Kairos Power

Advanced Reactor Licensing

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Kairos Power's mission is to enable the world's transition to clean energy, with the ultimate goal of dramatically improving people's quality of life while protecting the environment.

In order to achieve this mission, we must prioritize our efforts to focus on a clean energy technology that is *affordable* and *safe*.

Overview of Kairos Power

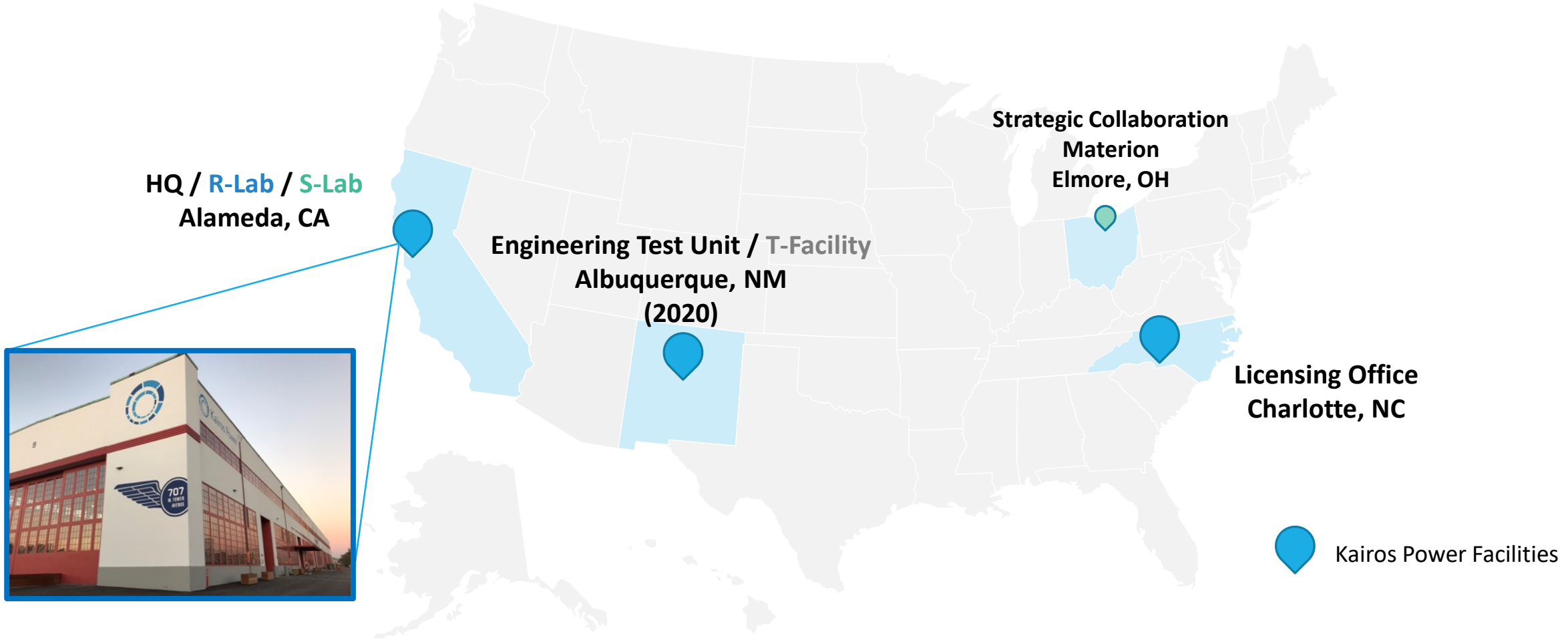
- Nuclear energy engineering and design company ***singularly focused*** on the commercialization of the fluoride salt-cooled high temperature reactor (FHR)
  - Founded in 2016
  - Current Staffing
    - 158 Employees
    - ~90% Engineering Staff
- Private funding commitment to engineering design and licensing program and physical demonstration through nuclear and non-nuclear technology development program
- Schedule driven by US demonstration by 2030 (***or earlier***) and rapid deployment ramp in 2030s

