



**INDUSTRY PERSPECTIVES ON NEEDS
& OPPORTUNITIES FOR RESILIENT
COASTAL INFRASTRUCTURE**

WORKSHOP REPORT OUT

FEBRUARY 2020

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EXECUTIVE SUMMARY

CERISE (Center of Excellence for the Resilience of Industrial and Energy Infrastructure) is a new research center at Rice University that focuses on coastal resilience in the oil & gas, chemical and petrochemical industries exposed to hazards, such as hurricane & flood events or the effects of a changing climate. CERISE organized a three-hour workshop with participation from 17 representatives of 11 coastal industries or industry organizations, as well as eight participants with complementary areas of expertise at Rice University to get initial input on the potential value CERISE can bring to the industry. The workshop design and facilitation was led by Dr. Henk Mooiweer of Innovenate LLC.

The workshop participants identified key infrastructure risks, such as threats, consequences, and lack of mitigation. The workshop syndicates identified the following key roles for CERISE: To become the safe space for industry to co-create with researchers, share, learn and exchange information and best practices. Moreover, CERISE will serve as a knowledge hub, organize symposia and roundtable discussions and closely cooperate with industry.

Additionally, the workshop identified key areas of industry interest that CERISE could specifically focus on pertaining to coastal resilience of industries and their infrastructure. This includes:

- Improving risk forecast and assessment;
- Providing clear and unbiased risk information;
- Demonstrating the value of risk mitigation; and
- Developing and sharing risk mitigation best practices; and
- Supporting risk-informed decision-making and planning for industries

Overall, workshop participants believe that CERISE will be valuable to their organizations and participants would like to stay engaged



**TO BECOME THE SAFE
SPACE FOR INDUSTRY
TO CO-CREATE WITH
RESEARCHERS, SHARE,
LEARN & EXCHANGE
INFORMATION & BEST
PRACTICES**



THE WORK- SHOP

DECEMBER 4, 2019



ABOUT

CERISE is a new research center at Rice University that aims to propel coastal resilience in the oil & gas, chemical and petrochemical industries exposed to hurricane & flood events or the effects of a changing climate. CERISE was formed to address particular challenges facing coastal industrial infrastructures, including protection from severe storms, response and recovery from such extreme events, and adaptation to chronic stressors, such as climate impacts or infrastructure deterioration. The goal of the workshop was to seek industry input to inform and direct the CERISE research agenda and ensure that expertise is most effectively leveraged to address ongoing and future needs surrounding resilience.

The workshop objectives were to: 1) Obtain an initial overview of key industrial and energy infrastructure risks, 2) Obtain a better insight in some of the root causes of risks and vulnerabilities, 3) Obtain an overview of some key barriers that hinder adequate risk mitigation and 4) Provide recommendations to CERISE about how it can best serve and inform industry on what they have identified as their most prominent issues, risks and vulnerabilities.

The CERISE workshop had participation from 17 representatives of 11 coastal industries or industry organizations, including American Fuel and Petrochemical Manufacturers, American Chemistry Council, Chevron, ExxonMobil, Harvest Gas Management, IHS Markit, Kinder Morgan, Magellan Midstream, Marathon, Motiva, and Shell. Additionally, eight participants from Rice University who specialized in resilience, infrastructure, energy and related fields attended to gather initial input on potential value CERISE can bring to the industry. These participants included CERISE core members Dr. Jamie Padgett, Dr. Pedram Hassanzadeh, Dr. Ted Loch-Temzelides, Dr. Rachel Meidl and Jim Blackburn. Participants agreed that neither the identity nor the affiliation of the industry participants should be revealed in connection with any specific discussions, statements, positions or information received.

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CERISE AIMS TO PROPEL COASTAL RESILIENCE IN THE OIL & GAS, CHEMICAL AND PETROCHEMICAL INDUSTRIES.

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WORKSHOP RESULTS

THE WORKSHOP GROUPS CREATED AN “OUTLINE RISK MATRIX” FOR COASTAL INDUSTRIES. THIS WAS AN OPENING EXERCISE TO QUICKLY IDENTIFY THE KEY HAZARDS AND THREATS, CONTRIBUTING RISK FACTORS AND IMPACTS/CONSEQUENCES OF ACTION. THE RESULTS HELPED GUIDE THE WORKSHOP, AS WELL AS THE FUTURE WORK & FOCUS OF CERISE. SELECTED EXAMPLES THAT RANKED HIGH ON PERCEIVED LIKLIHOOD OF OCCURRENCE AND/OR POTENTIAL IMPACT ARE HIGHLIGHTED ON THE RIGHT.





01

KEY HAZARDS & THREATS

- Storm surge
- Extreme rainfall



02

CONTRIBUTING RISK FACTORS

- Limited understanding of key issues and solutions
- Complex jurisdiction issues and inconsistencies
- Lack of approved and consistent method of risk assessment
- Dependence on industry and public infrastructure recovery abilities



03

IMPACTS & CONSEQUENCES

- Impact on community
- National economic impact
- Hydrocarbon fuels supply chain impact
- Health and environmental impact of spills



CONCLUSIONS

Based on workshop participant round table comments on the potential role of CERISE and a further evaluation of the workshop results the following potential roles for CERISE were identified. CERISE should become the safe space for industry to co-create with researchers, share, learn and exchange information and best practices. CERISE should host industry round tables, organize industry symposia and closely cooperate with industry and become a clearing-house to share and develop best practices.

CERISE might specifically focus on:

- Improving risk forecast and assessment;
- Providing clear and unbiased risk information;
- Demonstrating the value of risk mitigation;
- Developing and sharing risk mitigation best practices; and
- Supporting risk-informed decision-making and planning for industries

POTENTIAL ROLE OF CERISE TO REMOVE RISK MITIGATION BARRIERS

The workshop concluded with a discussion of the potential role of CERISE to remove risk mitigation barriers. This included a discussion on how to improve the risk forecast, provide clear and unbiased risk information, develop and share mitigation best practices and how to demonstrate the value of risk mitigation. CERISE should consider conducting additional research on these areas of interest in order to provide valuable input and coordination for industry and industry partners.



NEXT STEPS

CERISE will further develop and implement its strategy and present a 2020 Execution Plan. CERISE will invite workshop participants and other coastal-based organizations to become part of the CERISE network, participate and support the execution of the 2020 plan. As a research center of excellence and knowledge hub, CERISE can serve as an accelerator for discovery and a vehicle for information exchange. The Center and its work aims to provide a blueprint for risk modeling, mitigation and protection strategies for industries around the world exposed to such hazards as hurricanes, flood events and the effects of changing climate.

**CENTER OF EXCELLENCE FOR
RESILIENCE OF INDUSTRIAL &
ENERGY INFRASTRUCTURE**

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