National Grid Demand Forecasting

Case 24-G-0248
Technical Conference

July 30, 2024

nationalgrid

Welcome to All

Agenda

1. Introduction & Welcome
2. Overview of Demand Forecasts
3. Q&A

Meeting Logistics:

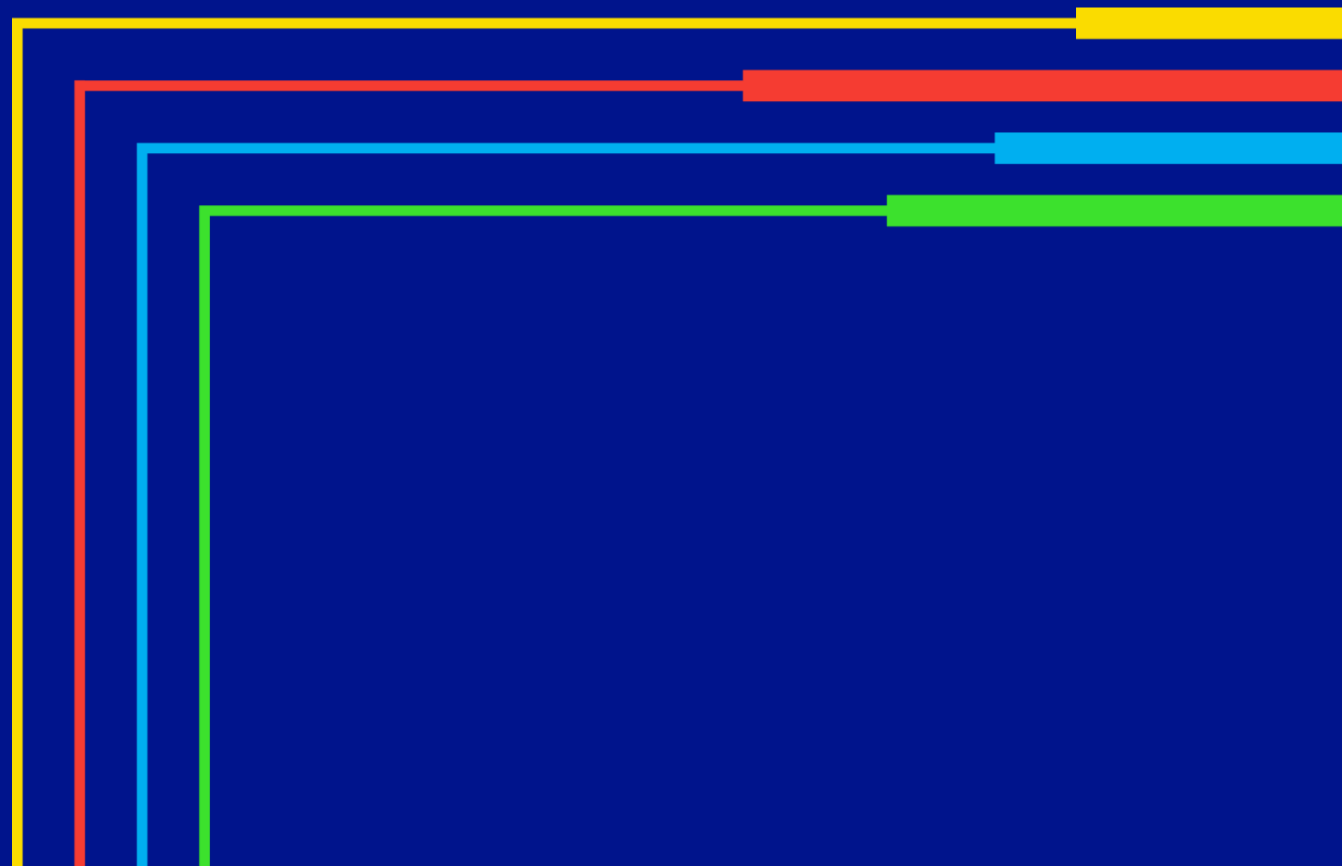
Q&A will be held at the end of the presentation to address matters related to the material presented.

Please use the “raise hand” feature of the meeting platform.

DPS Staff will be moderating the Q&A portion of today’s conference.

