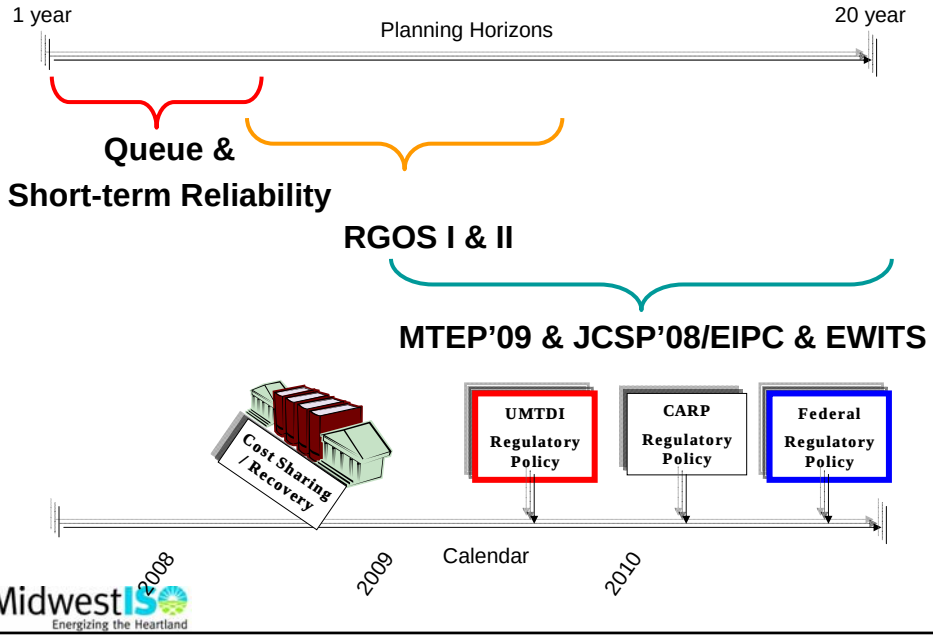
High Plains Regional Transmission Summit

John Lawhorn
Director Regulatory & Economic Studies – Midwest ISO

November 2, 2009

MidwestISO
Energizing the Heartland

Timelines for Planning Processes / Policy



MidwestISO
Energizing the Heartland

2

External and Internal Planning Activity at Midwest ISO

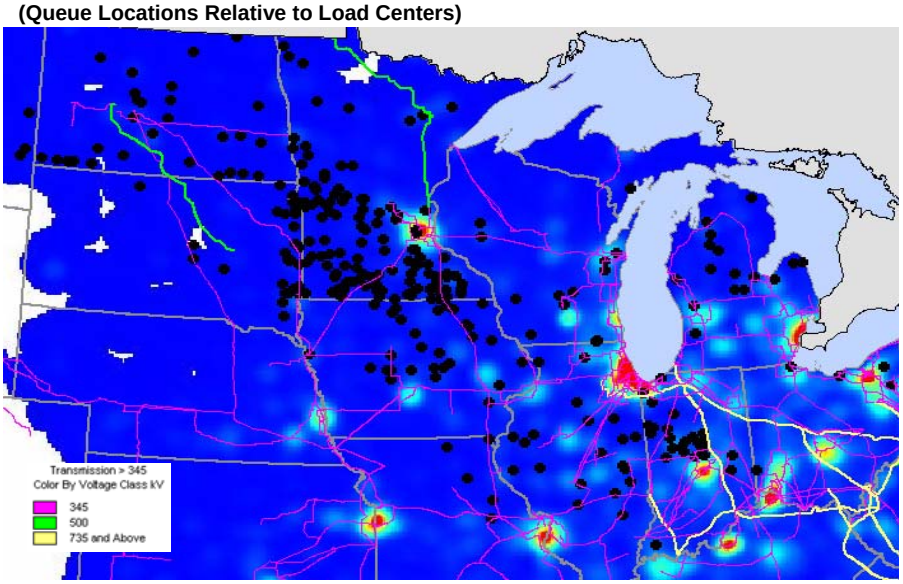
- Internal
  - Queue
  - Targeted Studies (such as the Regional Generation Outlet Study)
  - MTEP (MISO Transmission Expansion Plan)
- External
  - Regional Generation Outlet Study
  - MTEP (MISO Transmission Expansion Plan)
  - JCSP08 (Joint Coordinated System Plan)
  - EWITS (Eastern Wind Integration Transmission Study)
  - EIPC (successor to JCSP)
  - Top Congested Inter-RTO Flowgates

