

# MODERN DISTRIBUTION PLANNING

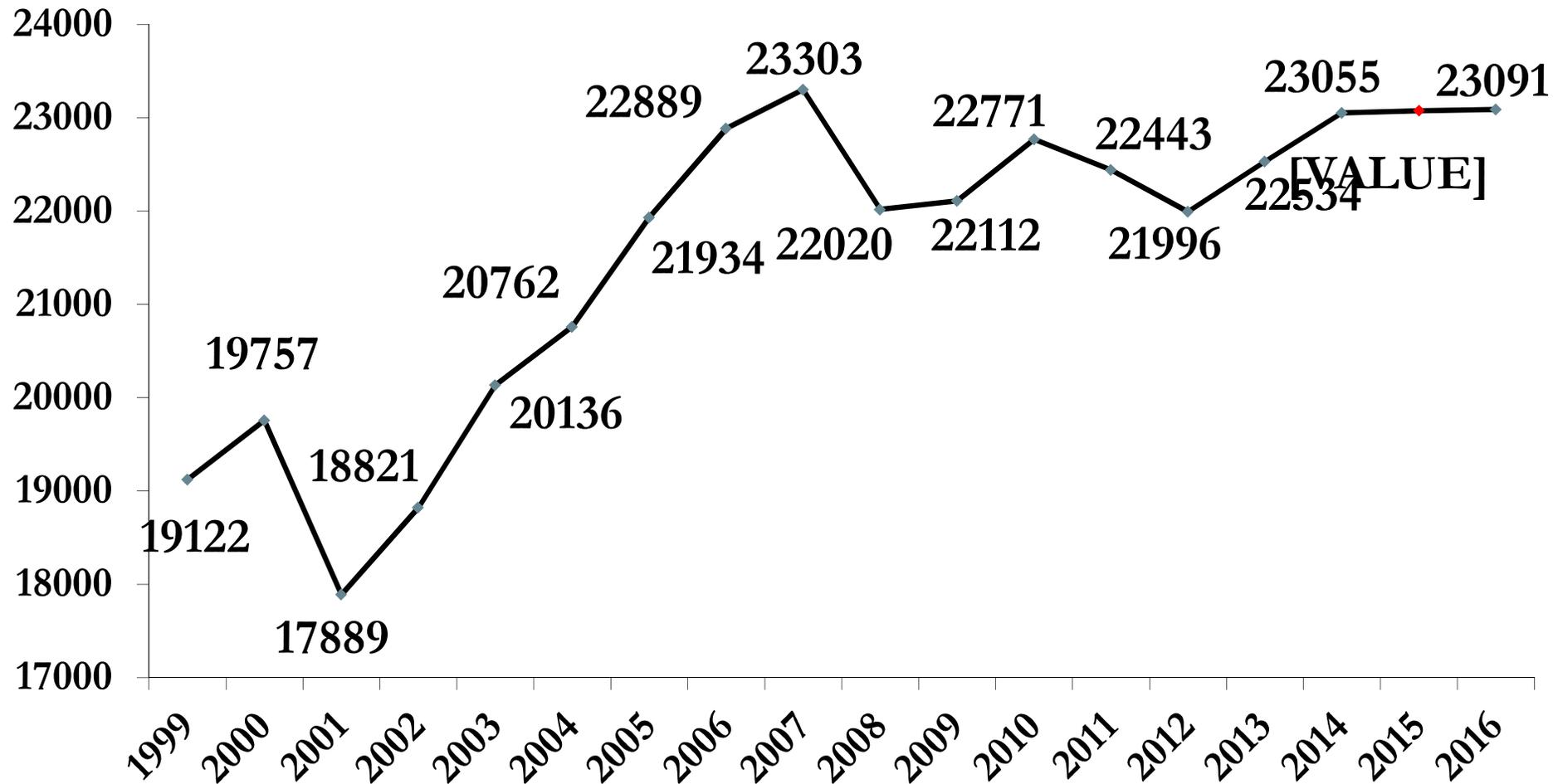
EMERGING COMPLEXITY AND OPPORTUNITIES FOR THE FUTURE

## HECO STAKEHOLDER ENGAGEMENT WORKSHOP

May 10, 2017



# SCE Recorded Peak Load (MW)

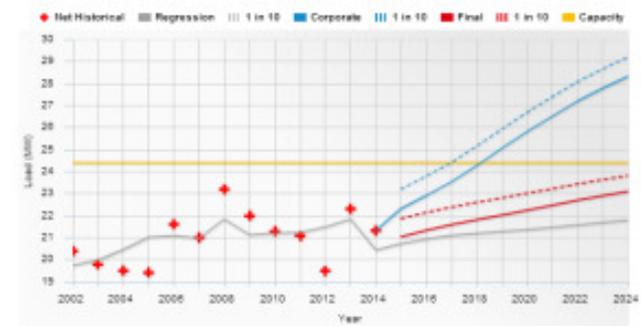


# Traditional Long Term Distribution Planning



## Timeline

- Process is performed on a yearly basis
- Needs are based on expected timeline
  - Near Term: 1-3 Years (i.e. distribution lines)
  - Mid Term: 3-5 Years (i.e. substation transformers)
  - Long Term: 5-10 Years (i.e. new substations)



## Things to Consider

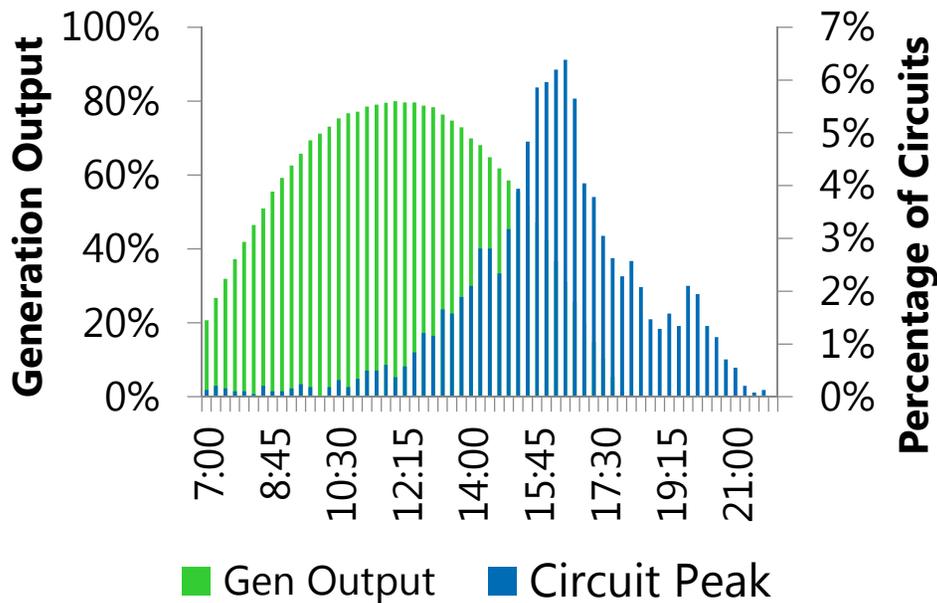