1

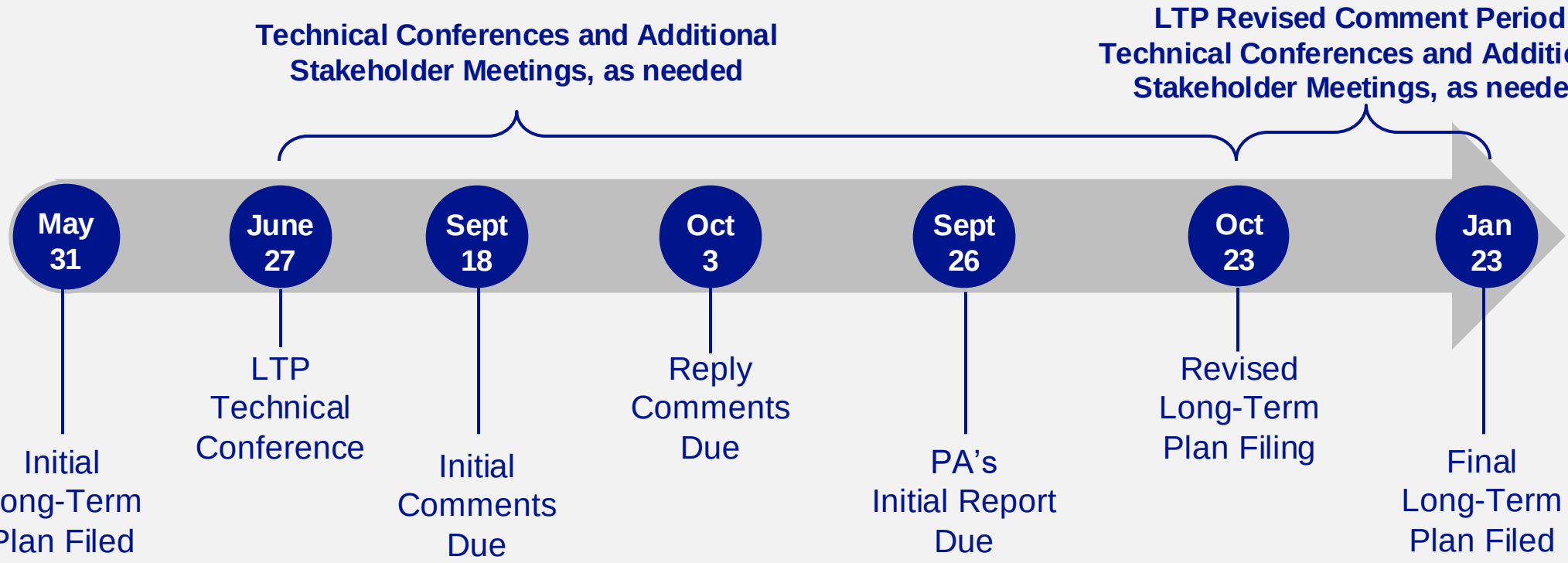
Introduction



nationalgrid

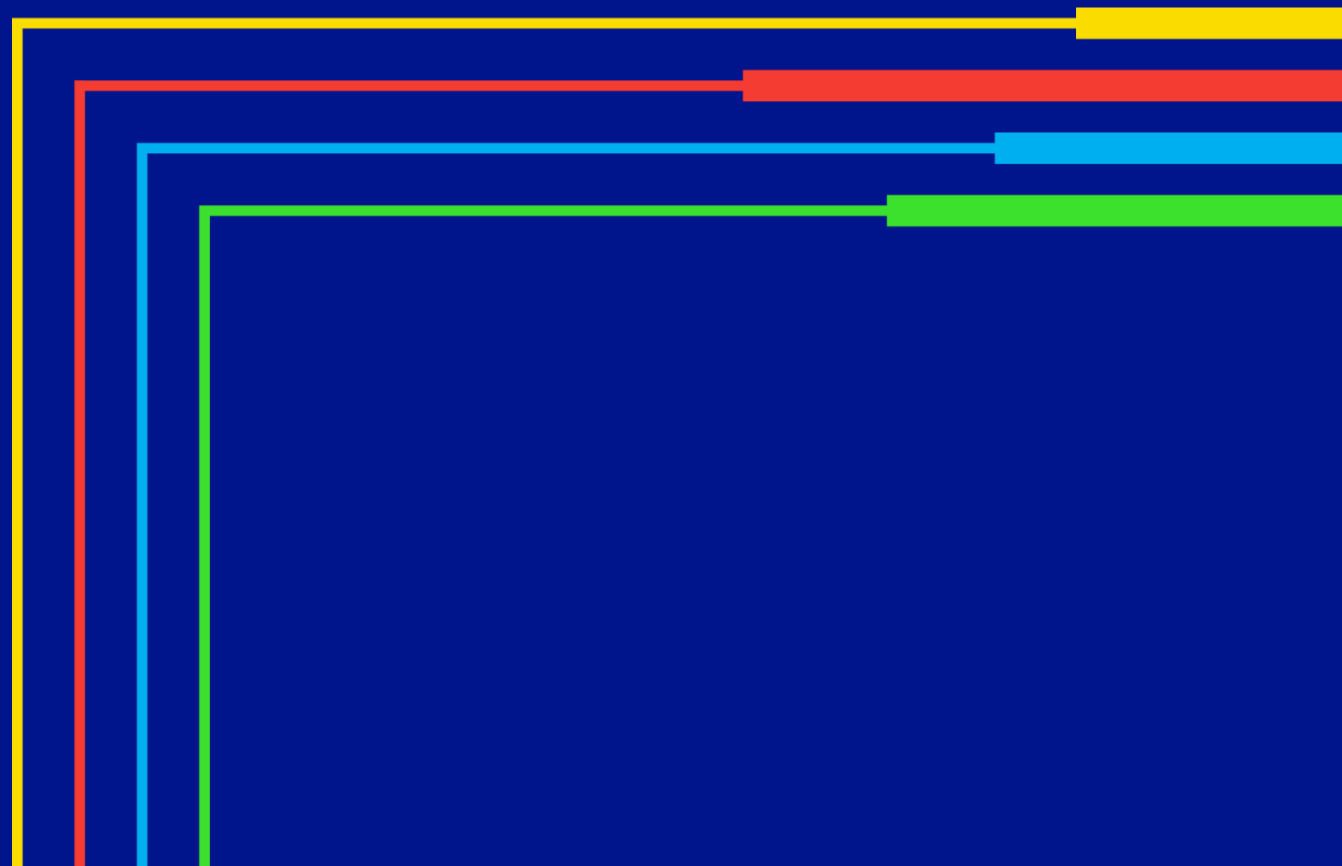
Introduction to National Grid's Initial LTP

- National Grid filed our LTP for KEDNY/KEDLI/NMPC on 5/31/24; Case 24-G-0248; materials available on **ngridsolutions.com**
- We are working on our revised LTP, which will incorporate our latest forecast of customer requirements
- The schedule below is updated to reflect the extended comment and reply comment period



