
A large, light gray, stylized sunburst graphic is centered on the slide. It consists of numerous triangular segments radiating from a central point, creating a semi-circular shape at the top and a more complex, multi-pointed shape at the bottom. The segments are arranged in a way that they overlap, giving it a three-dimensional appearance.

MISO Transmission Planning

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**Illinois Renewable Energy Conference
July 21, 2016**

MISO Transmission Planning Objectives

Fundamental Goal

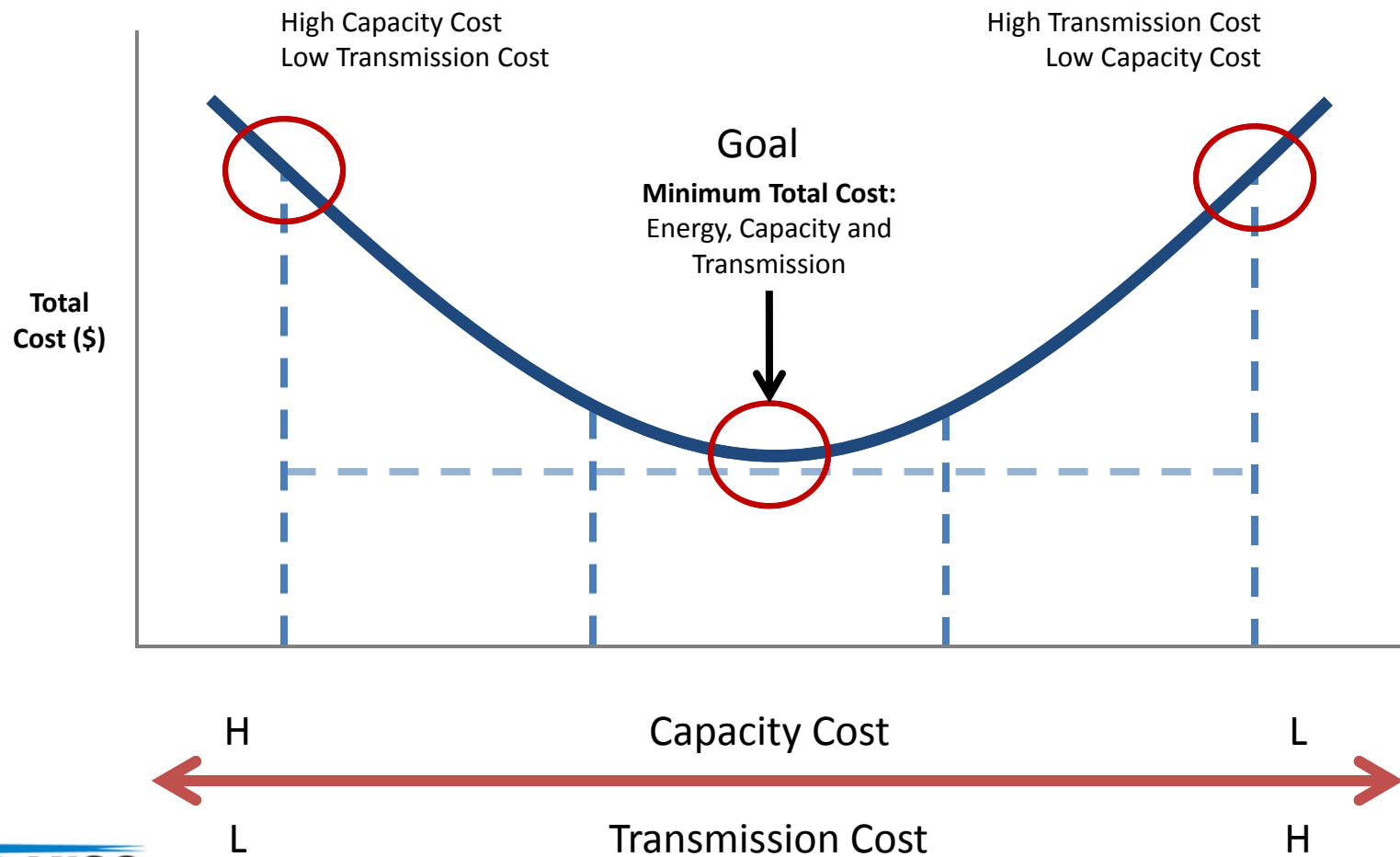
The development of a comprehensive expansion plan that meets reliability needs, policy needs, and economic needs

