



PPL Electric Utilities

Keystone Solar Future Project

Conventional Power Grid

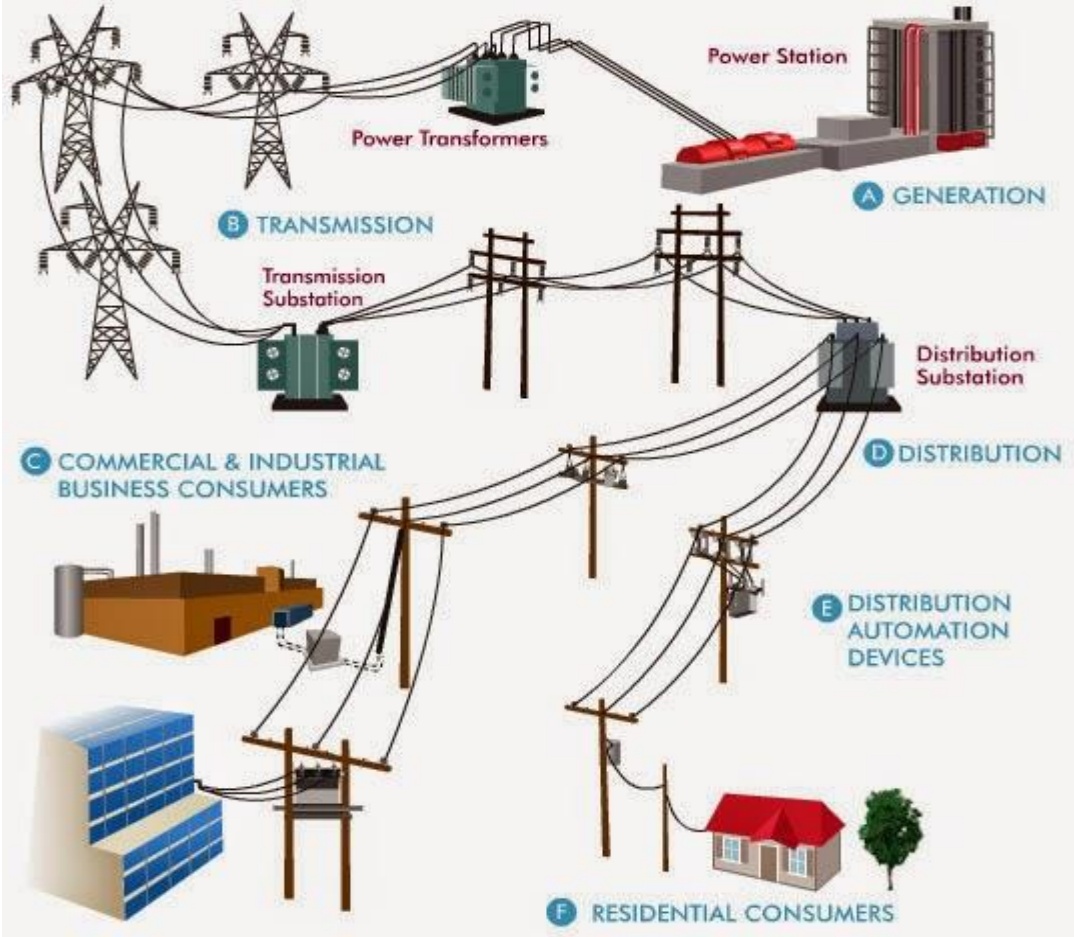


Photo Credit: <https://cleantecnica.com/2015/12/16/how-the-grid-works-why-renewables-can-dominate/>



How do get notified of these?



