

# WECC

## WECC 2016-2017 Assessment Results and 2019 Study Program

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# Overview

- What is WECC?
- 2016-2017 Study Program
  - Study Program scope
  - Observations
- 2018-2019 Study Program
  - Study Program approach
  - Priority Assessments

# Who We Are

## Not-for-Profit Organization

- Assure reliable bulk power system in the Western Interconnection

## Regional Entity

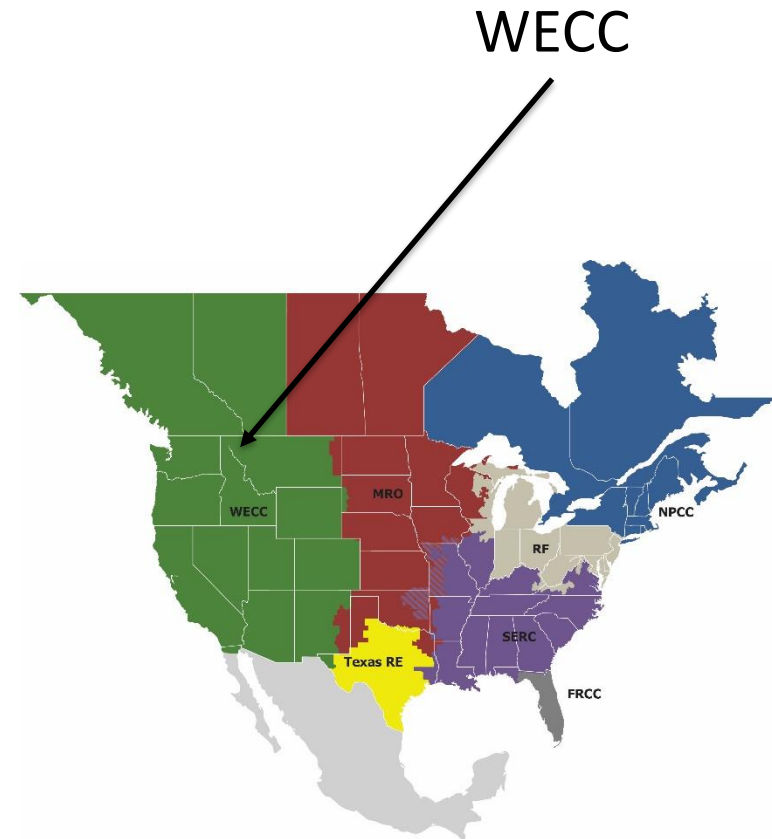
- Approved by FERC
- Largest of seven

## Authority delegated by NERC

- Create, monitor and enforce reliability standards

## Unique Perspective

- Both Region and Interconnection



# What Does WECC Do?

## Compliance

- Ensure compliance with NERC reliability standards
- Conduct audits every 1-3 years

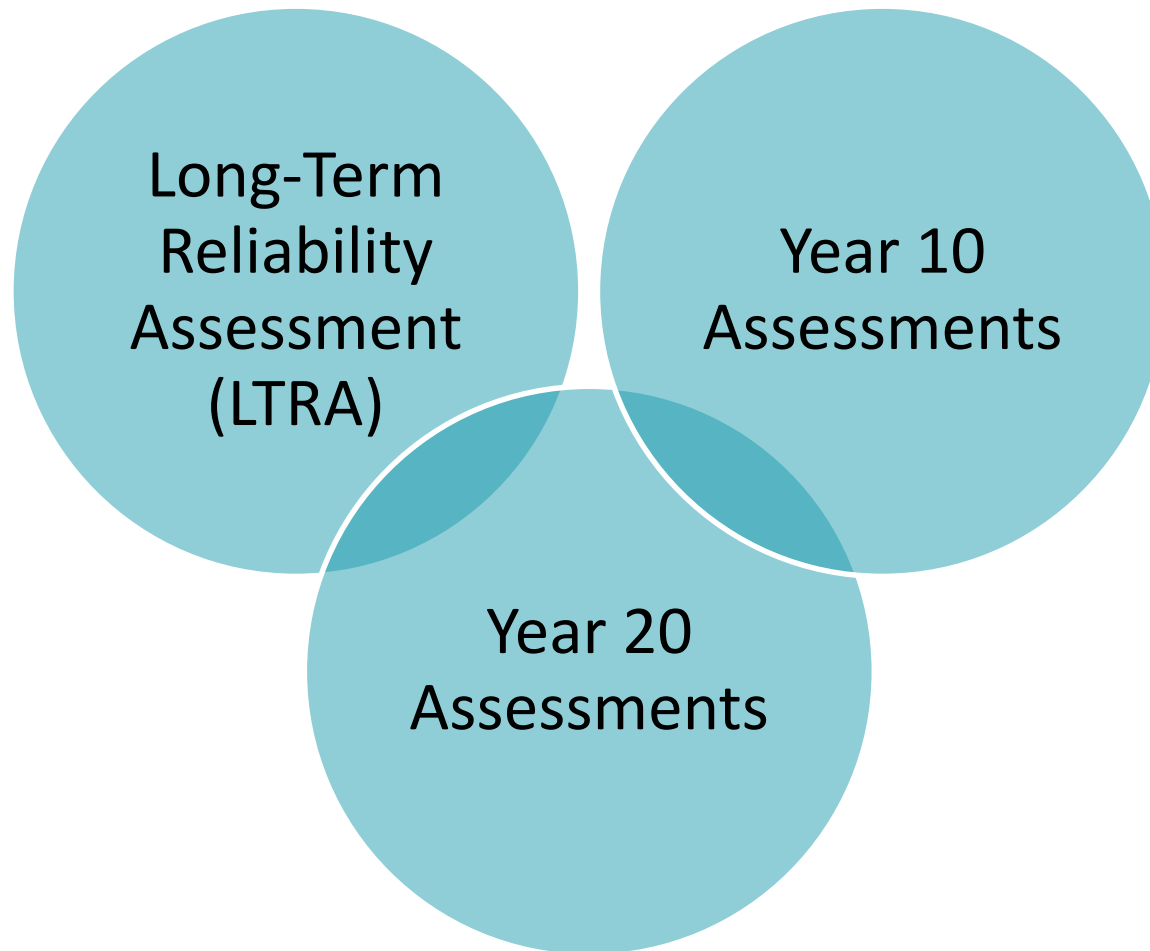
## Planning

- Reliability Assessments 0-20 years in the future
- Essential Reliability Services, Economics and Policy Impacts
- Event Analysis
- Situational Awareness
- Performance Analysis

