

National Perspectives on Key Challenges

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Serving North America

Providing natural gas transportation to markets in Canada, United States, and Mexico

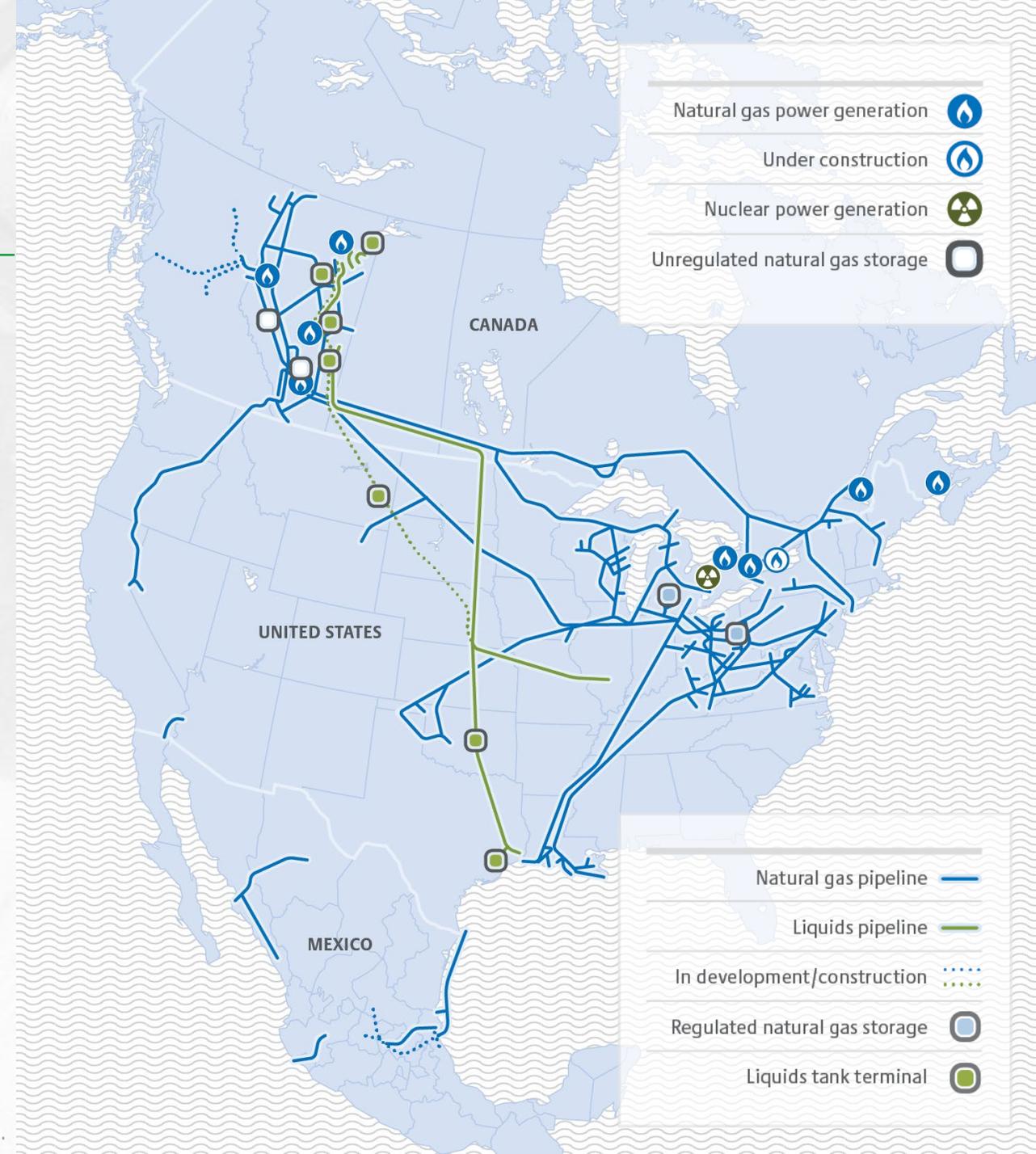
- 57,500 mi of pipeline
- 653 Bcf of storage capacity
- 23 Bcf/d; ~25% of continental demand

Supplying United States with reliable crude oil

- 3,000 mi of pipeline
- 590,000 Bbl/d Keystone System transports ~20% of Western Canadian exports

