

APPENDIX F. PIPELINE EXPANSION PROJECTS INCLUDED IN SENSITIVITY 13

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Sensitivity 13 adds several pipeline projects that are currently under development, but that did not meet the criteria for inclusion in the RGDS, to the GPCM infrastructure. These projects did not have publicly-demonstrated market support prior to April 22, 2014. A discussion of the highlights of the proposed pipeline expansion projects incorporated in the incremental Sensitivity 13 pipeline topology across six PPAs follows. The projects enumerated in this appendix are described by location, and cost data is provided where it is available.

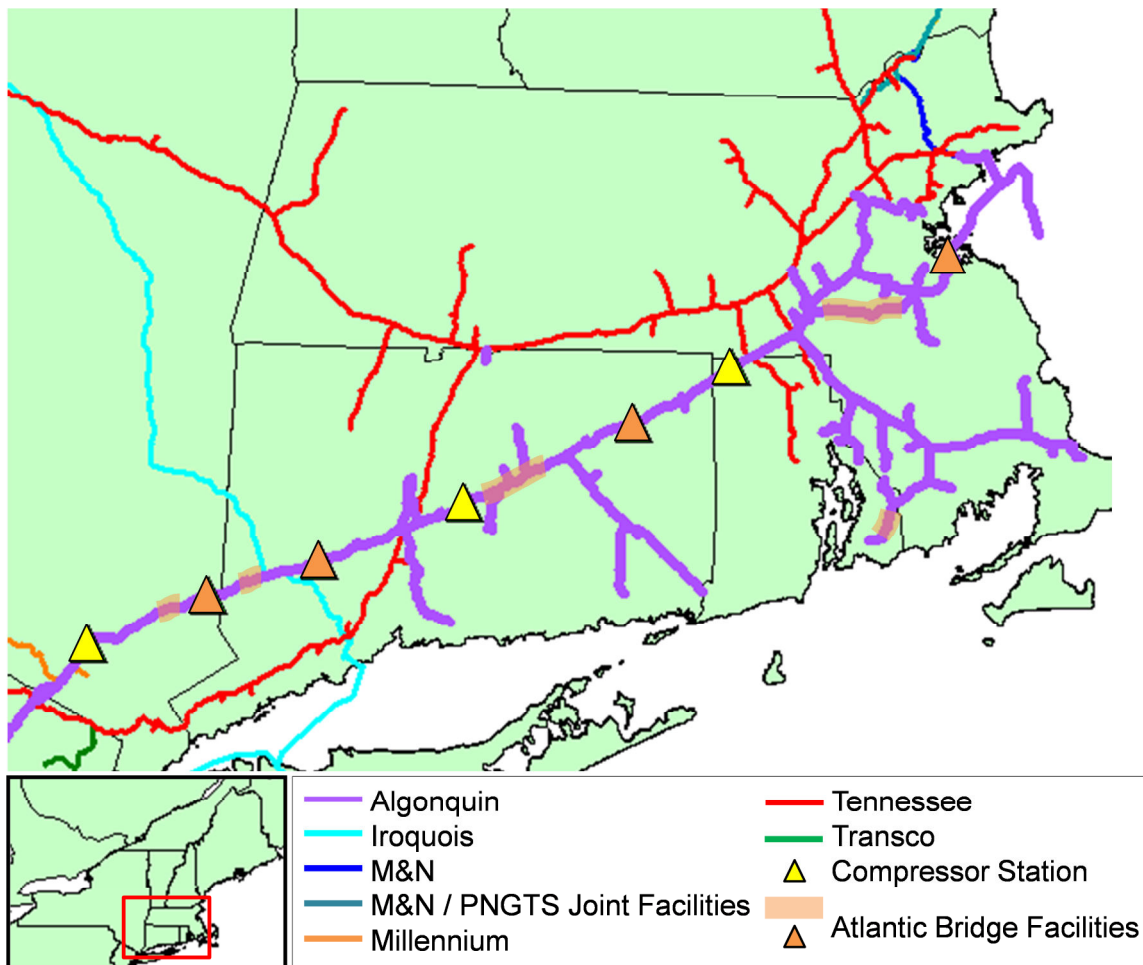
Algonquin

One Algonquin project has been included in Sensitivity 13.¹ As described in Appendix B, the Atlantic Bridge Project will enable Algonquin and M&N to add 100 to 600 MDth/d of mainline transportation capacity from receipt points as far upstream as Algonquin's interconnection with Texas Eastern in Lambertville, NJ to delivery points as far downstream as Maine.² Because the open season notice for the project indicated that an anchor shipper precedent agreement has been executed with Unifil Corporation, 100 Dth/d of incremental capacity, the minimum project size, was included in the RGDS. The incremental 500 MDth/d was included in Sensitivity 13. Preliminary project facilities have been announced for the planned November 2017 in-service date, and are illustrated in Figure .

¹ Spectra recently announced development of the Northeast Access Project, which would add up to an incremental 1 Bcf/d of capacity on Algonquin and M&N in 2018.

² Source: Description of Atlantic Bridge Project on Spectra Energy website.
<http://www.spectraenergy.com/Operations/New-Projects-and-Our-Process/New-Projects-in-US/Atlantic-Bridge/>

Figure F1. Atlantic Bridge Project Preliminary Facilities



Central New York Oil & Gas

Central New York Oil & Gas held an open season for the Northern Expansion Project in May 2013.³ This project would add up to 250 MDth/d of incremental wheeling capacity on the Stagecoach system between existing connections with Millennium, Tennessee and Transco, and would also extend the system to a new interconnection with Dominion in Tompkins County, NY. Additional firm storage capacity is also contemplated under the terms of the open season.

