

**MISO Regional Transmission
Overlay Study Scope**
DRAFT

Planning Advisory Committee
August 17, 2016

Overview

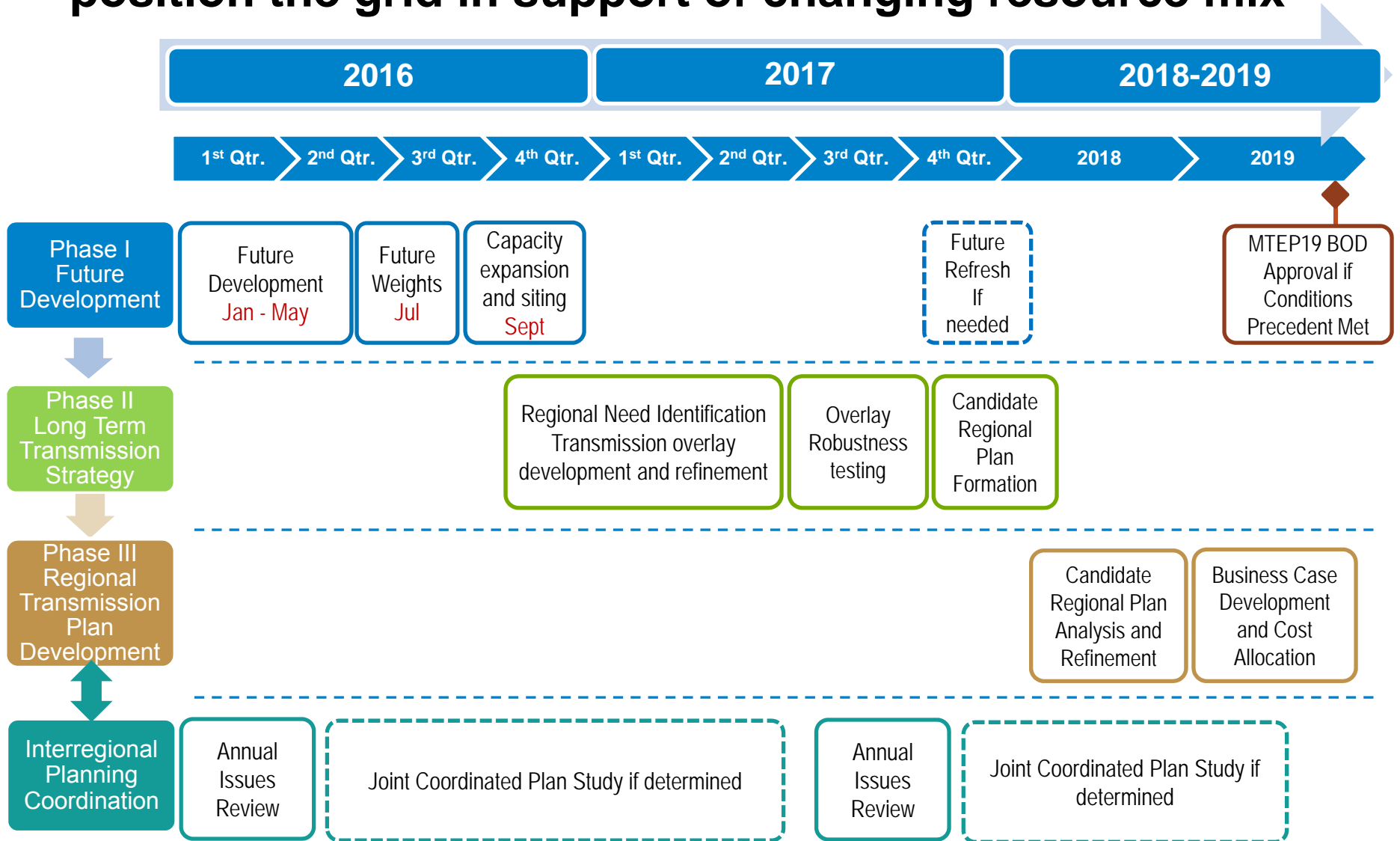
- **Objective**

- Review draft study scope of MISO Regional Transmission Overlay Study and solicit stakeholder feedback

