

Vector PipelineTM

Customer Meeting

October 1, 2015



Vector Pipeline™

Overview

- **Welcome – Pete Cianci**
 - **Vector Update – Matt Malinowski**
 - **ICF International – Kevin Petak**
 - **Discussion**
-



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Matt Malinowski

Manager, Market Development



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Vector Update

Gas Day / NAESB

Operations

System Flows

New Projects

Post 2017 - Nexus & Rover

Market Opportunities



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Gas Day Changes NAESB 3.0





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Gas-Electric Coordination

- Gas nomination schedule changing to improve coordination of natural gas and electricity markets.
 - FERC Order 809: NAESB 2.0 with Gas Day Changes and 2.0 Minor Corrections
 - NAESB 2.0 went into effect December 2012
-



Order 809

- Effective for April 1, 2016 Gas Day Flow
 - Gas Day start remains at 9 a.m.
 - One additional intraday cycle
 - Tighter time frame to schedule each cycle
 - Capacity Release timeline changed to accommodate new timing for gas day cycles
-



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The New Gas Day

(Central Clock Time)

Cycle	Current		NEW	
	9 a.m. Gas Day Start		9 a.m. Gas Day Start	
	Nomination	Gas Flow	Nomination	Gas Flow
Timely	11:30 a.m.	9:00 a.m.	1:00 p.m.	9:00 a.m.
Evening	6:00 p.m.	9:00 a.m.	6:00 p.m.	9:00 a.m.
ID 1	10:00 a.m.	5:00 p.m.	10:00 a.m.	2:00 p.m.
ID 2	5:00 p.m.	9:00 p.m.	2:30 p.m.	6:00 p.m.
ID 3			7:00 p.m.	10:00 p.m.



NAESB Version 3.0 Standards

- Published November 2014 but not yet approved by FERC. NOPR issued July 16.
 - Comprehensive with all changes to date, including NAESB 2.1
 - Location common codes eliminated and replaced with proprietary codes
 - Behind-the-scenes data set changes and clean-up for language consistency
-



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Operations



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2015 Compressor Work Completed

- Springville #2 – entire control system replaced January, 2015
 - Joliet engine exchanged – January, 2015
 - No Firm was impacted
-



2016 Proposed Work

- Highland station – both engines due for replacement
 - Highland #1 – replace entire control system – (2-3 week outage)
 - New SCADA system
 - Continued electronic upgrades
 - No impact to Firm expected
-



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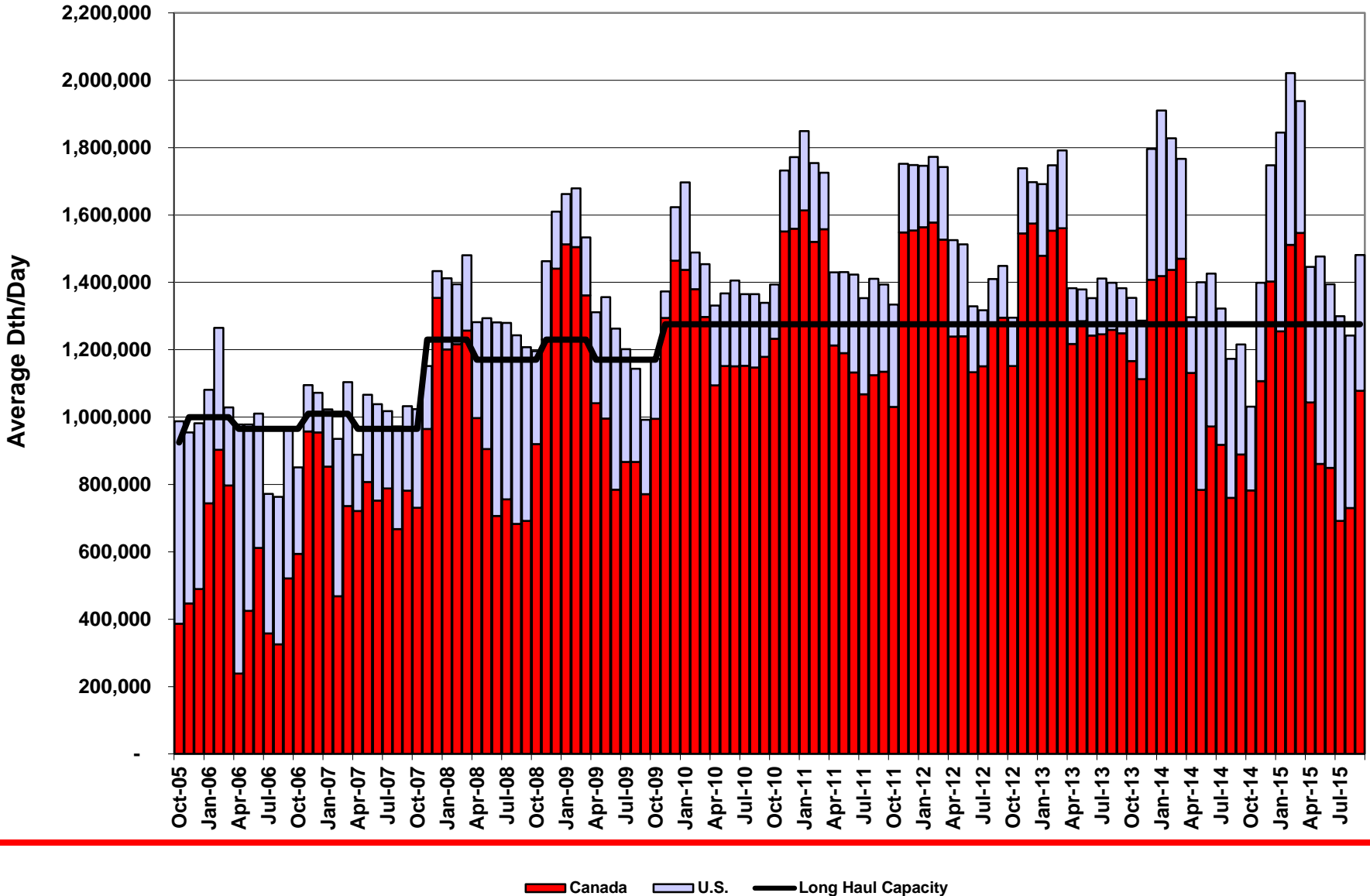
System Flows



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Scheduled Deliveries

(Includes Longhaul, Shorthaul, Backhaul and Segmentation)

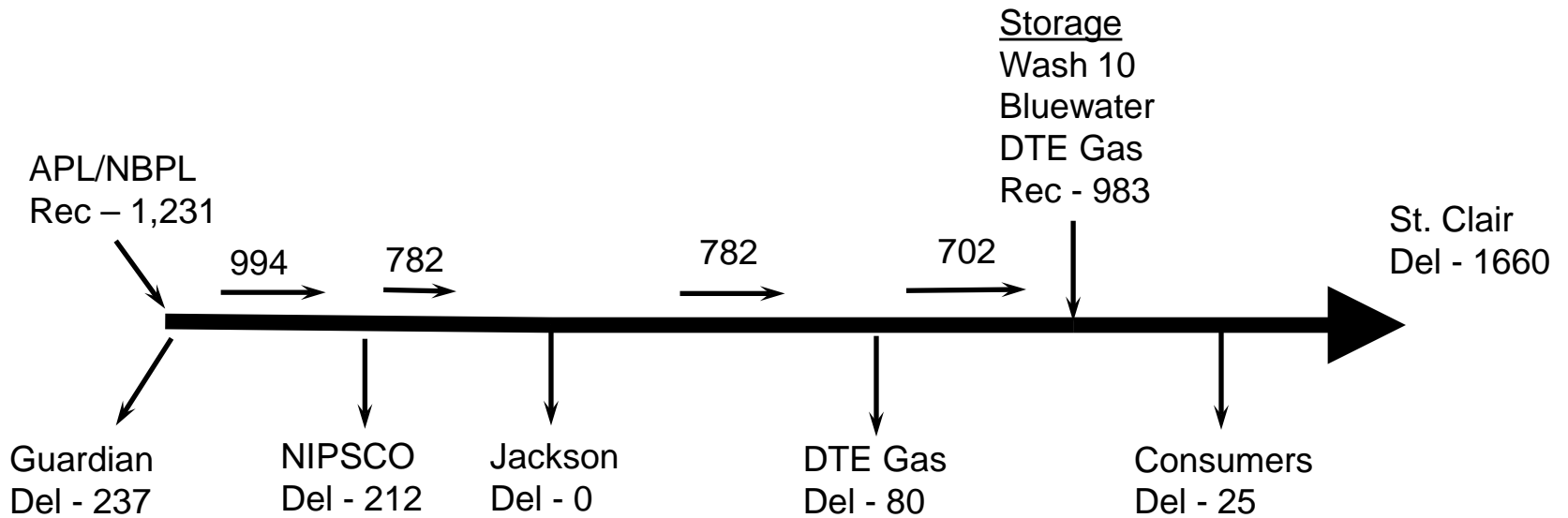




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Winter 2014/15

Winter 2014/15 System Peak – 2,214 Dth
February 20, 2015



This past winter was not as dynamic as the prior.....

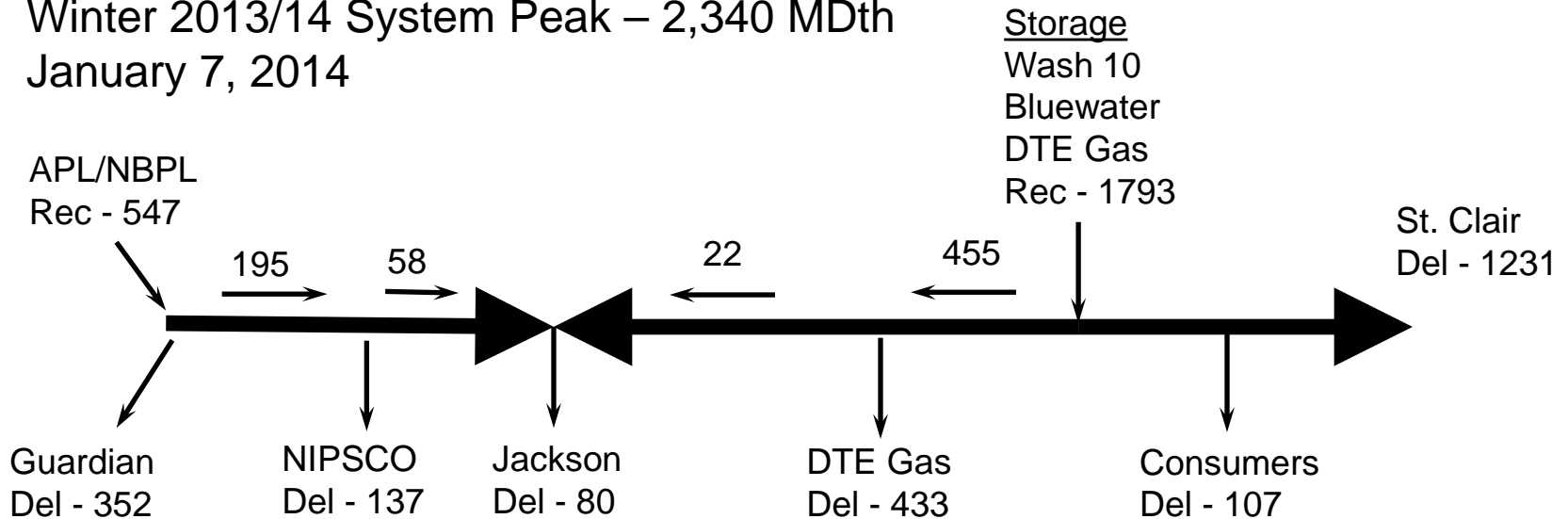


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Winter 2013/14

(Polar Vortex)

Winter 2013/14 System Peak – 2,340 MDth
January 7, 2014

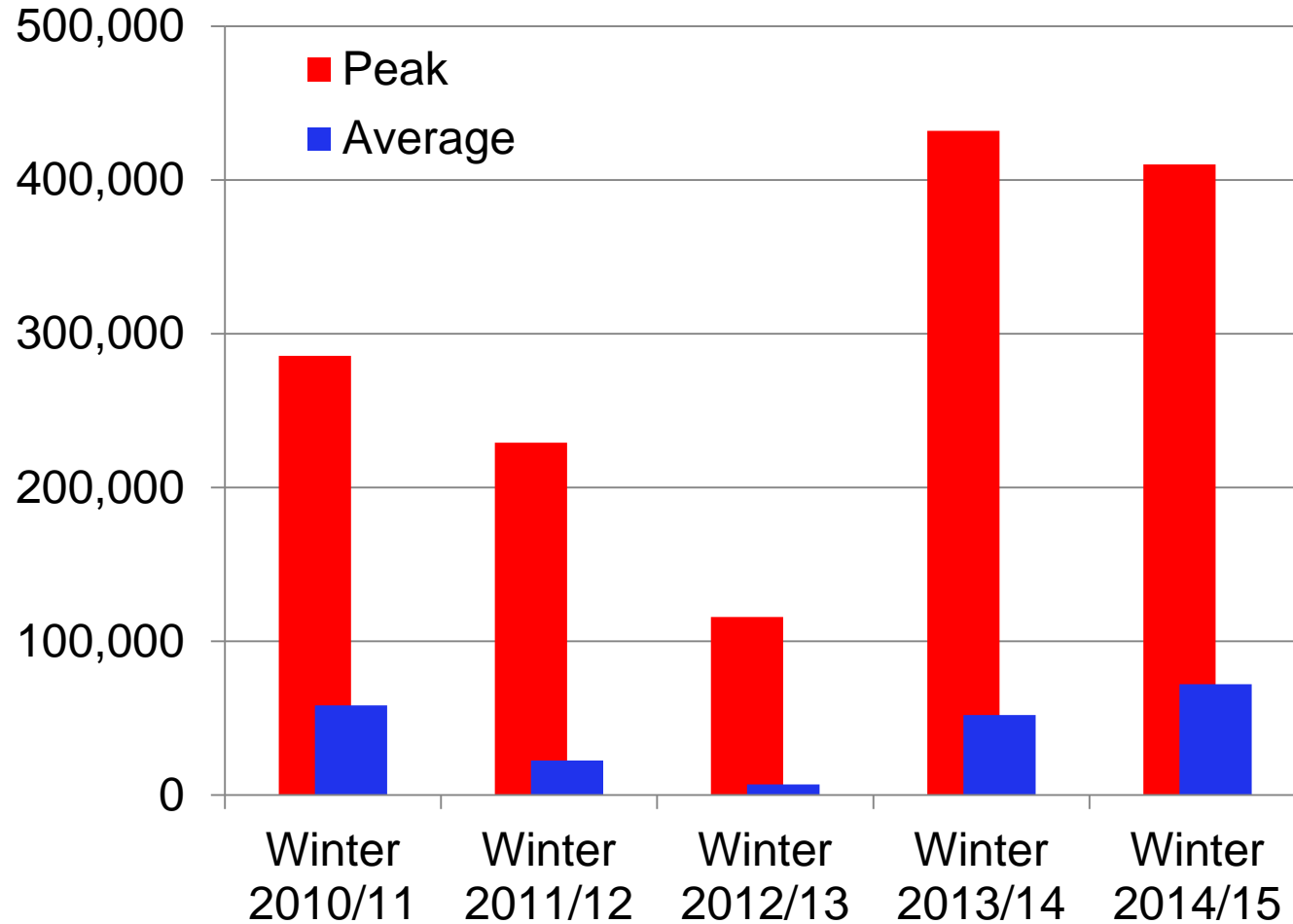




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Guardian Deliveries - Winter

(Physical Volumes - MDth/d)

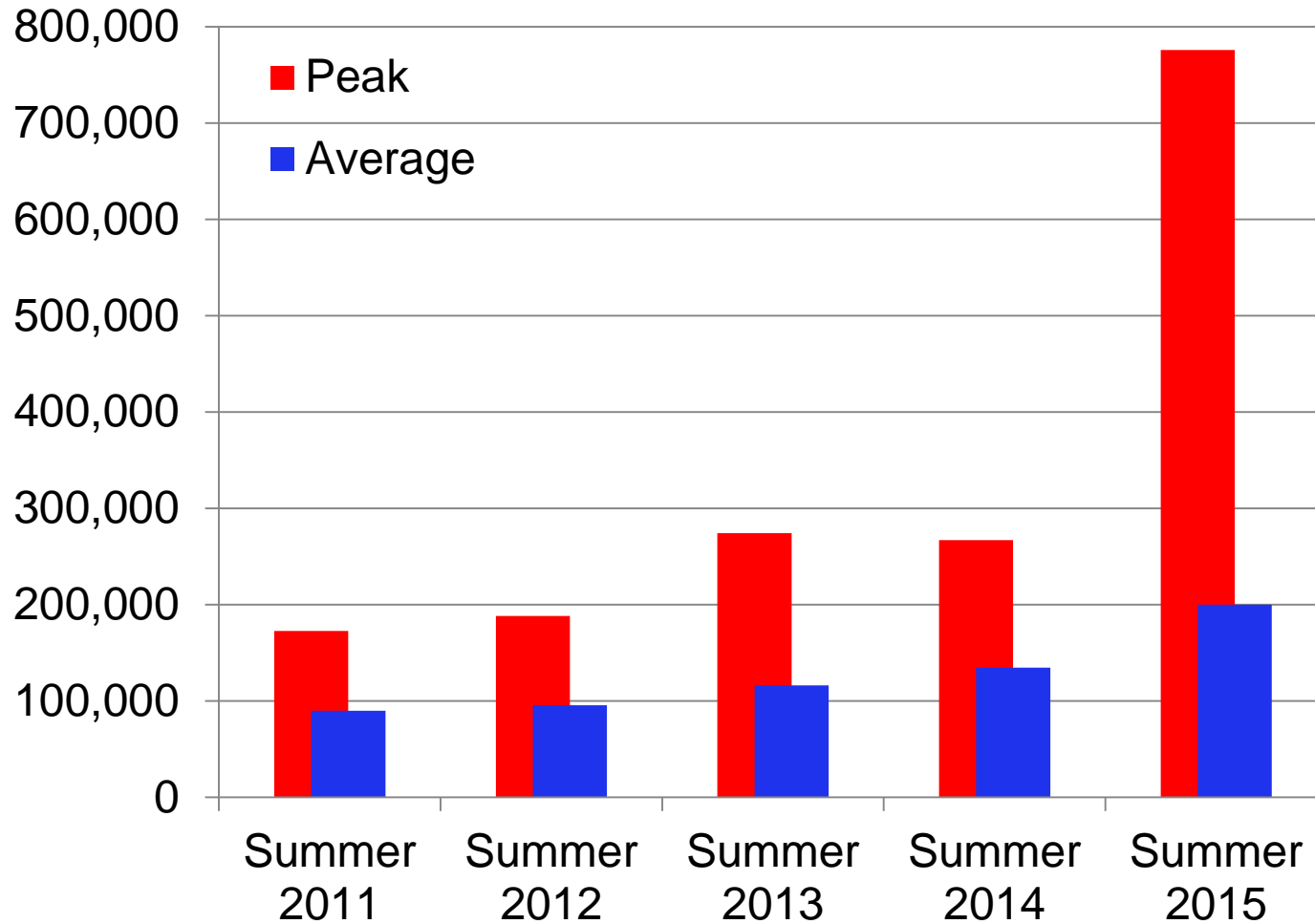




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Guardian Receipts - Summer

(Physical Volumes - MDth/d)