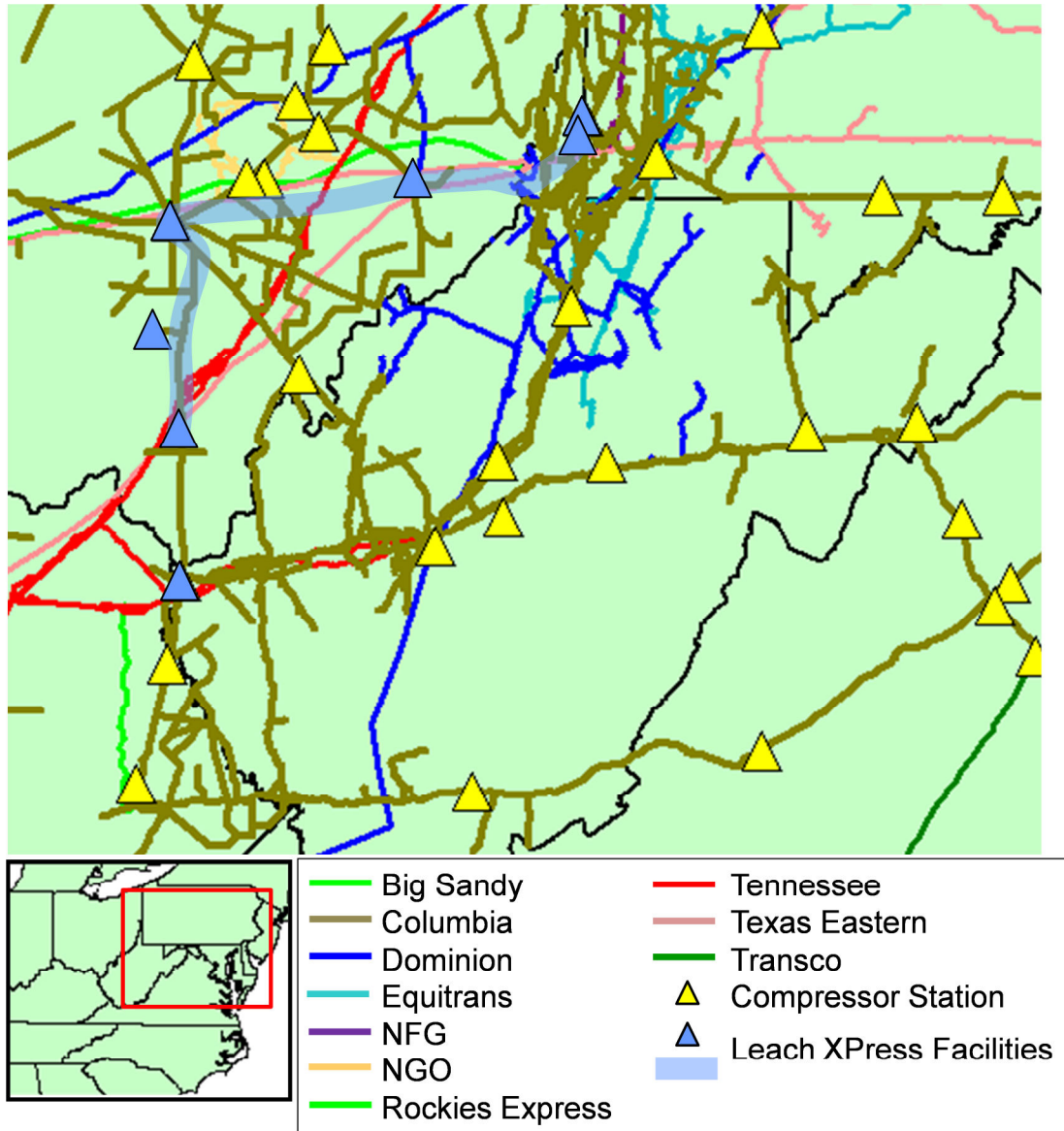
Columbia Gas

Two Columbia Gas expansion projects have been included in Sensitivity 13: the QuickLink Project and the Leach XPress Project. The QuickLink Project was designed to transport up to 500 MDth/d of Utica shale gas to interconnections with Dominion, Rockies Express and Texas Eastern for a November 2015 in-service date. The Leach XPress Project involves approximately 160 miles of new pipeline and compression facilities between southeastern Ohio and northern

³ Source: Northern Expansion Project open season notice.
<http://www.stagecoachstorage.com/ExternalFiles/SitesIP/stagecoach/notices/CYNOG%20Northern%20Expansion%20Project2.pdf>

West Virginia.⁴ The locations of these new facilities are shown in Figure F2. The capacity of the project is 1.5 Bcf/d and the estimated cost is \$1.4 billion. An open season was held in early 2014 for a projected in-service date in the second half of 2017.

Figure F2. Leach XPress Project Facilities



Columbia Gulf

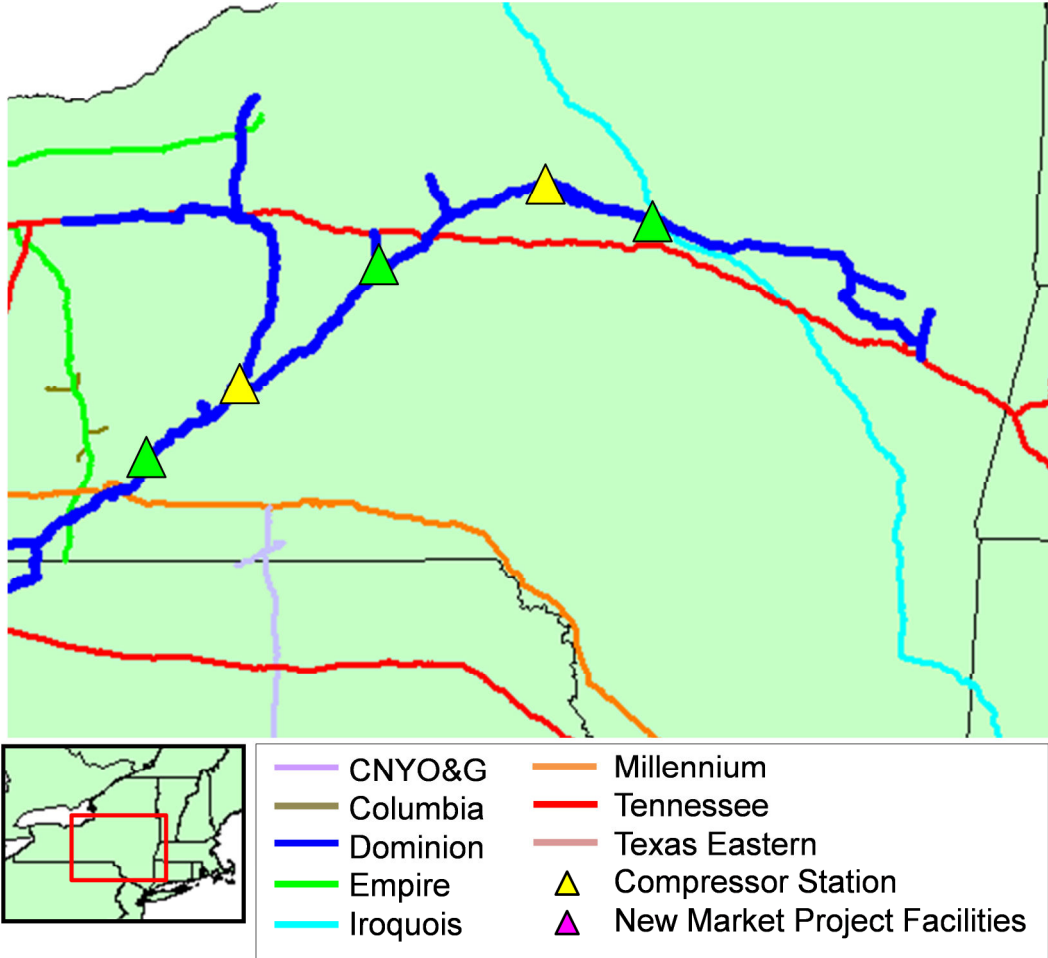
The Rayne XPress Project represents the last 1.2 Bcf/d of available capacity on Columbia Gulf for north to south flow, from receipt points in Kentucky to delivery points in Mississippi and Louisiana. An open season was held in early 2014 for a projected November 1, 2016 in-service date.

⁴ Source: Columbia Gas Leach XPress Project information site: <https://www.columbiapipelinegroup.com/current-projects/leach-xpress-project>

Dominion

Two Dominion projects are included in Sensitivity 13: the New Market Project and the Lebanon West II Project.⁵ The New Market Project, which was filed with FERC in June 2014, would add two new 11,000 HP compressor stations and expand another compressor station by 11,000 HP, to add 112 MDth/d of capacity from interconnections with Texas Eastern and Transco at Leidy to delivery points in upstate New York, including 82 MDth/d to the Brookman Corners / Canajoharie interconnection with Iroquois.⁶ The estimated construction cost is \$159 million, and the planned in-service date is November 2016. The locations of the New Market Project facilities are shown in Figure F3.

Figure F3. New Market Project Facilities



The Lebanon West II Project would allow 130 MDth/d of shale-produced gas to be transported from Butler, PA to Lebanon, OH, beginning in late 2016.