- **Key Takeaways**

- Value based planning is a multi-year process to position the grid in support of changing resource mix
- The focus of 2017 is to identify regional needs and develop long term overlay roadmaps, using three futures developed through MTEP17 process
- Integrated overlay design approach brings a holistic view of system needs by identifying and combining reliability needs and economic opportunities upfront
- Multiple review opportunities provided through a stakeholder inclusive process

Value based planning is a multi-year process to position the grid in support of changing resource mix



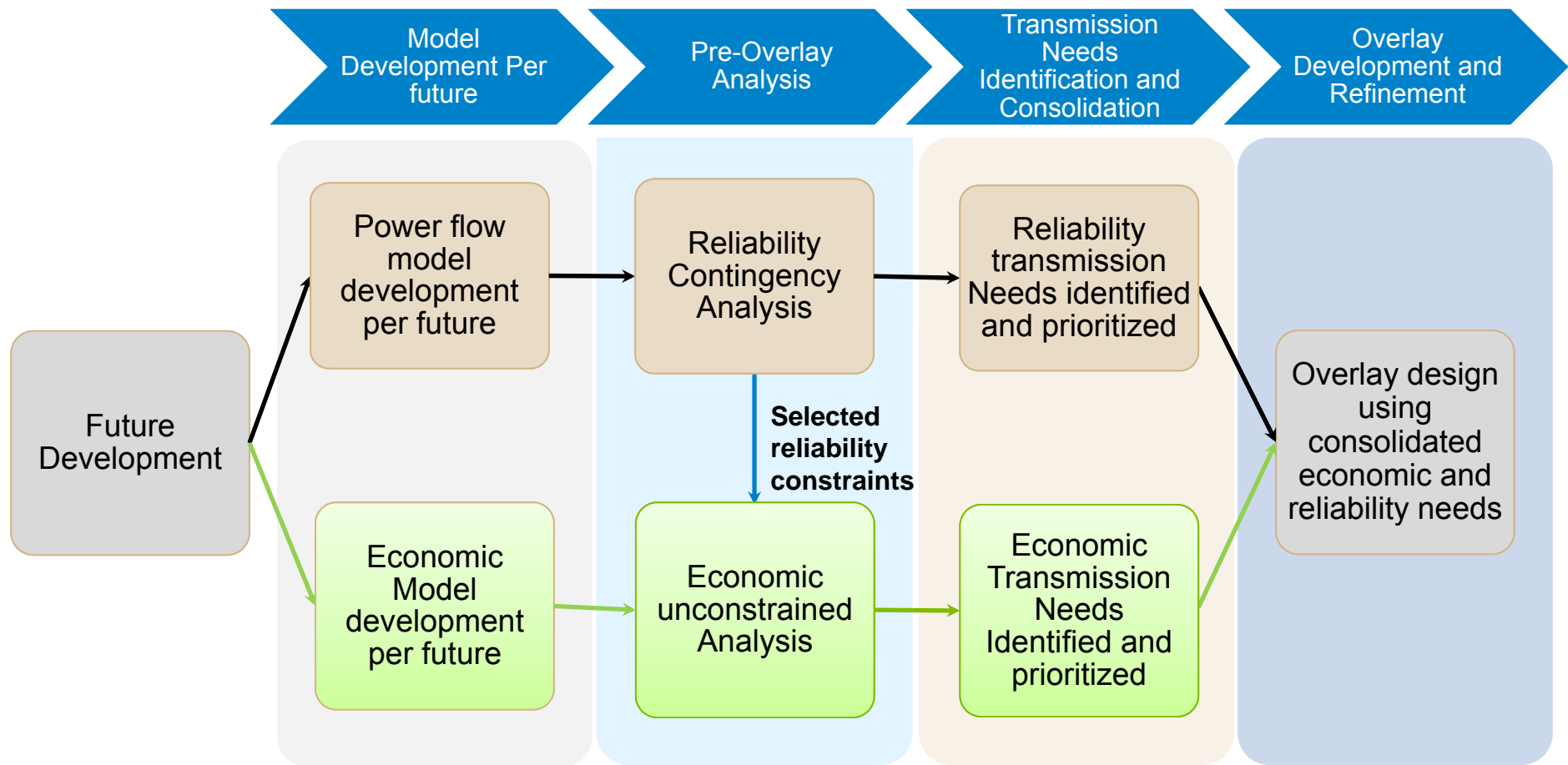
Phase I Future Development

- **Three Futures developed through the MTEP17 process will be used for Phase II conceptual overlay development**
 - Existing Fleet
 - Policy Regulations
 - Accelerated Alternative Technologies