MISO Board of Directors Planning Principles

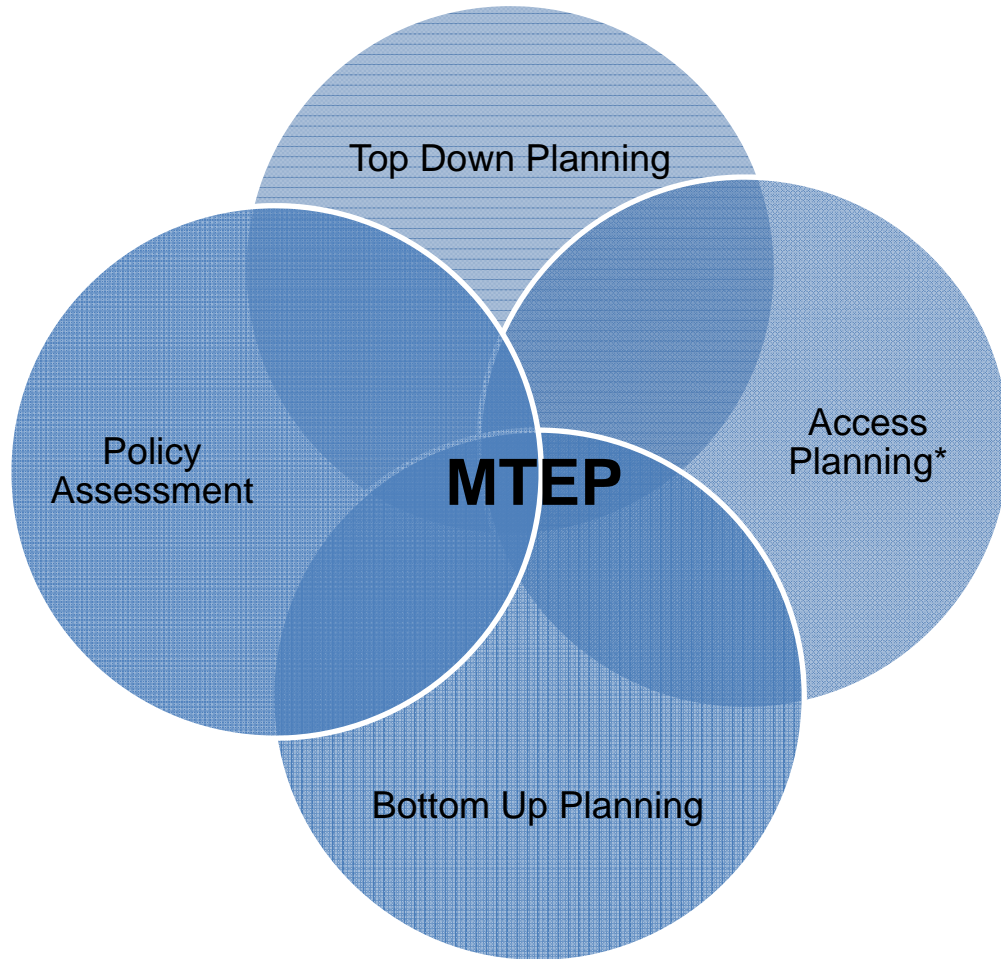
- Make the benefits of an economically efficient electricity market available to customers by identifying transmission projects which provide access to electricity at the lowest total electric system cost
- Develop a transmission plan that meets all applicable NERC and Transmission Owner planning criteria and safeguards local and regional reliability through identification of transmission projects to meet those needs
- Support state and federal energy policy requirements by planning for access to a changing resource mix
- Provide an appropriate cost allocation mechanism that ensures that costs of transmission projects are allocated in a manner roughly commensurate with the projected benefits of those projects
- Analyze system scenarios and make the results available to state and federal energy policy makers and other stakeholders to provide context to inform regarding choices
- Coordinate planning processes with neighbors and work to eliminate barriers to reliable and efficient operations