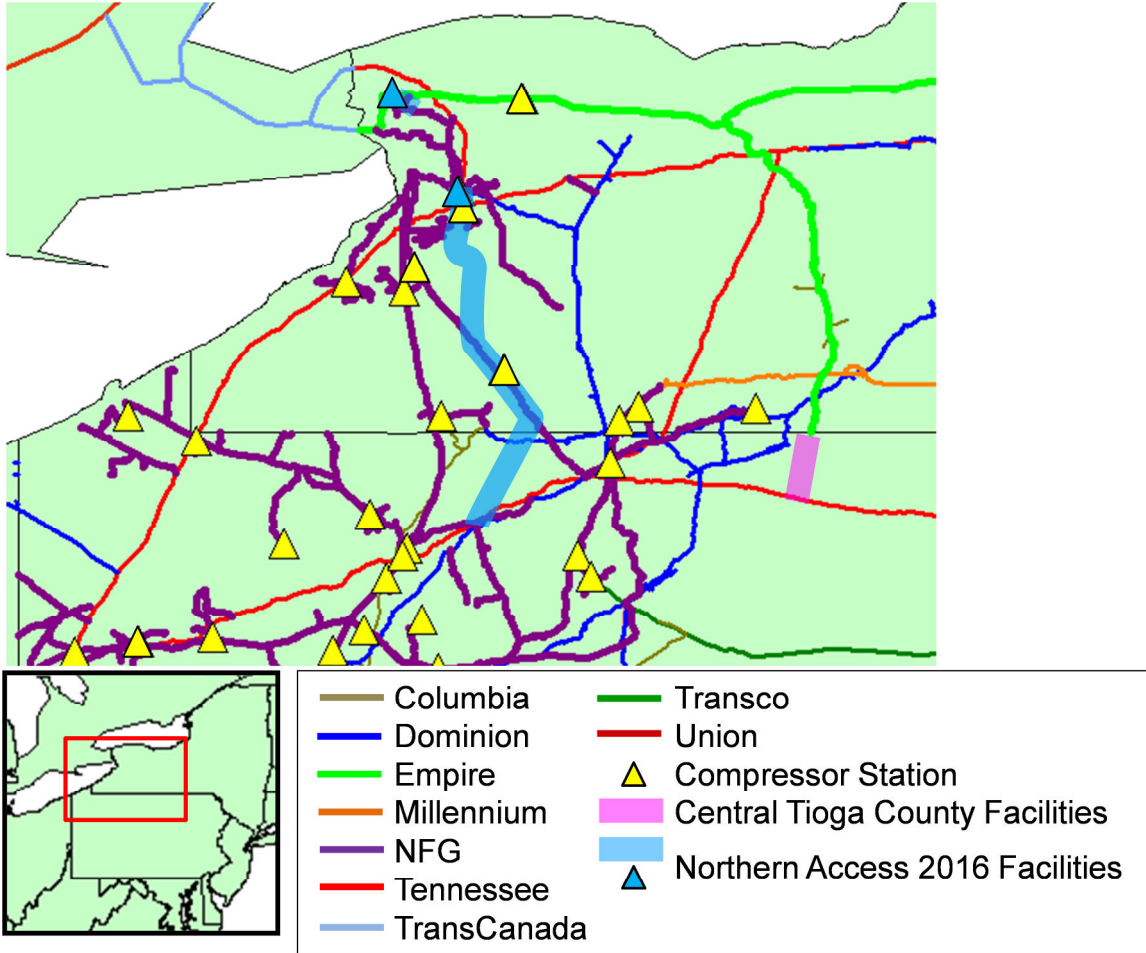
⁵ Dominion also recently announced development of the Atlantic Coast Pipeline Project, which would build a new 550-mile pipeline from central West Virginia to southern North Carolina via southeastern Virginia. The capacity of the pipeline is projected to be 1.5 Bcf/d, with a late-2018 in-service date.

⁶ FERC Docket No. CP14-497

Empire and NFG

Three Empire and NFG projects have been included in Sensitivity 13: the Central Tioga County Extension Project, the Clermont to Transco Project, and the Northern Access 2016 Project.⁷ Known proposed facilities associated with these projects are shown in Figure F4.

Figure F4. Empire / NFG Expansion Projects (Sensitivity 13)



The Northern Access 2016 Project would create 350 MDth/d of incremental capacity from Marcellus production to delivery points on Tennessee’s 200 Line and Empire’s Chippawa interconnection with TransCanada.⁸ Proposed NFG facilities include 97 miles of new 24” pipeline from McKean County, PA to Erie County, NY, 2,500 HP of incremental compression at the Portersville Compressor Station in Erie County, NY, and a new interconnection with Tennessee, also in Erie County, NY. Empire’s proposed facilities include 4 miles of 24” pipeline in replacement of existing 16” pipeline, a new 15,000 HP compressor station, and a natural gas dehydration facility, all in Niagara County, NY. The target in-service date for these facilities is November 1, 2016.

⁷ The Northern Access 2016 Project was previously referred to as the Clermont to Chippawa expansion project.

⁸ FERC Docket No. PF14-18

The Central Tioga County Extension Project is designed to connect Empire's existing system to additional Marcellus production via a 20-mile pipeline extension in Pennsylvania.⁹ Two compressor stations are also included in the preliminary facilities. The incremental supply would be deliverable to interconnections with Millennium at Corning, with Tennessee at Hopewell, and with TransCanada at Chippawa. The planned capacity of the project is 200 to 250 MDth/d, for an in-service date in 2016 or later.

The Clermont to Transco Project is designed to create 300 to 500 MDth/d of incremental transportation from shale receipt points to an interconnection with Transco at Leidy for a 2017 in-service date.¹⁰

Equitrans

The Ohio Valley Connector Project consists of approximately 35.5 miles of new 30-inch pipeline from Wetzel County, West Virginia to Monroe County, OH, a total of 40,000 HP at two new compressor stations and a 14-mile 24-inch diameter pipeline loop in West Virginia, as shown in Figure F5.¹¹ The projected capacity addition associated with these facilities is 900 MDth/d, for a May 2016 in-service date. The project is designed to expand transportation of Marcellus shale production to the interstate pipeline grid.

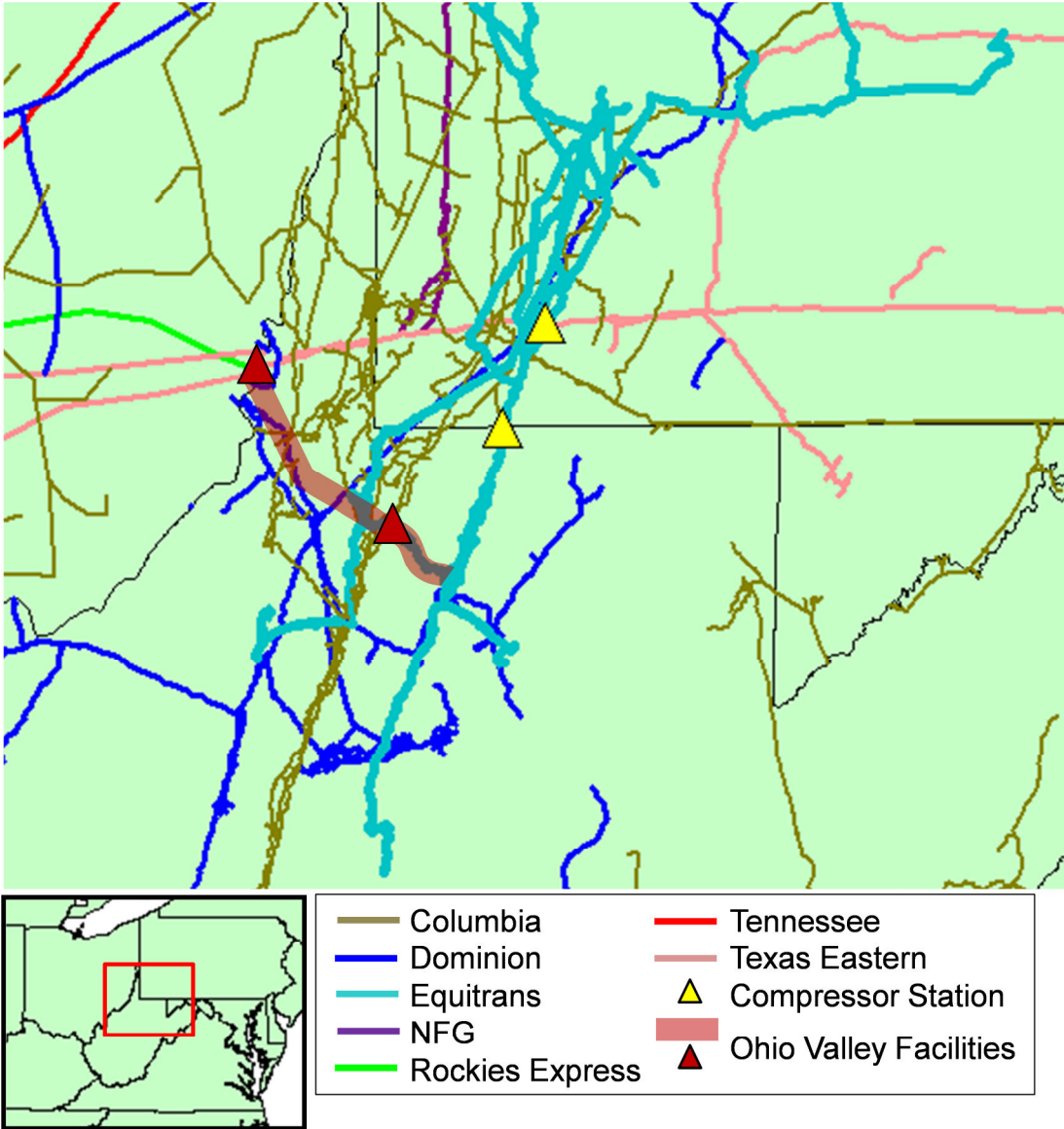
⁹ Source: NFG's project information summary. http://www.nationalfuelgas.com/empire/docs/Tioga_2013.pdf

