# Xcel Energy Colorado

## NTG and Market Effects Research

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# Agenda

- Methodology
- Literature review findings
- Additional considerations
- Recommended NTG estimate
- Recommended next steps

# Approach to getting at a prospective HP NTG value

| Interviews with Xcel Energy Staff | Review Xcel Energy Documents | Conduct literature review | Conduct trade partner interviews |
|---|---|---|---|
| Interviewed Xcel Energy staff about Xcel's activities in the CO heat pump market. | Reviewed previous evaluations of Xcel Energy's heat pump rebate offerings, as well as internal reports on market activities and events to corroborate market-level activities. | Conducted a literature review with 22 sources. Sources included: heat pump evaluations, market effects evaluations, articles detailing NTG/market transformation research best practices, and other HP market resources. | Interviewed 6 contractors who participate as trade allies in the heat pump or related products. |

# Lit Review Findings

# There are no consistent method used for HP NTG estimates

We found variations in NTGR approaches in the following key areas:

- Calculated Versus Stipulated: Some utilities use evaluators to conduct primary research to assess program influence while others negotiate a stipulated NTGR based on secondary data from other utilities and government organizations.
- NTGR Inputs: Some evaluations rely solely on customer input, while others include contractors' perspectives on the influence of utilities rebates. And while there is general consistency in the NTGR framework, the questions asked of customers (and contractors) tend to vary by evaluation.
- NTGR Reporting: Sometimes evaluations report a single NTGR for an entire program, others assign a NTGR by measure category (e.g., HVAC or water heating or lighting), and others assign measure specific NTGR. This variation seems primarily driven by the available data, the evaluation's level-of-effort, and regulatory requirements of a jurisdiction.
- Inclusion of a Market Effects Adder: Some include market effects in their analysis while others do not, even if they are participating in market transformation activities, indicating that some NTGRs may underestimate program impacts.

# We included 13 program NTGRs in our estimate

| UTILITY | LOCATION | REBATE SUMMARY | NTGR | SOURCE |
|---|---|---|---|---|
| Xcel Energy Colorado | Colorado | MSHP - $500, ccHSHP - $600, ASHP - $800, ccASHP - $1,000, GSHP no fuel conversion - $1,500/heating ton, GSHP fuel conversion - $2,000/heating ton | 57 | TRC, "Colorado Residential Heating and Cooling Product Impact and Process Evaluation," 2021. |
| Ameren Illinois | Illinois | HPWH - $300, ASHP – varies based on home type. Up to $750 for ducted, up to $1,000 for ductless MSHP | 78 | Opinion Dynamics, "Residential HVAC Initiative NTG Research," 2019. |
| Rocky Mountain Power | Idaho | Dual fuel HP - up to $1,800, ductless HP - up to $1,700, ASHP - up to $1,600, GSHP - up to $2,000 | 89 | ADM Energy Research and Evaluation, "Evaluation, Verification and Measurement Report Wattsmart Homes Program Idaho," 2021. |
| ComEd | Illinois | ASHP - up to $2,000, MSHP - up to $1,350, Geothermal HP system - up to $9,000, geothermal indoor unit replacement $1,275 - $1,800 | 80 | Guidehouse, "ComEd Residential HVAC Impact Evaluation Report," 2021. |
| Mass Save | Massachusetts | ASHP - up to $16,000, GSHP - up to $25,000, HPWH - $750 rebate | 91 | Guidehouse, "Massachusetts Residential Programs Net-to-Gross Research of RCD and Select Products Measures," 2021. |
| NIPSCO | Indiana | HPWH - $750, ASHP – up to $300 | 58 | ILLUME, "2021 DSM Portfolio Evaluation Report," 2022. |
| New Jersey Clean Energy Program | New Jersey | Offered through specific gas or electric utilities | 73 | NMR Group, Inc., "New Jersey Recommended Net-to-Gross Ratios Overall Report," 2023. |
| APS | Southwest | Program design details were not detailed in the source material. | 100 | TRC, "Colorado Residential Heating and Cooling Product Impact and Process Evaluation," 2021. |
| Utility D | Southwest | Program design details were not detailed in the source material. | 82 | TRC, "Colorado Residential Heating and Cooling Product Impact and Process Evaluation," 2021. |
| Utility E | Southwest | Program design details were not detailed in the source material. | 98 | TRC, "Colorado Residential Heating and Cooling Product Impact and Process Evaluation," 2021. |
| PECO | Northeast | Program design details were not detailed in the source material. | 98 | TRC, "Colorado Residential Heating and Cooling Product Impact and Process Evaluation," 2021. |
| Dominion Energy | Northeast | Program design details were not detailed in the source material. | 76 | TRC, "Colorado Residential Heating and Cooling Product Impact and Process Evaluation," 2021. |
| DTE | Northeast | Program design details were not detailed in the source material. | 92 | TRC, "Colorado Residential Heating and Cooling Product Impact and Process Evaluation," 2021. |

# We recommend taking the mean of the NTG ratios for Xcel's base NTG estimate

We took the **mean of the 13 available NTG ratios** from our literature review, including the 6 NTGRs included in Xcel Energy's recent evaluation report (2021).

