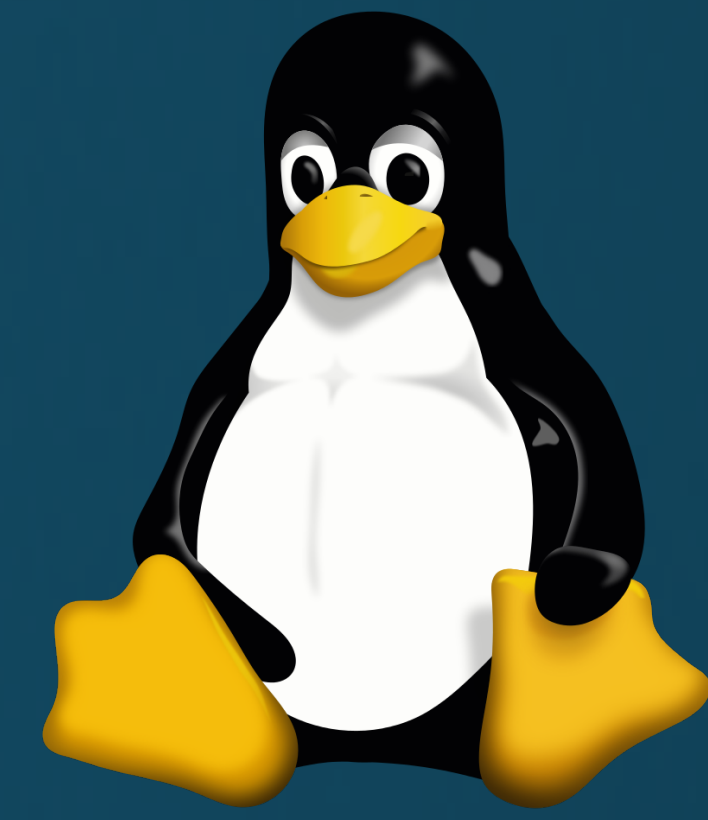
Python

+



Embedded board

+



Linux

= Networked Sensor Data Collection

Relevant Research Topics

- Network communication to indoor, building level and grid sensors
- Big data and database optimization
- High resolution timeseries data
- Non-intrusive load monitoring: Infer multiple load profiles at a single measurement point
- Occupancy estimation and prediction for smart control of building loads
- Standardized communication bus, hardware interfaces and platform for building management

Resources

- Energy Technologies Area, Lawrence Berkeley National Laboratory (U.S. Dept. of Energy)
- Software Defined Buildings, UC Berkeley
 - sMAP (simple Monitoring and Actuation Profile)
 - BTrDB (Berkeley Tree DB)
- American Council for Energy-Efficient Economy (ACEEE)
- U.S. Energy Information Administration (EIA): latest statistics on energy trends
- Energy Institute @ Haas Business School, UC Berkeley



In Memoriam:
Arthur H. Rosenfeld,
“Godfather of Energy Efficiency”
1926-2017

Credit: Berkeley Lab