¹⁰ Source: NFG Analyst Day Presentation, November 19, 2013.

<http://www.sec.gov/Archives/edgar/data/70145/000119312513446286/d630969dex99.htm>

¹¹ FERC Docket No. PF14-13

Figure F5. Ohio Valley Connector Project Facilities



Iroquois

Iroquois’s South to North Project would allow shippers to move up to 300 MDth/d from south-to-north on the Iroquois mainline, from interconnections with Algonquin at Brookfield, Constitution at Wright and Dominion at Canajoharie to delivery points in Zone 1 and a new physical delivery/export point at the Waddington interconnection with TransCanada. A non-binding season with a proposed November 2016 in-service date was held for the project capacity in late 2013 and early 2014, no executed precedent agreements or preliminary expansion facilities have been announced, although modifications to allow flow reversal are typically minimal.

NGPL

The Gulf Coast Market Expansion Project was designed to provide up to 750 MDth/d of incremental firm transportation capacity from NGPL's Moultrie interconnection with Rockies Express in southern Illinois to markets in Texas and Louisiana for a July 2016 in-service date.¹² A non-binding open season was held for this capacity in early 2014.

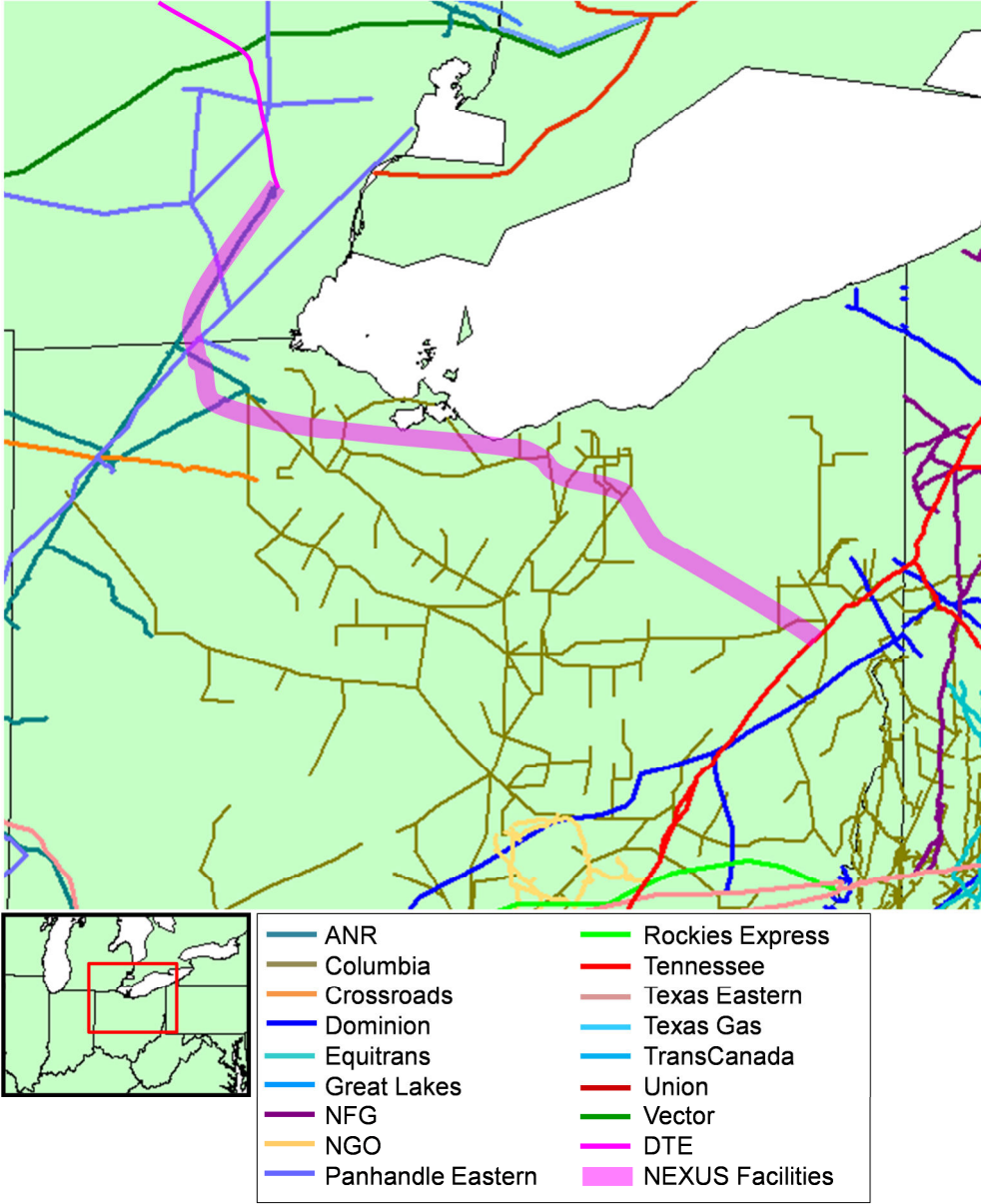
NEXUS Gas Transmission

NEXUS is a new pipeline developed by DTE Energy and Spectra Energy to transport Marcellus and Utica shale supplies to customers in Ohio, Michigan, Chicago and southwestern Ontario.¹³ The primary infrastructure is a greenfield 250-mile pipeline from eastern Ohio to southeastern Michigan, shown in Figure F6. An initial season in late 2012 resulted in over 1 Bcf/d of interest in the project, and a supplemental open season was held during summer 2014 to solicit additional interest up to the full 2 Bcf/d design capacity. The in-service date for the new pipeline could be as early as November 2017.