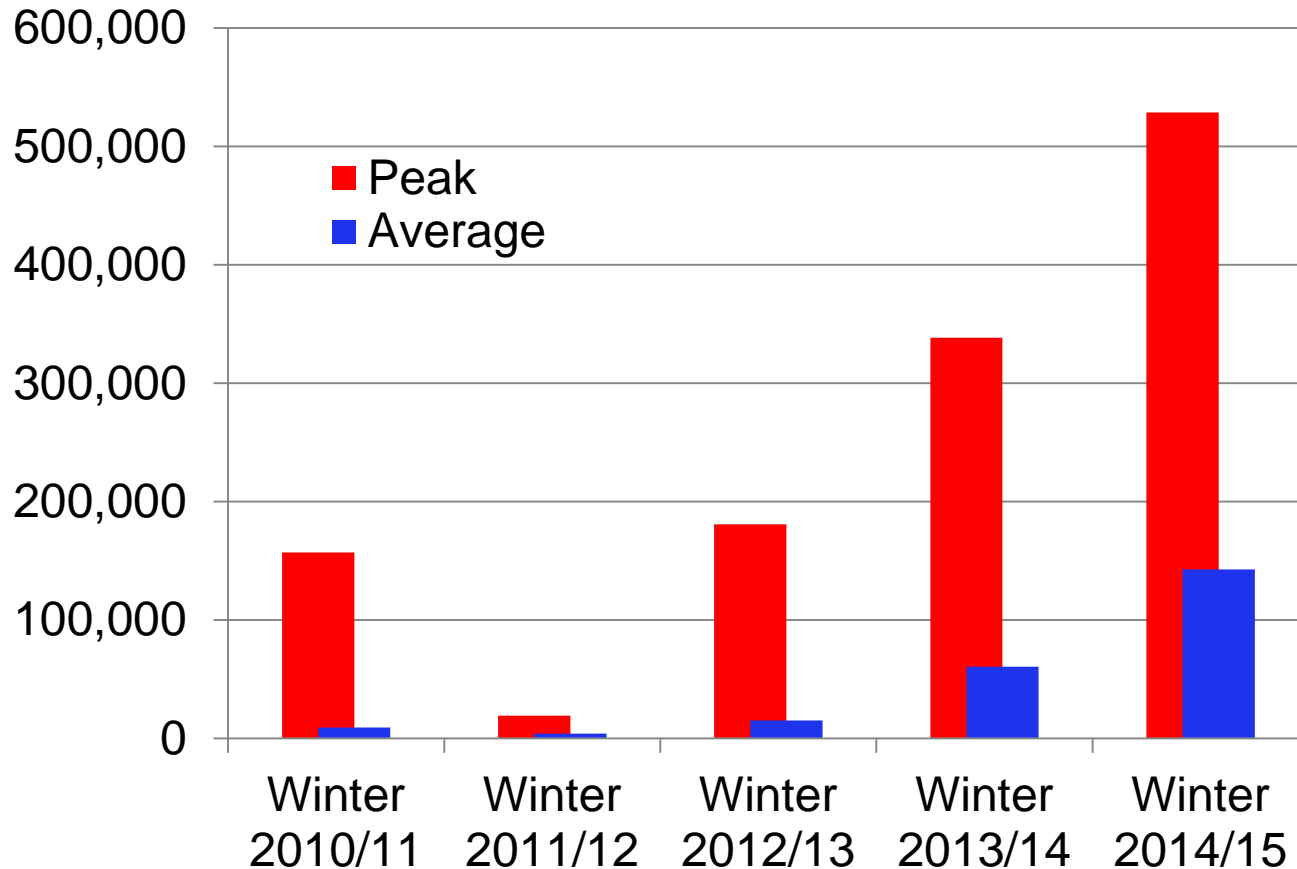




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NIPSCO Deliveries

(Physical Delivery - MDth/d)



- Station capacities: Crown Point – 600 MMcf/d; LaPorte – 150 MMcf/d



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BTU Content

(Btu/cf @ St. Clair)

<u>Year</u>	<u>Btu/cf</u>
2010	1015
2011	1015
2012	1026
2013	1035
2014	1045

- Ethane rejection remains an industry-wide phenomenon
-



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New Facilities



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New Interconnect

- Greenfield South
 - New delivery in Ontario for a 300MW Power Plant
 - Vector hot tap tied-in Summer 2015
 - Commissioning planned 4th Q 2015
-



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Potential Interconnects

- Chicago Markets – 2016 or 2017
 - Provides direct access to large LDC market
 - New baseload powerplant – Indiana
 - 675 MW plant on PJM grid
 - Expected in-service 2018
 - Potential Future second phase
 - 675 MW into MISO
-



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Post 2017



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What's new

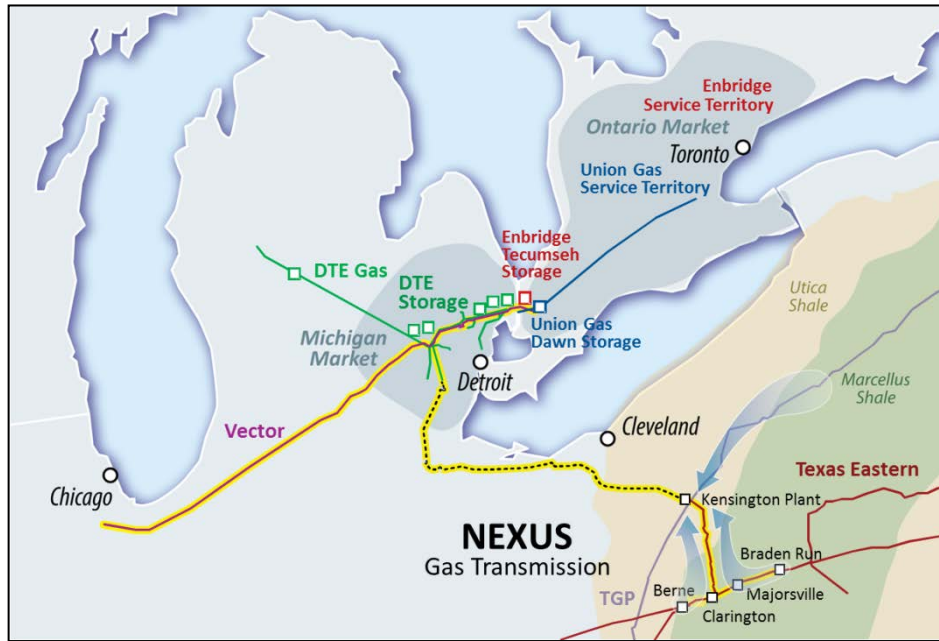
- Nexus will be utilizing Vector's system to transport gas from Milford & Belle River to Dawn.
- Rover will be utilizing Vector to transport gas from Livingston Co. to Dawn.
- Combined, both parties committed approximately 1.4 Bcf/d on Vector.
- Capacity was created from existing capacity by converting long-haul to short-haul capacity.
- No expansion is needed right now, but Vector is prepared to move forward with an expansion (post 2017) if there is market support.
- Vector is sold out of capacity to Dawn starting late 2017, once both projects are in-service.



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Nexus Pipeline

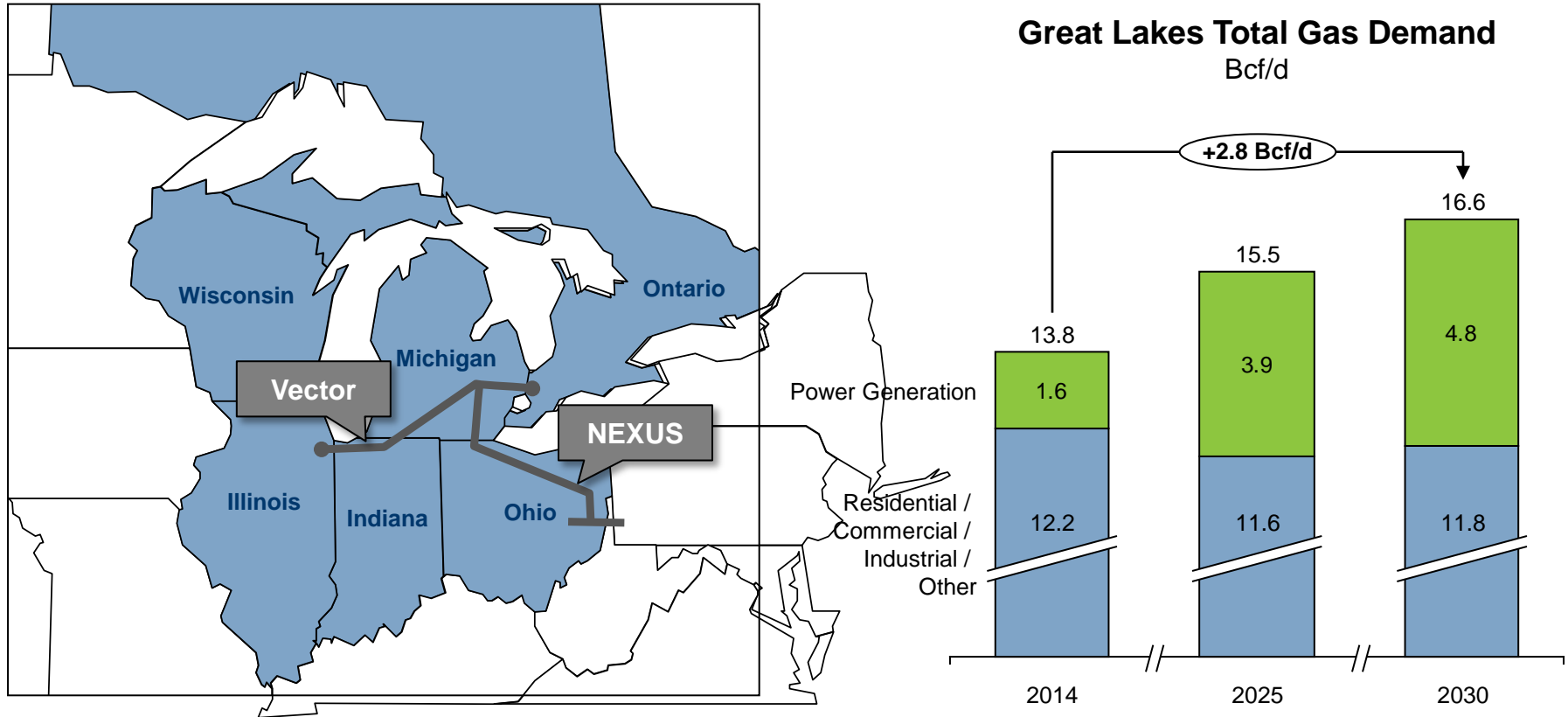
The NEXUS Project – Developed Jointly by DTE Energy and Spectra Energy



\$14B	Market Cap	\$19B
\$23B	Enterprise Value	\$33B
BBB+	Credit Rating	BBB

NEXUS is supported by two strong, creditworthy sponsors – DTE and Spectra – that are firmly committed to the project

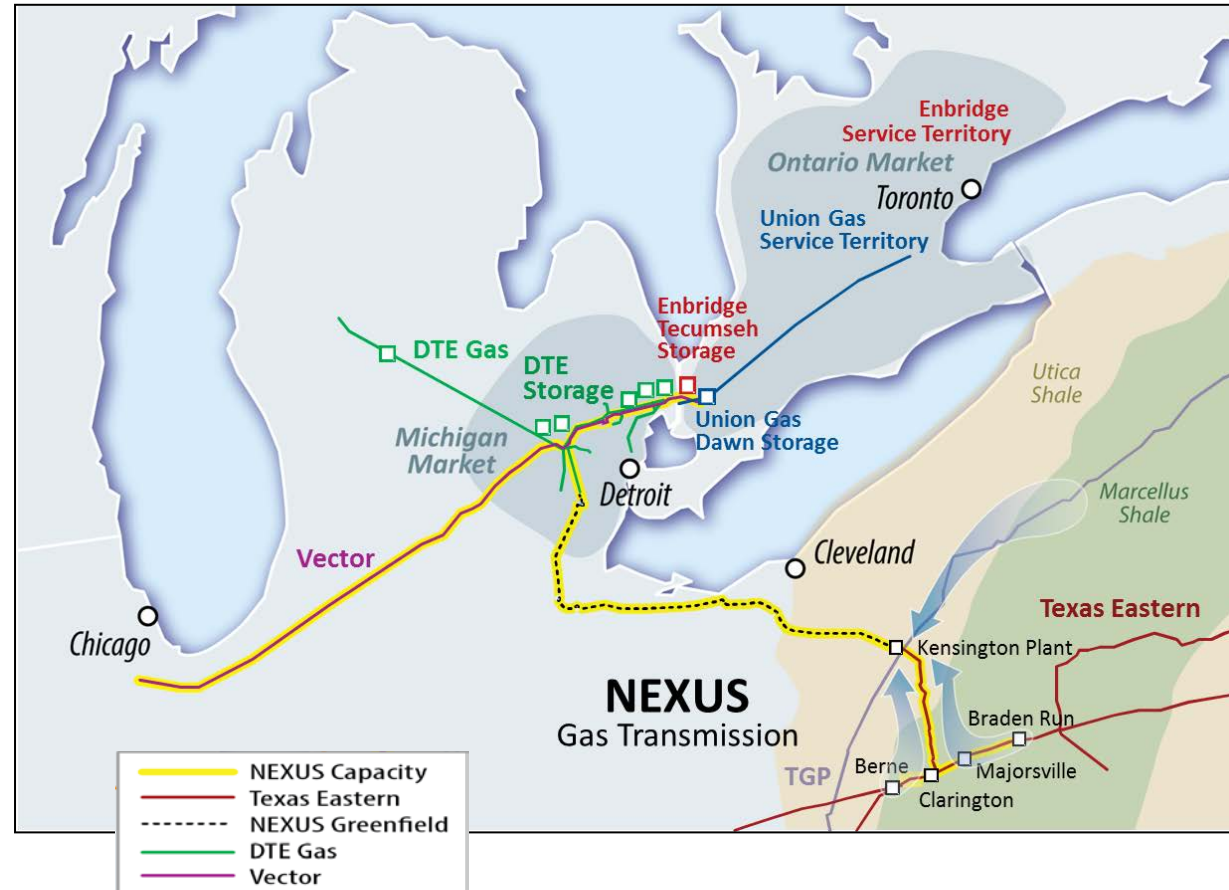
Great Lakes Demand – Driven by Power Generation



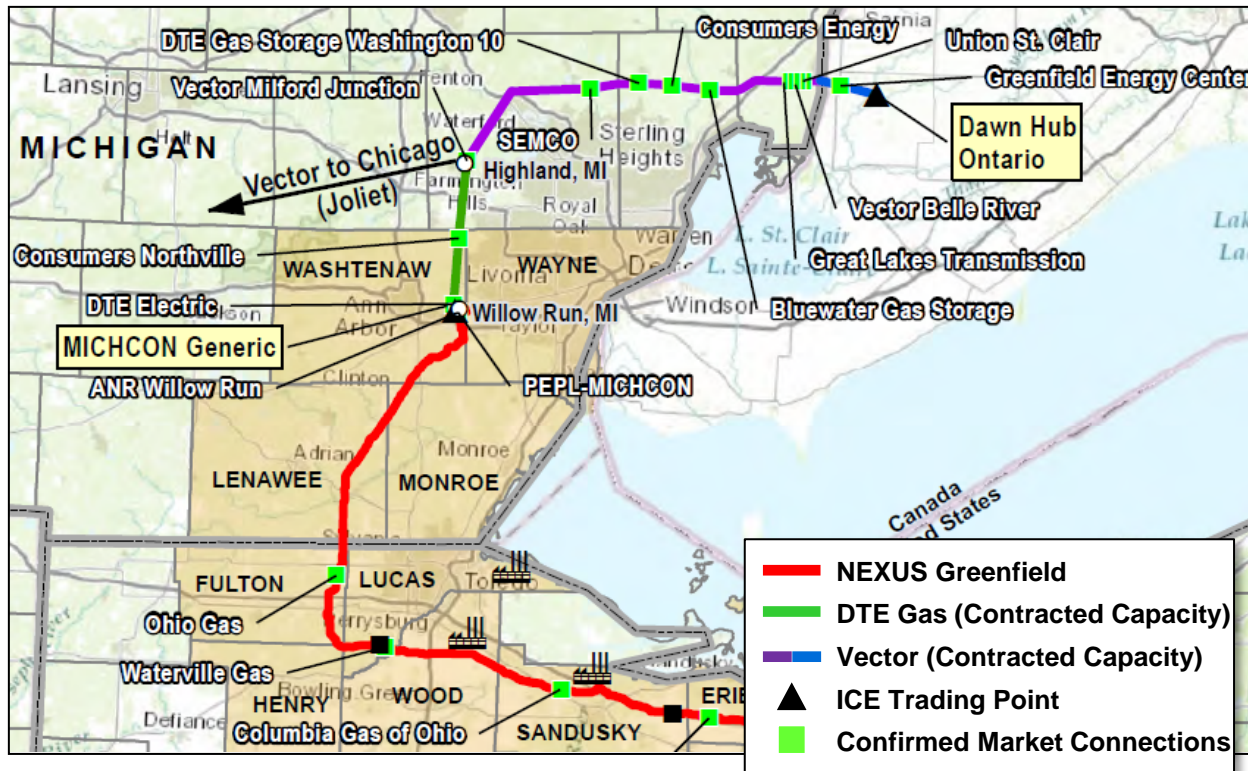
- Great Lakes demand is anticipated to increase ~2.8 Bcf/d, driven by power generation
- Given its low-cost position on the gas supply stack, the Utica / Marcellus is poised to displace a significant amount of existing supply serving the Great Lakes market