- Micro and macro economic drivers
- Maintain operability and proper voltage to transfer customers during emergencies
- Diversity of specific geographic load and customer mix
- Impact of weather and micro climates
- Protection coordination
- Customer behavior

## General Process

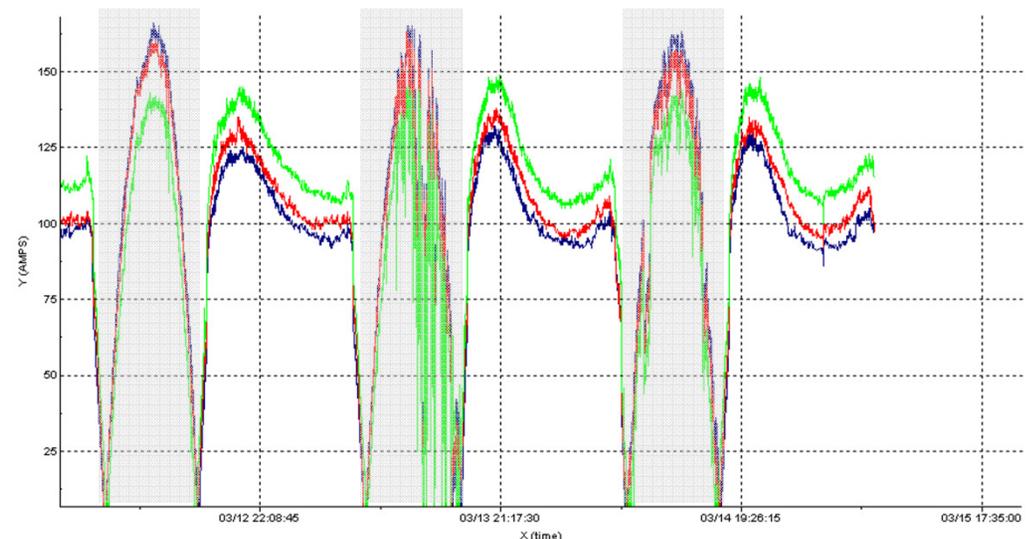
- Determine Thermal Capacity Needs
- Evaluate Voltage and Power Quality Needs
- Analyze Protection Needs
- Ensure Safety and Reliability Needs

# DERs and Increasingly Complex Grid

As distributed energy resources are added to the grid, operating characteristics of the grid are changing, leading to increased complexity.