2

Demand Forecast



nationalgrid

Our Long-Term Plan Scenarios

Reference Case

- Based on National Grid's main planning scenario extended to 2050
- Can be considered business-as-usual, but it does account for the impact of:
  - Demand-side management savings
  - All-Electric Buildings Act, NYC Local Laws 97 and 154

Clean Energy Vision (CEV)

- Illustrates National Grid's vision for the gas transition
- Fully eliminates fossil fuels before 2050; Consistent with CAC Scoping Plan gas transition recommendations
- Includes rapid expansion of electrification and efficiency/DSM
- Gas network transformed to play complementary role delivering clean alternative fuels

Accelerated Electrification (AE)

- Illustrates a high-electrification gas transition
- Based on Climate Action Council Integration Analysis Scenario 3
- Includes significant volumes of low-carbon fuels, but less than CEV
- Includes greater levels of electrification than CEV

Forecasting is key to understanding the trajectory gas demand over the next two decades

Short-term Planning

The Reference Case shows a projected increase in gas demand. Uncertainty bands around this case show the potential range of over or under forecasting in the near term

Long-term Planning

The analysis in the LTP looks at the Reference Case, Clean Energy Vision, and Accelerated Electrification scenarios, helping the company prepare for a net-zero future

What types of forecasts are produced?

1. Retail Forecast = Monthly demand at customer meters in normal year

   Used for Rate setting

2. Wholesale Forecast = total daily requirement at city gate in normal and design year

   Used to ensure adequate gas supply for winters

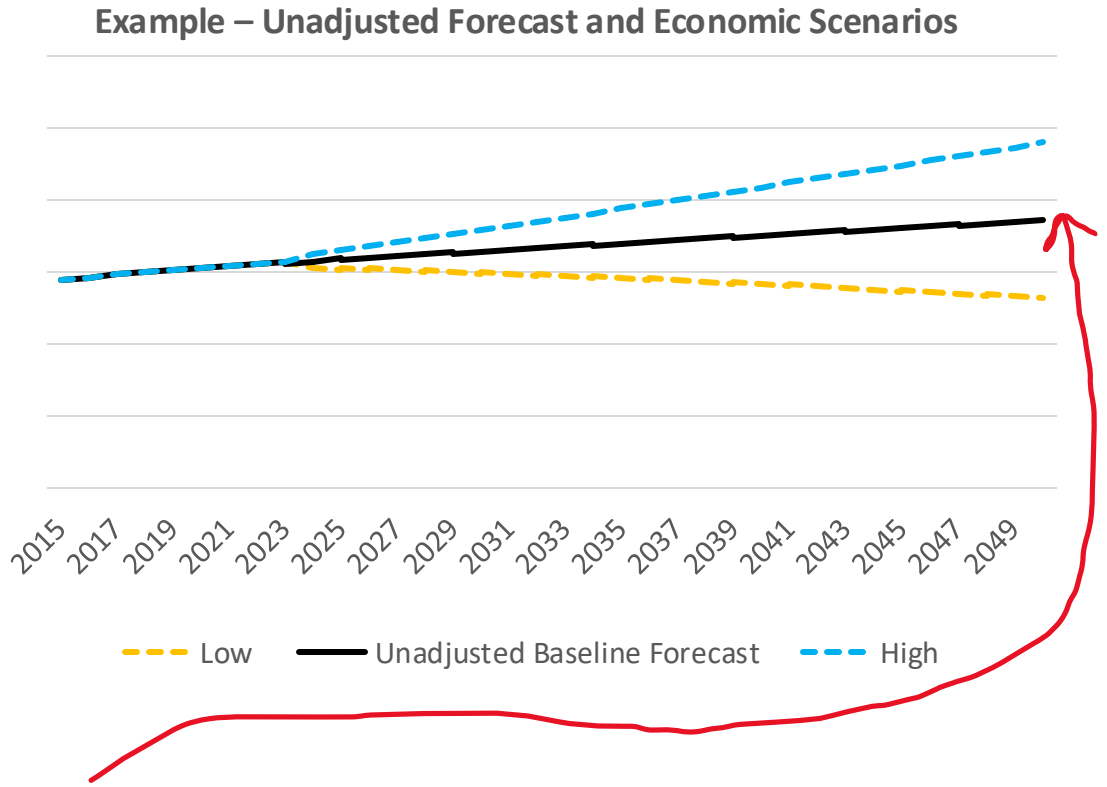
3. Design Day = coldest day for which the Company plans

   Used to ensure adequate capacity to maintain integrity of distribution system during high demand periods

How do we forecast demand?

1. **Q. How do we forecast retail demand?**
   A. *Model the relationship between historical usage/customer count to historical economic, price, weather, and temporal trends. These models then use projected economic/prices to forecast customer count/UPC*

2. **Q. How do we forecast wholesale and design day demand?**
   A. *Retail forecast is modified for lost and unaccounted for gas and billing lags and then allocated to the daily-level for normal and design year weather profiles using an equation that estimates the relationship between daily temperature and sendout*



3. **Q. Is this unadjusted forecast our best guess of future demand?**
   A. No, it does not take into account accelerations in DSM programs, new laws, any large customer additions, etc

Post-Modeling Adjustment Process

Unadjusted Baseline Forecast ± Reference Case Adjustments = Reference Case

What type of post-model adjustments do we consider for Reference Case?

- **Demand-side Management Programs**
  - Energy efficiency (EE), electrification (EH), demand response (DR)
- **Public Policy Laws**
  - e.g. NYC Gas Ban
- **Major Shocks**
  - e.g. Moratoria
- **Others**
  - Large Customer Connections, Changes in tech/trends

What are the criteria for a post-model adjustment to be included in the Reference Case?