# 2016-2017 Study Program

- Types of Studies
- Specific Assessments
- Preliminary Observations

# 2016-2017 Types of Reliability Assessments



# Types of Reliability Assessments

	LTRA		
Description	Annual submittal required by NERC		
Data Source	Load-Serving Entities (LSE)		
Foundational Data	Planned loads and resources from Integrated Resource Plans (IRP)		
Modeling Approach	N/A		

# Types of Reliability Assessments

	LTRA	Year 10 Assessments	
Description	Annual submittal required by NERC	Most likely set of loads, resources and transmission topology 10 years in the future	
Data Source	Load-Serving Entities (LSE)	LTRA, transmission owners, public data	
Foundational Data	Planned loads and resources from Integrated Resource Plans (IRP)	Common Case Anchor Data Set	
Modeling Approach	N/A	Production Cost Model (PCM)	



# Types of Reliability Assessments

	LTRA	Year 10 Assessments	Year 20 Assessments
Description	Annual submittal required by NERC	Most likely set of loads, resources and transmission topology 10 years in the future	Infrastructure needs 20 years in the future
Data Source	Load-Serving Entities (LSE)	LTRA, transmission owners, public data	Extension of assumptions in Common Case or Anchor Data Set
Foundational Data	Planned loads and resources from Integrated Resource Plans (IRP)	Common Case Anchor Data Set	WECC Scenarios Capital Cost Assumptions Other Public Data
Modeling Approach	N/A	Production Cost Model (PCM)	Capital Expansion

# Observations—LTRA (2017)

## Planning Reserve Margins

Based on Reference Margin Level (RML)

No WECC subregion drops below the RML within the assessment period

## Demand

CA/MX: Relatively flat (0.27% growth)

Other subregions: 0.62% – 1.88% growth

## Generation

Based on 2015 flexibility study, WI appears to be able to function with expected high renewables

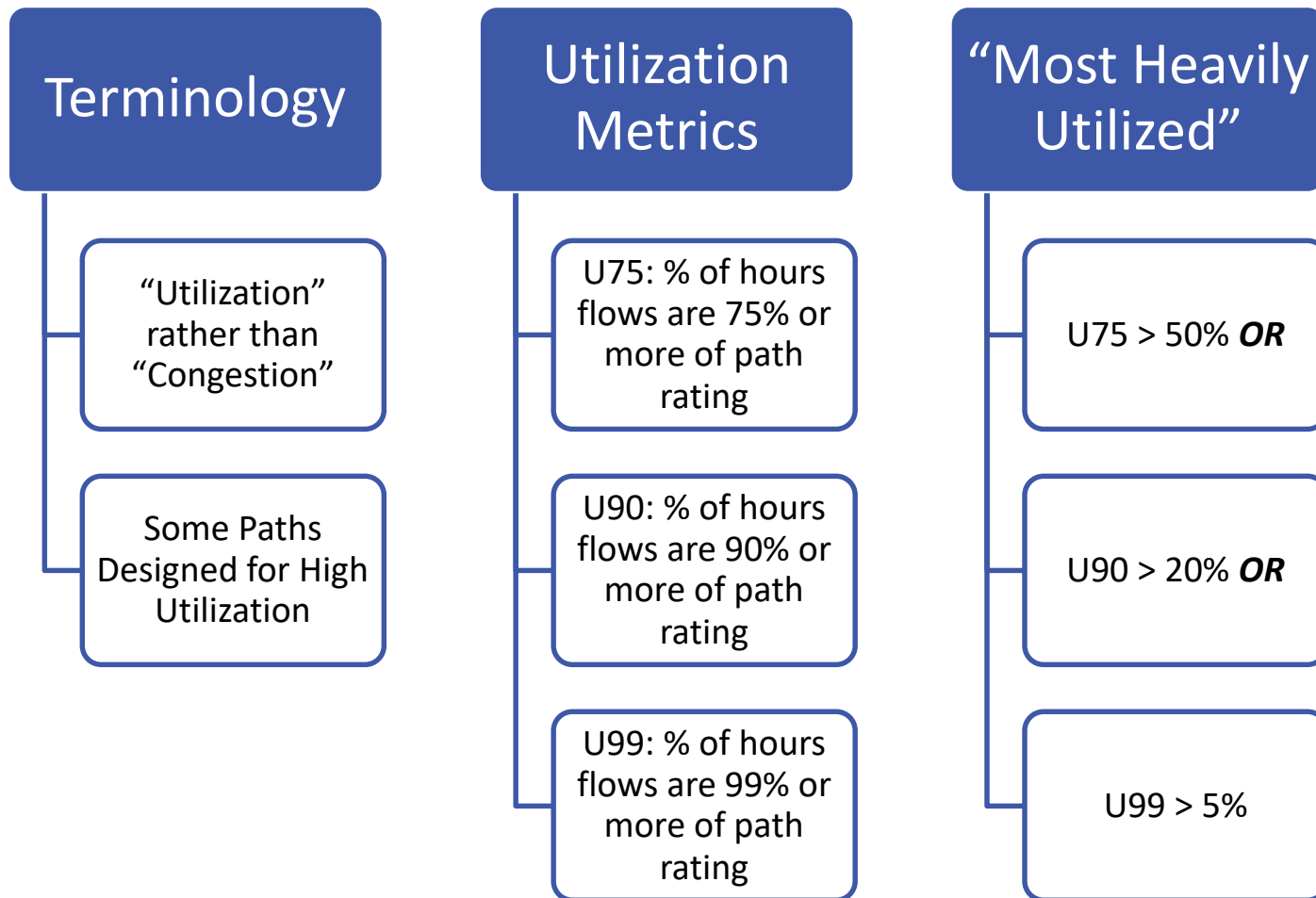
Retirement of generation is not currently a major concern