Photo Credit: google.com

Smart Grid

Three-Phase vs. Single-Phase

The distribution grid largely consists of circuits with the following types of construction:

- **THREE-PHASE** – The “backbone” lines that serve some customers and make up the main line of the circuit
- **SINGLE-PHASE** – One of the three phases off the “backbone” three-phase lines that serve customers, very common in rural areas

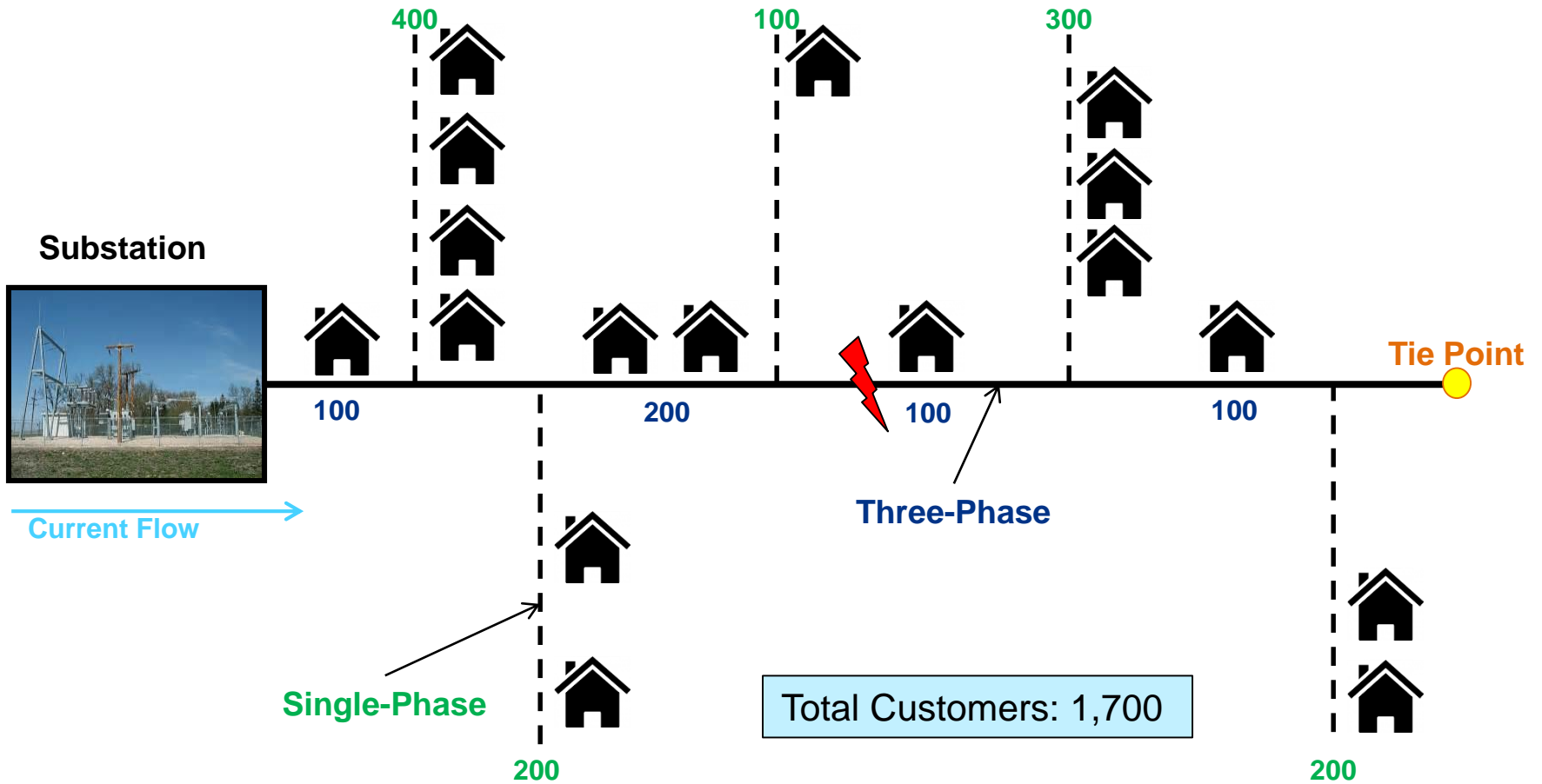
THREE-PHASE



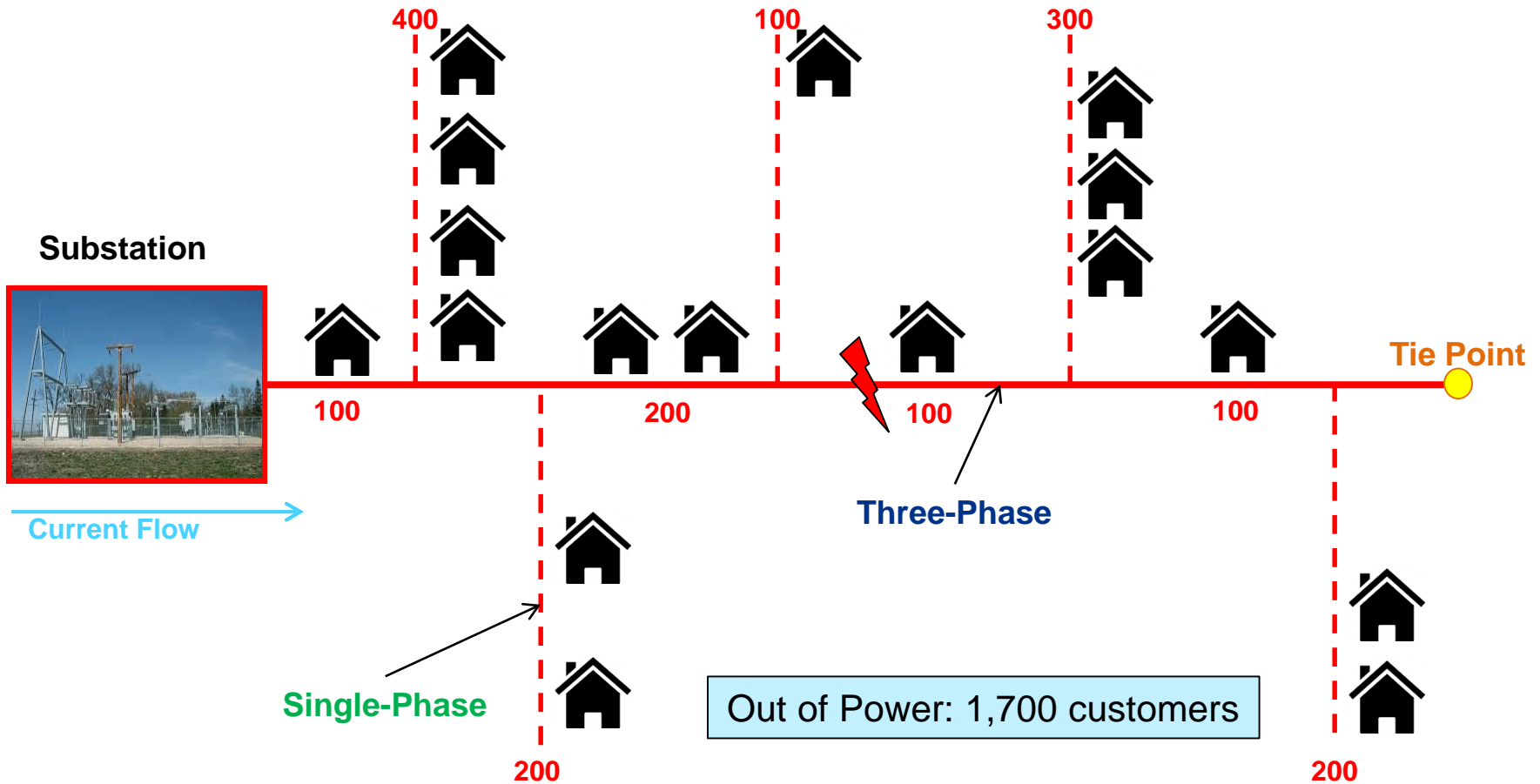
