

# WECC

## Transmission Expansion Planning

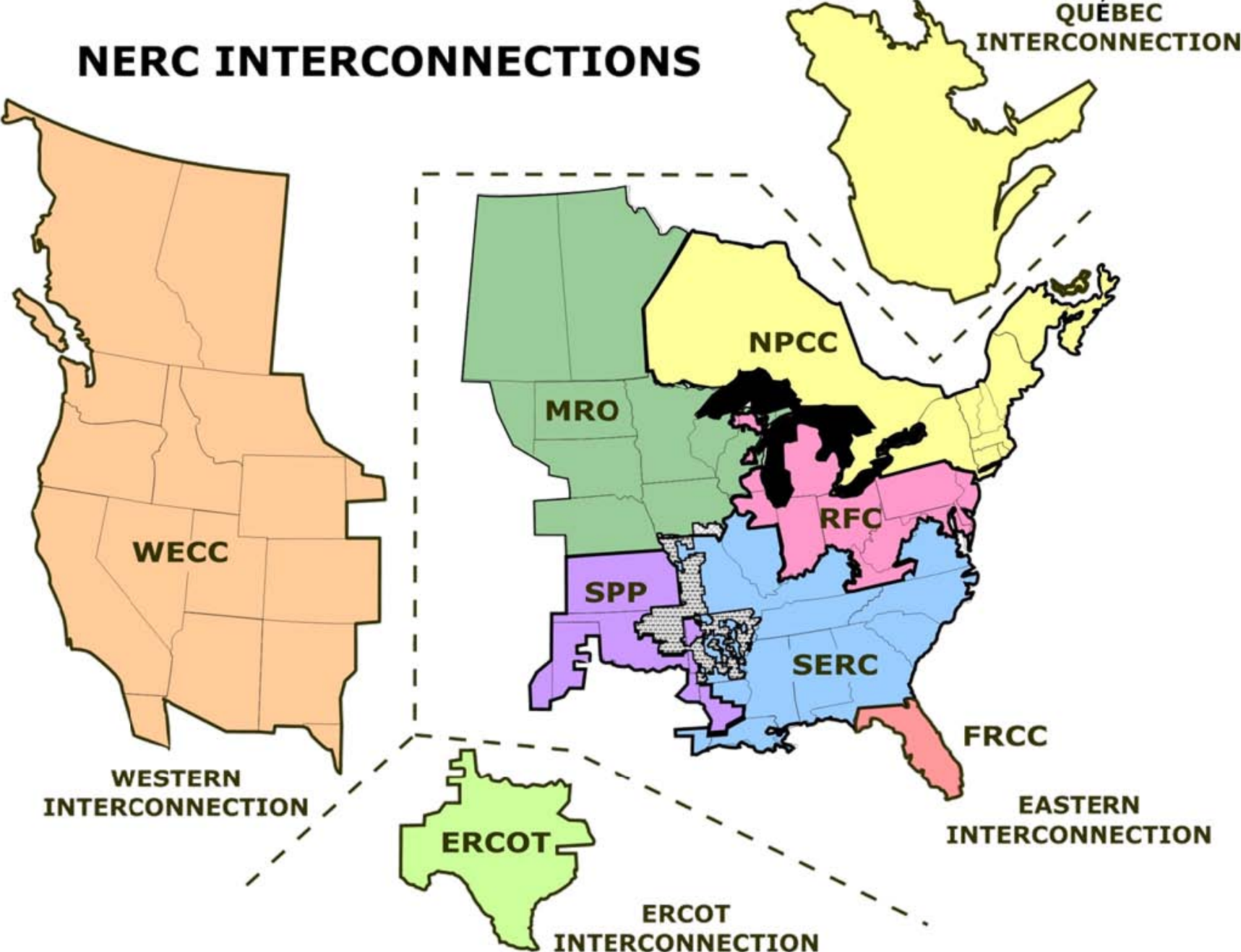
**Byron Woertz, Senior Project  
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*Western Regional Partnership Webinar, November 18, 2014*

# Overview

- TEPPC Study Program and Priorities for 2014
- SPSG Scenario Planning Process
- EDTF Efforts and Contribution to Planning
- Stakeholder Outreach—DoD and Tribal Participation

# NERC INTERCONNECTIONS



# WECC Functions



## Non- Planning Functions

- Compliance Monitoring and Enforcement
- Standards Development
- Market-Operations Interface
- Operator Training
- WREGIS

## Planning Functions

- Loads and Resource Assessments
- Reliability Studies
- Transmission Expansion Planning