MISO transmission planning philosophy

MTEP Focuses on Minimizing the Total Cost of Energy Delivered to Customers



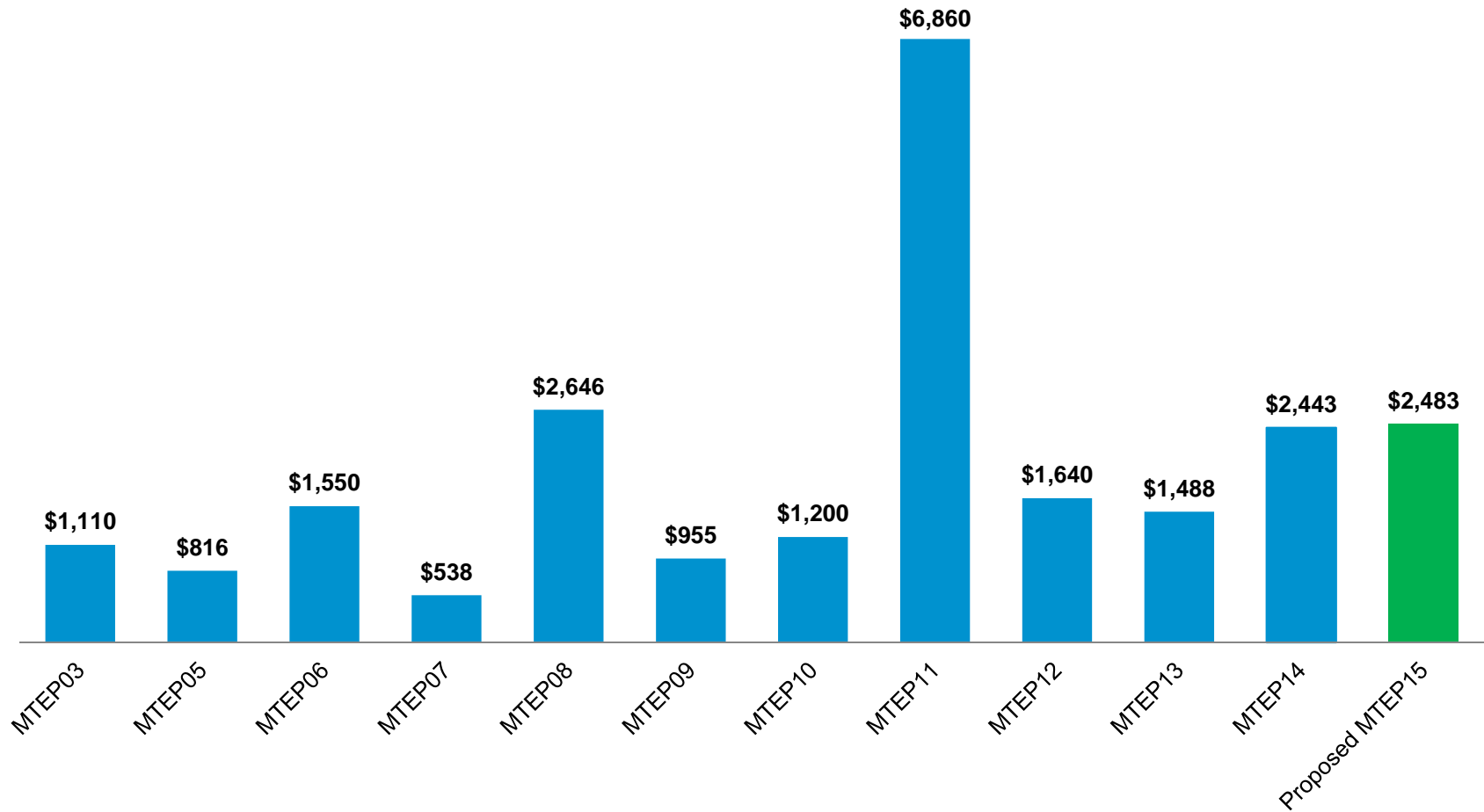
MISO Transmission Expansion Plan (MTEP)



