



Modelling Energy Efficiency in 2019 Minnesota Resource Plan

February 21, 2019

MN Resource Plans in NSP Territory

- 5-State NSP Service Territory
- Served 44,000 GWh and 8,500 MW in 2017
- 1.5M Residential and 200k C&I Customers



- January 2015 – 2016-2030 Minnesota Resource Plan
- July 2019 – 2020-2034 Minnesota Resource Plan
- Strategist Modelling Tool
- Energy Efficiency 2020-2034 DSM Program Years modeled as a resource

EE Bundle Development

- 2018 MN Statewide DSM Potential Study
- Provided results specific to NSP MN
 - Based on sales for NSP within MN
- Program Achievable
- Maximum Achievable
- Optimal Scenario – Xcel Developed
 - Optimized for MW avoidance
- 2020-2029 Program Years : 2030-2034 Program Years = 2029
- Include 1st-year impacts – kWh, kW and Spend – 18 electric end-uses

EE Strategist Inputs

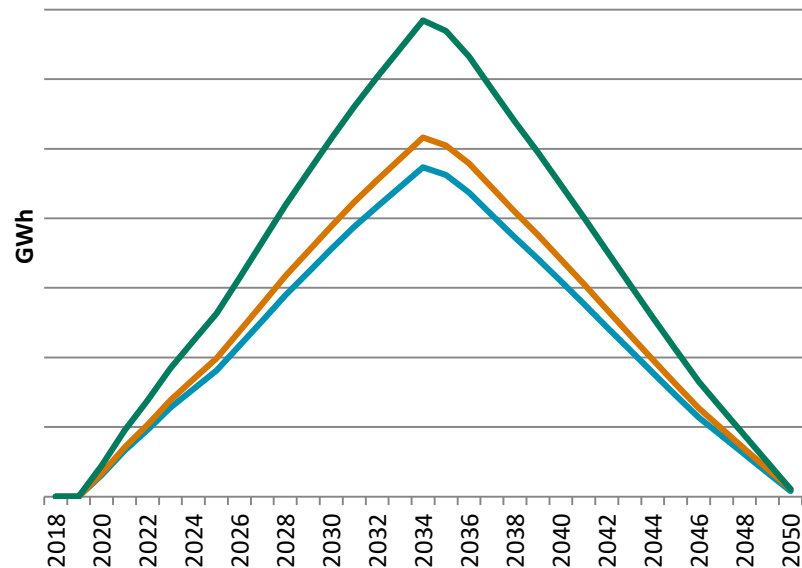
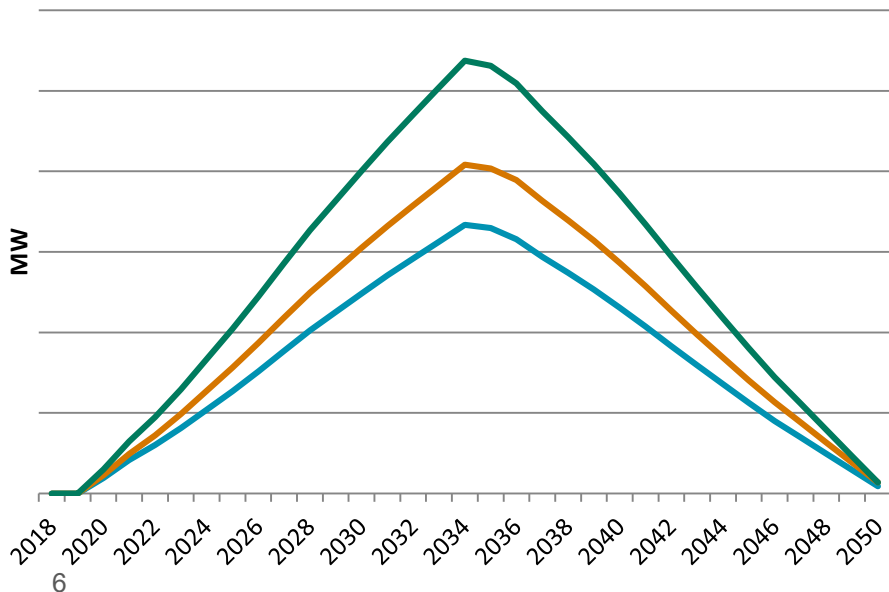
- For each of Bundles
 - Mapped 18 electric end-uses to 9 DSM Plan end-uses
 - Aggregated based on share of savings for each of 9 end-uses
 - Lifetime and hourly load shape from 17-19 MN DSM Plan
- Populated Four Inputs:
 - Utility Cost (2020-2034)
 - Monthly MWh Avoidance over Lifetime (2020-2050)
 - Monthly MW System Peak Hour Avoidance over Lifetime (2020-2050)
 - Typical weekly hourly load shape for each month

