

# EPRI's Advanced Construction Research

## Enabling the deployment of Advanced Reactors

Hasan Charkas, Ph.D, PE.

EPRI Principal Project Manager

Advanced Nuclear Technology

    
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# Engineering and Construction Innovation

GOAL  
& VALUE

Identify, develop, qualify engineering and construction technologies that enable:

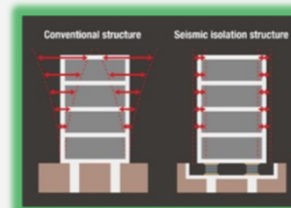
**Reduced Cost | Increased Quality | Improved Efficiency**



- Modular Construction Technologies
- Structural Health Monitoring
- Digital Twin Applications

Construction Technologies

- Risk-Informed Performance-based Design Solutions
- Steel-plate Composite (SC) Structures Analysis Guide
- Analysis of Structures, Systems and Components



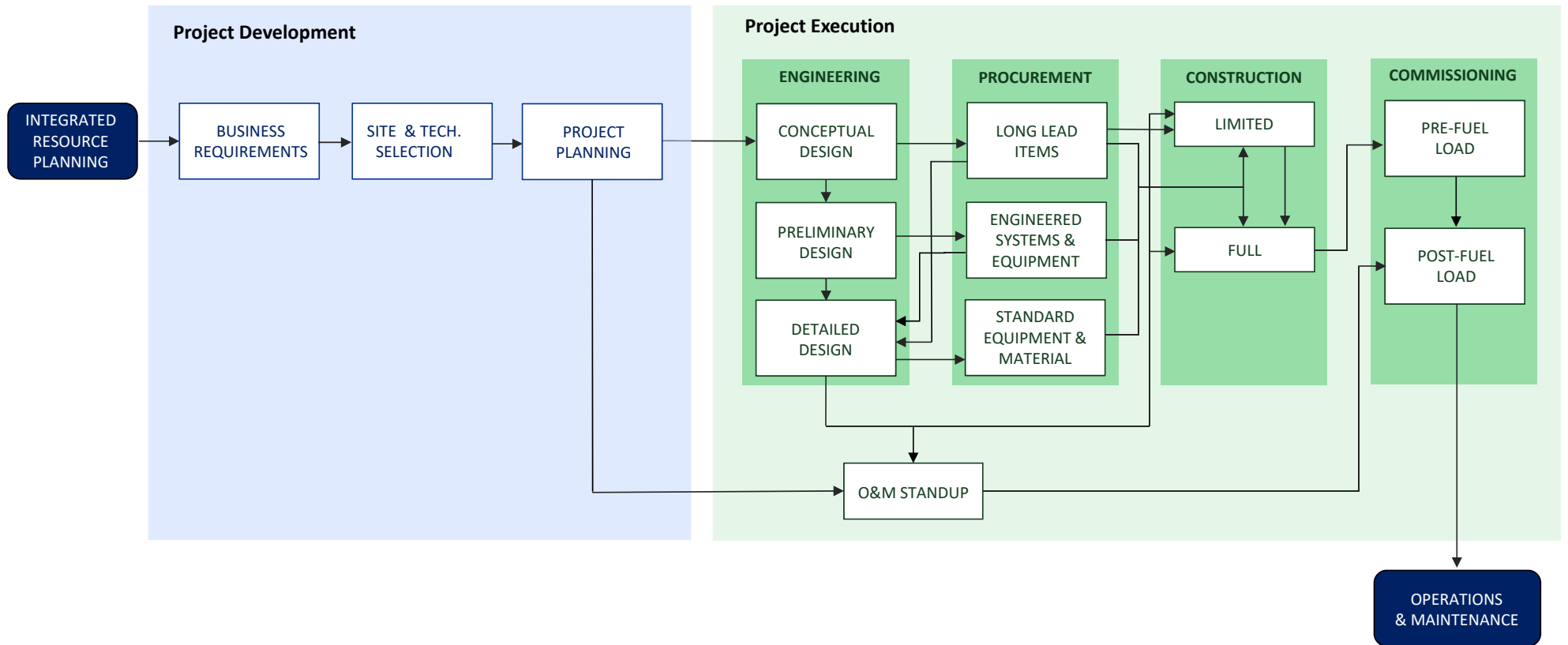
Engineering Solutions



- Assessing Concrete Behavior under Elevated Temperatures
- Testing high-strength Large Steel Rebars for applications
- Self-consolidating Concrete for Mass Construction Applications

Concrete and High Strength Rebars

# Project Development and Execution Lifecycle



# Shifting Paradigms for the Future Fleet

## Innovative Construction Processes

- Seismic Base Isolation
- Digital Twins
- Faster construction disposition
- Modularization



## Reinventing the Nuclear Supply Chain



- Commercialize advanced manufacturing techniques
- Reduce long-lead procurement times by **up to 90%**
- **Develop code cases** to allow for industry application