- Peak Time for Distribution Circuits Load and PV do not typically coincide
- The grid needs to accommodate this available power for the benefit of the customer and the grid



- Shaded areas show 3-phase reverse powerflow and intermittent output from PV from an actual circuit, this appears as one-way flow to operators
- Operators need visibility to power flow magnitude and direction

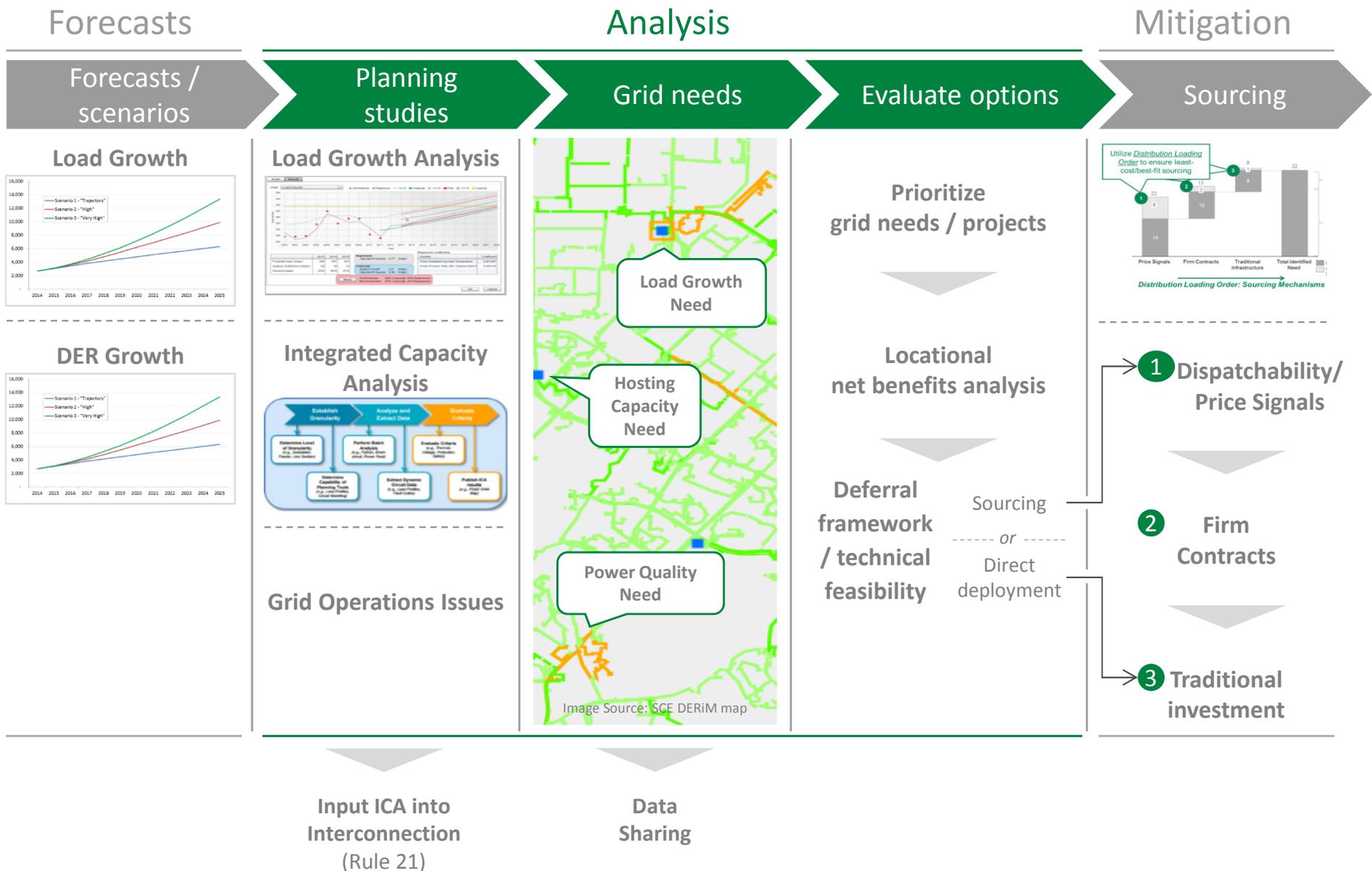
# Considerations with High DER Penetration