EE Day Matching

- Cooling loads highly weather sensitive – significant difference in impacts within a week
- Typical week load shape matched on system conditions
- EE load shapes by 48 daytypes
 - High, Medium, Low Weekday and Weekend for each month
- Typical Meteorological Year applied to system load shape
- Weekday w/ Highest System Peak Hour matched with High EE shape

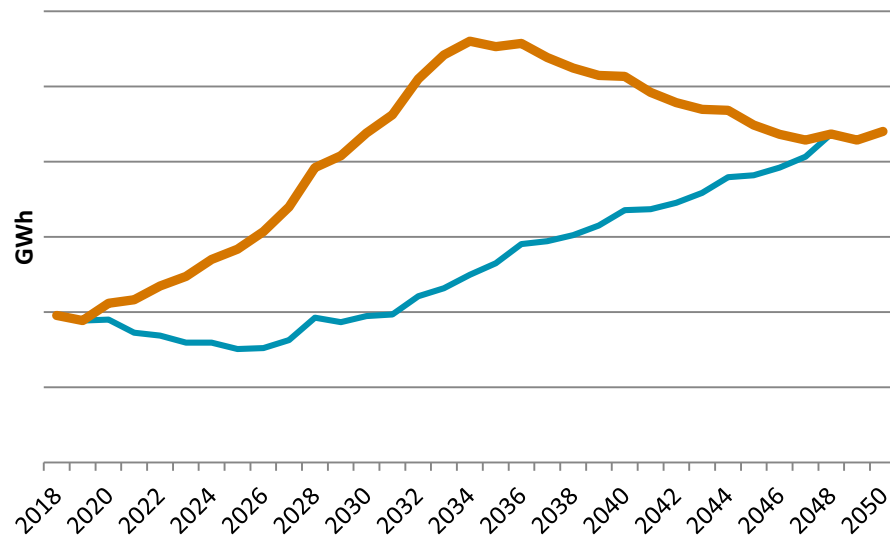
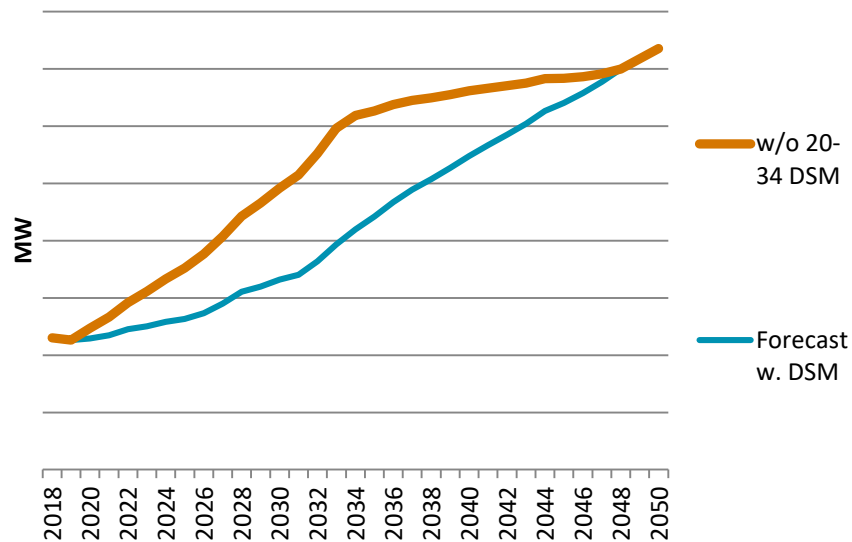
EE Lifetime Impacts

- Impacts from 2020-2034 Program Year Achievements persist through 2050
- Impacts decline after 2034 as measures expire



Backing out EE in Load Forecast

- Remove Impacts from 2020-2034 Program Year Achievements
- Produces Forecast w/o DSM from Program Years 2020-2034



Modelling Load with EE Bundles

- Present Value of Societal Costs (PVSC) 2018-2050 at each Bundle Level
 - Includes PVRR of DSM Costs
 - Bundle with lowest PVSC selected as EE forecast

