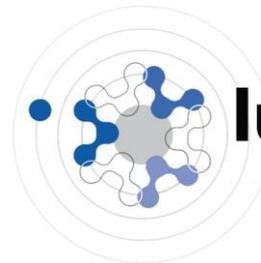


Seeo case study: finding success in nascent markets

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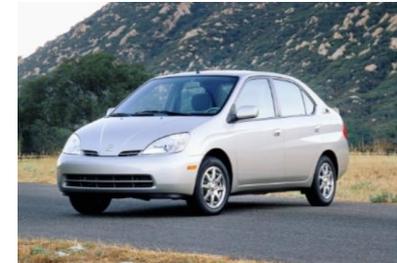
lux executive summit

Boston, MA • May 9 - 11, 2016

The automotive industry is poised for a dramatic shift in the way we power our vehicles

2000's

Mass adoption of electrified vehicles has been limited to hybrids, due to expensive batteries



2010's

EVs were hyped too soon, and consumers typically were forced to choose between practical range and price



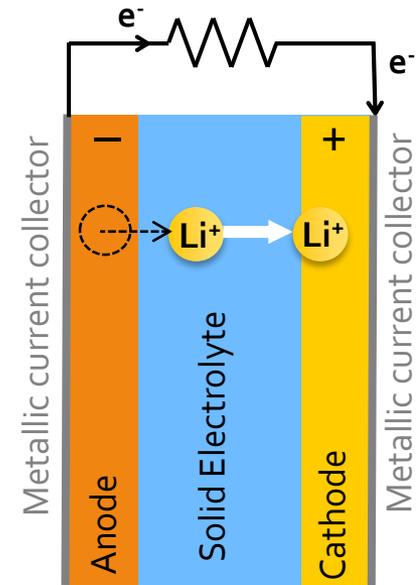
2017

For the first time ever, consumers will have the option to purchase affordable, long-range EVs



Solid-state batteries are seen by many as a successor to conventional Li-ion

- **Advantages:** safety, performance
 - Solid-state batteries use a solid electrolyte, replacing the flammable liquids used in conventional Li-ion
- **Disadvantages:** cost, manufacturing
 - Credible mass-manufacturing techniques have yet to emerge in the solid-state space, increasing costs and preventing scale-up



A variety of large incumbents and start-ups are investigating solid-state batteries as a potential successor to Li-ion