MidwestISO Energizing the Heartland

3

Limited Transmission Infrastructure in Location of Queue Requests

(Queue Locations Relative to Load Centers)

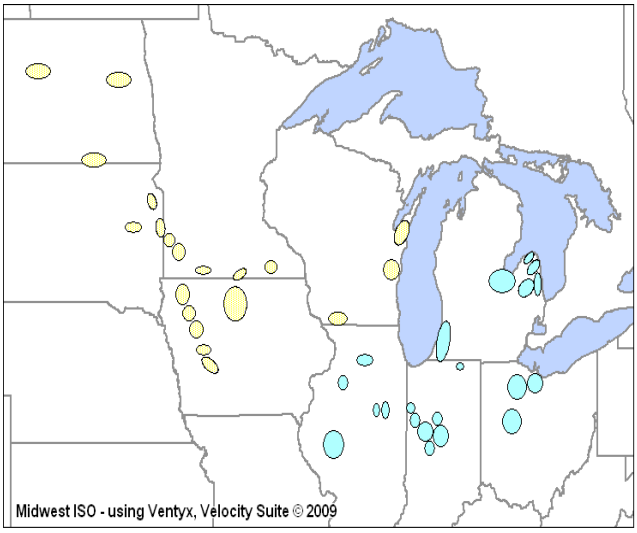


4

MidwestISO Energizing the Heartland

4

Regional Generation Outlet Study (RGOS) Goals



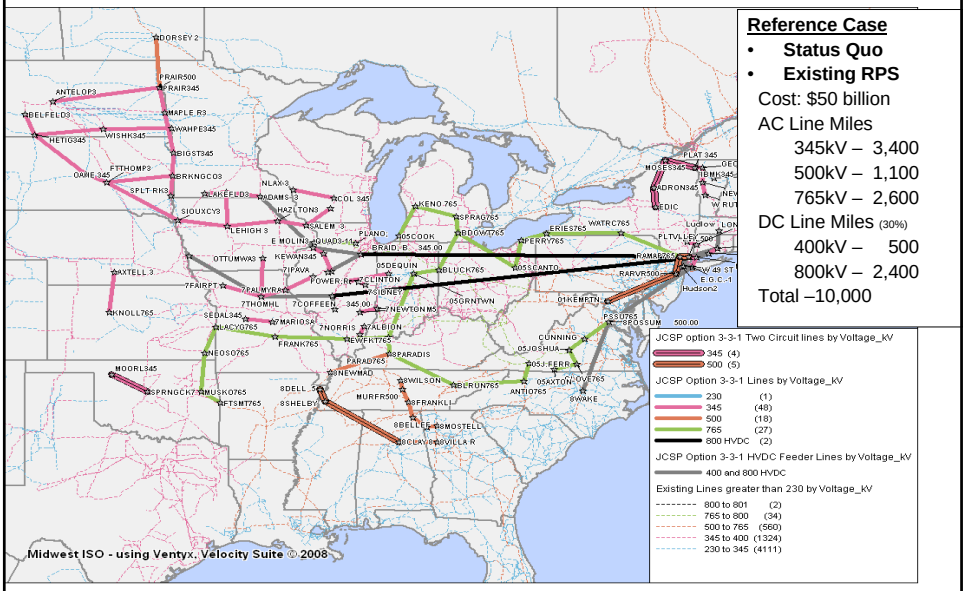
- Bridge between longer term (JCSP) and short term (Queue) planning processes
- Develop Definitive Transmission Plans to meet Midwest ISO first set of RPS' in western Midwest ISO
  - Minnesota, Wisconsin, Illinois, Iowa, Missouri, Michigan
  - Approximately 22,000 MW
- Achieve Regulatory Consensus
- Commitments to Plans by year-end 2009
- Analysis of eastern portion of footprint starting soon

MidwestISO Energizing the Heartland

5

5

JCSP Reference Case – Representative Overlay Needs



Reference Case

- **Status Quo**
- **Existing RPS**

Cost: $50 billion

AC Line Miles

345kV – 3,400

500kV – 1,100

765kV – 2,600

DC Line Miles (30%)