SINGLE-PHASE



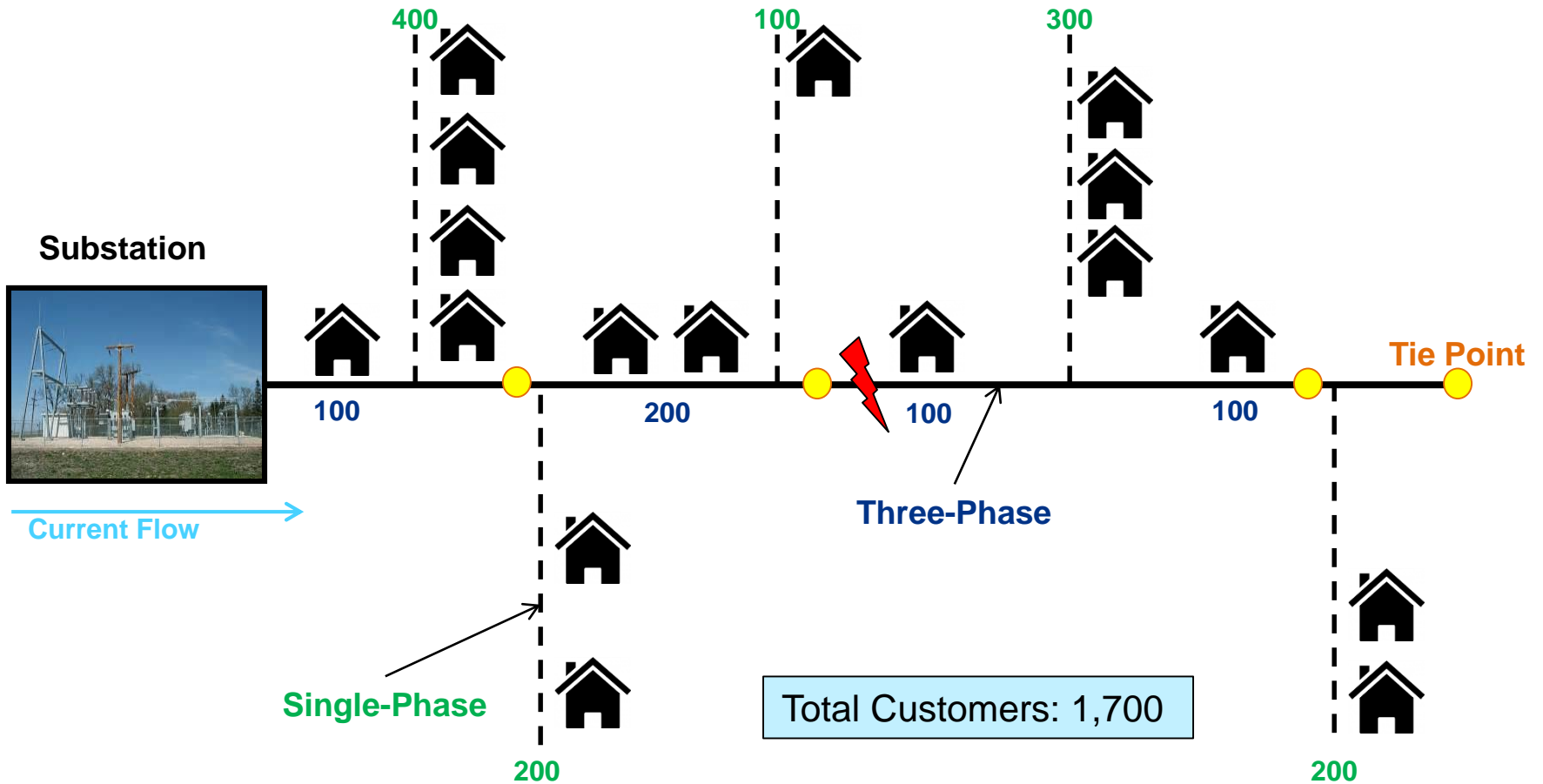
Sectionalizing Overview



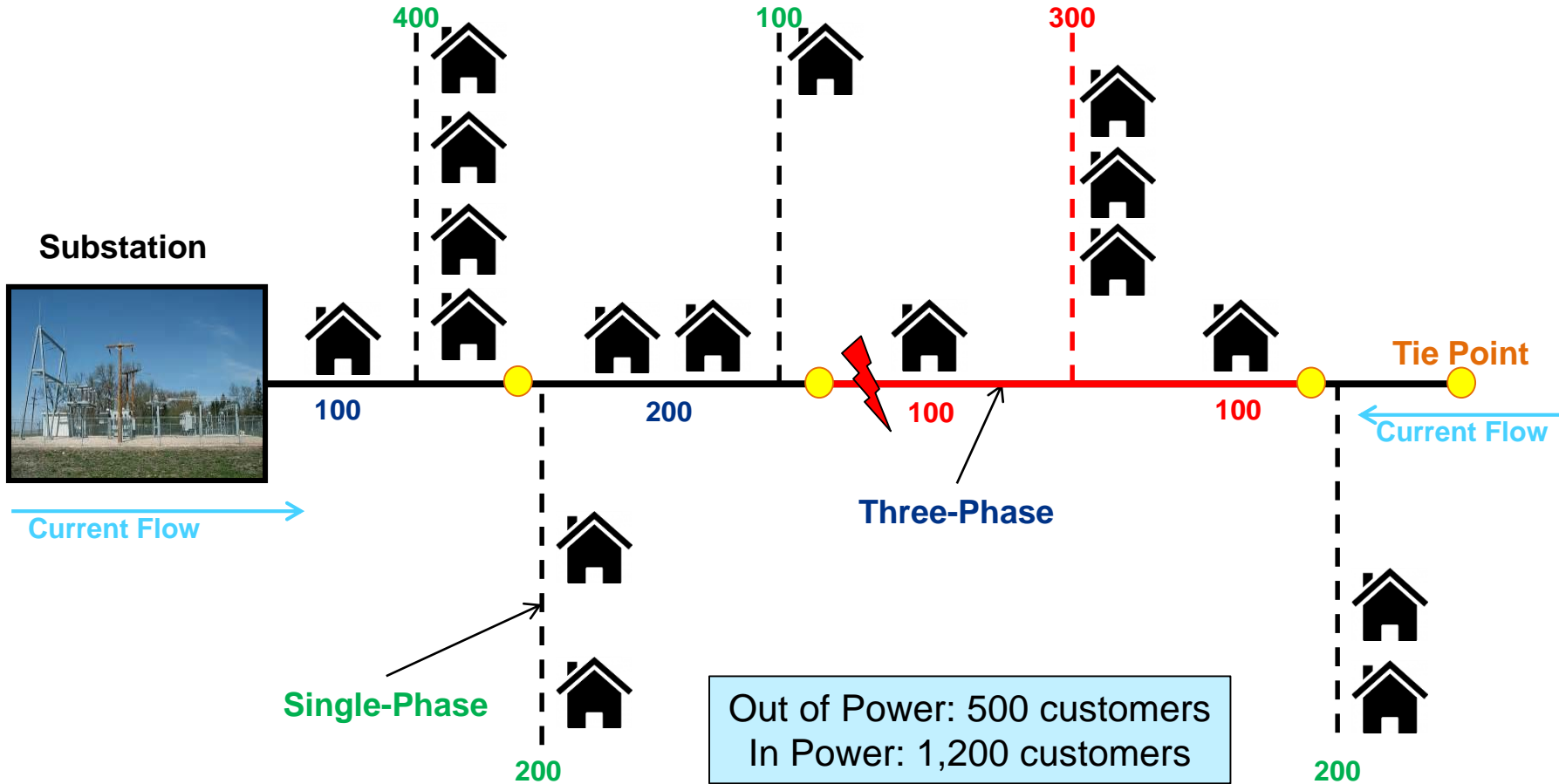
Sectionalizing Overview – No Sectionalizing