# Transmission Planning at WECC

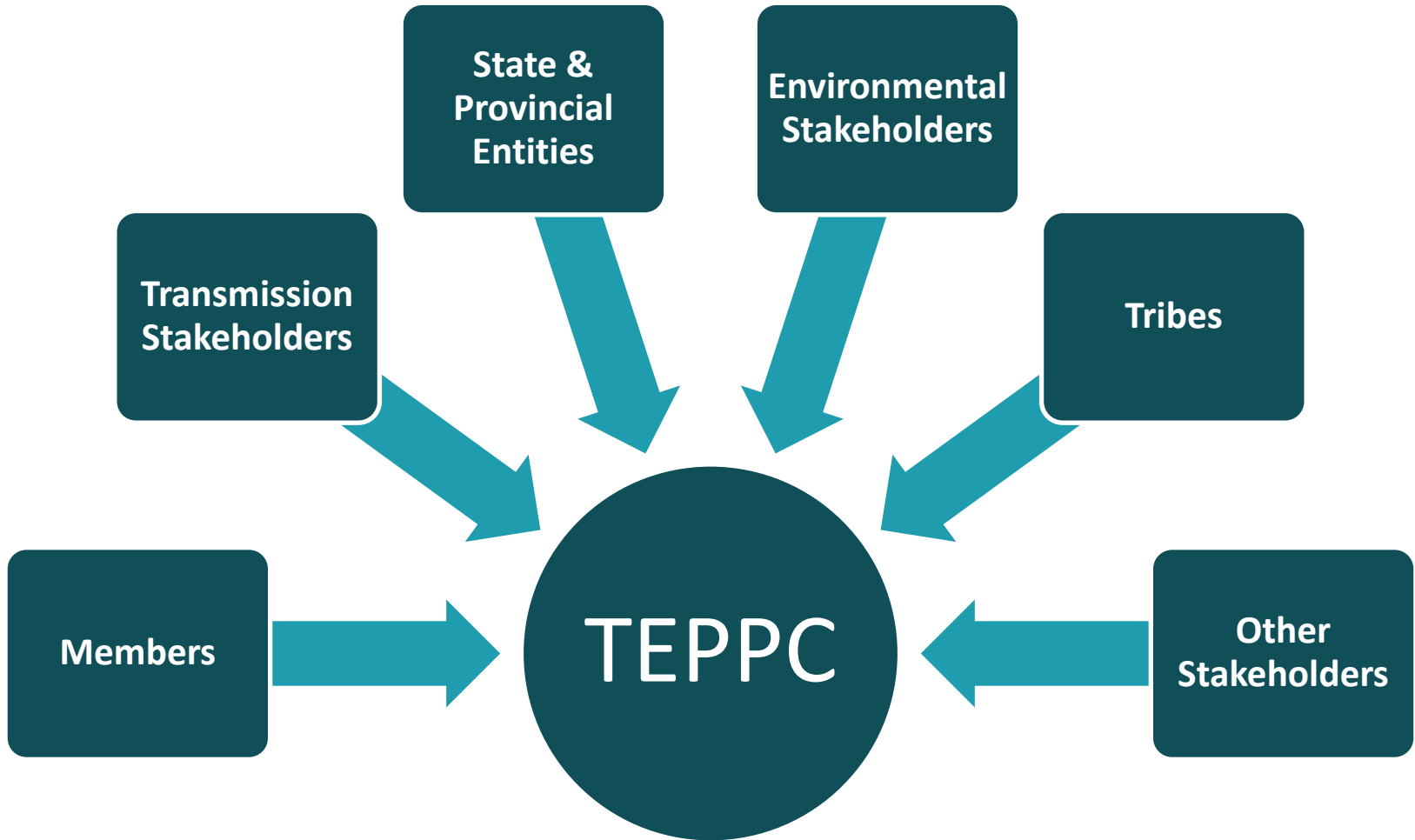
## Transmission Expansion Planning Policy Committee (TEPPC)

- Lead transmission expansion planning for the Western Interconnection
- Annual study program
- Congestion studies

## Subcommittees and Work Groups

- Technical analysis
- Studies
- Data
- Scenarios

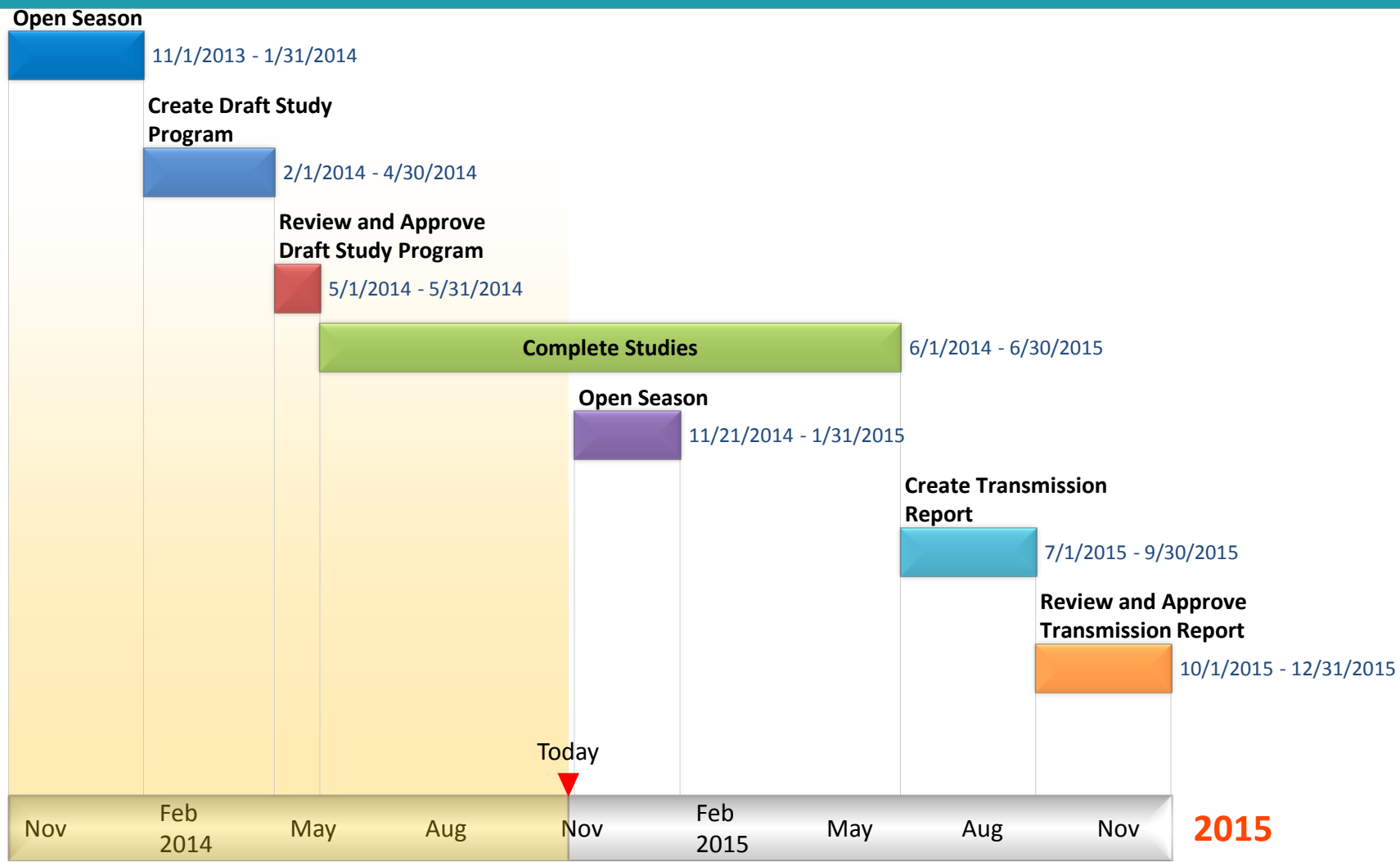
# Who Does TEPPC Serve?



