

EGEAS Work Update

CARP IV

June 17, 2009

Traverse City, MI

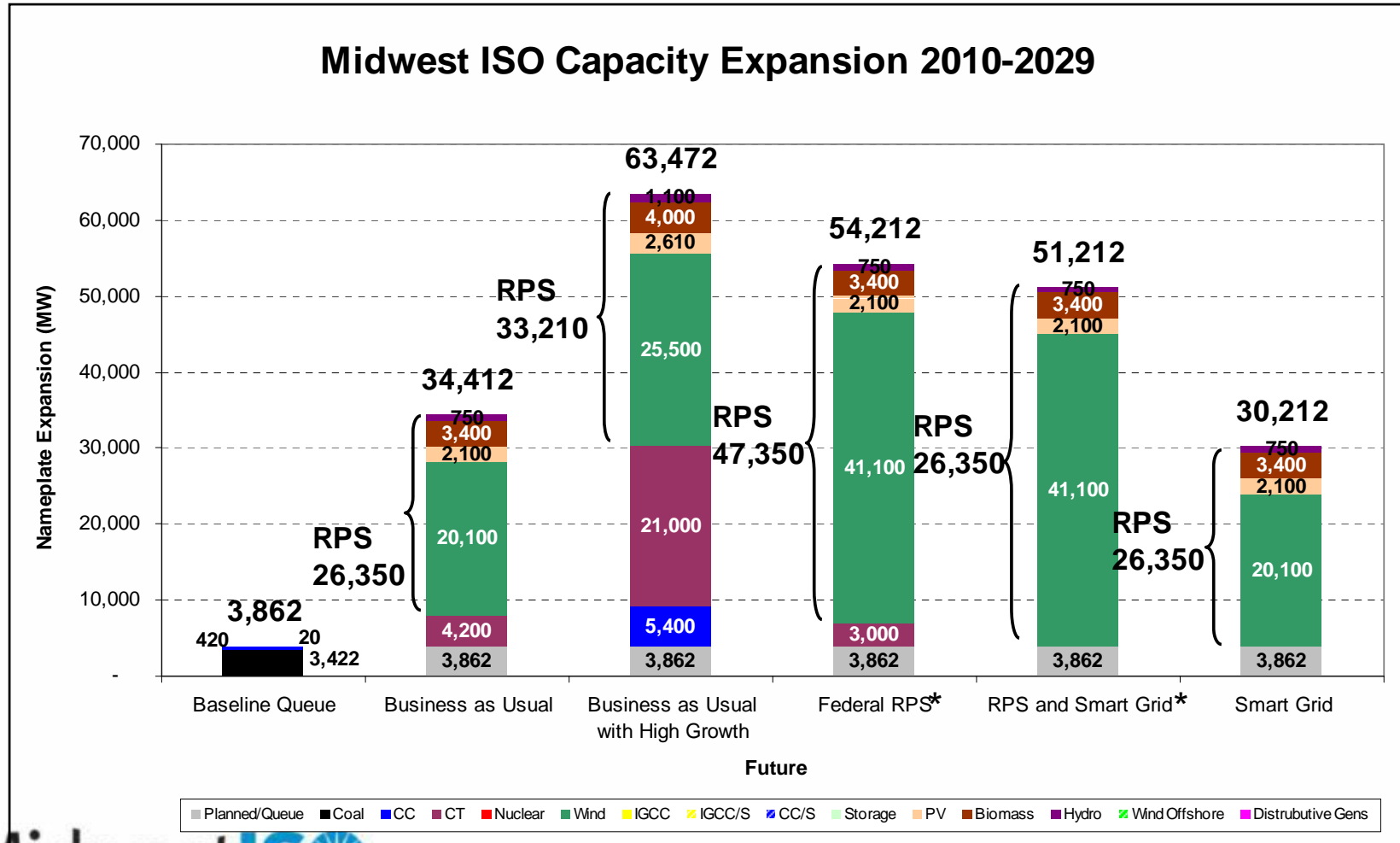
Current Status

- All models have been built for the three Midwest ISO regions based on the assumptions discussed at May CARP meeting
- Half the cases have been run at 15% reserve requirements for each region
- Preliminary analysis on carbon limitation futures is showing the desire for significant retirements
 - Midwest ISO staff wanted to discuss with CARP prior to finalizing analysis
 - Cap and Trade runs are proving difficult