Leading provider of low-carbon electricity

- 10 power plants, 6,000 MW



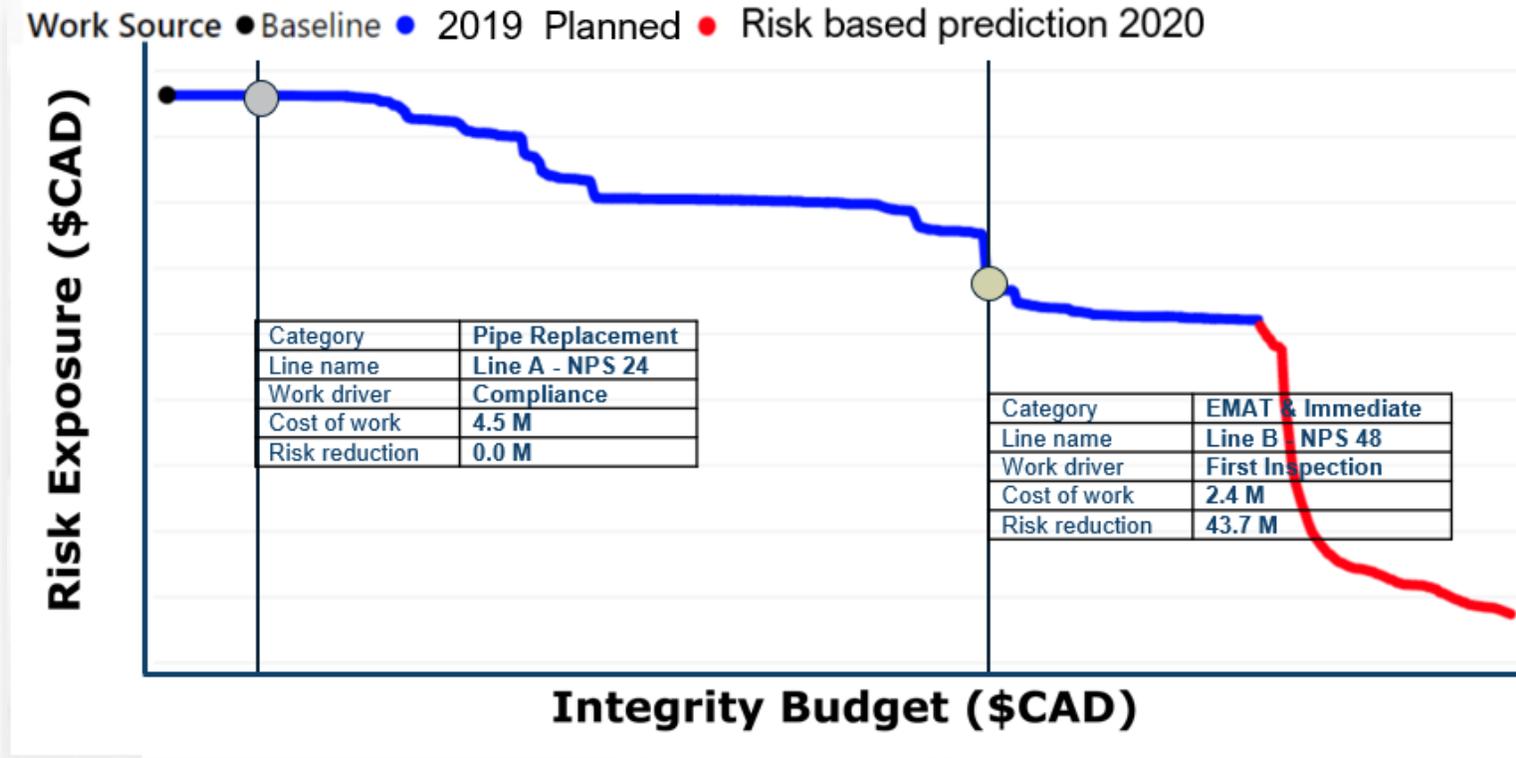
Three Key Challenges

1. Optimizing Impacts of New Gas Transmission Rules
2. Reducing GHG Emissions
3. Geohazard Management



Optimizing Impacts of New Gas Transmission Rules

MAOP reconfirmation practices have varying benefits – some require pipeline shutdown
 Risk reduction benefits and costs e.g.