Kairos Power Headquarters

Kairos Power Team

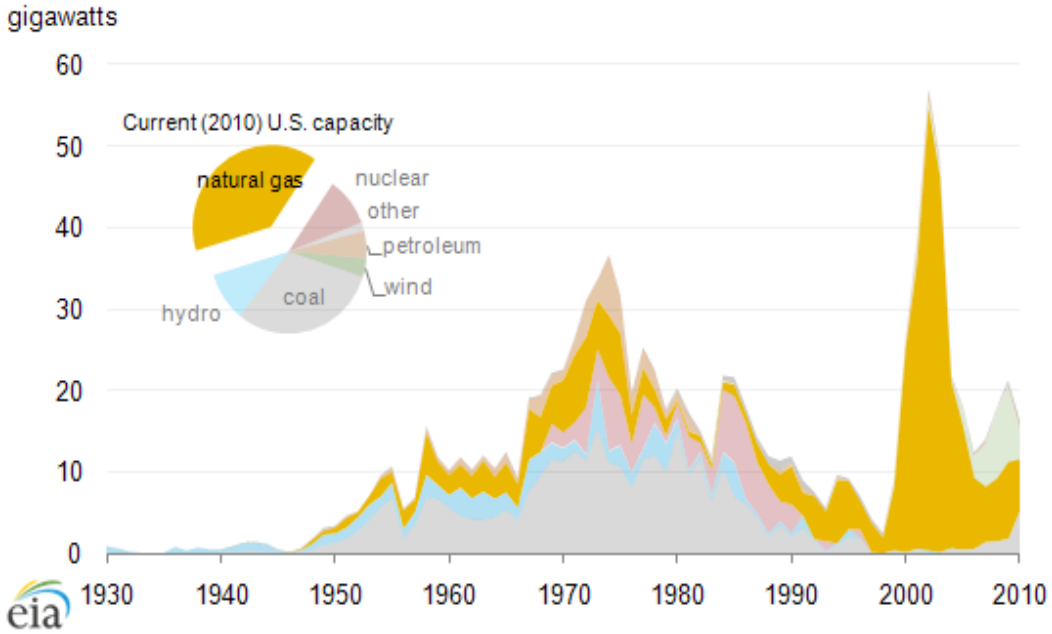
Kairos Power

Kairos Power Locations

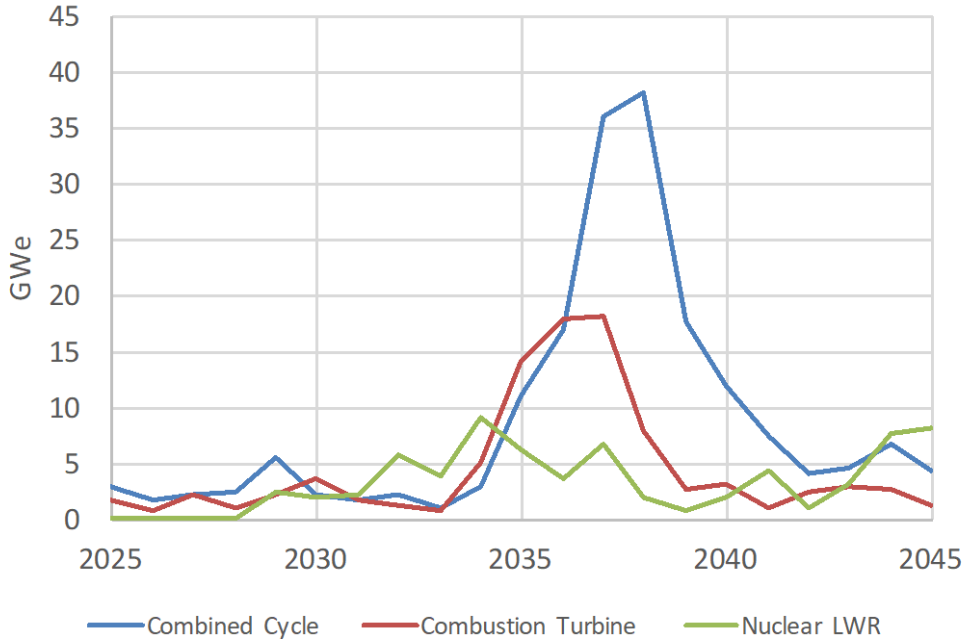


kairos (def.): the right or opportune moment

U.S. Electricity Generation by Initial Year of Operation and Fuel Type



Annual U.S. Generation Retirements



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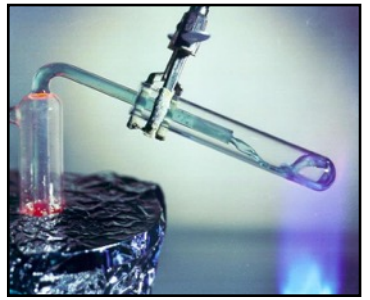
Kairos Power is Uniquely Suited to Supply the Nuclear Technology to Replace U.S. Natural Gas Capacity

- **Robust Inherent Safety**