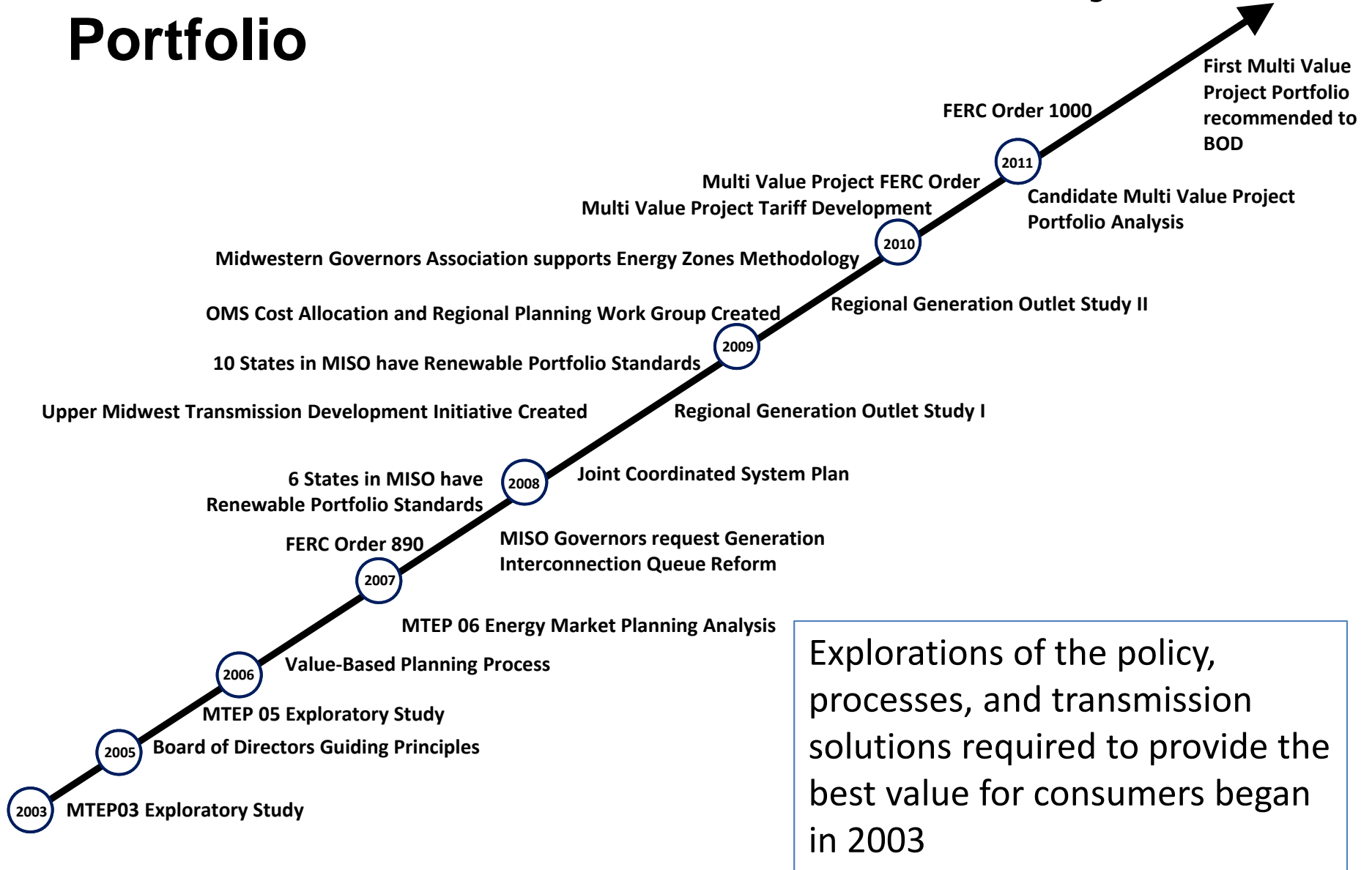
- The MTEP is the culmination of all planning efforts performed by MISO during a given planning cycle
- Establishes the recommended regional plan that integrates expansion based on reliability, transmission access, market efficiency, public policy and other value drivers across all planning horizons
- An annual report is produced, with most projects being approved in December

*Access Planning includes both the long term Transmission Service Queue and the Generator Interconnection Queue

