

# Developing the Next Generation Nuclear Plant *Evolving Strategy and Risk*

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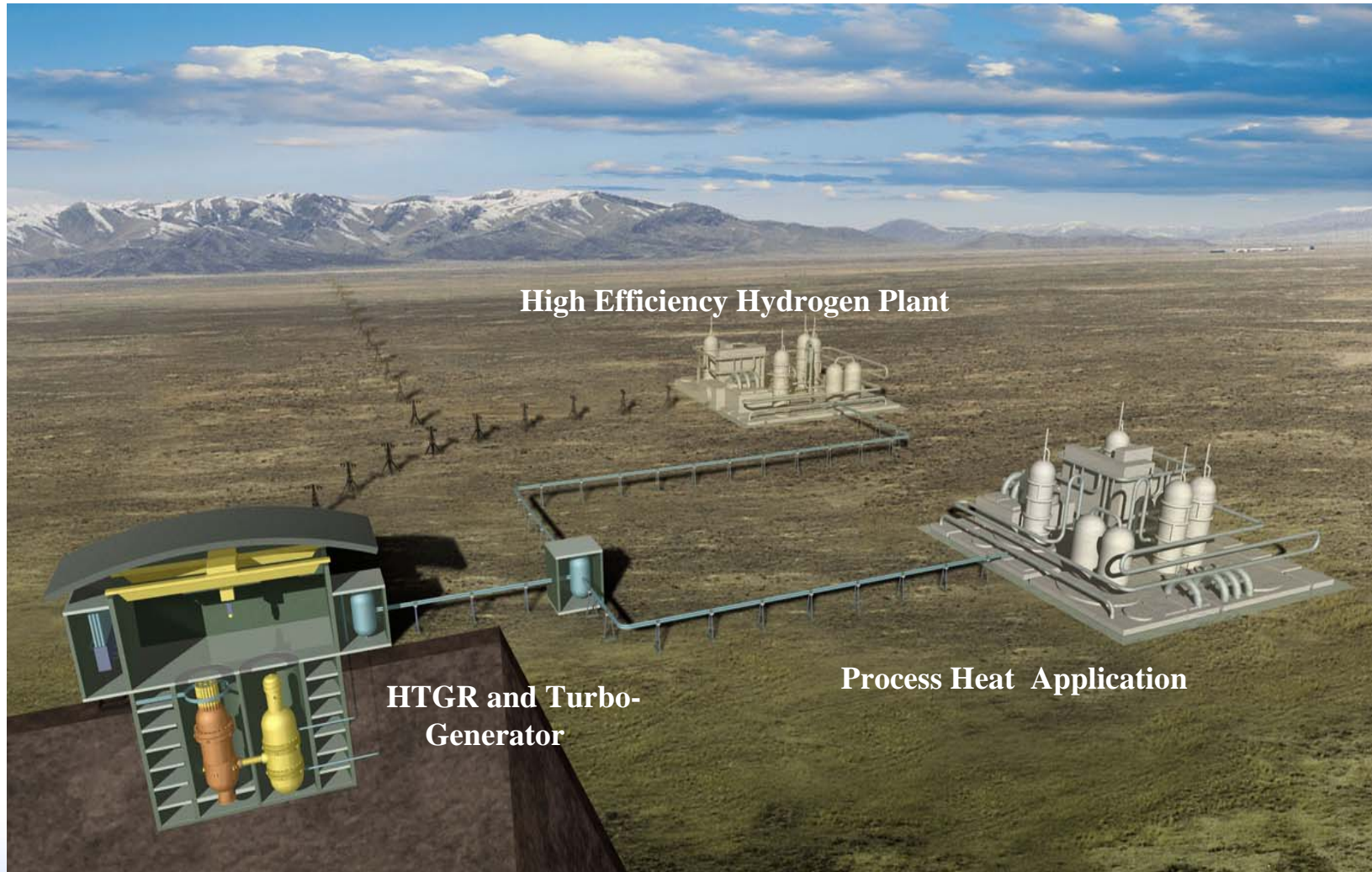
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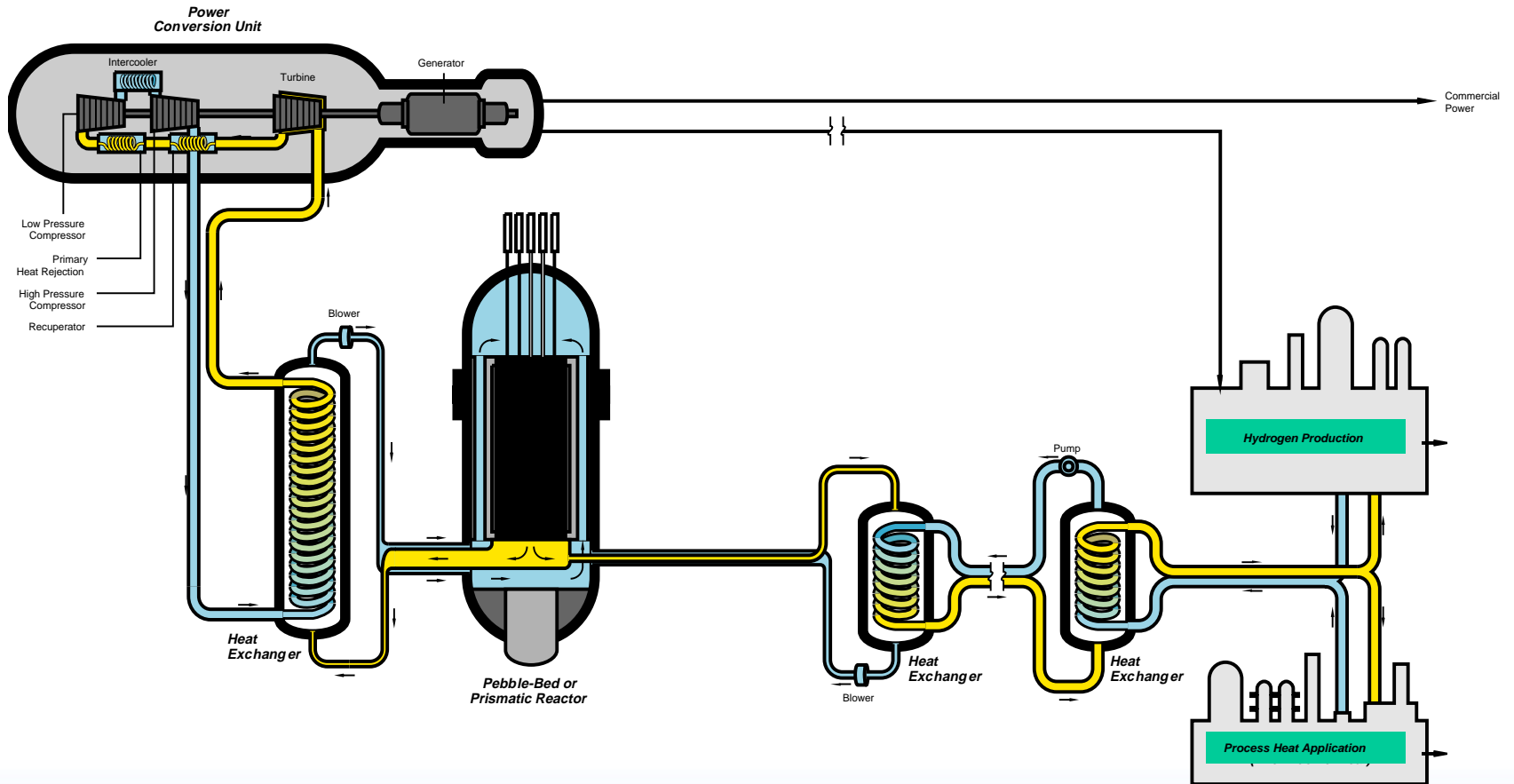
# Outline