  - Uniquely large ***fuel temperature margins***
  - Absorption of fission products in primary coolant
  - Low-pressure system
  - Effective passive decay heat removal
- **Lower Capital Costs**
  - Reduce requirements for high-cost, nuclear-grade components and ***structures*** through FHR intrinsic safety and plant architecture
  - Leverage conventional materials, existing industrial equipment, and conventional fabrication and construction methods

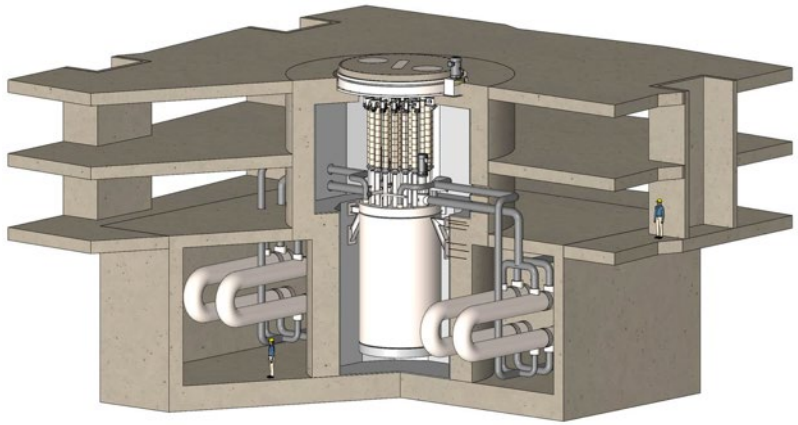
Technology Basis

Coated Particle Fuel
TRISO

Liquid Fluoride Salt Coolant
Flibe ($2LiF\text{-}BeF_2$)



