

Update: Forecast Numbers, Projected Clean Power Plan Compliance

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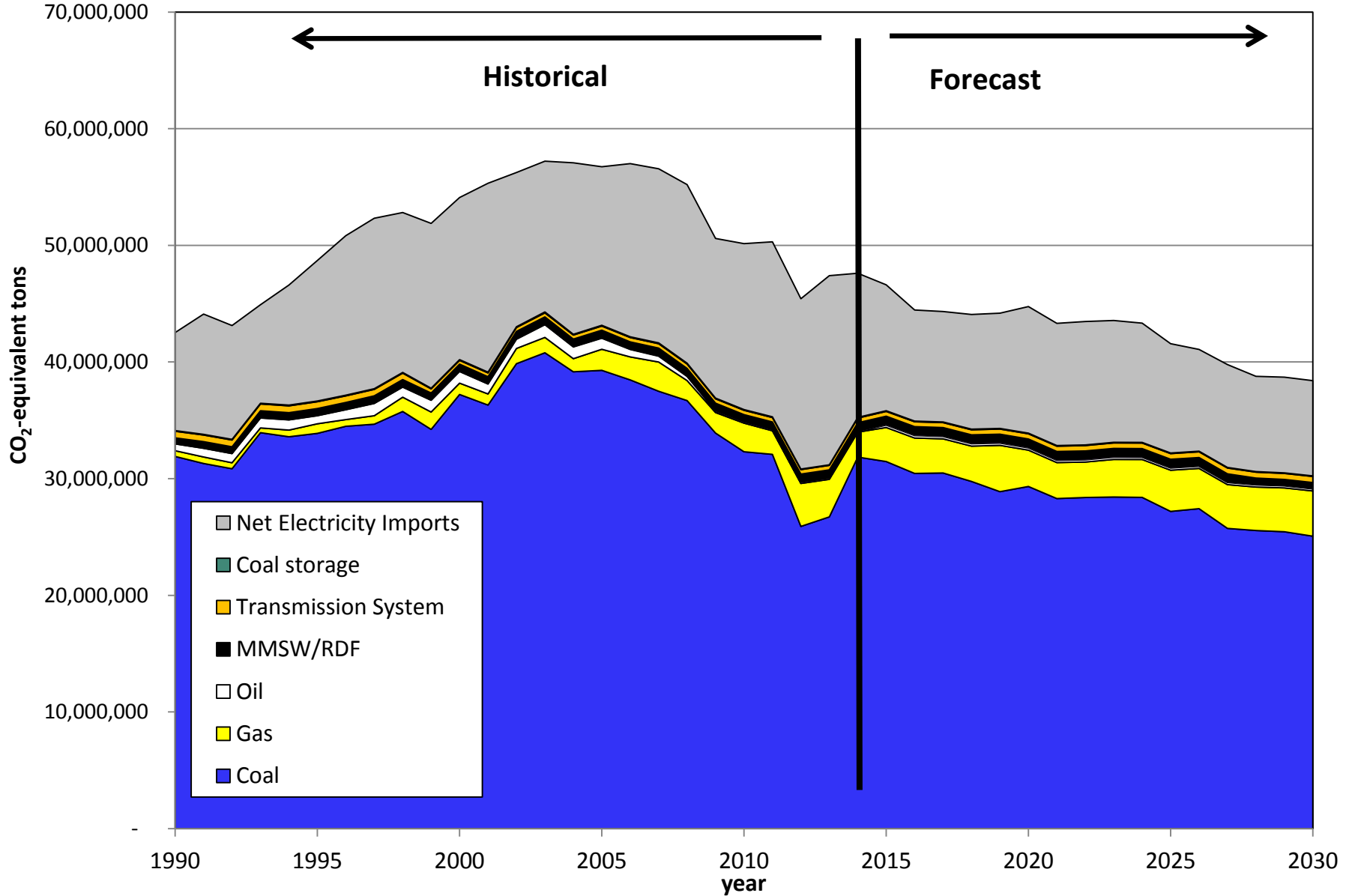


Minnesota Pollution Control Agency

Clean Power Plan forecast values extracted from MPCA 2014 electric power sector forecast

- CO₂ from affected units
 - MWH from affected units
 - MWH from eligible nuclear capacity expansions
 - MWH from eligible wind, solar, hydroelectric and biomass-based generation from renewable energy tracking under Minnesota's RES and SES (and the RPS's of neighboring states)
 - MWH from eligible new Manitoba Hydroelectric Board hydroelectric generation
 - MWH of eligible energy efficiency savings under MN energy efficiency resource standard (EERS) and antecedent retail sales forecasts
- MPCA technical support document with a description of forecast methods and with results from 2014 forecast can be found at:
 - http://www.environmental-initiative.org/images/files/CSEO/Electric_Power_Sector_GHG_BAU_Projections_Technical_Support_Document.pdf

