Company Overview

2022
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*. 
Fluoride Salt-Cooled High-Temperature Reactor Technology Basis

Coated Particle Fuel
- TRISO

Liquid Fluoride Salt Coolant
- Flibe (2LiF-BeF₂)
Overview of Kairos Power

• Nuclear energy engineering, design, and manufacturing company *singularly focused* on the commercialization of the fluoride salt-cooled high-temperature reactor (FHR)
  ◦ Founded in 2016
  ◦ Current Staffing
    ◦ 280 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

• Cost targets set to be competitive with natural gas in the US electricity market
Kairos Power Locations

HQ / R-Lab / S-Lab
Alameda, CA

Molten Salt Pilot Plant
Elmore, OH

Licensing Office
Charlotte, NC

T-Facility / Engineering Test Unit
Production Development Facility
Albuquerque, NM

Hermes Reactor
Oak Ridge, TN

• RAPID Lab
• Salt Lab
• Testing Facility
Kairos Power Highlights

Kairos Power starts business operations

Sep. 2016
Site selection for KP-HQ and R-Lab in Alameda Point

Sep. 2017
RAPID Lab operations begin

Oct. 2018
Pre-application engagement with NRC begins

Feb. 2020
Kairos Power acquires Albuquerque manufacturing & testing facility

Mar. 2020
Kairos Power forms strategic partnership w/ Materion to supply beryllium fluoride

May 2020
Decision to build Hermes demonstration reactor is made

Jul. 2020
Salt Lab is commissioned in Alameda
Kairos Power Highlights

Dec. 2020
Kairos Power wins $303M DOE ARDP award. T-Facility construction begins. Site announced for Hermes reactor in Tennessee

Jan. 2021
Pebble Development Lab construction begins

May 2021
Cooperative development agreement with TVA

Jun. 2021
T-Facility completed. First non-nuclear pebble manufactured in PDL

Nov. 2021
ETU vessel delivered to KP-SW

Sept./Oct. 2021
CPA for Hermes reactor submitted to NRC
Kairos Power Highlights

Nov. 2021
NRC formally accepts Hermes CPA for review

Q1 2022
ETU construction is underway with vessel, PHTS piping, and supporting structures installed

Q1 2022
Graphite moderator blocks manufactured at KP-SW are loaded into the vessel

Q2 2022
30,000 simulated fuel pebbles completed in the KP-SW Pebble Development Lab

Apr. 2022
Kairos Power establishes the KP-OMADA Development Consortium

Apr. 2022
Kairos Power wins 2022 BloombergNEF Pioneer Award
kai·ros (def.): the right or opportune moment

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

Annual U.S. Generation Retirements
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

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**Technology Basis**

- Coated Particle Fuel
  - TRISO

- Liquid Fluoride Salt Coolant
  - Flibe (2LiF-BeF₂)

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**Kairos Power Reactor Nuclear Island**
Kairos Power Nuclear Development Paradigm Shift

Conventional Nuclear Development Cycle

Kairos Power Accelerated Test Cycles for Innovation and Optimization
Kairos Power Testing Program - Rapid Technology Demonstration Requires **Non-Nuclear** Development and Qualification Facilities

**RAPID LAB**
- Rapid Analysis, Prototyping, and Iterative Design Lab

**SALT LAB**
- Salt Handling and Loop Testing Lab

**TESTING FACILITY**
- Component Testing Facility

**USER FACILITY**
- User Ops & Maintenance Training Facility
What is Kairos Power’s Falcon 1?

SpaceX’s Falcon 1 Flight 4 on the launch pad at Omelek Island in the Kwajalein Atoll of the Marshall Islands (19 Sep 2008)
Kairos Power Engineering Test Unit (ETU) Overview

• **What?**
  ◦ A non-nuclear, unenriched Flibe-wetted, and isothermal integrated test for principal SSCs (e.g., vessel, pump, pebble handling, CRDMs, etc.)
  ◦ Full-scale version of Hermes and proportional to KP-X Commercial Reactor

• **Why?**
  ◦ **Cost:** Establish competitive cost through vertical integration
  ◦ **Supply Chain:** Initiate and exercise supply chain for KP-FHR specialized components and materials
  ◦ **Design / Test:** Demonstrate design and integration of principal KP-FHR technologies
  ◦ **Operations:** Accelerate experience base of large-scale Flibe facility and initial plant operations

*ETU should provide confidence in Kairos Power’s ability to design, build, and operate high-temperature Flibe systems*
What is Flibe?

• A molten salt made from a mixture of lithium fluoride (LiF) and beryllium fluoride (BeF2)

• Desirable properties:
  ◦ High heat capacity
  ◦ Strong affinity for radionuclides
  ◦ Maintains single phase at operating temperatures
  ◦ Optically transparent

Kairos Power is an industry leader in working with Flibe

• Kairos Power has established the capacity to safely work with beryllium products in S-Lab to test, develop, and operate Flibe systems
  ◦ Partnering with Materion has enhanced our beryllium EH&S program and S-Lab design
  ◦ Integral to our development pathway of rapid iteration with non-nuclear systems to de-risk nuclear technology
Kairos Power Path to Commercialization: Successive Large-Scale Integrated Demonstrations
Kairos Power Hermes Reactor Overview

• What?
  ◦ A low power demonstration reactor that will prove Kairos Power’s capability to deliver low-cost nuclear heat

• Why?
  ◦ **Cost**: Establish competitive cost through iterative learning cycles
  ◦ **Supply Chain**: Advance the supply chain for KP-FHR specialized components and materials while vertical integrating critical systems
  ◦ **Design / Test**: Deliberate and incremental risk reduction
  ◦ **Licensing Approach**: NRC will license Hermes as a non-power reactor and facilitate licensing certainty for KP-FHR
  ◦ **Operations**: Provide a complete demonstration of nuclear functions including reactor physics, fuel and structural materials irradiation, and radiological controls

*Hermes will ultimately demonstrate the U.S. aptitude to license an advanced reactor in a timely manner*
Kairos Power Receives U.S. DOE ARDP Award

- Kairos Power is a recipient of an **Advanced Reactor Demonstration Program (ARDP)** award for Risk Reduction funding to support development of the Hermes reactor
- This is a cost-shared partnership between the DOE and industry to demonstrate advanced nuclear technology in the United States
- The total award value over the next seven years is **$629 million** (DOE share is $303 million)
- Kairos Power is partnering with Materion Corporation, Oak Ridge National Laboratory, Idaho National Laboratory, and Electric Power Research Institute on this project
Kairos Power Selects Oak Ridge Site to Deploy Hermes

- Kairos Power has acquired the former K-33 gaseous diffusion plant site at the East Tennessee Technology Park
- Hermes will achieve criticality in **2026**
- Hermes leverages proven technologies that originated in Oak Ridge with the Molten-Salt Reactor Experiment (MSRE) in the 1960s
- Kairos Power is investing **$100 million** and creating **55+ full-time jobs** to support construction and operation of Hermes
- Hermes is a collaborative effort by Kairos Power and our partners
Kairos Power is significantly retiring risk to commercial deployment:

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