



Winter 2014/15 Review

*Electric/Gas Operations Committee (EGOC)
Teleconference*

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SUPERVISOR, FORECAST & SCHEDULING



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WINTER 2014/15 WEATHER

Winter 2014/15 Compared to Winter 2013/14

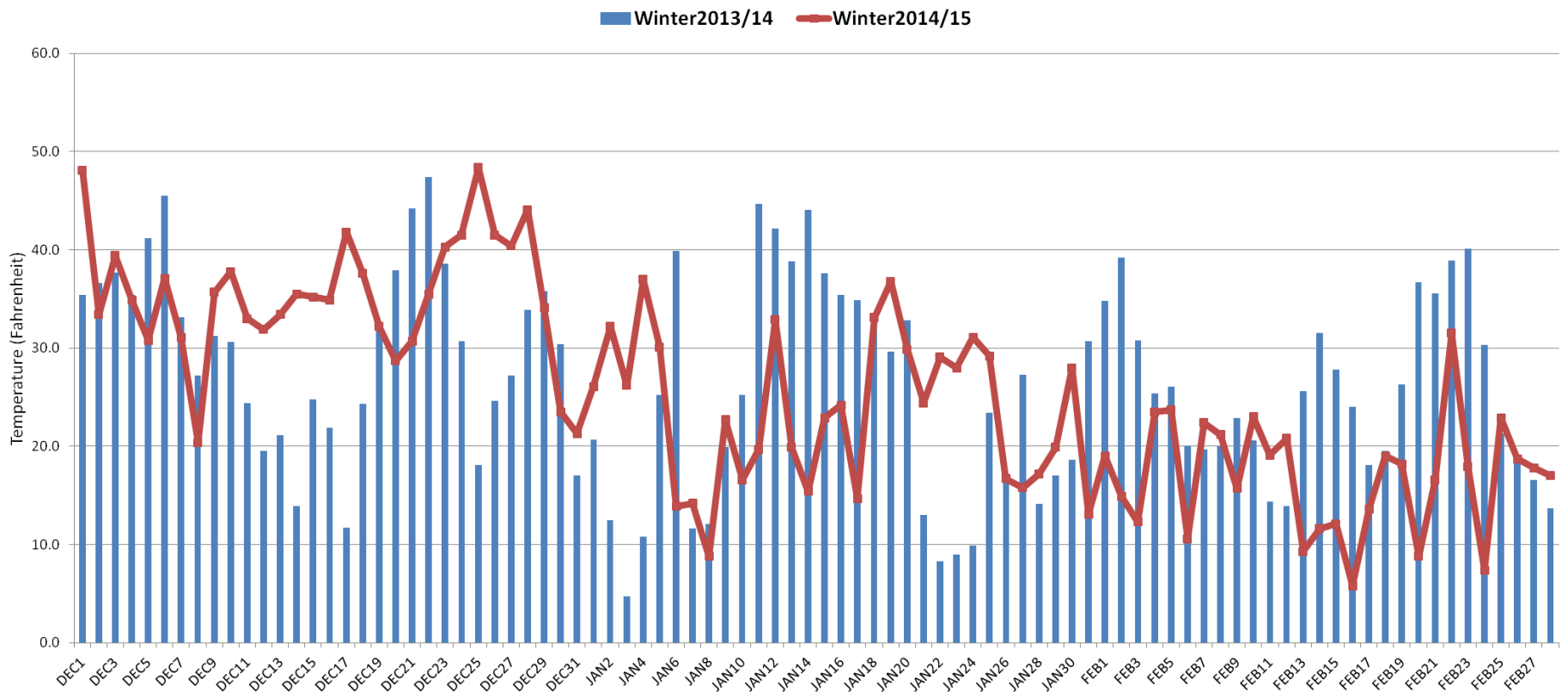
- **December 2014**: Milder than previous year
 - Lower demand
 - Less restriction on Natural Gas system
 - Less need for oil
- **January 2015**: Colder average temperature but previous year had pockets of extreme cold temperatures
 - Slightly lower energy demand
 - Less oil burned than last January
- **February 2015**: Coldest month in recent history when comparing average temperature and cumulative HDDs (data starts 1960)
 - Higher demand
 - High pipeline capacity utilization
 - Significantly more oil burned