# 2014 TEPPC Study Program

- Transition year
  - Previously, 2-year study program ending with comprehensive transmission plan
  - Highly time-intensive
  - End result: overly complex set of documents
- TEPPC currently determining details of reporting system

# 2014 TEPPC Study Program

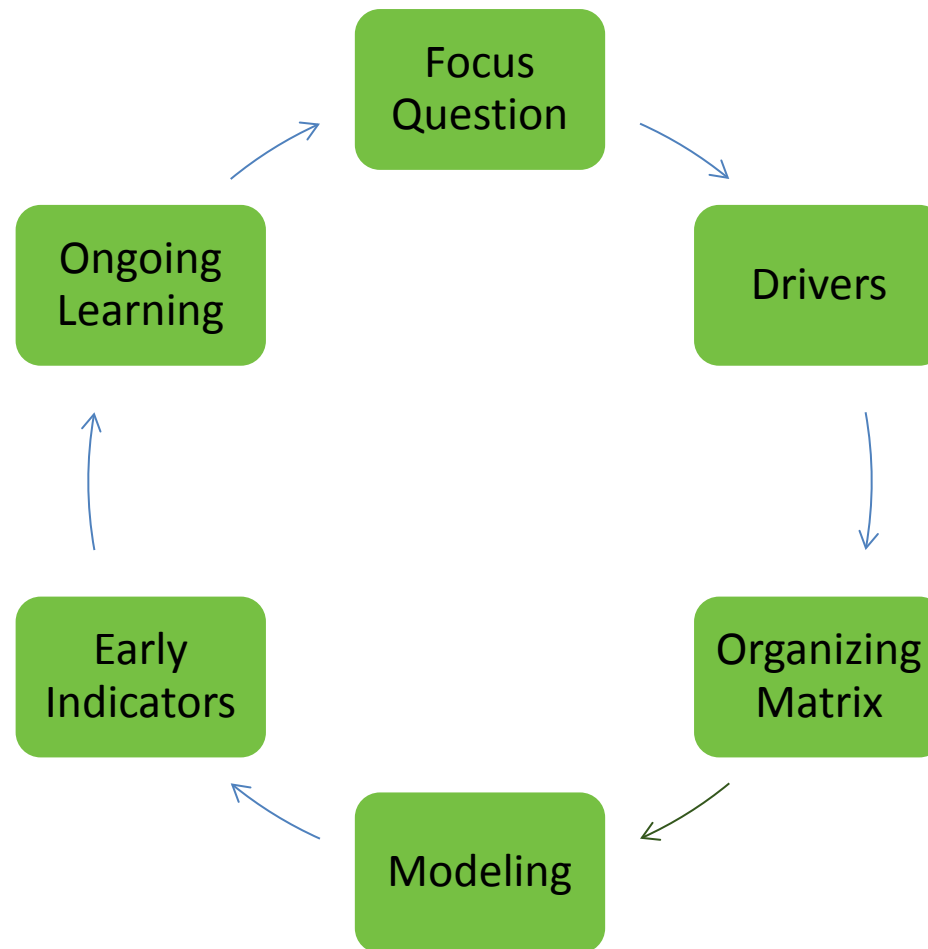




# Study Priorities for 2014

- Current Study Program includes:
  - 39 high-priority 10-year studies
  - 11 high-priority 20-year studies
  - 7 medium- and low-priority studies
- Study themes include (among others):
  - Coal plant retirements
  - High distributed generation
  - Transmission expansion cases
  - High renewable development (various locations)

