DOCKETED	
Docket Number:	21-IEPR-05
Project Title:	Natural Gas Outlook and Assessments
TN #:	237857
Document Title:	Presentation - Natural Gas Infrastructure Safety and Integrity
Description:	05_Qing Tian, CEC
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	5/19/2021 2:39:48 PM
Docketed Date:	5/19/2021

Natural Gas Infrastructure Safety and Integrity

Presenter: Qing Tian Ph.D. and PE, Team Lead, Energy System Research Office

Date: May 20, 2021

Natural Gas Infrastructure Safety and Integrity

Drivers: Aging natural gas infrastructure, natural gas incidents, and California climate goals

Mission: Conduct assessment and advance technologies that improve the safety of natural gas pipelines & storage systems while reducing GHG emission

Funding:

- Natural Gas Research and Development Program
  - $24 million annually
  - ~ $6 million for safety and integrity

Safety

Decarbonization

Equity

Natural Gas Pipeline Safety

Sensors and Monitoring Technologies for Detecting and Preventing Damages

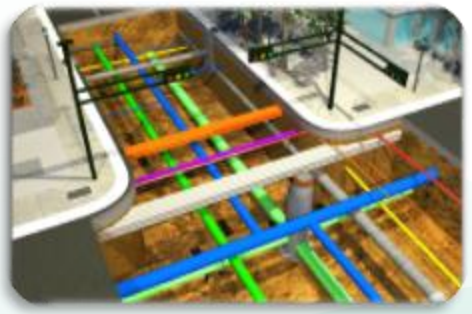
- Excavation Encroachment Notification System to reduce third-party damages
- Smart Shutoff Devices to safeguard natural gas customers

Information Management

- High Accuracy Mapping System to accurately map subsurface pipelines and trace component features
- 3D Visualization Tool to detect and visualize underground pipelines

Risk Assessment

- Open-source Tools to analyze seismic risk and prioritize mitigation measures



Natural Gas Storage Safety

Sensors and Monitoring Technologies for Detecting and Preventing Damages

- Sensors and monitoring devices to collect data from a variety of sources to quantify leak risk and evaluate leak amount
- The systems are being developed specifically to help utilities meet new regulations on wellhead monitoring

Risk Assessment

- Tools to help identify hazard sources and provide mitigation options for all storage system components