¹² Source: NGPL Gulf Coast Market Expansion open season notice.
http://pipeline.kindermorgan.com/info_postings/matrix/NGPL%20Open%20Season%2002%2018final.pdf

¹³ Source: NEXUS Gas Transmission Project Supplemental Open Season Notice for Firm Service.
<http://nexusgastransmission.files.wordpress.com/2014/07/nexus-supplemental-open-season.pdf>

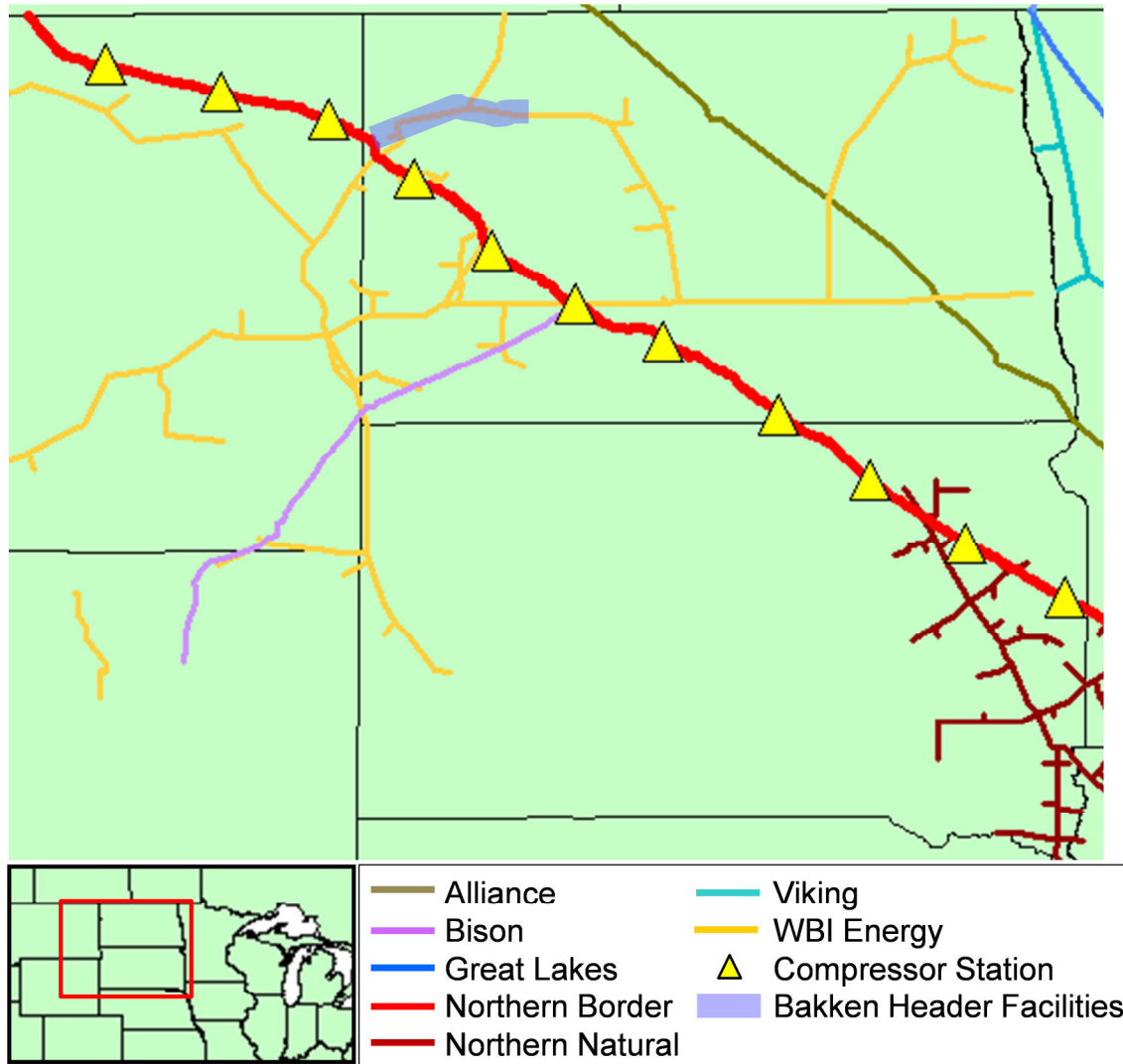
Figure F6. NEXUS Facilities



Northern Border

Northern Border’s Bakken Header Project would increase access to the Bakken shale production area for markets served by Northern Border. Available project information indicates that project facilities consist of 55 miles of 20-inch pipe between a Tioga receipt point and the Northern Border mainline, and a 25-mile extension between Tioga and Stanley, shown in Figure F7. Approximately 20,000 HP of incremental compression is also planned. The capacity of the new line would be 400 MDth/d, and the expected in-service date is as early as November 2016.

Figure F7. Bakken Header Project Facilities



PNGTS

PNGTS’s Continent to Coast Project is designed to increase the firm capacity of the Pittsburg to Westbrook portion of its system to 300 to 350 MDth/d, in conjunction with an upstream expansion on TransCanada.¹⁴ This expansion has been characterized as requiring minimal infrastructure changes, with a November 2016 in-service date.

Tennessee

One Tennessee project has been included in Sensitivity 13, the Northeast Energy Direct Project.¹⁵ This project is designed to transport up to 2.2 Bcf/d from central Pennsylvania to

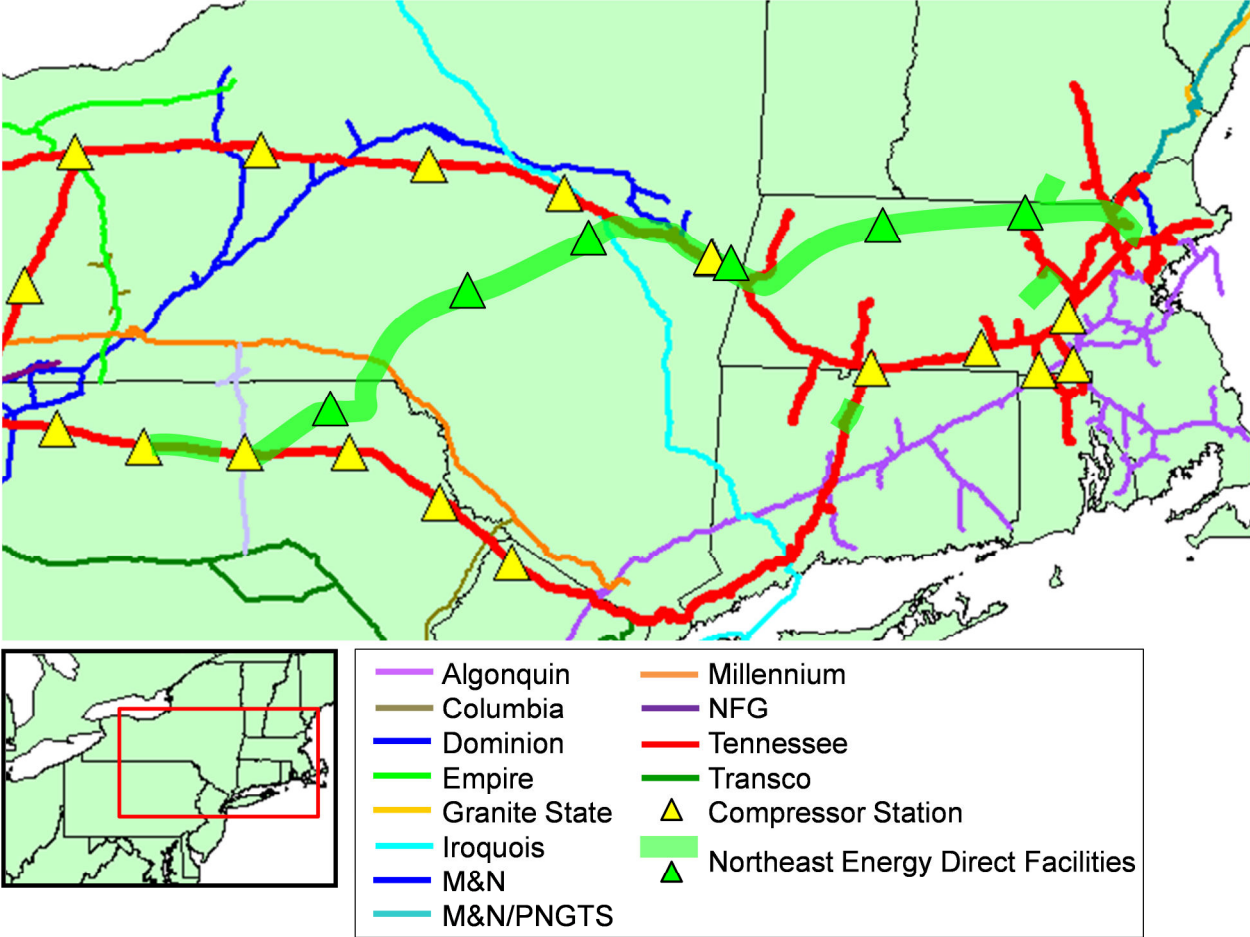
¹⁴ Source: PNGTS Continent to Coast Open Season Documents.