Project Scope

- Design Capacity: 1.5 Bcf/d
- ~250 miles of 36” pipe
- 130,000 HP with 4 compressor stations
- In-Service: November 2017
- CapEx: \$2+ billion
- Multiple receipt and delivery points



NEXUS – Key Market Access



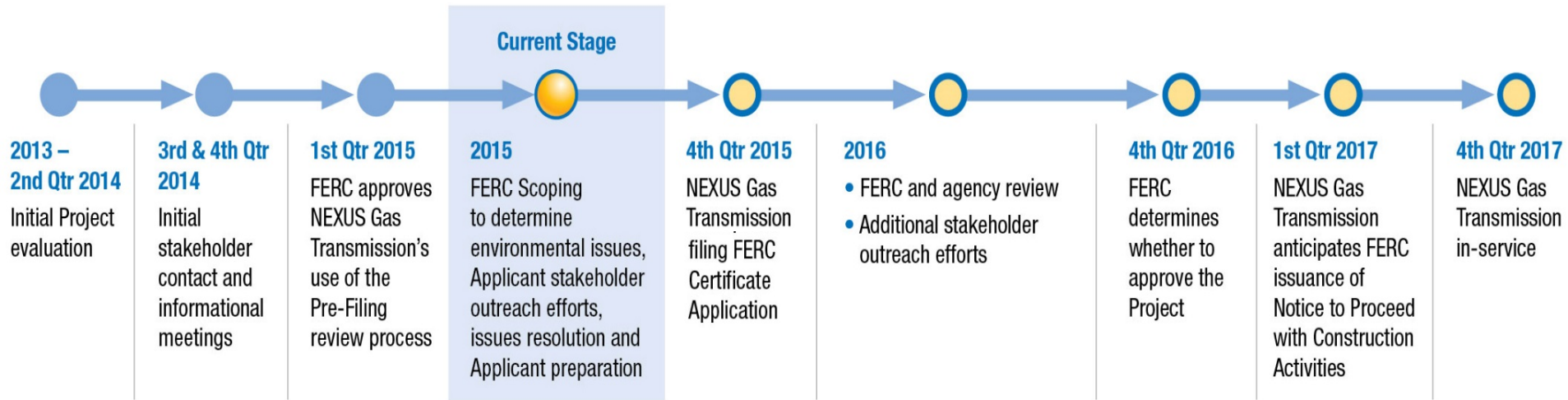
NEXUS Market Access

- Michigan
 - MichCon trading hub
 - DTE Gas
 - Consumers Energy
 - Storage (DTE Gas, Washington 10, Bluewater)
- Ontario
 - Dawn trading hub
 - Union Gas and Enbridge
 - Storage (Dawn and Tecumseh)
- Vector
 - Chicago area LDCs
 - Power generators

NEXUS provides access to:

- ***Deep and liquid trading hubs at Dawn and MichCon***
- ***~1 Tcf of working storage capacity***
- ***Large direct purchase markets behind LDCs***

NEXUS Timeline



Key Milestones

- Oct. 2014 – Held 9 voluntary informational sessions in OH and MI
- Jan. 2015 – FERC accepted project use of pre-filing process
- Jan. 2015 – Submitted first drafts of Resource Reports 1 & 10
- Feb. 2015 – Held 10 Open Houses in OH and MI
- Apr.-May 2015 – FERC held 6 scoping meetings in OH and MI
- Jun. 2015 – Submitted draft Resource Reports
- Q4 2015 – Filing FERC 7C application

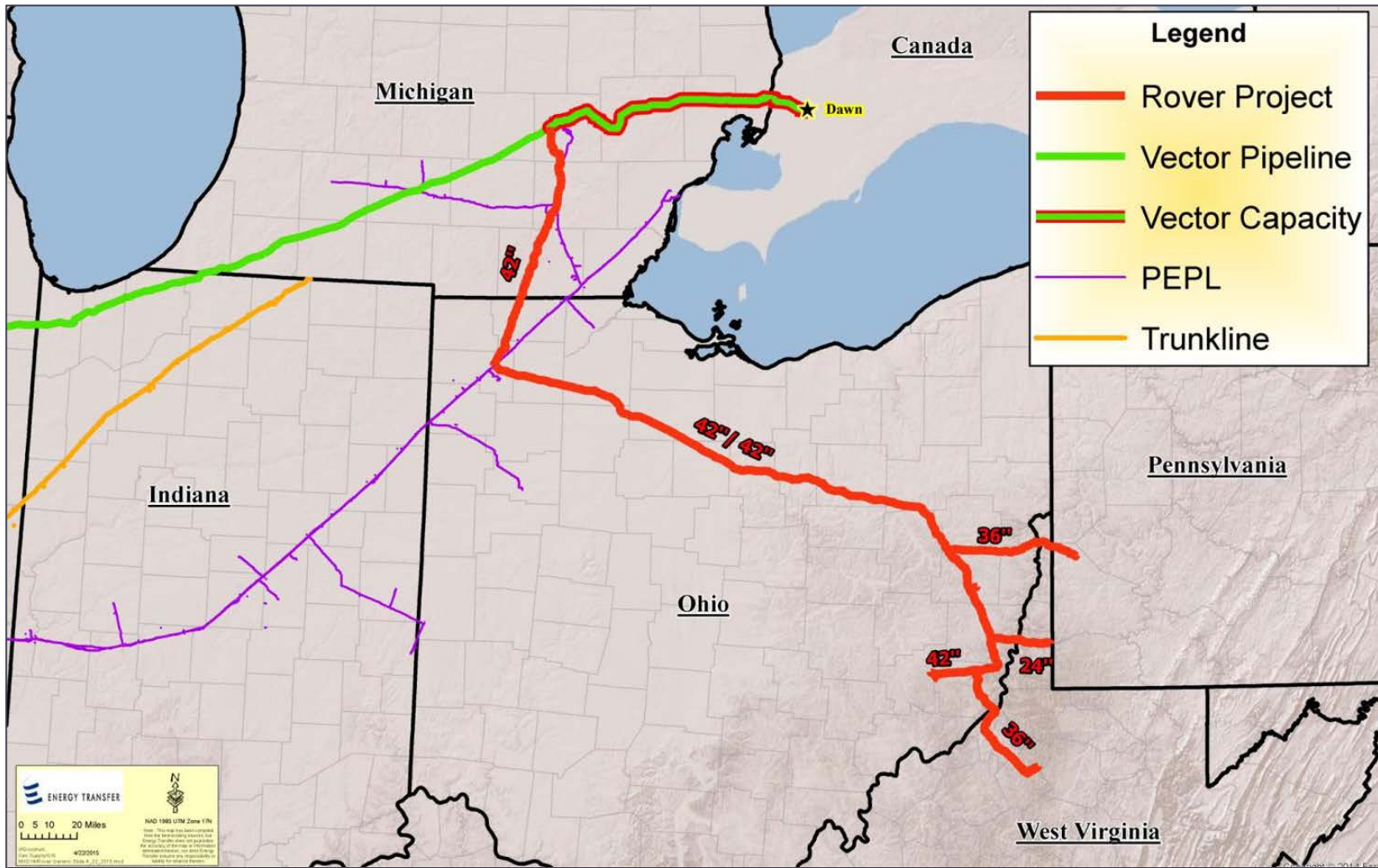


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Rover Pipeline LLC

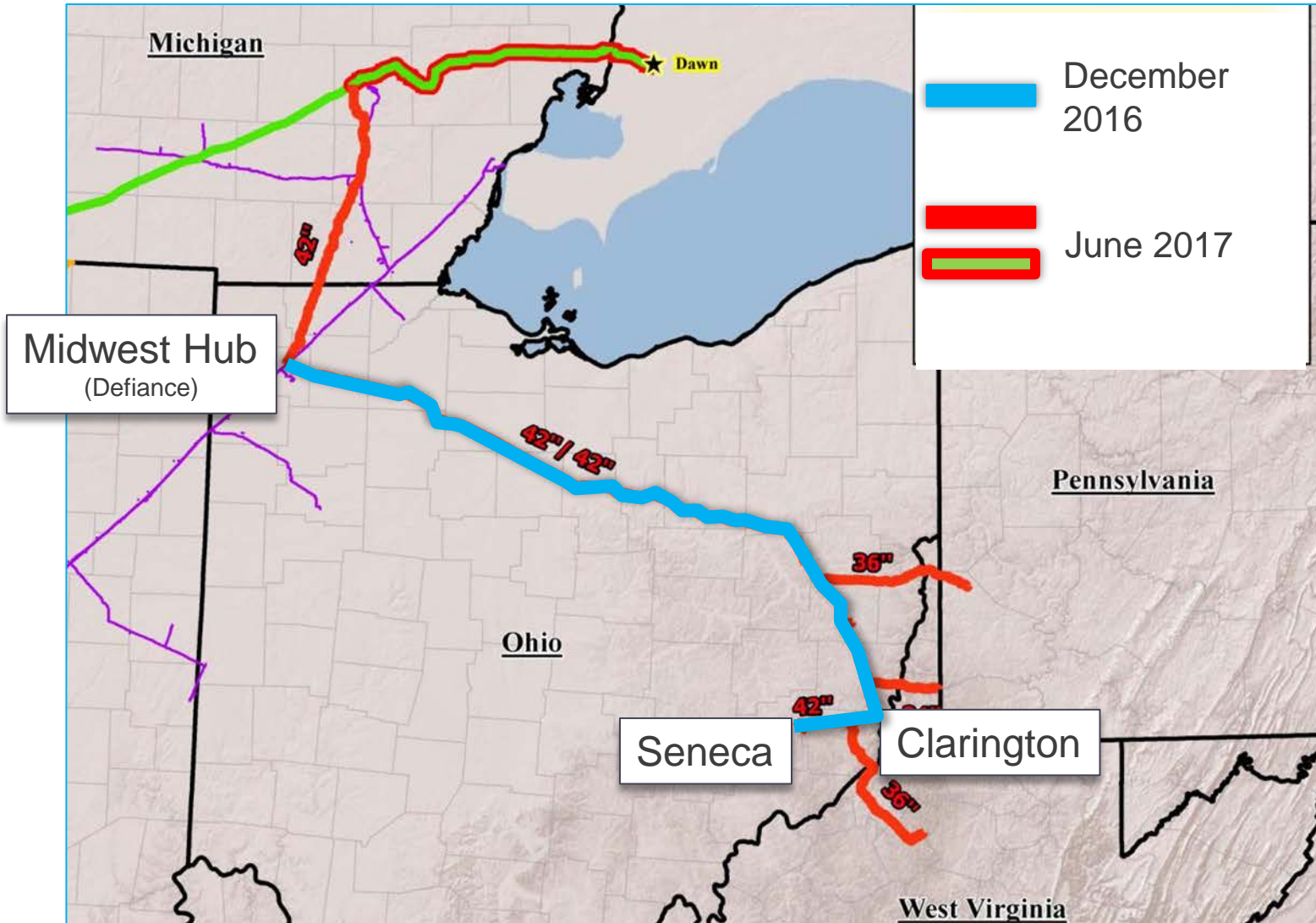


ROVER PIPELINE

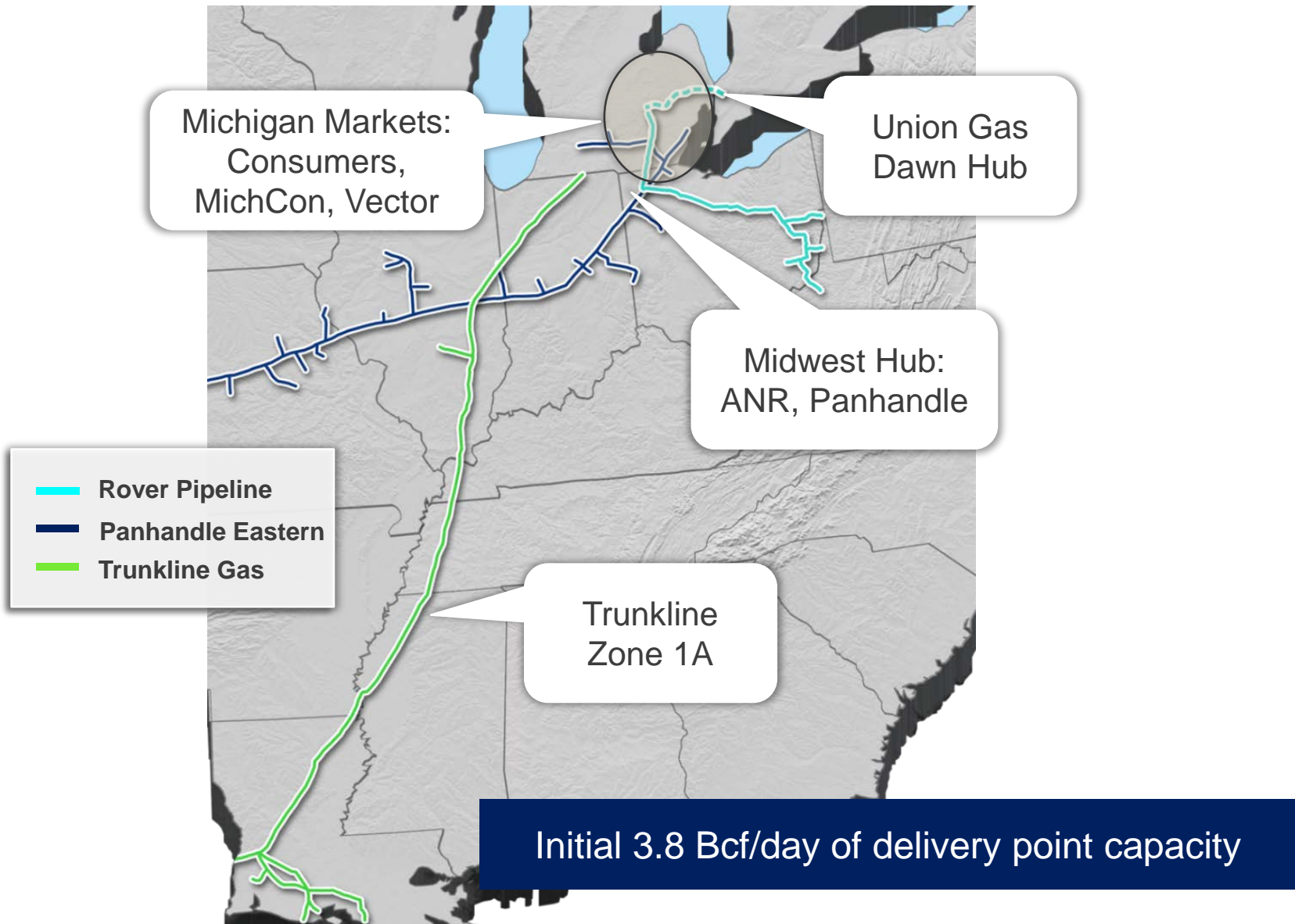


711 miles of pipeline; initial forward haul capacity of 3.25 Bcf/day of capacity

ROVER PIPELINE – ESTIMATED IN-SERVICE DATES



ROVER PIPELINE – MARKETS



ROVER PIPELINE MAJOR ACCOMPLISHMENTS



- FERC certificate application filed February 20th; anticipating Order by 1st Quarter 2016.
- Long-lead time materials being procured.
 - 100% of major materials purchased at or below budget.
 - Scheduled to be delivered by end of the year.
- Surveys complete.
- ROW on budget and on schedule.

