




Kairos Power

Operating Experience Program and Rapid Iterative Approach to Reactor Deployment

PEIWEN WHYSALL, JORDAN HAGAMAN

SEPTEMBER 30, 2024



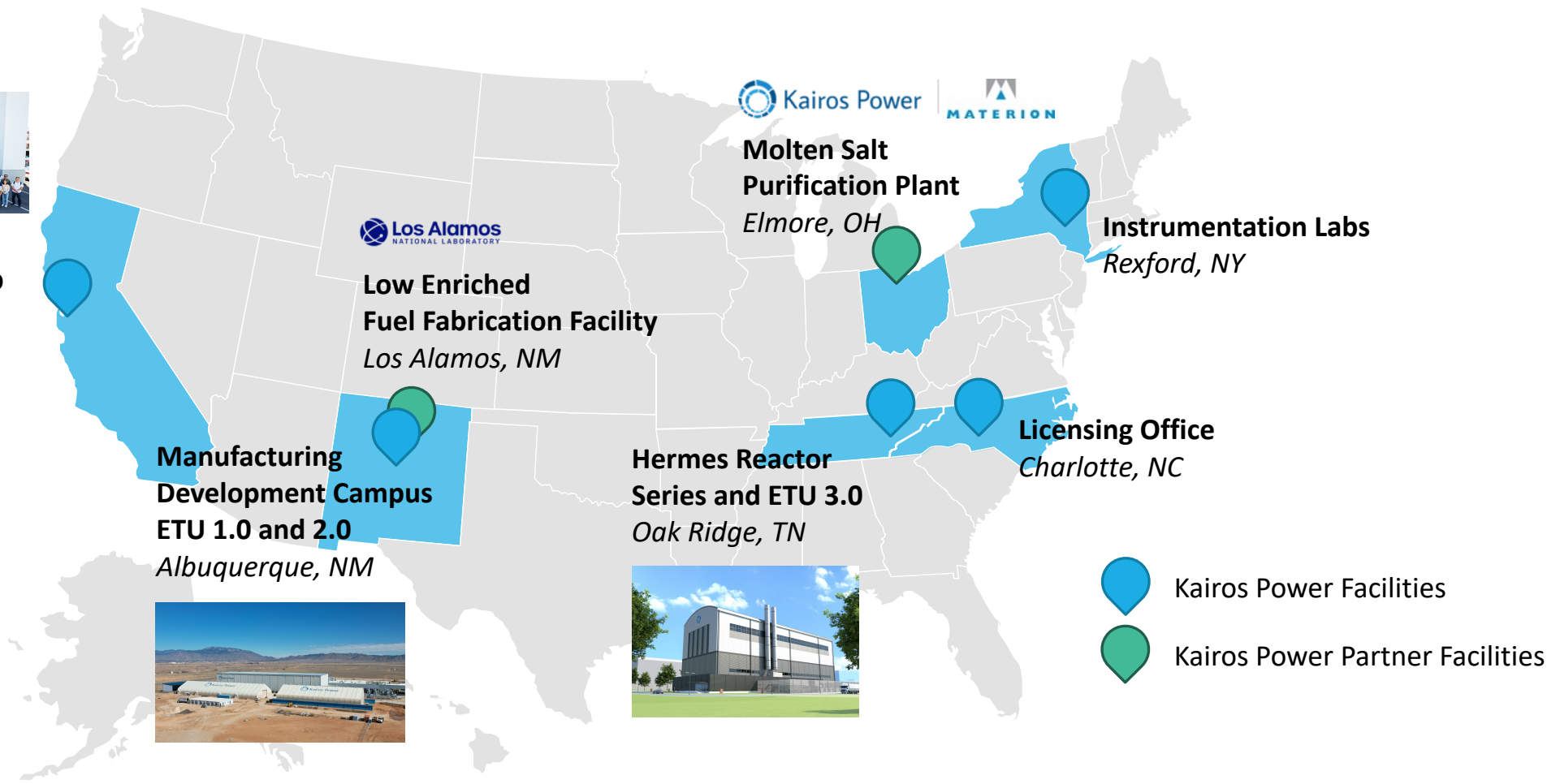
Kairos Power's mission is to enable the world's transition to clean energy, with the ultimate goal of dramatically improving people's quality of life while protecting the environment.