<http://www.gasnom.com/ExternalFiles/SitesIP/pngts/OpenSeasonDocumentAndBindingRequest.pdf>

¹⁵ In prior listings of Sensitivity 13 projects, this project has been referred to by its previous name, the Northeast Expansion Project.

eastern New England.¹⁶ An open season was held during the first quarter of 2014. To date, Tennessee has announced that 500 MDth/d of precedent agreements have been executed with New England LDCs, and that negotiations with other potential shippers are ongoing. Planned project facilities are illustrated in Figure F8, and include 32 miles of pipeline looping in Pennsylvania, 135 miles of greenfield pipeline from Pennsylvania to Wright, NY, 52 miles of new pipeline co-located with the existing Tennessee system in New York and Massachusetts, 125 miles of greenfield pipeline in Massachusetts, several new compressor stations, modifications to existing compressor stations, and various new laterals and meter stations. The estimated in-service date is November 2018.

Figure F8. Northeast Energy Direct Facilities



¹⁶ FERC Docket No. PF14-22

Texas Eastern

Two Texas Eastern projects have been included in Sensitivity 13: the Renaissance Project and the Natrium Lateral Project.¹⁷ The Renaissance Project was designed to create up to 1 Bcf/d of incremental capacity from the Marcellus and Utica shale production areas to delivery points as far south as central Mississippi, including a connection to a new 290-mile pipeline extending from Mount Pleasant, TN through northeast Alabama and northern Georgia to connections with Southern and Transco in west central Georgia.¹⁸ A non-binding open season for this capacity was held in early 2013.

The Natrium Lateral Project was designed to move up to 400 MDth/d of firm supply from the Dominion's Natrium Processing Plant in northern West Virginia along a new 10-mile lateral to Texas Eastern's mainline just east of Clarington, OH. From Clarington, the gas could flow to the east or west along the Texas Eastern system. A non-binding open season for this capacity was held in early 2012.

Texas Gas

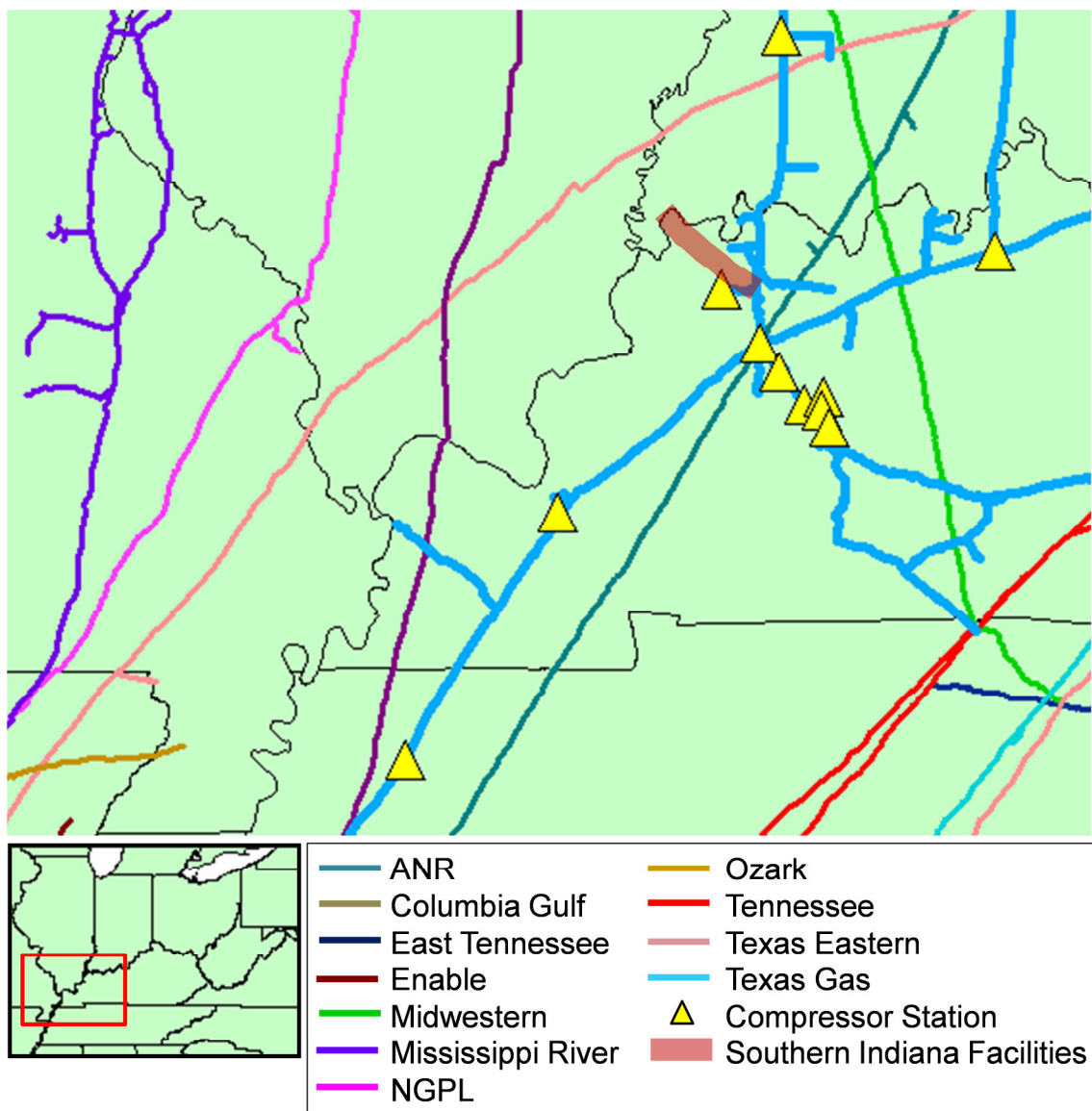
Two incremental Texas Gas expansion projects are included in Sensitivity 13. The first, the Southern Indiana Market Lateral Project, would construct a 30-mile 20-inch diameter pipeline from the Texas Gas mainline in Kentucky to two new industrial customers just over the border into Illinois, as shown in Figure F9. The capacity of the lateral will be determined by the results of the open season that was held in the first quarter of 2014 for a July 2016 in-service date.

¹⁷ Texas Eastern also recently completed open seasons for three new projects. The Access South Project would provide up to 320 MDth/d of incremental firm transportation capacity from the Marcellus and Utica shale production areas to markets in the Southeast, with a delivery point in central Mississippi and a November 2017 in-service date. The Adair Southwest Project would provide up to 200 MDth/d of incremental firm transportation capacity from the Marcellus and Utica shale production areas to an interconnection with Columbia Gulf in northern Kentucky, also for a November 2017 in-service date. The Appalachia to Market Project, also known as the A2M Project, would provide up to 1 Bcf/d of incremental firm transportation capacity from the Marcellus and Utica shale production areas to markets in the Northeast for a November 2018 in-service date.

