Research and Development
Needs & Opportunities
for CM and REE:
Gulf Coast Regional & Offshore

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• Deep technical expertise for the
  o Exploration of resources and quantification of reserves
  o Drilling and mining
  o Separation, production and monetization
  o Value and supply chain optimization: Local, National, Global
  o End – of – life options and Circular economy

• Impact of current energy crisis

• Offshore Gulf Coast: Network & Infrastructure
  • ~1,800 active platforms within the OCS; more than 40 % facilities are 25+ years old (~2000 decommissioned in last 15 years)
  • Industry averages >130 platform removals / yr
Research & Development Opportunities

• Application of data sciences, artificial intelligence, and machine learning for resource identification and quantification: Transfer and Adoption from Fossil Energy Applications including for Produced Water

• Automated extraction & concentration through robotics and automation as adapted to modular processing

• Processing & Separation: Intensified processes, Green chemistries, Novel energy inputs

• Green supply chain & Sustainable mineral extraction: Circular management of chemical reagents

• End-of-life management and recycling of REE: magnets, turbines, PVs, EVs

• Unconventional sources for REE: Laterites, Deep sea, Seawater
Adjacent & Integrated Advancements

• Permitting: Complex, Multi-jurisdictional, Environmental regulations
• Supply Chain Management: Managing market needs & market economics
• Managing Technology Transfer
• Workforce Development Challenges: Interdisciplinary and multi-level
Innovation and Entrepreneurship

• Convergence of multi-disciplinary teams of science, engineering, business, legal and policy
  • Defining a sustainability index
  • Defining a standard for LCA/TEA

• Various bottlenecks and potential solutions in value chain:
  • Marine harvesting of minerals (cobalt) through repurposing of offshore rigs: Incorporating Green Harvesting Membranes
  • Application of AI/ML for Identification & Resource Quantification for fossil based CM/REE resources
  • Robotics and Automation for automated drilling and production
  • HPHT Technologies for deep wellbore
  • Recycling technologies through Sustainable Hydrothermal Processes
Thank You & Questions

• Thanks for your attention

• Questions

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