- **MISO will utilize the Sector Average weighting for the MTEP17 Futures**

MTEP17 Future	Sector Average
Existing Fleet	31%
Policy Regulations	43%
Accelerated Alternative Technologies	26%

- **The set of futures and associated weights will be reassessed and refreshed as needed prior to phase III regional transmission plan development**

Phase II Integrated Transmission Overlay Design



Integrated overlay design approach brings a holistic view of system needs by identifying and combining reliability needs and economic opportunities upfront

Holistic Transmission Needs Identification

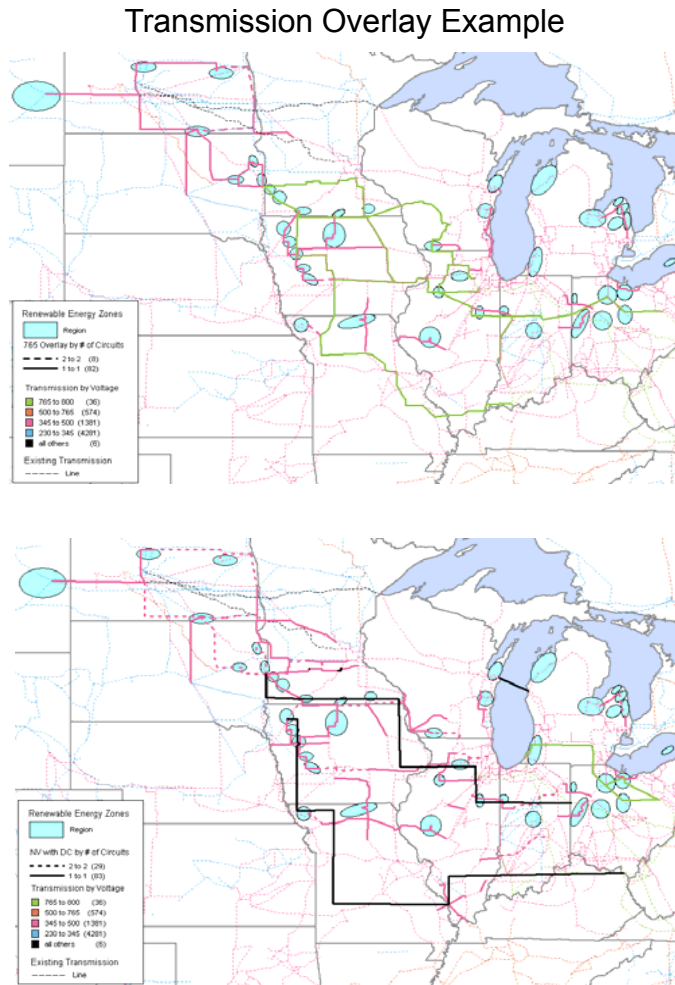
Reliability Contingency Screening

- Detailed AC power flow contingency analyses on a variety of system conditions
- Identify thermal and voltage issues across MISO footprint for each defined future
- Select a list of top thermal constraints for inclusion in economic analysis

