



VERMONT'S TRANSMISSION RELIABILITY RESOURCE

Effects of SPEED, Net-Metering & Other Programs on Load Forecasts

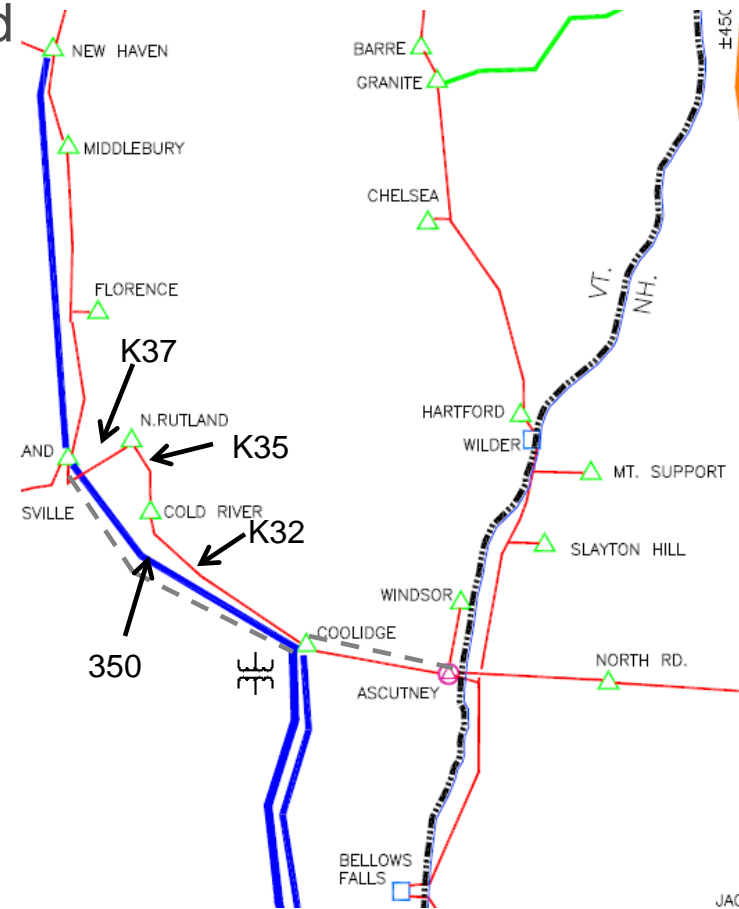
August 2, 2012

Board of Directors



Central Vermont Solutions

- Second 345 kV line between Coolidge and West Rutland
- Estimated at \$157M
 - Station costs & 50% contingency included
- NTAs are possible – study has started
 - Some or all overloads affected by DSM, PV-20 imports, and generation north and west of West Rutland
- All DUs affected (RNS cost)
- GMP is lead DU



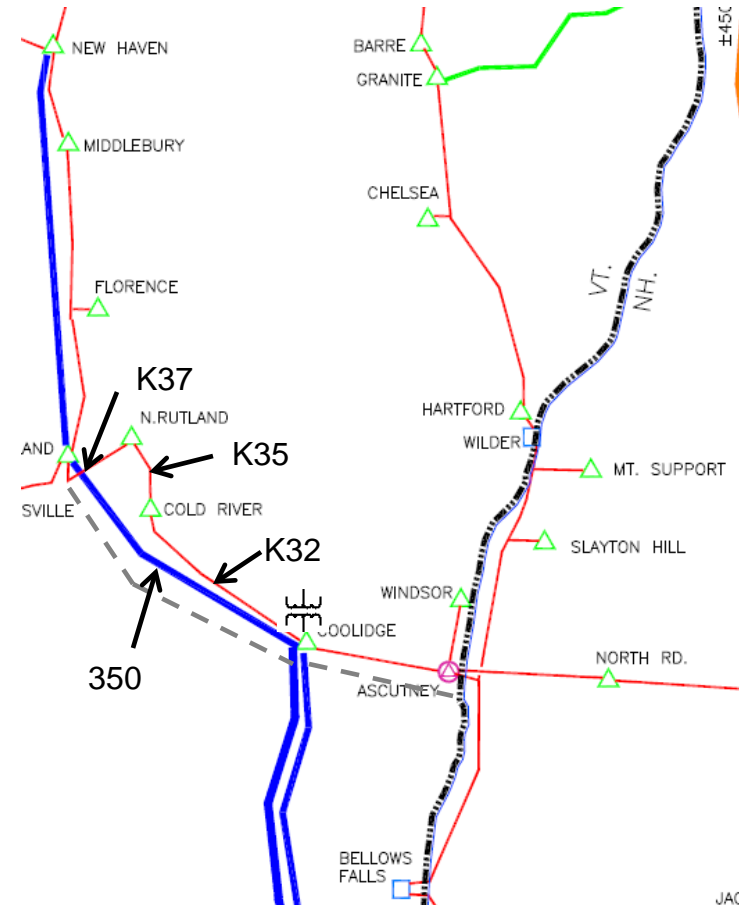
Timing of Central Vermont Solutions

VY in service

	Critical load level	Timing
Coolidge auto	1050 MW	2015
K32	1010 MW	Past
K35	1045 MW	2014
K37	1110 MW	2027

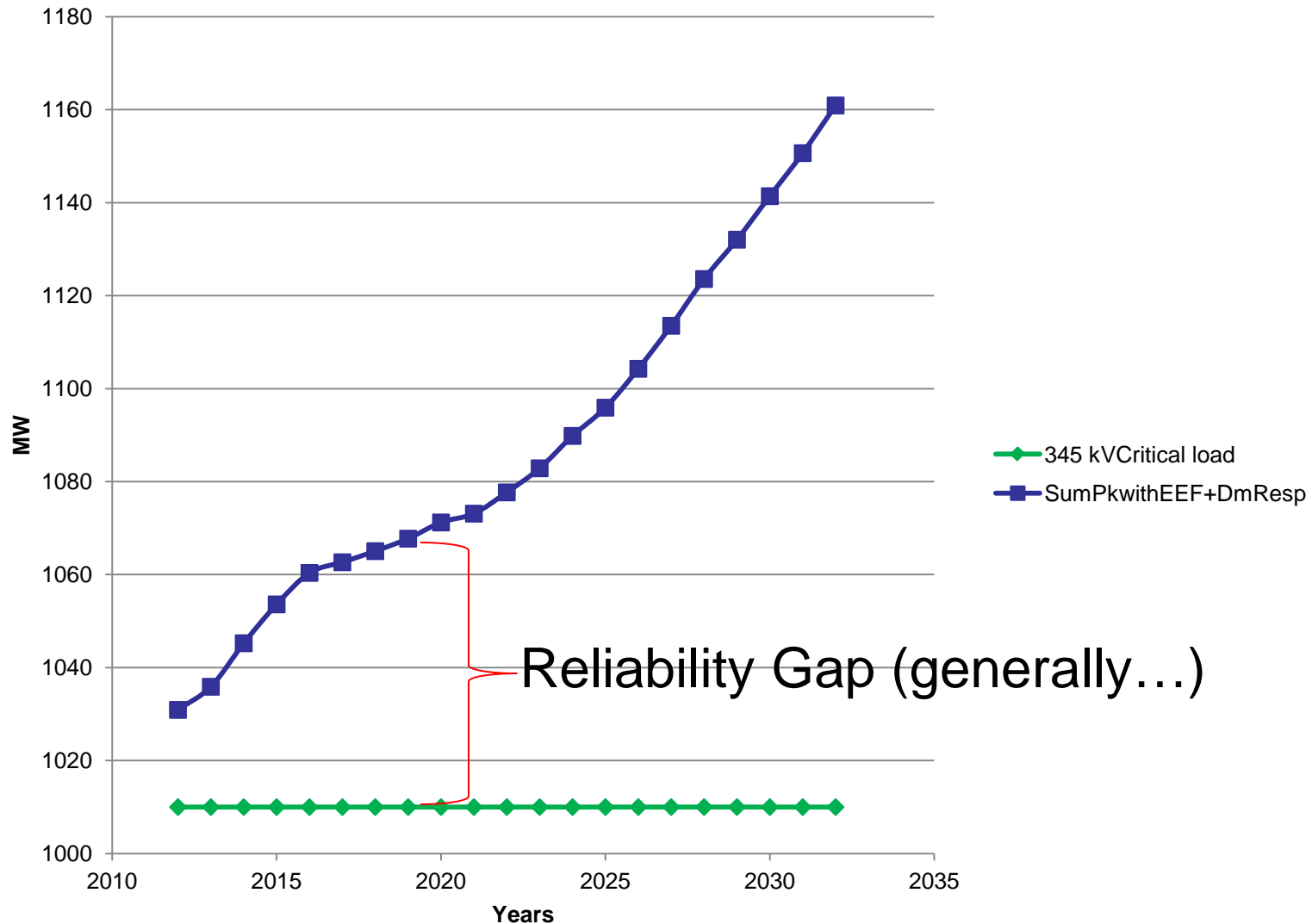
VY out of service

	Critical load level	Timing
Coolidge auto	1110 MW	2027
K32	1020 MW	Past
K35	1055 MW	2016
K37	1130 MW	2029