¹⁸ Source: Renaissance Project open season notice.

<https://infopost.spectraenergy.com/GotoLINK/GetLINKdocument.asp?Pipe=10076&Environment=Production&DocumentType=Notice&FileName=Renaissance+2nd+Open+Season.pdf&DocumentId=2c9080a83c00608e013c3fc746380417>

Figure F9. Southern Indiana Market Lateral Project Facilities



Texas Gas held a binding open season for the Northern Supply Access Project during summer 2014 for up to 584 MDth/d of capacity from receipt points in Ohio and Indiana to delivery points to southern mainline points, providing an additional outlet for Marcellus and Utica shale producers to reach new markets beginning in April 2017.

TransCanada

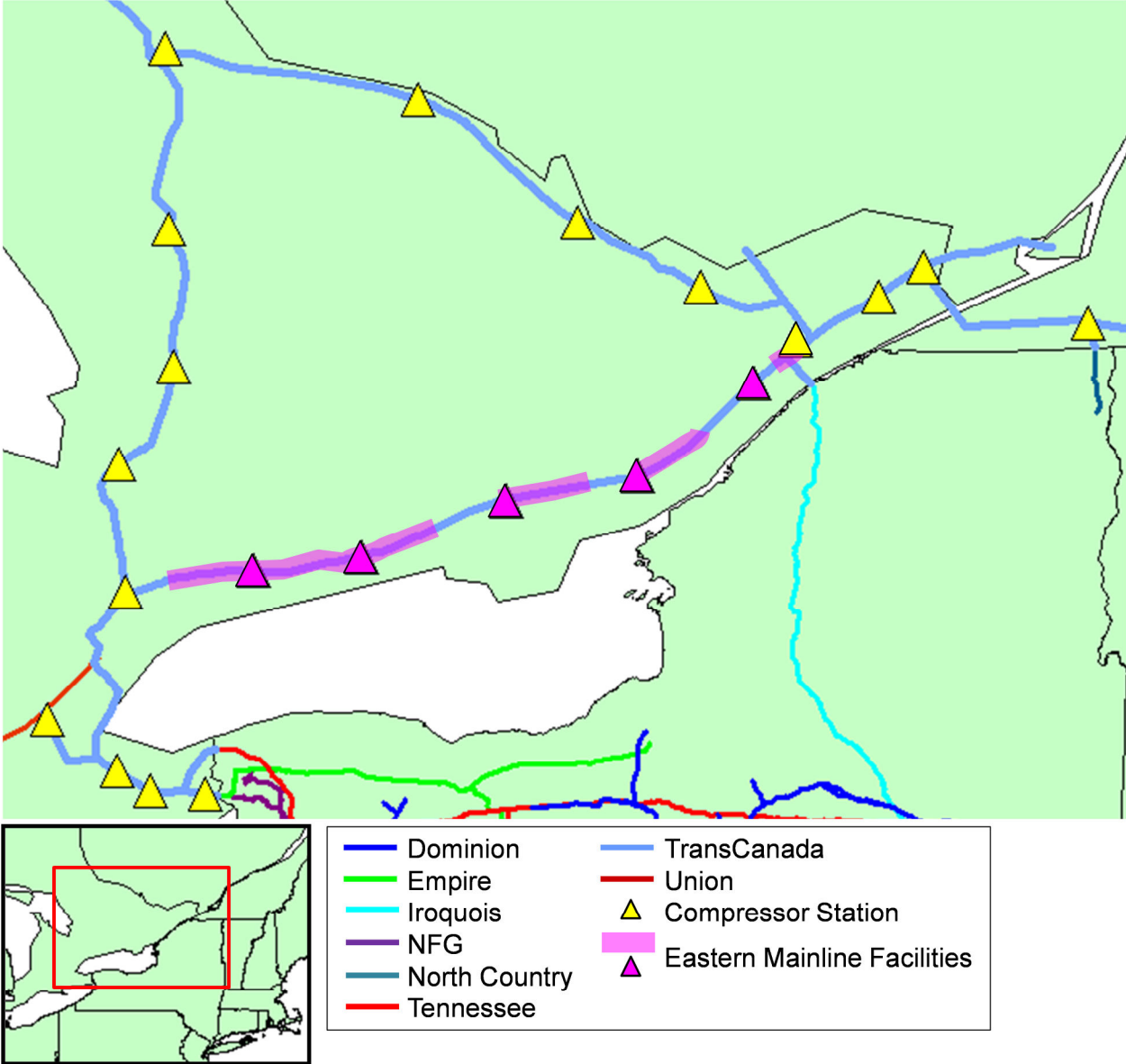
TransCanada’s Eastern Mainline Project would construct approximately 155 miles (250 km) of new 36-inch pipeline in southern Ontario, essentially looping the existing system.^{19,20} Compression would also be added at five existing stations. The locations of these facilities are

¹⁹ This project has previously been referred to as the Eastern Triangle Expansion Project.

²⁰ Source: Project information website. <http://eastermainline.com/>

shown in Figure F10. This project is designed to enable TransCanada to continue to meet its commercial obligations following the pipeline conversion associated with the Energy East Project using shale gas received from the Chippawa and Niagara interconnections.

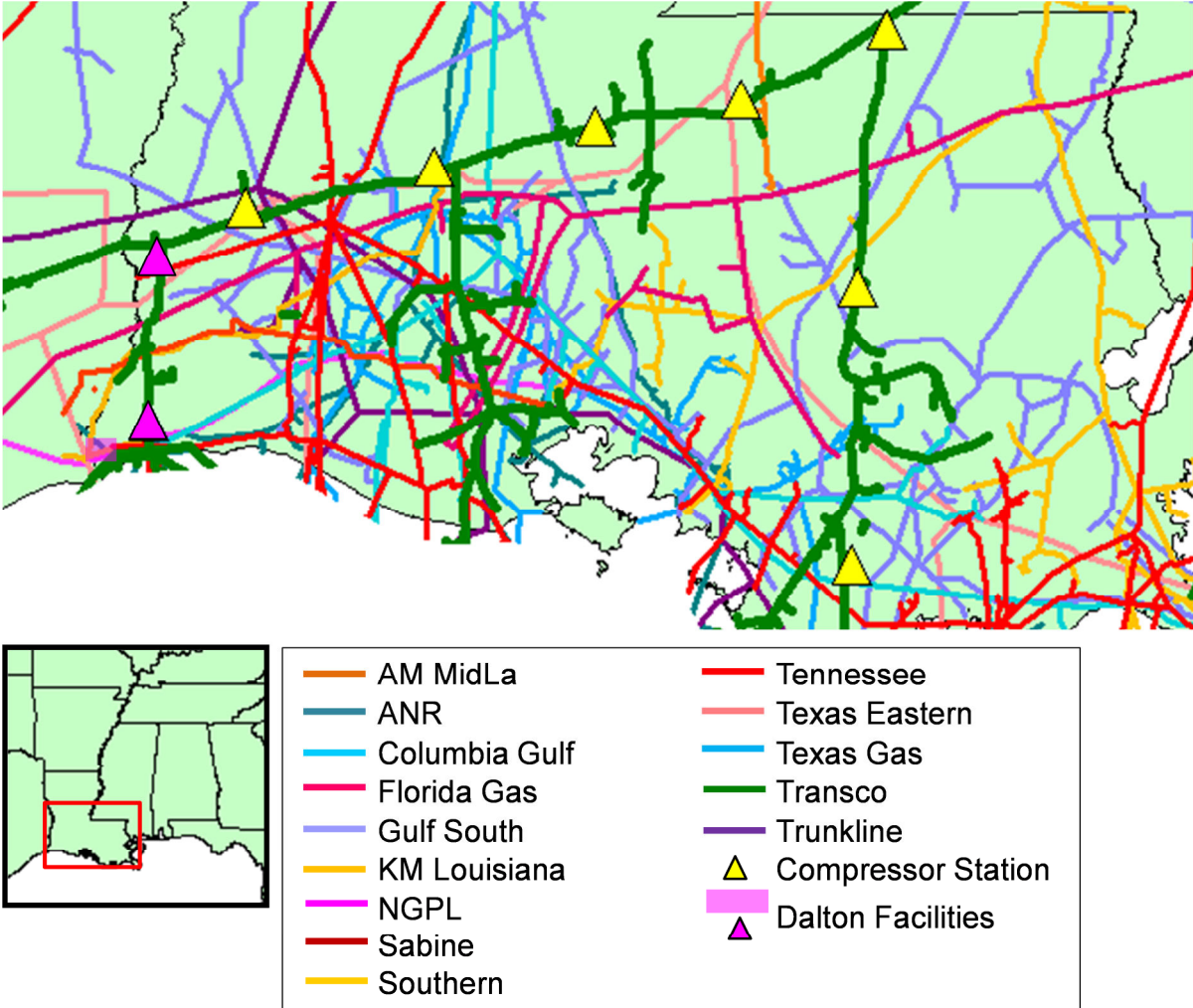
Figure F10. Eastern Mainline Project Facilities



