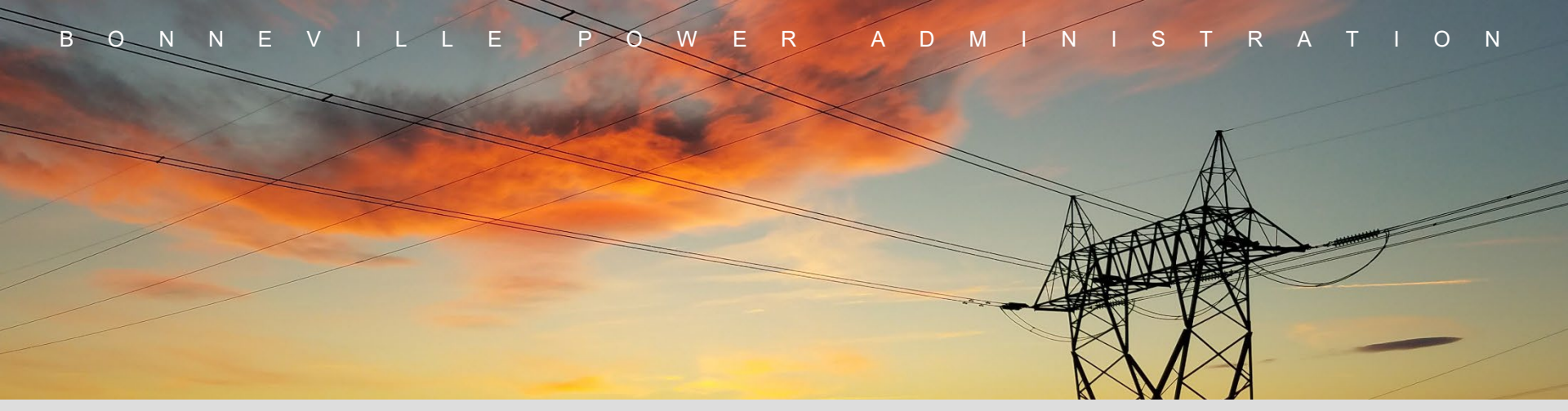


Digitizing Utilities at BPA

Tony Faris

NASPI Meeting

October 18, 2022

BPA Investment in Digitizing Utilities

- SynchroPhasor technology
  - Situational awareness and real time control
  - Long term archiving and data analytics
  - Parallel computing environment for running “big data” analytics
- Load testing and modeling
  - Air conditioners and heat pumps, LED lighting
  - Regional modeling of end use loads for planning studies
  - End use metering at residential and commercial buildings
- Network infrastructure
  - CIP-compliant multicasting, physical and electronic security
  - 24/7 monitoring
- BPA-wide data science user group
- Technology Innovation (TI) funding internal and external research projects

Challenges in Getting Value out of Data

Organizational

- Lack of technical expertise
- Engineers solving data science problems
- Limited time and availability
- Executive support and funding
- Overcoming “traditional” methods of operation

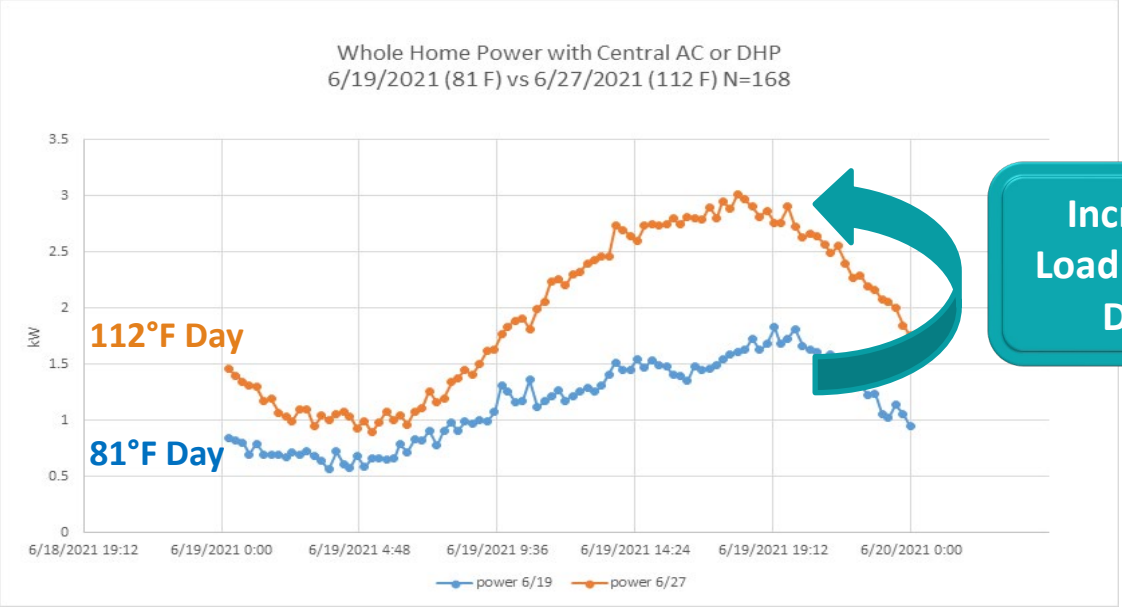
Technical

- Volume of measurement data
- Detecting and addressing “bad” data
- Improving infrastructure to support increased use
- Integrating data sets from multiple sources
- Generating actionable information
- Inherent variability in data