Current Completed Cases

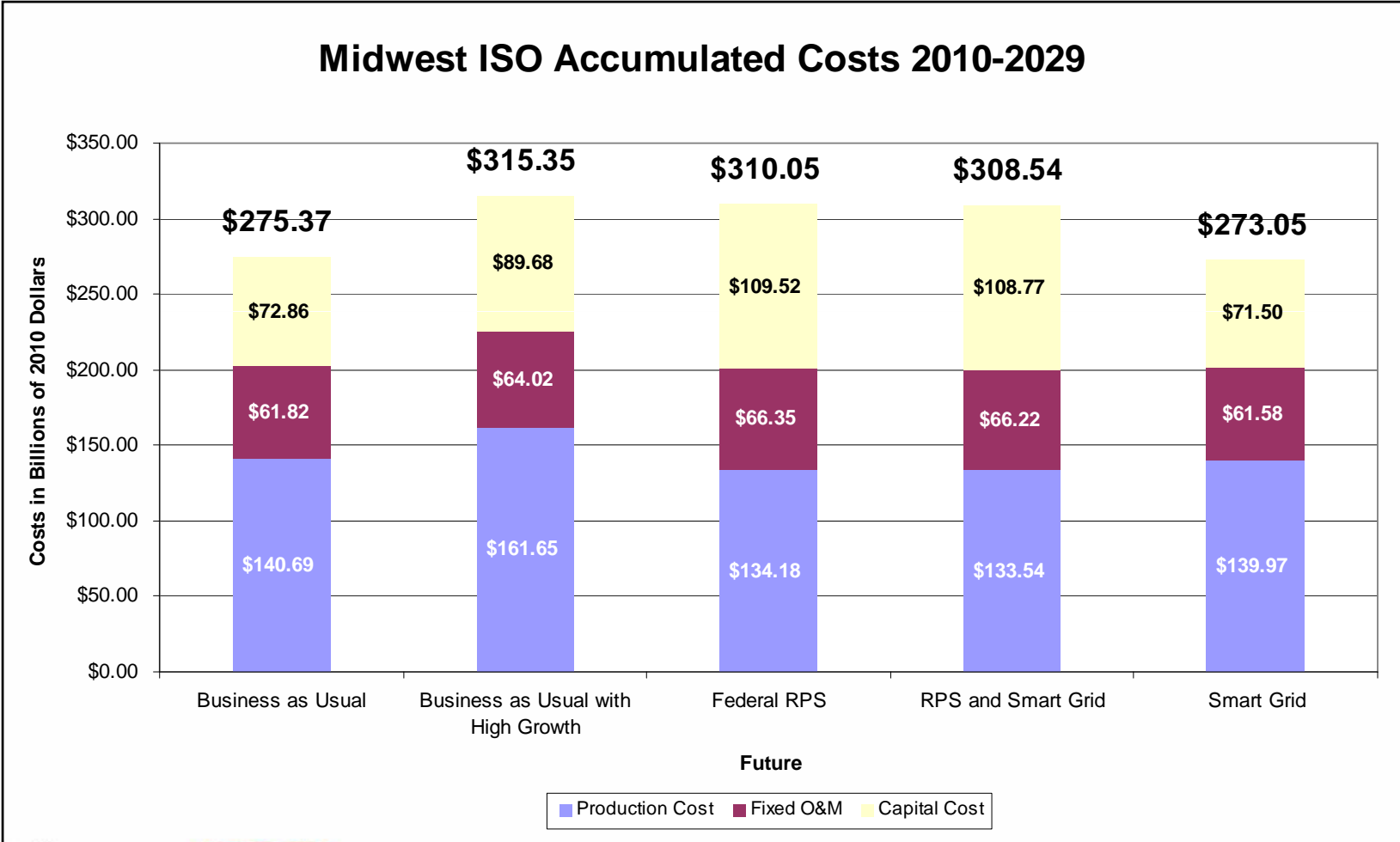
- Business as Usual
- Business as Usual with High Demand and Energy Growth
- Federal RPS
- Smart Grid
- Federal RPS & Smart Grid