Transco

One Transco expansion has been included in Sensitivity 13.²¹ The Gulf Trace Project is designed to expand its existing pipeline system to allow flow reversal in Louisiana to serve an expansion of the Sabine Pass LNG export terminal. In addition to modifications associated with the flow reversal, the preliminary project design also includes construction of a new compressor station and a compressor station expansion, along with an 8-mile lateral to the export terminal. The locations of these facilities are shown in Figure F11.

Figure F11. Gulf Trace Project Facilities

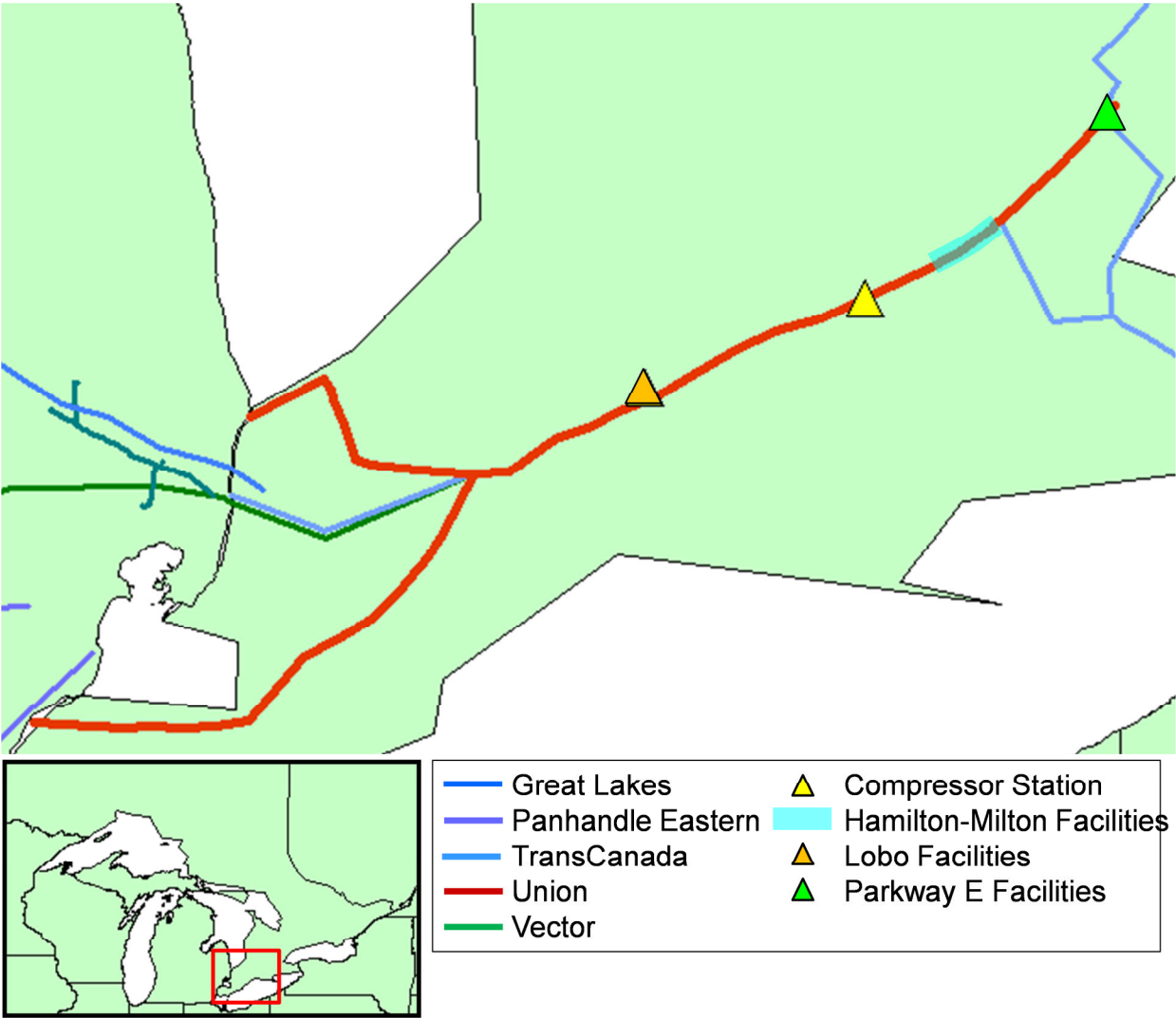


²¹ Since the Target 2 inputs were set, Transco has announced several new expansion projects. The Diamond East Project would consist of additional compression and pipeline looping along the Leidy Line into the Station 210 pool to add up to 1 Bcf/d of capacity to Transco’s existing system for a mid-2018 in-service date. The Western Marcellus Pipeline Project would consist of a new greenfield pipeline from Clarington, OH and Marshall County, WV to Station 165 in southern Virginia, along with mainline improvements to move the gas north to Pennsylvania and south to Louisiana. The project’s preliminary design capacity is up to 2 Bcf/d, for a late 2018 in-service date. Finally, the Garden State Expansion Project, which has been fully contracted by a New Jersey LDC, is designed to add 180 MDth/d of capacity from the Station 210 pool to Burlington County, NJ; phased construction is planned for 2016 and 2017 in-service dates.

Union

Three Union expansion projects have been included in Sensitivity 13: the Lobo Compressor Station Expansion Project, the Parkway E Project, and the Hamilton-Milton Project. Each of these projects is designed to expand the capacity of Union’s Dawn to Parkway system for a November 2016 in-service date. Project facilities are illustrated in Figure F12. The Lobo Compressor Station Expansion Project involves incremental compression at the existing Lobo station. The Hamilton to Milton Expansion Project, involves approximately 12 miles (20 km) of 48-inch loopline. Finally, the Parkway E Project involves incremental compression at the existing Parkway station. The total capacity increase associated with these projects is approximately 1,137 MDth/d (1.2 PJ/d).

Figure F12. Union Expansion Project Facilities (Sensitivity 13)



WBI Energy

The Dakota Pipeline Project involves the construction of a new 375-mile 24-inch pipeline, with two compressor stations, connecting Bakken shale supplies to markets in the Great Lakes via an interconnection at Emerson with Great Lakes, Viking, and potentially TransCanada. The proposed route of the new pipeline is shown in Figure F13. The project open season, held in the first quarter of 2014, listed a proposed initial capacity of 400 MDth/d, with a potential increase to 500 MDth/d based on the results of the open season. The construction cost was estimated is \$650 million, with a November 2017 in-service date.

Figure F13. Dakota Pipeline Facilities