Average Temperature Comparison

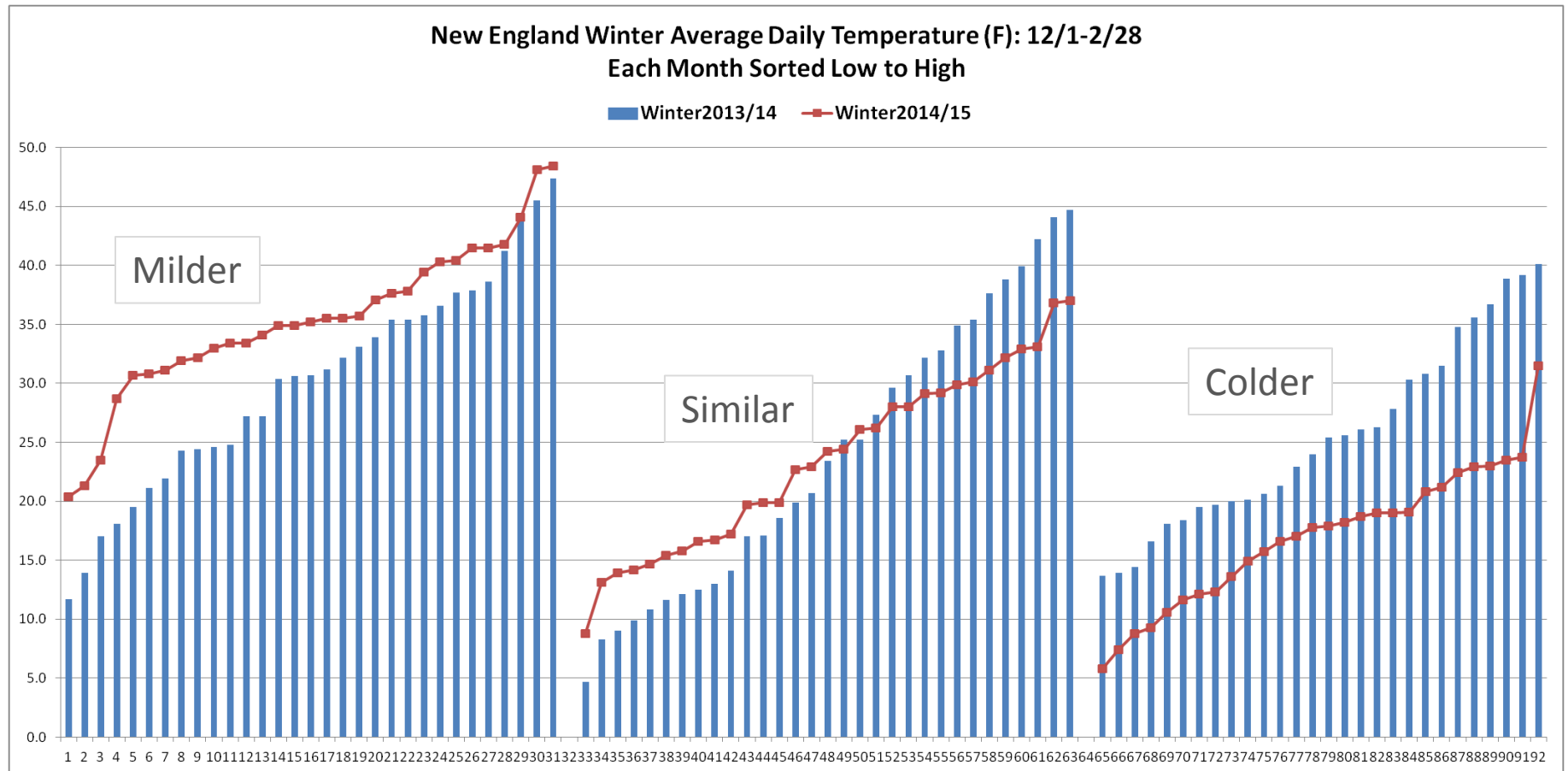
- Daily Average Temperature winter 2013/14 vs winter 2014/15

New England Winter Average Daily Temperature (°F): 12/1 - 2/28



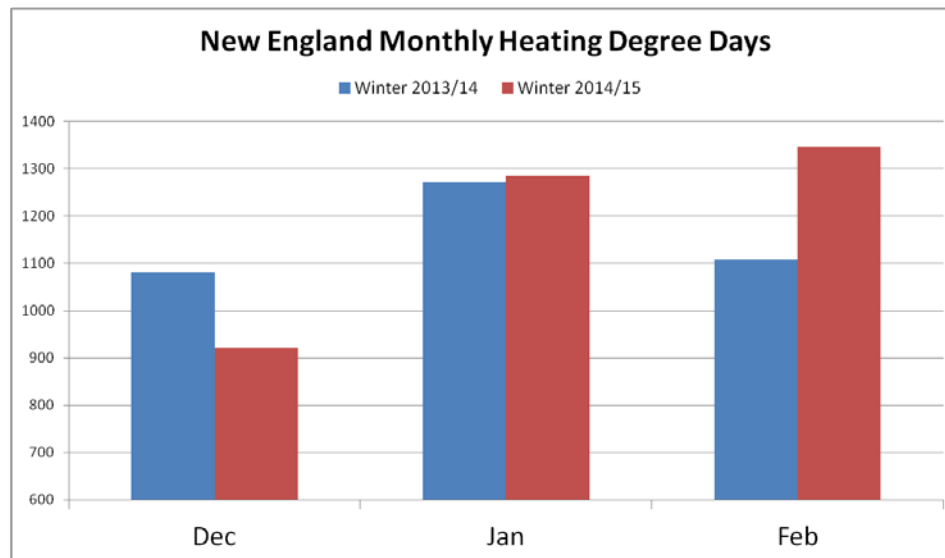
Average Temperature Comparison

- Sorted by Low to High Temperature, Monthly
 - Clearly milder December
 - Clearly colder February