## Transmission

Several entities have proposed new transmission projects

It is not anticipated that transmission additions will be needed to maintain reliability

# Transmission Utilization



# Preliminary Observations—Year 10 Studies

## Transmission

Across all studies, grid appears to be adequate

## Storage Cases

Additional storage facilitates additional wind—with limitations

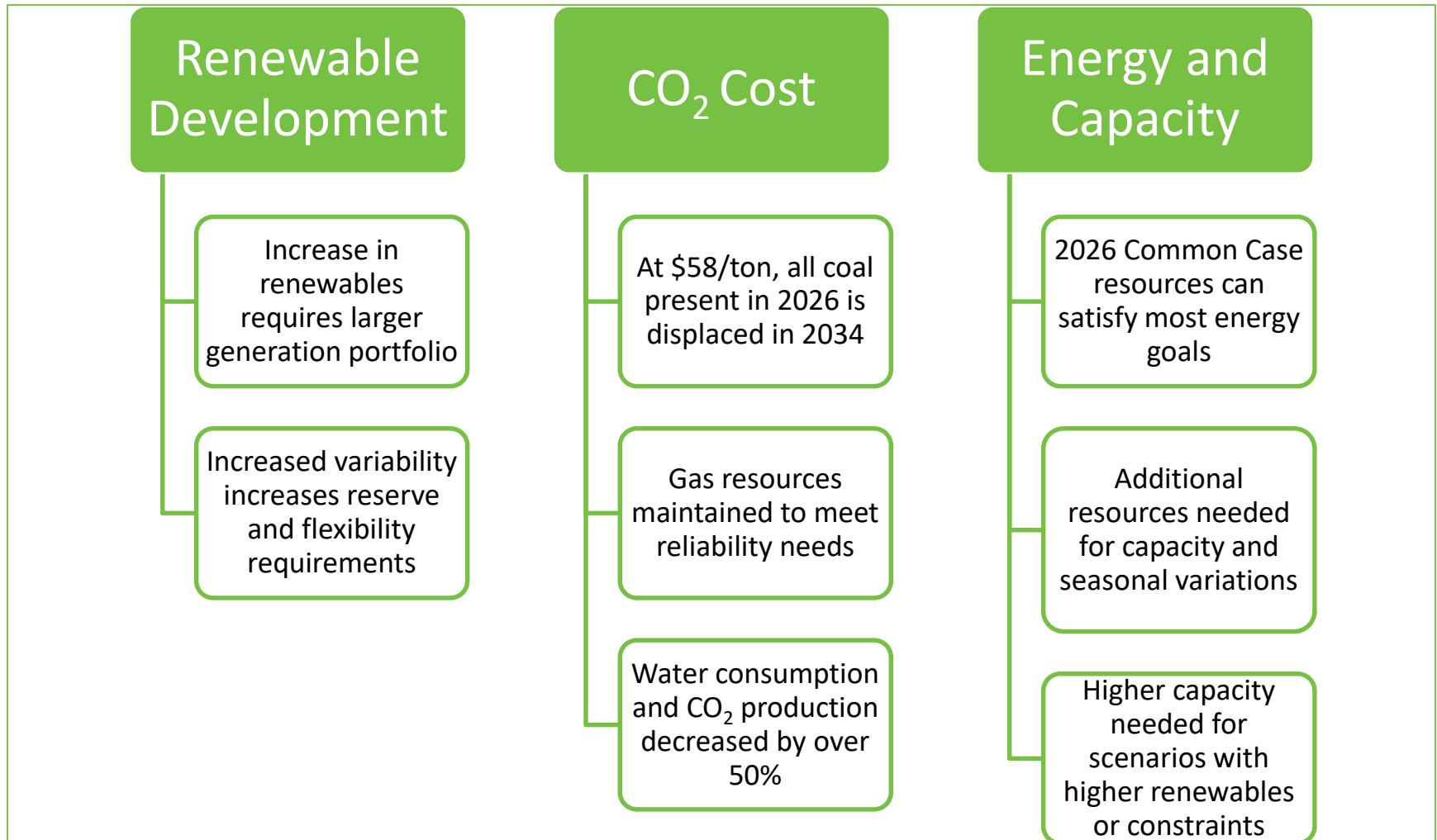
Pumped hydro storage can absorb wind fluctuations