- Regulatory approval?
- Is there enough information?
- Is the impact measurable and substantive?
- Is there a clear path to implementation?
- Can it be modelled in time for the forecast release?

Unadjusted Baseline Forecast ± CEV EE and Electrification Assumptions = Clean Energy Vision (CEV)

Unadjusted Baseline Forecast ± AE EE and Electrification Assumptions = Accelerated Electrification

Summary of Assumptions - New York

Reference Case Post-Model Adjustments

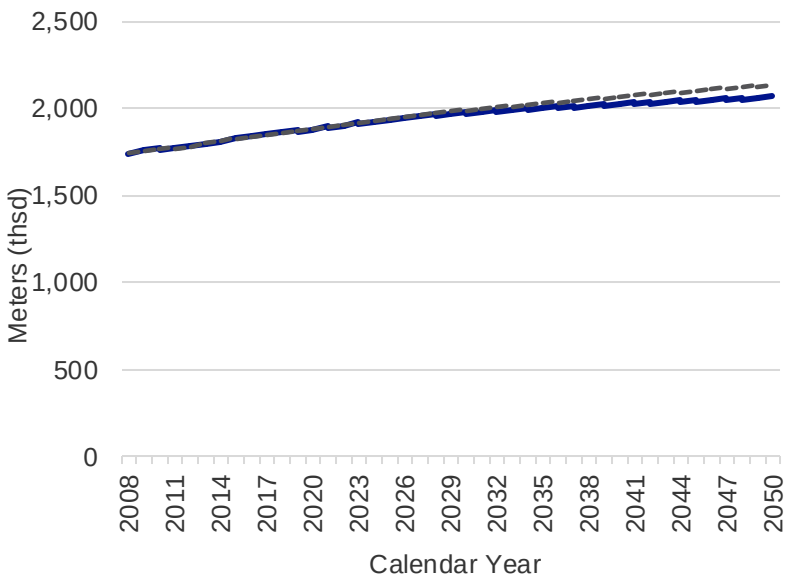
- Post Model Adjustments:
  1. Energy Efficiency
  2. Electrification
  3. Demand Response
  4. Local Law 97
  5. Local Law 154
  6. All-Electric Building Act (AEB Act)
- Base economic outlook from Moody's Economics (this forecast uses March 2023 vintage)
- Off-system saturation limits included

Clean Energy Vision & Accelerated Electrification Post-Model Adjustments

- Post Model Adjustments:
  1. Energy Efficiency
  2. Electrification
- Base economic outlook from Moody's Economics (this forecast uses March 2023 vintage)
- Off-system saturation limits included

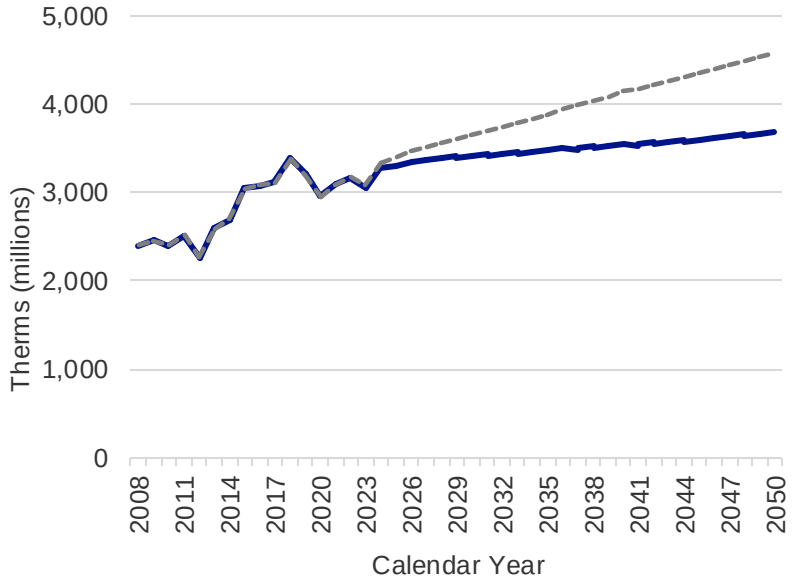
Reference Case – Downstate New York (KEDLI & KEDNY)

Meter Count



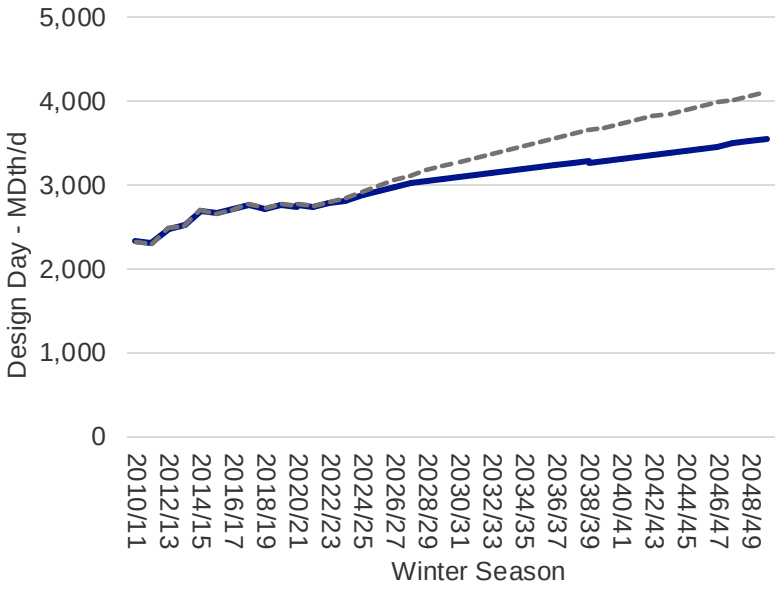
PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification	-3.4%