Heating Degree Days by Month

- Heating Degree Days (HDDs) apply a single value to describe how cold a day is. More HDDs mean colder temperatures.
- HDDs show milder December and colder February
- January looks comparable, but winter 2013/14 had higher highs and lower lows and resulted in a similar average



$$HDD = 65 - \left(\frac{T_{High} + T_{Low}}{2} \right)$$

WINTER 2014/15 READINESS

Winter Preparations

- Prior to the start of the winter of 2014/15:
 - Prior year, still in effect:
 - Advanced the Day Ahead Market Timeline to allow more time to procure gas
 - Replacement Reserve Pricing
 - Tighter criteria for FCM Reserve Shortage Events
 - Increased Coordination and Communication
 - Winter Preparedness Seminar with Designated Entities
 - Winter Reliability Program
 - For Winter 2014/15:
 - Energy Market Offer Flexibility Enhancements (December 3, 2014)
 - Expanded the Winter Reliability Program to include LNG and Dual Fuel Conversions

Other Preparations for Winter – Coordination and Communication

ISO-NE stepped up communications through:

- Regular conference calls with NPCC Reliability Coordinators
 - Beginning in December and continuing through the cold weather
- Regular communications with gas pipelines
 - Routine review of gas purchases via pipeline Electronic Bulletin Boards for generators known to be committed on natural gas
 - Information Policy changes were made to improve gas-electric coordination per FERC Order 787
 - Exchange of more detailed information on both the gas and electric side proved helpful
- Winter preparedness seminars
 - ISO-NE offered both online and live training
- Fuel surveys
 - Initially monthly; became more frequent at different points in the winter



WINTER 2014/15 OPERATIONS

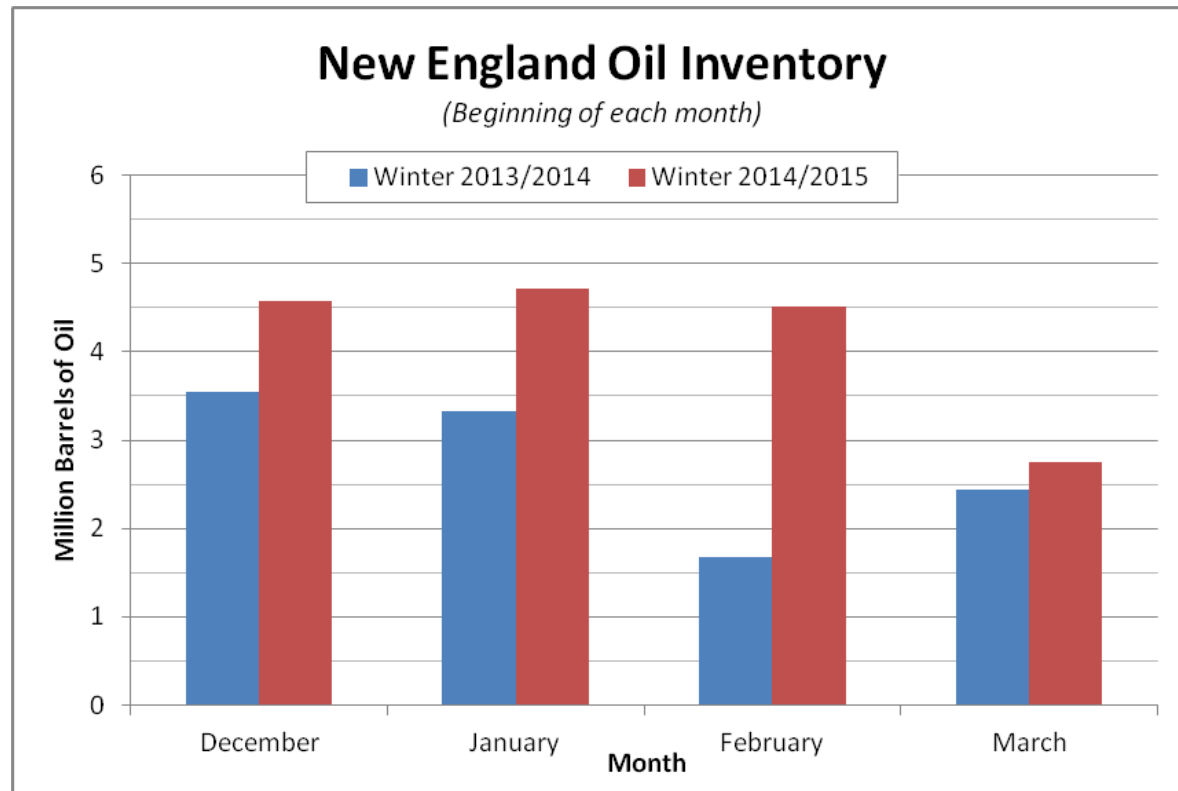
Winter Operations Summary

- The New England Power Grid operated well throughout the winter
- Close coordination with generators and gas pipeline operators helped operate the grid reliably during really cold days
- Increased LNG injections were very helpful in maintaining grid reliability
- The Winter Reliability Program, was instrumental in augmenting the fuel security of the region, primarily by boosting oil inventory in the region
- Cold weather in February depleted fuel supplies after mild December kept oil tanks more full than last season
- Some problems late in the season with fuel barges getting through the ice and weather to dock and unload cargoes