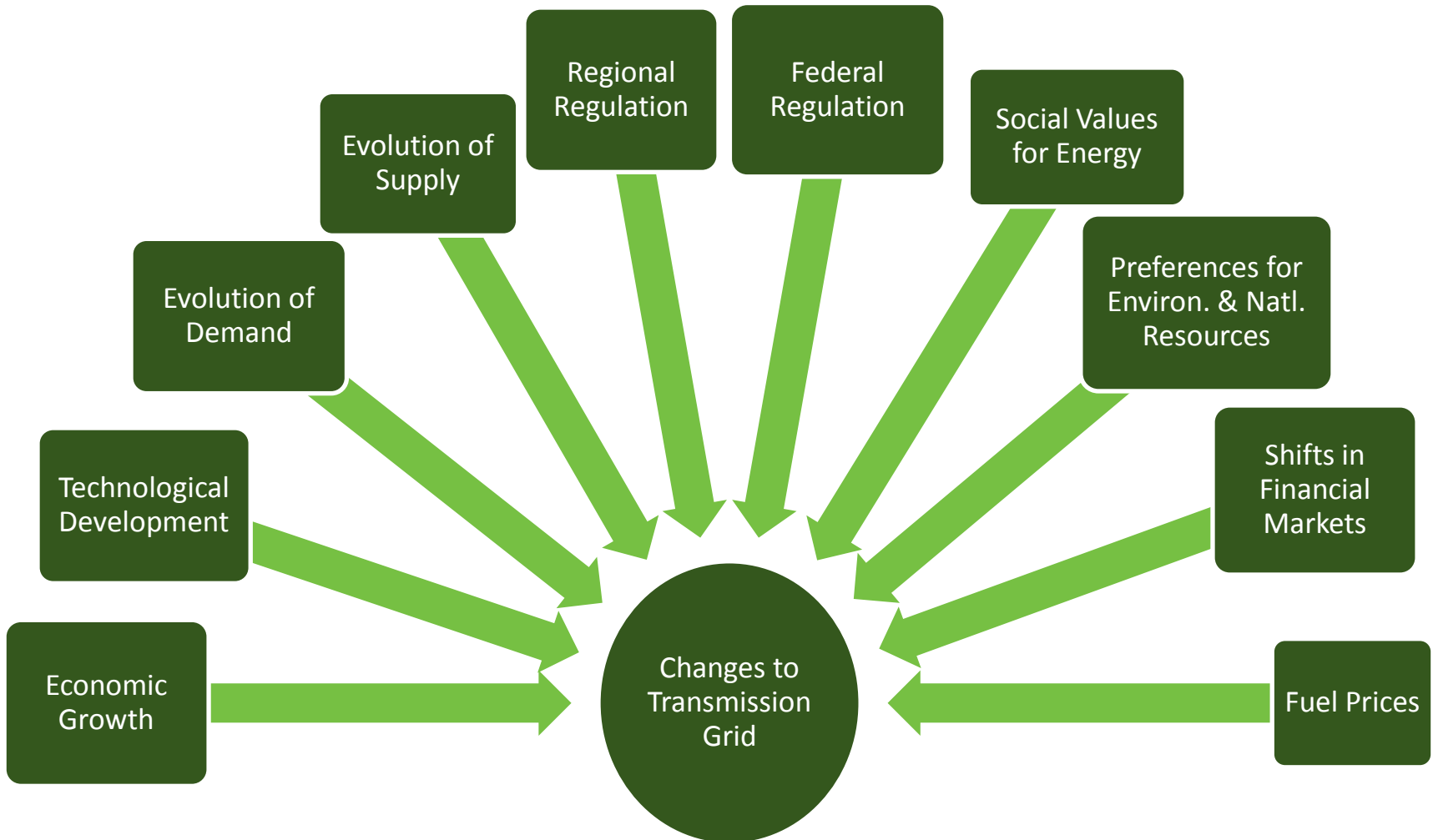
# Scenario Planning Process



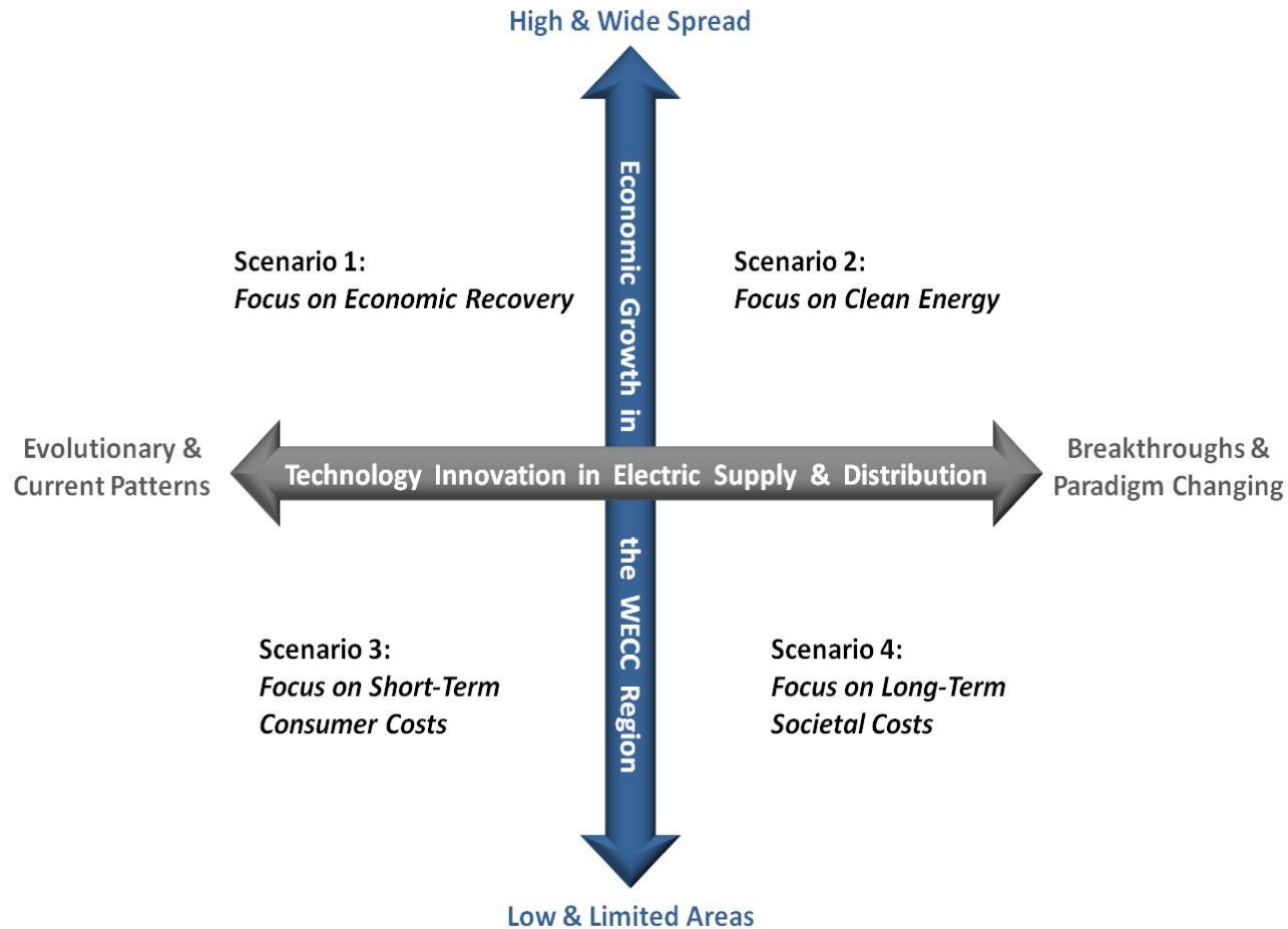
# Focus Question

- How will demand for electric power services in the Western Interconnection change in the next 20 years and how will electric power supply services and transmission networks change to accommodate that demand?