Rover pipe arriving at the Port of Cleveland





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Market Opportunities



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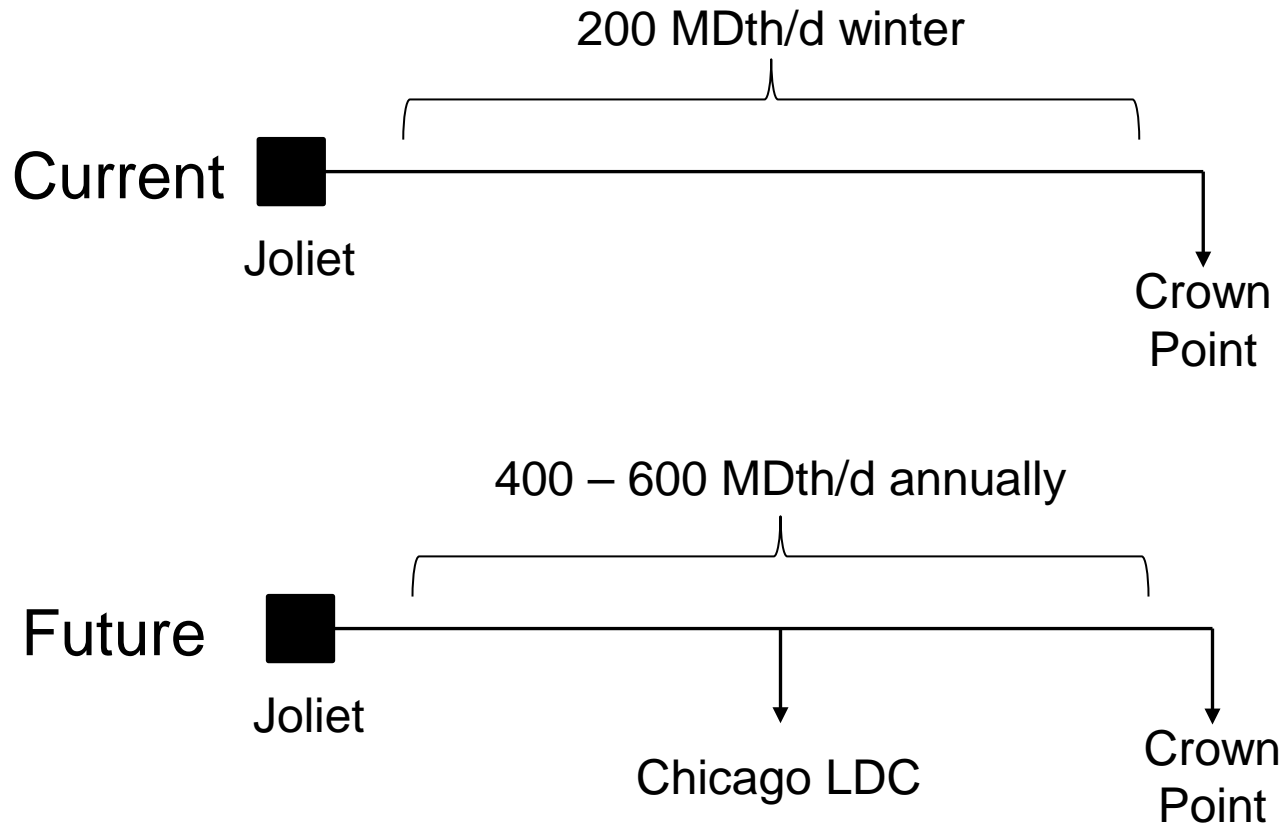
Capacity Available Chicago to Dawn

- **December 2015 through May 2017:**
 - **Dec 2015: 290,000 dth/d**
 - **April 2016: 289,811 dth/d**
 - **Nov 2016: 417,200 dth/d**
 - **Dec 2016: 502,200 dth/d**
 - **April 2017: 528,628 dth/d**
- **After June 1, 2017 all capacity to Dawn is reserved**



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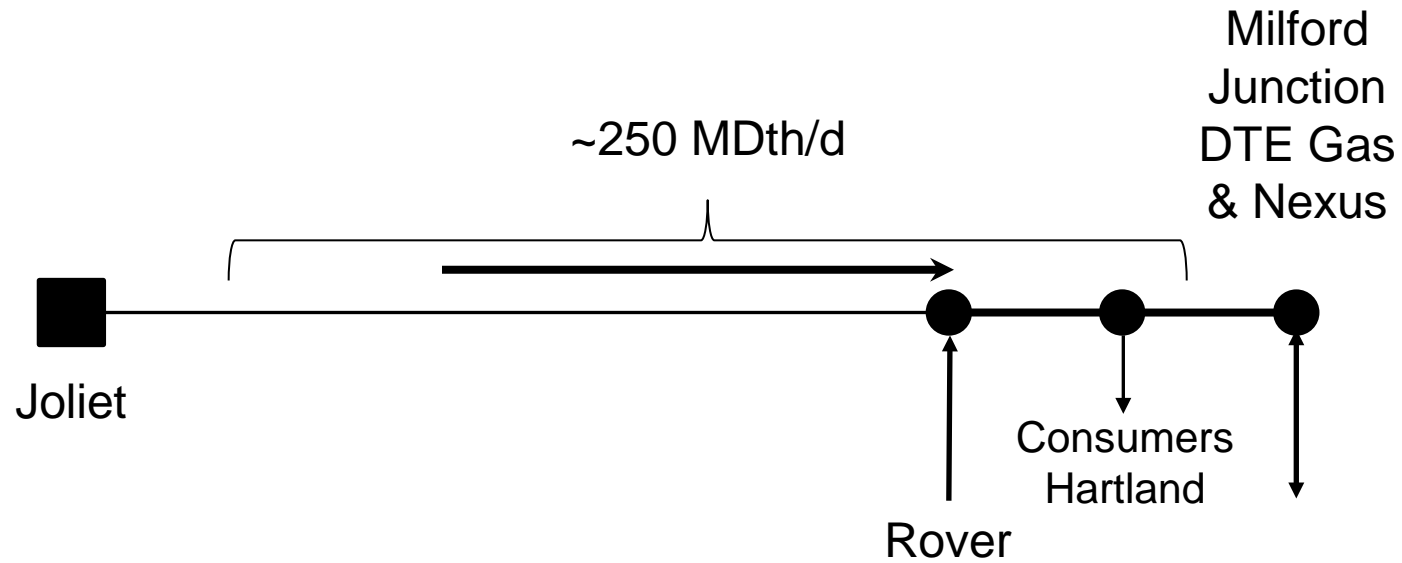
Zone 1 Capability Market Opportunities for Chicago Supply





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Joliet to Milford – 2018 Chicago Supply to City Gates



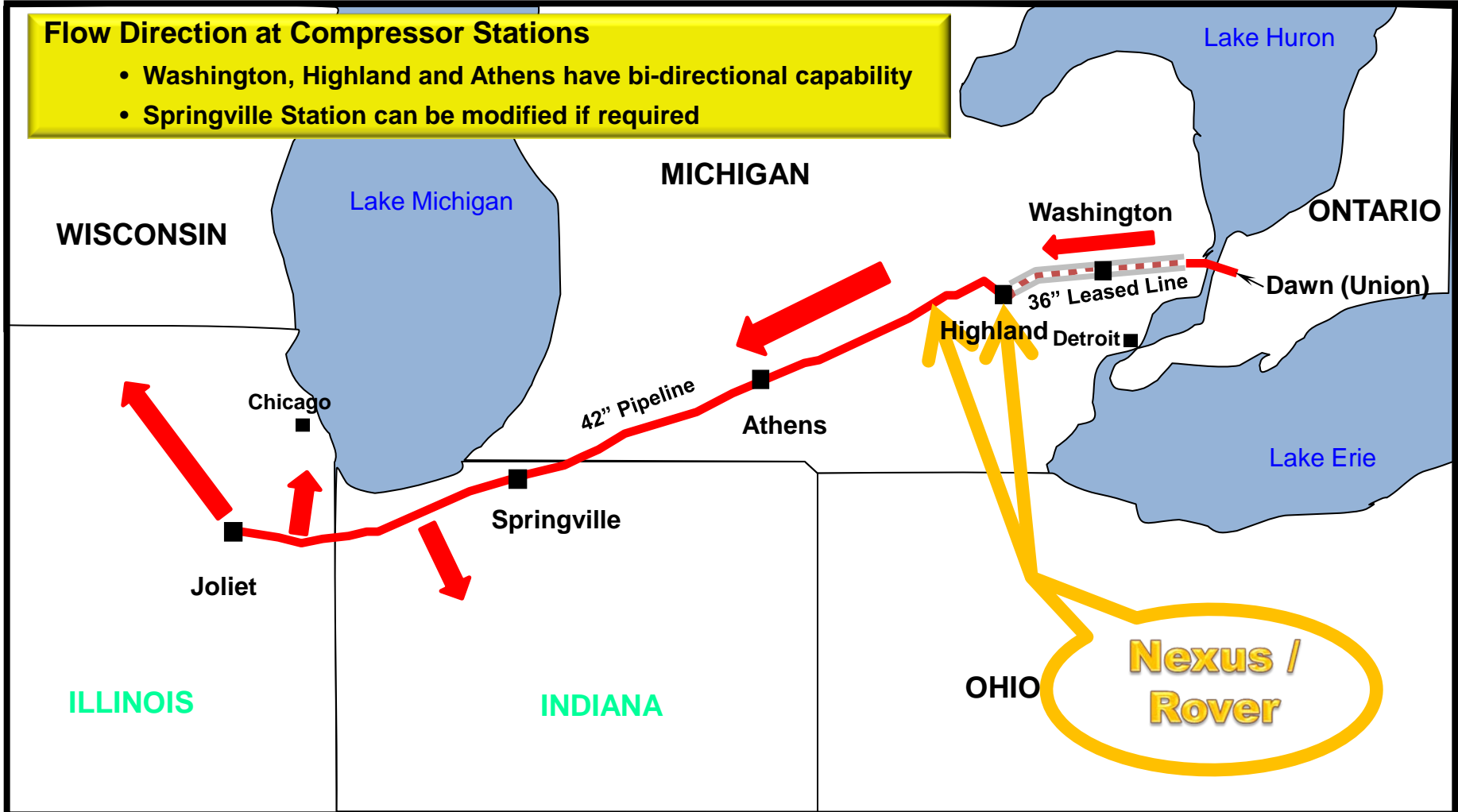


East to West Flow

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Flow Direction at Compressor Stations

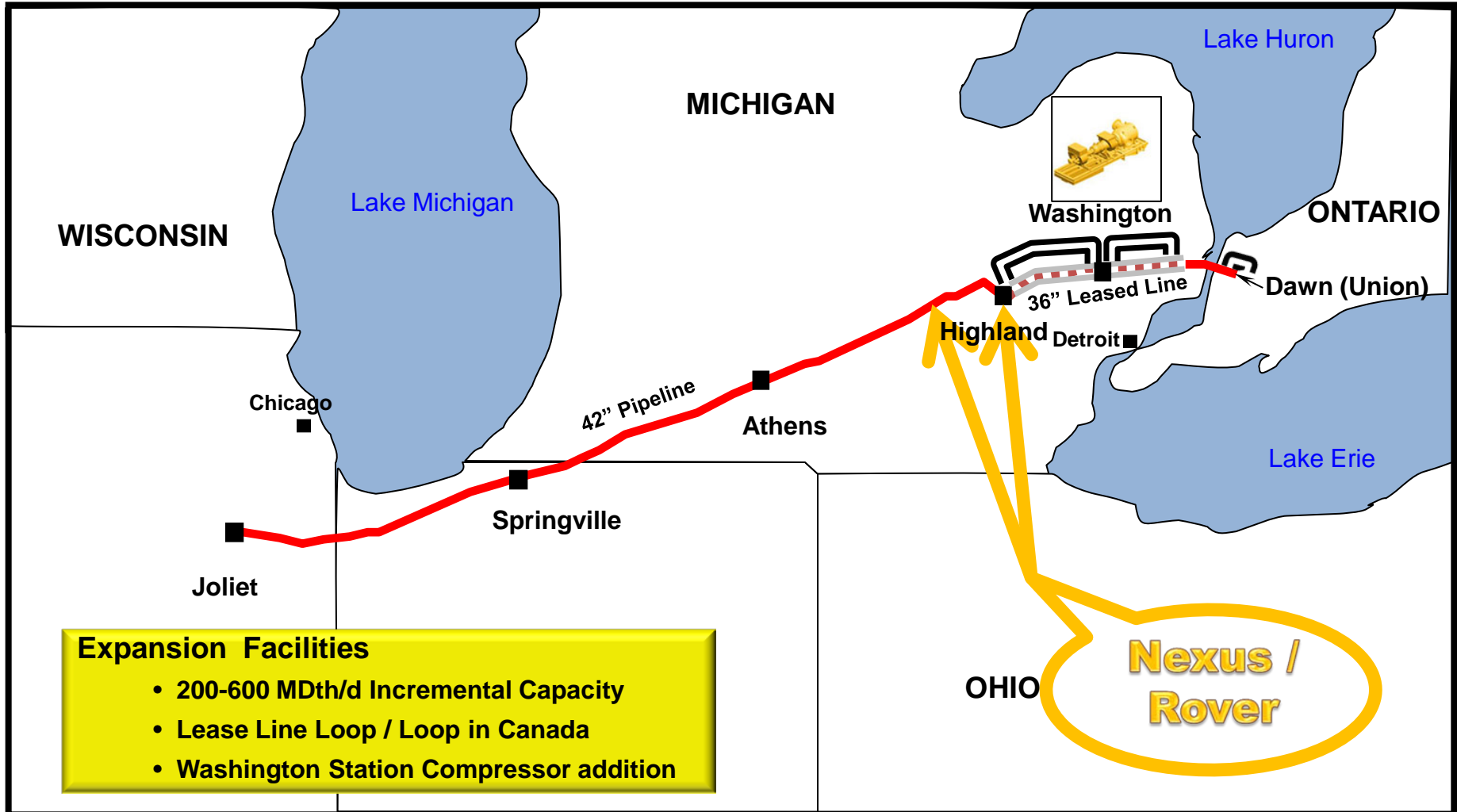
- Washington, Highland and Athens have bi-directional capability
- Springville Station can be modified if required





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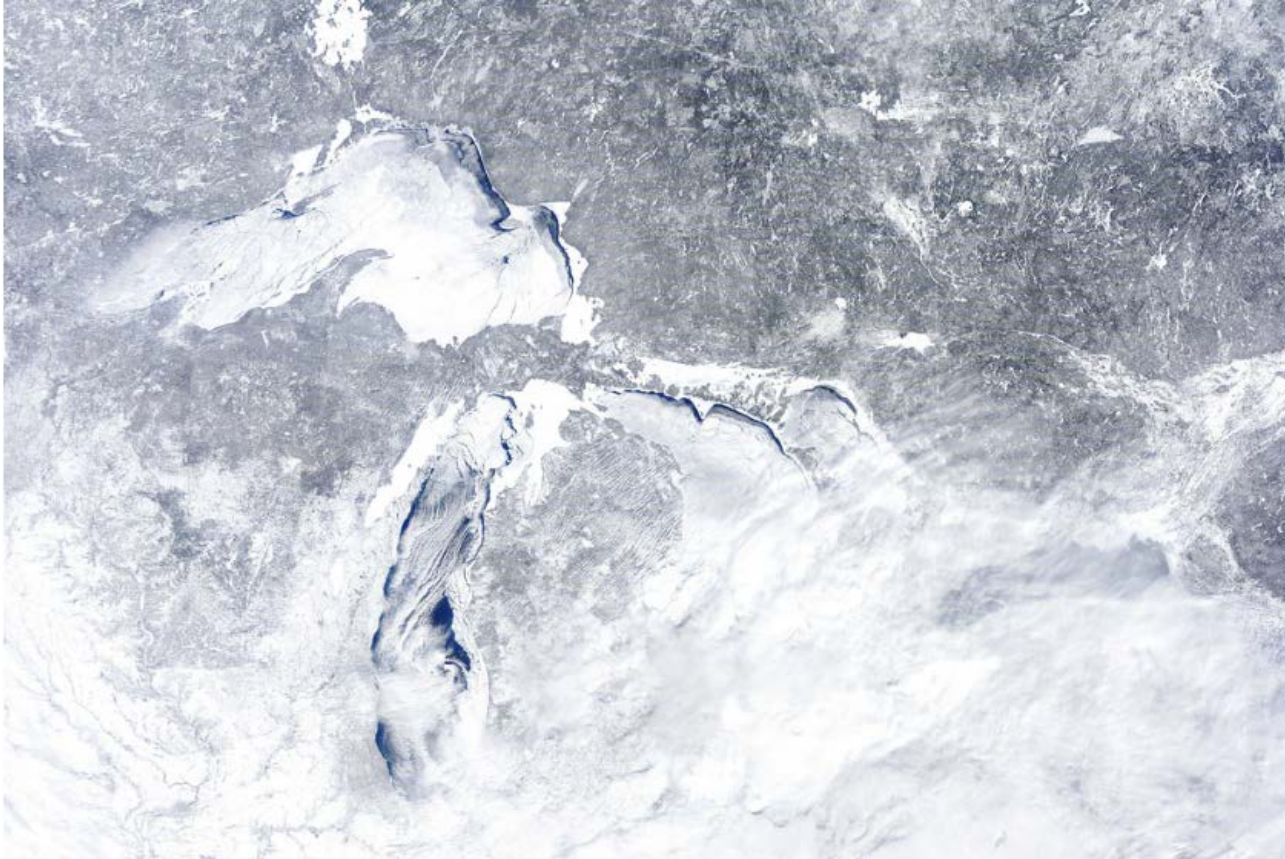
Potential to Expand





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Weather Predictions





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Questions



ICF's Base Case Views for Vector Pipeline

Based on ICF's Natural Gas Strategic: Q3 (July) 2015 Base Case

Vector Customer Meeting October 1, 2015

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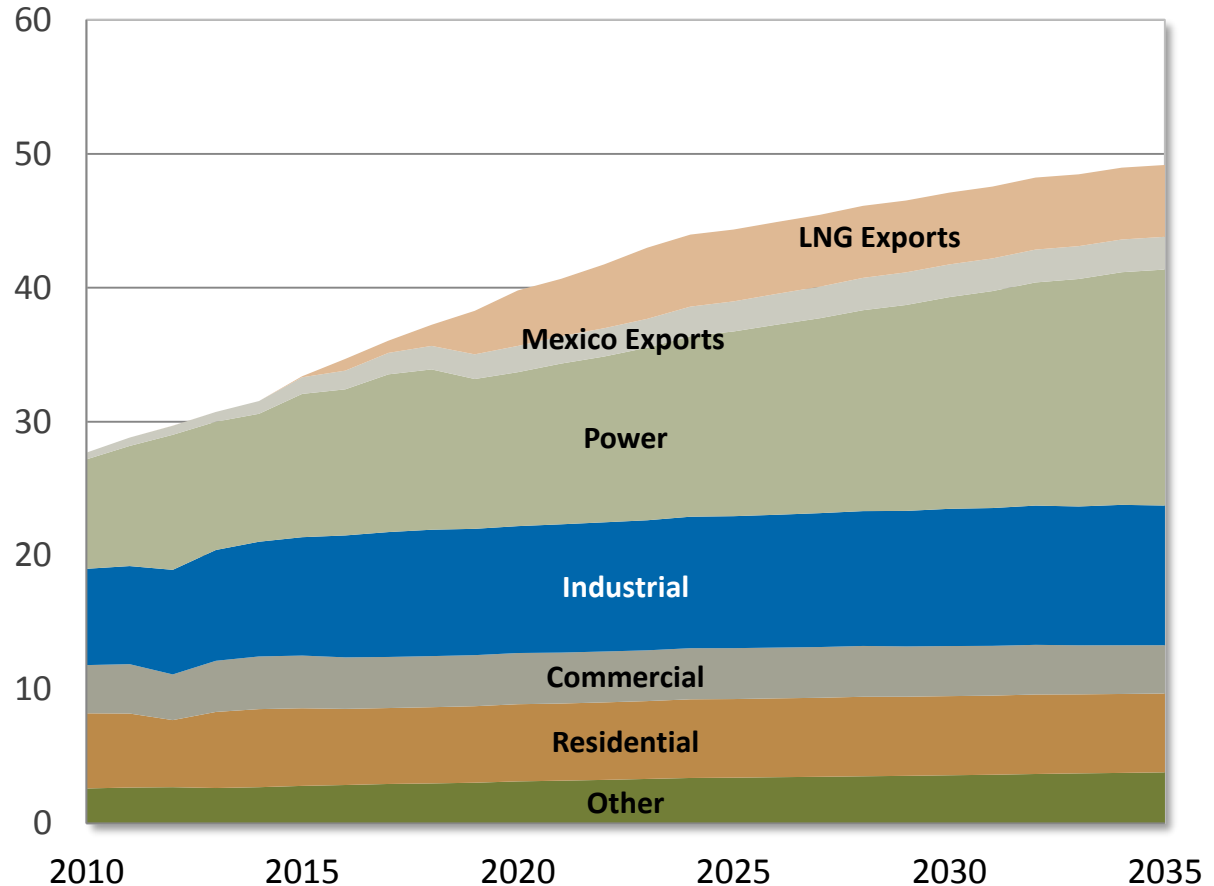
- Macro Market Trends
- Pipeline Flow and Basis Results Relevant to Vector Pipeline
- Conclusions

Projected Market Growth



- By 2035, U.S. and Canadian gas consumption is projected to increase by nearly 18 Tcf (48 Bcfd), versus today's level, exhibiting an average growth rate of roughly 2.1% per year.
 - Roughly 46% of the growth comes from the power sector, which grows to nearly 18 Tcf (48 Bcfd) by 2035.
- Gas exports also create significant demand growth.
 - LNG exports reach 5.4 Tcf (14.7 Bcfd) by 2025.
 - Mexican Exports grow to 2.4 Tcf (6.7 Bcfd) by 2035.