Monthly Oil Inventory

- More oil as we entered into February 2015 than in 2014
- Significantly more oil depleted during February 2015



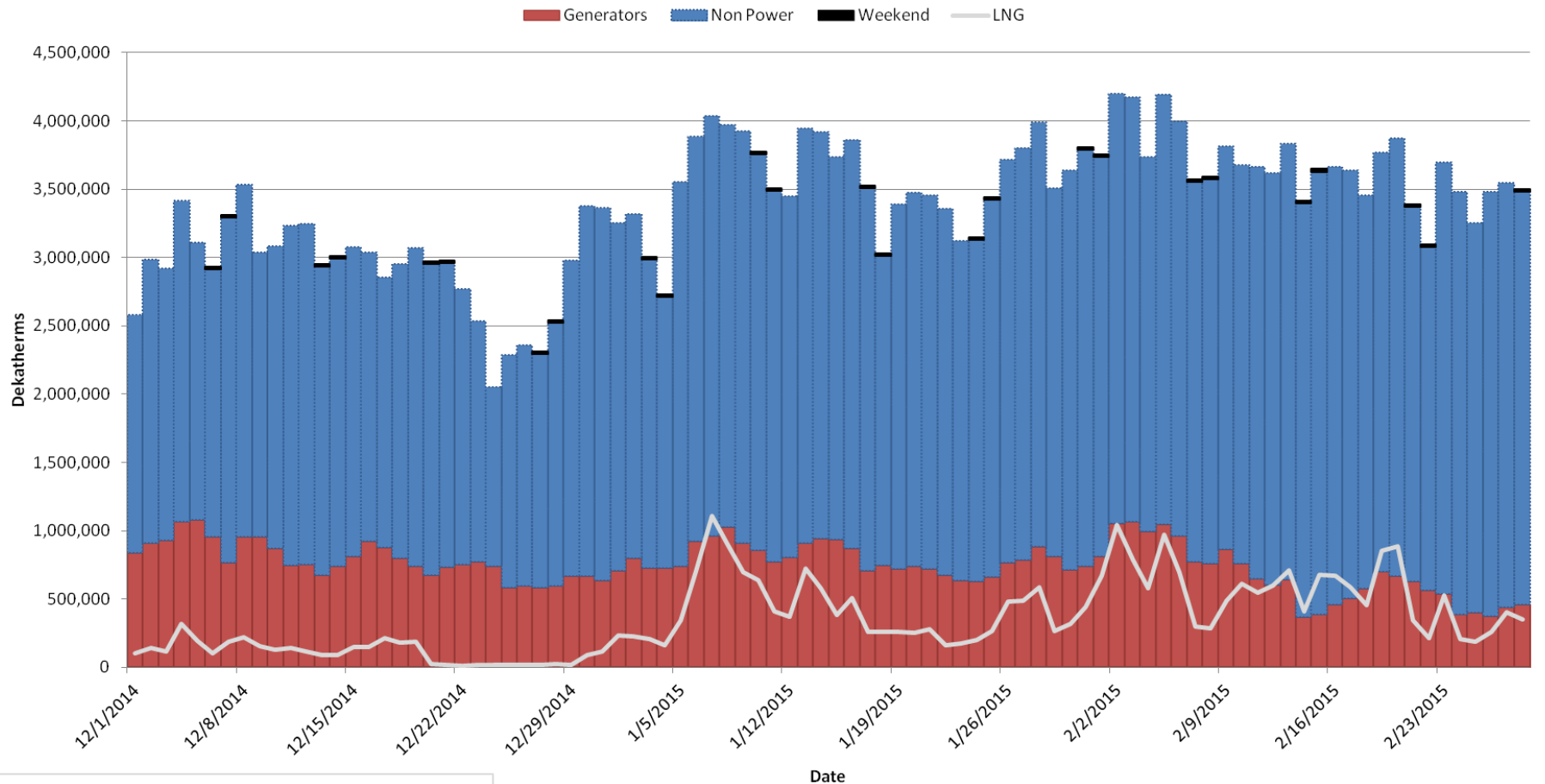
Pipelines Continue to be Primarily For Non-Power Use

- The natural gas pipeline infrastructure was built to primarily supply firm customers
- Peak overall natural gas demand requires large volumes from the east (including LNG) to supplement constrained supply from the West
- Majority of the pipeline capacity is for Local Gas Distribution Companies