Historic and MPCA-forecasted Greenhouse Gas Emissions from Electric Power



Principal Sources of Data for Forecast

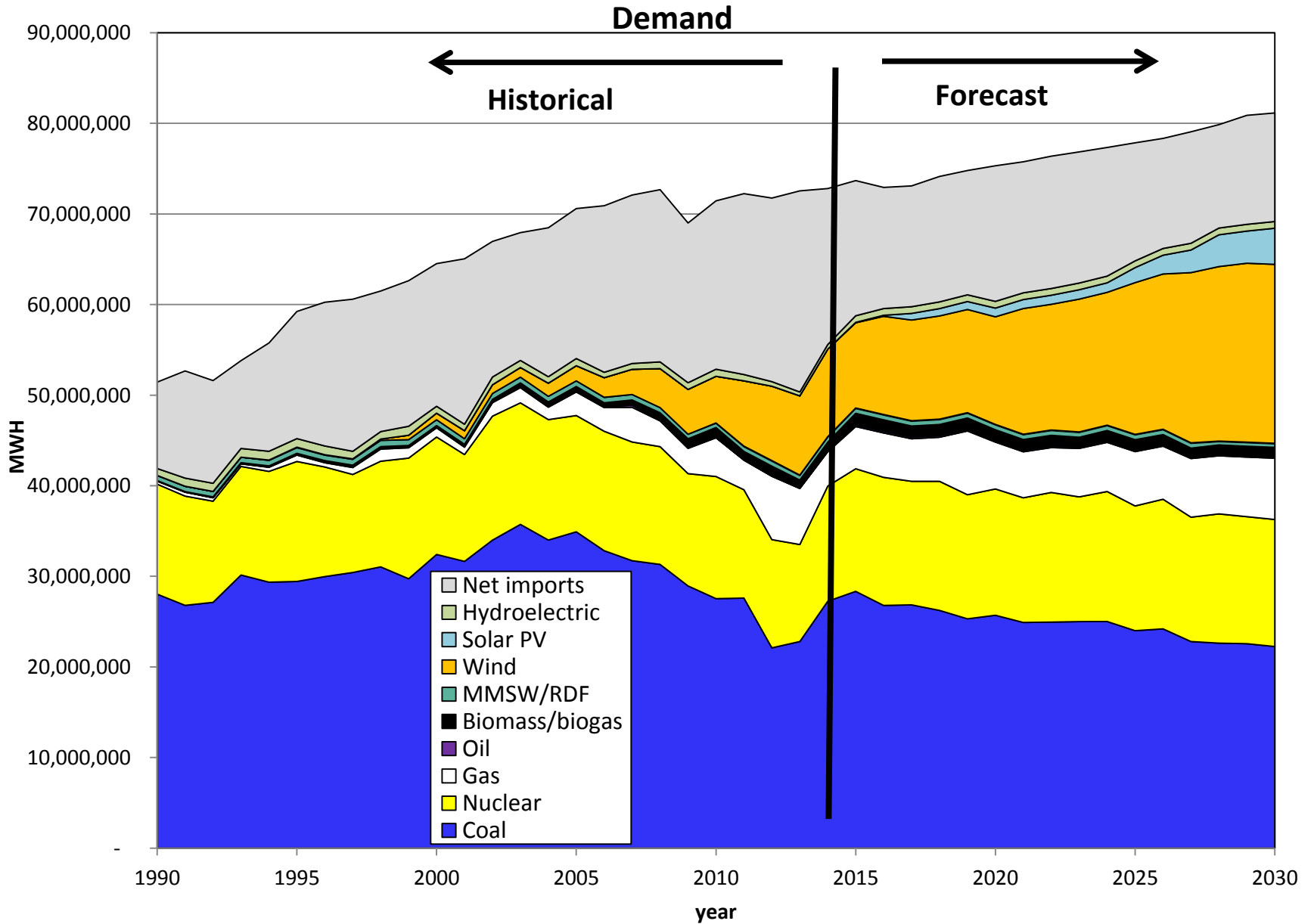
- In-state generation
 - thermal units Electric Utility Annual Reports
MPCA GHG emission inventory
EIA forms 923, 860
- Net Imports*
 - retail sales Electric Utility Annual Reports
 - T&D losses historical data, MPCA GHG EI
 - wind, solar, hydro RPS and SES compliance
assessment, EIA form 923 and
FERC Form 1
 - emission rate EIA *Annual Energy Outlook*

