

NORTH AMERICAN MIDSTREAM INFRASTRUCTURE THROUGH 2035

APRIL 12, 2016



LEANING INTO THE HEADWINDS

Midstream infrastructure – mainline pipelines, laterals, processing plants, gathering lines, compression, lease equipment and storage – is essential to bringing domestic natural gas, natural gas liquids and oil production to households, businesses, industrial consumers, refineries and electric power generators. The benefits of the shale revolution that have transformed the North American energy landscape can only be realized by constructing new midstream infrastructure.

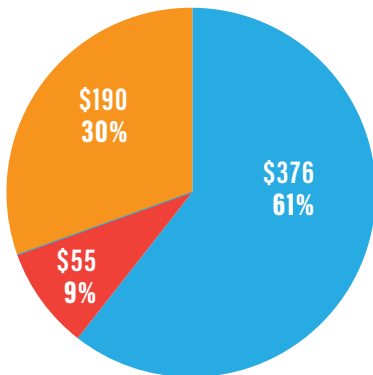
The INGAA Foundation, Inc. has sponsored reports forecasting midstream infrastructure for more than 20 years. The reports inform industry, policymakers and stakeholders about the new dynamics of North America's energy markets and the need for infrastructure development.

\$546 BILLION

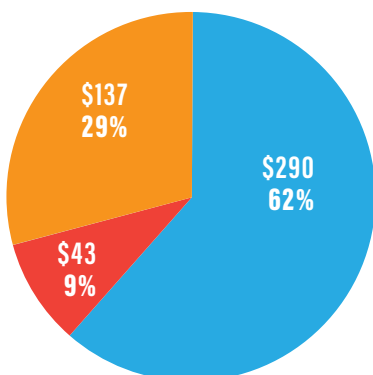
TOTAL PROJECTED MIDSTREAM CAPITAL EXPENDITURES

TOTAL INFRASTRUCTURE INVESTMENT IS SUBSTANTIAL, AVERAGING \$22.5 TO \$30 BILLION PER YEAR. THE MAJORITY OF MIDSTREAM ACTIVITY IS ASSOCIATED WITH NATURAL GAS DEVELOPMENT.

HIGH CASE | BILLIONS OF 2015
2015-2035 | **\$621**



LOW CASE | BILLIONS OF 2015
2015-2035 | **\$471**



■ CRUDE OIL
 ■ NATURAL GAS
 ■ NGL

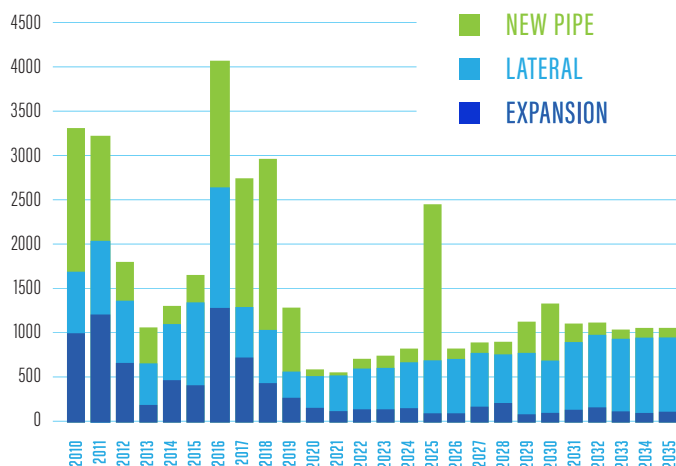
NATURAL GAS CAPITAL EXPENDITURES IS \$13.8 TO \$17.9 BILLION PER YEAR (2015-2035)

BILLIONS OF 2015\$ ¹	CURRENT STUDY	CURRENT STUDY	PRIOR STUDY
	HIGH CASE	LOW CASE	BASE CASE
GAS TRANSMISSION MAINLINE PIPE	\$3.6	\$2.2	\$4.2
LATERALS TO/FROM POWER PLANTS, GAS STORAGE AND PROCESSING PLANTS	\$2.4	\$1.5	\$2.2
GATHERING LINE (PIPE ONLY)	\$1.6	\$1.4	\$1.7
GAS GATHERING LINE COMPRESSION	\$1.4	\$1.1	\$1.1
GAS LEASE EQUIPMENT	\$1.3	\$1.1	\$1.3
GAS PIPELINE & STORAGE COMPRESSION	\$0.9	\$0.6	\$0.5
GAS STORAGE FIELDS	\$0.2	\$0.1	\$0.5
GAS PROCESSING CAPACITY	\$1.7	\$1.3	\$1.2
LNG EXPORT FACILITIES	\$3.7	\$3.4	\$2.2
TOTAL CAPITAL EXPENDITURES	\$16.8	\$12.7	\$14.9
TOTAL W/ IM & NOX CONTROL	\$17.9	\$13.8	N/A