Kairos Power Reactor Nuclear Island



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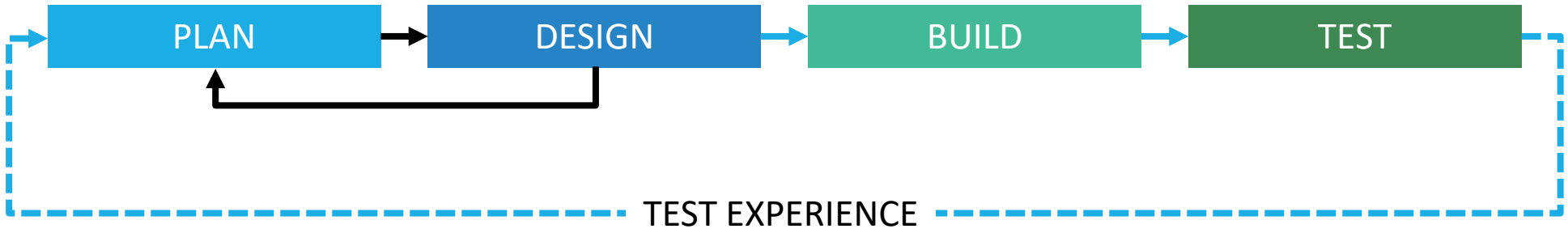
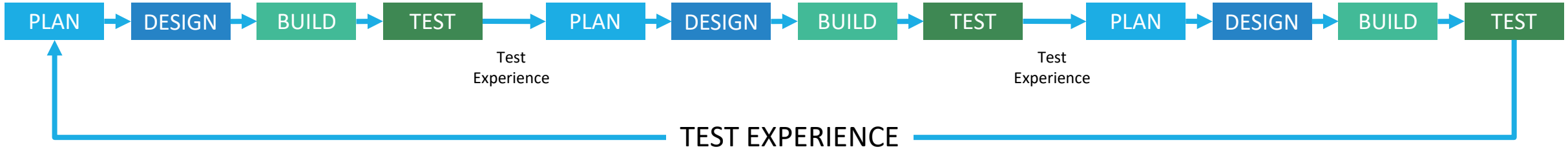
Kairos Power Nuclear Development Paradigm Shift

Conventional Nuclear Development Cycle



Kairos Power Accelerated Test Cycles for Innovation and Optimization



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Kairos Power Testing Program - *Rapid Technology Demonstration Requires Non-Nuclear Development and Qualification Facilities*

R RAPID LAB

Rapid Analysis, Prototyping, and Iterative Design Lab

S SALT LAB

Salt Handling and Loop Testing Lab

T TESTING FACILITY

Component Testing Facility

U USER FACILITY

User Ops & Maintenance Training Facility

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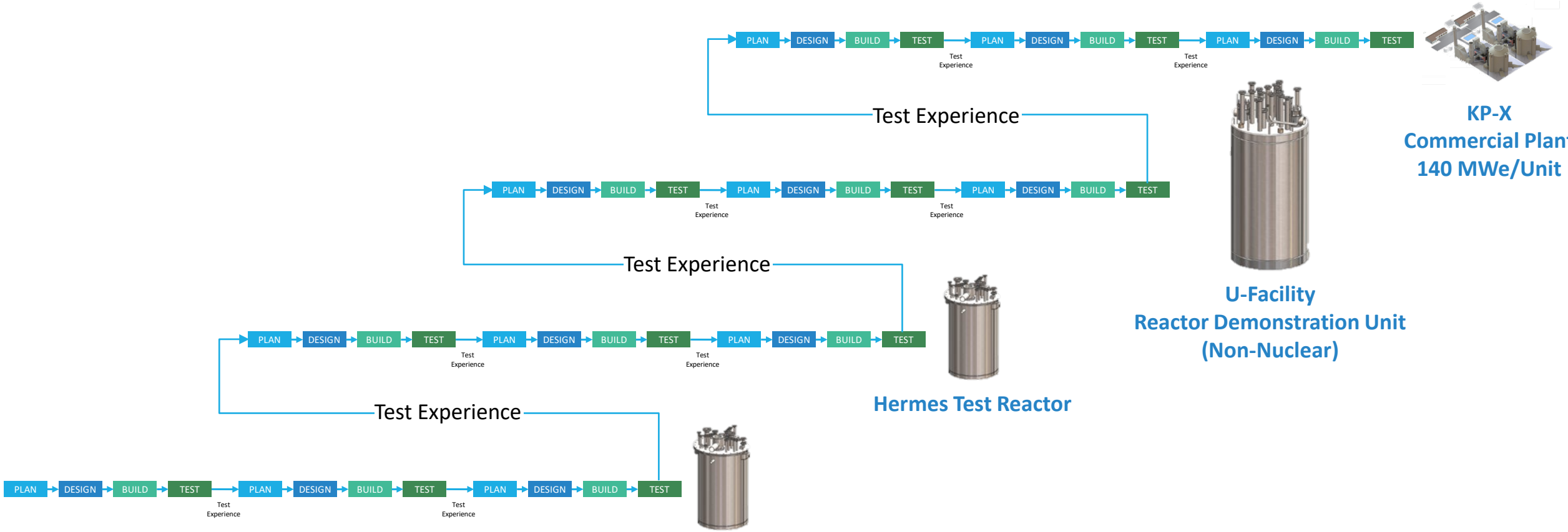
Kairos Power Development Program