Pipelines Primarily For Non-Power Use; LNG Essential for Power Use

Natural Gas Schedules to Generators vs. Non-Power Use - Winter 2014 - 2015



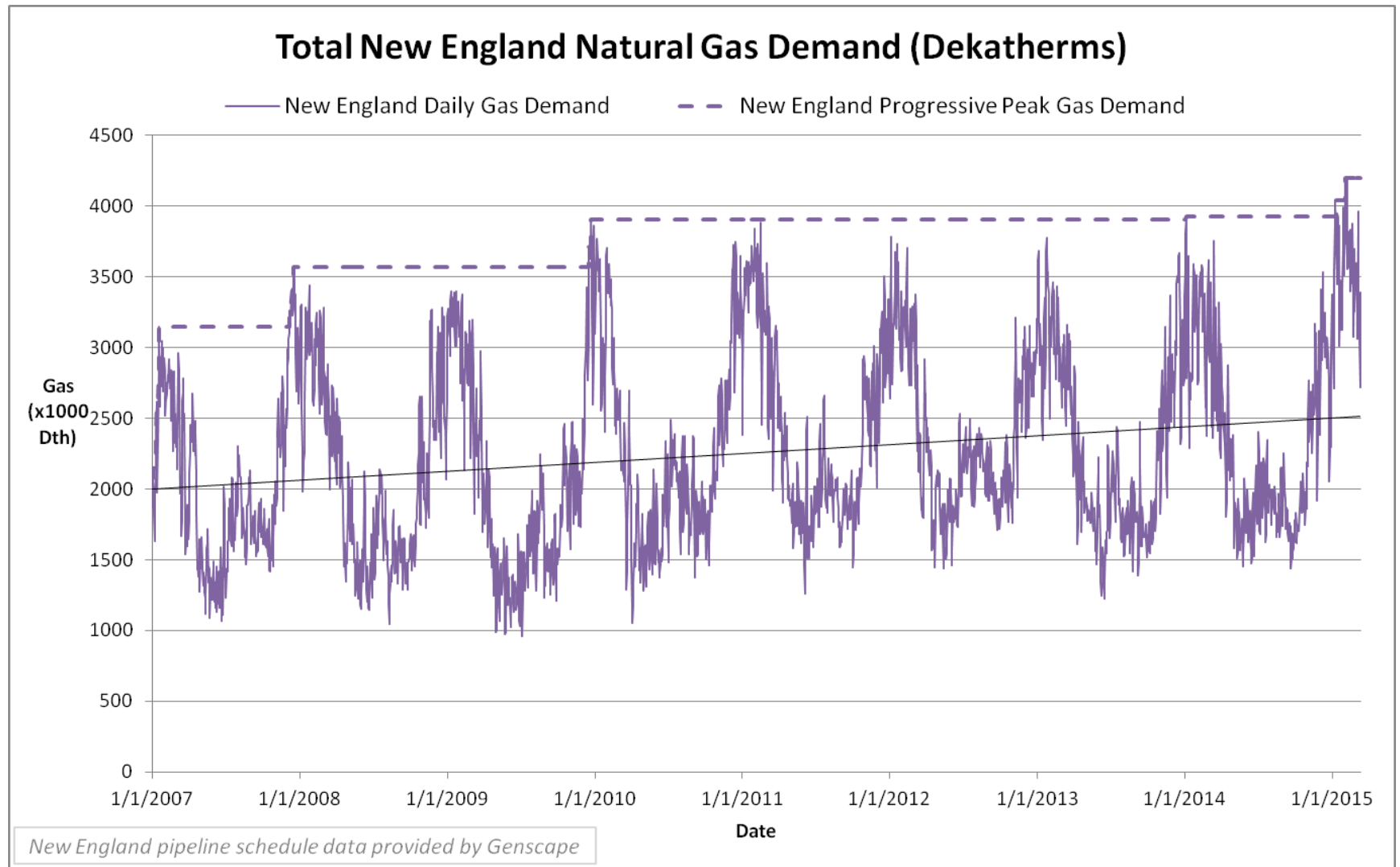
New England pipeline schedule data provided by Genscape

Natural Gas Demand On The Rise

- Multiple days of record breaking single-day natural gas demand this year
- Continuing trend of rising average natural gas demand across all users