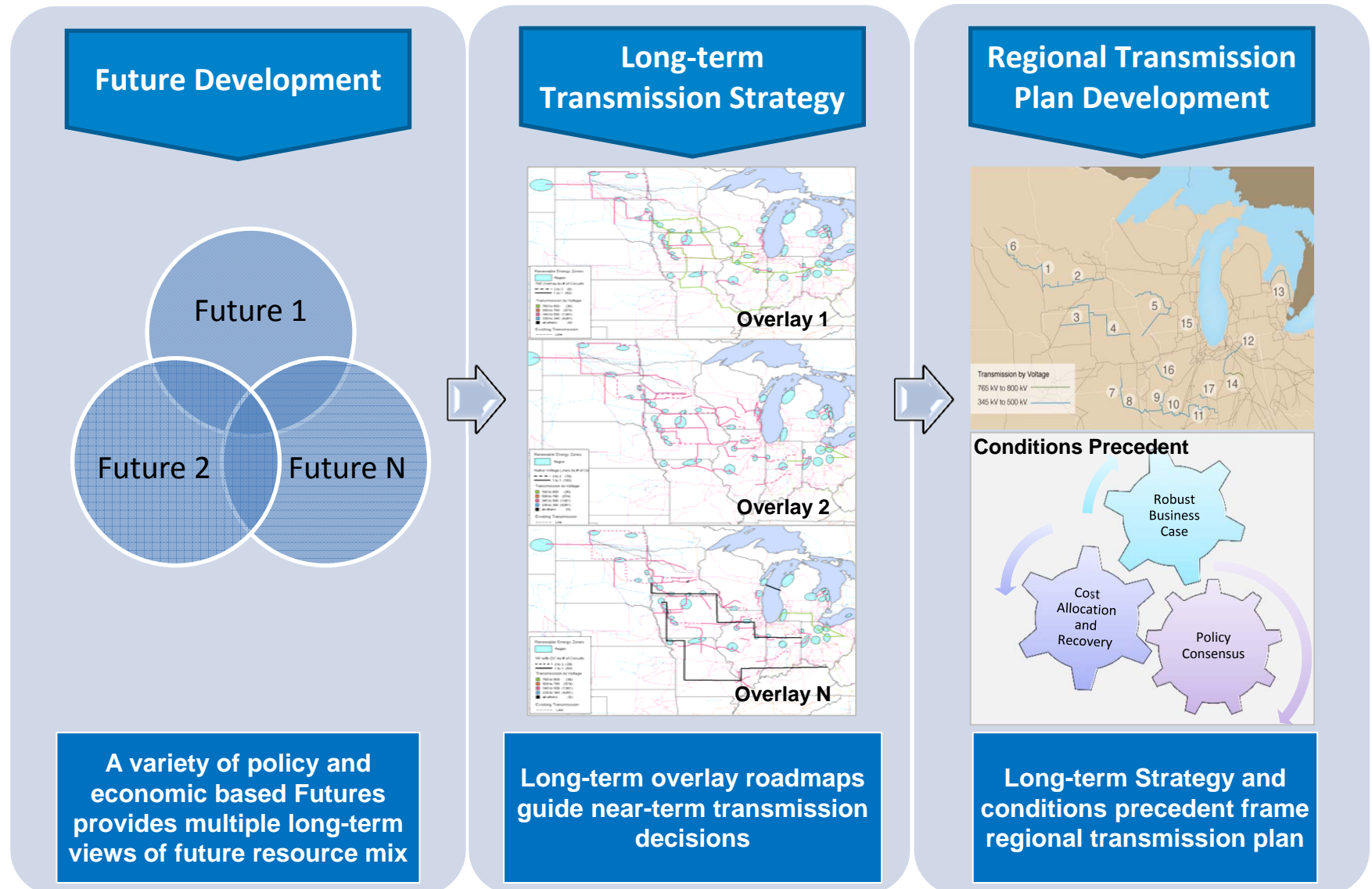
MTEP Investment Summary (in millions)