- Kairos Power Iterative Process to Reduce Nuclear **Development Risk**



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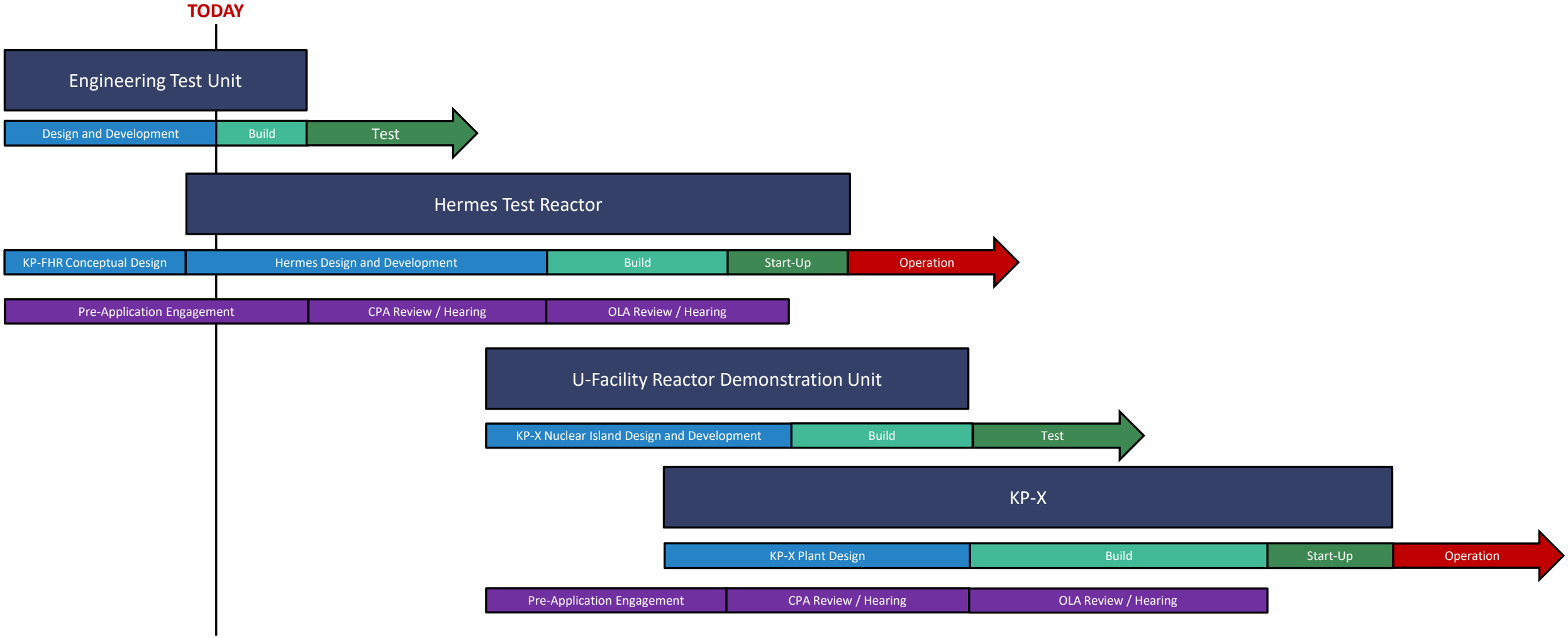
Kairos Power Development Schedule