## Gas

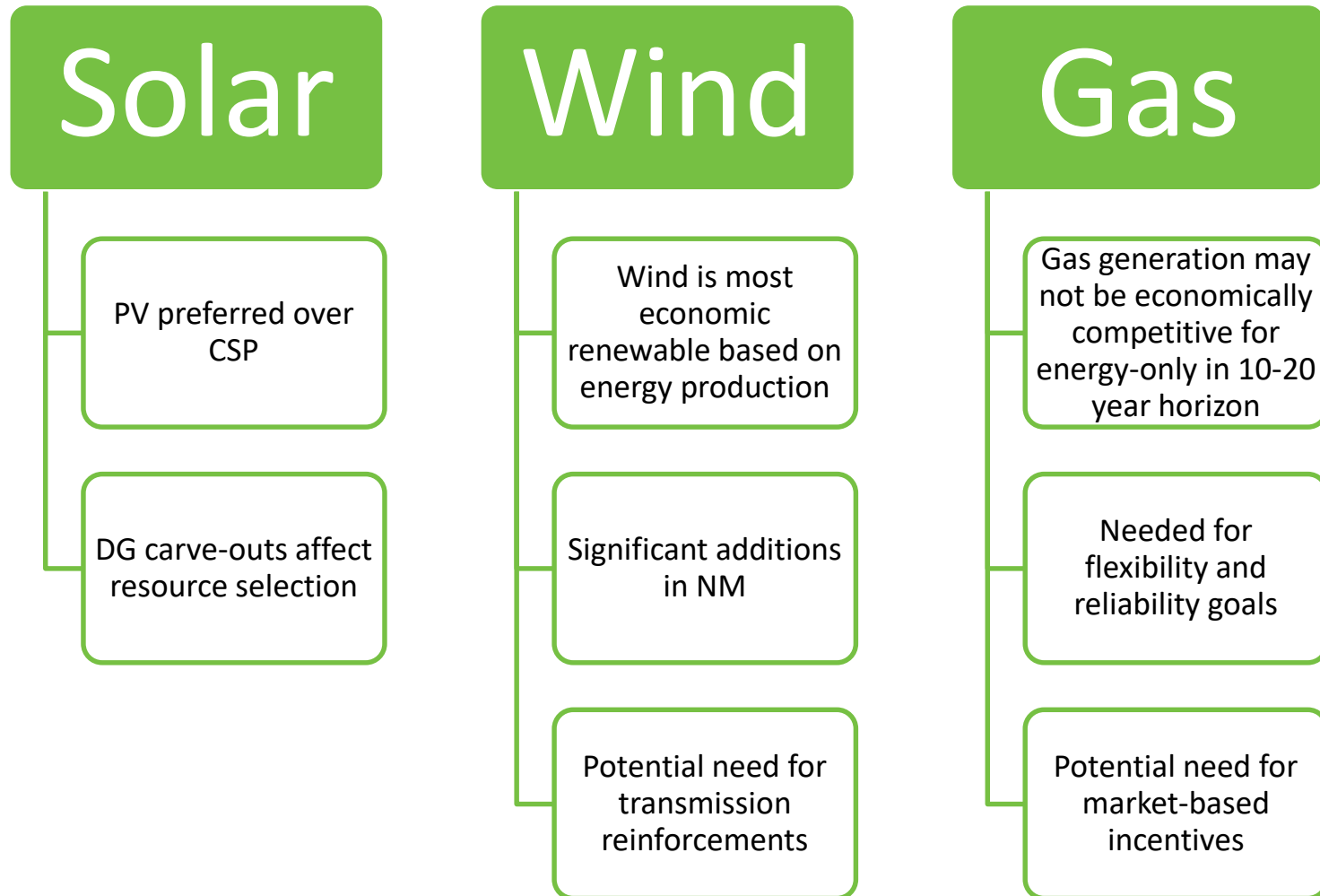
In high renewable cases, gas varies counter to renewables

Impacts on transmission flows depend on resource locations

# Preliminary Observations—Year 20 Studies



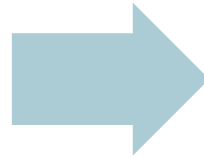
# Year 20 Observations—Cont.



# From Past to Future

## Tool-Based Approach

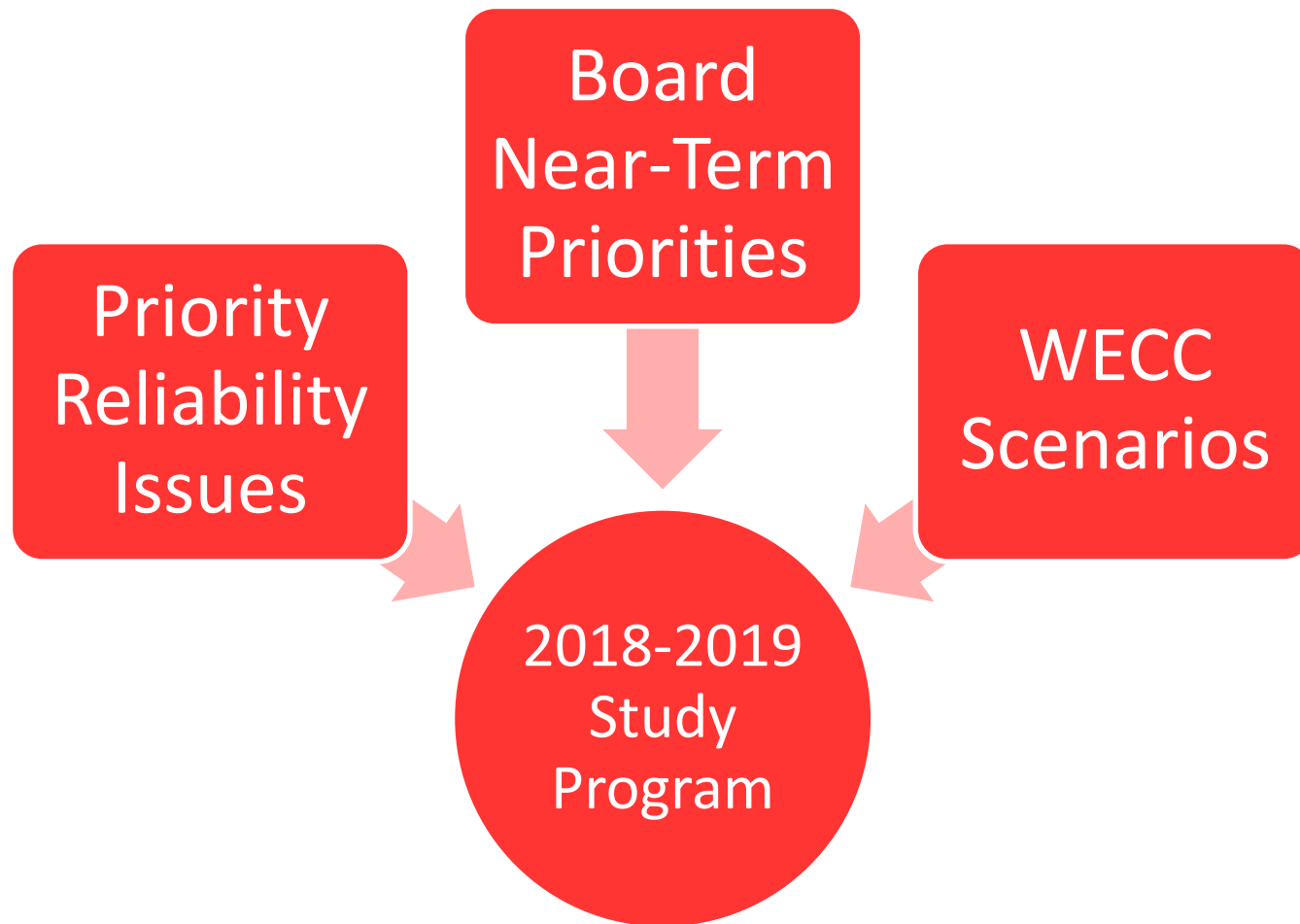
- What can we learn from PCM analyses?
- What can we learn from power flow analyses?