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

Kairos Power Locations and Infrastructure



Headquarters
RAPID Lab / Salt Lab
Alameda, CA



**Low Enriched
Fuel Fabrication Facility**
Los Alamos, NM



**Molten Salt
Purification Plant**
Elmore, OH



Instrumentation Labs
Rexford, NY



**Manufacturing
Development Campus**
ETU 1.0 and 2.0
Albuquerque, NM



**Hermes Reactor
Series and ETU 3.0**
Oak Ridge, TN



Licensing Office
Charlotte, NC



Kairos Power Facilities

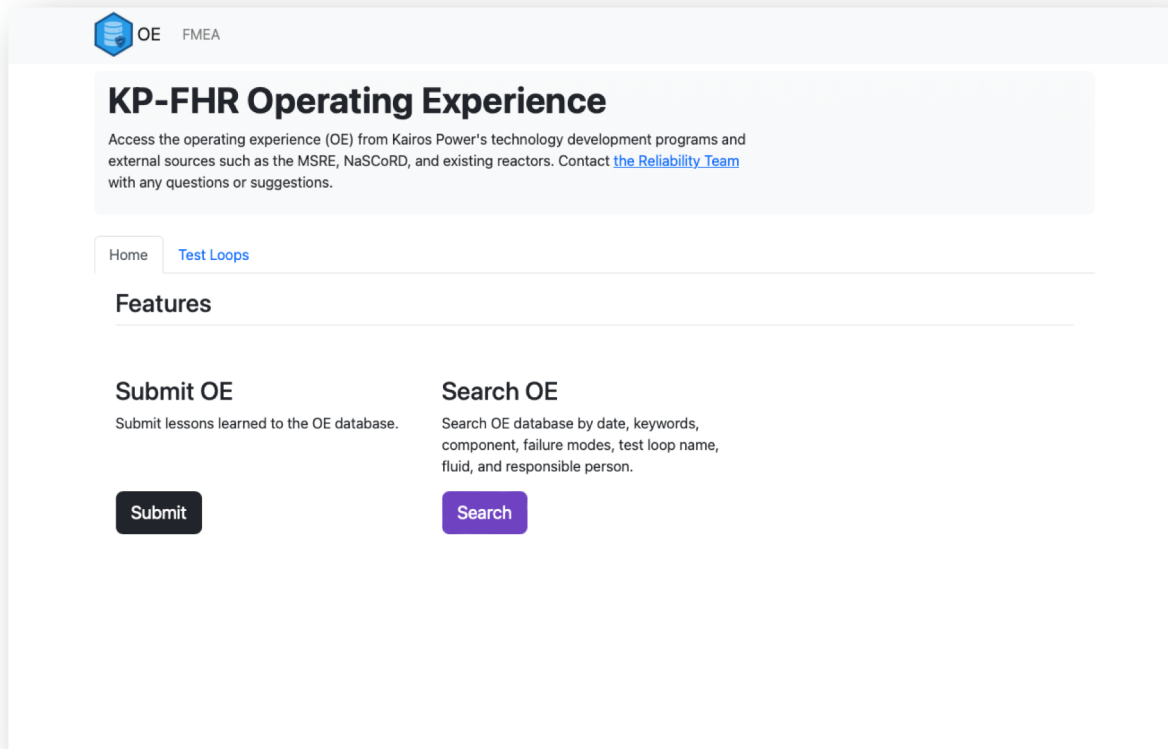


Kairos Power Partner Facilities



Operating Experience (OE) program overview

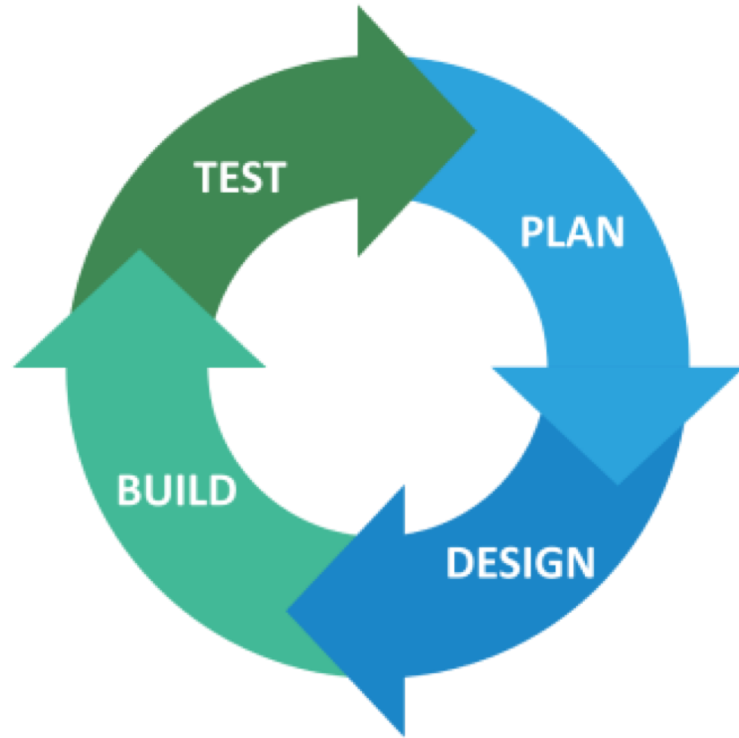
Identify, document and make accessible organizational knowledge to enable the iterative approach development pathway



OE can be any organizational knowledge, including hardware successes and hardware surprises

- Things went well
- Validation of assumptions
- Design
- Fabrication
- Assembly
- Commissioning
- Operations
- Programmatic
- Literature review
- Test results
- Supplier quality issue
- Corrective Action
- Near misses

Process steps



Initiate OE

Screen OE

Publish OE

Revise OE

Tools used in the OE program

Vertical integration of software

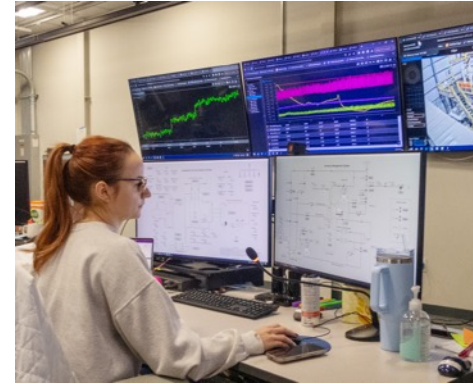
The OE program uses structured data with open-source packages, version control system, and continuous integration and continuous delivery tools to capture hardware successes and hardware failures, and to build the user interface to access the OE of the different hardware projects at Kairos Power.

The logo for YAML, consisting of the letters 'Y', 'A', and 'M' stacked vertically in black, with 'L' to the right of 'M'. The letter 'A' is colored red.The logo for GitHub, consisting of the word 'GitHub' in a bold, black, sans-serif font.The word 'docker' in a blue, lowercase, sans-serif font, with a registered trademark symbol (®) to the right.

ETU 1.0 Testing Progress

2,000+ Hours of Pumped Salt Operations

- **ETU 1.0 testing highlights at 550+°C:**
 - Loaded 13 metric tons of molten salt into the largest Flibe system ever built
 - Demonstrated online refueling with surrogate fuel via the Pebble Handling and Storage System
 - Achieved highest-ever Flibe flow rate up to 3,000 GPM
 - Logged over 30,000 strokes of the Reactivity Control System
 - Commissioned a first-of-its-kind chemistry control system to continuously monitor purity of Flibe in the system



Lessons learned from the ETU program will inform the design and operation of the Hermes demonstration reactor in Tennessee

