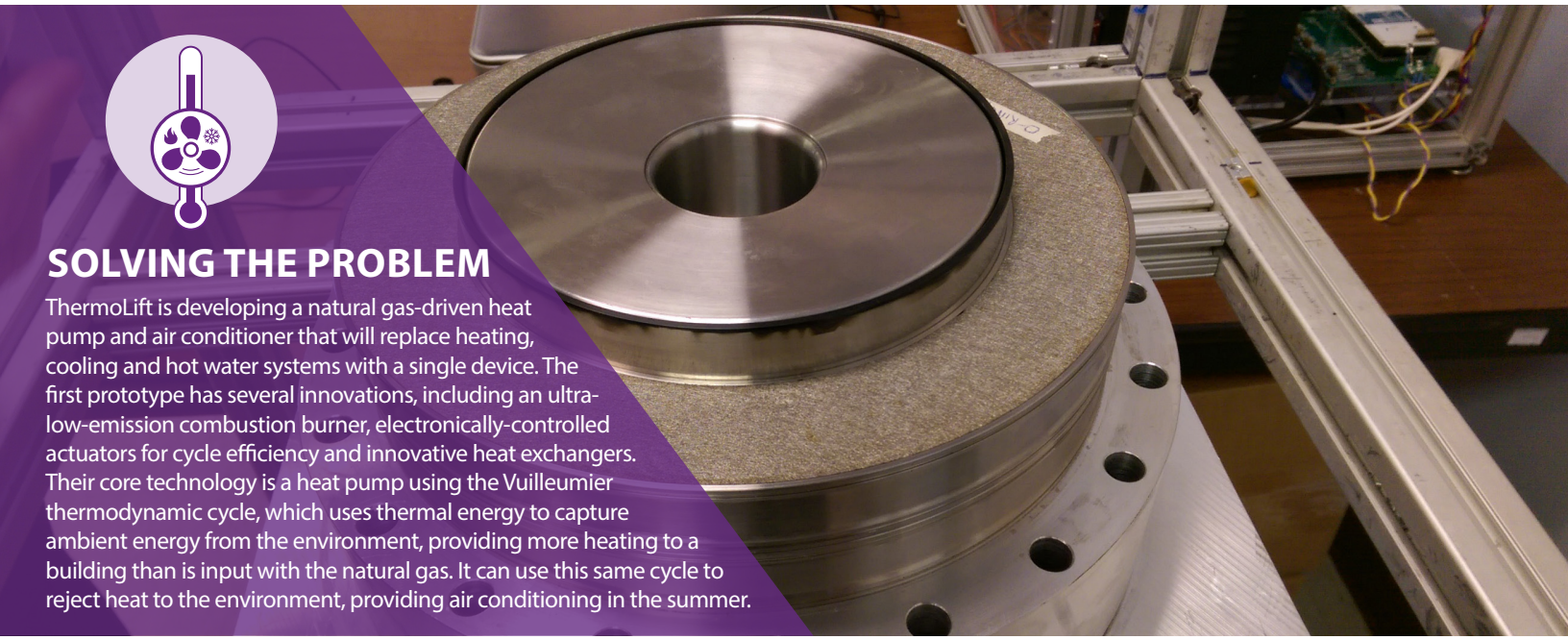
Innovation Incubator (IN^2)

WELLS FARGO

THERMOLIFT



SOLVING THE PROBLEM

ThermoLift is developing a natural gas-driven heat pump and air conditioner that will replace heating, cooling and hot water systems with a single device. The first prototype has several innovations, including an ultra-low-emission combustion burner, electronically-controlled actuators for cycle efficiency and innovative heat exchangers. Their core technology is a heat pump using the Vuilleumier thermodynamic cycle, which uses thermal energy to capture ambient energy from the environment, providing more heating to a building than is input with the natural gas. It can use this same cycle to reject heat to the environment, providing air conditioning in the summer.

THE IMPACT:

ThermoLift expects to reduce commercial and residential energy consumption by up to 50 percent with its proven technology. ThermoLift also reduces environmental concerns, including ozone depletion and greenhouse effects, by replacing traditional heating, cooling and hot water systems, which represent the largest portion of electricity consumed in a home.

HOW IN^2 IS HELPING:

ThermoLift is in need of NREL's system and building modeling expertise. NREL modeling will help bound the performance potential of various product development scenarios. ThermoLift will also benefit from NREL's relationships with global manufacturing entities and large portfolio managers to help with the development of distribution channels.

TIER 1: Bench Scale

- **Concept development stage**
- **Develop plans for prototyping & testing**
- **3 – 5 years to market**

TIER 2: Prototype

- Available for testing & validation
- Plans for development of final product
- Less than 2 years to market

TIER 3: Commercially Ready

- Models available in limited quantity
- Integrated demonstration
- Less than 18 months to market testing

ABOUT THE IN^2 PROGRAM

IN^2 is a technology incubator that fosters and accelerates early stage technology companies that provide scalable solutions to reduce the energy impact of buildings. Through a $30 million program funded by the Wells Fargo Foundation and co-administered by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), sustainable building technologies are able to evolve and develop, contributing to the overall goal of a Smart and Connected Community that uses energy, water and other resources efficiently, reducing the negative impact on the environment.

NREL
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