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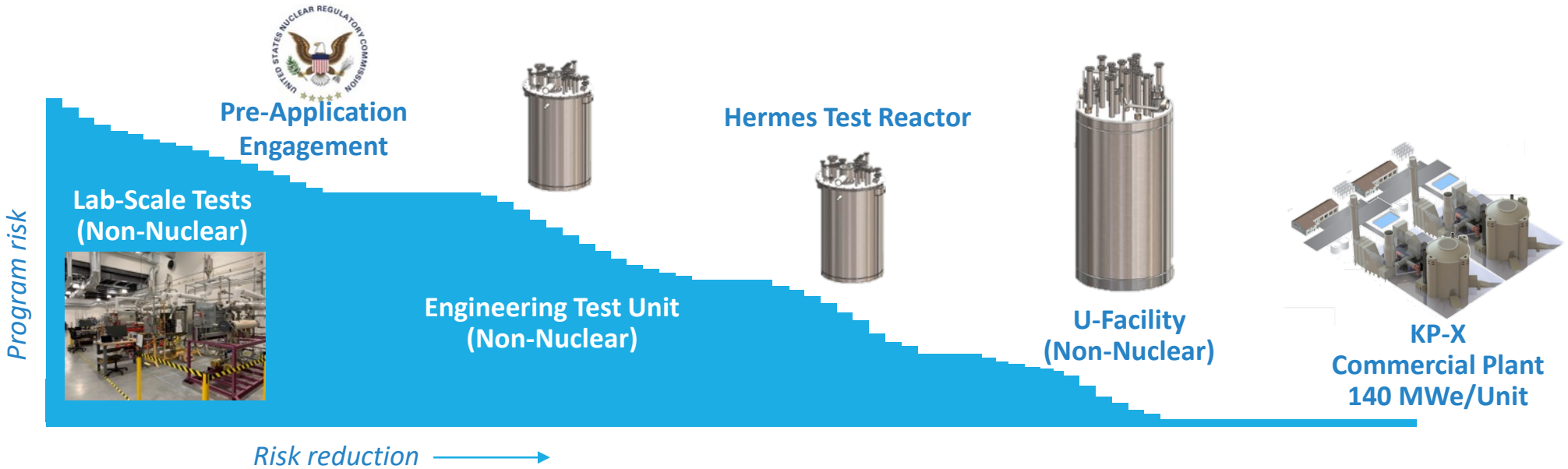
Risk Reduction



Kairos is significantly retiring risk to commercial deployment

- Technical risk via iterative development and Hermes test reactor
- Regulatory risk via comprehensive pre-application engagement
- Commercial risk via full-scale U-Facility