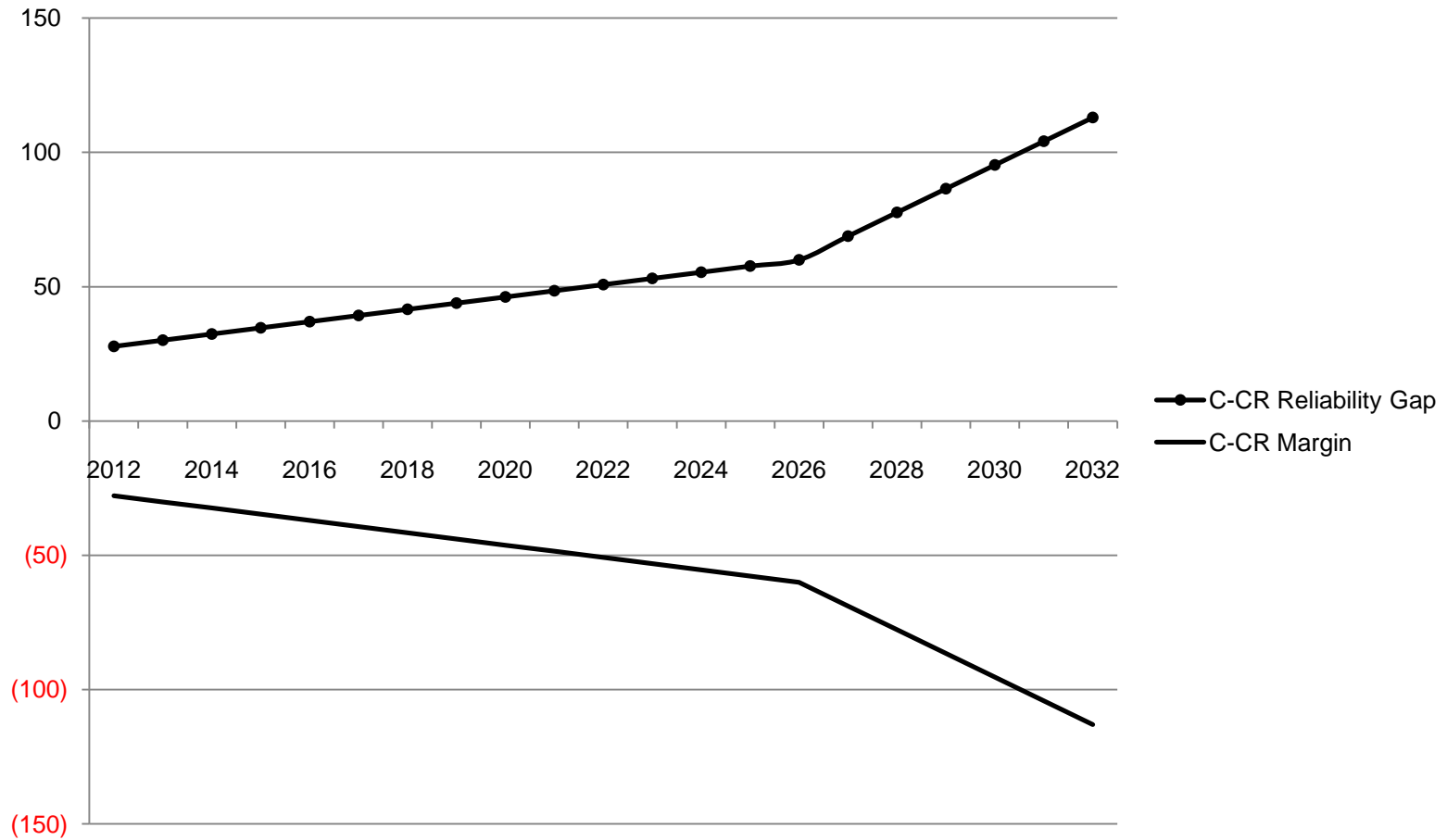
All-time summer peak is 1130 MW in 2006, and 2011 summer peak was 1060 MW, increased from 1020 MW peak in 2009

Load forecast and critical load

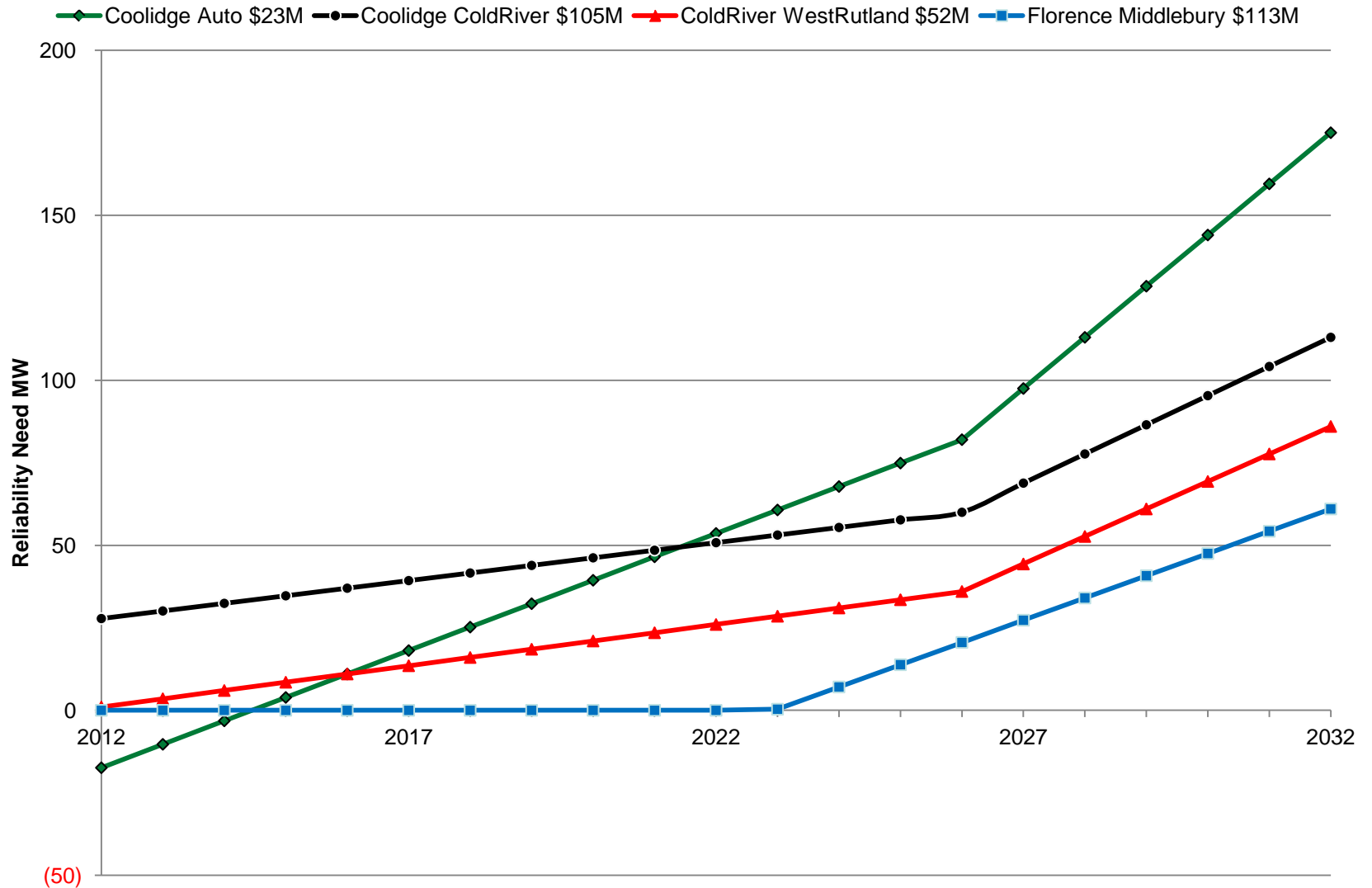


Plotting the Coolidge-Cold River gap (K31 effects not included)

Coolidge ColdRiver



Reliability gaps to be met by NTAs (K31 effects not included)



(50)

UNCERTAINTIES AROUND THE LOAD FORECAST

Causing uncertainties regarding the timing of criteria violations and reinforcements

Load forecast in the draft scope for the future ISO-NE study

1% vs. 1.5%		EE beyond FCM			
Year	CELT 2012 Forecast	Passive DR EE from FCM	Energy Efficiency 2012 Forecast	Active (Real time) DR - Scaled to 75%	Net Load
2012	1120	71	0	30	1019
2013	1130	91	0	38	1001
2014	1140	104	0	39	997
2015	1155	124	0	51	980
2016	1165	124	19	51	971
2017	1180	124	37	51	952
2018	1190	124	53	51	962
2019	1200	124	68	51	957
2020	1210	124	82	51	953
2021	1220	124	95	51	950
2022	1230	124	108	51	947

Add 25 MW to the ISO-NE net load forecast to get the corresponding VELCO load levels to account for the difference in load measurement approaches (Highgate losses, block load, Connecticut Valley)

Treatment of Energy Efficiency (EE) and Demand Response (DR) in the VT load forecast

- 50% of VT budgeted EE (~10MW/yr)
 - ISO-NE forecast shows EE at 19 MW in year 5 and 13 MW in year 10 due to increasing production costs
- DR from 2011 FCA5 (41 MW)
 - DR was kept constant in the forecast, but the latest ISO-NE load table shows that DR is increasing over time ... at least for FCA6. Latest figure is 51 MW.