## Autonomous Advanced Reactor



- Optimize **staff** while improving **safety** and **reliability**
- Leverage **sensors**, **drones**, and **robotics**

## Separation of NF & AF

Develop a methodology to **decouple nuclear facility** from adjacent facilities

- Improve **economics**
- **Enables** non-electric missions
- Simplifies **licensing** reviews





# Large-Scale Testing

## PHASE 1 (COMPLETE)

Study lap splice strength of large steel bars for use in nuclear application to reduce reinforcement congestions



## PHASE 2

Explore mechanical splices of high-strength steel bars

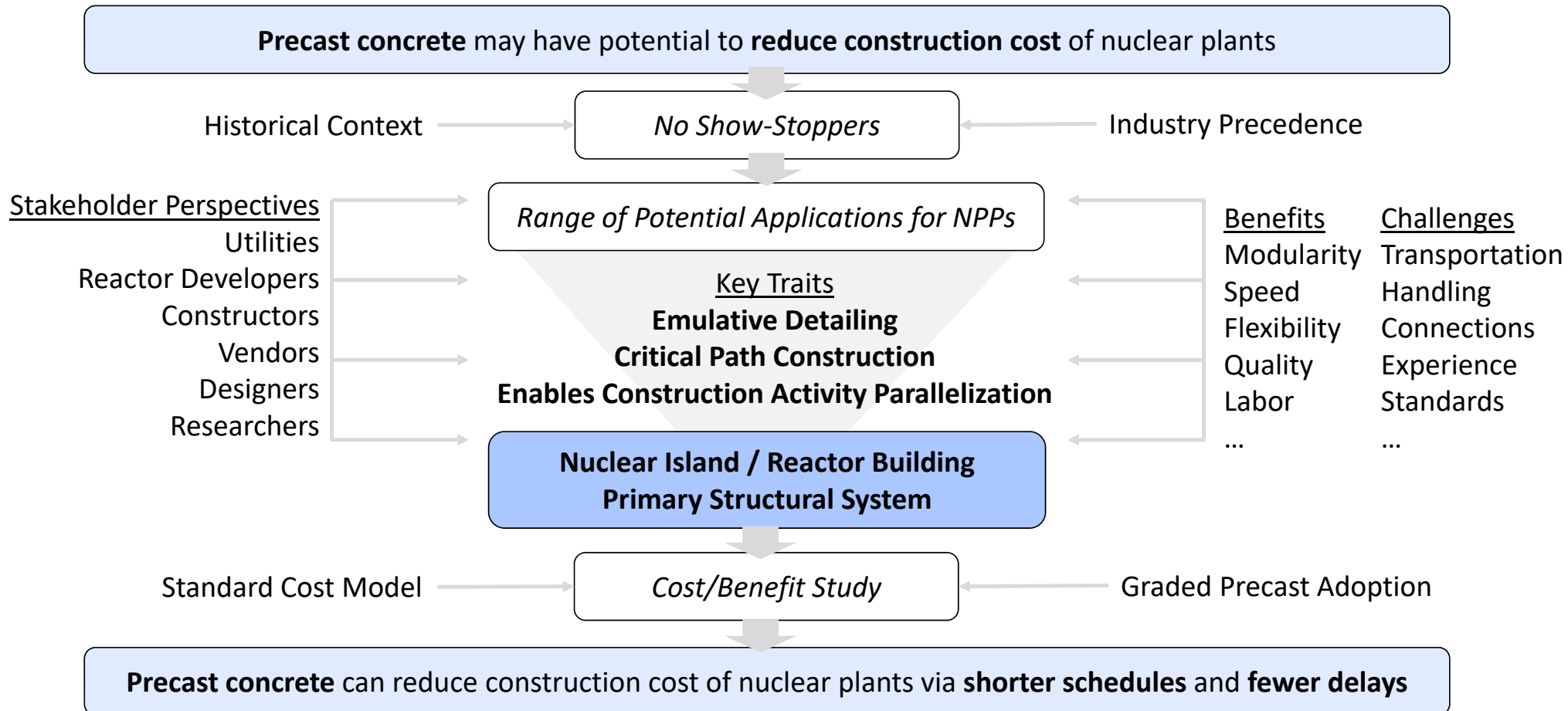


## PHASE 3

Experiment earthquake-resistant anchorage design



# Evaluation of Precast Concrete Construction for New Reactors



# Accelerating Construction Schedule

- Streamlining Construction Evaluations (SCE) for dispositioning construction nonconformances [3002023903](https://www.eprri.org/3002023903)
- Risk informing construction inspections
- Strategies for efficient and skilled labor
- Large demonstration projects of critical construction activities
  - Field welding/Fit-up/Fabrication of modules
  - Underground construction



A blue-tinted photograph of four people, two men and two women, standing together. They are dressed in professional attire, including lab coats and a hard hat. The image is overlaid with the text 'Together...Shaping the Future of Energy®'.

**Together...Shaping the Future of Energy®**