Sectionalizing Overview – With Sectionalizing



Sectionalizing Overview – With Sectionalizing



The Past – Mechanical Devices



Protective: Oil-Circuit Recloser



Sectionalizing: Air-Break Switch



Sectionalizing: Load-Break Switch



Sectionalizing: Fused Cutout

The Present – Smart Devices



Protective & Sectionalizing: Vacuum Circuit Recloser



Recloser Control with
Downed Conductor
Detection



Cellular
Network

DMS

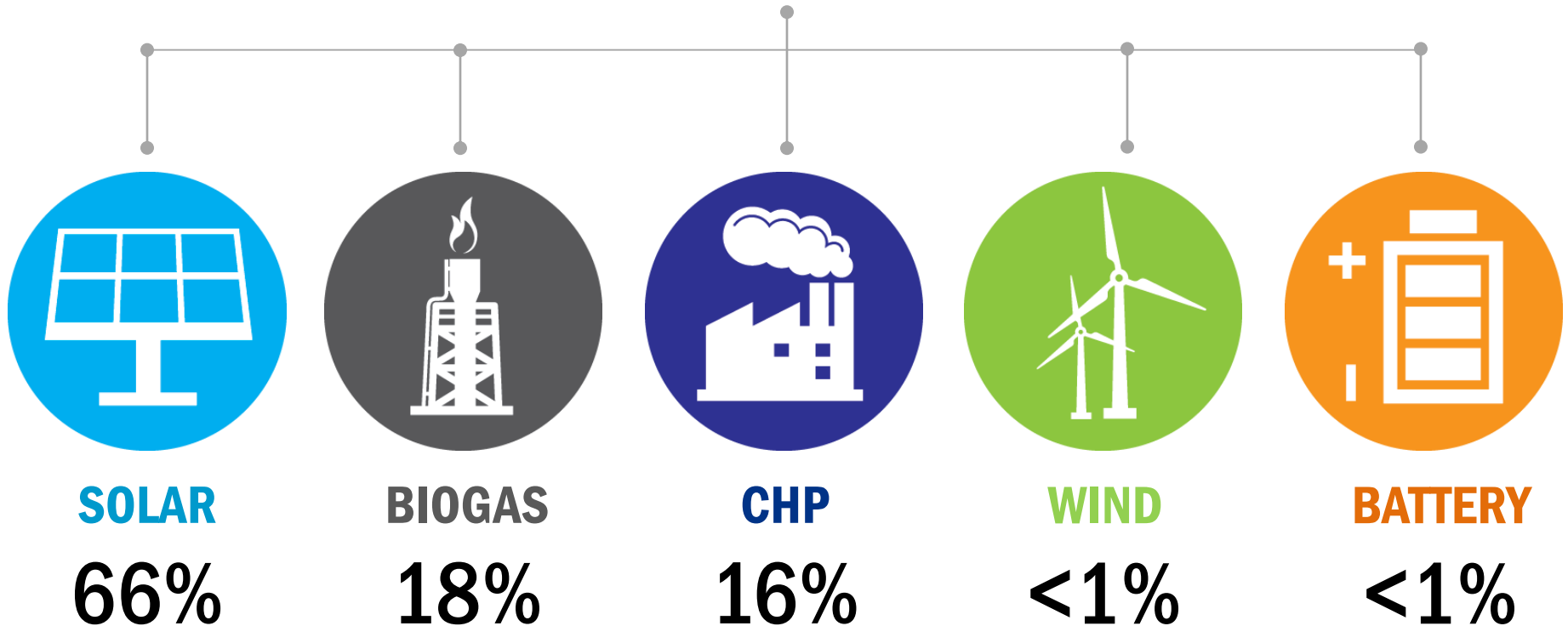
Distribution
Management
System
"The Brain"



PPL Electric Utilities

Grid of Future is not just a future trend...