Treatment of SPEED and Net-metering in VT load forecast

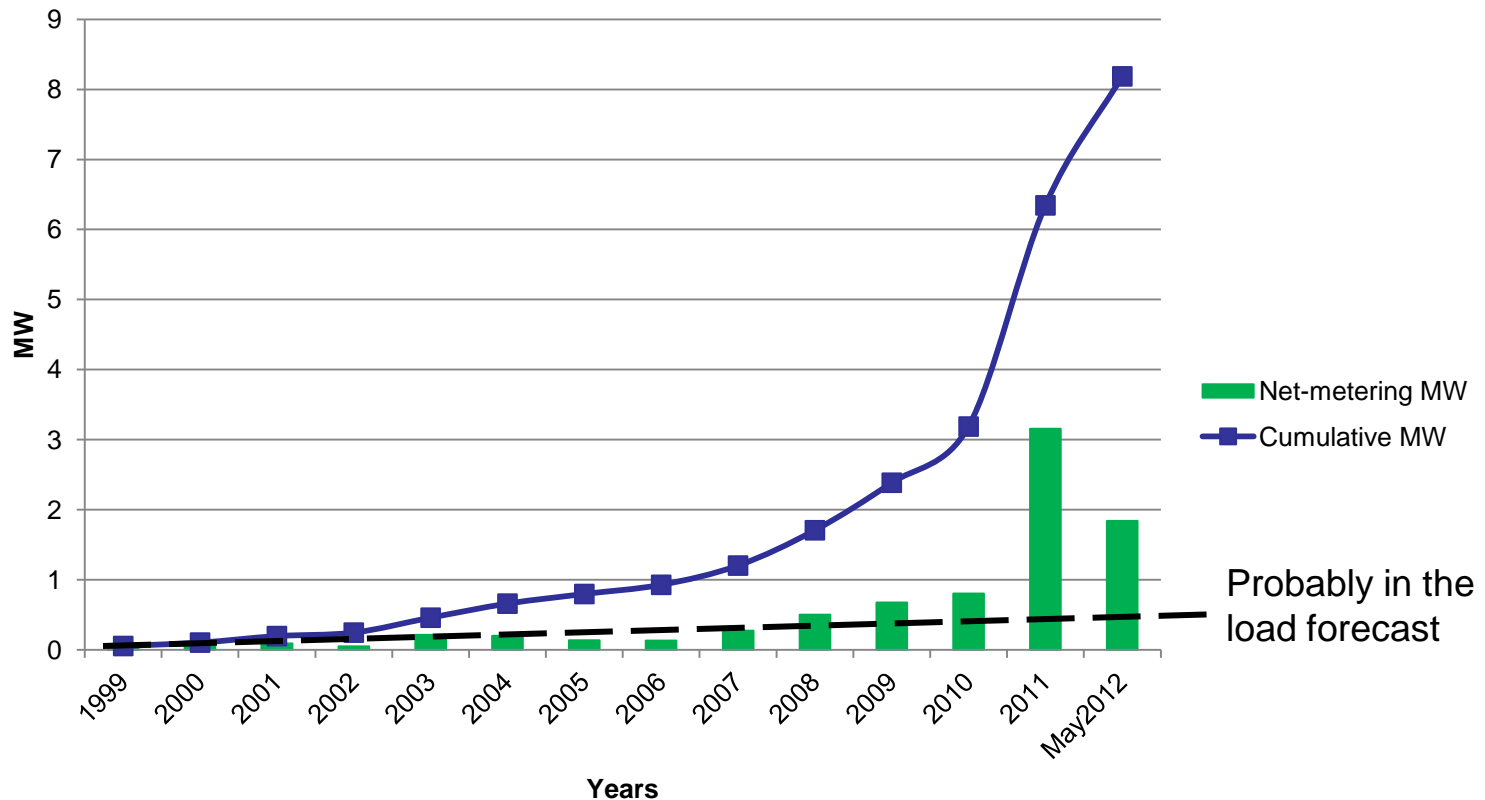
- Load forecast does not model in an explicit way
 - Net-metering effects
 - Modeled as negative load at the current implementation rate
 - The VT Energy Plan shows about 13 MW obtained CPG, but far fewer received the incentive payments, i.e. fewer installed
 - SPEED projects effects
 - Modeled as negative load at the current implementation rate
 - About 8 MW has been installed as of 2011, but current info shows that more than 12 MW will be added in 2012
 - The board recently set a cumulative goal of 127.5 MW for 2022 at a rate of 5 MW to 10 MW per year

SPEED = Sustainably Priced Energy Enterprise Development, i.e. standard offer or renewable energy program

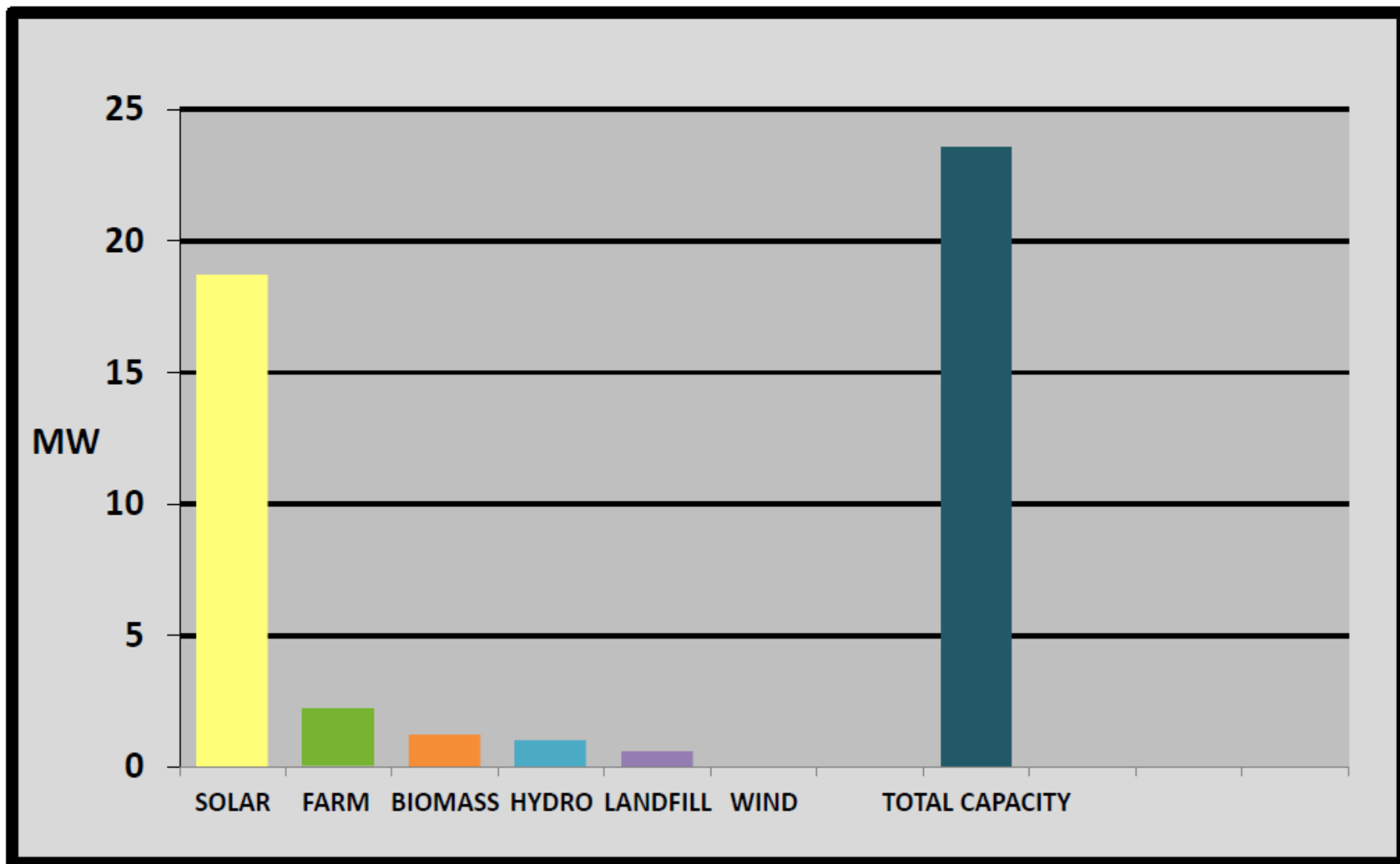
Net-metering = program allowing consumers to install renewable resources, which can turn their energy meter backwards, i.e. sell energy back to the local utility

Estimated Net-metering installations

- VT Energy plan states that 13 MW of generation has received a CPG
 - Curve is based on several VT DPS data sources
 - 1999 to 2003 based on CPGs
 - 2004 to May 2012 based on incentives to wind and solar PV
 - Curve does not include other sources (methane, small-scale hydro, 0.3 MW total)