- **Summary update on the NGNP Project**
- **Developing the Commercial Alliance and the Public-Private Partnership**
- **Selected design and technology development risks**

# The NGNP Concept – HTGR Demonstration



# Reference Commercial Demo



# Where are we?

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1. **Partial project organization**
2. **Commercial alliance essential to obtain adequate funding for development**
3. **Preliminary project risk assessment/management plan**
4. **Engineering studies and pre-conceptual design in process**
5. **Preliminary R&D plan – acquisition studies for fuels and materials and pre-conceptual design will re-define**
6. **ROM cost and schedule estimates – better defined by pre-conceptual design**
7. **Technical and functional requirements to be developed from pre-conceptual design work**

# Defining Documents

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- **Business Strategy** – *A Public-Private Partnership to Develop the Next Generation Nuclear Plant Commercial Demonstration, October 2006*
- **Technology Review** – *Design Features and Technology Uncertainties for the Next Generation Nuclear Plant, June 30, 2004*
- **Technology Risk Assessment** – *Next Generation Nuclear Plant Project – Preliminary Project Management Plan, March 2006*

# Near Term Priorities for NGNP

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- ***Engineering Studies and Pre-conceptual Design***
- ***Selected R&D***
- ***Licensing Strategy***
- ***Quality Assurance Excellence***
- ***Planning for Project Success***