Annual Retail Volume



PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification	-3.8%
Partial Electrification	-7.8%
Volumetric Savings (EE,LL97, WHHPs)	-8.0%
Total	-19.6%

Design Day Sendout



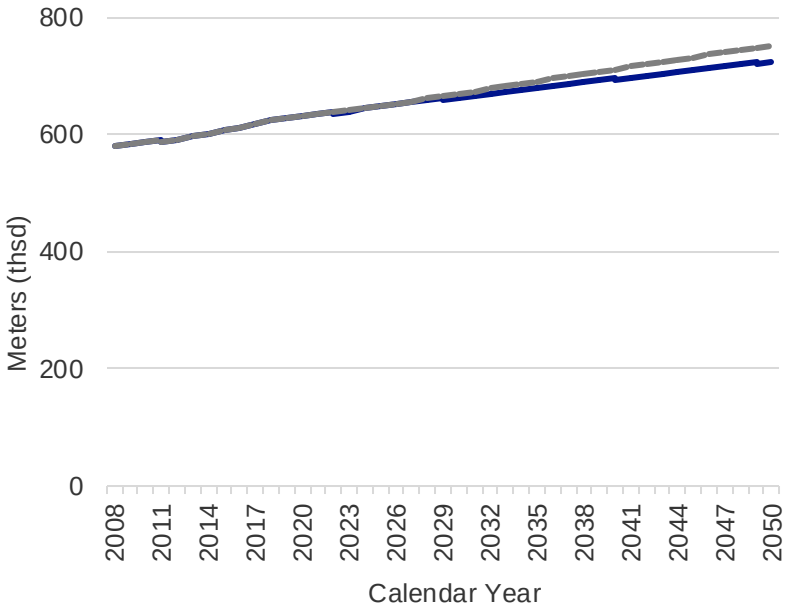
PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification & WHHPs	-4.5%
Partial Electrification	-0.0%
Volumetric Savings (EE,LL97, WHHPs)	-8.8%
Demand Response (firm)	-0.5%
Total	-13.8%

Reference Case

Unadjusted Baseline Forecast

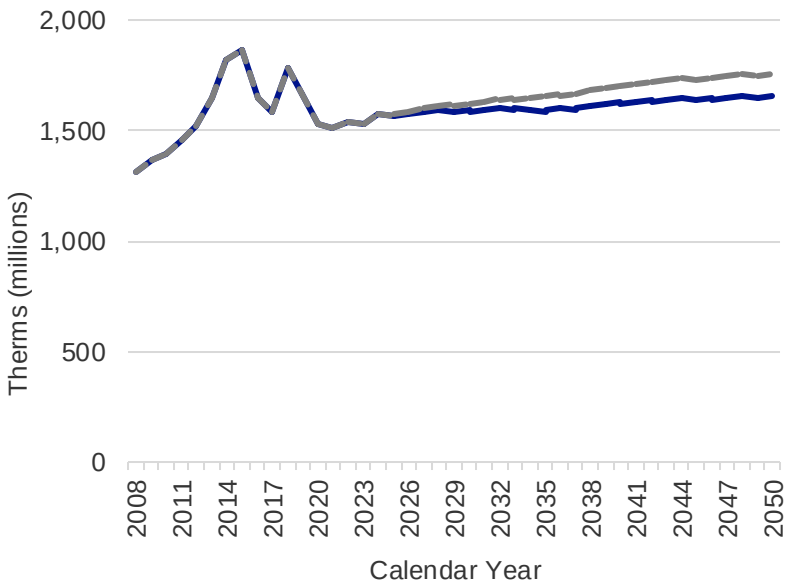
Reference Case – Upstate New York (NMPC East Gate & West Gate)

Meter Count



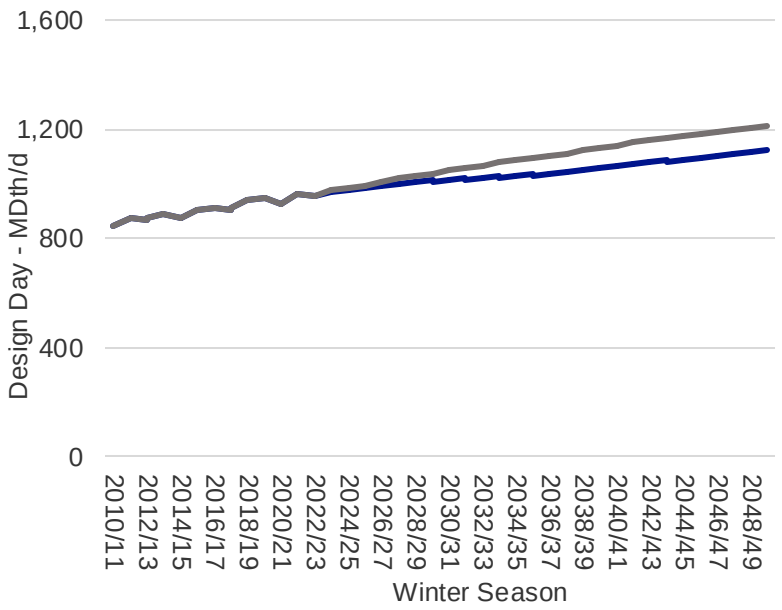
PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification	-3.6%

Annual Retail Volume



PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification	-1.7%
Partial Electrification	-0.7%
Volumetric Savings (EE,WHHPs)	-3.5%
Total	-6.0%