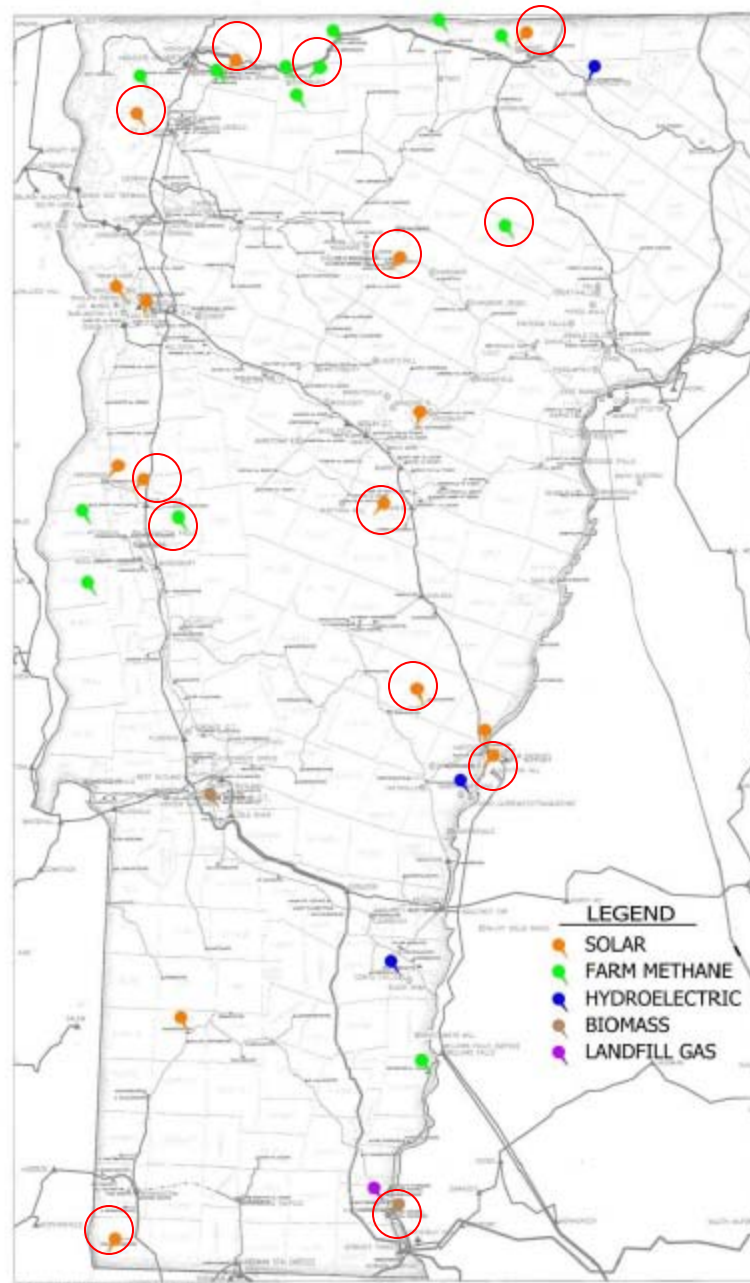


SPEED projects projected to be commissioned as of 2012



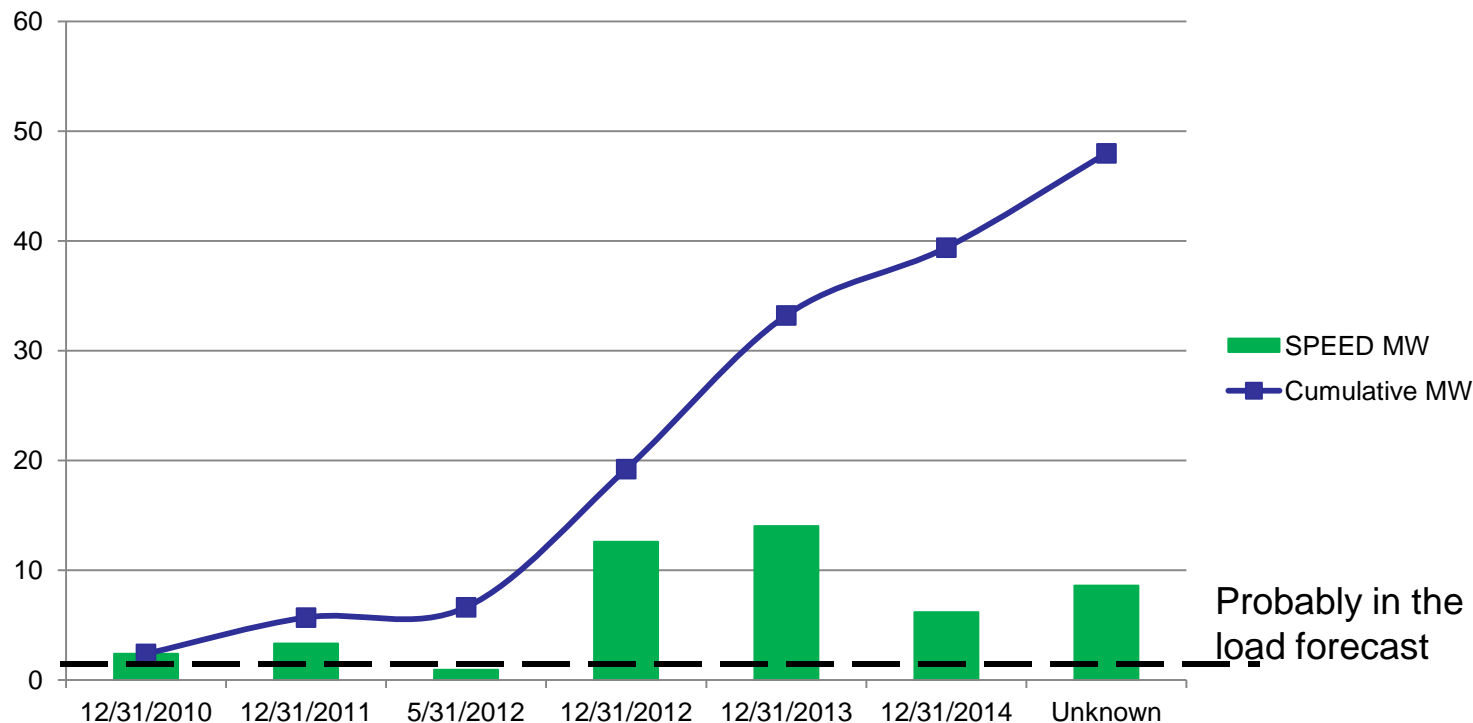
Existing & new SPEED projects

○ New 2012 SPEED projects



Estimated SPEED generation installations

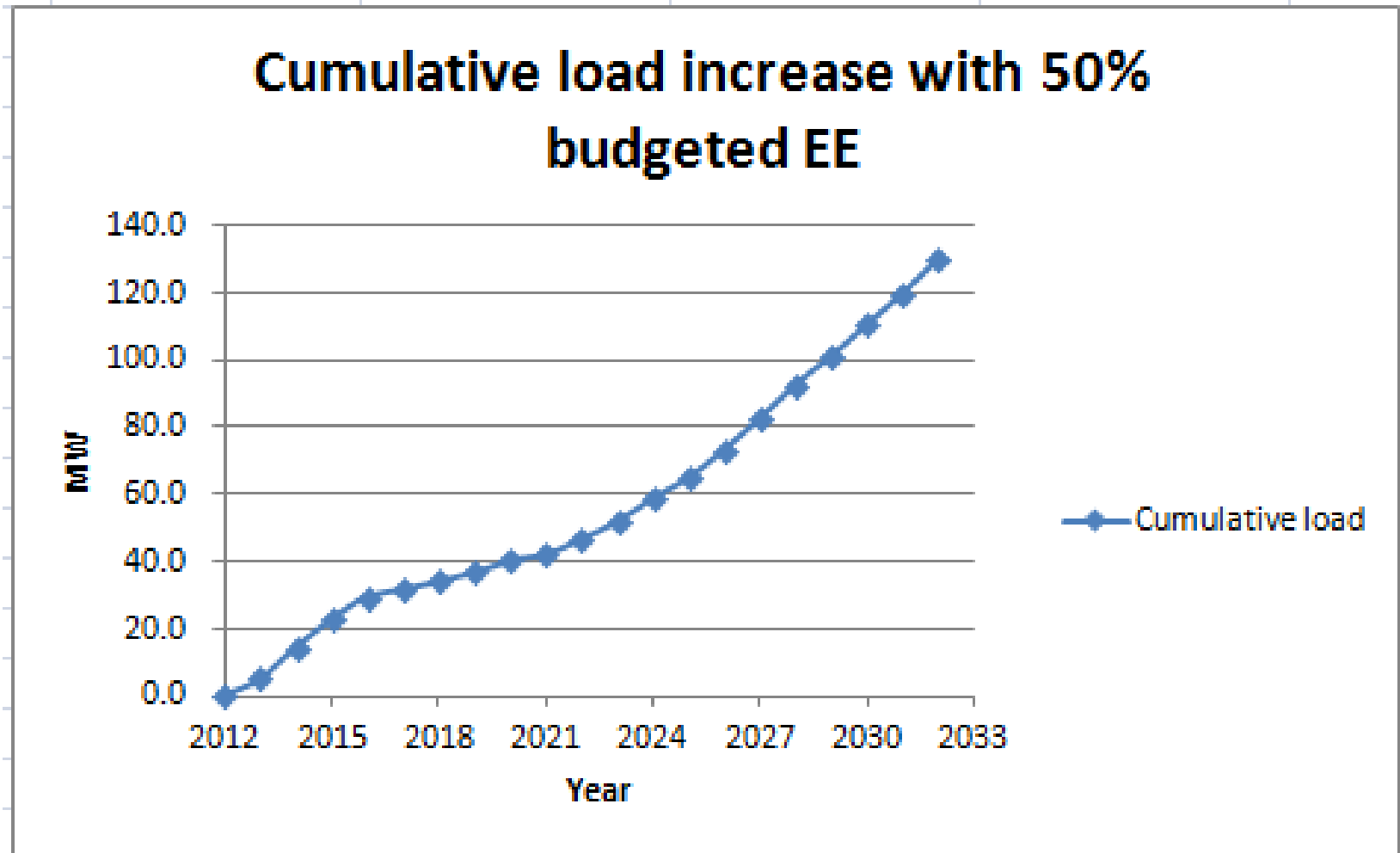
- SPEED facilitator stated that about 25 MW of generation will be installed as of 2012
 - Curve is based on several SPEED data sources
 - Applications being processed on the SPEED web site (2.3 MW were existing as of August 2010)
 - Data provided to the NTA study group to make reasonable projections of SPEED additions
 - These three data sources do not match exactly (used the lower values)



POTENTIAL EFFECTS OF SPEED PROJECTS, NET-METERING, AND ISO-NE DR ON VERMONT LOAD

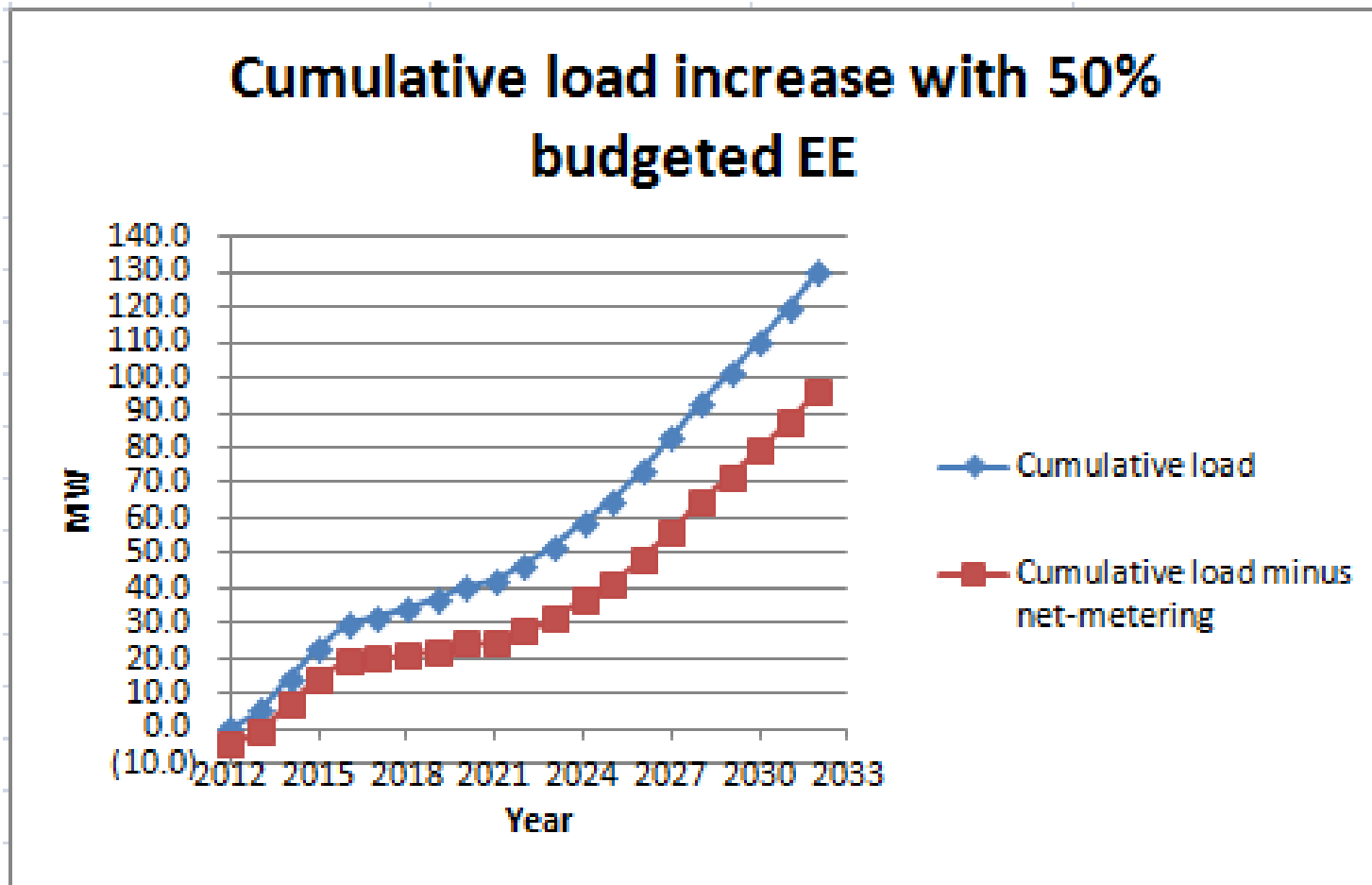
Cumulative load increases from ITRON 90/10 load forecast