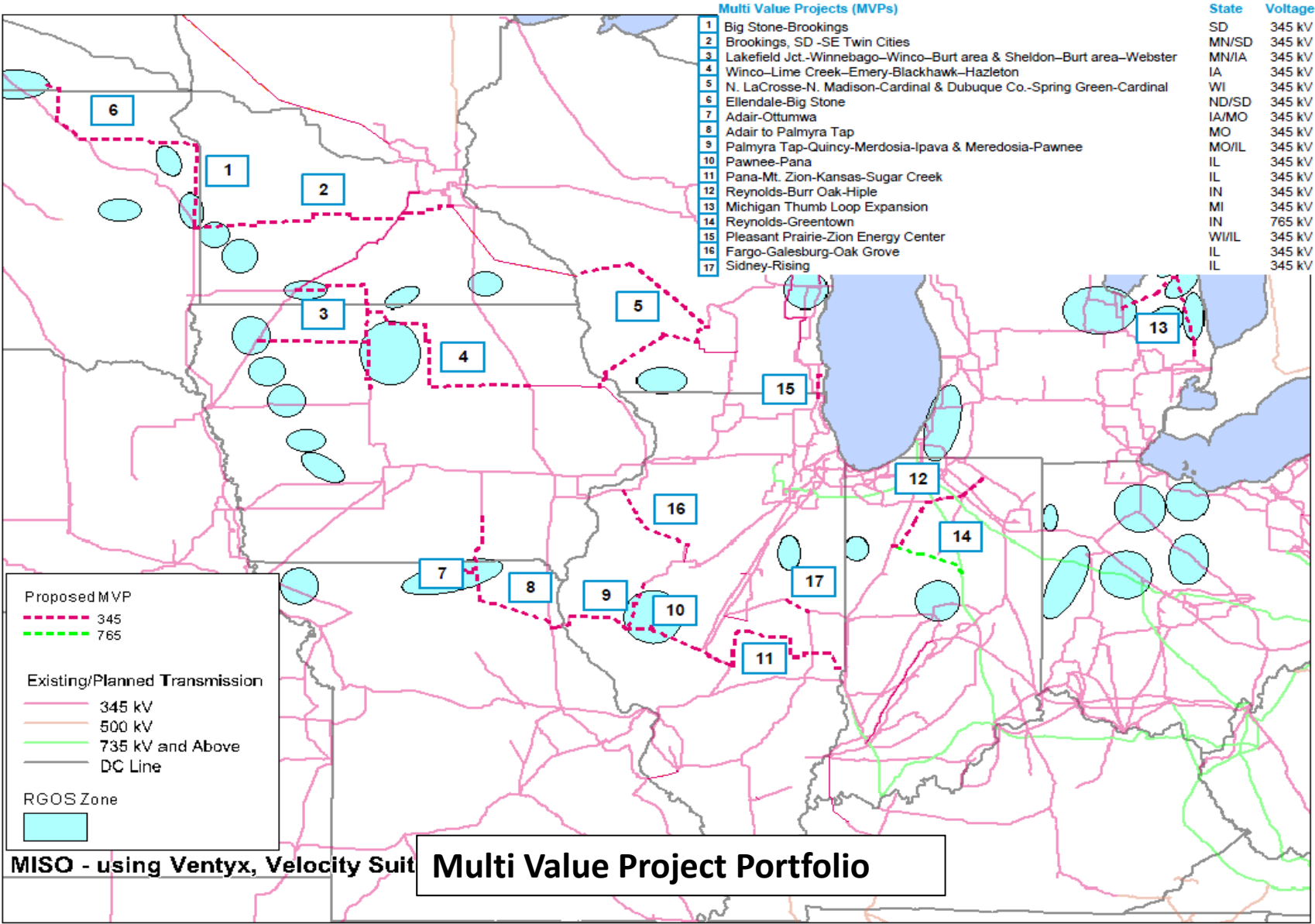
The Road to the First Multi Value Project Portfolio



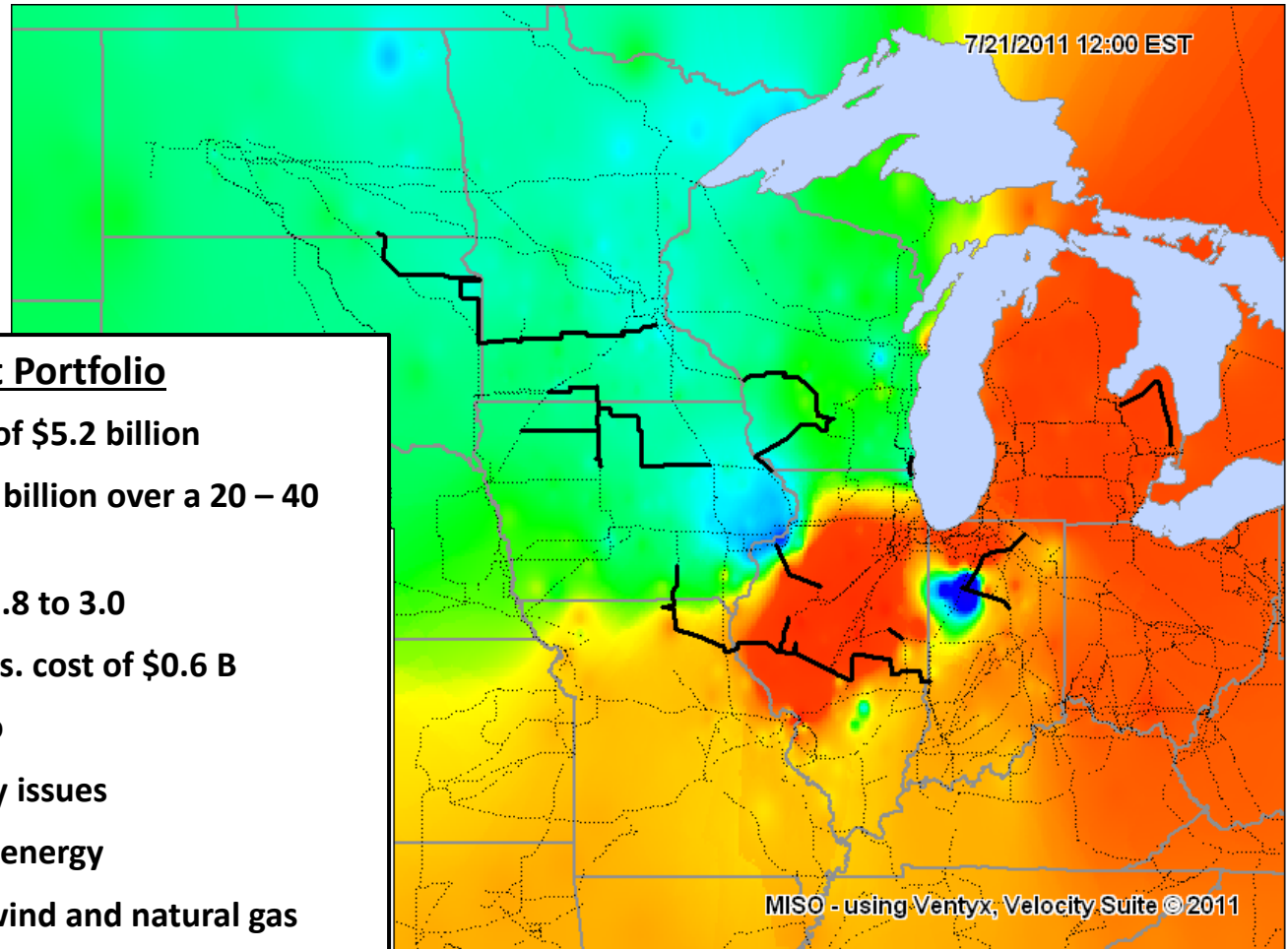
Value Based Planning develops the most robust plan under a variety of policy and economic future scenarios