## Risk-Based Approach

- What potential future reliability risks should we be thinking about?
- How can we study them?

# Drivers for Future Reliability Assessments





# WECC Near-Term Priorities

## Representation of Inverter-Based Resources

- Improve the representation of inverter-based resources in WECC's base cases
- Focus on data collection for utility-scale photovoltaic resources, battery storage, and Distributed Energy Resources (DER)

## Impacts of the Changing Resource Mix

- Existing Path Ratings
- Remedial Action Scheme effectiveness
- Expansion of utility-scale storage devices
- Protection system ratings
- Resource adequacy (RA) and alternate RA methodologies
- Interface between transmission and distribution with a focus on modeling techniques
- Essential Reliability Services unique to the Western Interconnection

# WECC Near-Term Priorities

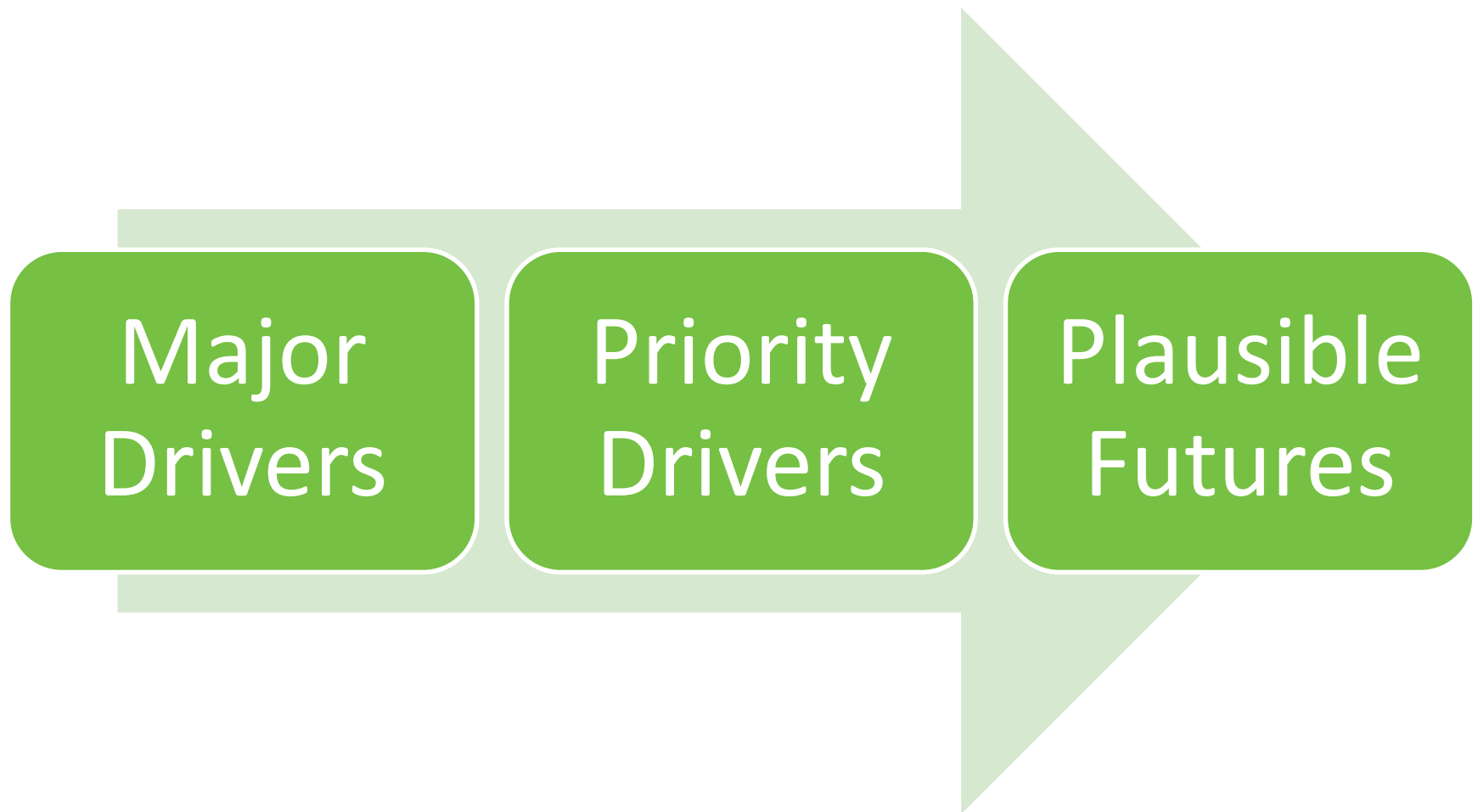
## Expansion of RC and Market Service Providers