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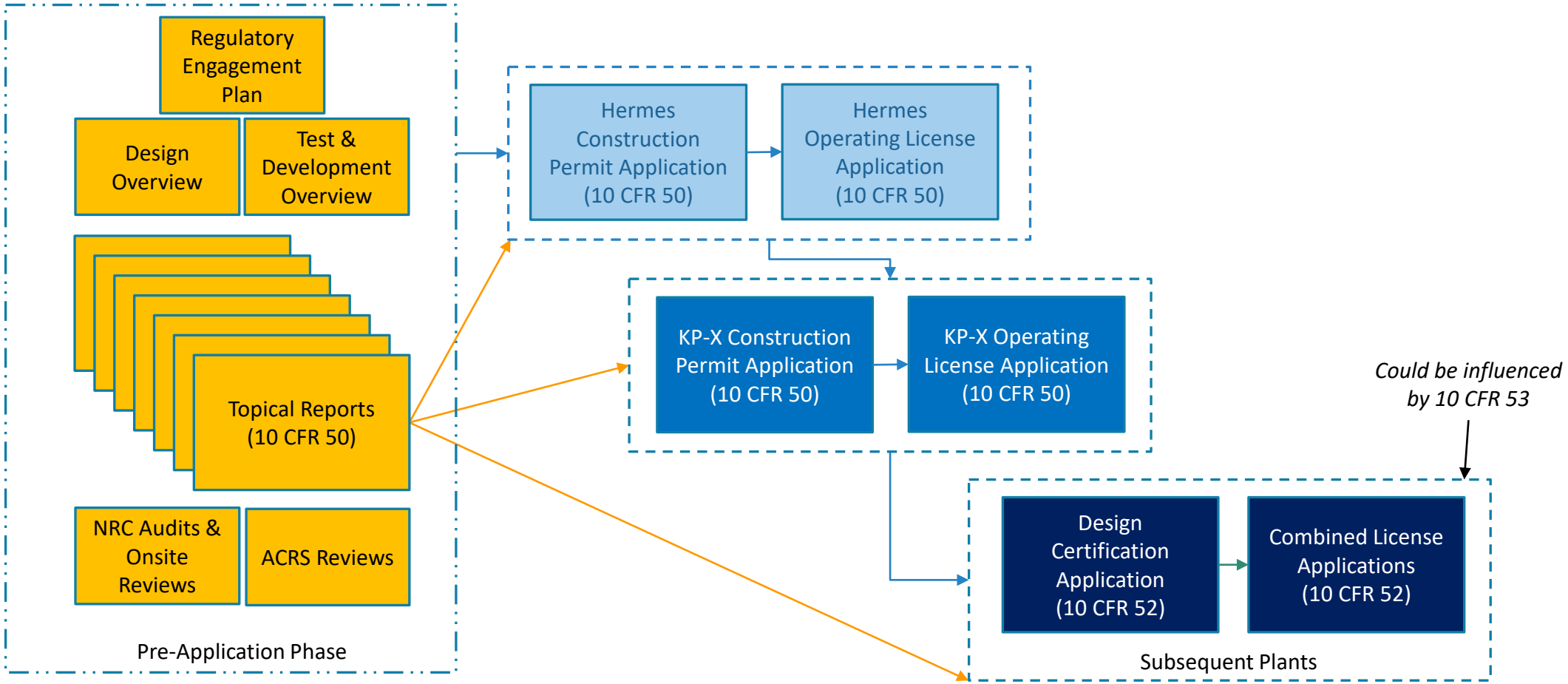
KP-FHR Licensing Strategy