After additional intensive analysis, the candidate portfolio was refined into a final Multi Value Project Portfolio



Multi Value Projects reliably and economically enable established energy policy choices



Multi-Value Project Portfolio

- Total portfolio construction cost of \$5.2 billion
- Total net benefit of \$6.7 to \$32.8 billion over a 20 – 40 year life
- Provides benefit / cost ratios of 1.8 to 3.0
- Provides annual value of \$1.3 B vs. cost of \$0.6 B
- 17 elements in the MVP portfolio
- Resolves 650 elemental reliability issues
- Enables 41 million MWh of wind energy
- Supports energy zones for both wind and natural gas

Multi-Value Project Portfolio Status*

MVP No.	Project Name	State	Estimated In Service Date ¹		Status		Cost ¹	
			MTEP Approved	Q1 2016	State Regulatory Status	Construction	MTEP Approved	Q1 2016
1	Big Stone-Brookings	SD	2017	2017	●	Pending	226.7	226.7
2	Brookings, SD-SE Twin Cities	MN/SD	2011-2015	2013-2015	●	Complete	738.4	672.4
3	Lakefield Jct. - Winnebago-Winco-Burt area & Sheldon-Burt Area-Webster	MN/IA	2015-2016	2016-2018	●	Underway	550.4	541.1
4	Winco-Lime Creek-Emery-Black Hawk-Hazelton	IA	2015	2015-2018	●	Underway	468.6	464.3
5	N. LaCrosse-N. Madison-Cardinal (a/k/a Badger-Coulee Project) & Cardinal-Hickory Creek	WI/IA	2018-2020	2018-2020	◐	Pending	797.5	1034.5
6	Big Stone South - Ellendale	ND/SD	2019	2019	●	Pending	330.7	395.7
7	Ottumwa-Zachary	IA/MO	2017-2020	2017 - 2018	◐	Pending	152.3	191.9
8	Zachary-Maywood	MO	2016-2018	2016-2018	◐	Pending	112.8	153.4
9	Maywood-Herleman-Meredosia-Ipava & Meredosia-Austin	MO/IL	2016-2017	2016-2017	●	Underway	432.2	705.4
10	Austin-Pana	IL	2018	2016-2018	●	Pending	99.4	135.5
11	Pana-Faraday-Kansas-Sugar Creek	IL/IN	2018-2019	2016-2018	●	Underway	318.4	438.4
12	Reynolds-Burr Oak-Hiple	IN	2019	2019	●	Underway	271.0	271.0
13	Michigan Thumb Loop Expansion	MI	2013-2015	2012-2015	●	Complete	510.0	510.0
14	Reynolds-Greentown	IN	2018	2018	●	Pending	245.0	387.5
15	Pleasant Prairie-Zion Energy Center	WI	2014	2013	●	Complete	28.8	33.0
16	Fargo-Sandburg-Oak Grove	IL	2014-2019	2016-2018	●	Pending	199.0	219.3
17	Sidney-Rising	IL	2016	2016	●	Underway	83.2	90.6
Totals:							5,564	6,471