400kV – 500

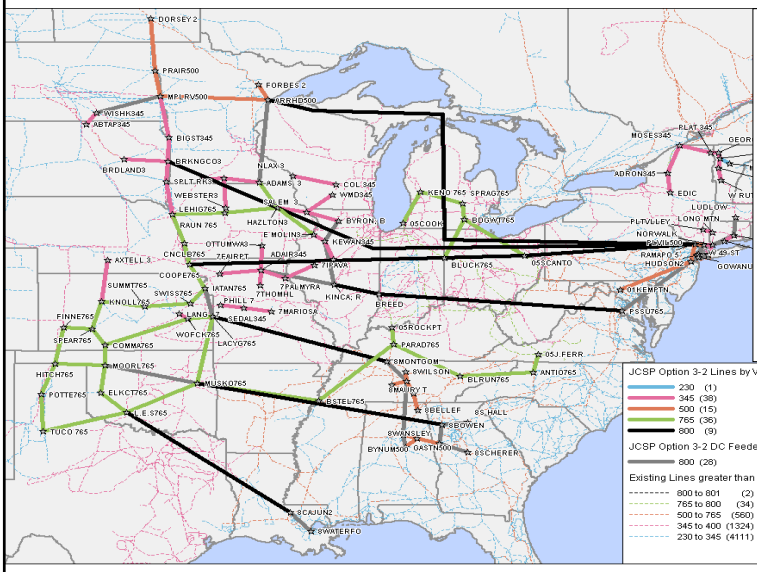
800kV – 2,400

Total –10,000

MidwestISO Energizing the Heartland

6

JCSP 20% Wind Energy - Representative Overlay Needs



20 % Wind Case

- **20% RPS by 2024**

Cost: $80 billion

AC Line Miles

345 – 2,200

500 – 1,100

765 – 4,000

DC Line Miles

400kV – 0

800kV – 7,500

Total –15,000

MidwestISO Energizing the Heartland

7

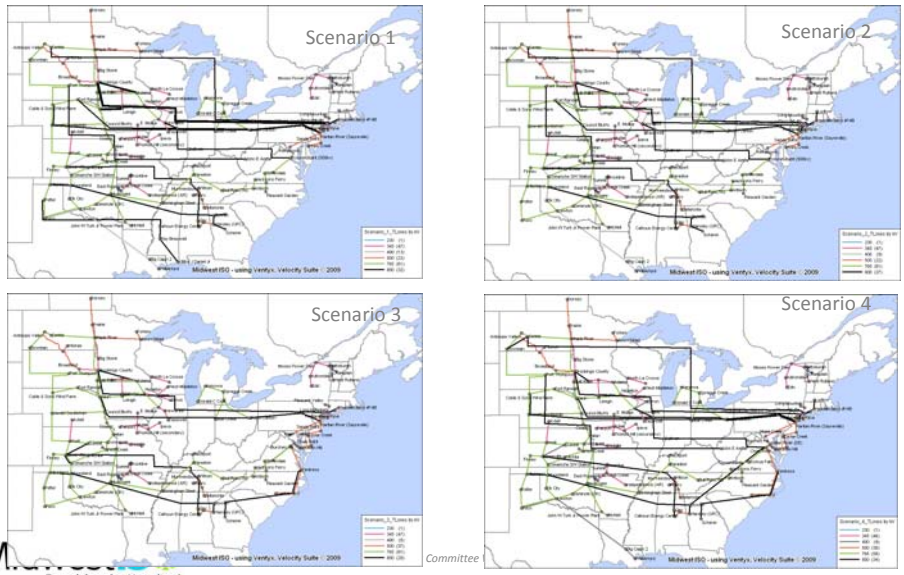
EWITS Scenario Definitions

- **Scenario 1: 20% Lowest Cost Wind**
- **Scenario 2: 20% Hybrid with Offshore (closest to JCSP 20%)**
- **Scenario 3: 20% Load – weighted Wind with Aggressive Offshore**
- **Scenario 4: 30% Aggressive On and Offshore**

MidwestISO Energizing the Heartland

8

EWITS - Overlays for 4 Scenarios



Committee

Energizing the Heartland

9

Line Miles and Transmission Cost Assumptions in 2024$

Cost per Mile Assumption							
	345 KV	(2) - 345 kV	500 KV	(2) - 500 kV	765 KV	DC - 400 kV	DC - 800 kV
2024$	2,250,000	3,750,000	2,875,000	4,792,000	5,125,000	3,800,000	6,000,000