*net imports = retail sales plus T&D losses minus in-state net generation

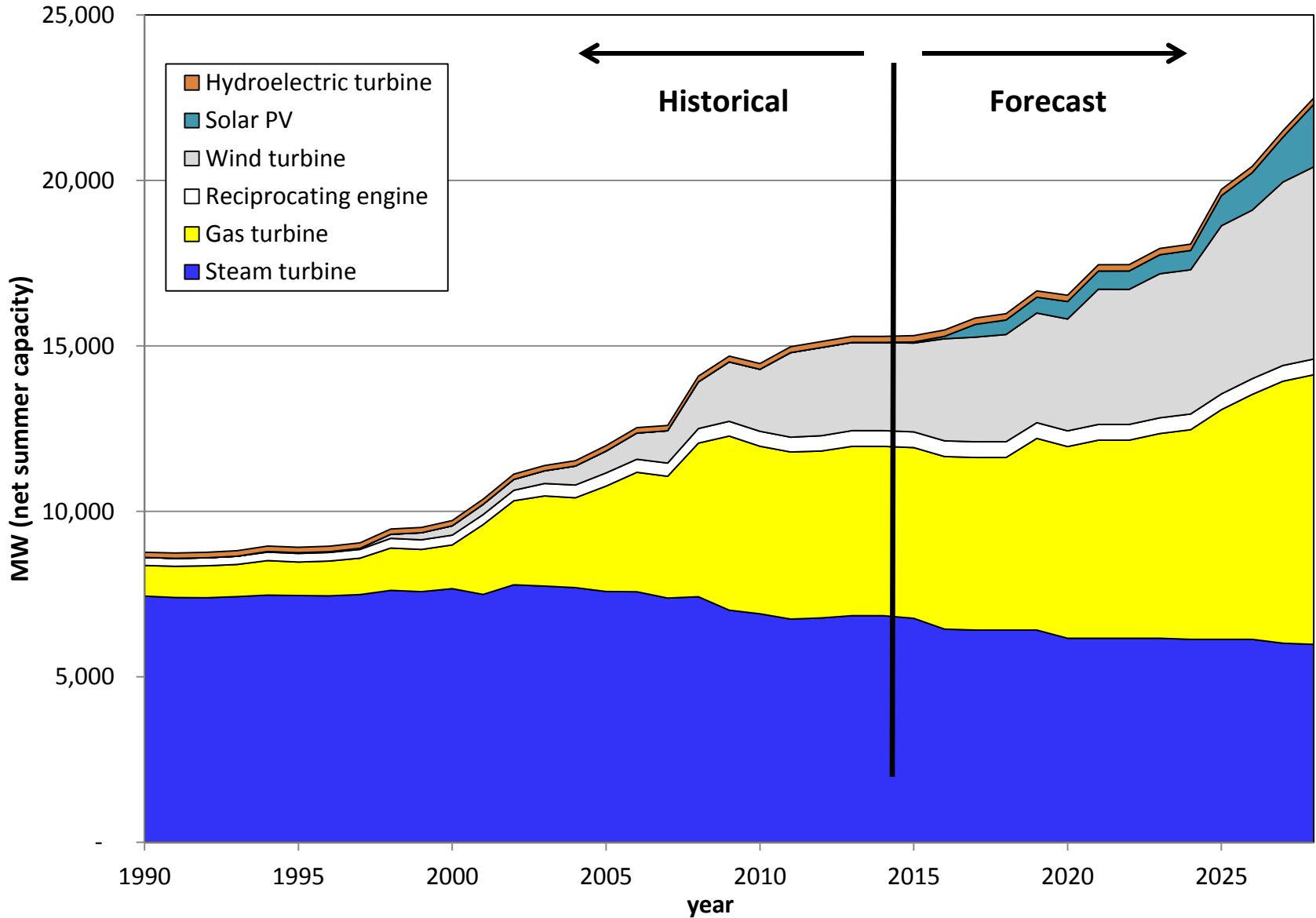
Basis of Changes to Forecast

- Updated Electric Utility Annual Reports
 - XCEL, Ottertail Power, Minnesota Power, Interstate Power, SMMPA
- Most recent Integrated Resource plans
 - GRE, MMPA, Minnkota, MRES
- Revised RPS and SES analysis for:
 - adjusted retail sales (WAPA exemption), sales for resale
 - large new MHEB eligibility in Wisconsin
 - Southern Minnesota Energy Cooperative
 - local practice in assigning exemptions and capacity to states and in definition of shelf life
 - roster of new and proposed facilities or capacity
 - RPS eligibility of SES-excess generation
 - implications of 'behind-the-meter' solar PV