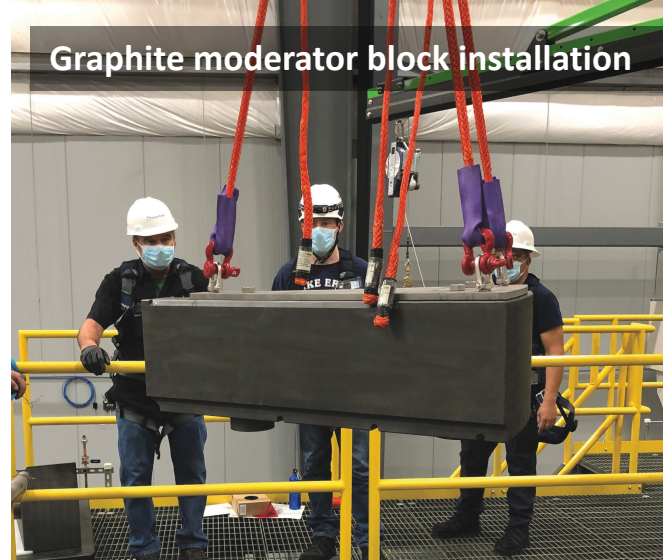
Building the Engineering Test Unit

Albuquerque, NM



ETU Vessel Delivered

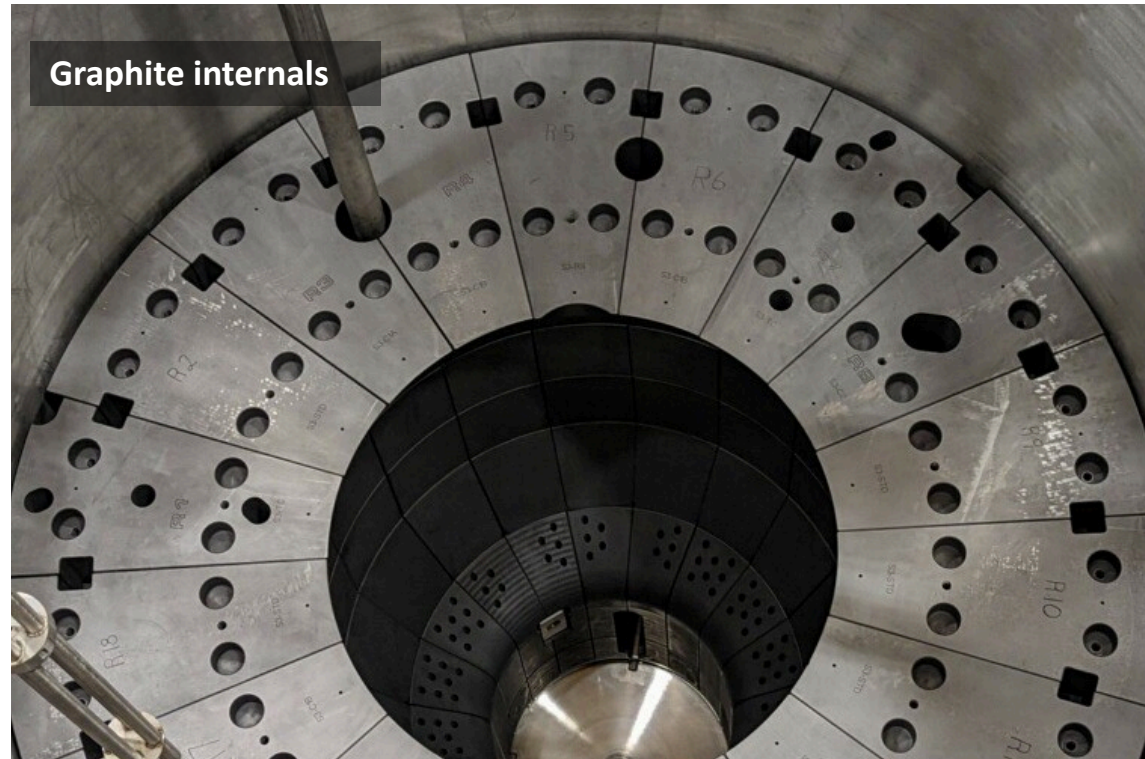
Graphite moderator block installation



Adding the 30,000th simulated fuel pebble



Graphite internals



Engineering Test Unit

Albuquerque, NM



Flibe Arrival



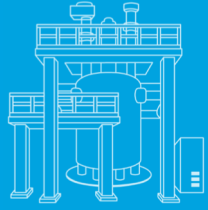
ETU Control Room
Albuquerque, NM



Argos Remote Control Room
Alameda, CA

Capturing ETU 1.0 Lessons Learned

number of OE entries



588

and counting...