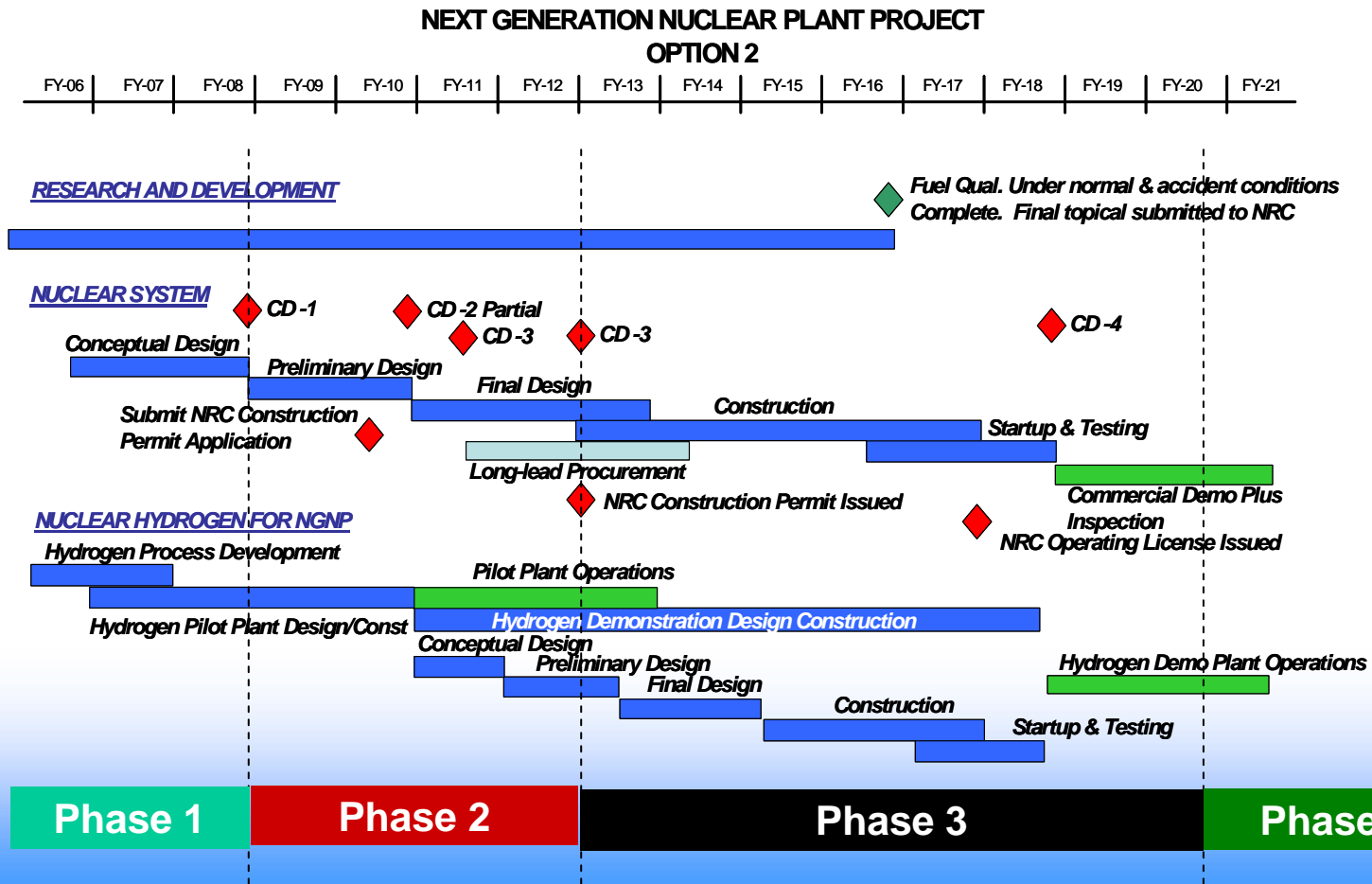
# Execution is a Multi-Phased Effort

Phase 1	Phase 2	Phase 3	Phase 4
<b>Program Development &amp; Project Definition</b>	<b>Plant Design &amp; Licensing</b>	<b>Plant Construction &amp; Operation</b>	<b>Commercial Deployment</b>
<ul style="list-style-type: none"><li>• Conceptual Design &amp; Engineering</li><li>• Licensing Strategy Development</li><li>• Reference Cost &amp; Schedule Baseline</li></ul>	<ul style="list-style-type: none"><li>• Complete Detailed Design</li><li>• License NNGP</li><li>• Obtain Construction License</li><li>• Detail Design Cost &amp; Schedule</li></ul>	<ul style="list-style-type: none"><li>• Construct Facilities</li><li>• Train Operators</li><li>• Conduct Confirmatory Testing</li><li>• Operation &amp; Demonstration Runs</li></ul>	<ul style="list-style-type: none"><li>• Commercial Certification</li><li>• Deployments</li></ul>