- Evaluate potential reliability risks and mitigating measures
- Consider Regional Reliability Standards, resulting from the expansion of Reliability Coordinators (RC) and/or market service providers

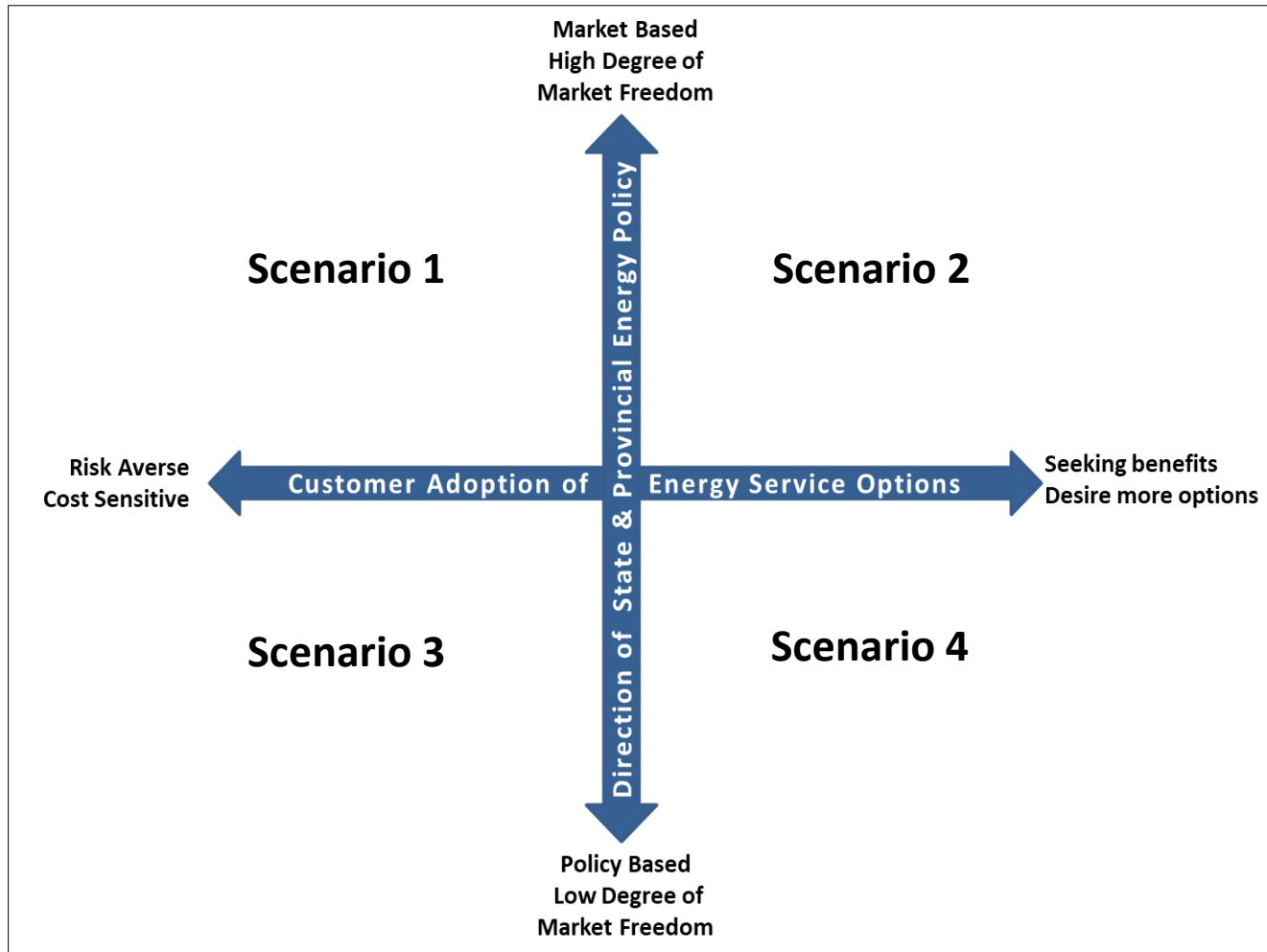
## Clarify Roles in BPS Planning

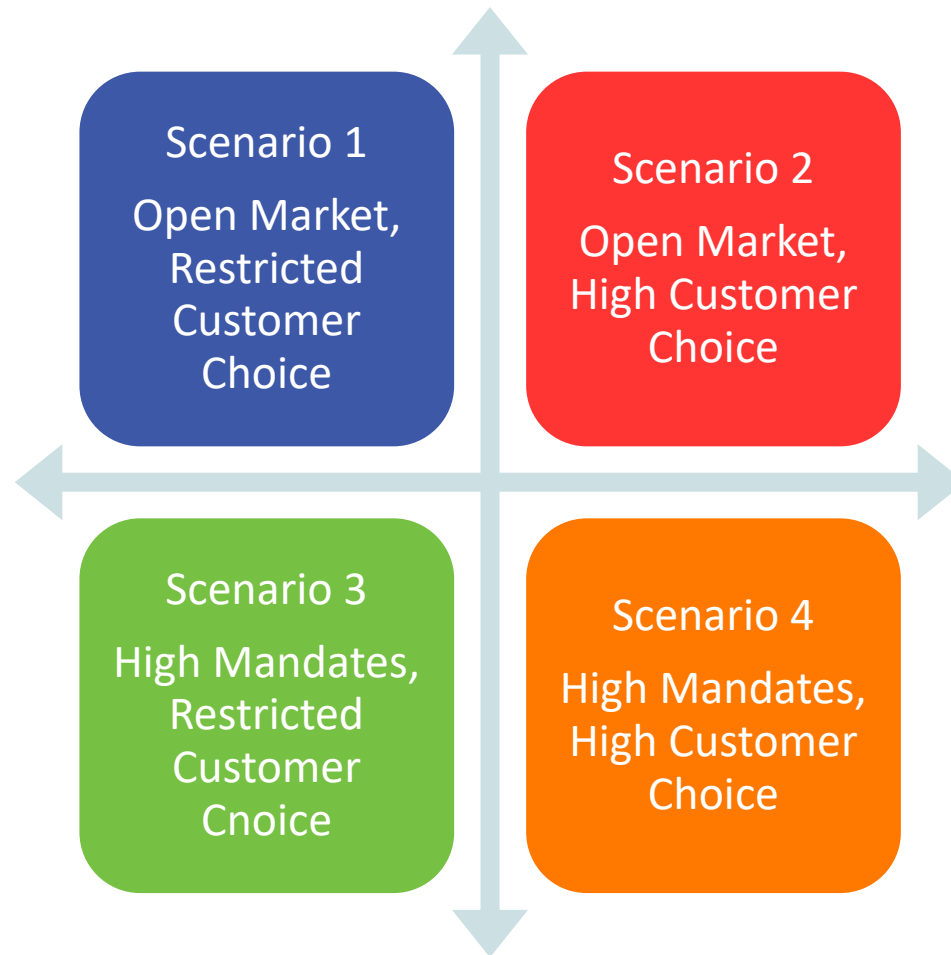
- Improve coordination by clarifying the roles, responsibilities, and relationships among WECC and
  - FERC-Jurisdictional Regional Planning Groups
  - International Planning Groups (non-FERC Jurisdictional Canadian entities)
  - Planning Coordinators
  - Transmission Planners
  - Other stakeholders involved in BPS planning

# Scenario Development

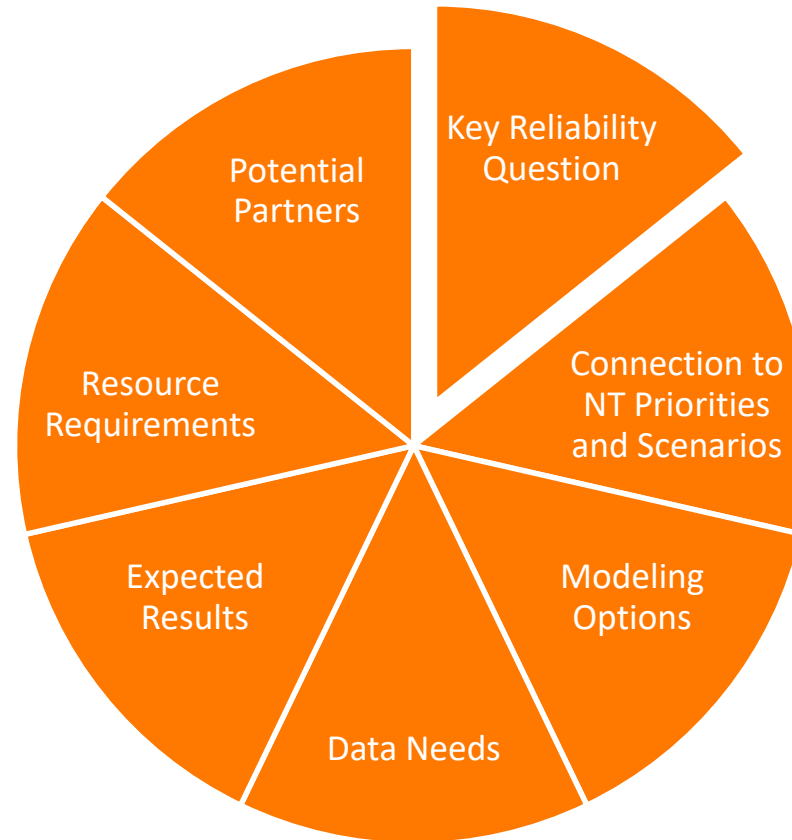


# WECC Scenarios





# Reliability Assessment Structure



# 2019 Reliability Assessments – Phase 1

## Changes to System Inertia with High Renewable Implementation

- Retirement of 90 to 100% of the coal fleet
- Increase in renewable technologies
- Impacts of changes to system inertia on primary frequency response to a disturbance

## Significant Electrification

- High market penetration of passenger and commercial electric vehicles
- Significant effort to electrify non-electrical energy uses
- Increasing penetration of electronically-interfaced end-use loads

## System Resilience Under Extreme Natural Disaster

- Reliability impacts of major natural disasters
- Regional/systemwide impacts

# 2019 Reliability Assessments – Phase 1

## El Paso Natural Gas Pipeline Disruption

- Would an interruption in gas supply from the El Paso Pipeline, as described in WECC's Gas-Electric Interface Study, create stability risks in Southern California or Arizona?