Digitizing Utilities Challenge Proposal

- Four primary tasks under BPA track
  - Temperature sensitivity of loads
  - Estimating electrification from measurement data
  - Impact of future electrification
  - Projection for regional-specific results
- Partnership with Clark PUD in Vancouver, WA

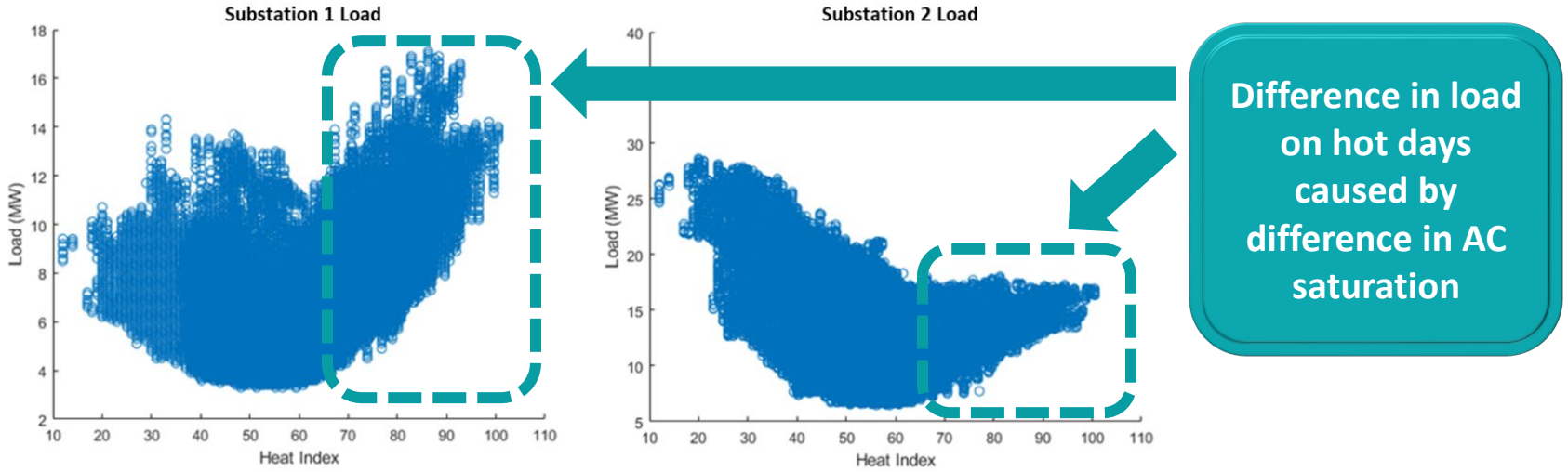
Task 1: Weather Sensitivity



Increased Residential Load Primarily Due to AC During Heatwave

- Perform weather sensitivity analysis and develop models correlating weather conditions and end use loads

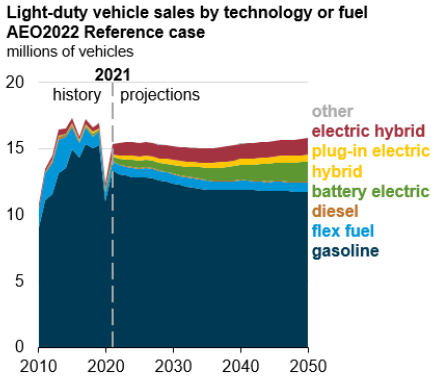
Task 2: Electrification Estimation

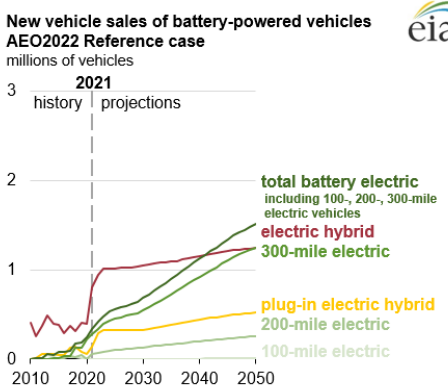


- Use historical measurement data to estimate electrification (% AC, % heating, etc.) at unique substations/feeders

Task 3: Impact of Future Electrification

- Increase in electric vehicles, heat pumps, etc.
- Changes in building codes, retrofitting
- Incentive programs at state and federal level





Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022* (AEO2022) Reference case

- Generate ***realistic*** electrification scenarios and address the impact on future demand

Task 4: Regional Projection

- Regional variability in weather sensitivity, electrification, incentive programs
  - Extreme hot/cold climate zones
  - Natural gas vs. electric saturation
  - State by state future electrification efforts
- Address impact of regional variability on end use load shapes, weather sensitivity models, and electrification estimates

Benefits of BPA's Participation

- Results will improve load modeling at WECC and NERC level
- Collaboration with local utilities to generate models at distribution level
- Best and brightest working on substantive and relevant problems
- Allows engineers to be engineers
- Long term partnerships beyond scope of prize period
- Potential high reward for minimal investment

Contact Info

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