- Averaging about 6.5 MW per year over the next 20 years



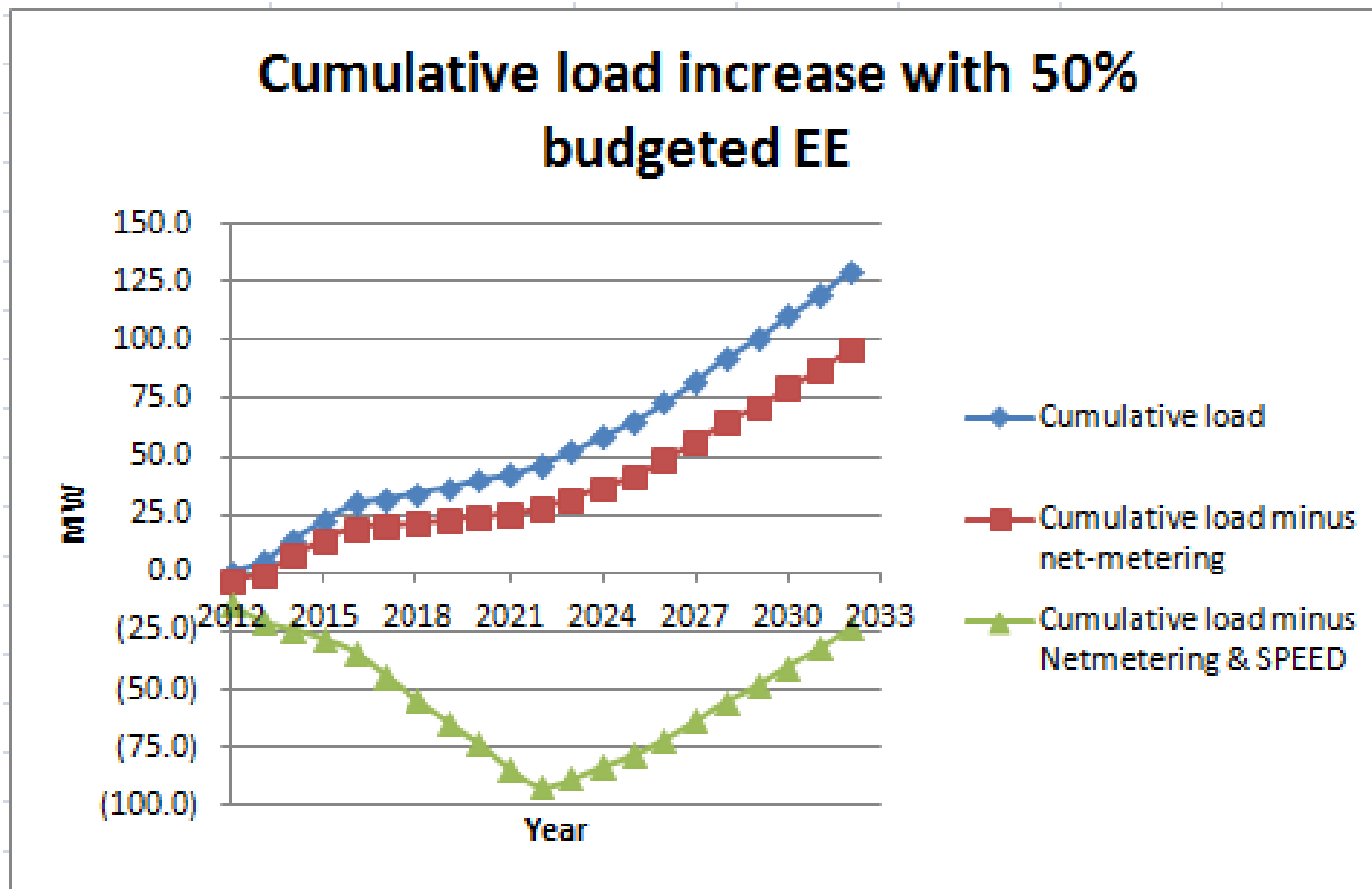
Cumulative load increases from ITRON 90/10 load forecast – adjusted by Net-metering

- Assumed 6 MW existing, 4 MW in 2012 based on installation trend, and 1.5 MW per year as a conservative annual installation rate with a maximum of 34 MW in 2032 to reach the 4% of state load limit



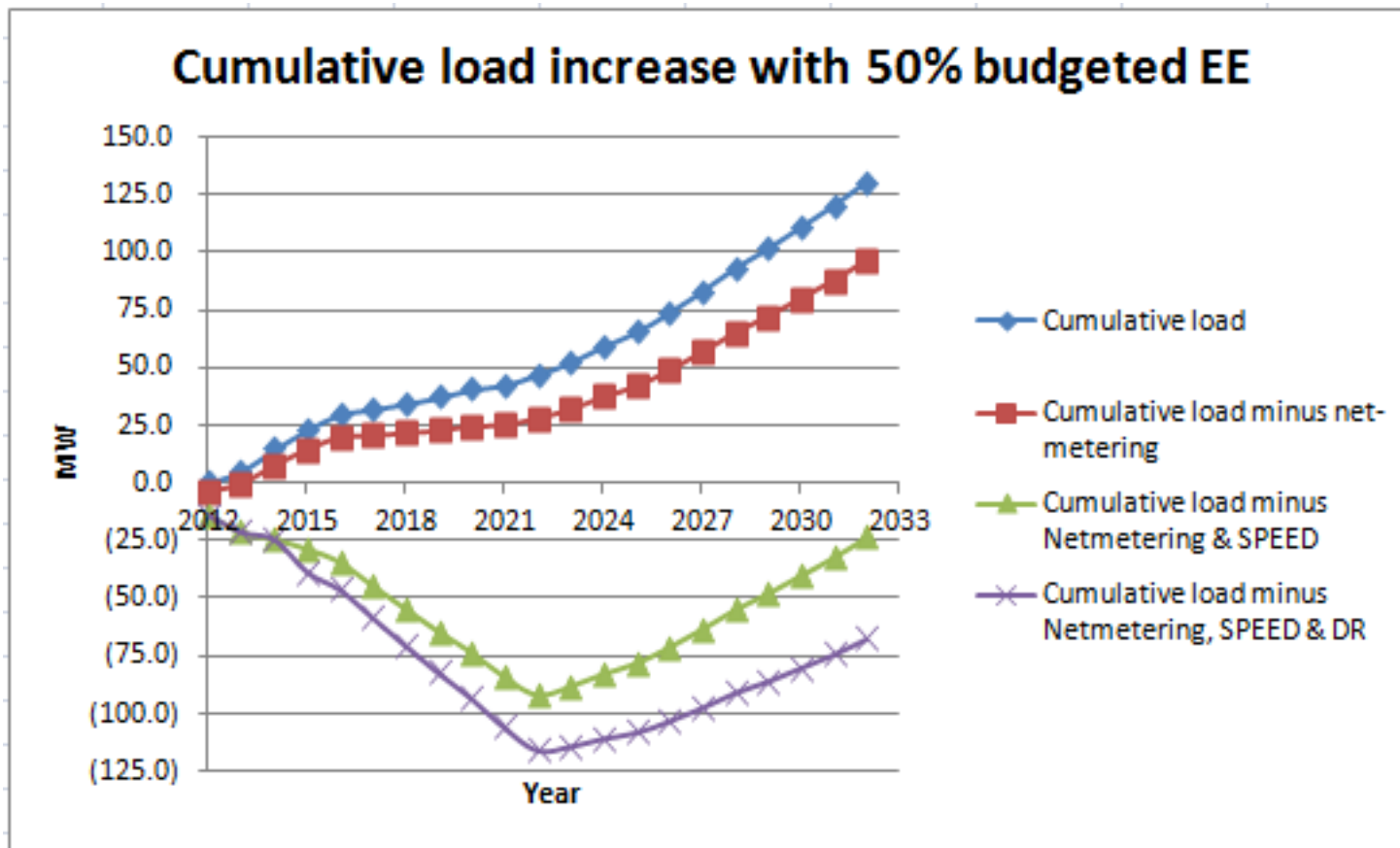
Cumulative load increases from ITRON 90/10 load forecast – adjusted by Net-metering and the SPEED projects

- For SPEED: Assumed 8 MW existing, 10 MW in 2012 based on installation trend, and 11 MW per year as a convenient annual installation rate to reach a maximum of 120 MW in 2022 to reach the 128 MW limit