# Key Issues Will Define Successful Execution

- NRC license application and licensing process
- Technology development and qualification
- Acquisition strategy and long lead procurement
- Startup testing and initial operations

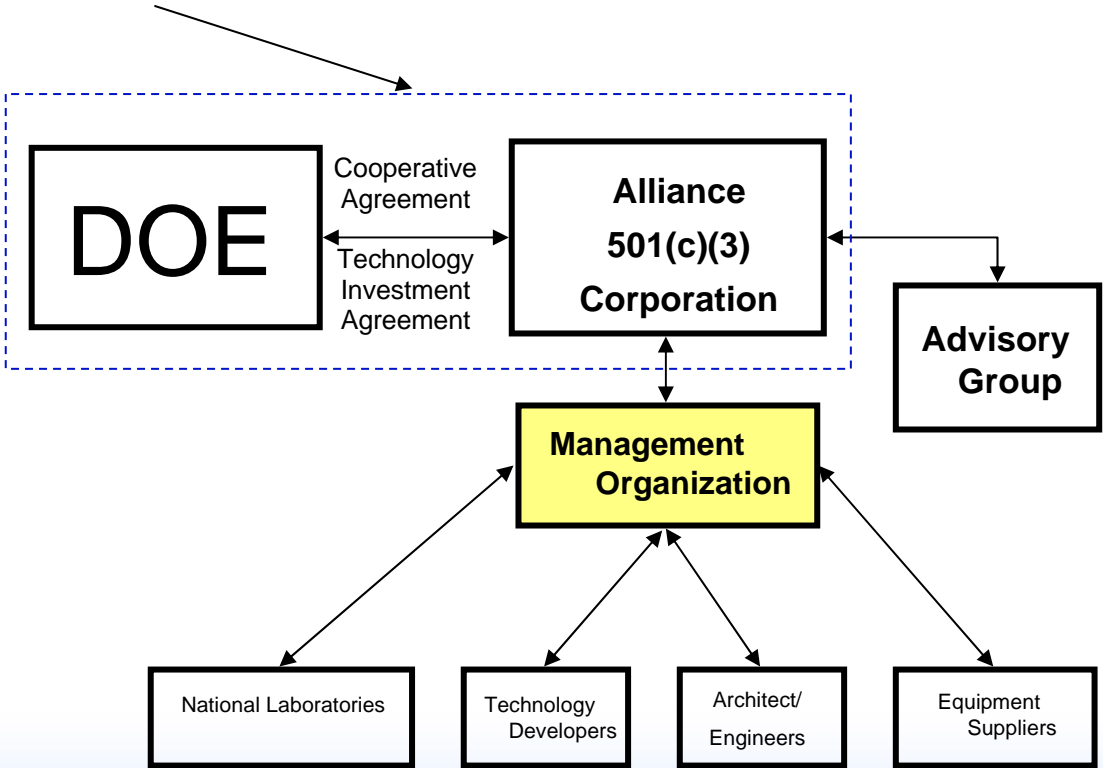


# Steps to Assure Viable Commercial HTGR

- 1. Establish commercial industry alliance to enter into a public/private partnership**
- 2. Complete the conceptual, preliminary and final design of a prototype HTGR that produces process heat, hydrogen and electricity**
- 3. License with the Nuclear Regulatory Commission**
- 4. Build and operate a demonstration plant sufficient time to confirm performance**
- 5. Certify standardized HTGR designs for commercial deployment in a broad range of applications**

# Proposed Partnership Organization

## NGNP Public-Private Partnership



# What are the near-term objectives of the Public-Private Partnership activities?

- **Demonstrate commercial energy industry interest in the HTGR concept and related technologies, including hydrogen production**
- **Attract private funding and value-in-kind contributions from end-users and technology developers/vendors**
- **Obtain political support and Government agreement to cost-share development and demonstration**
- ***Steps to achieve these objectives include:***
  - **Preparing a credible business strategy and project plan**
  - **Developing a commercial Alliance of major end-users and technology developers/vendors**
  - **Forming a public-private partnership to share the development and demonstration costs for these advanced technologies**

# What does the Alliance/Partnership want to demonstrate and commercialize?

## Balance

- Economics
- Performance
- Reliability
- Design risk
- Technology development risk
- Timing

# Selected Design and Technology Development Risks (1)

- **TRISO Fuel**
  - Performance
  - Acquisition (e.g., fabrication facility, timing)
- **Graphite**
  - Design requirements
  - Qualification methods
  - Acquisition
- **Intermediate Heat Exchangers**
  - Design
  - Materials

# Selected Design and Technology Development Risks (2)

- **Heat Transport**
  - **Medium**
  - **Operating conditions**
  - **Degree of isolation**
- **Process Heat Applications**
  - **Processes**
  - **Scalability**