## Water Availability Issues

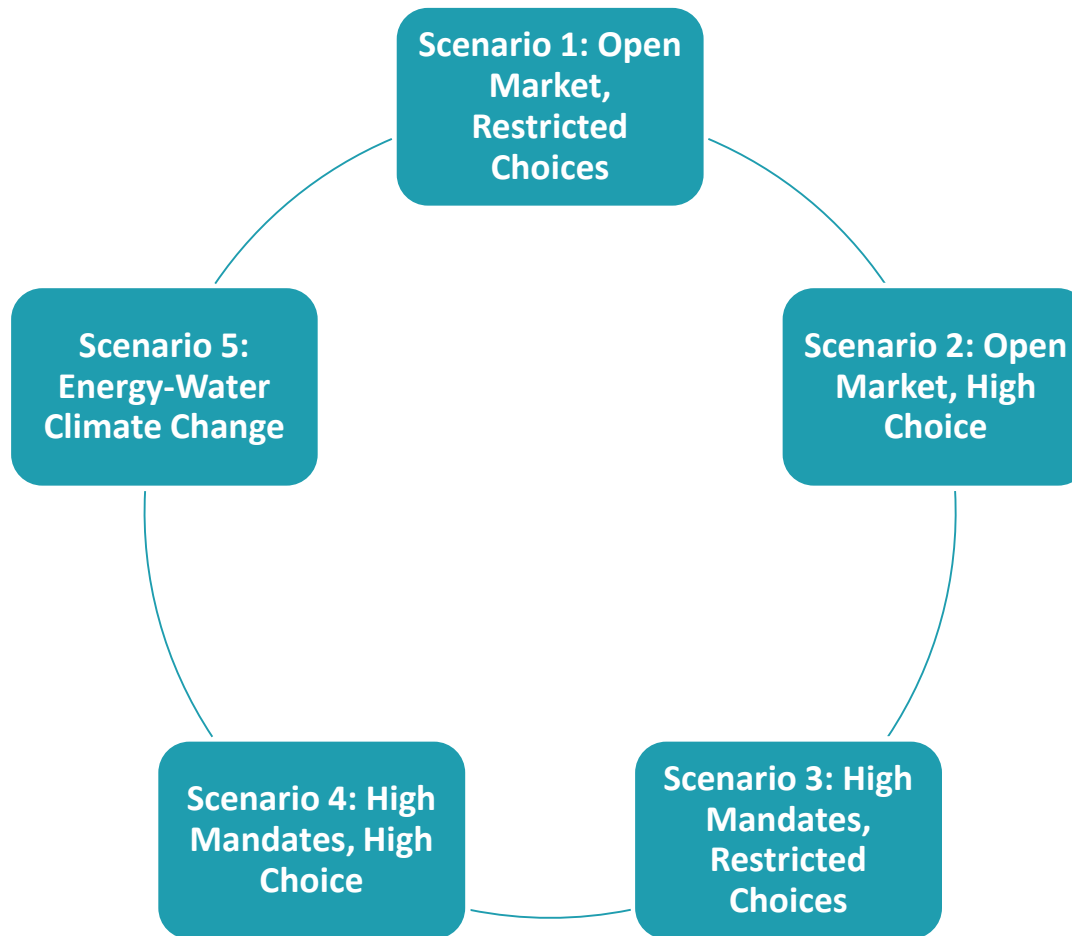
- How will limitations on water availability in the next 10-20 years impact reliability?

## Reliability Impacts of Most Likely Year 10 Future

- In the Year 10 "Base Case" (2028), are there any reliability risks associated with path flows, resource adequacy, system stability or other parameters?



# Scenario-Based Assessments



# 2019 Reliability Assessments – Phase 2

## Utility Business Models

- Potential reliability risks created by new utility business models

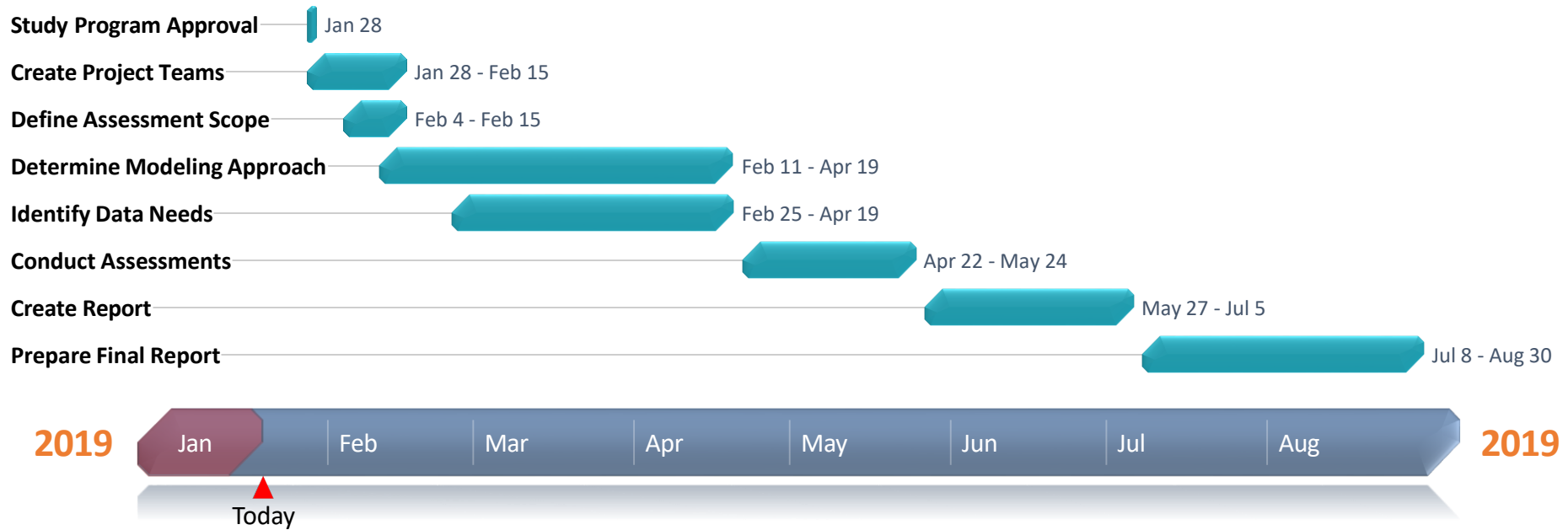
## Resource Adequacy Under Contingency

- Resource adequacy if generator outages in 2028 follow historic patterns observed in 2015-2017

## Gas Unit Unavailability

- Reliability risks created by gas generators being unavailable because they are uneconomic to keep running

# Study Program Baseline Schedule



# Contact Information

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