LG Chem

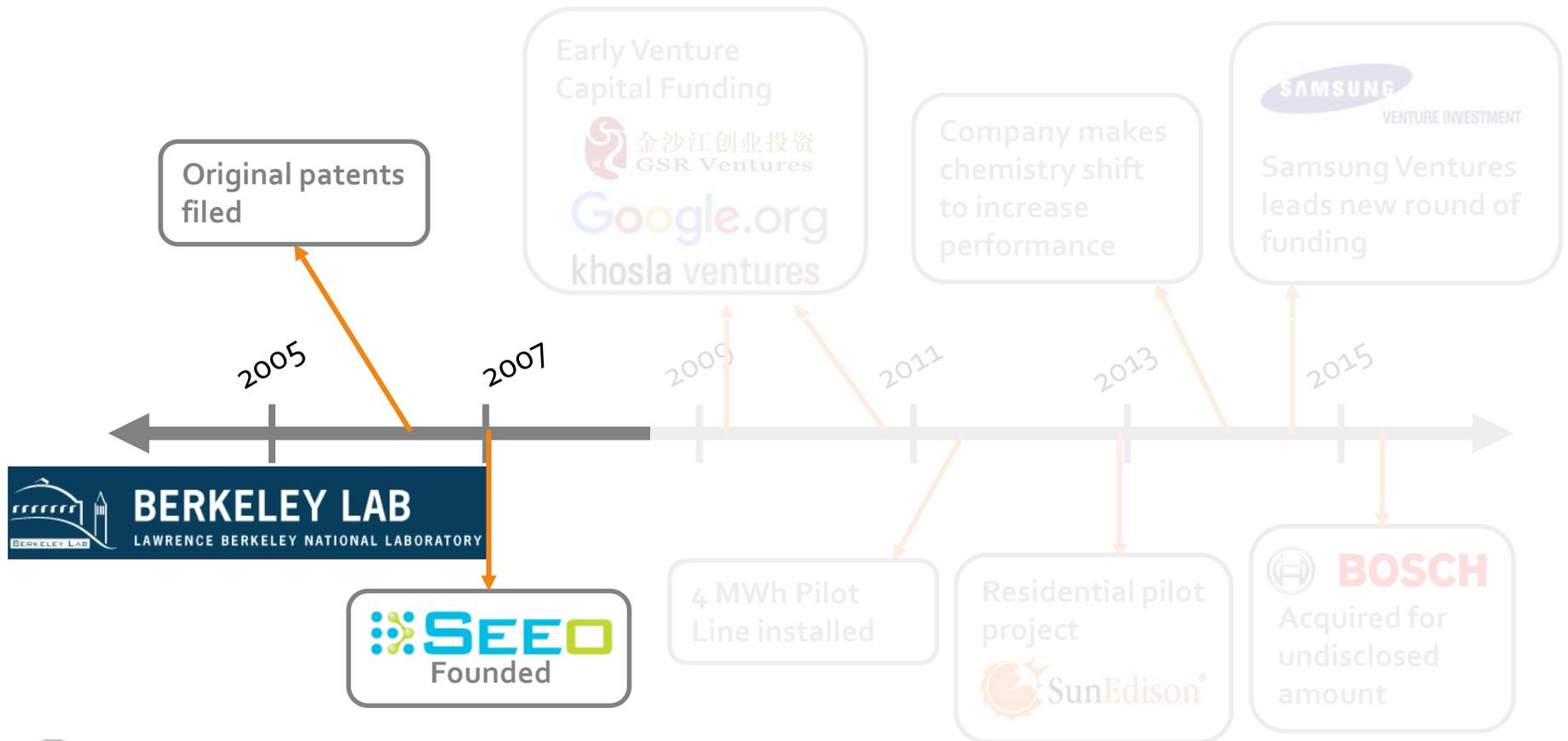
SolidPower



SAKTIB



Seeo's foundations can be traced back to an accidental discovery in a government research lab



Seeo's foundations can be traced back to an accidental discovery in a government research lab

- Seeo found it could alter the electrochemical properties of the polymer using nanostructuring, a process it patented in 2006
 - Originally working on artificial muscles before LBNL researchers realized the polymer's electrochemical properties were suitable for a battery electrolyte

Seeo founders Hany Eitouni, Mohit Singh, and Nitash Balsara



Image credit: LBNL

United States Patent
Balsara, et al.