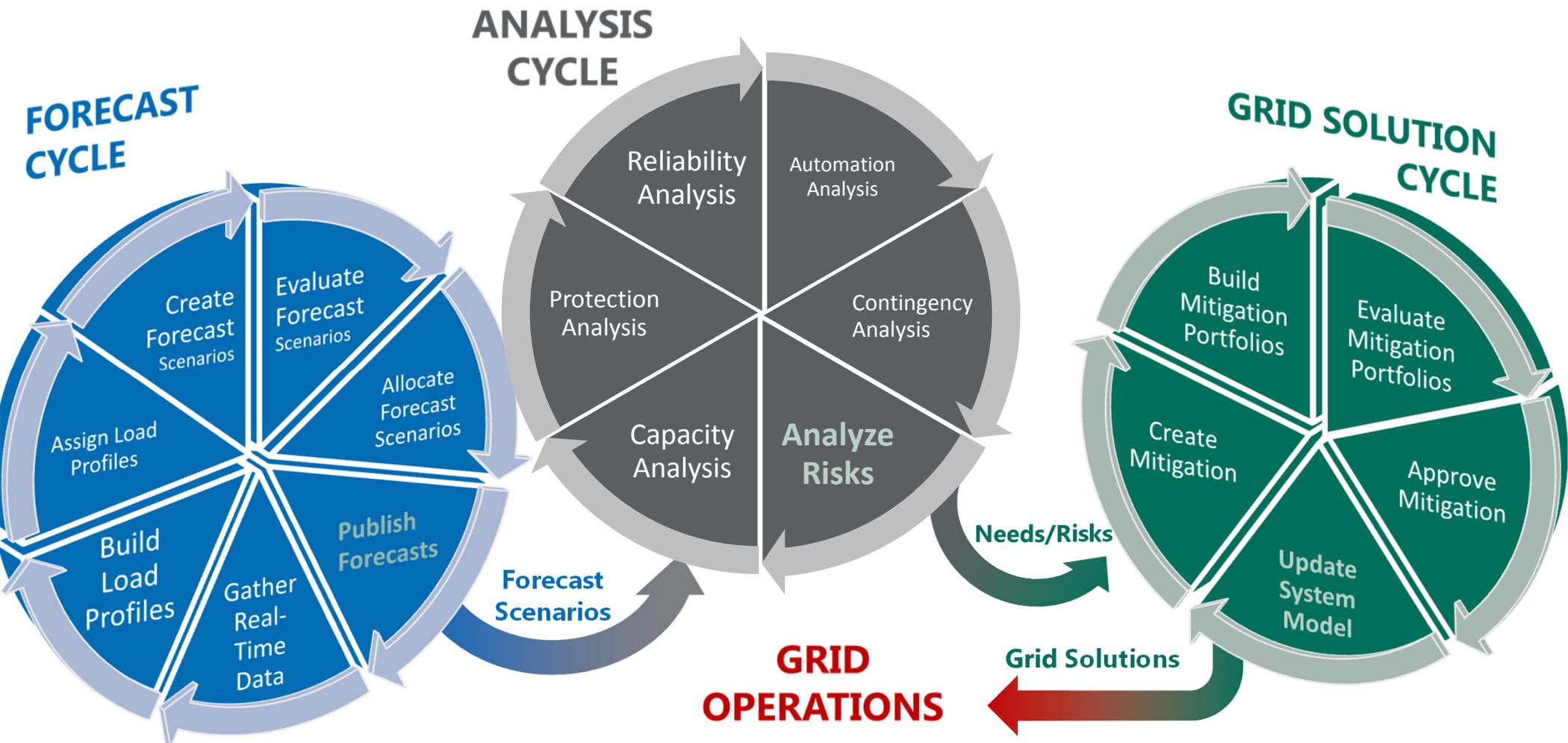
## **New Considerations**

- Thermal Capacity – Use of Integration Hosting Capacity
- Voltage and Power Quality – Leveraging Future Potential of Smart Inverters
- Protection – Impact of Increasing or Decreasing Short Circuit Duty
- Modeling – Impact of Circuit Reconfigurations, Lack of Situational Awareness
- Safety and Reliability – Effect on Grid Operations, Increased Masking of Load
- Impact on Future Standards
- Age and Condition of Distribution System Equipment