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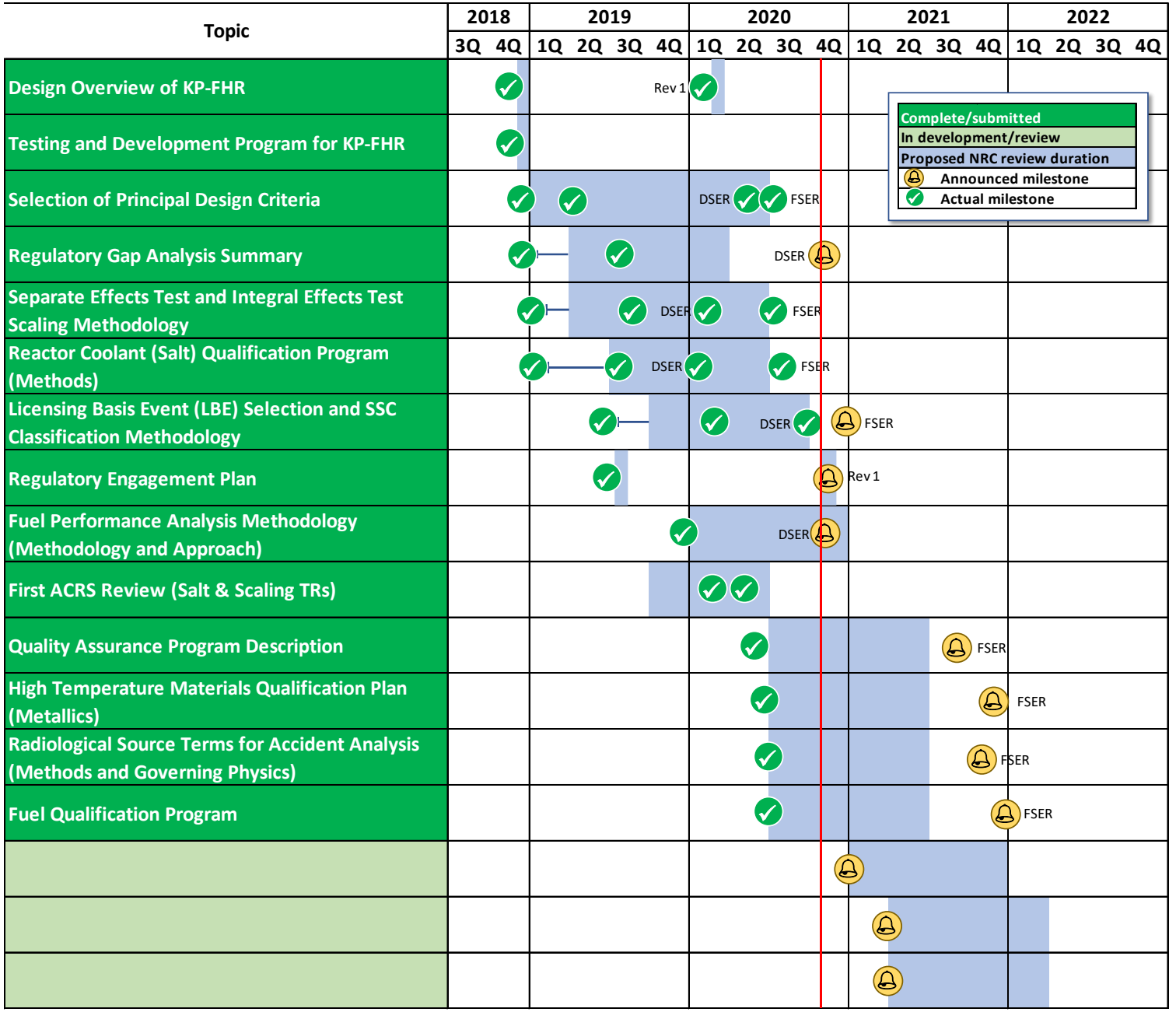
Pre-Application Engagement Status

- 18 technical or topical reports or revisions
- Pilot of “no-RAI” review
- Multiple audits, onsite reviews (including PIRT acceptance)
- NRC approvals:
  - Principal Design Criteria
  - Test Scaling Methodology
  - Salt Coolant Qualification
  - Licensing Basis Event Selection (draft)
- ACRS review of Test Scaling and Salt topicals (LBE pending)
- Under review:
  - Regulatory Gap Analysis
  - Fuel Performance
  - QA Program
  - High-Temp Metallic Materials
  - Mechanistic Source Term
  - Fuel Qualification



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Retiring Regulatory Risk

Industry/NRC

- Risk-Informed Emergency Planning
- Principal Design Criteria
- Functional Containment
- Risk-Informed Safety Case
- Risk-Informed Application Content
- Non-LWR PRA Standard
- TRISO Fuel Qualification
- Consequence-Based Security
- Part 53
- Advanced Reactor GEIS

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- Iterative development and testing cycle: *innovative approach to identifying and mitigating risk early*
- Significant, industry-leading pre-application engagement with NRC: *retires substantial regulatory risk*
- Test reactor licensing for Hermes: *retires technical risk*
- Common test and commercial reactor safety case: *retires regulatory risk for commercial plant*
- U-Facility and KP-X *design* are identical; U-Facility deployment occurs after Hermes, before KP-X: *retires substantial commercial (construction) risk*
- Hermes and KP-X licensing pathway: *enables earliest deployment and reduces FOAK regulatory risk*


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