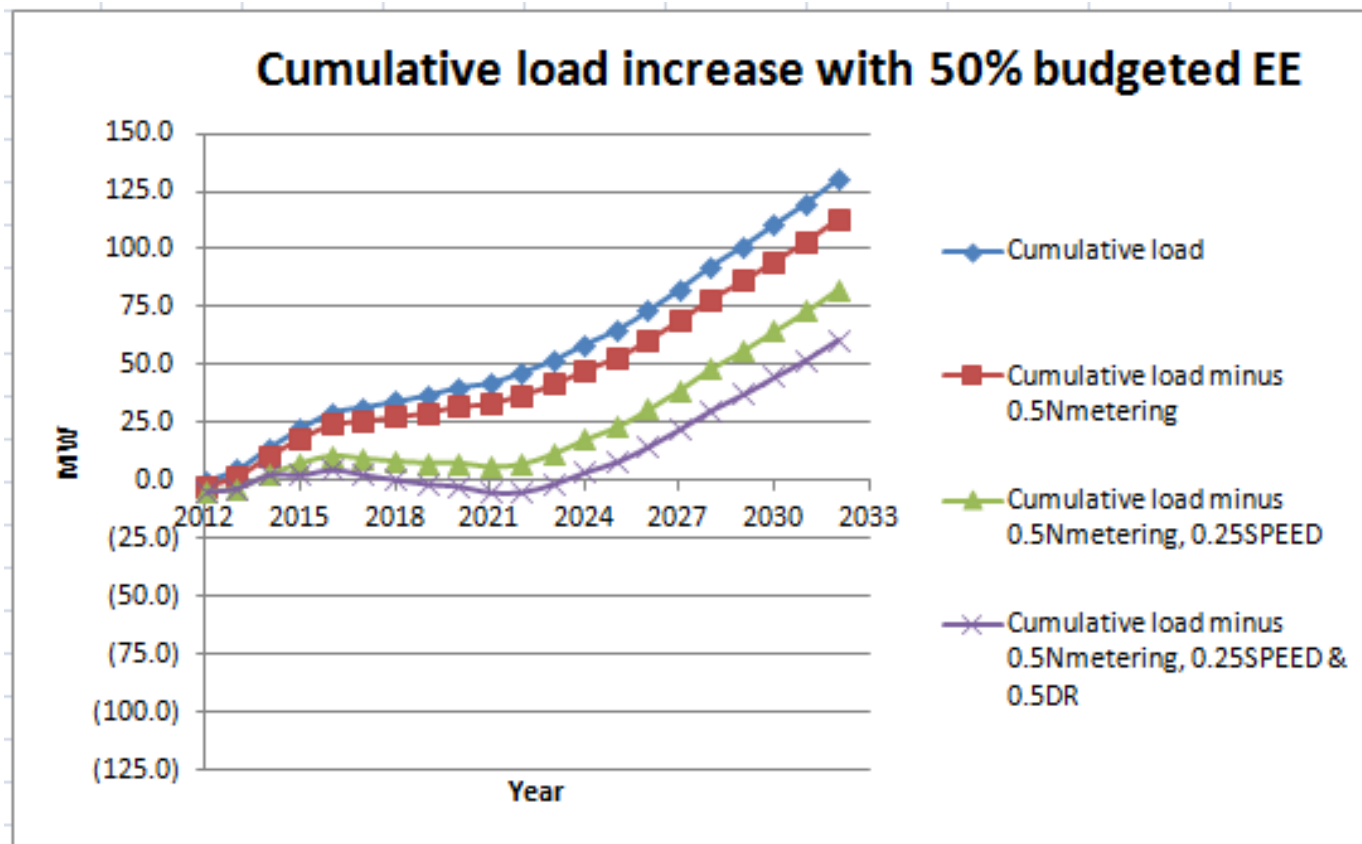
Cumulative load increases from ITRON 90/10 load forecast – adjusted by Net-metering, SPEED projects and ISO-NE DR

- For DR: Assumed 10 MW additional in 2015 based on ISO-NE load table in the VT/NH draft study scope, and 2 MW per year as a reasonable annual installation rate.



What if these resources contribute little to system reliability?

- Benefits are lower due to financial barriers, saturation, slower rate of installation, wrong location, wrong technology
 - Net-metering reduced from 1.5 MW to 0.75 MW per year (2 MW in 2012)
 - SPEED reduced from 11 MW to 2.75 MW per year (2.5 MW in 2012)
 - DR reduced from 2 MW to 1 MW per year (0 MW in 2012, 5 MW in 2015)



PRELIMINARY RESULTS FROM NTA STUDY, ASSUMING VT LOAD FORECAST IS UNCHANGED

Predicted above market costs of NTA solutions

Preliminary Findings of Screening Analysis – 2

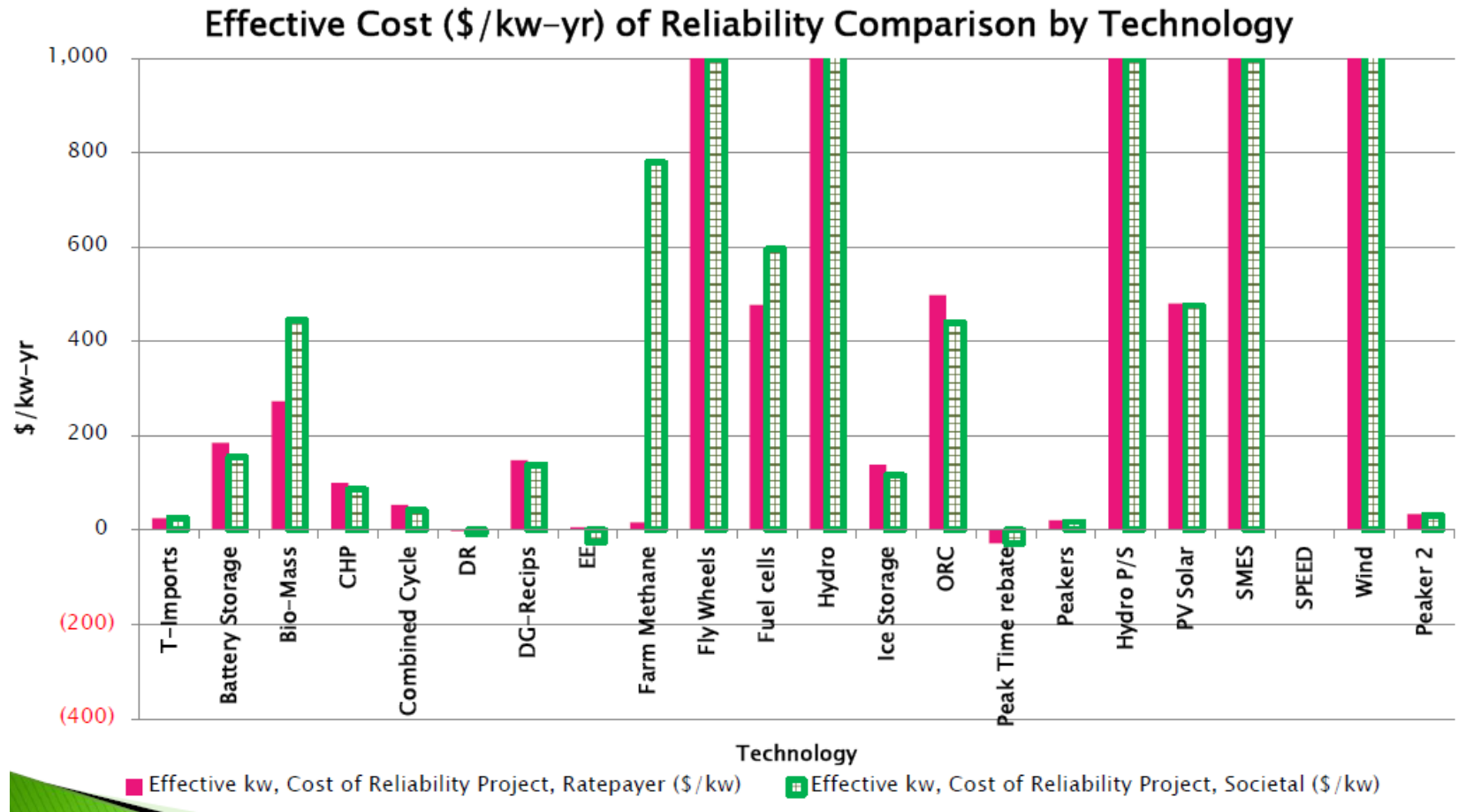
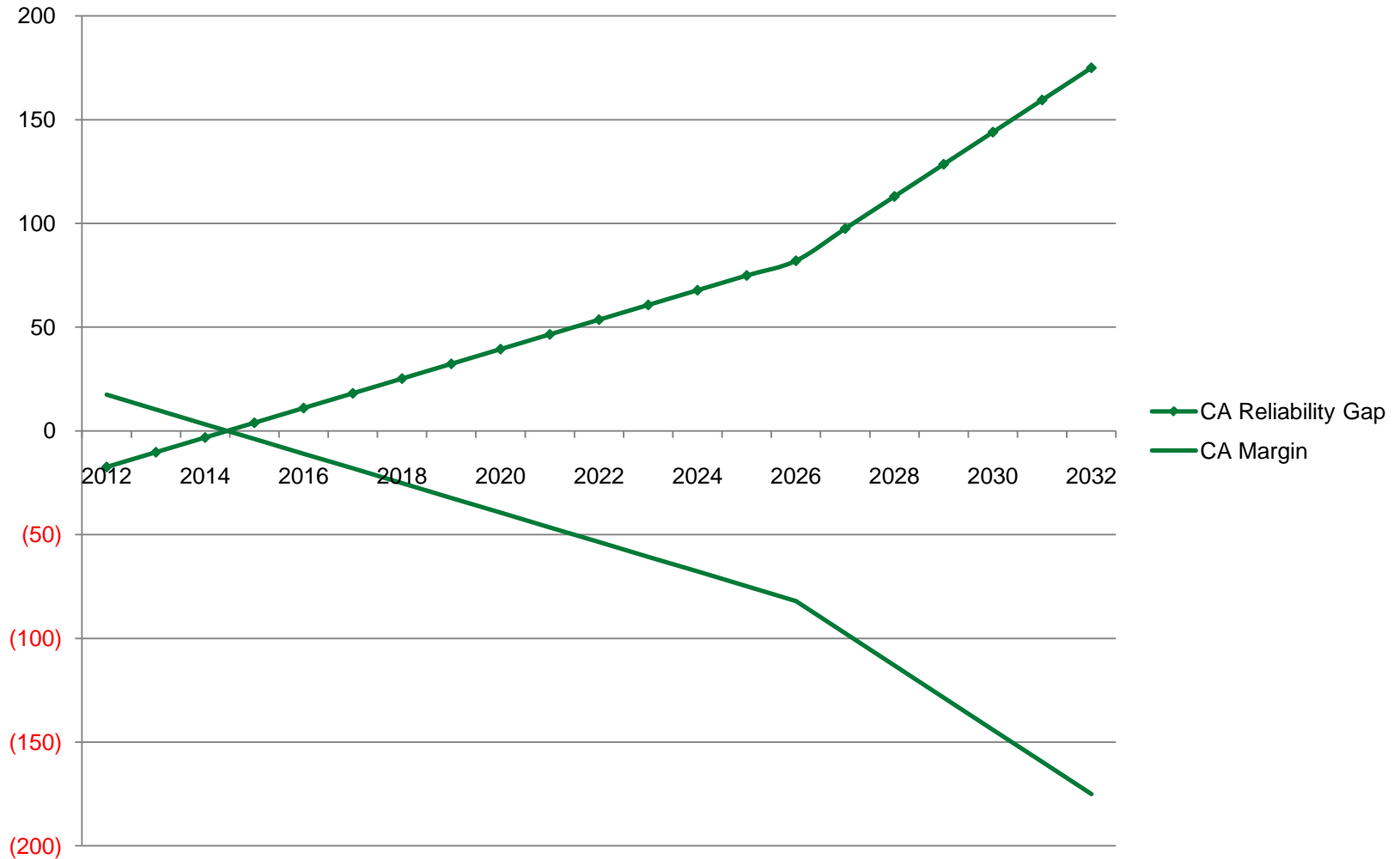