Economic Unconstrained Analysis

- Detailed production cost model simulations with and without existing transmission constraints
 - Constrained Case
 - Unconstrained Case
- Differences between these two cases provide a set of economic opportunities
 - Energy sources and sinks
 - Locational Marginal Prices (LMPs)
 - Interface flows
 - Adjusted product cost savings potential

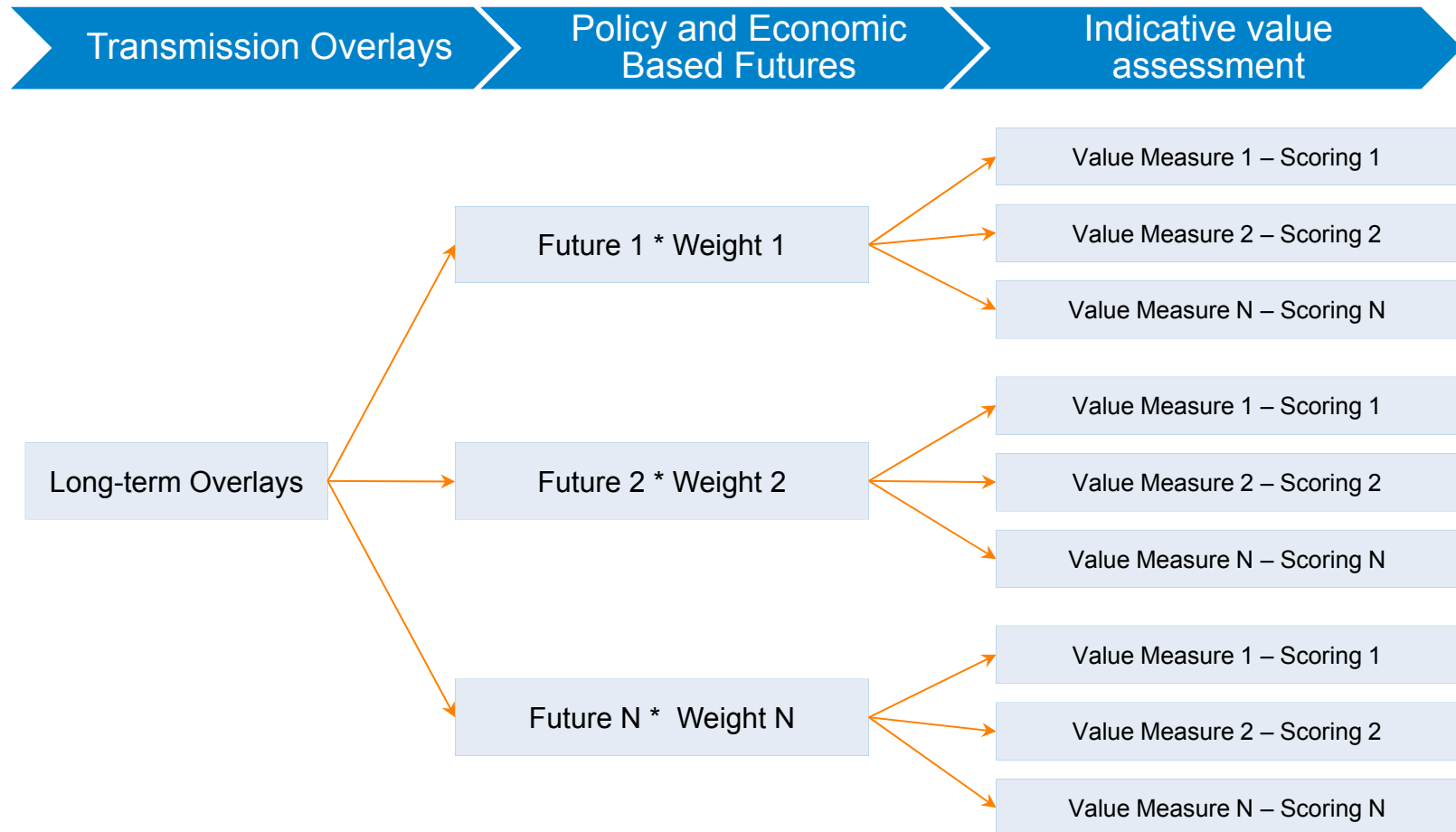
Integrated Overlay Development and Refinement