Total DER Capacity on System: 172 MW



Distributed Generation

PPL customers are becoming suppliers of electricity with the advancement of Distributed Generation technologies such as solar, wind, and combined heat and power

PPL is currently focused on communication with customer solar inverters through the Keystone Solar Future Project



The solar inverter is the “brains” of the solar installation, converting DC power to utility-usable AC power and controlling the output of the solar system

Project Scope



Interconnection Web Portal



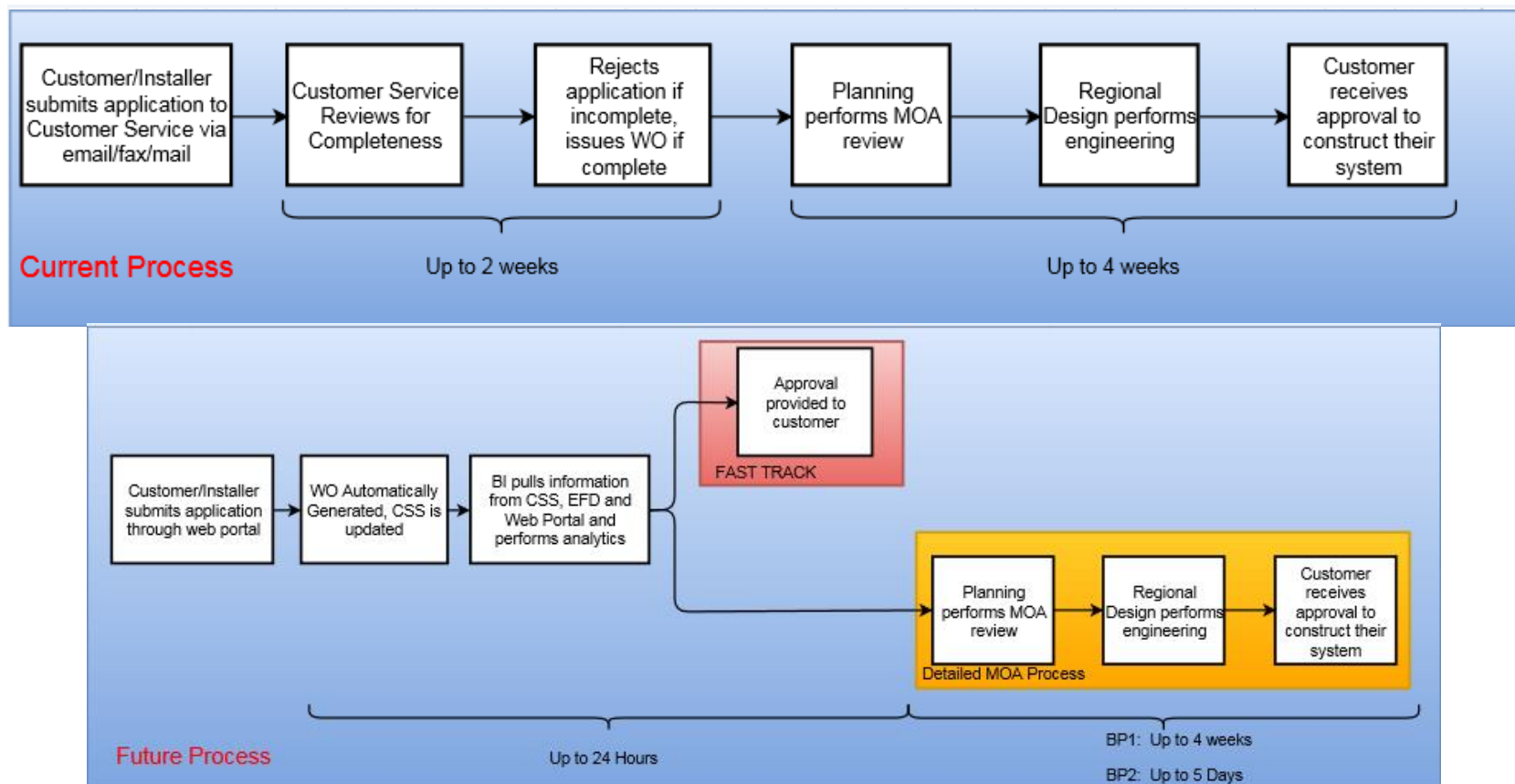
Distributed Resource Management System (DERMS)