U.S. and Canadian Gas Demand (Tcf per year)



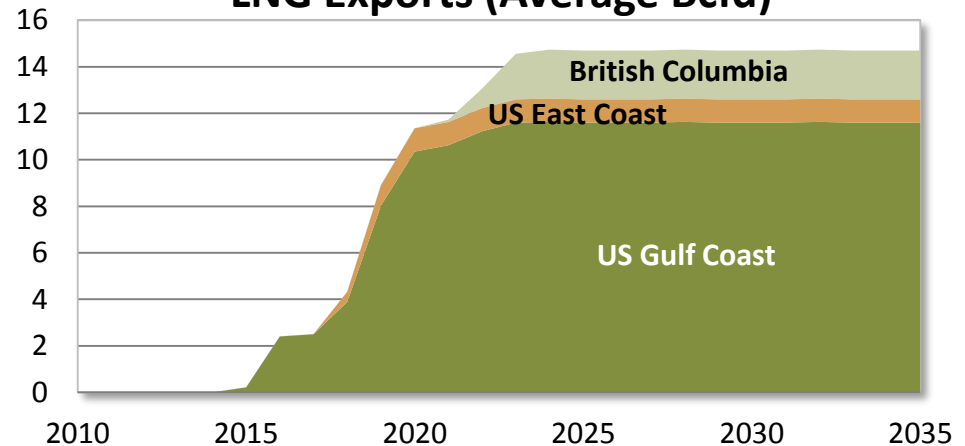
Projected Exports



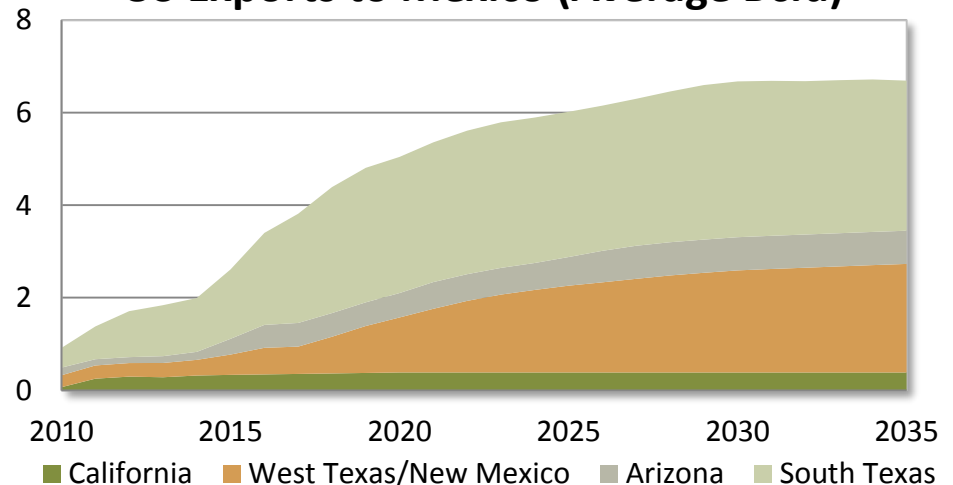
- Since 2012, DOE has approved non-FTA exports for 9 U.S. LNG terminals: Sabine Pass, Freeport, Lake Charles, Carib Energy*, Cove Point, Cameron LNG, Jordan Cove, Oregon LNG, and Corpus Christi.
 - ICF’s current projection assumes U.S. LNG exports reach 12.6 Bcfd by 2025, up 3.5 Bcfd (relative to ICF’s Q2 projection), primarily due to higher assumed Gulf Coast exports.
 - LNG exports from British Columbia reach 2.1 Bcfd, the same as in ICF’s Q2 projection.
- U.S. exports to Mexico will continue to grow, driven by increases in U.S. production and growth in Mexican gas use.
 - Mexican gas demand is being driven by replacement of oil-fired generation.

* Carib Energy is a small facility, with planned exports of less than 0.1 Bcfd.

LNG Exports (Average Bcfd)



US Exports to Mexico (Average Bcfd)

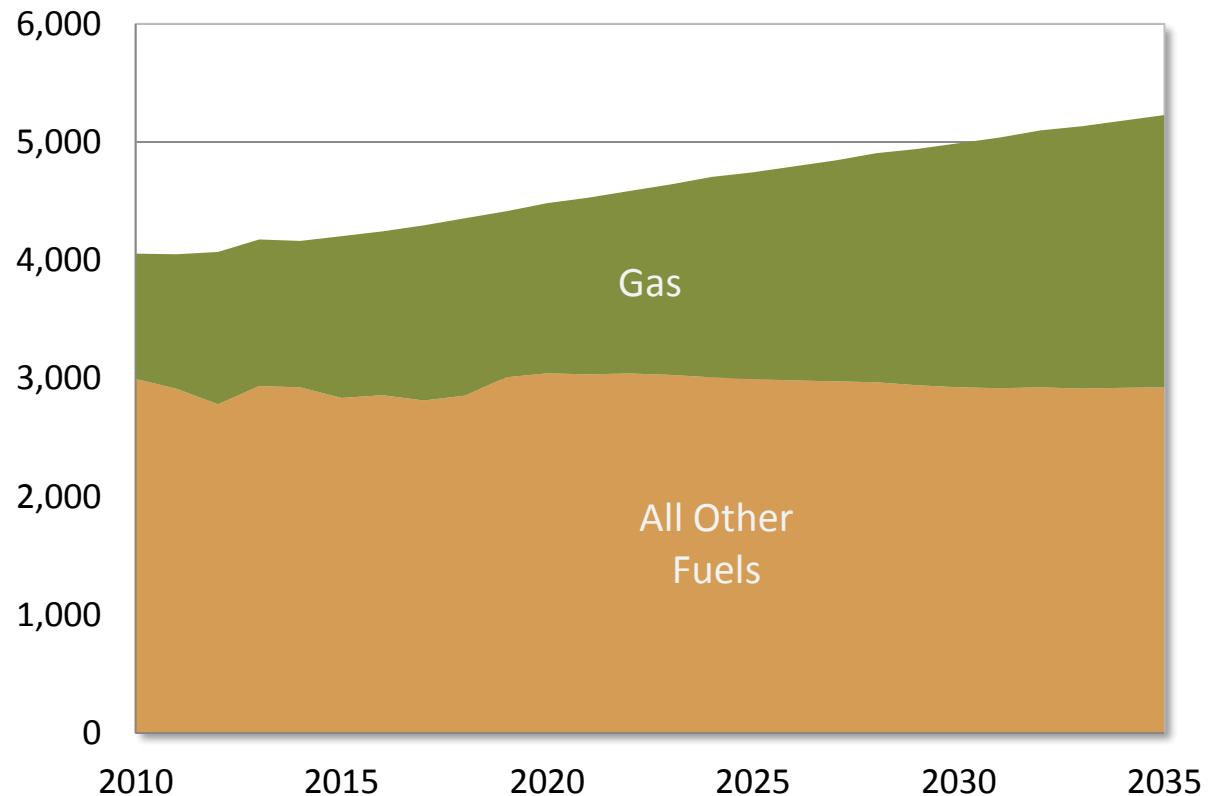


Projected Electric Generation



- Electric load increases at a rate of about 1.1% per year.
- Gas fired generation will continue to gain market share.
 - Coal and nuclear plant retirements and the addition of new natural gas capacity drive this increase as a response to the following assumptions:
 - MATS;
 - Federal carbon program;
 - Assumed 60-year life span for most U.S. nuclear units.
 - While renewable generation continues to grow, it requires support from a fast dispatch source for back up, such as gas, which could increase pressure on gas infrastructure.

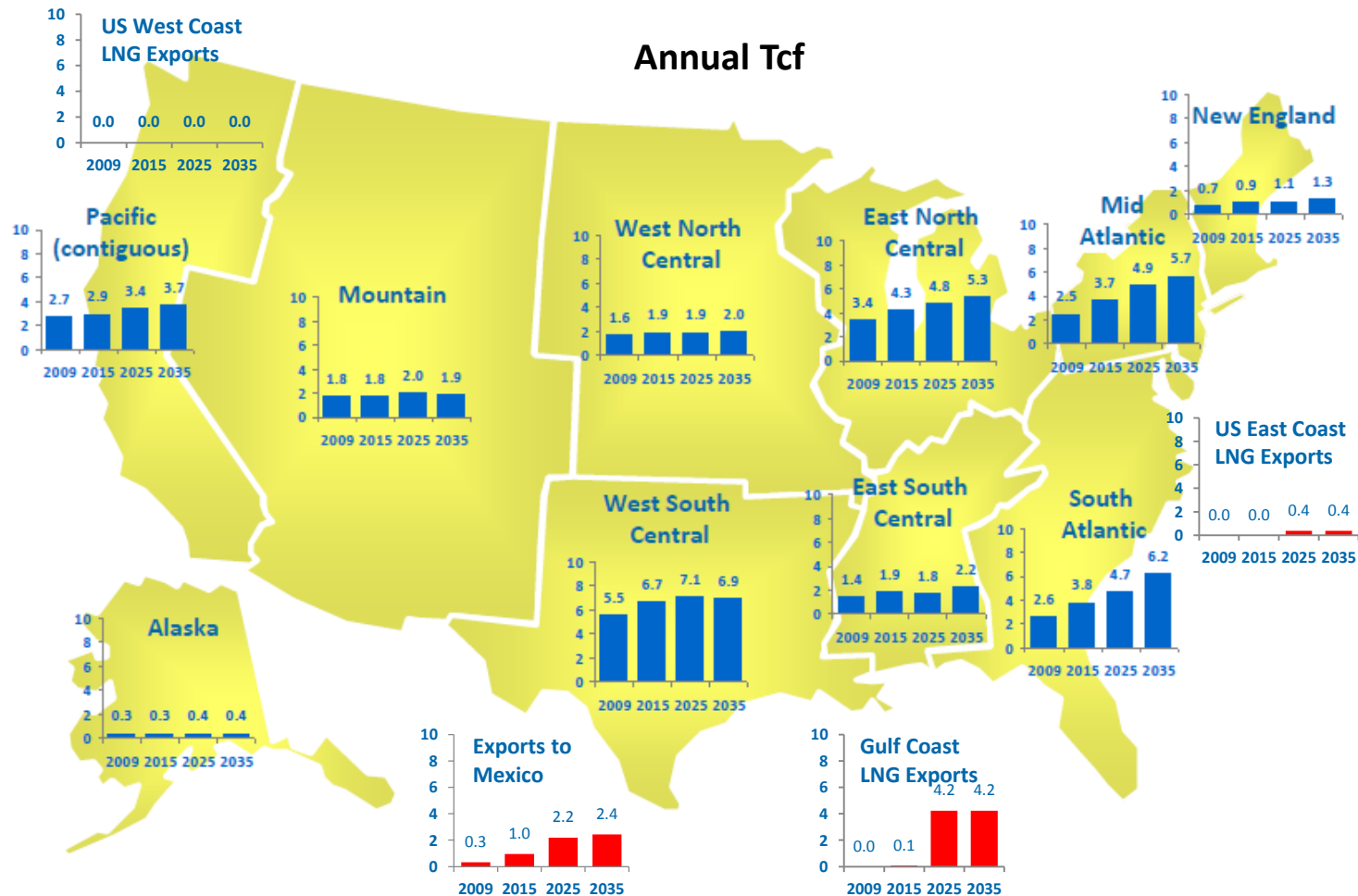
U.S. Electricity Generation (TWh per Year)



Regional Demand Across the U.S.



- Regional growth in gas consumption is primarily due to increased gas use for electric generation.
- The largest increase occurs in the South Atlantic region, with 2.4 TCF of growth in annual demand.
- Significant growth in the Mid-Atlantic and East North Central regions, mostly driven by coal plant retirement.



Regional Demand Across Canada

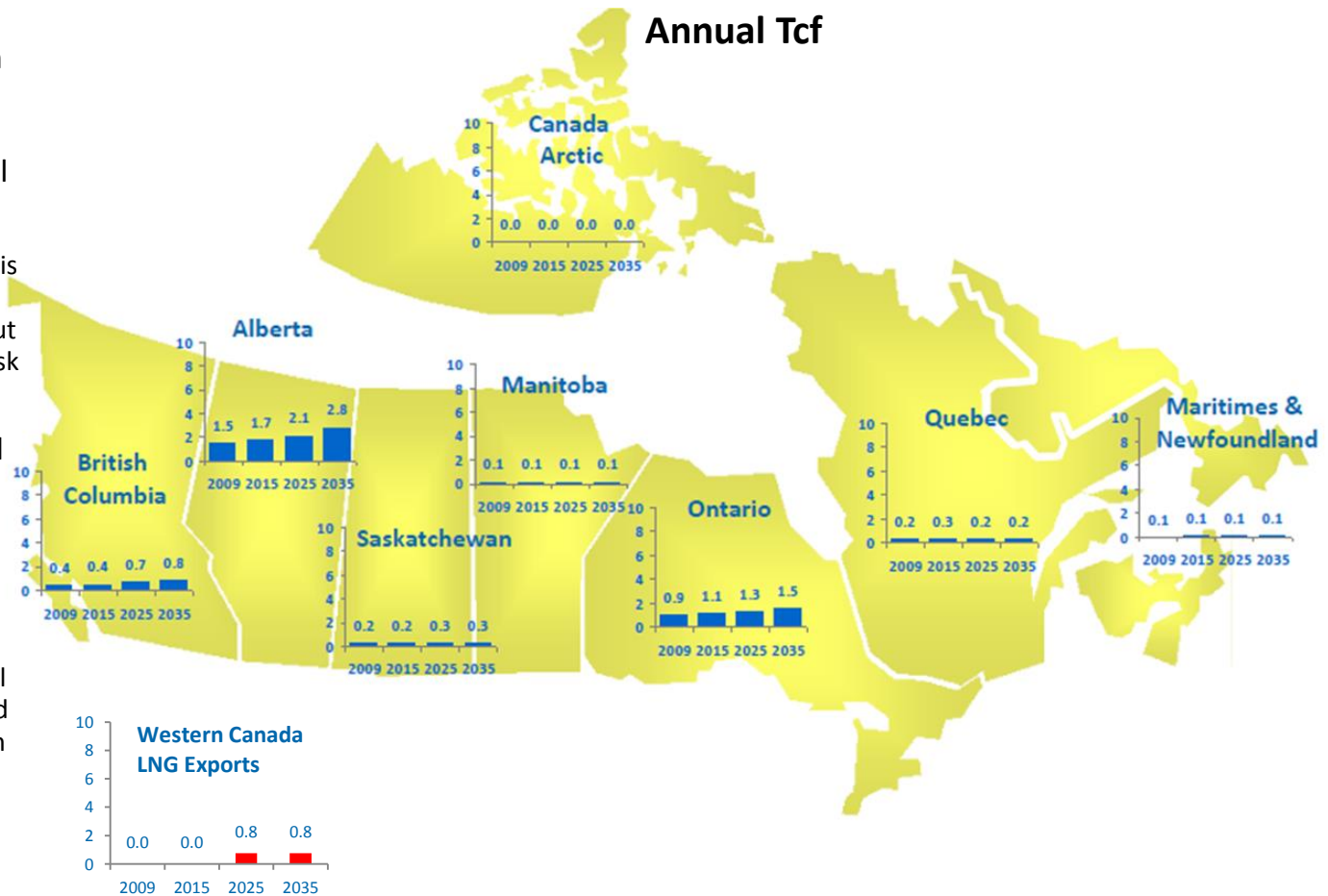


- Consumption growth in Western Canada is primarily driven by increased gas use for oil sands development.

- Annual oil sands gas use is expected to increase by roughly 1 Tcf by 2035, but lower oil prices pose a risk for this development.

- In 2014, Ontario retired the last of its coal-fired power plants.

- Future growth in gas demand comes from recovery of industrial demand and incremental growth in power demand (due to both load growth and nuclear plant retirements).