- A stakeholder inclusive process to develop and refine conceptual overlays in an open and collaborative fashion
- Ensure a reliable and efficient overlay development by addressing consolidated economic and reliability needs
- Iterative process to refine overlays to maximize value inclusive of economic, reliability, and policy drivers

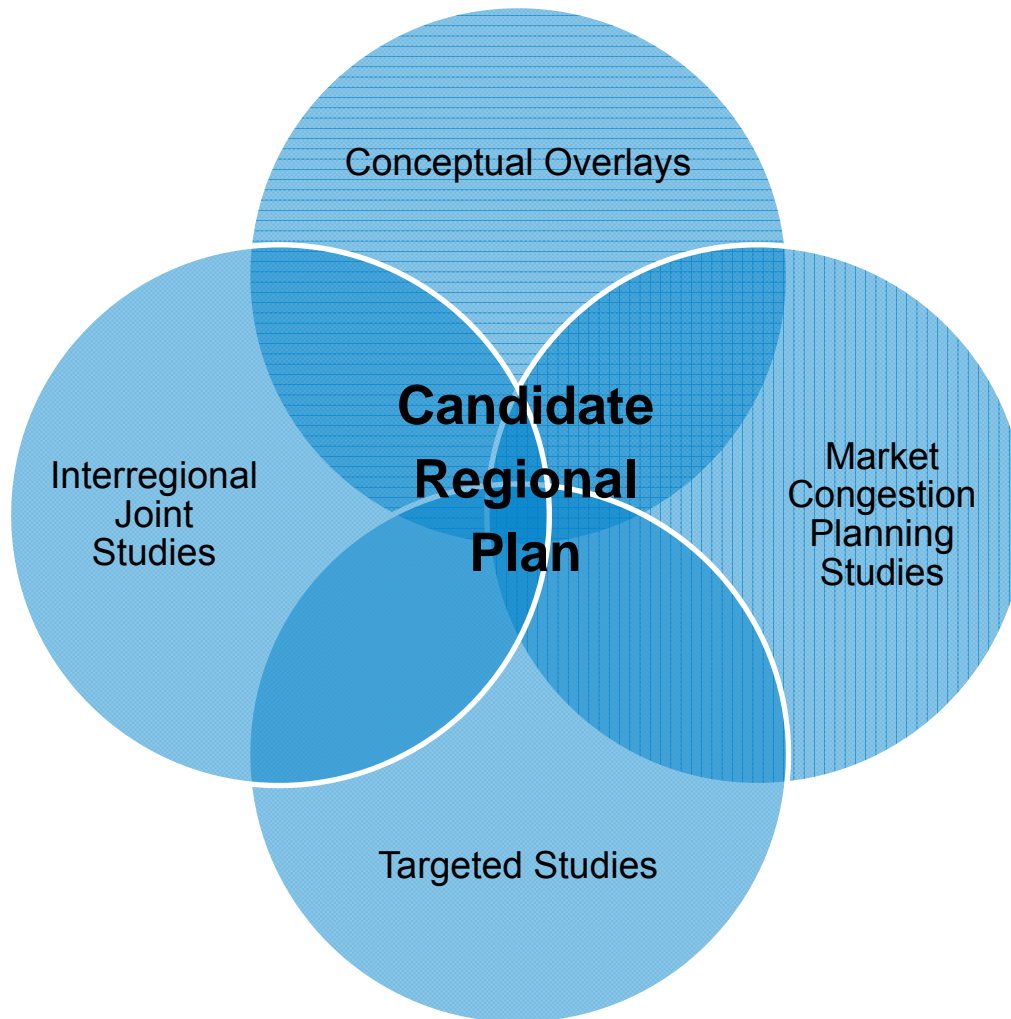
The graphics are for illustrative purposes ONLY