Midwest ISO Capacity Expansion

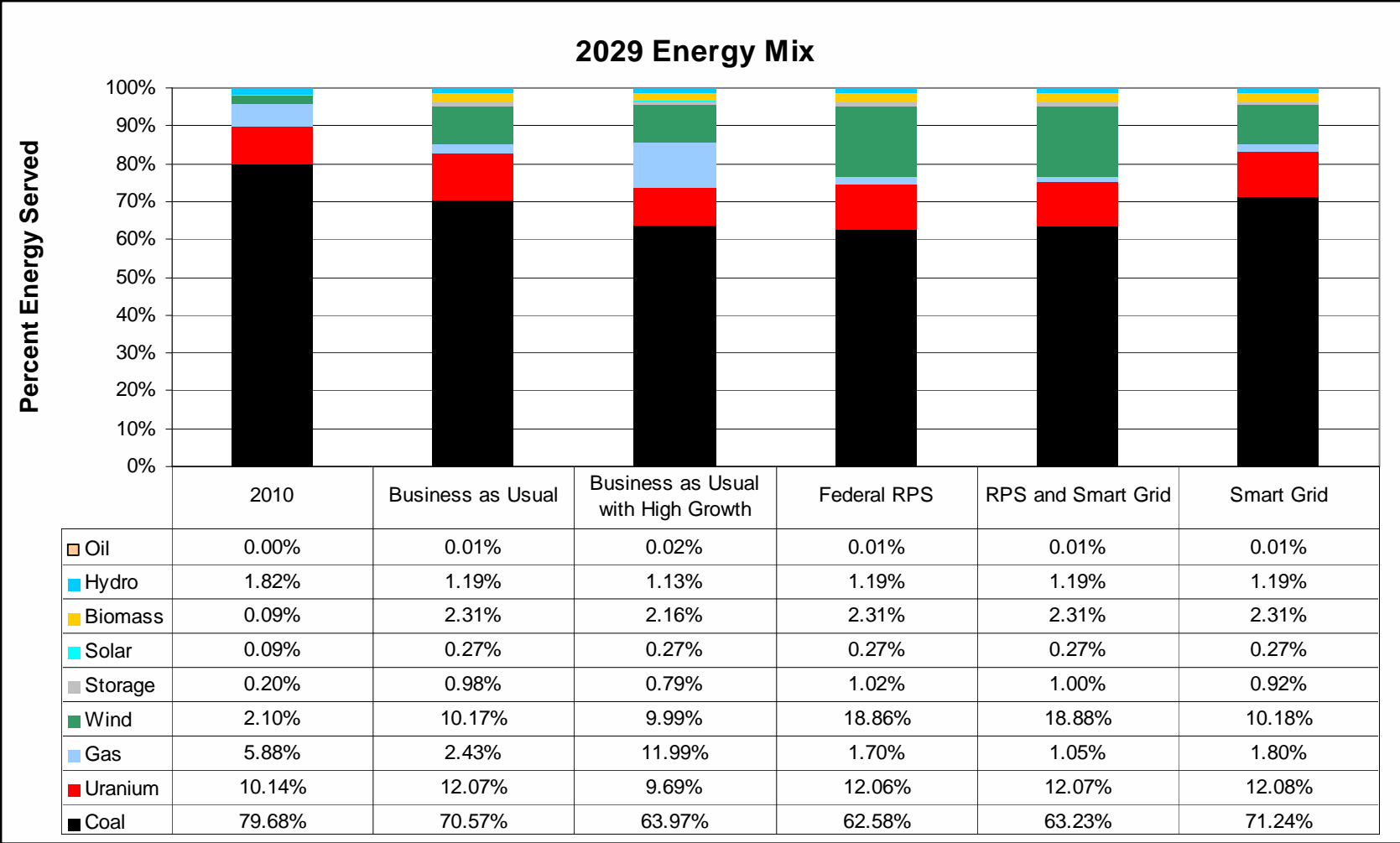


*In the Federal RPS Future's additional needs for the RPS are met with wind

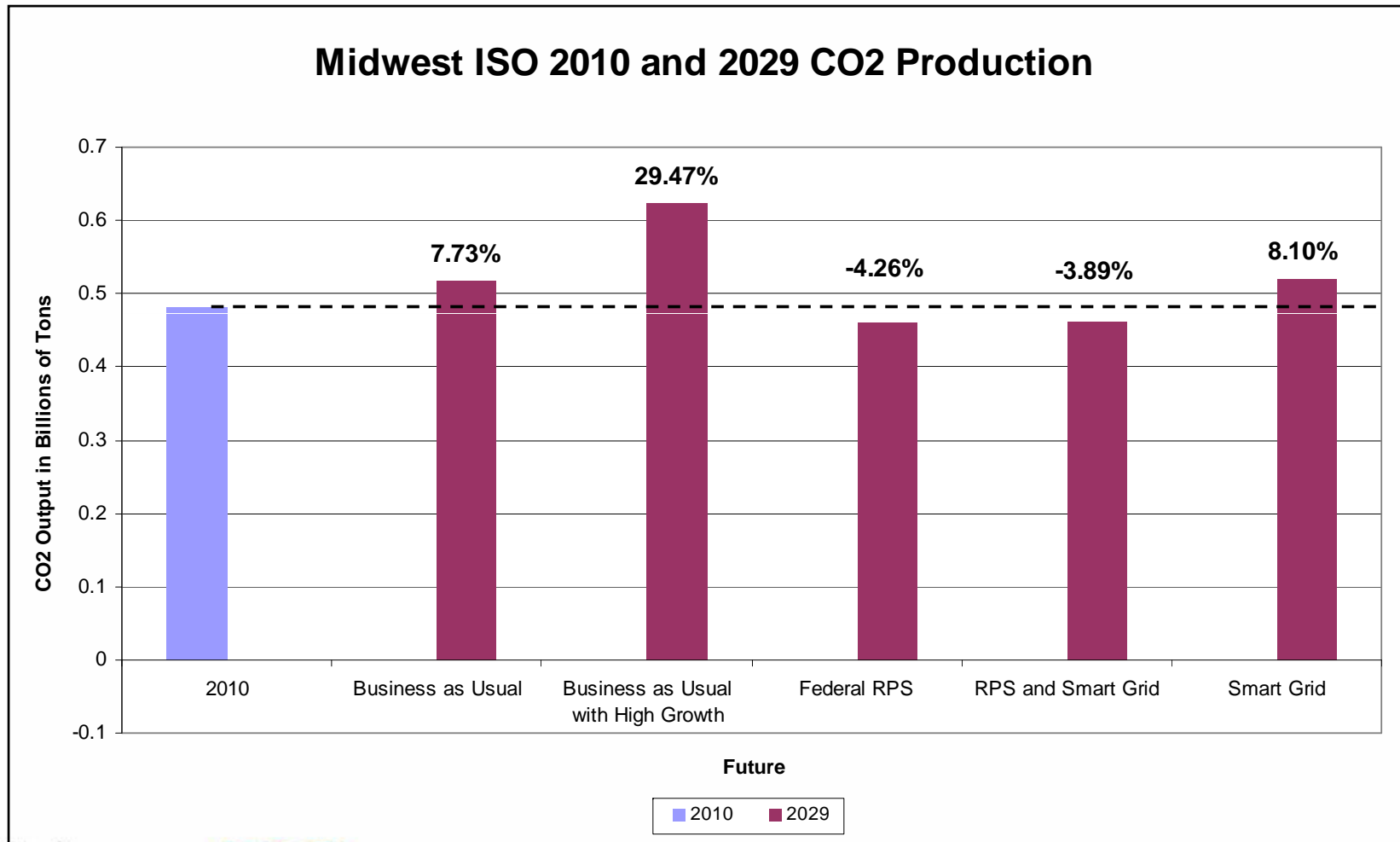
Midwest ISO System Costs



Midwest ISO Energy Contributions



Midwest ISO CO2 Outputs



Completed Cases Findings

- Model did not add renewable capacity for economic nor reliability criteria
 - PV
 - Wind
 - Biomass
 - Hydro
- State mandated RPS requirements are included into the model to meet CARP assumptions
- Reduced starting future demand and energy projections have significantly reduced capacity additions previously seen through Midwest ISO analysis.

Issues to Decide

- Area reserve margin targets
 - 15% per region will result in Midwest ISO wide overbuild
 - Reduced reserve margin targets (such as 9 to 10% will reduce capacity expansion requirements)
 - The first assumes no capacity sharing across the entire footprint, where the second allows sharing of capacity to reach a Midwest ISO wide target

Issues to Decide

- Retirements
 - Carbon Tax future
 - \$100/ton cost indicates that a significant amount of the existing fleet could be retired
 - Some regions, with the applied demand growths, may be able to retire without replacement
 - If replacements are required to maintain reserves, what should be the replacement (siting issue)
 - Capture and Sequestration retrofits
 - Biomass
 - Nuclear
 - Other
 - Carbon Cap and Trade futures
 - Should we retire only baseload to achieve the cap, or are all units available for retirement. Should we only expect to retire enough capacity to get to the cap