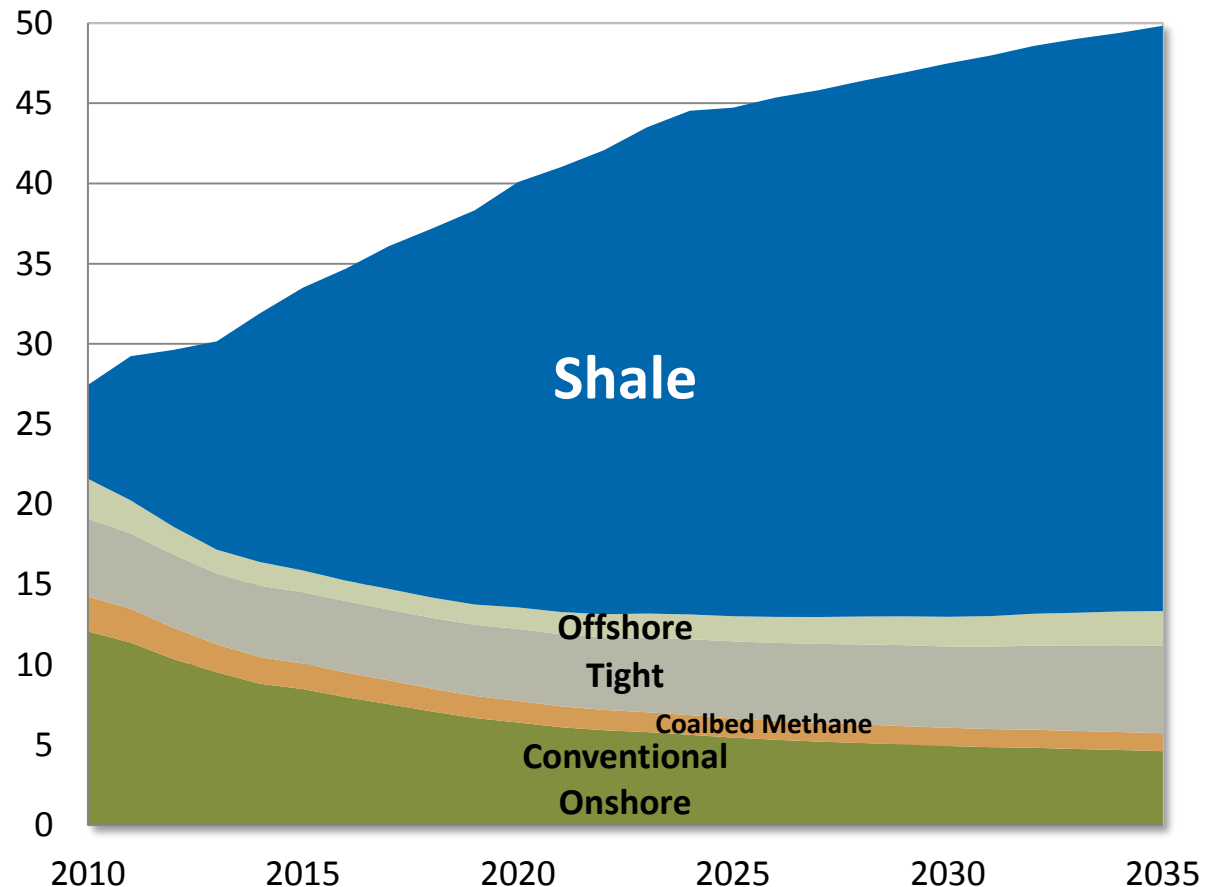


Projected Gas Supply



- Total gas production increases by 2.1% per year, primarily from shale gas production, which grows by 4.2% annually.
 - By 2020, shale gas production account for about two-thirds of all U.S. and Canada gas production.
- Other unconventional gas production remains fairly constant:
 - Tight gas increases modestly while CBM declines.
- Conventional production continues to decline by 3.0% annually.
- Offshore production exhibits modest increases, mostly toward the end of the analysis period.

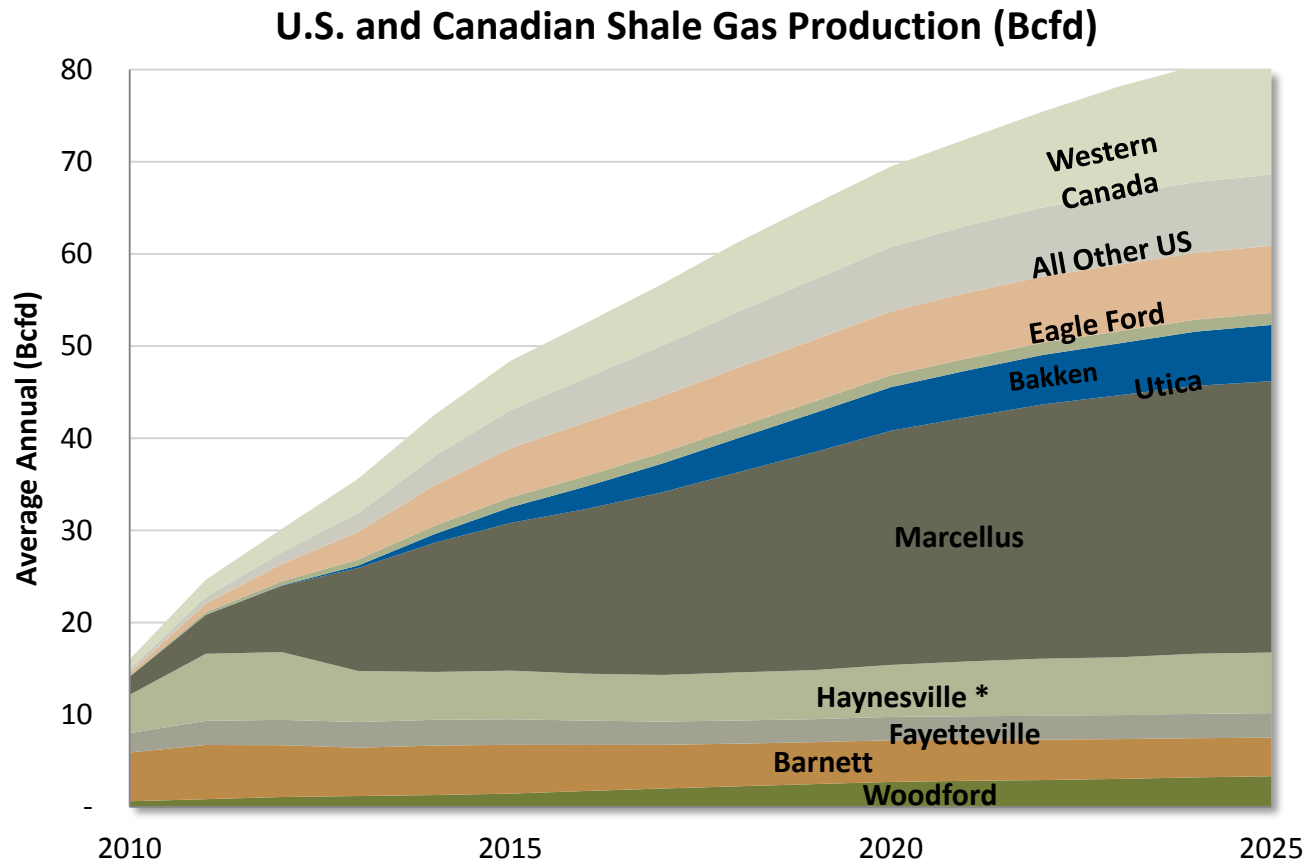
U.S. and Canadian Gas Production (Tcf per year)



Shale Gas Resource Development



- Total U.S. and Canada shale gas production is projected to increase by more than 90% from about 42 Bcfd in 2014 to about 80 Bcfd in 2025.
- The Marcellus and Utica Shale account for roughly 50 percent of the incremental production growth from shale formations.
- Major growth is also expected from Western Canadian shale plays (the Montney, Horn River, Cordova & Liard), which grow to nearly 13 Bcfd by 2025 from their current level of roughly 4 Bcfd, but lower oil prices pose a greater risk for development of these resources.

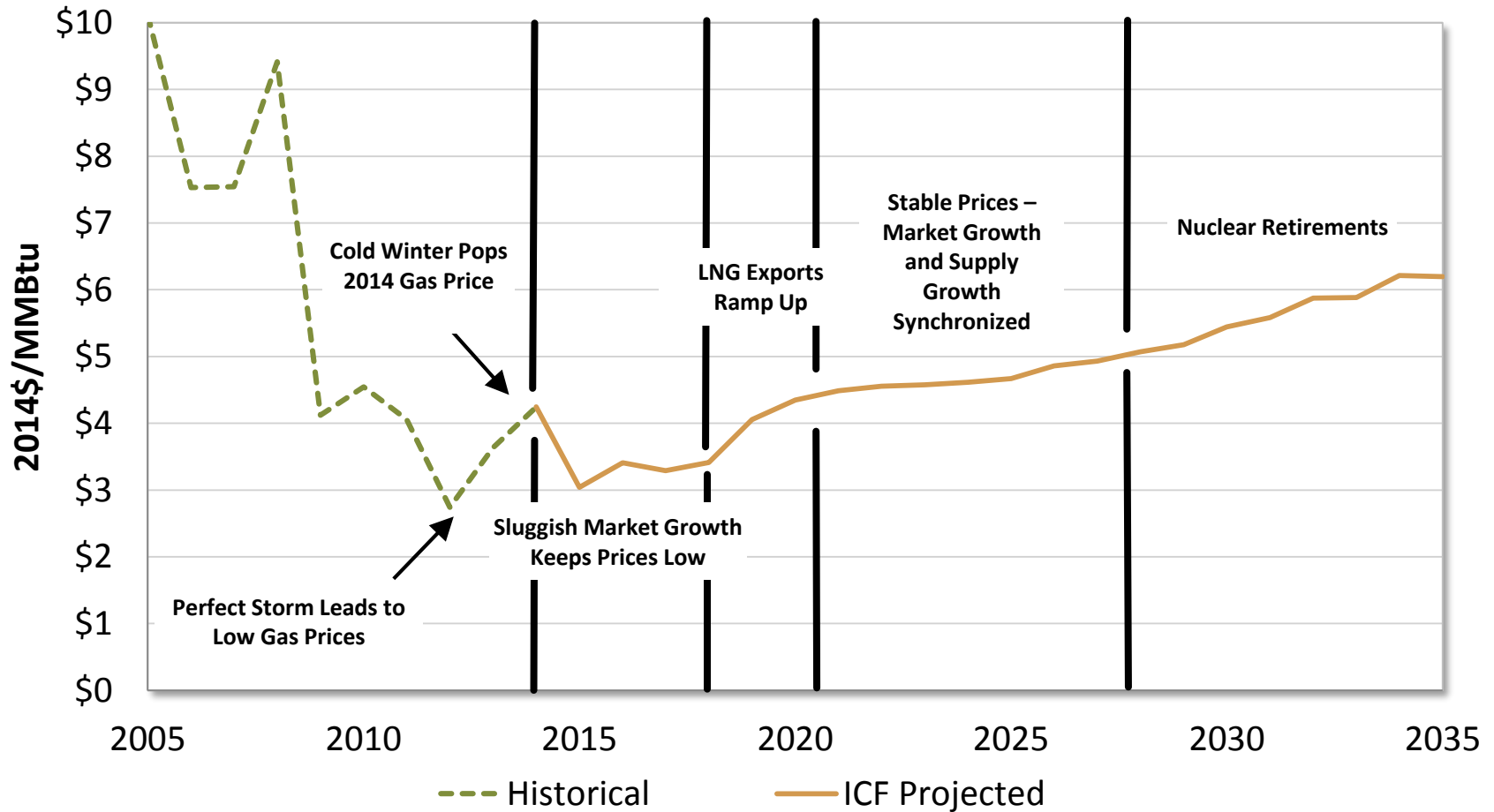


*Haynesville values shown here include production from other shales in the vicinity, e.g., the Bossier Shale.

Projected Natural Gas Prices



Annual Average Henry Hub Price



Projected Basis for a few Select Gas Transportation Paths (Nominal \$ per MMBtu)

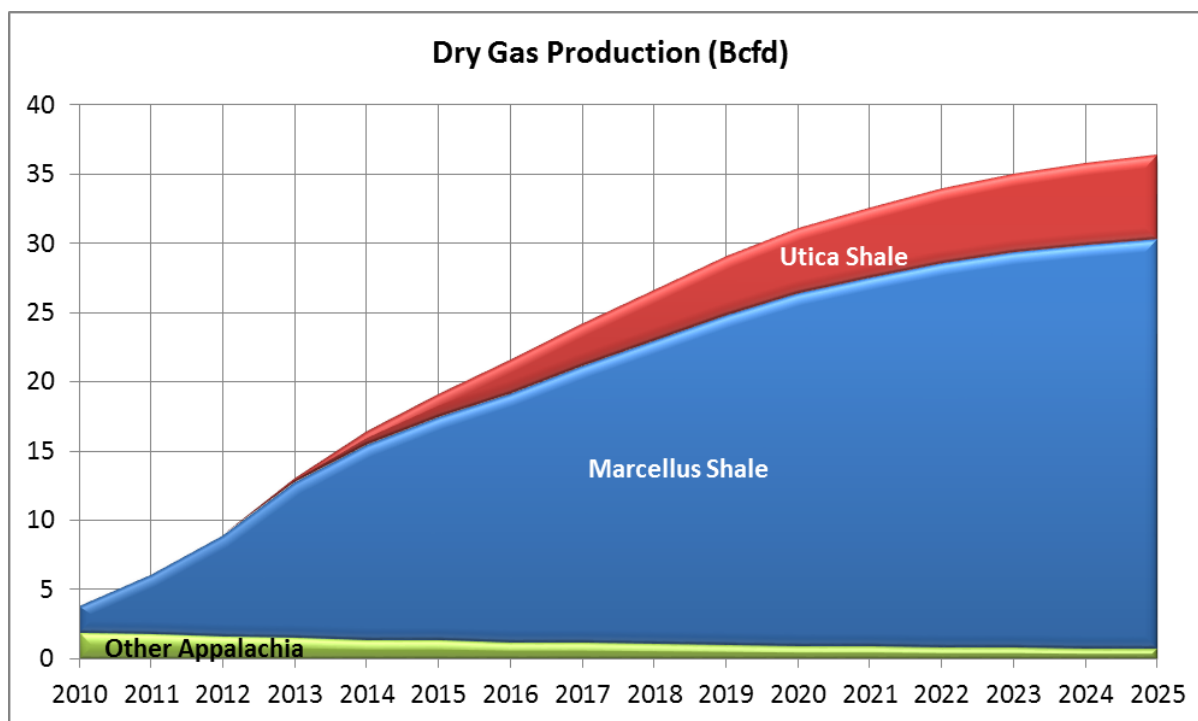


	2011	2012	2013	2014	2015	2016-20	2021-25	2026-35
Chicago minus Marcellus	(0.03)	0.00	0.20	2.23	1.46	0.94	1.15	1.64
Chicago minus AECO	0.44	0.44	0.78	1.51	0.70	0.71	0.81	0.94
Chicago minus Rockies	0.30	0.17	0.20	1.21	0.40	0.33	0.32	0.46
Chicago minus Henry Hub	0.13	0.10	0.13	1.24	0.16	(0.05)	(0.25)	(0.53)
Henry Hub minus Marcellus	(0.15)	(0.10)	0.07	0.99	1.30	0.99	1.40	2.17
Dawn minus Chicago	0.27	0.23	0.22	0.64	0.24	0.19	0.20	0.25
Dawn minus Henry Hub	0.40	0.33	0.35	1.88	0.40	0.14	(0.05)	(0.28)
Dawn minus Marcellus	0.25	0.23	0.43	2.87	1.70	1.13	1.35	1.89

Marcellus and Utica Gas Production – A Big Factor in Vector Pipeline’s Future



- Dry gas production from Marcellus rises from an average of 15 Bcfd in 2014 to over 29 Bcfd in 2025, an average annual growth rate of 7%. Utica production rises from about 1 Bcfd in 2014 to over 6 Bcfd in 2020, an average annual growth rate of about 20%.
- Growth slows after 2020, as depletion from existing wells becomes more pronounced at the higher levels of production.
- Production from the area’s conventional production continues to decline.



Annual Total Well Completions

	Marcellus Shale	Utica Shale
2010	980	0
2011	1,841	12
2012	1,532	89
2013	2,235	305
2014	2,006	390
2015	1889	399
2016	1993	498
2017	2114	584
2018	2190	601
2019	2292	613
2020	2333	614
2021	2,217	568
2022	2,261	561
2023	2,199	543
2024	2,160	536
2025	2,085	521

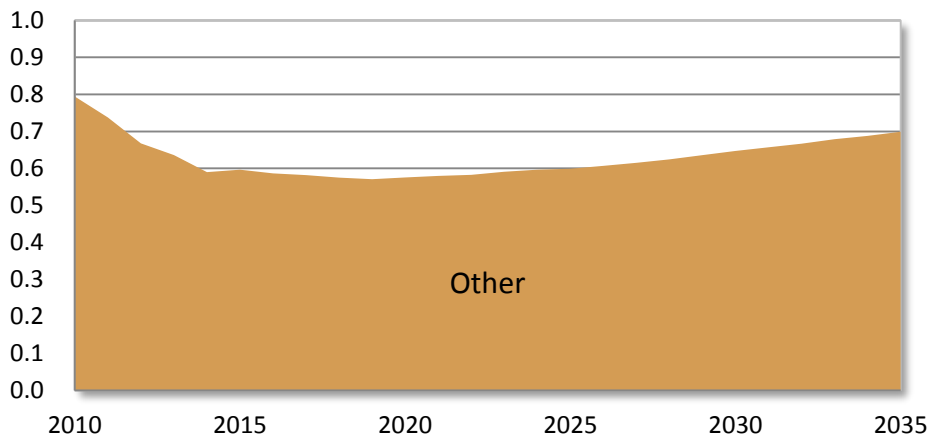
Production and Demand for the North Central Consuming Area Home to Vector Pipeline



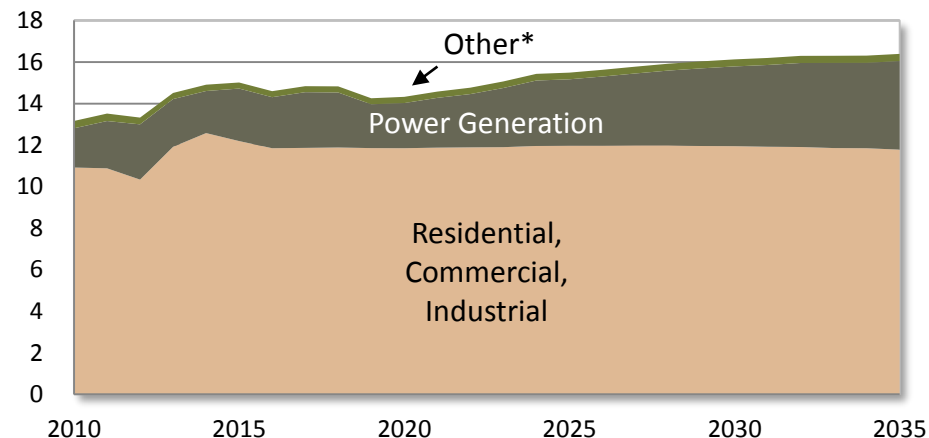
(Includes MN, WI, IA, IL, MO, MI, IN, TN, KY & Western OH)

- Area has little indigenous production and has historically relied on imports from elsewhere, mostly the Gulf Coast and Western Canada, to satisfy its demand.
- Even though demographic changes are not favorable for the area's gas and electric load growth, there is likely to be modest growth in gas-fired generation as a result of coal plant retirements.
 - Gas use in the power sector will rise by 1-2 Bcfd through 2035, yielding total gas use that is 5 to 10 percent above today's level.
 - About 4.5 GW of coal plant retirements in Michigan over the next decade.