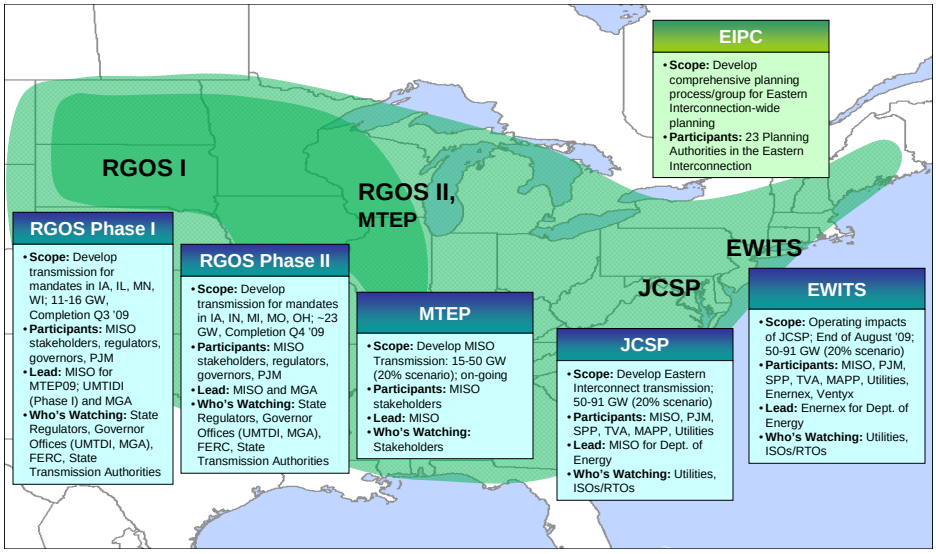
Estimated Line Mileage Summary (Miles)								
	345 KV	(2) - 345 kV	500 KV	(2) - 500 kV	765 KV	DC - 400 kV	DC - 800 kV	Total
Scenario 1	1,977	247	1,264	243	7,304	560	11,102	22,697
Scenario 2	1,977	247	1,264	243	7,304	560	8,352	19,947
Scenario 3	1,977	247	1,264	742	7,304	769	4,747	17,050
Scenario 4	1,977	247	1,264	742	7,304	560	10,573	22,667

Estimated Cost Summary (Millions of 2024$)								
	345 KV	(2) - 345 kV	500 KV	(2) - 500 kV	765 KV	DC - 400 kV	DC - 800 kV	Total
Scenario 1	5,560	1,158	4,543	1,456	46,791	2,397	83,265	145,169
Scenario 2	5,560	1,158	4,543	1,456	46,791	2,397	62,640	124,544
Scenario 3	5,560	1,158	4,543	4,445	46,791	2,957	35,603	101,056
Scenario 4	5,560	1,158	4,543	4,445	46,791	2,397	79,298	144,191

MidwestISO
Energizing the Heartland

10

Midwest ISO is Actively Engaged in Planning from Regional to National Levels



EIPC

- **Scope:** Develop comprehensive planning process/group for Eastern Interconnection-wide planning
- **Participants:** 23 Planning Authorities in the Eastern Interconnection

RGOS Phase I

- **Scope:** Develop transmission for mandates in IA, IL, MN, WI; 11-16 GW, Completion Q3 '09
- **Participants:** MISO stakeholders, regulators, governors, PJM
- **Lead:** MISO for MTEP09; UMTIDI (Phase I) and MGA
- **Who's Watching:** State Regulators, Governor Offices (UMTDI, MGA), FERC, State Transmission Authorities

RGOS Phase II

- **Scope:** Develop transmission for mandates in IA, IN, MI, MO, OH; ~23 GW, Completion Q4 '09
- **Participants:** MISO stakeholders, regulators, governors, PJM
- **Lead:** MISO and MGA
- **Who's Watching:** State Regulators, Governor Offices (UMTDI, MGA), FERC, State Transmission Authorities

MTEP

- **Scope:** Develop MISO Transmission: 15-50 GW (20% scenario); on-going
- **Participants:** MISO stakeholders
- **Lead:** MISO
- **Who's Watching:** Stakeholders

JCSP

- **Scope:** Develop Eastern Interconnect transmission; 50-91 GW (20% scenario)
- **Participants:** MISO, PJM, SPP, TVA, MAPP, Utilities
- **Lead:** MISO for Dept. of Energy
- **Who's Watching:** Utilities, ISOs/RTOs

EWITS

- **Scope:** Operating impacts of JCSP; End of August '09; 50-91 GW (20% scenario)
- **Participants:** MISO, PJM, SPP, TVA, MAPP, Utilities, Enernex, Ventyx
- **Lead:** Enernex for Dept. of Energy
- **Who's Watching:** Utilities, ISOs/RTOs

MidwestISO Energizing the Heartland

RGOS = Regional Generation Outlet Study
MTEP= Midwest ISO Transmission Expansion Plan
JCSP = Joint Coordinated System Plan

EWITS = Eastern Wind Integration and Transmission Study
EIPC = Eastern Interconnection Planning Collaborative

11