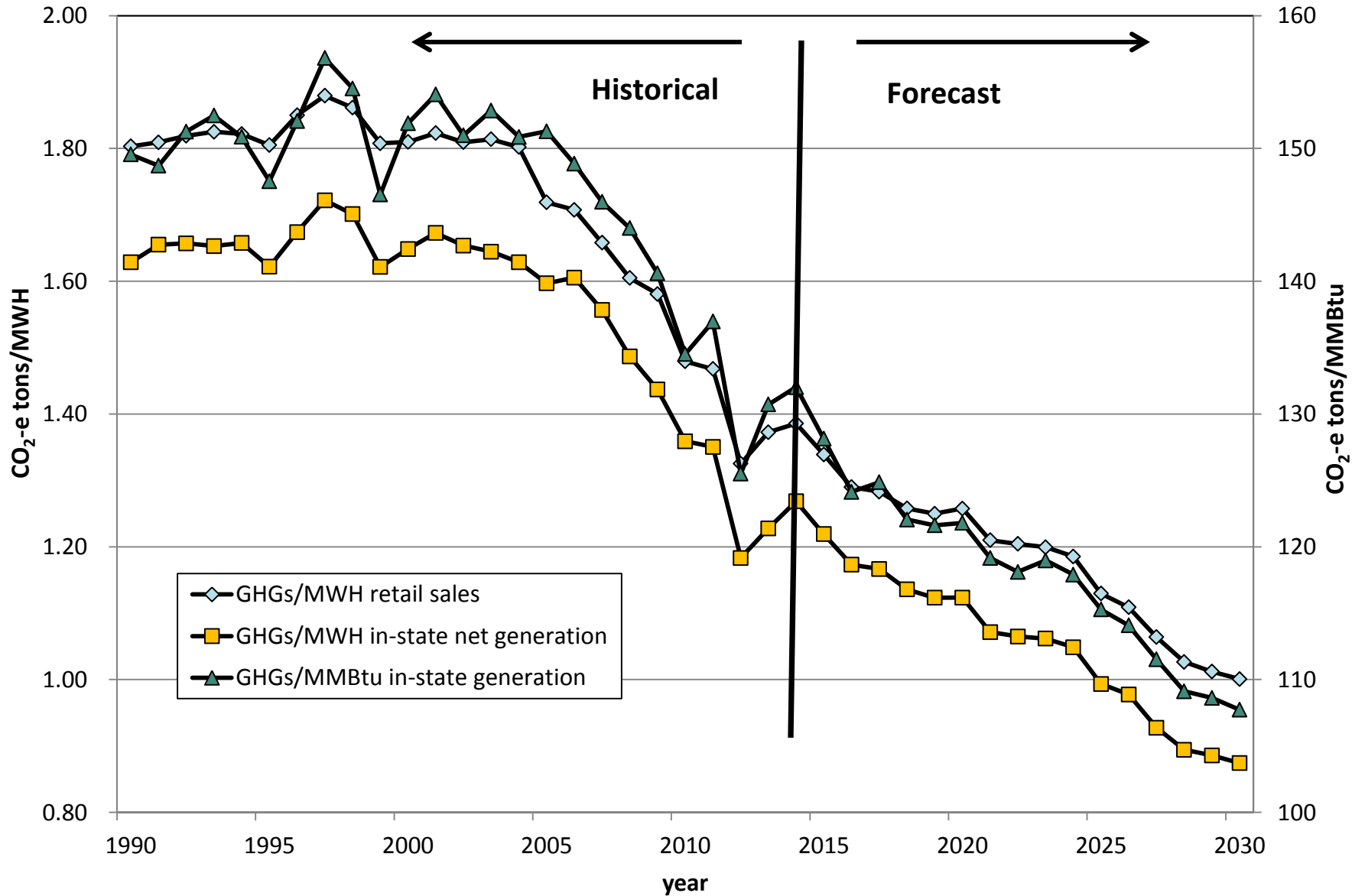
Historic and MPCA Forecasted Electric Generation to Service Minnesota