Annual Indigenous Supply (Average Bcfd)



Annual Demand (Average Bcfd)



* Other includes pipeline fuel, lease and plant gas use

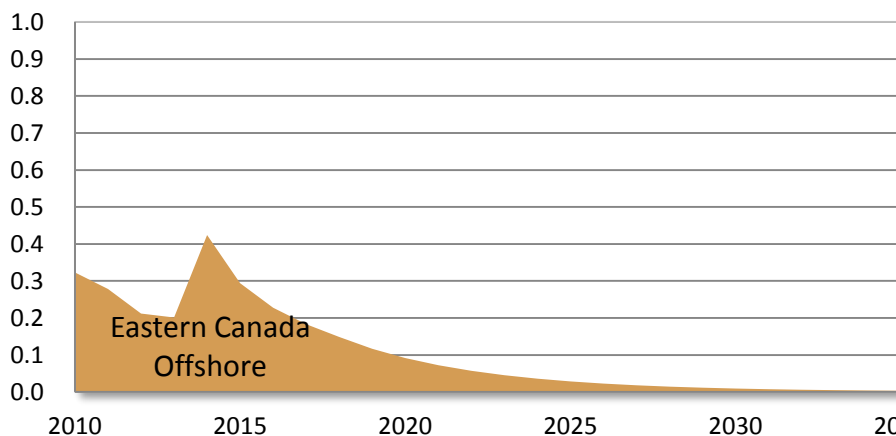
Production and Demand for Eastern Canada

(Includes ON, QC & Maritime Provinces)

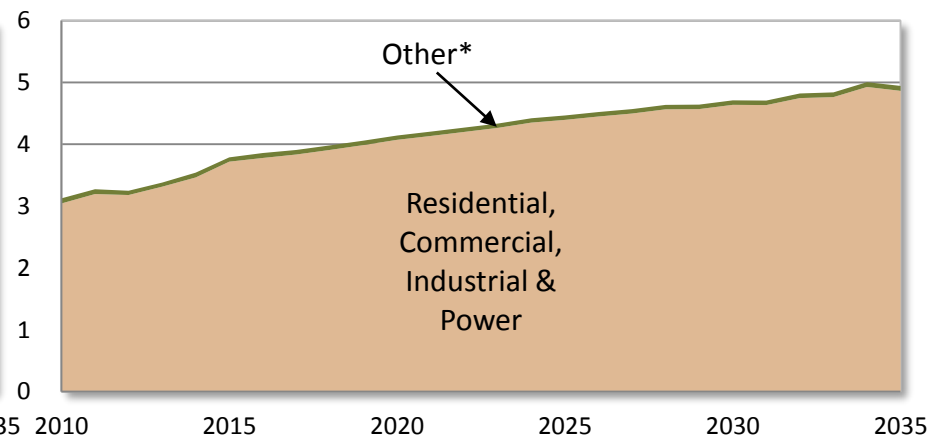


- Eastern Canada's demand is likely to grow robustly, due to incremental gas-fired generation that replaces declines in nuclear generation that result from nuclear plant maintenance, refurbishment, and retirements.
- The relatively small amount of supply from Eastern Canada will continue to decline, and the area will become even more reliant on pipeline imports.
 - Historically, the area has mostly relied on Western Canada for its gas supply, but that dynamic has been changing with Marcellus production growth.

Annual Indigenous Supply (Average Bcfd)

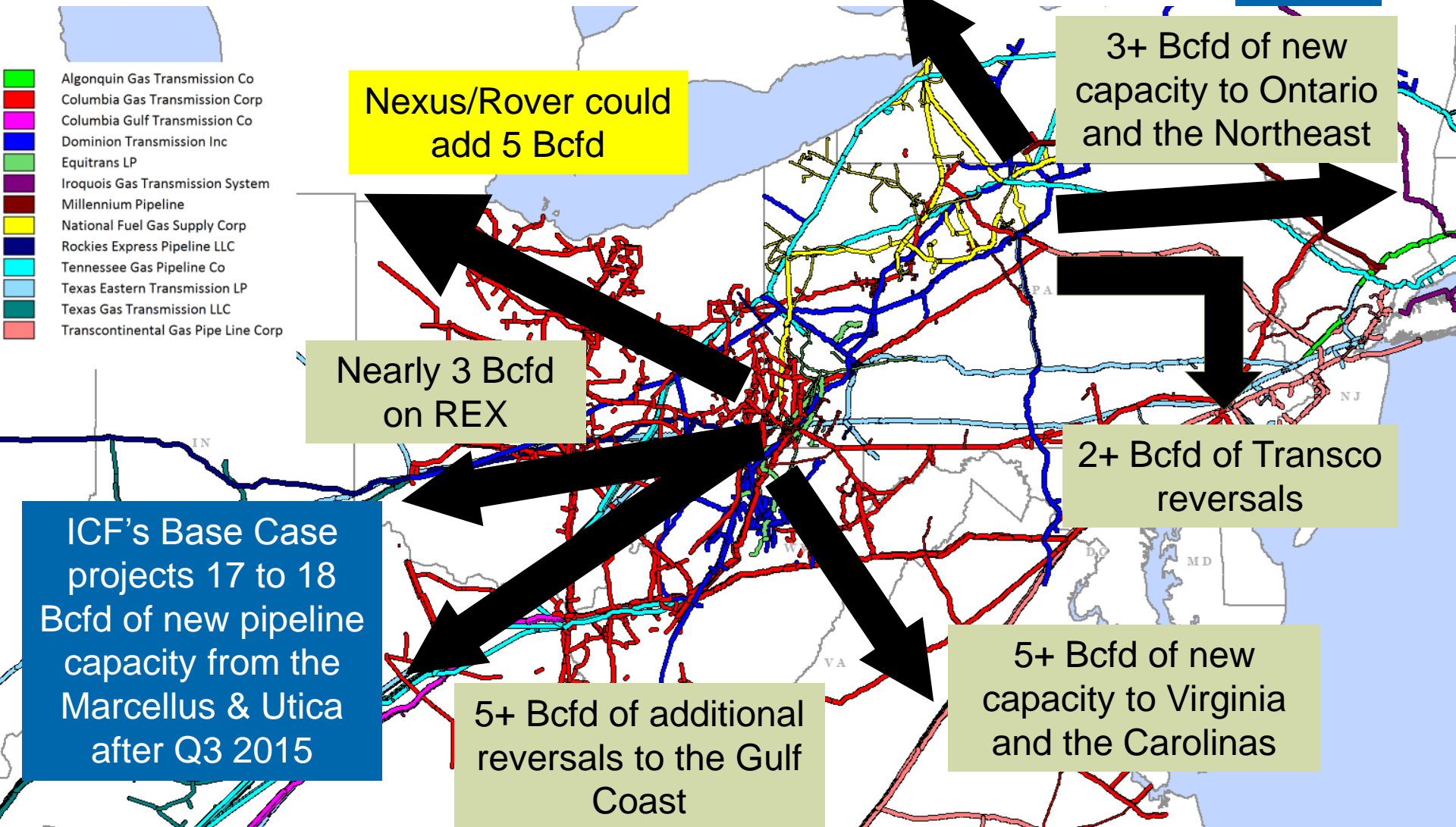


Annual Demand (Average Bcfd)



* Other includes pipeline fuel, lease and plant gas use

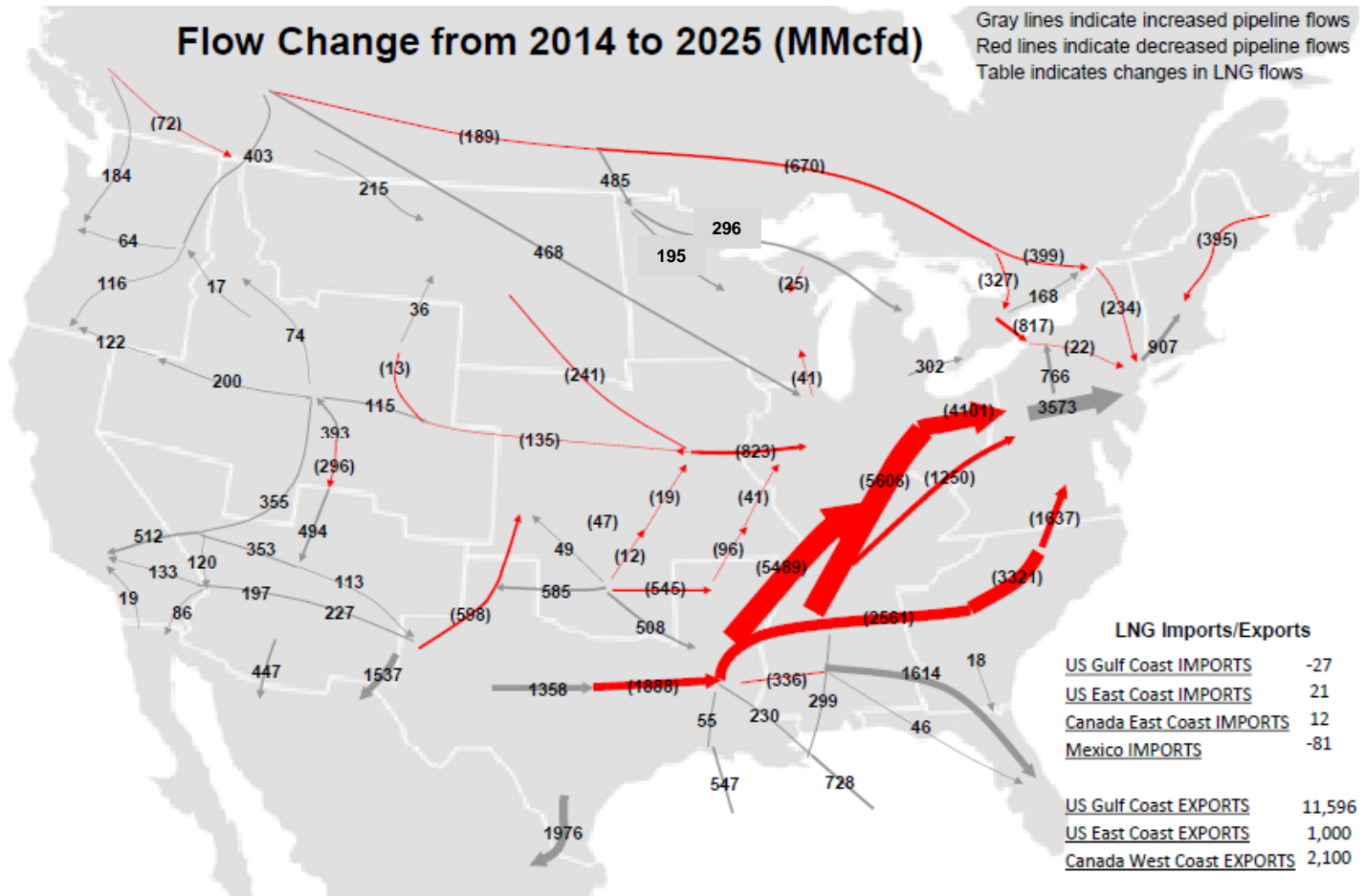
Flows from the Marcellus and Utica



Changes in Pipeline Flows Over the Next Decade



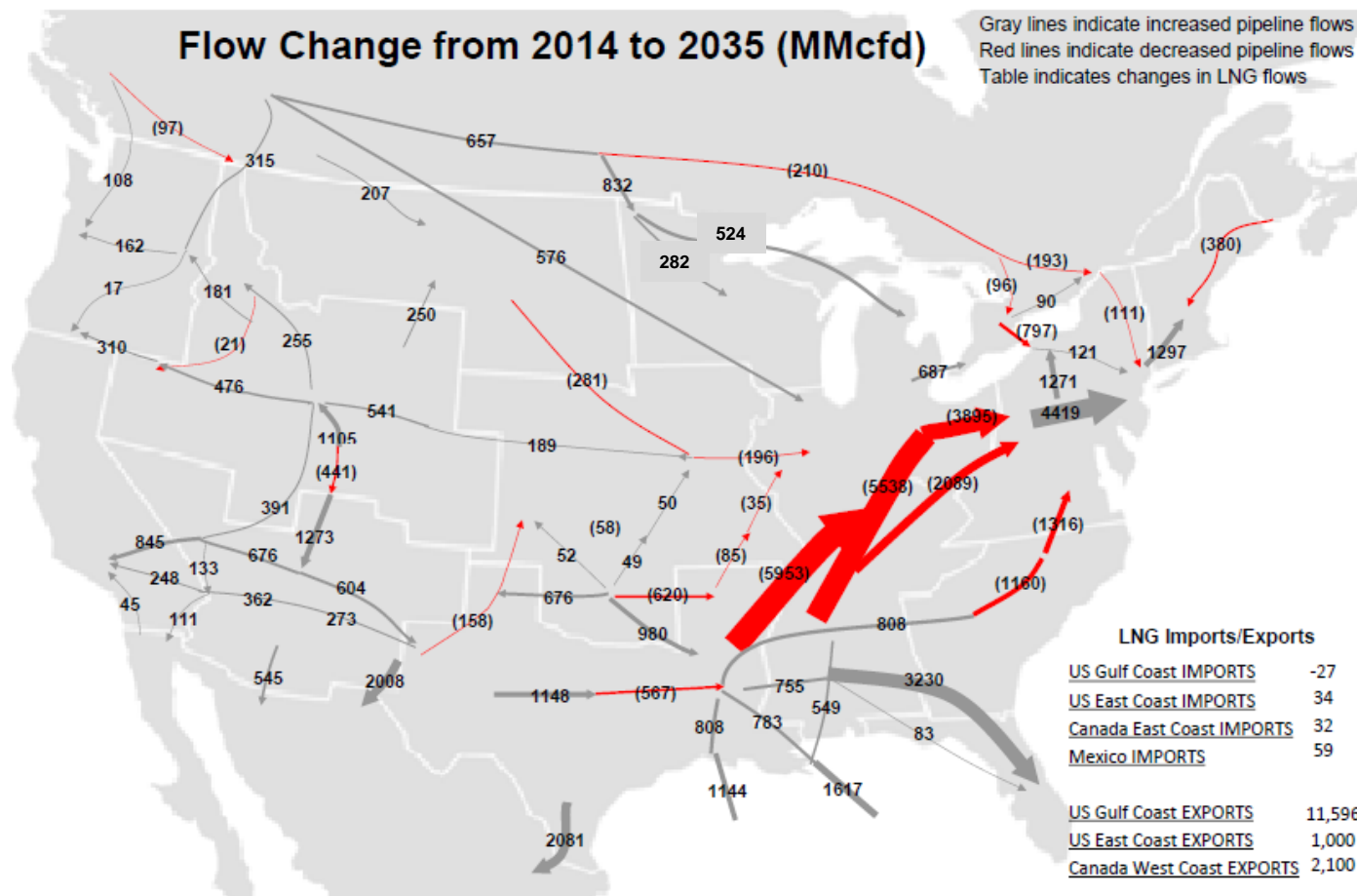
- Robust Marcellus gas production growth displaces flows to the Northeast U.S..
- Marcellus gas flows into U.S. Midwest and Eastern Canada.
- Declining conventional production in Alberta and increasing gas demand for oil sands development and LNG exports from British Columbia reduce eastward flows into Ontario
- Alliance Pipeline is likely to benefit from increased developed of “wet” shale gas resources in Western Canada.



Changes in Pipeline Flows In the Longer Term



- Trends in the longer term are similar to those through 2025.



Gas Supply Mix for the U.S. Midwest and Eastern Canada



U.S. Midwest

	2010	2015	2025	2035
Western Canada	31%	24%	29%	27%
Marcellus	0%	11%	30%	37%
Midcontinent/Rockies	46%	43%	36%	30%
Gulf Coast/Other	23%	22%	5%	6%

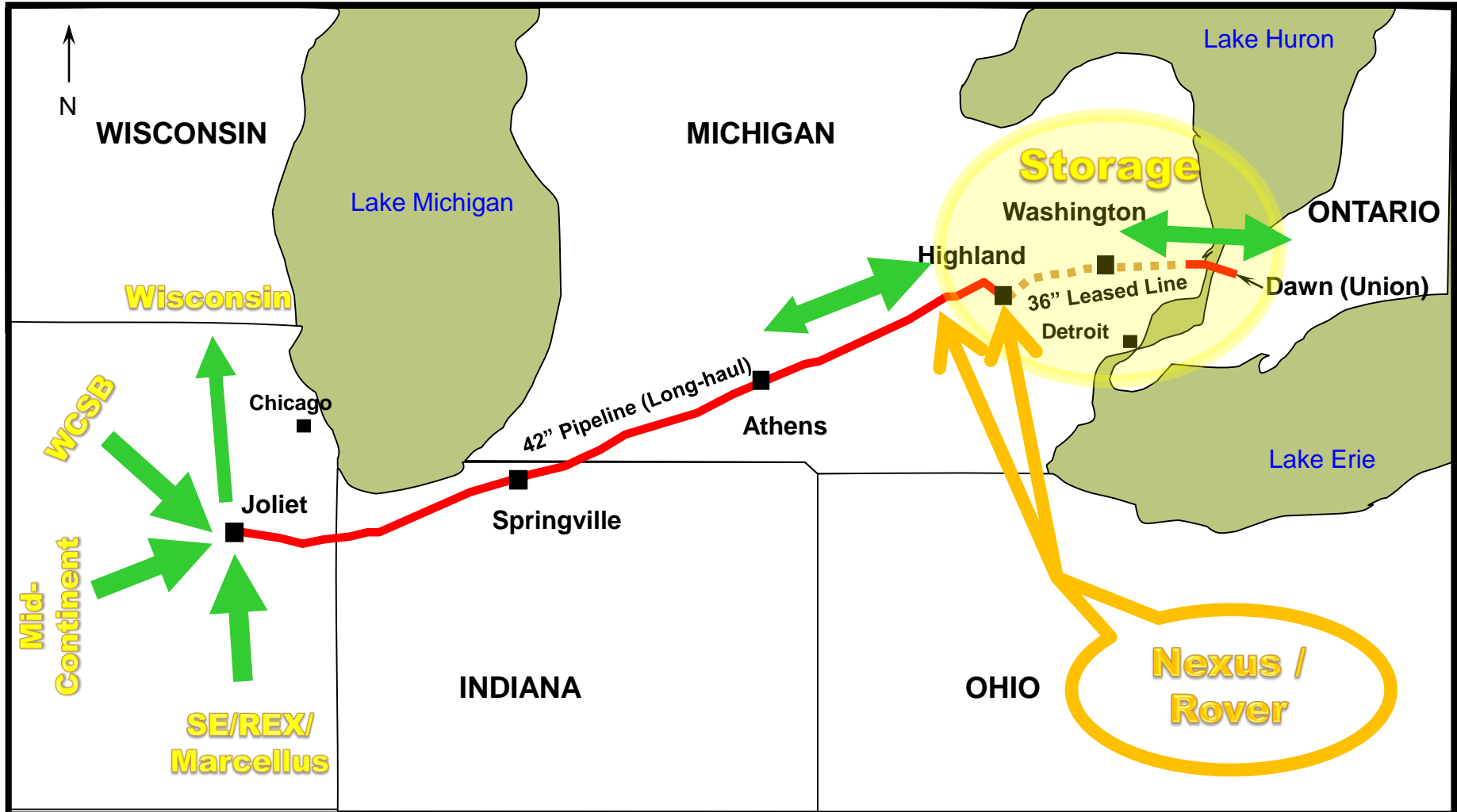
Eastern Canada

	2010	2015	2025	2035
Western Canada	60%	44%	34%	34%
Marcellus	0%	17%	48%	52%
Midcontinent/Rockies	19%	19%	12%	9%
Gulf Coast	21%	20%	6%	5%