HMI

17



PSP

12

RCSS

20

CGVS

56

CCS

9

IAS

9

HVAC

8

PHSS

52

Enclosure

34



PHTS

56

RVS

96

IC&E

34

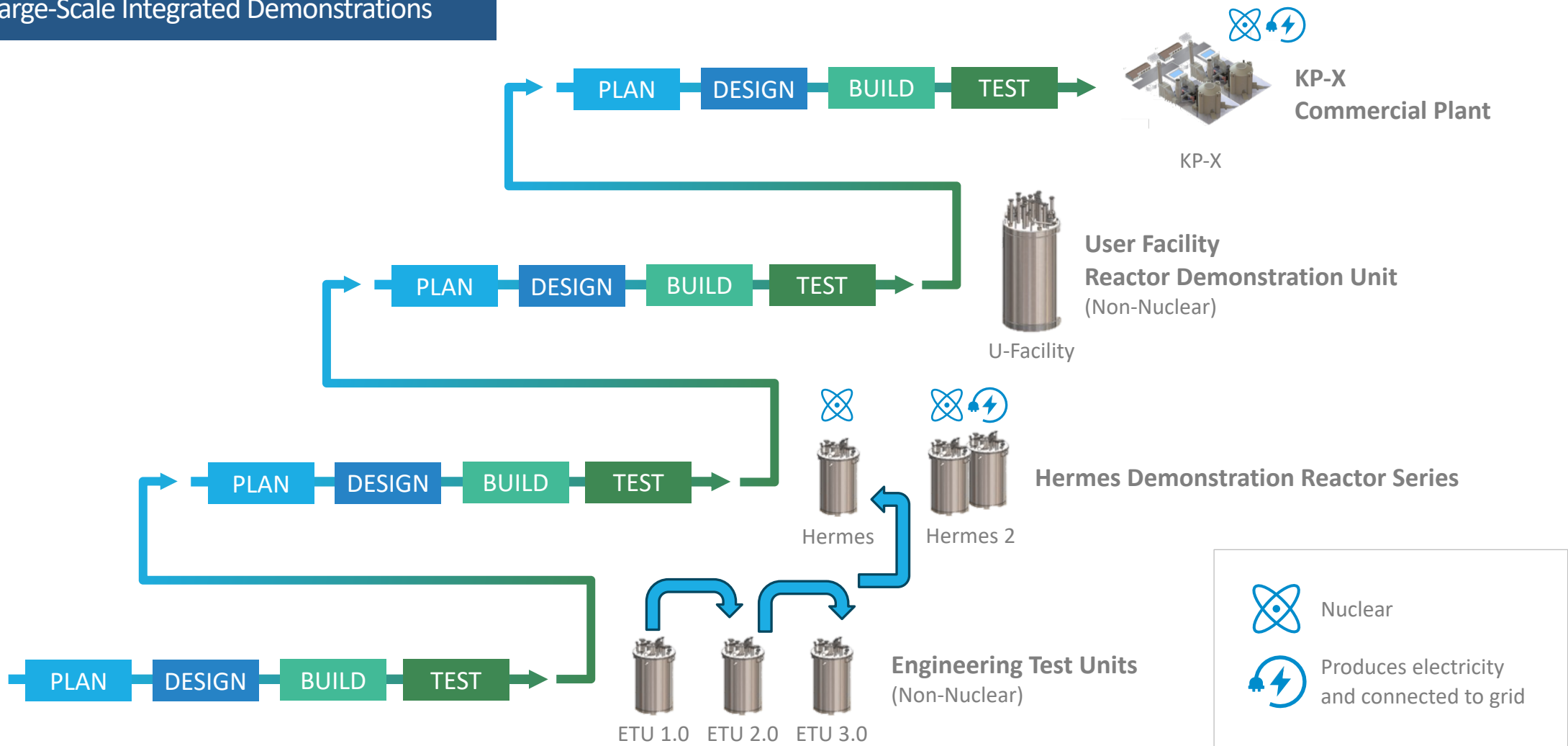
IMS

47

and more...

Kairos Power Path to Commercialization

Successive Large-Scale Integrated Demonstrations



Engineering Test Unit 2.0

Piloting Modular Construction

- **ETU 2.0** will comprise **30+** subsystem modules
- Skids are being built in Kairos Power's **Modular Systems Facility** in Albuquerque, N.M.
- Designed for ease of transport by truck/rail
- Lessons from ETU 2.0 will inform the modular construction of **ETU 3.0** and **Hermes** in Oak Ridge, Tenn.





Kairos Power

Enabling the world's transition to clean energy
while improving people's quality of life
and protecting the environment