Non-Pipeline Alternatives: Emerging Opportunities in Planning for U.S. Gas System Decarbonization

To meet ambitious climate targets, utilities and regulators are planning for a future less reliant on fossil gas and more dependent on clean energy resources. Integrated energy planning and non-pipeline alternatives are solutions designed to help reach that future.

Defining the solutions

What are NPAs: Non-pipeline alternatives are intended to simultaneously reduce greenhouse gas emissions and defer, reduce, or avoid the need to construct or upgrade the natural gas system, with potential for ratepayer savings. This can include customer installation of all-electric equipment or connection to other lower-carbon infrastructure, including thermal energy networks.

What is IEP: Integrated energy planning is about understanding how the gas, electric, and customer energy systems interact and bringing that knowledge into utility and energy planning processes to help meet long-term climate goals. This enables a better understanding of how customers are impacted by the clean energy transition to create cost-effective solutions that preserve the safety and reliability of systems customers rely on.

Studying the possibilities

National Grid and RMI have analyzed nine NPA case studies from the U.S. and Europe to better understand how NPAs have been most effectively implemented and the challenges to scaling up these projects as part of the clean energy transition.These case studies include projects by National Grid to transition some upstate New York customers to geothermal heating systems, California utility PG&E's experience decommissioning 22 miles of gas transmission pipe by converting customers from gas, and successful efforts in Europe to transition entire neighborhoods off the gas system over a period of 10 years.

nationalgrid

RMI

The path forward

The case studies reveal the benefits and the challenges regulators and utilities must carefully balance.

1. Current NPA projects reflect diverse energy policy goals and energy system characteristics, necessitating unique solutions to meet each jurisdiction's energy needs.
2. There's no one-size-fits-all cost-benefit analysis for utilities to apply to NPAs to analyze impacts on consumers, on meeting emissions goals, and on achieving other societal goals.
3. There's a range of criteria to weigh when prioritizing NPAs, including gas asset risk and hydraulic feasibility, electric capacity, benefit-cost criteria, customer propensity for new technology adoption, and community factors.
4. NPA projects can be funded through a series of different sources while protecting ratepayers' long-term affordability, including federal, state, and local funding, and electric and gas rates.
5. To conduct IEP that achieves net-zero goals as cost-effectively and equitably as possible, regulatory support is needed to enable cross-utility data sharing and decision-making, and to invest in new tools and capabilities.
6. Utility and municipality partnership may be a key element of NPA projects and localized IEP to minimize cost, build community support, and incorporate local priorities in project planning.
7. Individual customer persuasion to reach 100% participation is not a scalable NPA strategy.
8. Policy change will be needed to evolve the utility business model and obligation to serve, while retaining the opportunity for cost recovery as part of a transition away from gas.

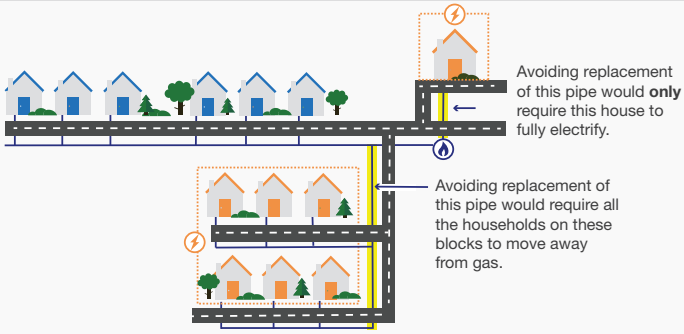
How NPAs work

Natural gas utilities serve over 77 million customers in the U.S. through more than 1 million miles of local distribution lines and system investments of over $20 billion per year. Reducing gas usage over time requires careful planning with an understanding of how interconnected the gas, electric, and customer energy systems are.

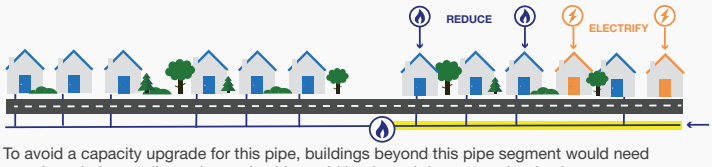
NPAs that electrify potential new or existing gas customers or connect them to infrastructure like networked geothermal systems have the potential to reduce emissions, gas system costs, and customer risk by avoiding unnecessary gas infrastructure spending.

Here's a closer look at three key types of NPA projects and how customers are impacted.

Avoided replacement



Avoided capacity expansion



To avoid a capacity upgrade for this pipe, buildings beyond this pipe segment would need to reduce their overall gas demand – this could be through incremental reductions across the group, or full electrification of some customers. This reduction would not require 100% participation of all households.

Avoided system extension