Design Day Sendout



PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification	-2.7%
Partial Electrification	-0.0%
Volumetric Savings (EE,WHHPs)	-5.3%
Demand Response (firm)	-0.02%
Total	-8.0%

Reference Case

Unadjusted Baseline Forecast

Economic conditions will drive growth of the gas system

Economic Development

- Reindustrialization will be a key source of economic strength, being both a direct and indirect source of increased gas demand in UNY

Price Differential for natural gas

- Natural gas prices are projected to remain the cheapest energy source for heating compared to electricity and oil

Housing Market

- History of underbuilding in a very tight market where demand for housing outstrips the supply of available units
- The old age of the housing stock in the upstate region also presents opportunities for renovation and/or reconstruction

Total customer growth can be broken down into three sources

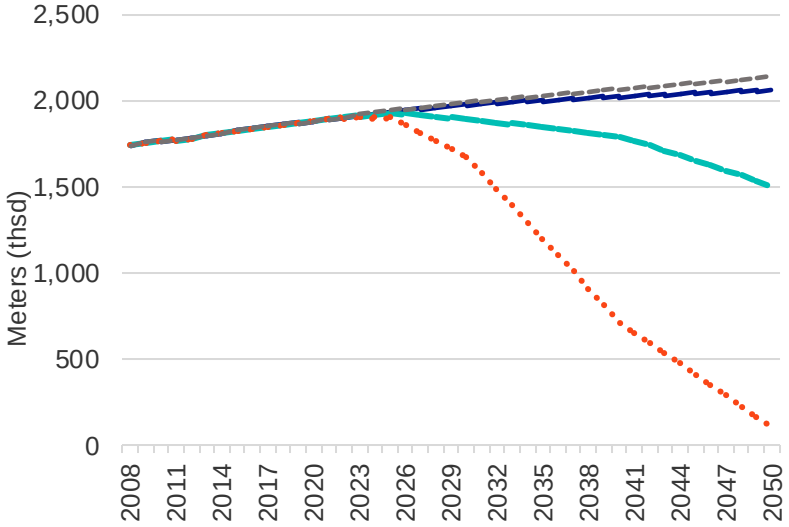
1. **Low-use migrations**
2. **Off-system conversion**
   - Forecasts factors in the potential for saturation of off-system conversions
3. **New Construction**
   - Limited by Local Law 154 and All-Electric Building Act

Summary of Off-System Conversion for Long-term Plan Forecasts

Company	Rate Group	Upper Limit on Off-System Conversions (meters)	Is limit been reached within the forecast horizon?
NMPC - East Gate	Residential Heating	40,926	No
	Commercial	14,397	No
NMPC - West Gate	Residential Heating	51,309	No
	Commercial	19,333	No
KEDLI	Residential Heating	190,708	No
	Commercial	21,462	No
	Multi-family	3,324	No
KEDNY	Residential Heating	17,714	Yes, in CY2034
	Commercial	8,866	No
	Multi-family	23,446	No

Scenario Comparison – Downstate New York (KEDLI & KEDNY)

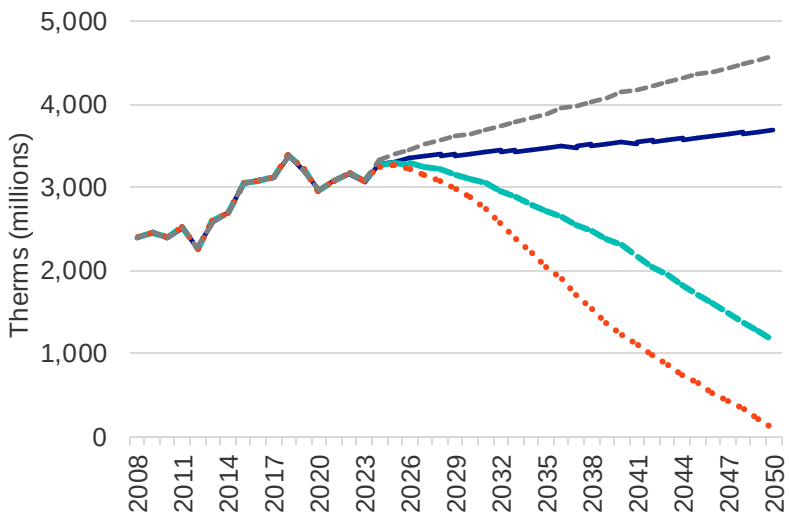
Meter Count



Clean Energy Vision	
PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification/100%H2	-29.7%

Accelerated Electrification	
PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification/100%H2	-96.8%

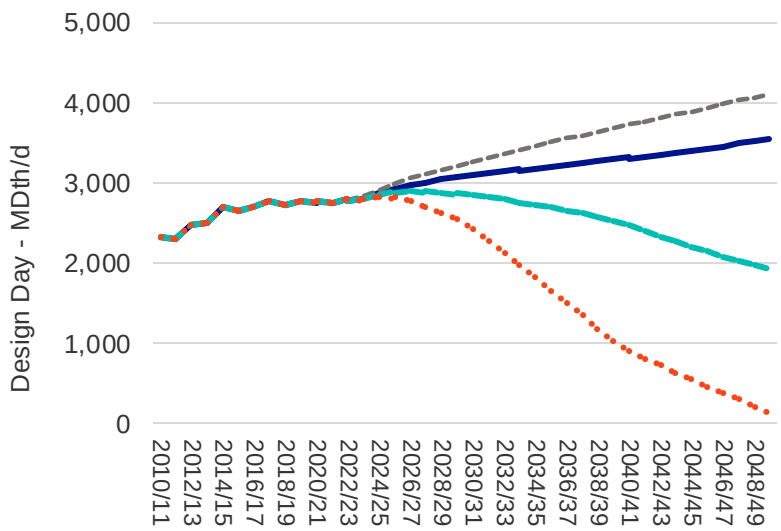
Annual Retail Volume



Clean Energy Vision	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-29.8%
Full Electrification/100%H2	-31.1%
Partial Electrification	-13.9%
Total	-74.8%