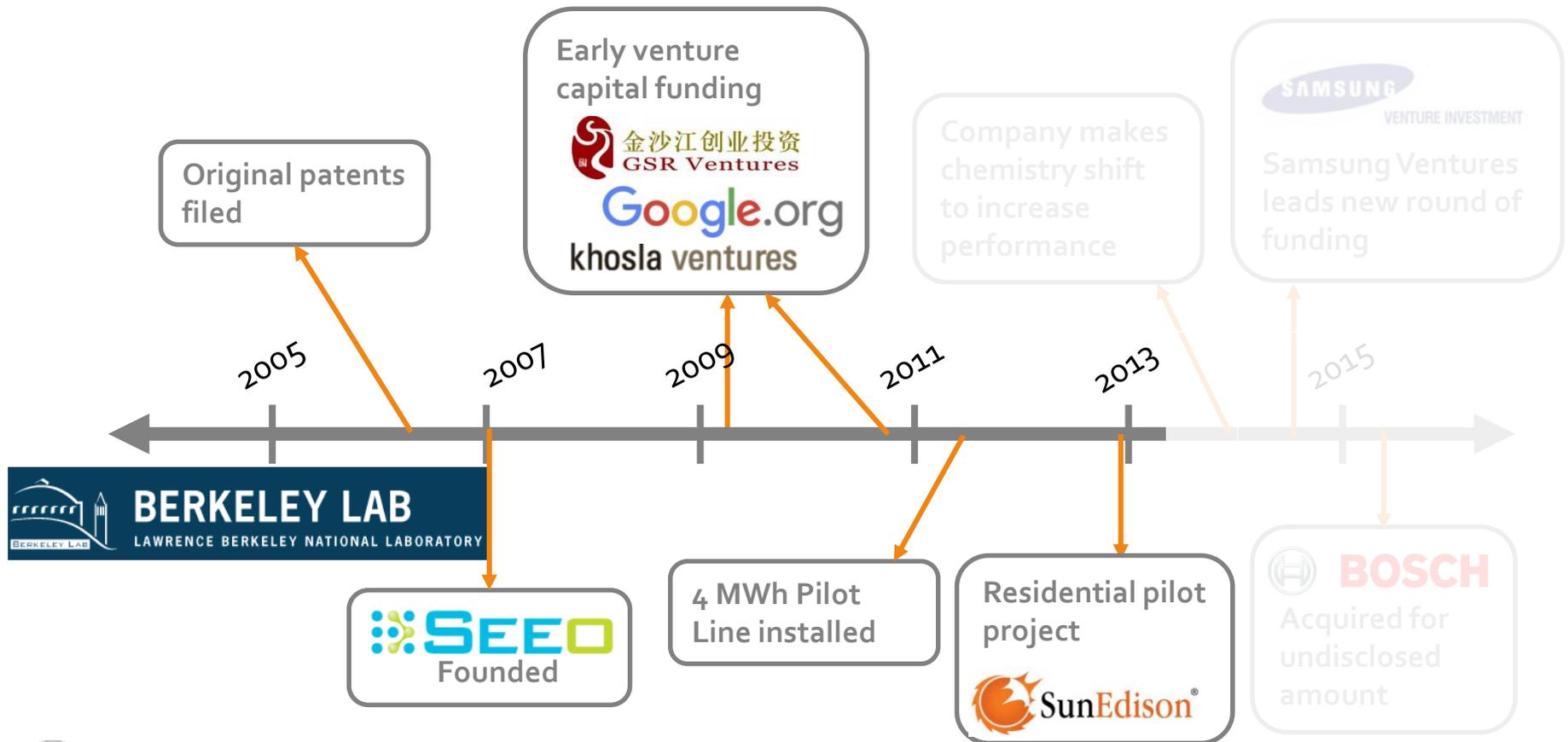
8,563,168

High elastic modulus polymer electrolytes

Abstract

A polymer that combines high ionic conductivity with the structural properties required for Li electrode stability is useful as a solid phase electrolyte for high energy density, high cycle life batteries that do not suffer from failures due to side reactions and dendrite growth on the Li electrodes, and other potential applications. The polymer electrolyte includes a linear block

As the company received more funding, it turned its focus to commercialization



Seeo opens a pilot manufacturing line in 2011, demonstrating manufacturing technique