Rising Natural Gas Demand in New England



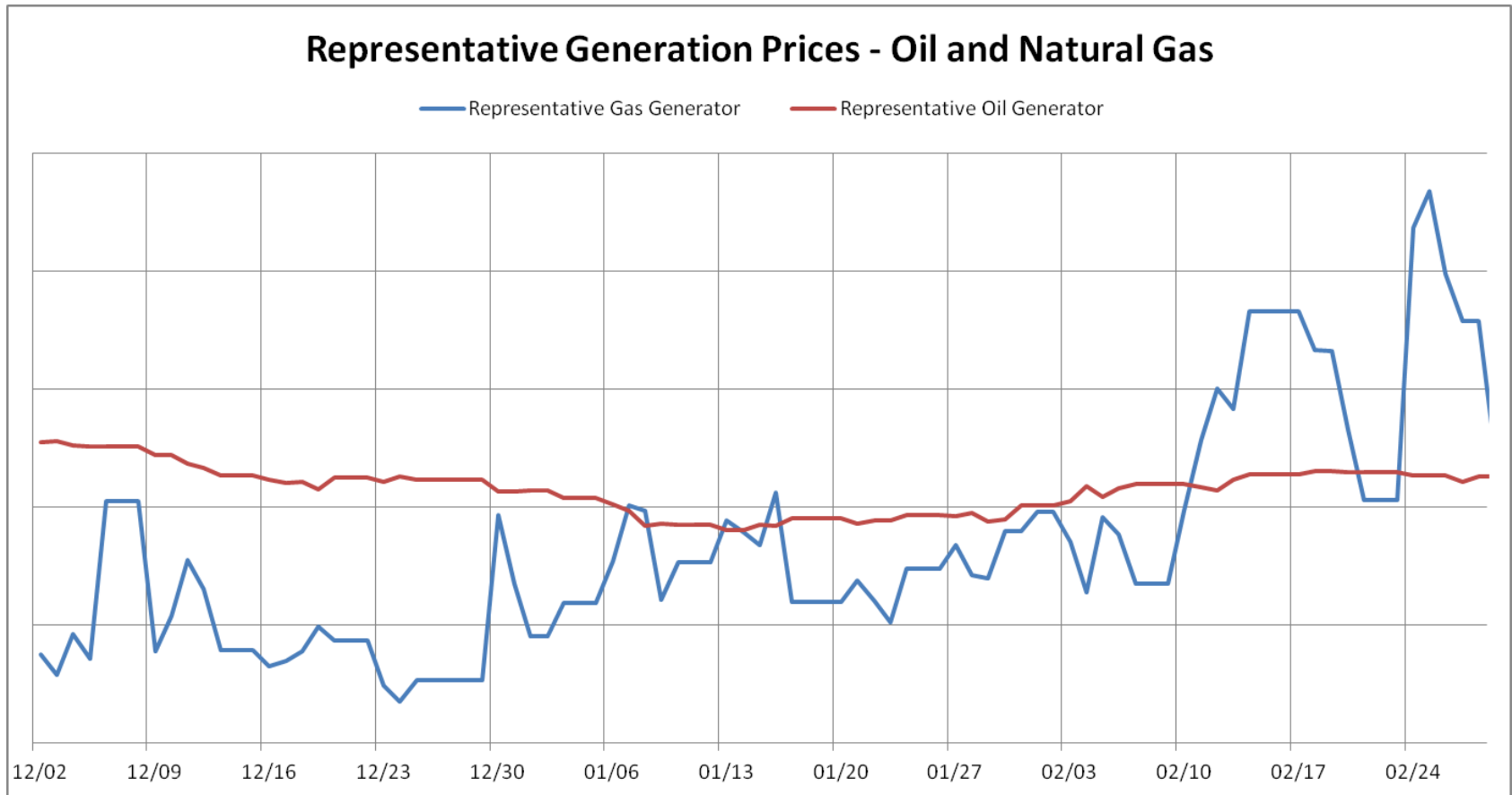
Pipeline Utilization:

Highest Natural Gas Supply Days

<i>All values shown as MMBTU scheduled</i>								
Pipeline	Location	Oper Capacity	2/5/2015	2/2/2015	2/3/2015	1/7/2015	2/6/2015	1/28/2015
Algonquin	Stony Point	1,583,000	1,522,000	1,494,000	1,517,000	1,343,000	1,486,000	1,518,000
Tennessee	Station 245	1,083,300	1,055,954	1,031,956	1,052,473	1,057,514	1,024,318	1,054,023
Iroquois	Waddington**	1,150,000	1,159,707	1,057,020	1,149,931	1,004,092	1,239,817	1,164,471
M&N	Baileyville (includes Canaport)	850,000	736,059	845,683	713,731	798,047	515,402	660,090
PNGTS	E. Hereford	168,000	259,335	238,141	259,334	217,377	259,206	259,322
Total		4,834,300	4,733,055	4,666,800	4,692,469	4,420,030	4,524,743	4,655,906
AGT/TGP	Distrigas	457,180	252,676	94,239	132,333	306,422	163,907	196,791
Algonquin	Northeast Gateway	400,000	141,187	322,871	149,320	199,819	166,343	0
Total		5,691,480	5,126,918	5,083,910	4,974,122	4,926,271	4,854,993	4,852,697