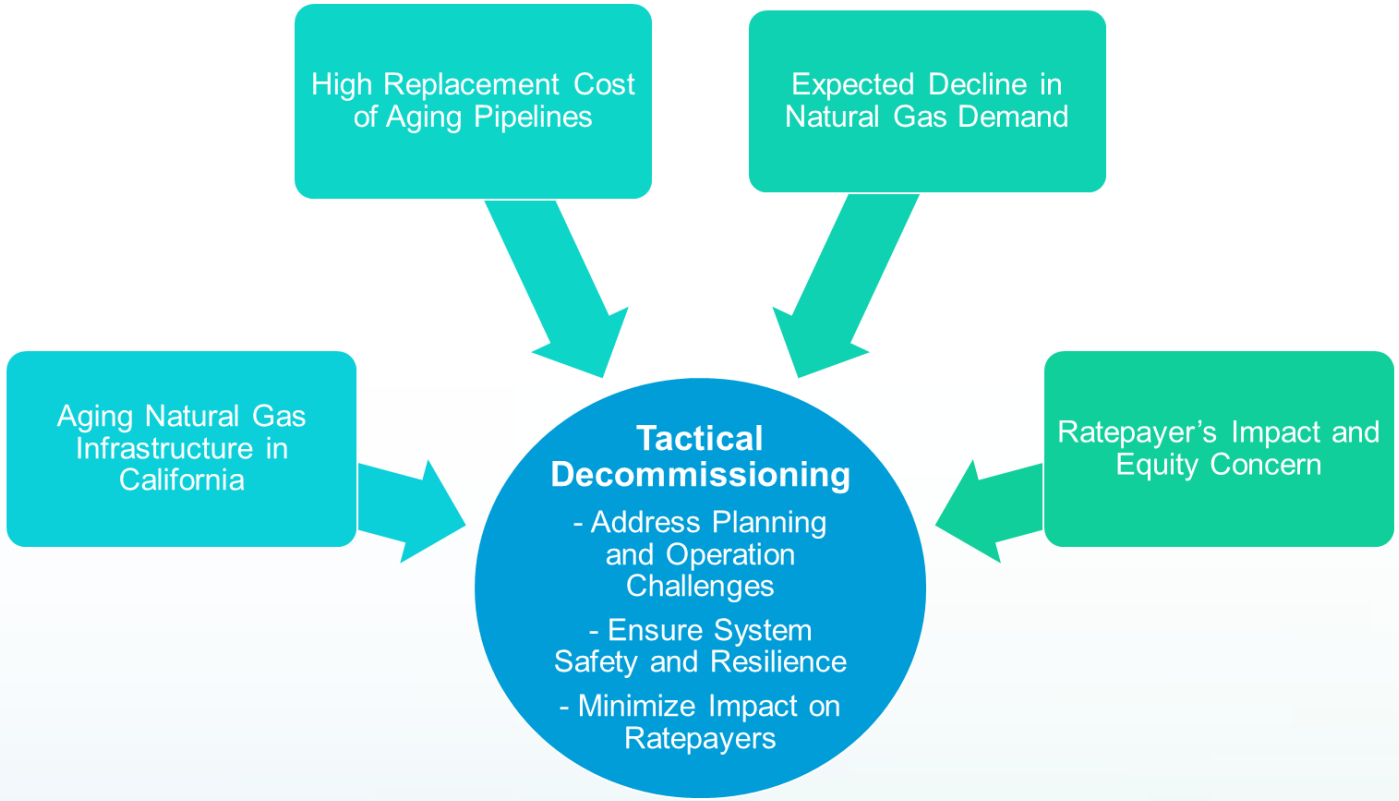

PG&E McDonald Island facility

Program Outcomes

Commercialization

- High Accuracy Mapping technology is fully commercialized. Deployment to Paradise reconstruction includes both pipelines and electric cables.
- More than 700 high accuracy mapping devices were deployed to multiple gas utilities in the nation after the project ended and
- Hundreds of encroachment notification devices were deployed by multiple utilities such as PG&E, SoCal Gas and NYSEG.

Pathways and Analytics for Tactical Decommissioning



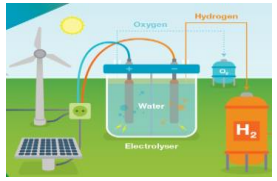
Tactical Decommissioning

- Stakeholder engagement and community research
- Economic and equity modeling
- Evaluation (decision analysis)
- Pilot deployment and applications
- Guidelines and criteria to replicate the success for broader deployment

Pilot Demonstration for Tactical Decommissioning

- Develop criteria and a framework for selected decommissioning sites
- Explore methodologies and develop deployment plans for strategic decommissioning while balancing decarbonization, consumer acceptance and safe operations
- Identify community priorities, perspectives, and paths forward on electrification and tactical gas decommissioning
- Identify opportunities to achieve gas system cost reductions through tactical decommissioning

Upcoming Research Opportunities

	Segments	FY 20-21 Natural Gas Research Initiatives for Hydrogen
	Production	Decarbonization via Efficient and Cost-Competitive Renewable Hydrogen and Biomethane: Emerging Renewable Hydrogen Production
	**Delivery**	**Pilot Test and Demonstration of Hydrogen Blending into Existing California Natural Gas Pipelines**
	Utilization - Transportation	Technology Integration and Demonstration of Hydrogen Fuel Cell Trucks and Buses
	Utilization – End Use Appliances	Examining the Effects of Hydrogen in End-Use Application

Thank You!