Seeo's coating machine on the 4 MWh pilot production line

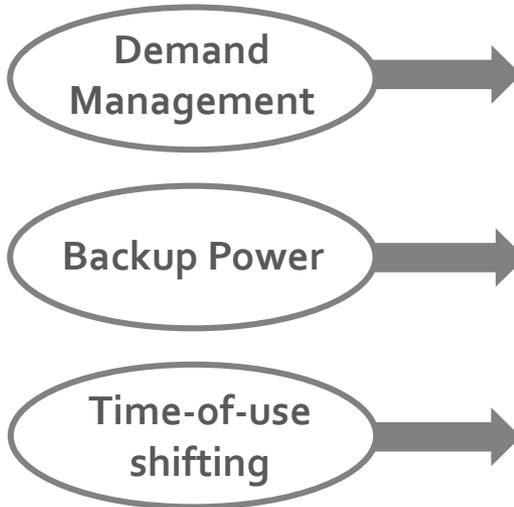


Seeo's large format cells produced at the Hayward, CA facility



Addressed key technological hurdles limiting commercialization potential

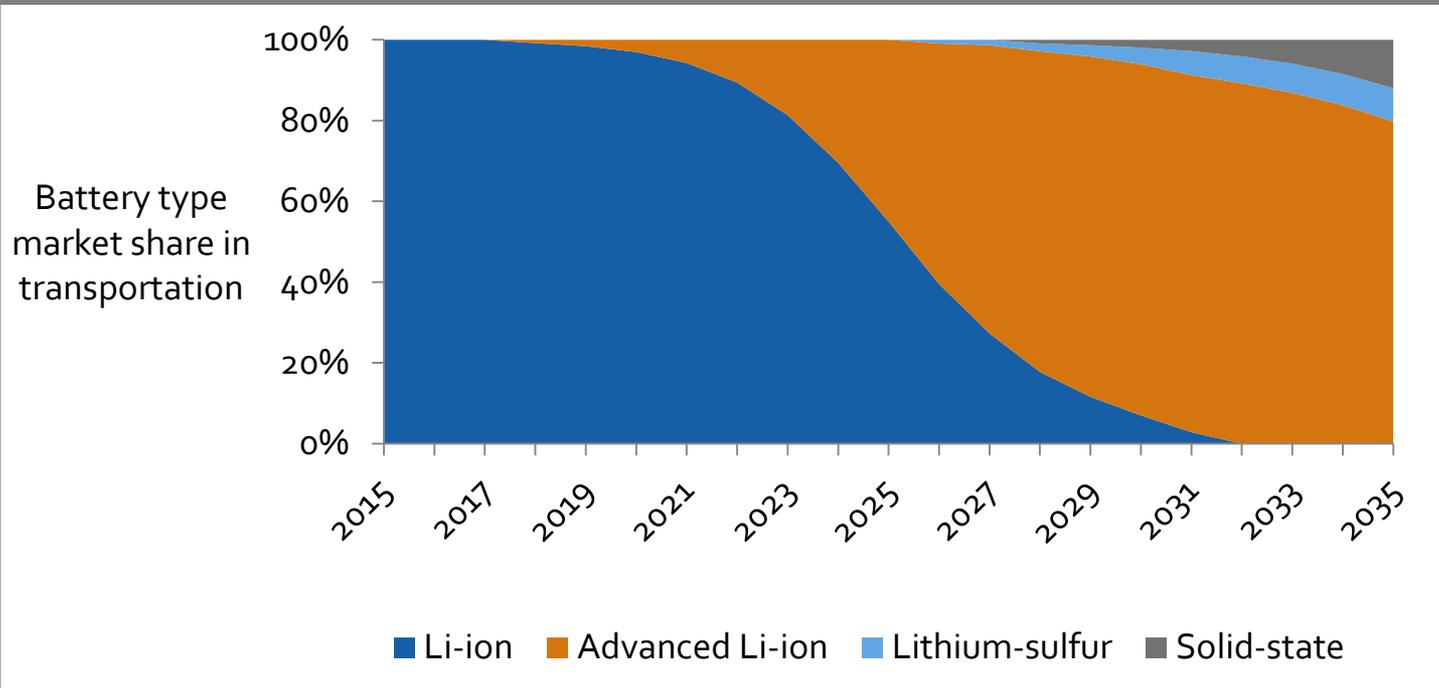
SunEdison used Seeo's batteries in a pilot installation of residential energy storage