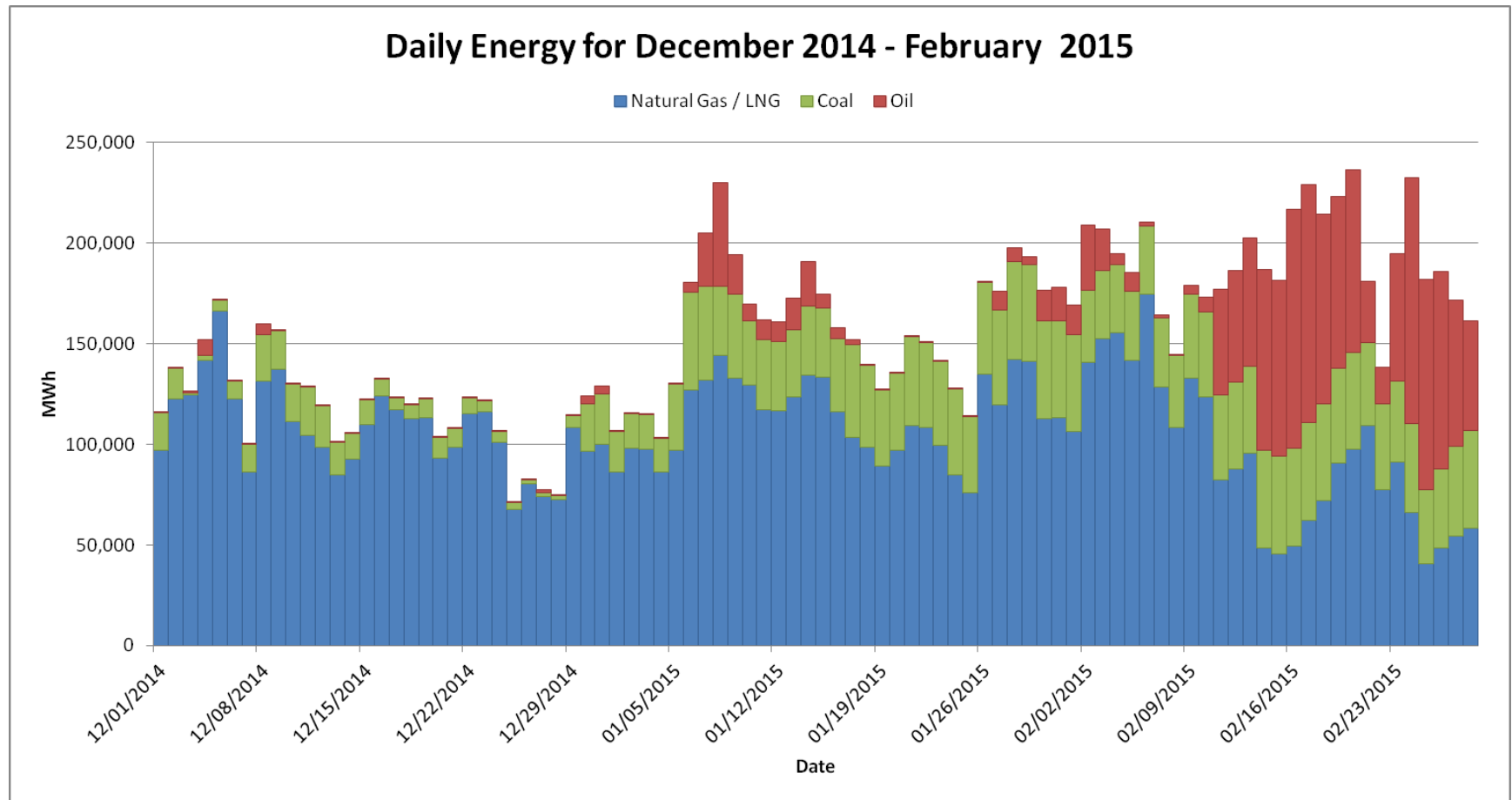
**** Not all gas is consumed in ISO-NE's footprint, especially Capacity at Iroquois**