Historic and MPCA Forecasted Installed Electric Generating Capacity in Minnesota



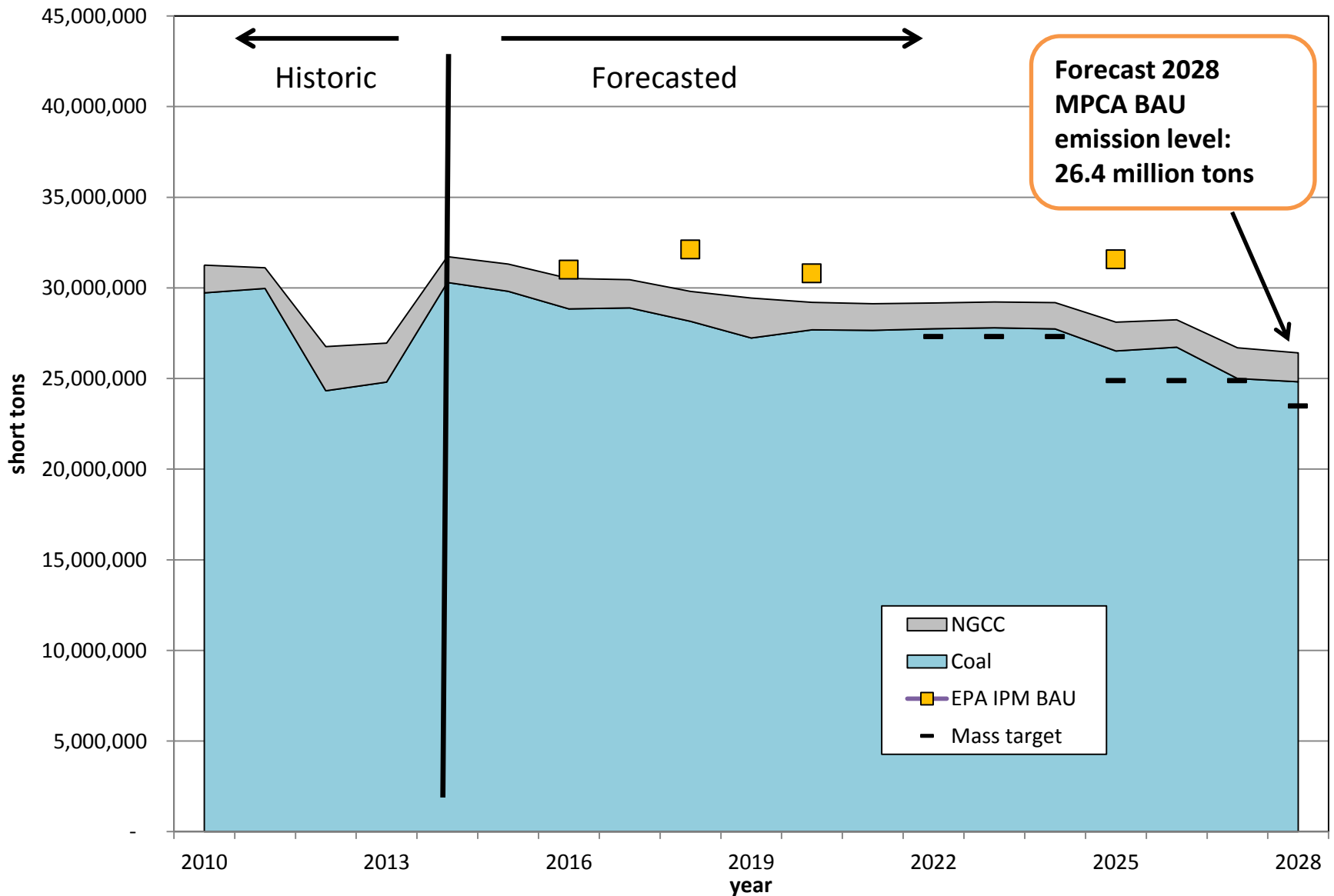
Historic and MPCA Forecasted Emissions Intensity in the Minnesota Electric Power Sector



CPP Compliance Work: Timing and Status

- Work current to October 1, 2015
- XCEL amendment to its 2015 IRP and revised EUAR are scheduled for early February 2016
 - On a mass basis, we would expect that the particulars of those 2016 filings will lower forecasted XCEL emissions at 2029 by at least 5 million tons (and probably more)
 - In a rate basis, all utilities that would be regulated by the MPCA under Section 111d are forecast to be in compliance without the need for any additional unit retirements or RE investments beyond what was assumed before XCEL's Sherco retirement announcement.