Leveraged government grants to develop technology and business partnerships

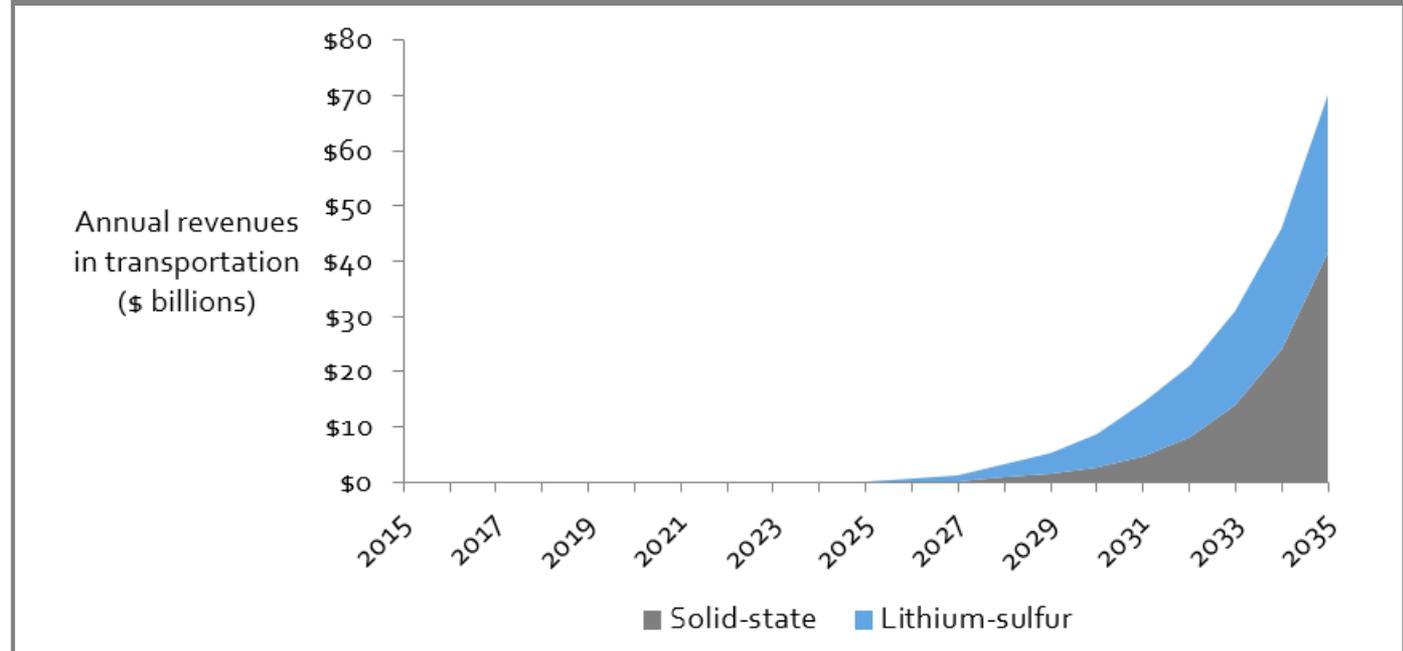
After initial pilot and demonstration success, sources of revenue run dry

Demand for solid-state batteries is nearly non-existent currently...