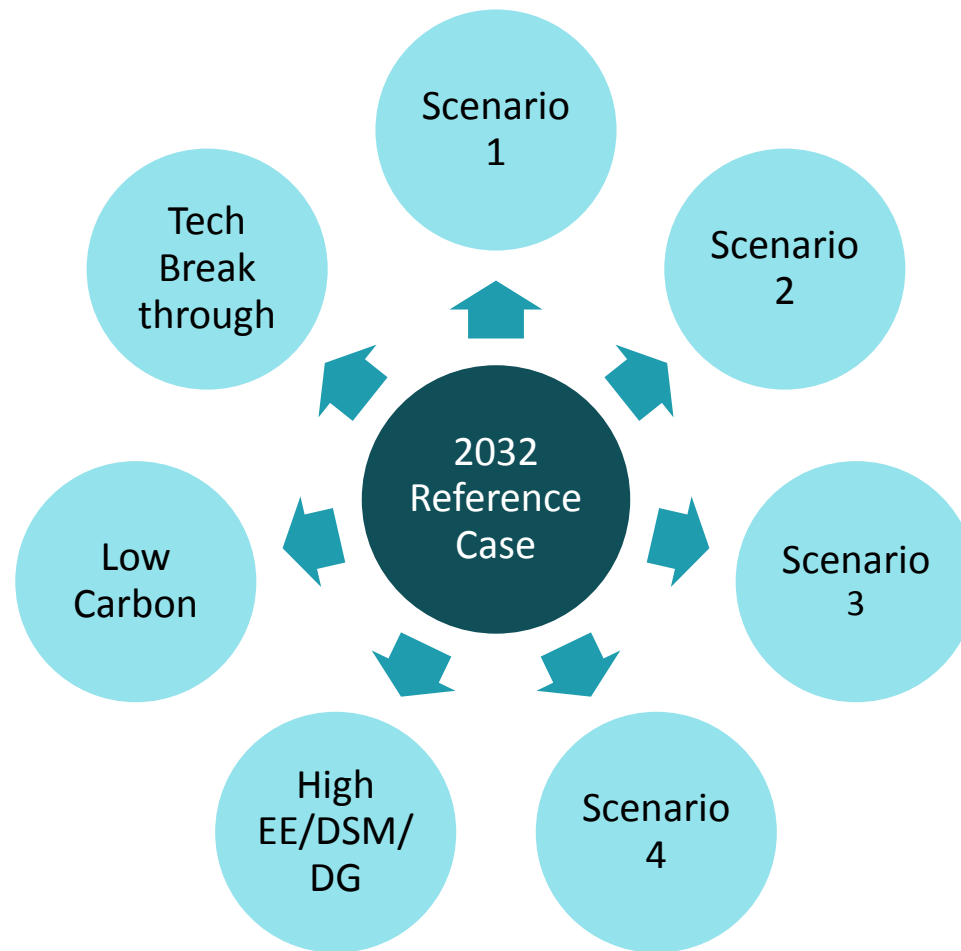
# Drivers



# Organizing Matrix

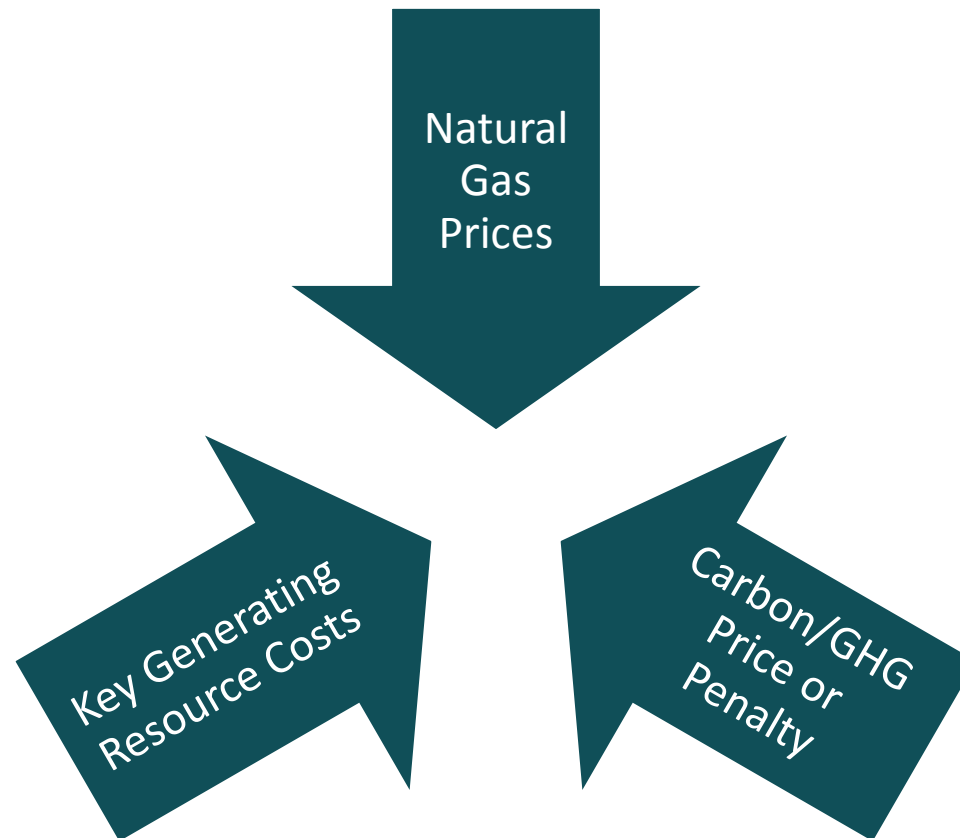


# 20-Year Study Cases—2012



# 20-Year Horizon Observations (2013)

1. Diverse potential resource additions are driven primarily by three factors



# 20-Year Observations...cont.

2. The 2034 Reference Case showed that:
  - Renewable resources were selected economically in addition to RPS requirements
  - Levelized costs for new gas and wind resources were very close
  - Transmission additions were driven by the need to gather and deliver low-cost renewable resources from remote areas to load centers
  - Solar penetration appears to be trending higher than depicted in the Reference Case
  - New coal generation is not economic if the carbon price is around \$37/ton
  - System flexibility with increasing intermittent resources is an important consideration that was not fully addressed in 2013