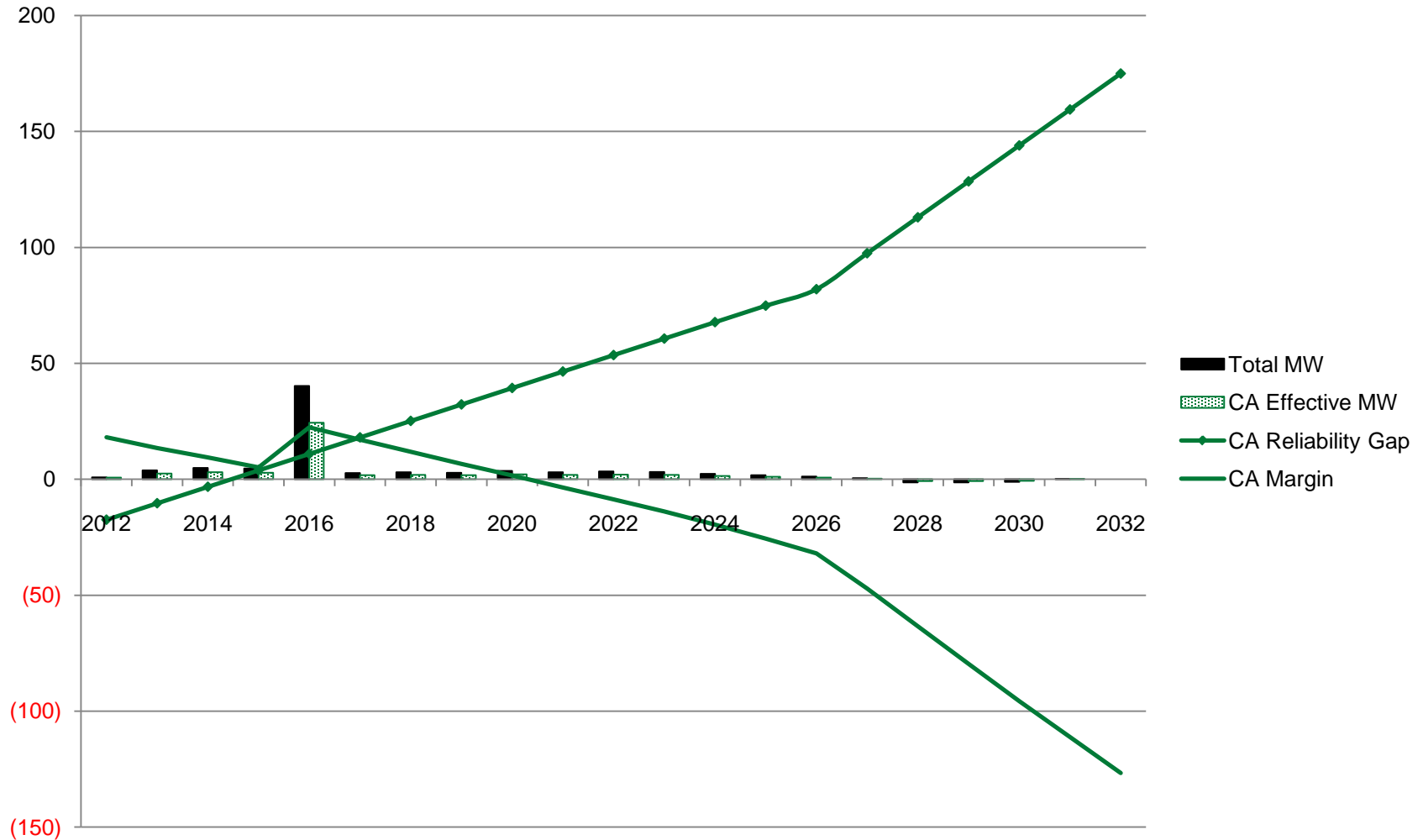
Illustration of Coolidge auto reliability need

Coolidge Auto



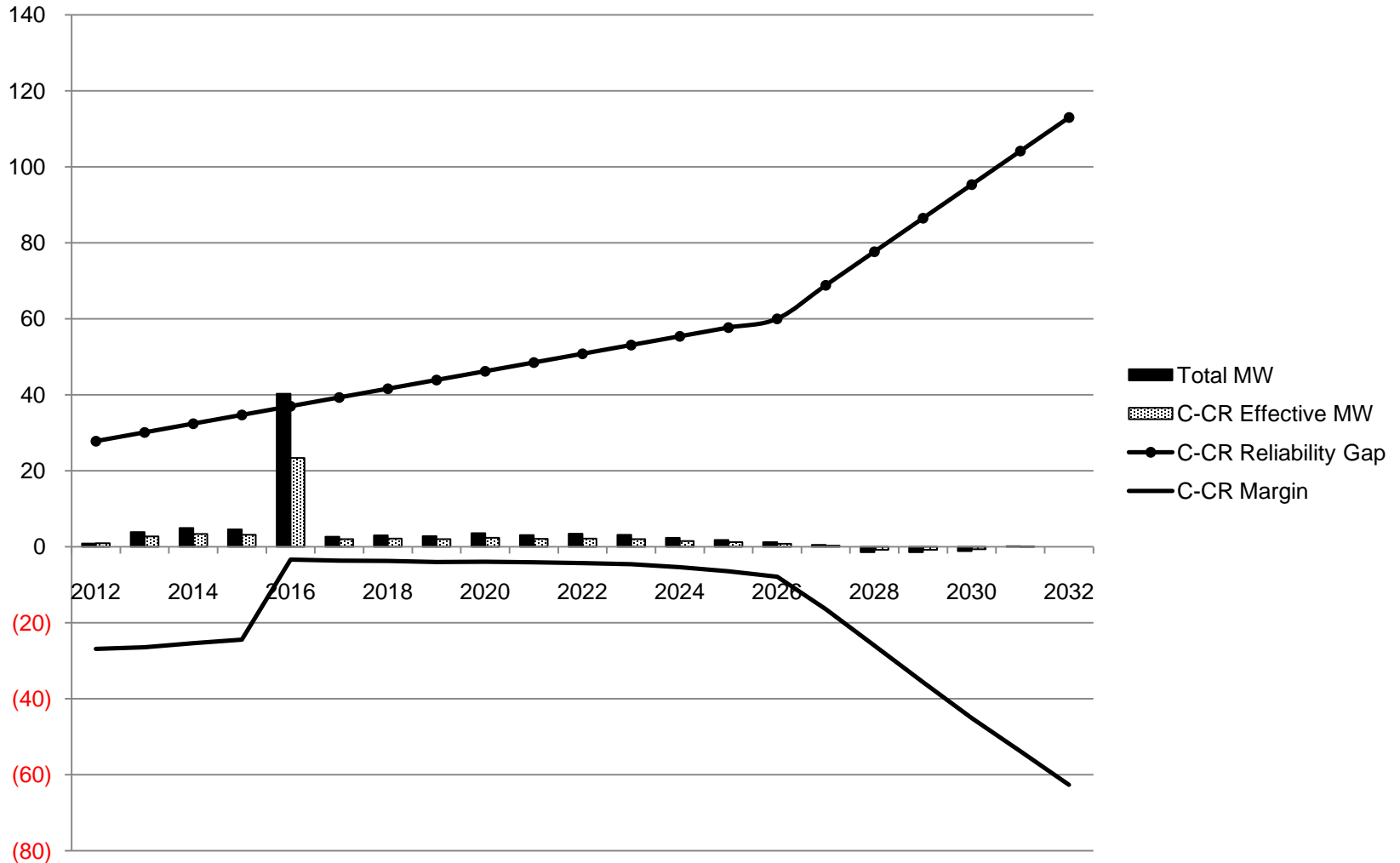
Preliminary NTA study results as of June (DR +EE)

Coolidge Auto



Preliminary NTA study results as of June (DR +EE)