Accelerated Electrification	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-29.8%
Full Electrification/100%H2	-68.0%
Partial Electrification	-0.0%
Total	-97.8%

Design Day Sendout



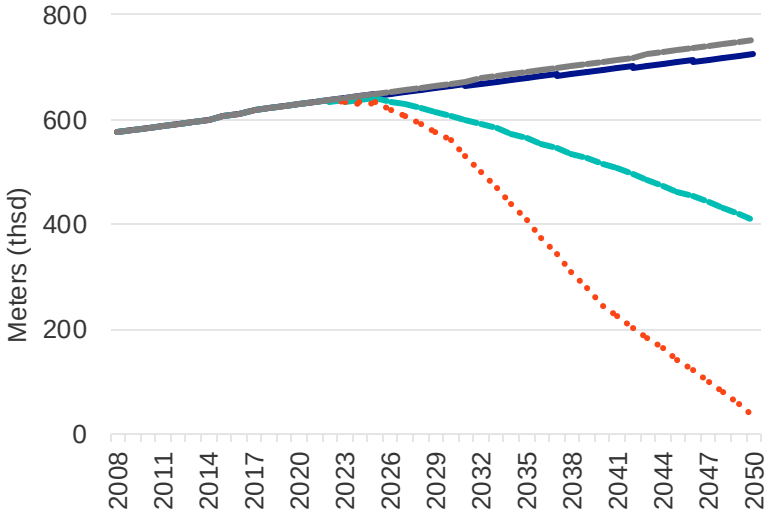
Clean Energy Vision	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-30.2%
Full Electrification/100%H2	-22.6%
Total	-53.3%

Accelerated Electrification	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-30.2%
Full Electrification/100%H2	-66.1%
Total	-96.3%

Reference Case
Unadjusted Baseline Forecast
Clean Energy Vision
Accelerated Electrification

Scenario Comparison – Upstate New York (NMPC East & West Gate)

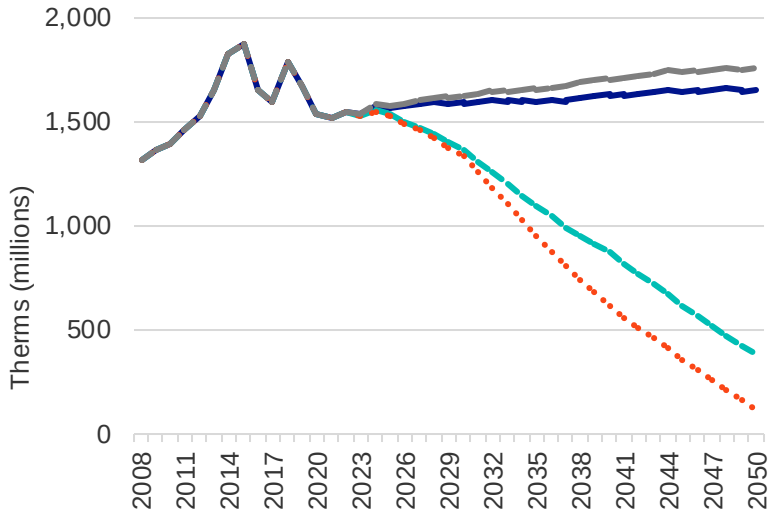
Meter Count



Clean Energy Vision	
PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification/100%H2	-45.8%

Accelerated Electrification	
PMA	% Reduction from Unadjusted Baseline in 2050
Full Electrification/100%H2	-95.3%

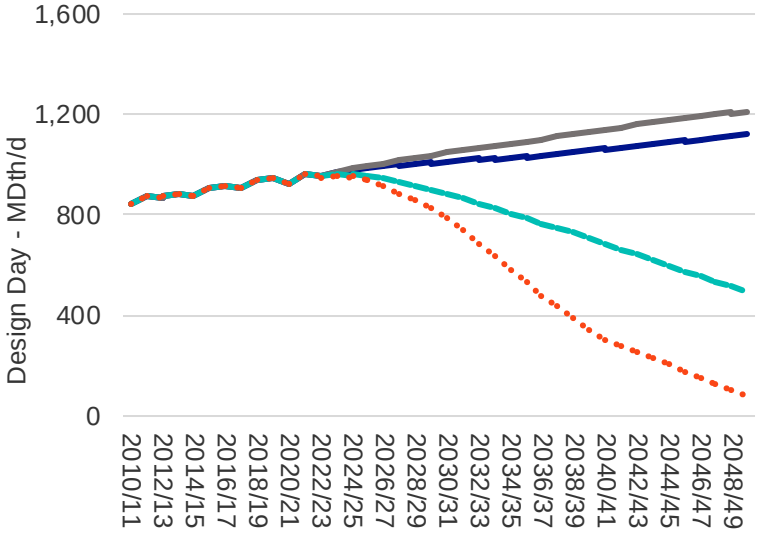
Annual Retail Volume



Clean Energy Vision	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-28.9%
Full Electrification/100%H2	-46.4%
Partial Electrification	-7.1%
Total	-82.3%

Accelerated Electrification	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-28.9%
Full Electrification/100%H2	-69.6%
Partial Electrification	-0%
Total	-98.4%