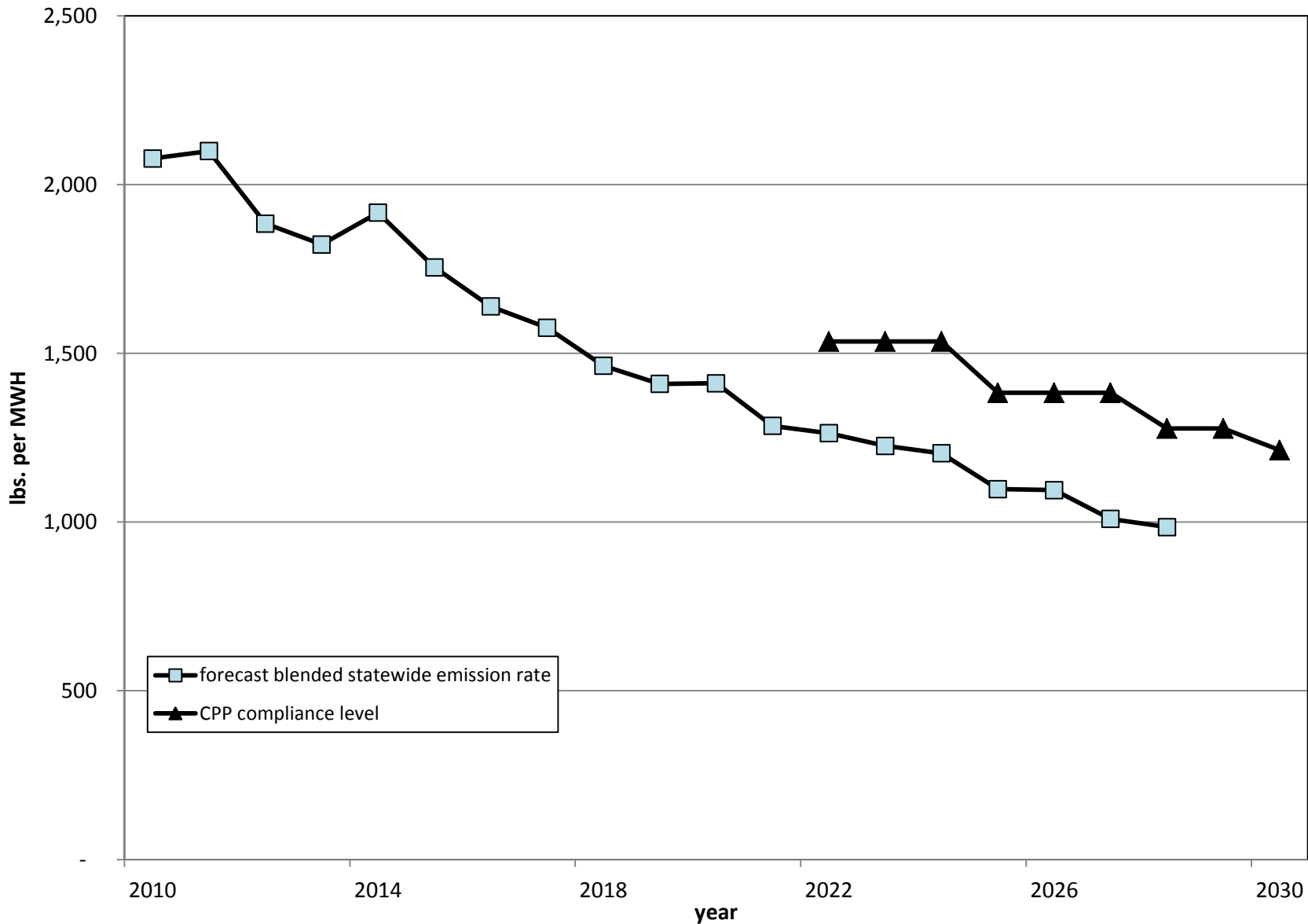
MPCA Historic and Forecast In-state CO₂ Emissions from CPP-Covered Generating Units