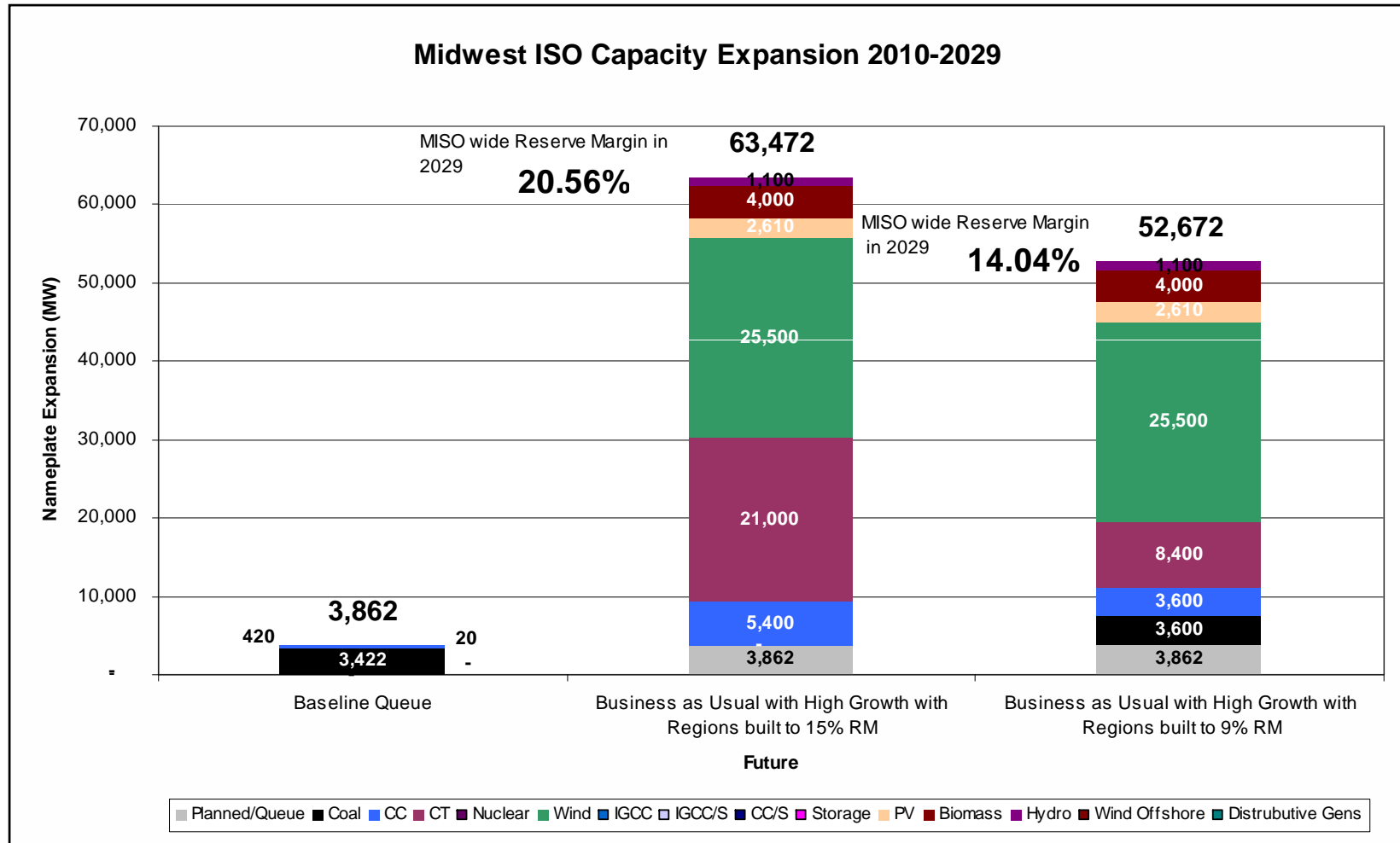
Carbon Cap application

- 2010 will be used as base year for carbon starting point
- 2012 will begin target reductions
 - 2012: -3% of 2010 value
 - 2020: -17% of 2010 value
 - 2030: -42% of 2010 value
 - Linear reduction of carbon between targets
- Cap adherence methods
 - Allow model to attempt to meet cap through dispatch of existing and new capacity where violation of cap may occur and the allowance cost will be applied
 - Retirements
- Midwest ISO staff believe it will be a better application to iterate runs to force retirements into the model until cap limitations are met

Cases to be Run

- If 15% reserve margin targets is used then
 - Carbon tax
 - Carbon Cap and Trade
 - RPS & Cap
 - RPS & Cap & SG
 - Cap & SG & PHEV
- If at reduced area reserve margin targets are used then
 - All futures must be run

15% versus 9% Reserve Margin



15% versus 9% Reserve Margin

	2029 Peak Load (MW)	2029 Reserve Capacity (MW)	Assumed Coincident Factor between regions	MISO Reserve Margin
Business as Usual with High Growth with Regions built to 15% RM	146,637	169,005	0.956	20.56%
Business as Usual with High Growth with Regions built to 9% RM	146,637	159,869	0.956	14.04%

CARP Direction needed

- Area reserve margin targets
- Retirement analysis issues
 - Retire entire coal fleet
 - Retire X% of coal fleet
 - Capacity to replace coal (siting implications)