Overlay Robustness Testing



Goal is to compare the performance of overlays and identify best fit long-term transmission strategy through a broad value assessment

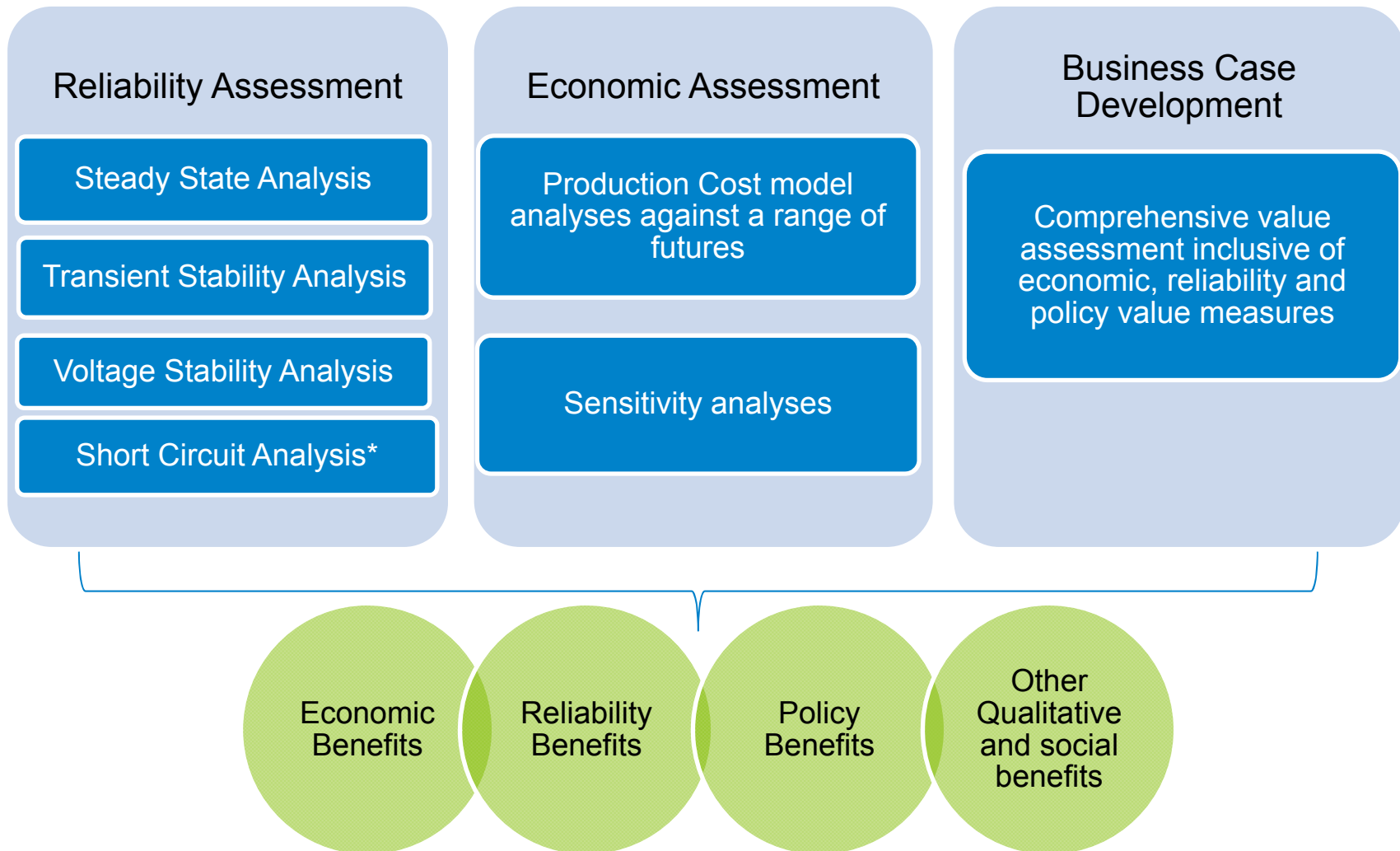
Candidate Regional Transmission Plan Formulation