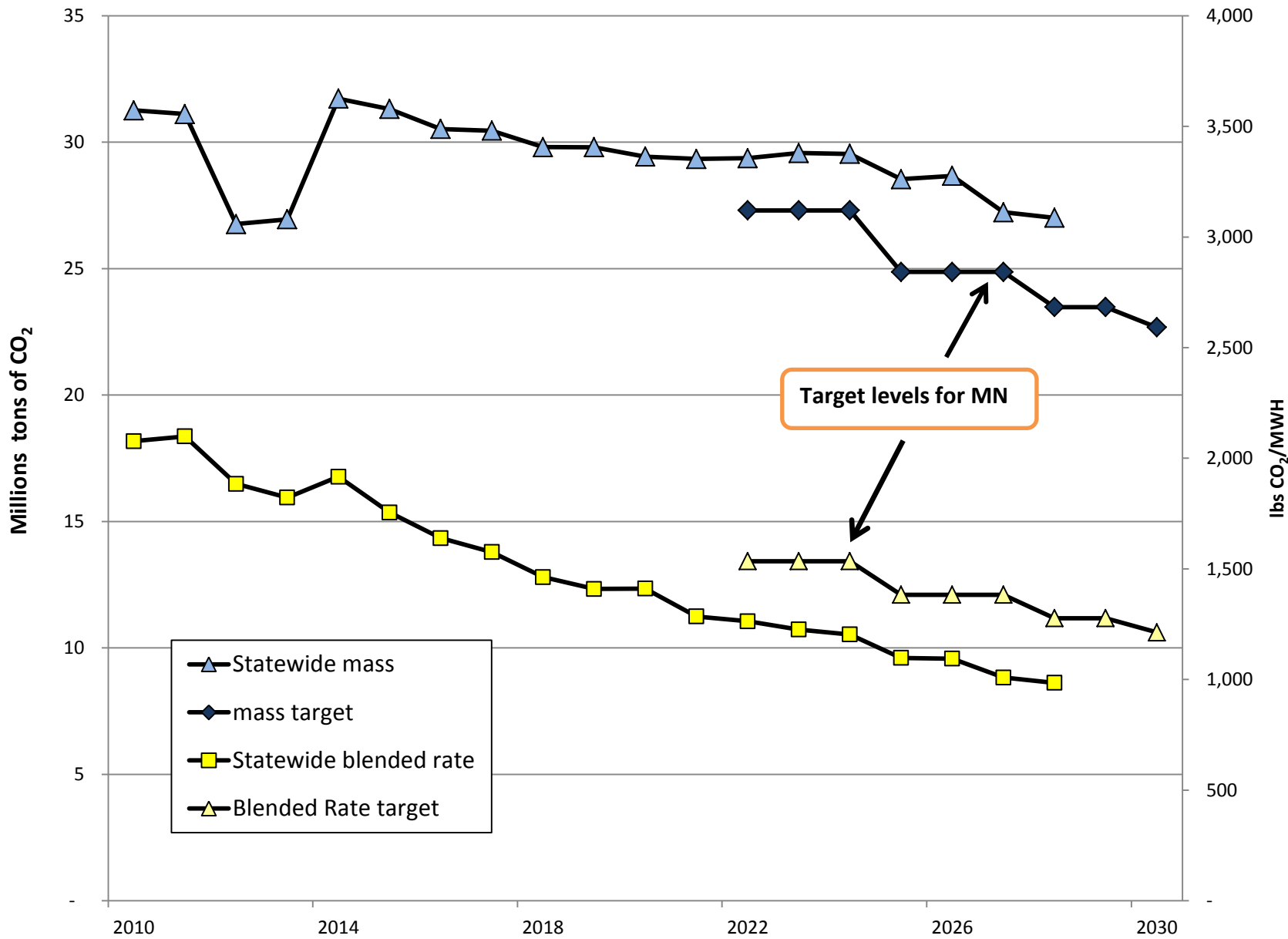
Available Compliance Resources under CPP

	year capacity installed or added	generation for years	banking of post 2021 credits	special conditions
domestic hydroelectric	2013 and later	2022 and later	yes	
foreign hydroelectric	2013 and later	2022 and later	yes	
domestic wind	2013 and later	2022 and later	yes	
foreign wind	2013 and later	2022 and later	yes	PPA required
domestic solar	2013 and later	2022 and later	yes	grid connection
domestic geothermal	2013 and later	2022 and later	yes	
domestic biomass	2013 and later	2022 and later	yes	approved feedstock
domestic WTE	2013 and later	2022 and later	yes	biogenic part; limits derived from effects on recycling and composting
domestic waste heat	2013 and later	2022 and later	yes	
domestic NGCC	2013 and later	2022 and later	yes	with heat rate better than standard; for incremental generation above 70% capacity factor
in-state nuclear	2013 and later	2022 and later	yes	
in-state CHP	2013 and later	2022 and later	yes	excess after thermal uses
in-state energy efficiency, load management and T&D improvement	2013 and later	2022 and later	yes	
out-of-state nuclear	2013 and later	2022 and later	yes	not available from neighboring states with mass-based systems
out-of-state CHP	2013 and later	2022 and later	yes	
out-of-state DSM: energy efficiency	2018 and later	2022 and later	yes	
out-of-state DSM: load management	2018 and later	2022 and later	yes	
out-of-state T&D improvement	2013 and later	2022 and later	yes	
CEIP credits	9/18 or date of p	2020, 2021	no	