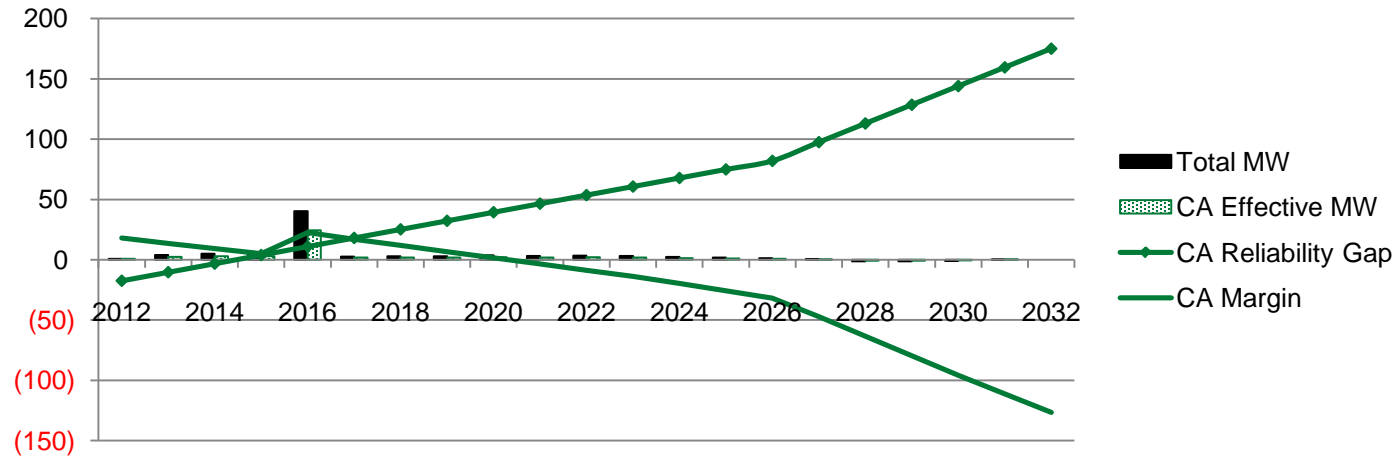
Coolidge ColdRiver



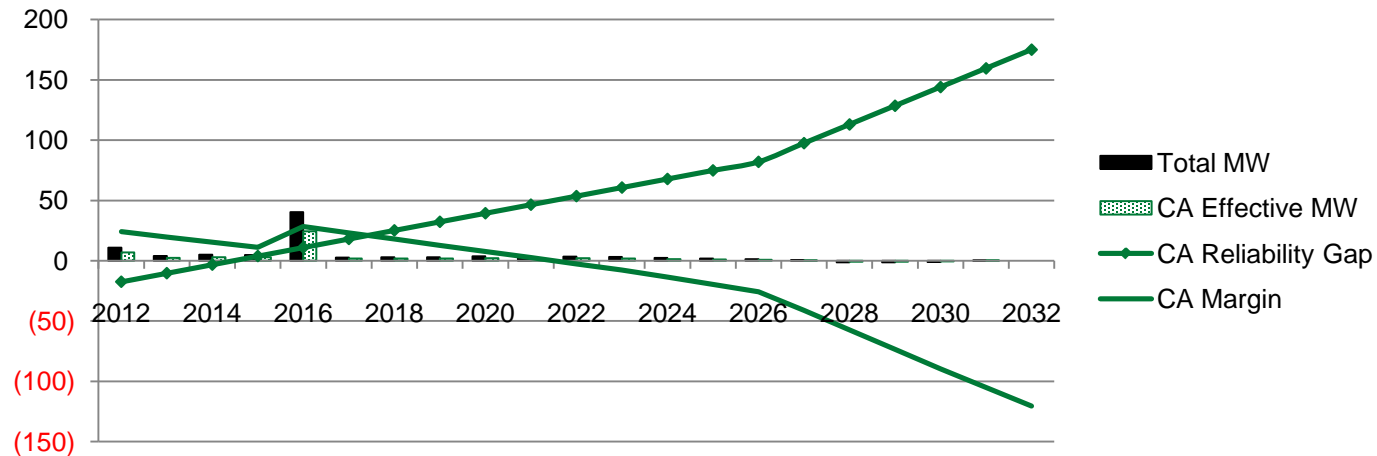
Preliminary NTA study results as of June (DR+EE+SPEED)

- Consider 10 MW of the suggested Speed addition in 2012
- Effects of the 2nd K31 line not modeled

Coolidge Auto - old



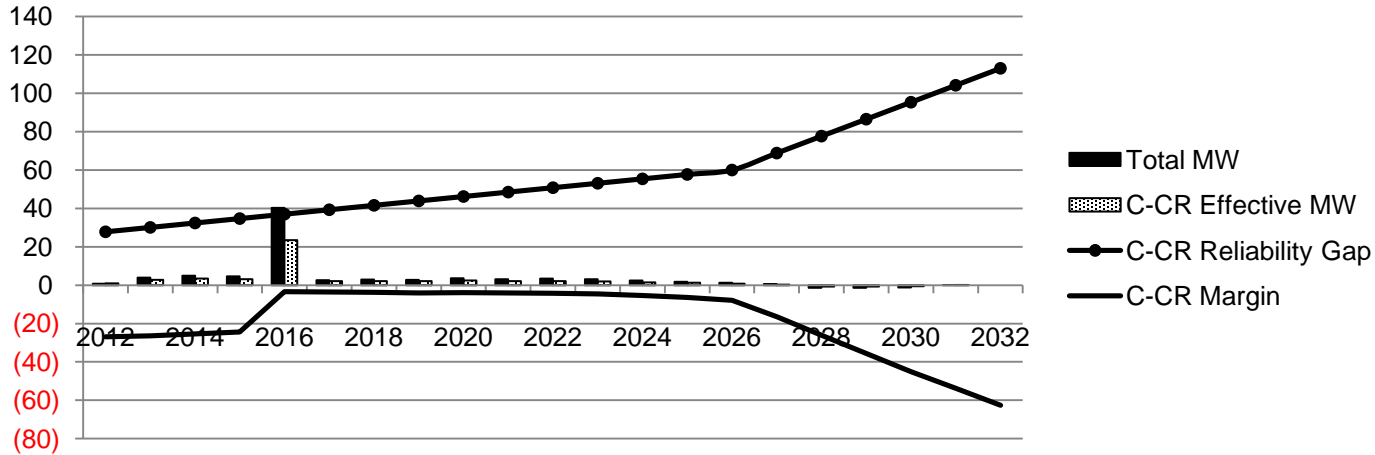
Coolidge Auto – with SPEED units (10 MW)



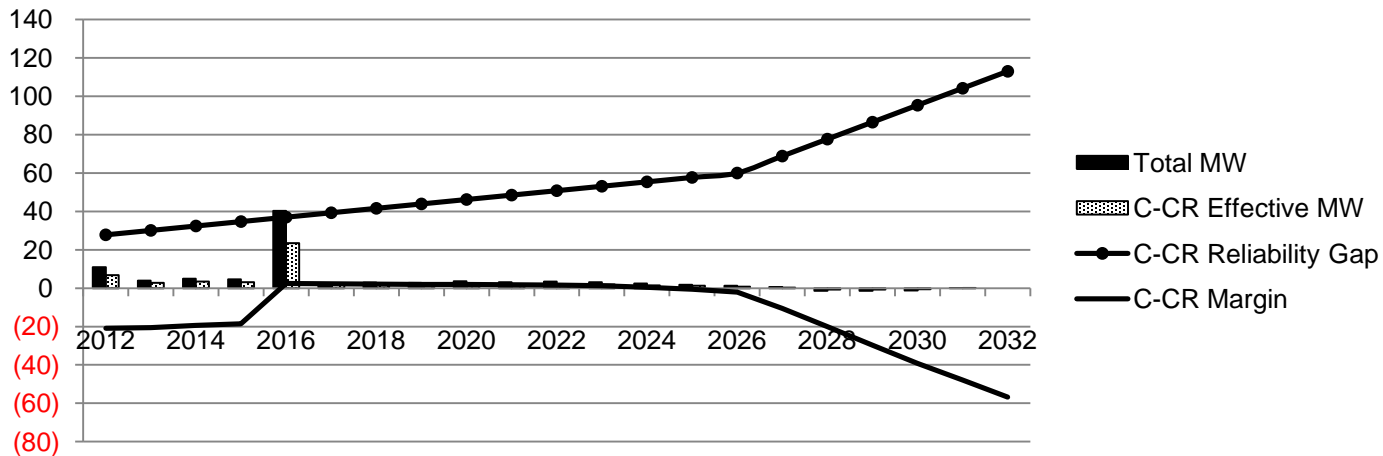
Preliminary NTA study results as of June (DR+EE+SPEED)

- Consider 10 MW of the suggested Speed addition in 2012
- Effects of the 2nd K31 line not modeled

Coolidge ColdRiver - old



Coolidge ColdRiver – with SPEED units (10 MW)



Conclusions

- The new SPEED and net-metering legislation introduces significant uncertainty regarding future loads
 - Net-metering PV projects now get \$0.20/kwh for 10 years (follows GMP's approach of providing a \$0.06 rate adder to PV)
 - More than 12 MW additional SPEED generation in 2012, 127.5 MW total by 2022 at a rate of 5 to 10 MW per year (significant ramp up expected in the next three years)
 - Has the potential to dwarf the effects of EE
 - Can reduce the amount of NTA needed, assuming the load forecast remains unchanged
 - There is some amount of risk in overestimating the reliability contribution from SPEED projects
 - Should discount SPEED units to account for project location and technology effects
 - Should work with the SPEED administrator and DUs to reduce uncertainty
 - Reality can be different from the state's goals (slower installation rate)
 - We may be able to achieve a better result with information sharing

Conclusions

- Even if the 2011 VT forecast remains as is, preliminary NTA study results suggest that the Coolidge to West Rutland 345 kV line can be postponed with some reasonable amount of cost-effective DR and EE
 - NTA study does not currently reflect net-metering, SPEED and other local generation additions
- Only the Central VT upgrades are affected by the load forecast
 - VT load affects the Ascutney-Coolidge line marginally
 - Northwest VT upgrades are needed beyond 10 years anyway
 - A 2nd Coolidge auto will likely be needed if the 345 kV line is not built
 - Auto negatively affected by the planned 2nd Ascutney-Coolidge line
 - Regional transfers and NH load affect the Coolidge auto significantly
 - The current auto is in bad condition

Actions

- Continue with the 2nd Coolidge-Ascutney line project
 - I.3.9 planning studies and design refinements are ongoing
 - Prepare to file 248 later this year
- Continue the NTA study short of developing solutions to a contract level accuracy
 - Contract level accuracy would require about \$100K
- Continue to modify capital spend as appropriate
- Secure additional regional and state data to refine analysis
- Explore and share with stakeholders financial and policy implications of refined analysis