Our **recommended base NTG ratio of 82%** comes from the average these NTGR. We believe this approach is appropriate, absent measured impact, since:

- There is a lot of variability in the industry when it comes to calculating NTG.
- Some utilities underrepresent their market influence in their NTGR.
- This review represents a wide range of utilities across the country with publicly available data and a substantial heating and cooling load.

# Xcel Energy is taking action to reduce HP market barriers

| Barriers | Activities |
|---|---|
| Heat pump knowledge among contractors is relatively low. | Heat pump specific contractor training – required to become qualified partners with Xcel Energy.<br><br>Partnering with subject matter experts to provide trainings on topics like customer communication and education, best practices for HP systems and configurations, manufacturer and distributor offerings, among others |
| Heat pumps can be expensive to install. | Worked with the City and County of Denver to refine and coordinate their heat pump rebate offerings with Xcel Energy's rebates. |
| Heat pump knowledge and awareness among customers is relatively low. | Developed heat-pump specific marketing and outreach messaging<br><br>Participating in the National Renewable Energy Laboratory's (NREL) Building Integration Barriers study group to improve heat pump adoption. |
| Cold climate heat pump technology is promising, but nascent. | Partnering with NREL to study how cold climate heat pumps perform at high altitudes<br><br>Supporting the Department of Energy in challenging manufacturers to extend the temperature capabilities of heat pumps in the DOE Cold Climate Heat Pump Challenge. |
| The market is still developing and settling. | Developed meaningful relationships with many organizations, including:<br><br>• Facilitating a heat pump manufacturer discussion with representatives from Mitsubishi, Daikin, Bosch, and Carrier at the Rocky Mountain Utility Conference in 2022.<br>• Co-facilitating the Consortium for Energy Efficiency's (CEE) Residential HVAC Committee, working to increase awareness and develop national heat pump standards.<br>• Serving on the Rocky Mountain Utility Exchange advisory board to collaborate on heat pump program practices |

# Additional Considerations

# Trade Partners have varied experience, but all note the importance of HP incentives on adoption

| Contractor type | # of interviews |
|---|---|
| HVAC contractors who primarily install furnaces and ACs | 2 |
| HVAC contractors who primarily install heat pumps | 1 |
| Home electrification contractor who primarily installs heat pumps | 2 |
| Weatherization contractor | 1 |

- Rebates help contractors install more efficient HVAC equipment.
- Some contractors have faced challenges trying to find in-stock rebate eligible equipment at local distributors.
- The combined value of the coordinated local government and utility rebates is driving more customers to ask about heat pumps.
- Trade allies have different perspectives on heat pumps and electrification.
- Contractors enjoy the Company's training and engagement events (e.g., the Broncos Training Camp Event).

# IRA is not ARRA and we'll have to think about them differently when it comes to attribution

- Both ARRA and IRA were designed to infuse money into the economy, but ARRA focused on "shovel-ready" programs while IRA was designed as a multi-year investment
- IRA projects will have a longer on-ramp with longer program design and funding requirements, and off-ramp with longer turn-around to get rebates and tax credits.
- Likely cannot use experience with ARRA projects to inform IRA-related market effects/NTG

# Recommended NTG

# Current NTG Recommendation

## 93% NTG Ratio

**82% base NTG ratio**
Average of 13 heat pump NTGR from different utilities, including the Company's evaluated NTGR from 2021

**11% market effects adder**
Based on the Company's current market activities and the adder used by the Massachusetts program administrators for their 2022 – 2024 energy efficiency plan

# Recommended Next Steps

Overall, we recommend shifting to a market effects approach to evaluating Xcel Energy's heat pump interventions. To do so, we recommend that Xcel:

1. Create a program theory and logic model (PTLM) that identifies barriers, outlines interventions, and details hypothesized short-term and long-term effects of interventions
2. Conduct a market baseline study to understand the current Colorado heat pump and electrification market, including research of the effect that existing interventions have already created.
3. Annually measure market adoption in Colorado and in the Company's territory
4. Assess changes in market adoption and the reduction of barriers using qualitative and quantitative metrics outlined in the PTLM
5. Calculate the Company's market effects by calculating the increase in heat pump market adoption due to the Xcel Energy's interventions

# Questions?