R&D Solutions:

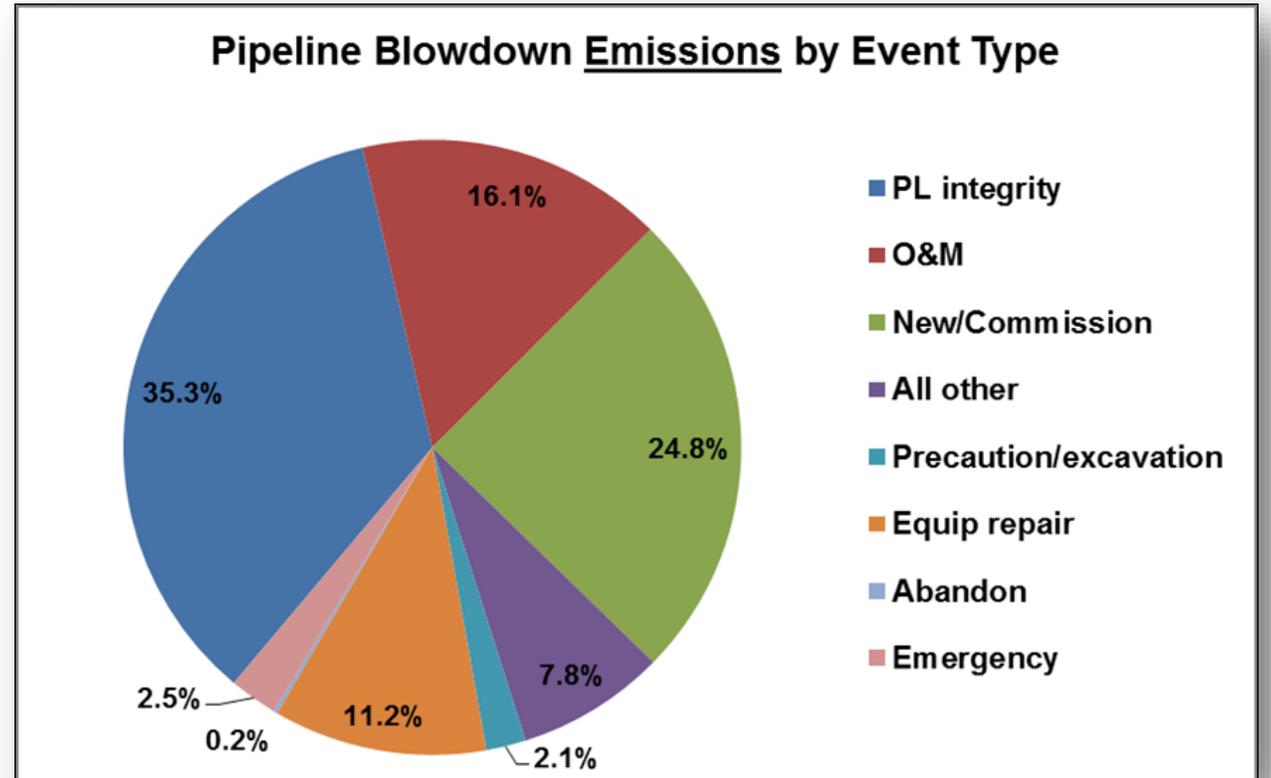
- Continue to advance alternatives to hydrotesting
- Continue to develop non-destructive material testing methods
- Improve inspection technologies to minimize replacements of safe pipe

Reducing GHG Emissions

Pipeline maintenance/integrity work represents a significant proportion of emissions from gas transmission pipelines

R&D Solutions:

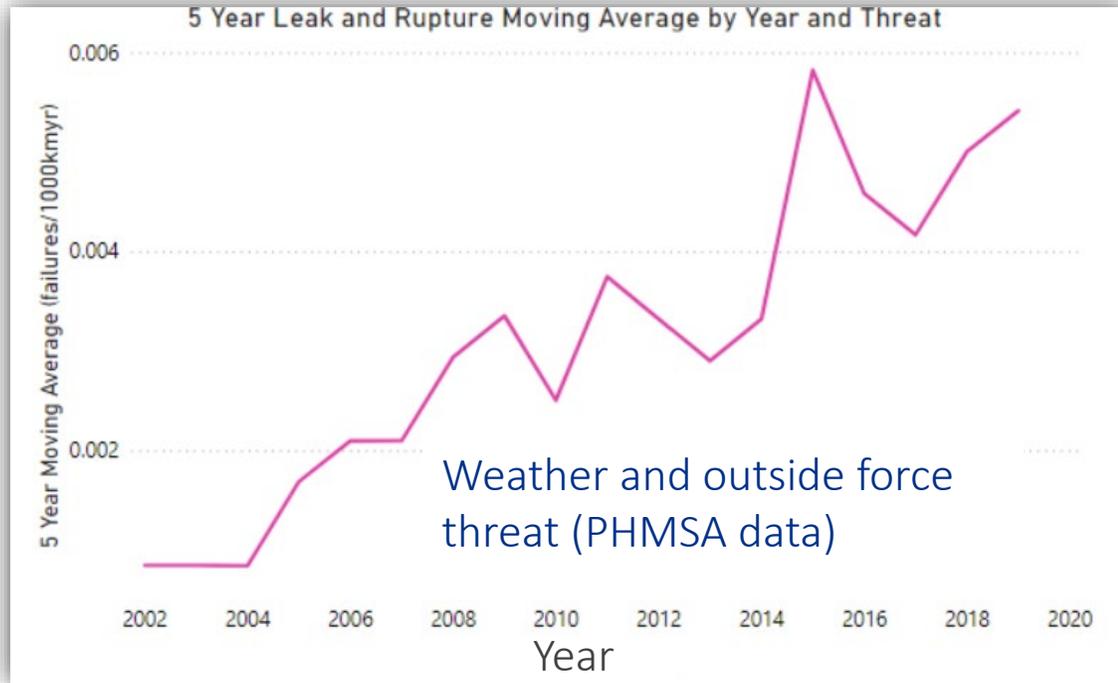
- Minimizing need to blow down gas
- Reducing/recapturing blowdown volumes