# 20-Year Observations...cont.

3. More aggressive cost reductions and higher carbon prices/penalties lead to more extensive transmission expansion.
4. Further study is needed to determine optimized transmission additions in view of uncertainty inherent in 20-year planning

# Environmental and Cultural Resource Data

- Environmental Data Task Force (EDTF)
  - Formed in June 2010
  - Includes representation by broad stakeholders
  - Provides input to regional transmission expansion planning process

# Primary EDTF Products

## Preferred Data Sets

- Available
- Reviewed for Quality
- Relevant to Transmission Planning

## Risk Classification System

- Four Risk Levels
- Low Risk (1) to Exclusion Area (4)

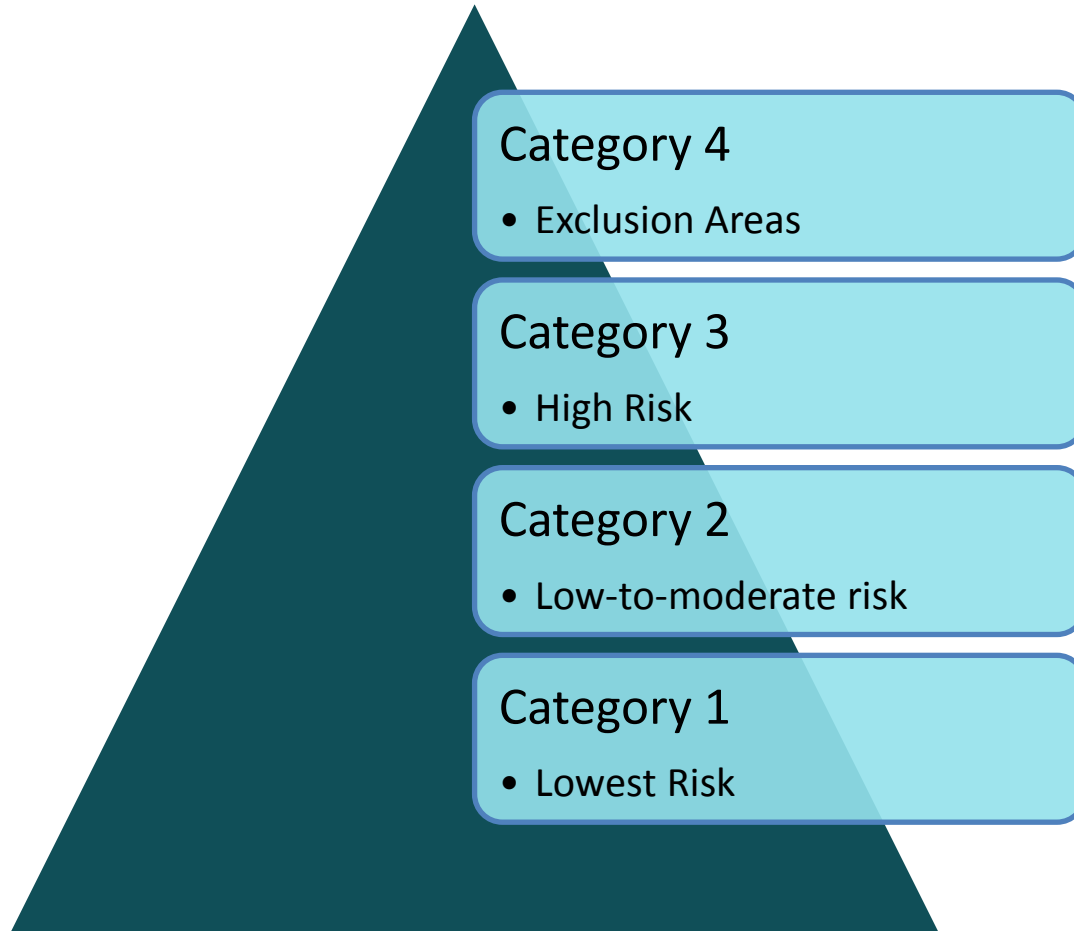
## Comparison Methodology

- Compares relative risks of transmission alternatives
- Alternatives identified in long-term study cases
- Available for use outside of WECC

## Review of Study Case Results

- Considers “environmental risk contours”
- Also considers cultural risks
- Considers capital costs of “bending lines”