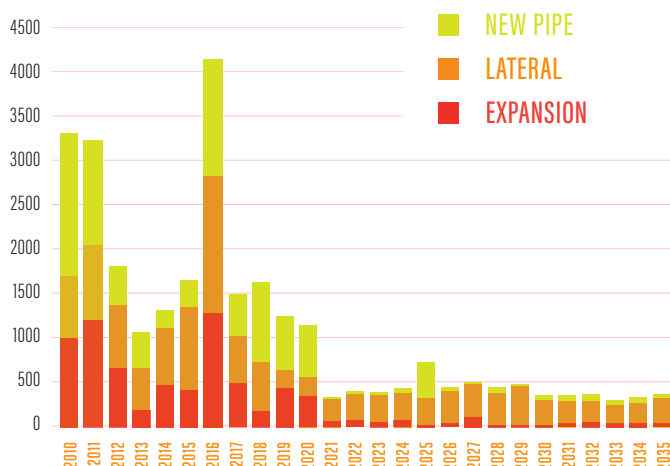
¹ CAPEX REPORTED IN THE PRIOR STUDY WERE CONVERTED FROM 2012\$ TO 2015\$, USING A 4.3% INFLATION FACTOR.

23,000 MILES OF NEW NATURAL GAS PIPELINE NEEDED (EXCLUDING GATHERING LINE)

MILES OF GAS PIPELINE | HIGH CASE



MILES OF GAS PIPELINE | LOW CASE



BETWEEN 18,000 AND **29,000 MILES** OF NEW GAS TRANSMISSION LINES WILL BE ADDED OVER THE 21-YEAR STUDY PERIOD (MIDPOINT OF **23,000 MILES**).

FUTURE BUILDOUT AVERAGES BETWEEN **850 AND 1,400 MILES PER YEAR** (MIDPOINT OF 1,100 MILES PER YEAR), VERSUS ROUGHLY **2,150 MILES PER YEAR** FROM 2010 TO 2014.

SIGNIFICANT BUILDOUT, PARTICULARLY FROM AREAS LIKE THE MARCELLUS AND UTICA, IS LIKELY TO CONTINUE FOR THE NEXT FEW YEARS.

RESULTS OF ECONOMIC IMPACT ANALYSIS FOR THE U.S. AND CANADA FROM 2015 THROUGH 2035: \$758.1 BILLION OF VALUE ADDED TO U.S. AND CANADIAN ECONOMIES

HIGH CASE, TOTAL EXPENDITURES = \$620.8 (BILLIONS OF 2015\$)

IMPACT TYPE	EMPLOYMENT JOBS PER YEAR	ANNUAL WAGES AND BENEFITS (2015\$ PER JOB)	LABOR INCOME	VALUE ADDED	STATE/PROVINCIAL AND LOCAL TAX REVENUES	FEDERAL TAX REVENUES
DIRECT	141,530	\$77,971	\$231.7	\$282.6		
INDIRECT	114,088	\$66,631	\$159.6	\$256.3		
INDUCED	168,960	\$50,800	\$180.2	\$322.3		
TOTAL	424,579	\$64,111	\$571.6	\$861.2	\$140.9	\$154.0

LOW CASE, TOTAL EXPENDITURES = \$471.2 (BILLIONS OF 2015\$)

DIRECT	107,752	\$77,689	\$175.8	\$215.7		
INDIRECT	86,556	\$66,489	\$120.9	\$193.9		
INDUCED	128,839	\$50,733	\$137.3	\$245.4		
TOTAL	323,146	\$63,941	\$433.9	\$655.0	\$107.3	\$116.1

323,000 TO 425,000 JOBS PER YEAR FOR NEW NATURAL GAS, OIL AND NGL INFRASTRUCTURE DEVELOPMENT