2017 Pipeline Blowdowns: Relative Contribution to Methane Emissions by Event Type (per EPA Subpart W reporting)

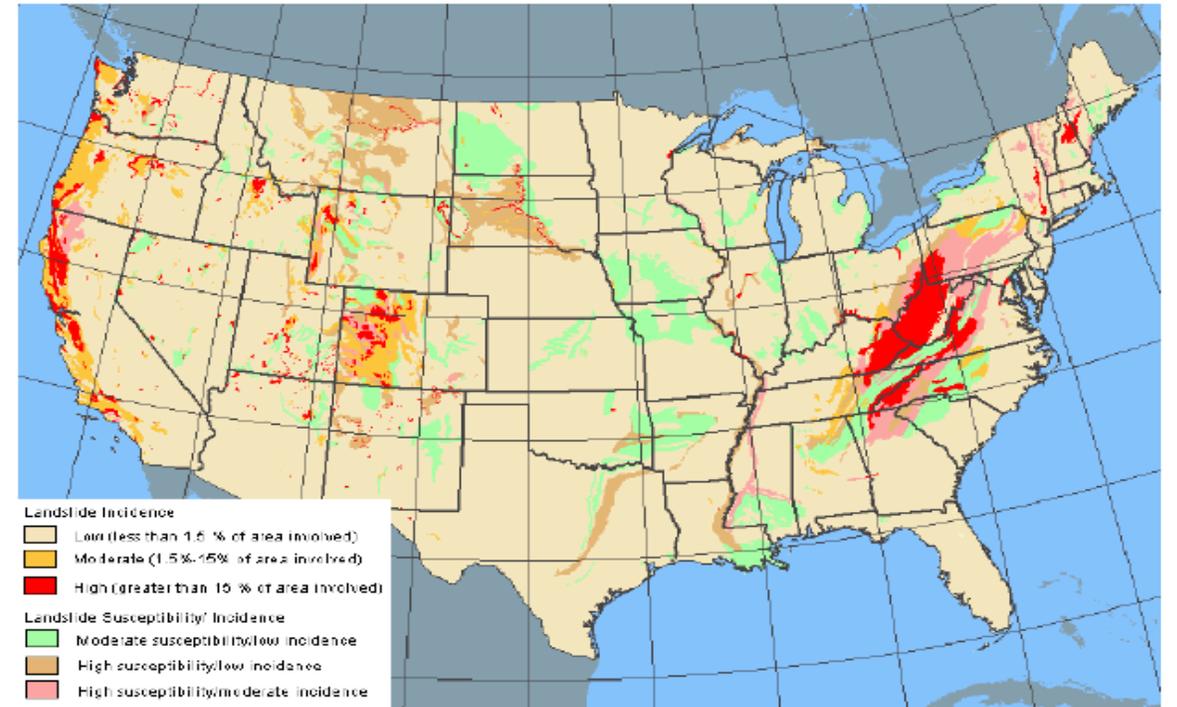
Geohazard Management

Increase in the frequency of incidents related to ground movement



R&D Solutions:

- Design and Construction for Geohazard
- Enhanced monitoring techniques
- Deploy predictive analytics



Landslide map: Map of relative landslide incidence and susceptibility across the conterminous United States. Red and pink areas have the highest incidence and susceptibility. [USGS map](#).

Thank You



Questions?