- **Objective is to look for compatibility and flexibility regardless of future policy and economic conditions**
- **Formulate low risk candidate regional plan by**
 - ✓ Identifying common transmission facilities among long term overlays
 - ✓ Considering and consolidating transmission solutions derived from concurrent regional and interregional studies as applicable

Phase III Regional Transmission Plan Development

A suite of detailed engineering analyses to refine plan and create robust business case



* Short Circuit Analysis will require stakeholder modeling and analysis

Stakeholder Communication Protocols

Communication	Purpose	Frequency	Participation	Medium
Planning Advisory Committee Meeting	Overview of project scope, schedule and progress updates	Monthly	All stakeholders with broad interest in the study	Committee scheduled meetings
Technical Review and Design Task Team meeting	Inputs on study assumptions, methodology, results, study report, and transmission design	Bi-Monthly or as otherwise needed	All stakeholders with focus on high level technical or policy interest	Workshops to be scheduled
External Committee Outreach	Provide periodic progress reports	As needed/requested	PSC, MSC, OMS, Regulatory, etc	Committee scheduled meetings
TAM Newsletter Status Report	Inform stakeholders on project progress	Monthly	Internal and external stakeholders	MISO website
FTP Site	Post study models, input files and study results subject to CEII	Post as information is available	Stakeholders with signed NDAs	MISO FTP site
Public Webpage	Repository of study information and meeting materials	Post as information is available	All stakeholders	MISO website

Going Forward

- **Feedback Request**

- MISO requests feedback on the draft scope of work word document posted with this presentation
- Please submit feedback to Lynn Hecker
lhecker@misoenergy.org by **September 9, 2016**