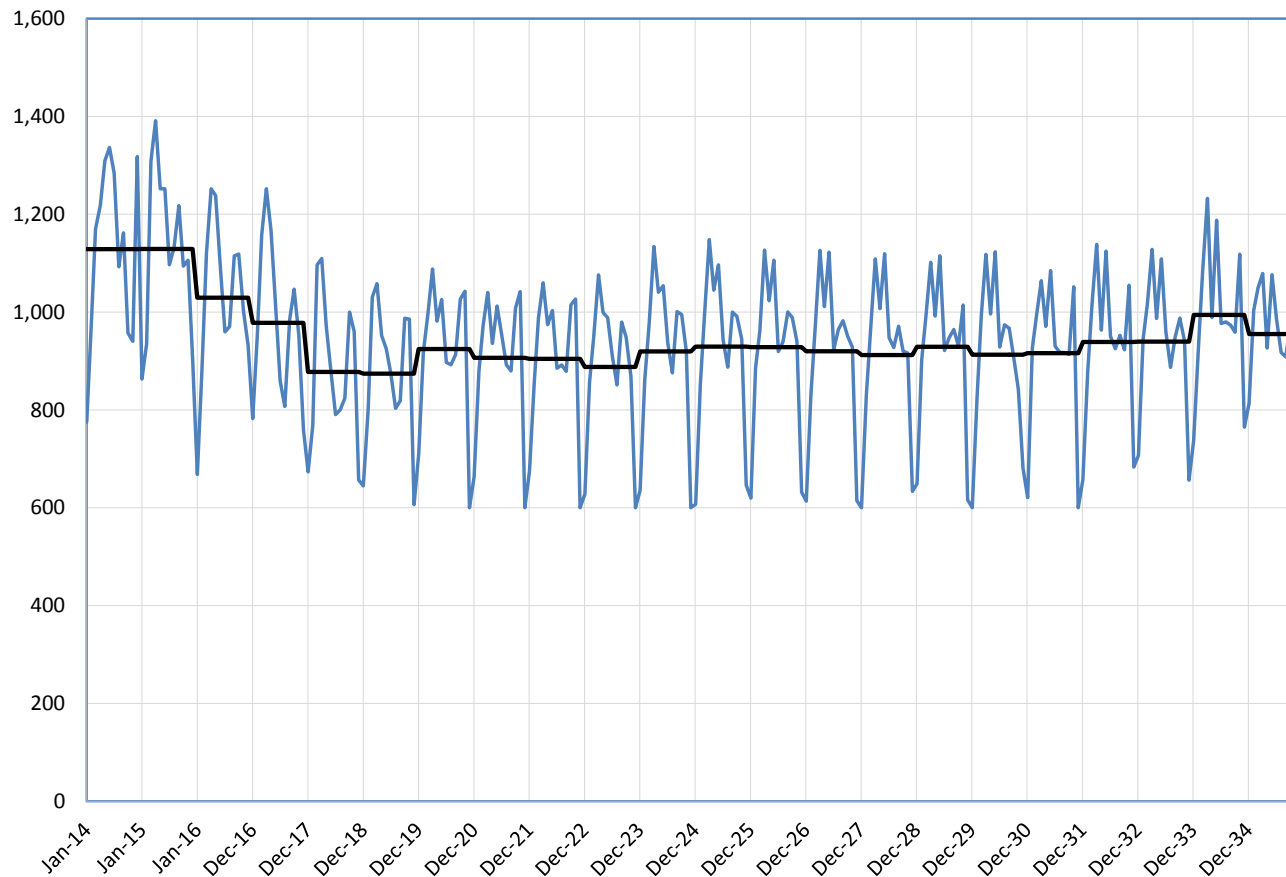
Marcellus Deliveries Directly to End-Users (Bcfd)

	2010	2015	2025	2035
Marcellus Area	1.0	5.0	7.4	9.6
Northeast	2.2	9.2	12.4	13.9
Southeast	0.2	2.3	9.1	9.9
Gulf Coast	0.0	0.2	2.7	2.6
Midwest	0.0	1.3	4.2	4.2
Eastern Canada	0.0	0.6	2.4	2.4
Total	3.4	18.7	38.1	42.6

Vector Pipeline

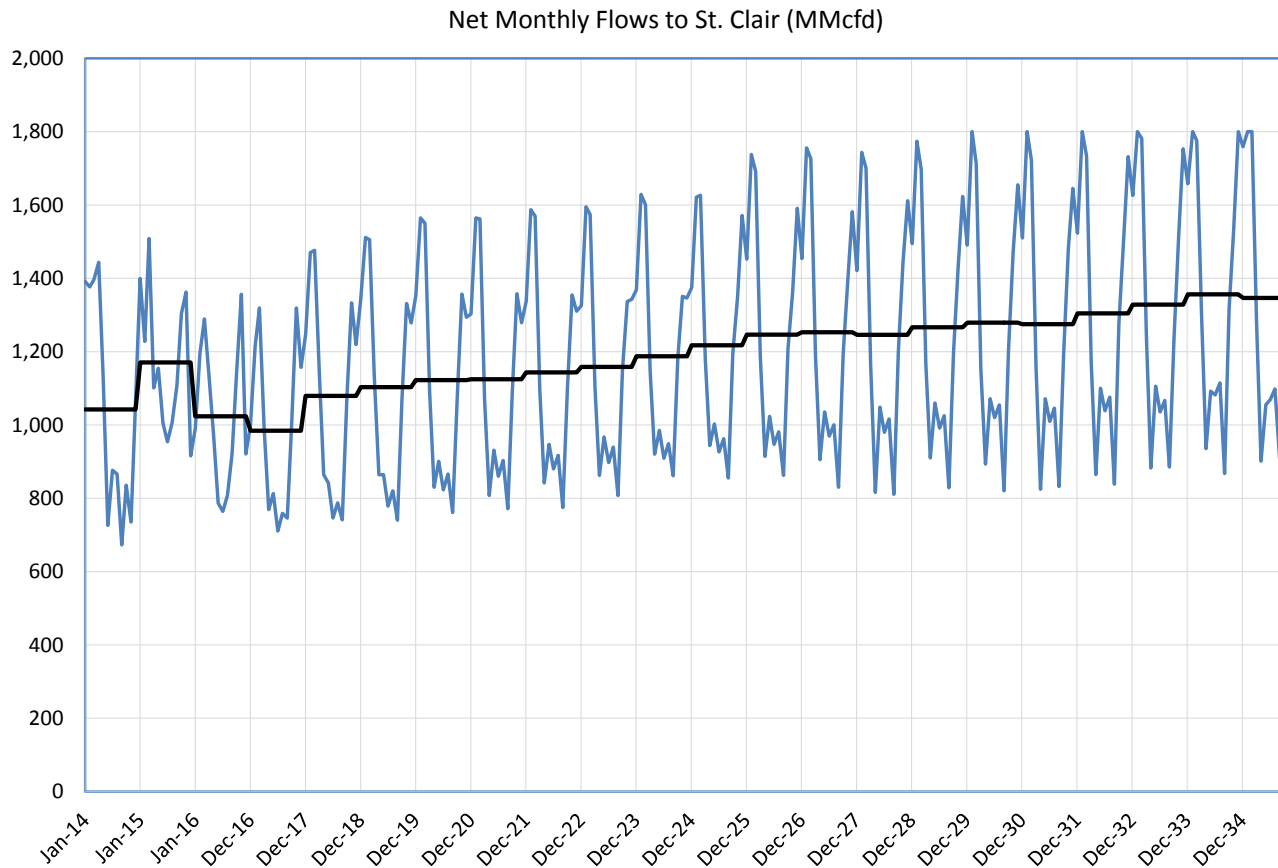


Projected Long-haul Flows along Vector Pipeline from Illinois to Michigan (MMcfd)



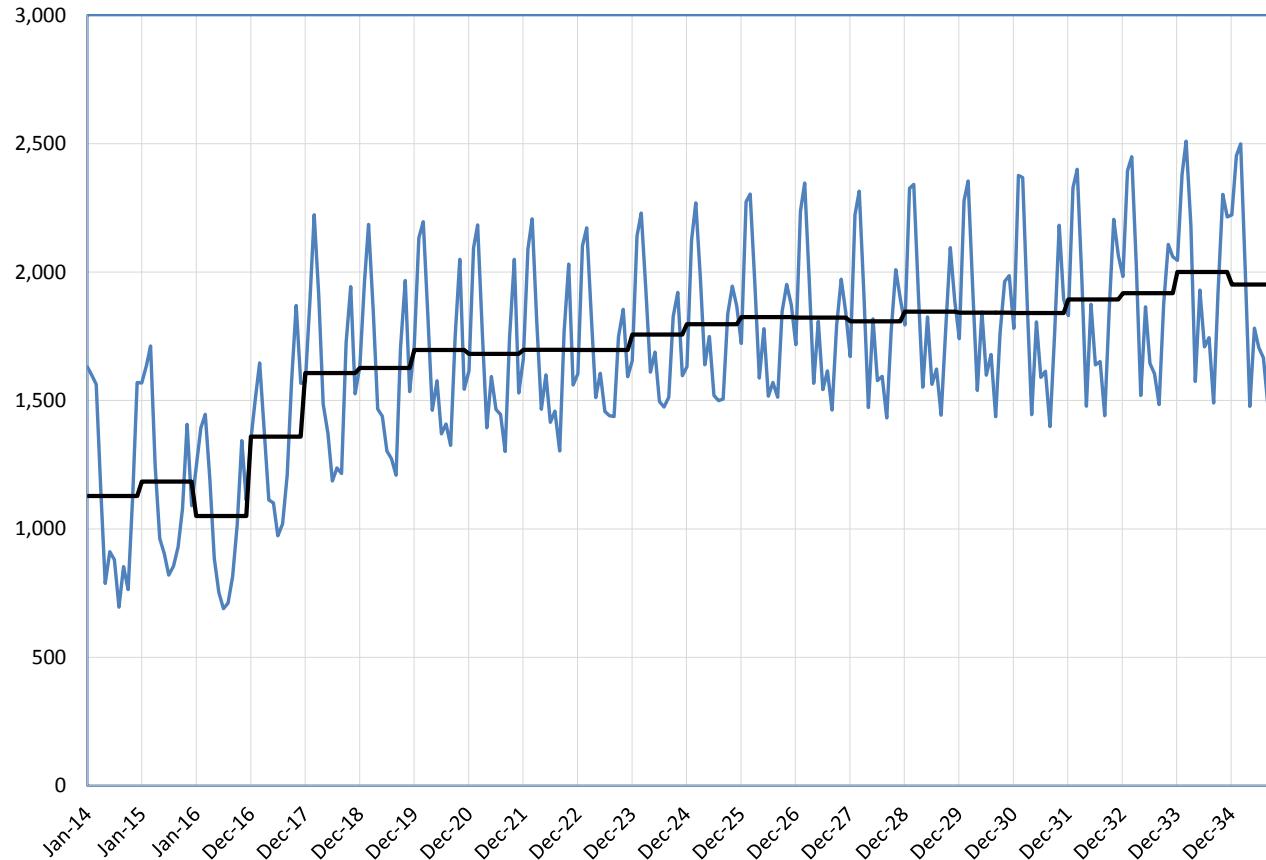
- Eastward flows along Vector's Mainline exhibit a modest decline as Marcellus deliveries into the U.S. Midwest increase.
- However, flow is supported by Alliance deliveries and REX flows into Illinois.

Projected Deliveries from Vector Pipeline at St. Clair



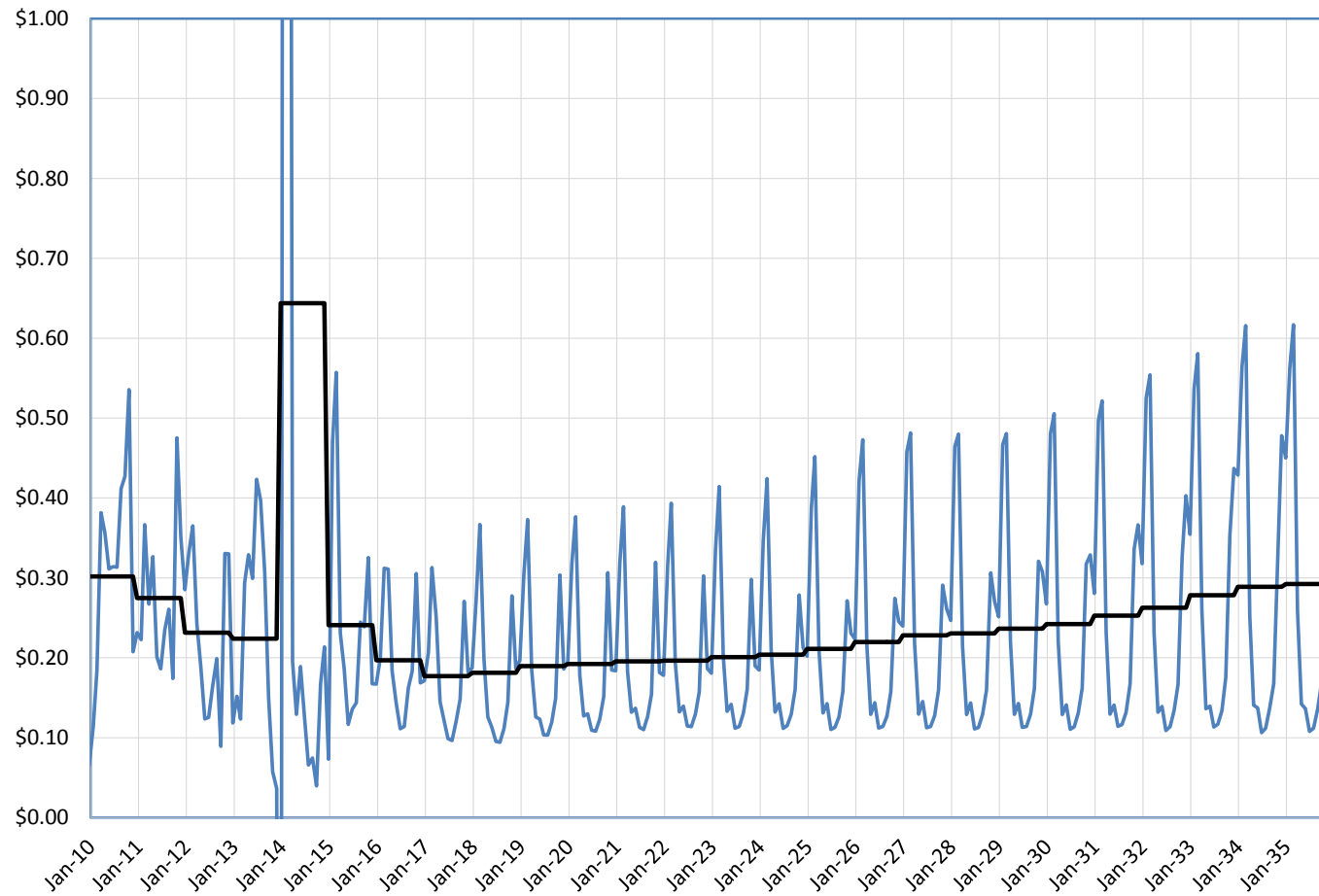
- Projected deliveries at St. Clair increase by about 300 MMcfd over the longer term supported by increased receipts from Rover/Nexus.
- Absent expansion, flows may be limited by pipeline capacity.

Estimated Deliveries from Vector Pipeline at All Delivery Points



- Projected deliveries at all delivery points are estimated to rise from an annual average of roughly 1,100 MMcfd to over 1,900 MMcfd.
- Deliveries supported by incremental supplies from the Marcellus and continued receipts from Alliance Pipeline and other historical sources.

Projected Basis from Chicago to Dawn



- Basis is modestly lower in the near term as incremental gas from the Marcellus displaces a modest amount of flow along the mainline.
 - Direct deliveries from Niagara into Ontario contribute to this result. However, Alliance receipts limit the reduction.
- Basis recovers as Marcellus receipts directly into Vector Pipeline increase.

Conclusions



- Marcellus production growth is robust, significantly penetrating U.S. Midwest and Eastern Canada markets – Marcellus gas is a significant positive factor for Vector Pipeline.
- Despite Marcellus penetration into the U.S. Midwest, Alliance flows remain strong as the pipeline is positioned well to capture liquids-rich gas from the Montney and Duverney – the impact of Marcellus gas on Alliance deliveries to Vector Pipeline is not significant.
- Market growth due to coal and nuclear plant retirements bolsters gas use in areas relevant to Vector Pipeline.
- Vector Pipeline deliveries rise from an annual average of roughly 1,100 MMcfd today to about 1,900 MMcfd in the longer term.
 - Deliveries at St. Clair rise by about 300 MMcfd and deliveries within Michigan rise by about 500 MMcfd.
- Basis from Chicago to Dawn remains between 20 and 30 cents per MMBtu over the next 10 to 20 years.



THANK-YOU



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Discussion



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Thank You