Oil More Economic Than Natural Gas, Especially During February 2015

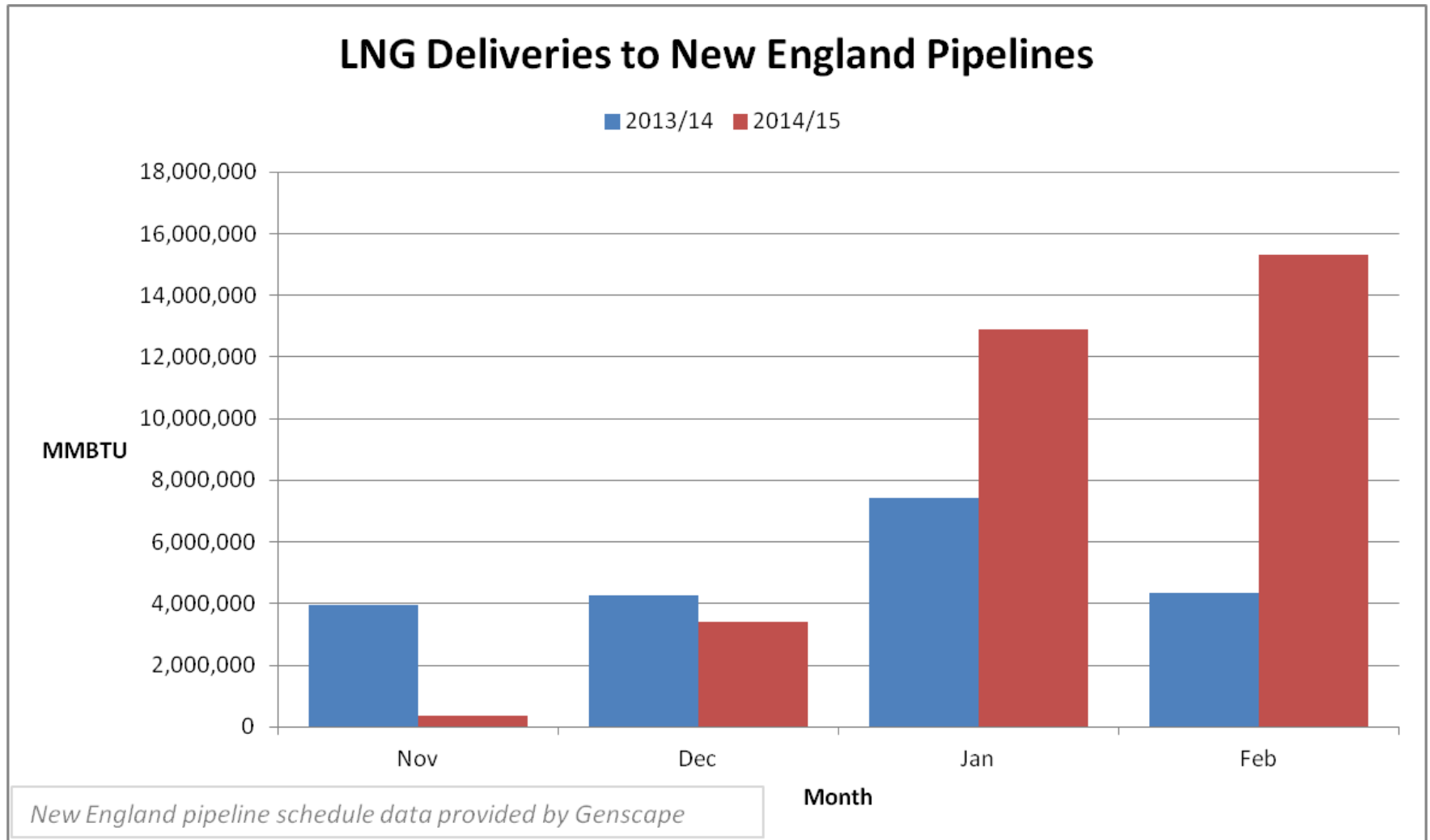


Colder Temps – Oil and Coal In Rate

Energy Contribution from Gas, Oil, and Coal



Significant Increase in LNG This Year

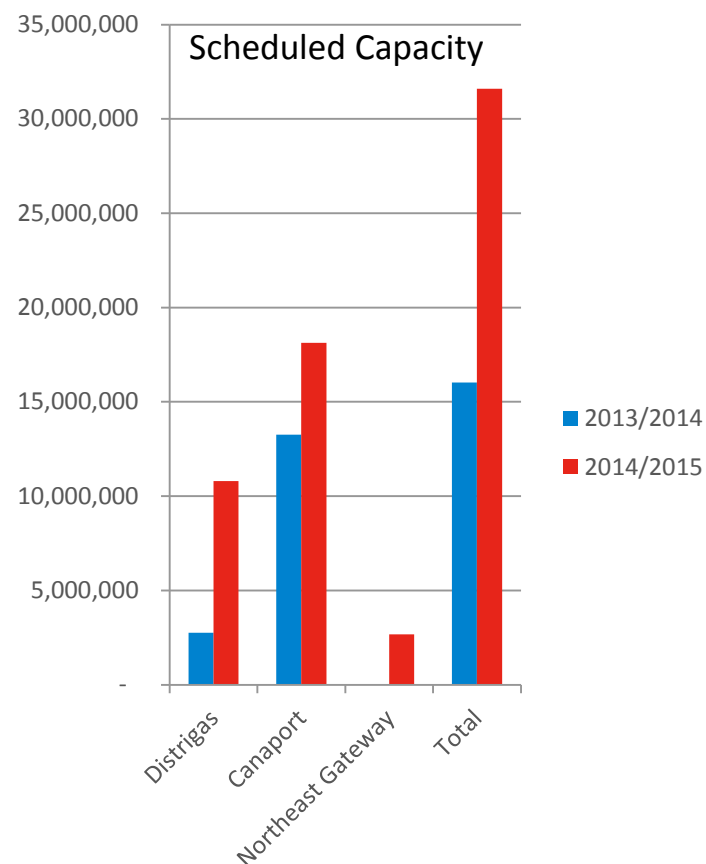


Observations from Winter Operations

LNG into New England Pipelines (shown in MMBTU scheduled)

December 2013 - February 2014				
	DECEMBER	JANUARY	FEBRUARY	TOTAL FACILITY
Distrigas	1,013,199	815,439	932,475	2,761,113
Canaport	3,237,722	6,609,209	3,419,294	13,266,225
Northeast Gateway	-	-	-	-
TOTAL/MONTH	4,250,921	7,424,648	4,351,769	16,027,338

December 2014 - February 2015				
	DECEMBER	JANUARY	FEBRUARY	TOTAL FACILITY
Distrigas	707,137	5,634,040	4,450,831	10,792,008
Canaport	2,681,902	6,177,325	9,270,340	18,129,567
Northeast Gateway	-	1,070,443	1,605,378	2,675,821
TOTAL/MONTH	3,389,039	12,881,808	15,326,549	31,597,396



Source: Genscape



Winter Operations Summary

- While operations this winter were relatively uneventful, challenges remain for future winters with fuel security and additional retirements
- Increased usage of oil and coal units, with additional retirements or colder weather, could limit generator output due to environmental limits
- LNG deliveries were favorable to winter operations
- World fuel prices also have an impact on what fuel shows up in New England
- The ISO will continue to work with stakeholders on addressing the transition winters between now and 2017/18, when the Pay-For-Performance design takes effect



Questions