# Long Term Planning Process Flow

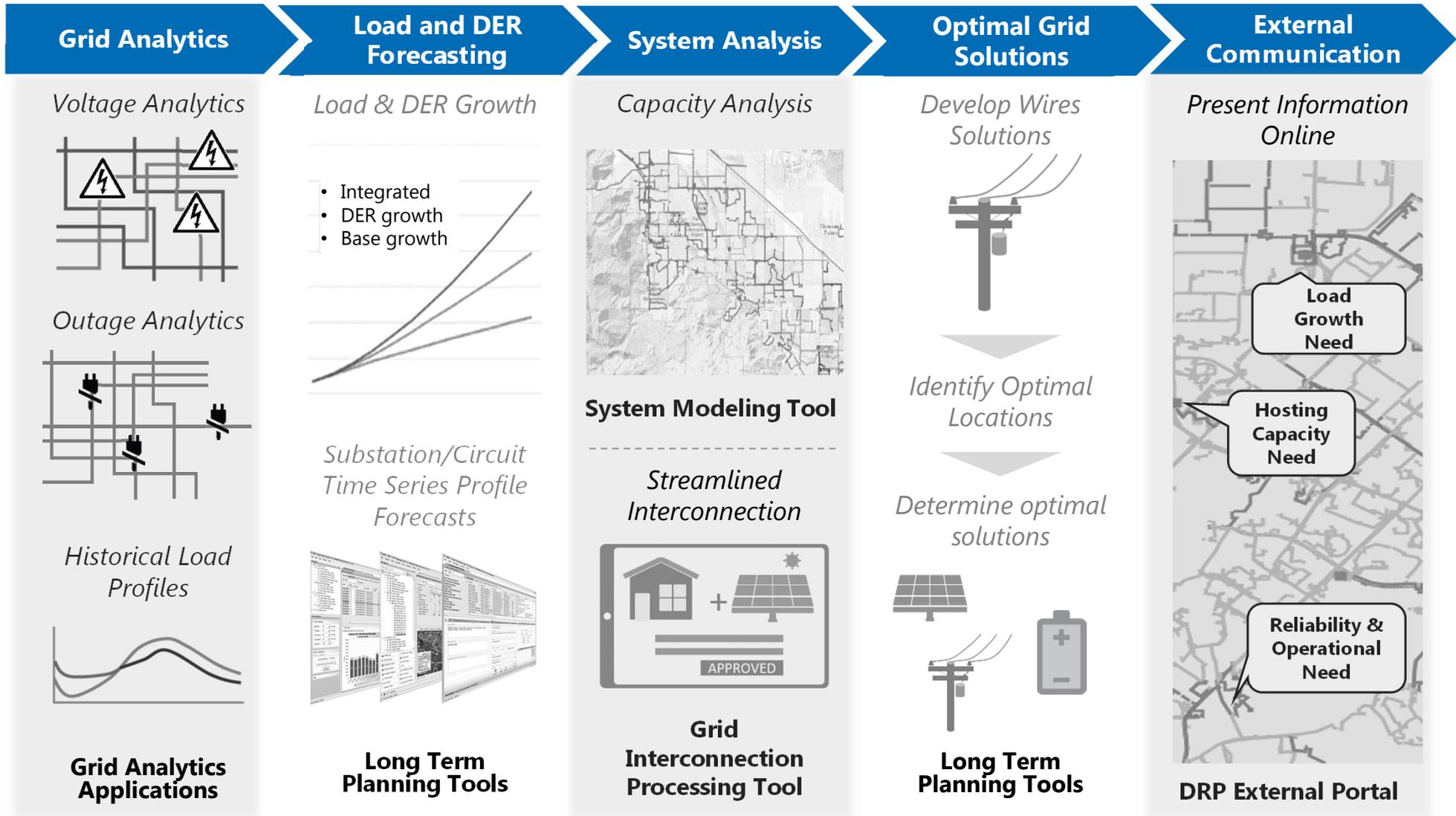


# Long-Term Planning Analysis Flow



# Planning Tool Capabilities

Planning tools will enable forecasting, analysis, and sharing.



THANK YOU

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