Design Day Sendout



Clean Energy Vision	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-30.6%
Full Electrification/100%H2	-30.7%
Total	-61.3%

Accelerated Electrification	
PMA	% Reduction from Unadjusted Baseline in 2050
Energy Efficiency	-30.6%
Full Electrification/100%H2	-66.1%
Total	-96.7%

Reference Case
Unadjusted Baseline Forecast
Clean Energy Vision
Accelerated Electrification

3

Stakeholder Collaboration

nationalgrid

We Welcome Your Involvement

- **National Grid and DPS Staff are eager to hear your comments about our LTP**
  - We believe the best path forward is for parties to bring feedback and suggestions to improve our LTP.
  - We would appreciate the opportunity to understand your position regarding a clean, fair, and affordable energy transition.
- **PA Consulting will be working with DPS Staff to facilitate the Information Request process.**
- **We invite your full participation in this and all future technical sessions. Requests for technical session topics should be routed through PA & DPS Staff.**
- **This and future presentations will be posted to ngridsolutions.com**

Q&A

nationalgrid

Appendix

nationalgrid

Weather Profiles for Initial LTP Forecasts

Normal weather is used for ratemaking purposes.

- For Downstate NY, normal Heating Degree Days ("HDD") for any given calendar day within a month were based on the average of the degree days for that calendar day over the 30-year period, ending June 30, 2018. KEDNY and KEDLI forecasts are developed using the KNYC Central Park weather station.
- The Companies' Upstate NY normal HDD are developed using the KALB weather station for Albany and the KSYR weather station for Syracuse. Each normal year was based on 30 years of data from January 1, 1990 – December 31, 2019.

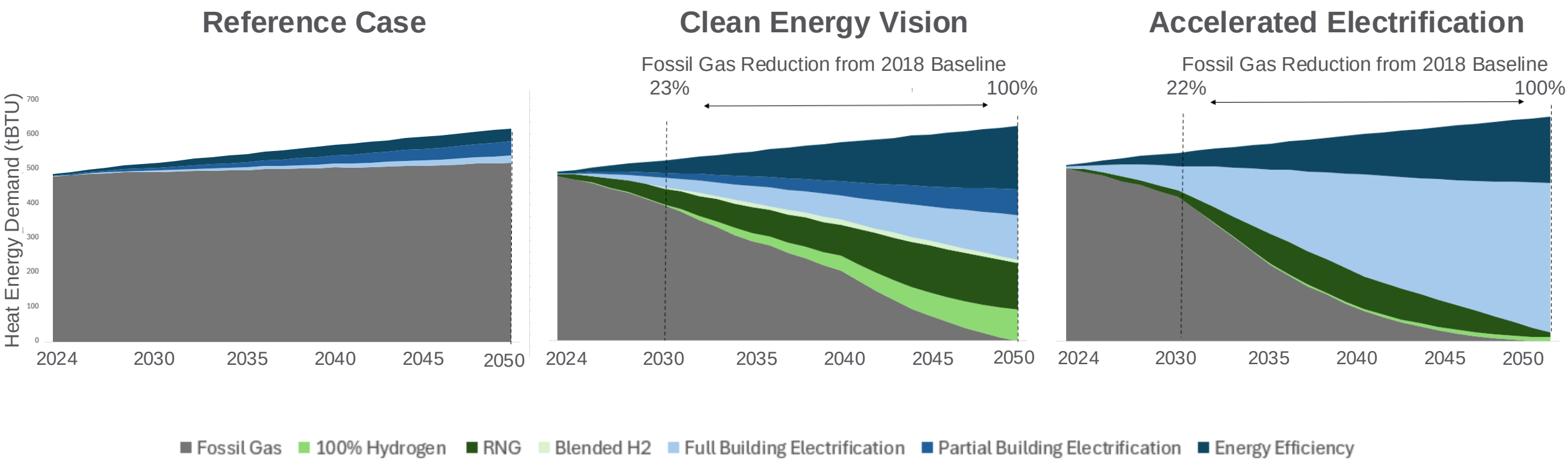
Design year weather ensures that the Companies have adequate seasonal natural gas resources.

- The Downstate NY design year was based on a once-in-forty-year probability using historical data from calendar years July 1978 – June 2018.
- The Upstate NY design years (for KALB and KSYR) are based on a once-in-forty-year probability using historical data from calendar years 1980 – 2019.

Design day weather ensures that the Company has adequate daily pipeline and supplementals deliverability to support distribution system integrity. Both Downstate and Upstate NY rely on actual observed coldest days as their design days.

- The Downstate NY design day is 65 HDD.
- The Upstate NY design day is 75 HDD for KALB and KSYR.

Energy Resource Volumes by Scenario



Growth Breakdown through 2050 - Reference Case

KEDNY - Meter Growth Breakdown - 2050 Cumulative			
	Residential Heating	Commercial	Multi-family
Low-use Migrations	48%	20%	9%
Off-System Conversions	20%	52%	40%
New Construction	32%	27%	51%

KEDLI - Meter Growth Breakdown - 2050 Cumulative			
	Residential Heating	Commercial	Multi-family
Low-use Migrations	30%		
Off-System Conversions	61%	84%	33%
New Construction	8%	16%	67%

NMPC East Gate - Meter Growth Breakdown - 2050 Cumulative			
	Residential Heating	Commercial	Multi-family
Low-use Migrations	8%		
Off-System Conversions	57%	46%	
New Construction	35%	54%	

NMPC West Gate - Meter Growth Breakdown - 2050 Cumulative			
	Residential Heating	Commercial	Multi-family
Low-use Migrations	13%		
Off-System Conversions	54%	46%	
New Construction	33%	54%	