State Regulatory Status Indicator Scale

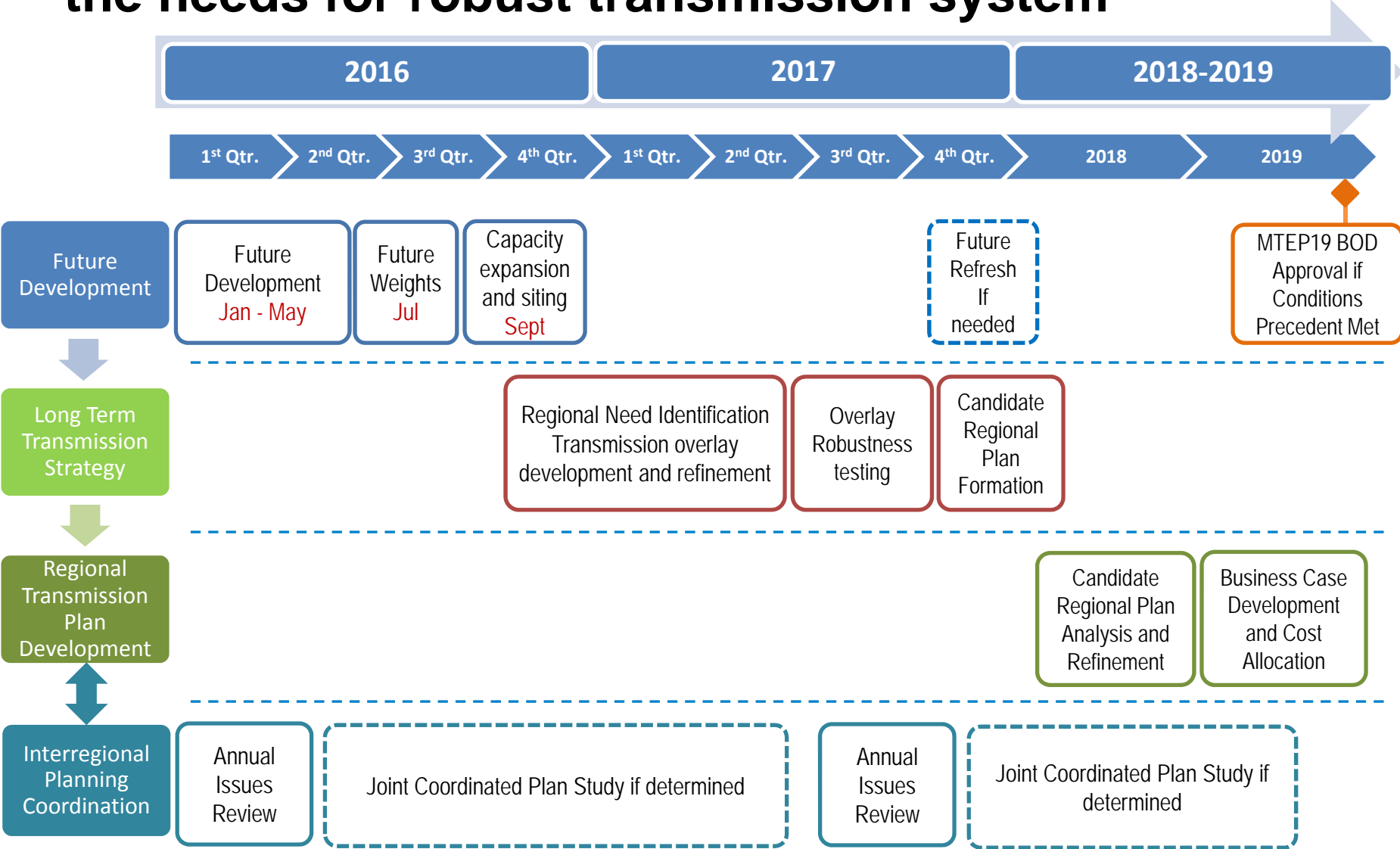
- Pending
- ◐ In regulatory process or partially complete
- Regulatory process complete or no regulatory process requirements

1. Estimates provided by constructing Transmission Owners. Costs stated in millions of nominal dollars.

*As of Q1 2016



Looking forward, changing resource mix will drive the needs for robust transmission system



Questions?

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