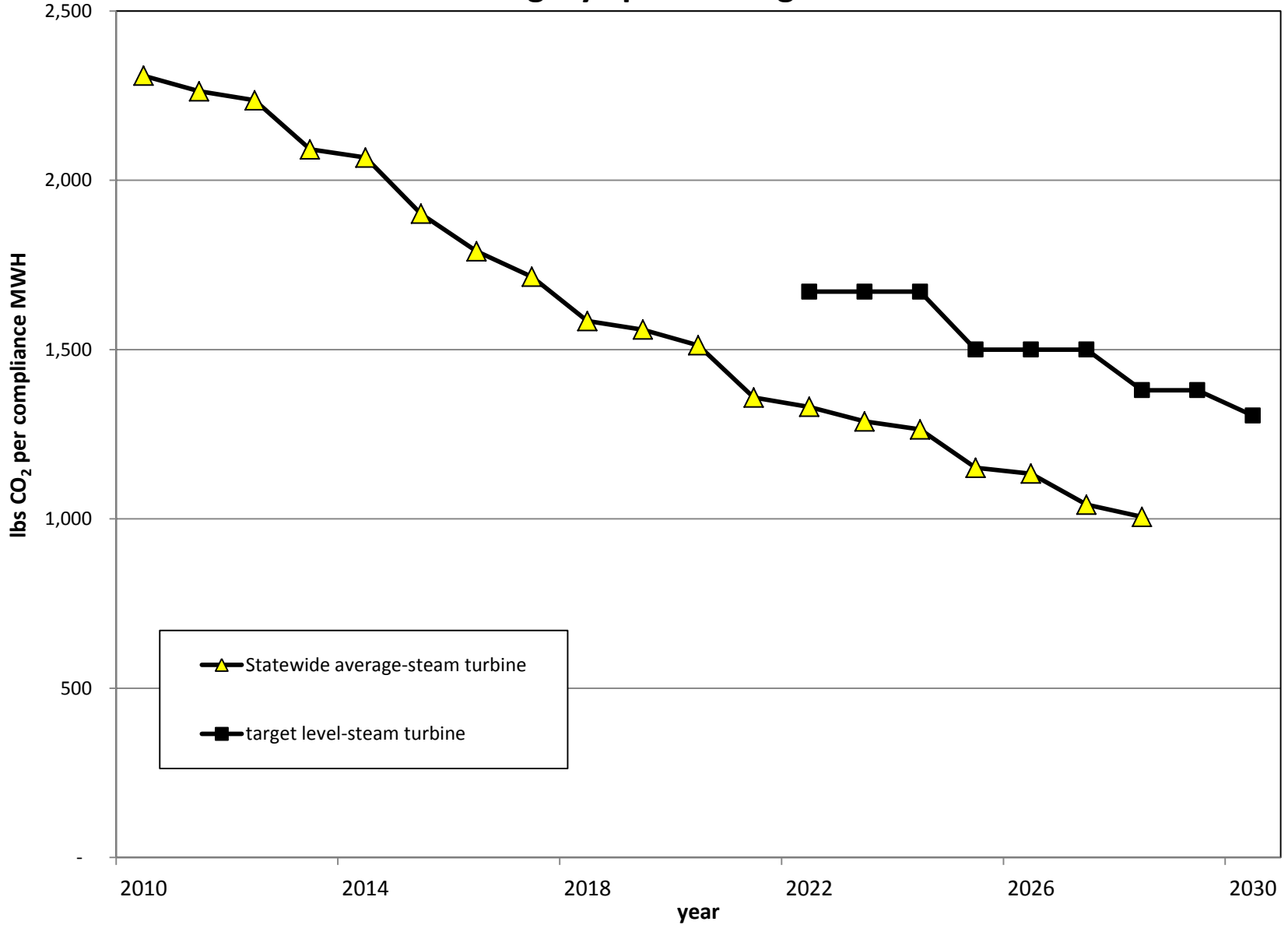
MPCA Forecasted Average Blended Emission Rate for Minnesota (CPP-covered Units only) and CPP Compliance Levels



MPCA Forecast Mass Emissions and Emission Rates for Affected Units



MPCA Forecast Emission Rates for Affected Steam Turbines and Category Specific Target Levels



Compliance Resources at 2028 (million MWH)*

* without GS-ERCs

Next Steps to Update the Forecast

- Roll-in new forecast values for XCEL Energy from amended 2015 Electric Utility Annual Report (early February)
- Include performance degradation effects for wind and solar and DSM lifetime effects