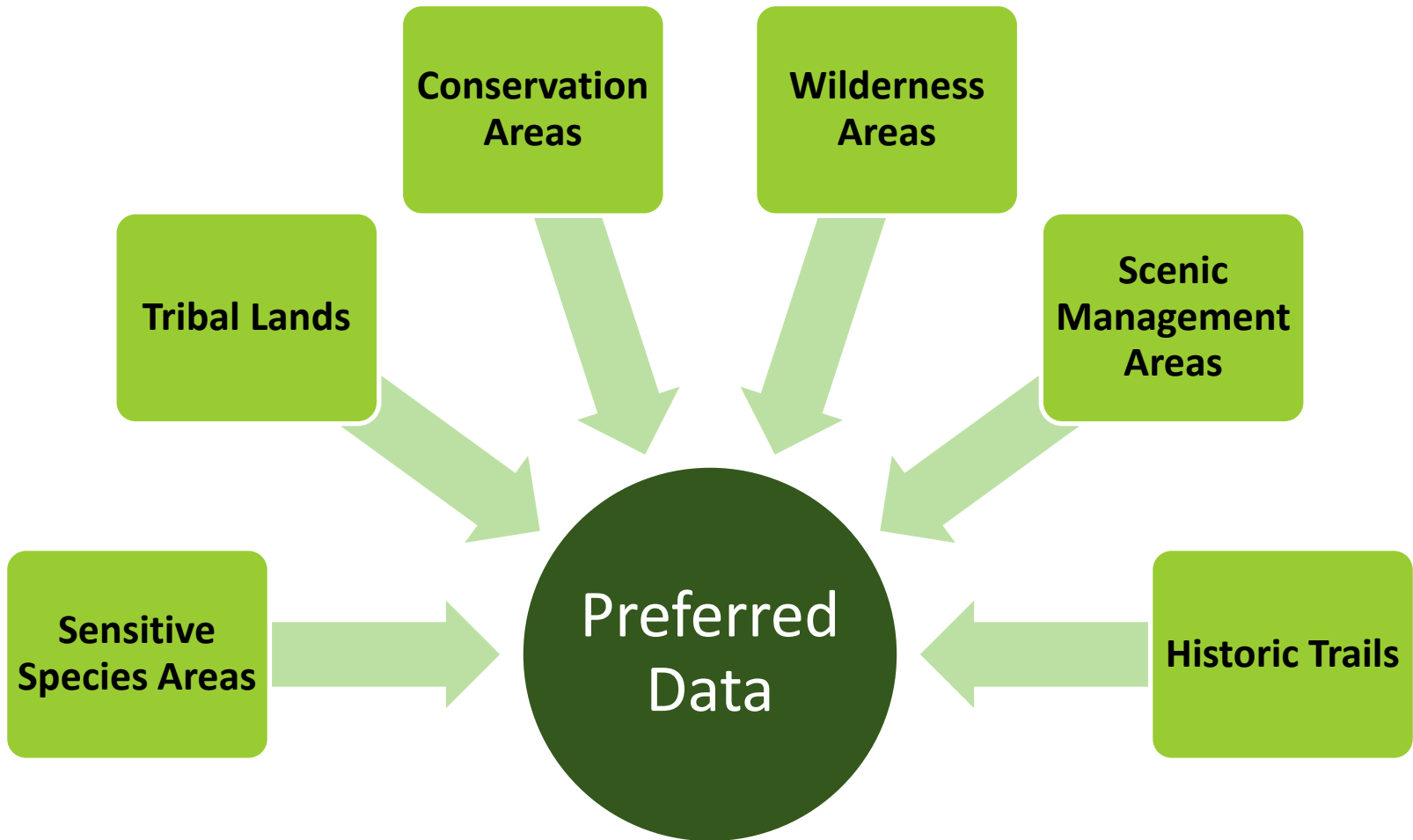
# Risk Classification



# Benefits of EDTF Products

- Early-stage environmental/cultural resource planning can decrease conflict and cost
- EDTF process ensures high data quality, and offers opportunity to avoid/mitigate risks at planning level
- Public availability of tools enables use in other state/regional/federal planning efforts

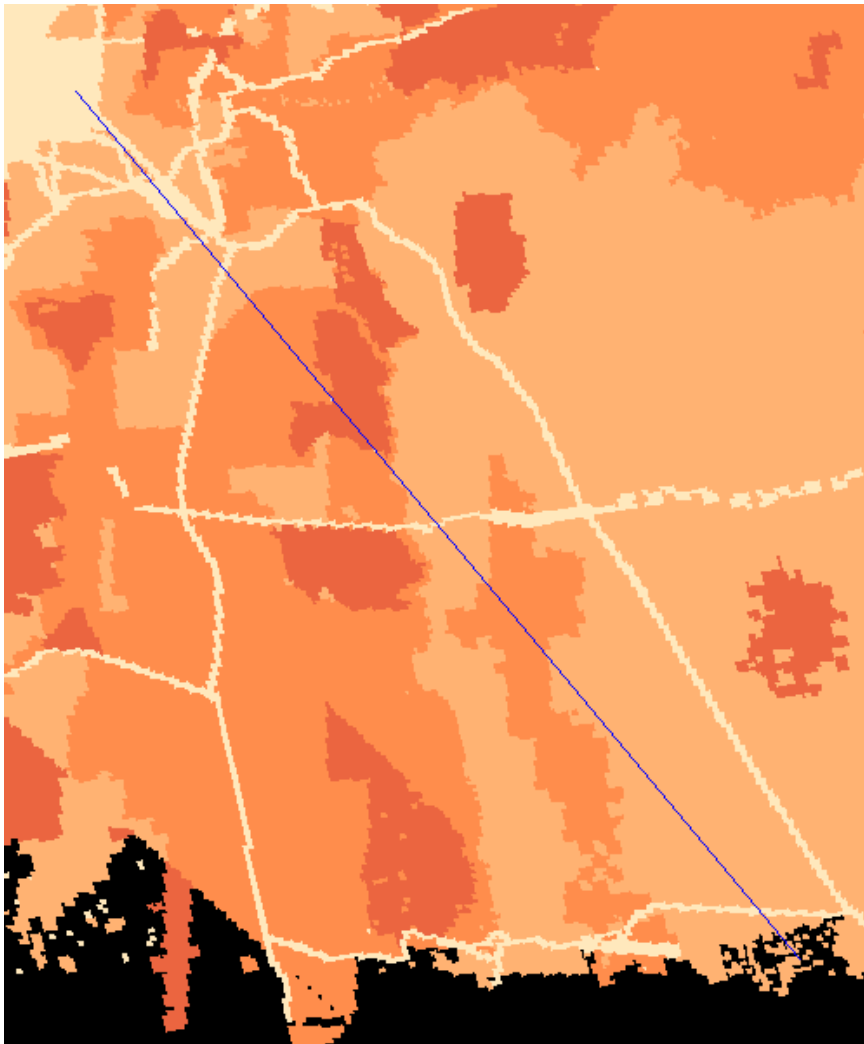
# Environmental/Cultural Data (Samples)



# How Does WECC Use These Data?

- Create transmission expansion options based on study case inputs
  - Loads, resource costs, fuel prices, carbon cost
- Options are “point-to-point”
  - Need to “bend the lines”