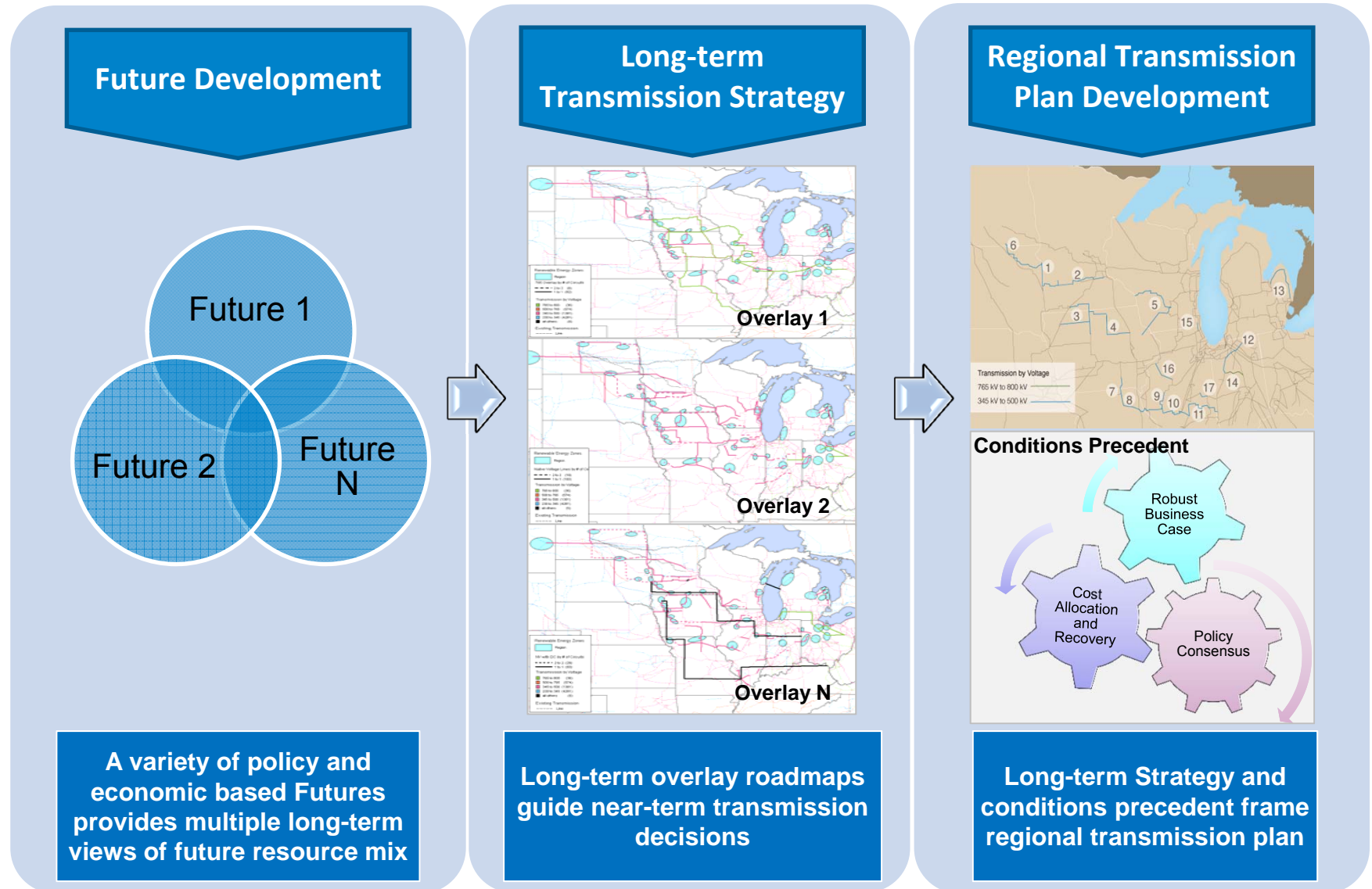
- **Next Steps**

- Incorporate stakeholder feedback on detailed study scope from the August PAC and finalize scope at the **September 28th PAC**
- Schedule first technical review and design task team meeting in October/November timeframe



APPENDIX

Value Based Planning develops the most robust plan under a variety of policy and economic future scenarios



The graphics are for illustrative purposes ONLY

MTEP17 Futures Key Assumptions

Future	Existing Fleet	Policy Regulations	Accelerated Alternative Technologies
Gross Demand & Energy Growth Rates	Low (High for LRZ 9 industrial) Demand: 0.3% Energy: 0.3%	Mid Demand: 0.7% Energy: 0.7%	High (Low for LRZ 9 industrial) Demand: 1.0% Energy: 1.0%
Natural Gas Price Forecast	Low	Mid	High
Max DR/EE/DG Tech. Potential⁴	DR: 8 GW EE: 9.6 GW DG: 2.3 GW	DR: 9 GW EE: 10.8 GW DG: 2.8 GW	DR: 12.1 GW EE: 25.6 GW DG: 6.4 GW
Retirements	Coal: 9 GW ¹ <u>Gas/Oil: 17 GW¹</u> Total by 2031: 26 GW	Coal: 16 GW ² <u>Gas/Oil: 17 GW¹</u> Total by 2031: 33 GW	Coal: 24 GW ² <u>Gas/Oil: 17 GW¹</u> Total by 2031: 41 GW
Renewables	Mandates + Goals	Mandates + Goals + maturity cost curve	Mandates + Goals + maturity cost curve
MISO System CO2 Reduction Target	N/A	All units target 25% ³	All units target 35% ³
Renewable Tax Credit	Continues until 2022	Continues until 2022	Continues until 2022

1. Based on age-related retirement assumptions – total by year 2031

2. Coal retirements resulting from economics of carbon regulation derived from the CPP Mid-Term Analysis – total by year 2031

3. CO2 reduction on aggregate MISO fleet (measured by total of all units' output) by 2030 from 2005 levels

4. Technical Potential represents the maximum feasible potential under each scenario. Only economically viable programs will be implemented in the MTEP17 models (each program will be compared against supply-side alternatives)