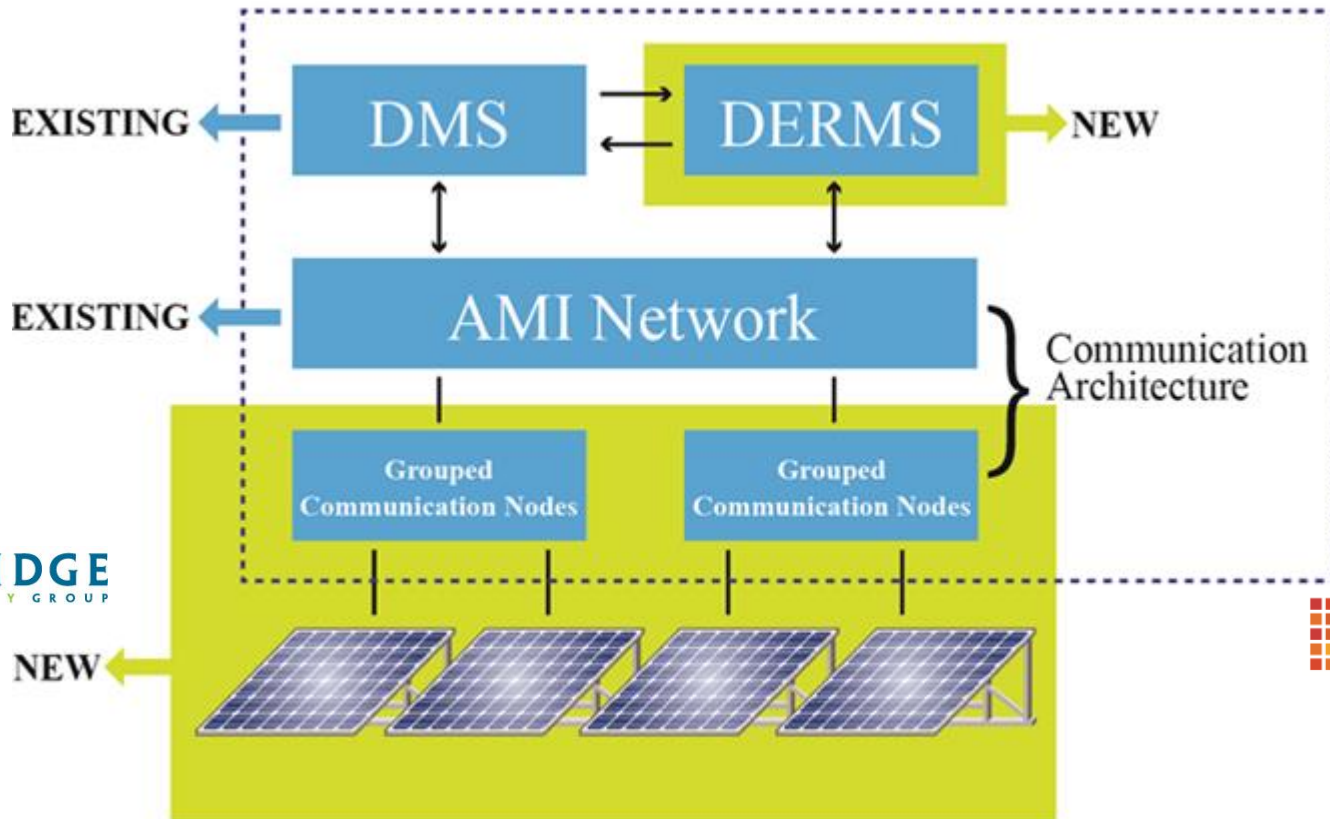
Proof of concept / Pilot

Interconnection Web Portal

DER Interconnection Application Review Process – Current vs. New



Keystone Solar Future Project



Foundation of Distribution Management System