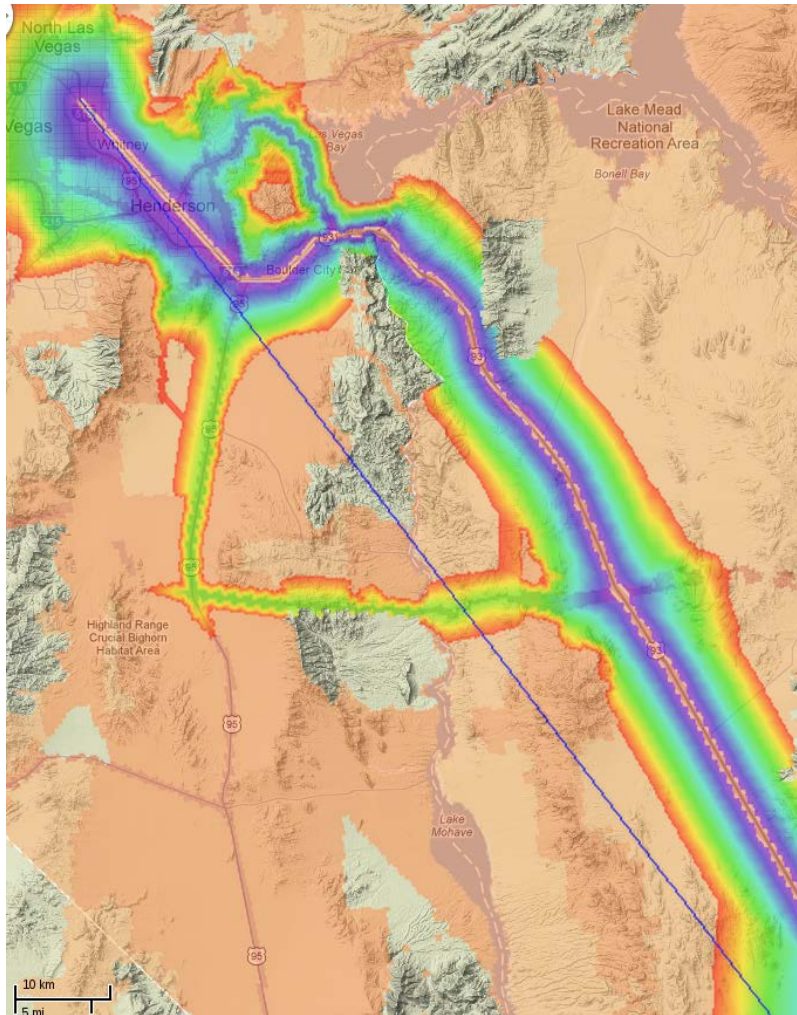
# EDTF Risk Classes 1-4



- Blue line connects endpoints
- Darker areas = higher risk category



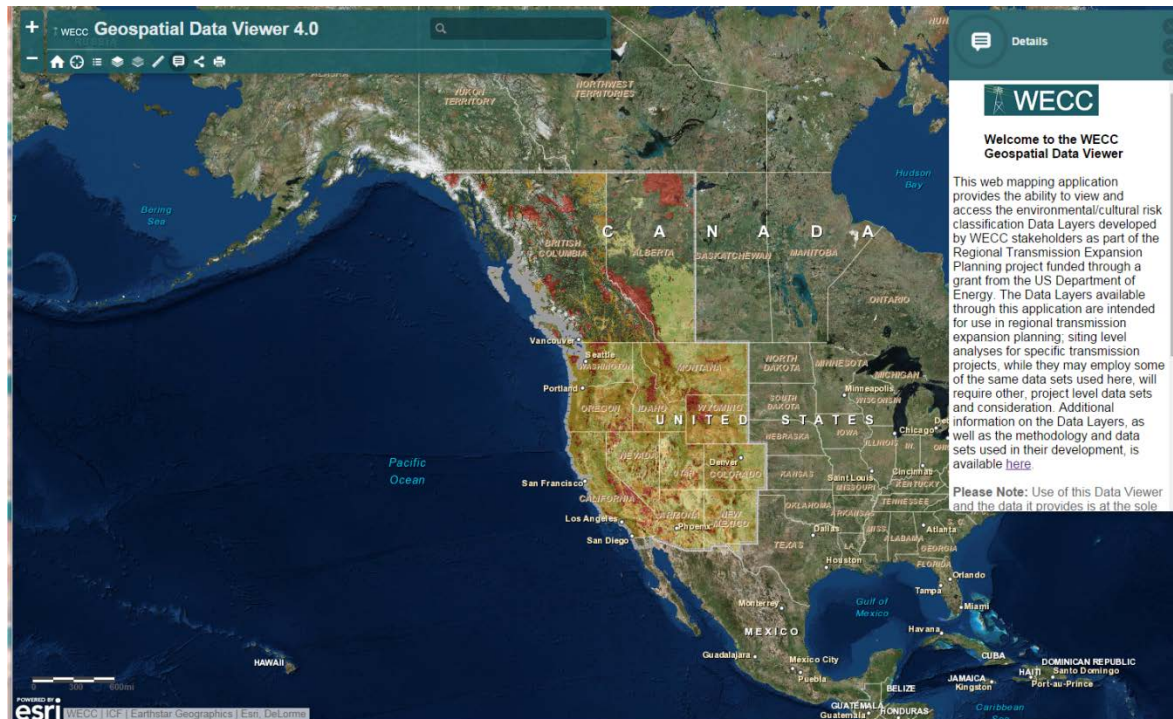
# Long-Term Planning Tool



## With Environmental Overlay:

- Semi-transparent EDTF overlay on terrain map
- Semi-transparent corridor over EDTF and terrain maps

# WECC Data Viewer



- Can be accessed from WECC's public website:  
[http://www.wecc.biz/committees/BOD/TEPPC/Pages/EDTF\\_DataViewer.aspx](http://www.wecc.biz/committees/BOD/TEPPC/Pages/EDTF_DataViewer.aspx)
- Is not intended to be an analysis tool

# Outreach to Key Stakeholders

- Additional data is needed
  - Planning considerations near Department of Defense facilities
  - Tribal boundaries and considerations
  - Cultural resource data
- Additional collaboration is also critical
  - Ongoing communications with DoD and tribal leaders