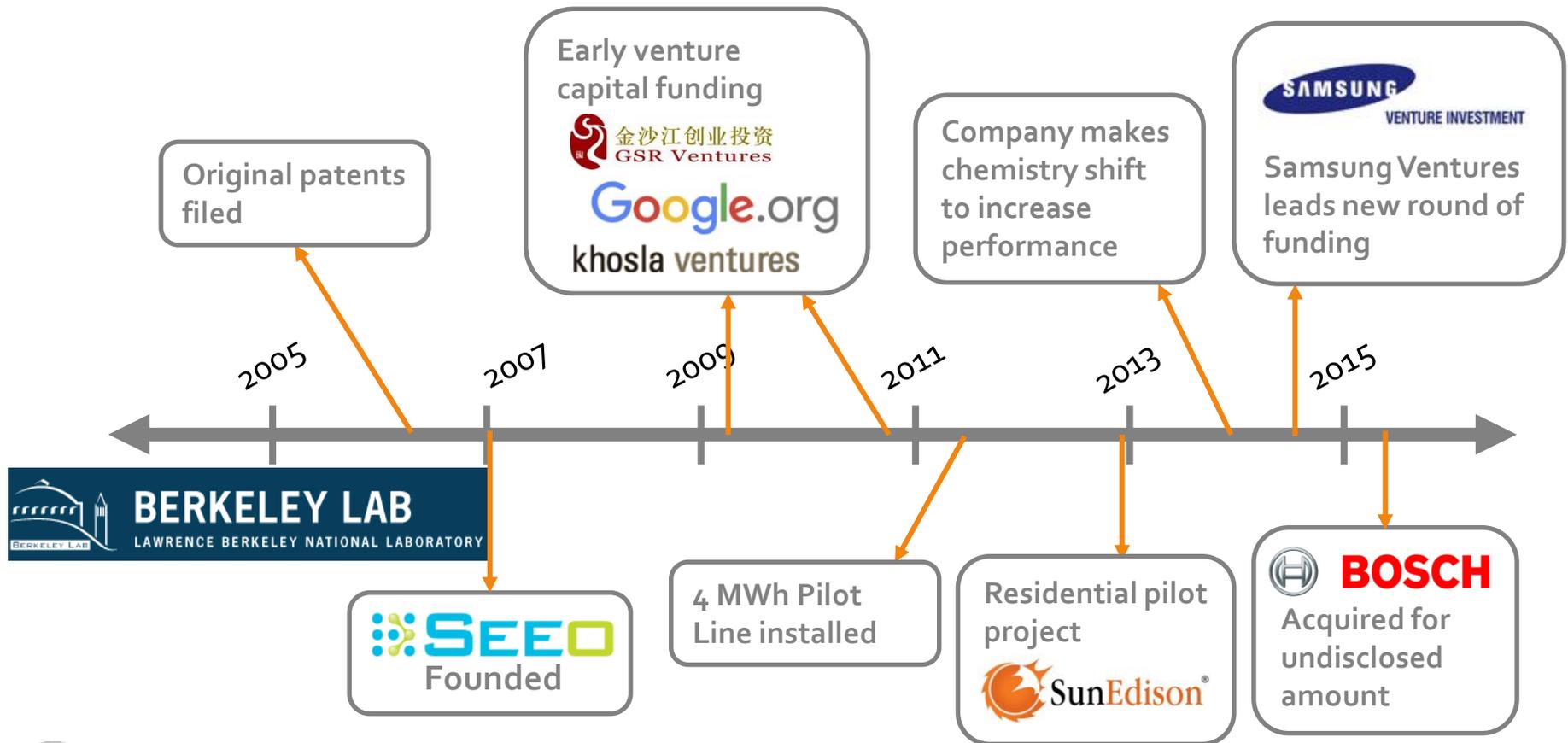
After initial pilot and demonstration success, sources of revenue run dry

...but there is a multi-billion dollar long-term opportunity



Scaled production capabilities in an appropriate time frame

As sources of revenues ran dry, the company was acquired by a major tier 1 automotive supplier



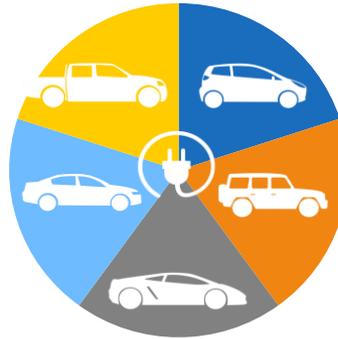
Seeo's acquisition was a positive for most involved in the deal

Winners



BOSCH

SEEQ

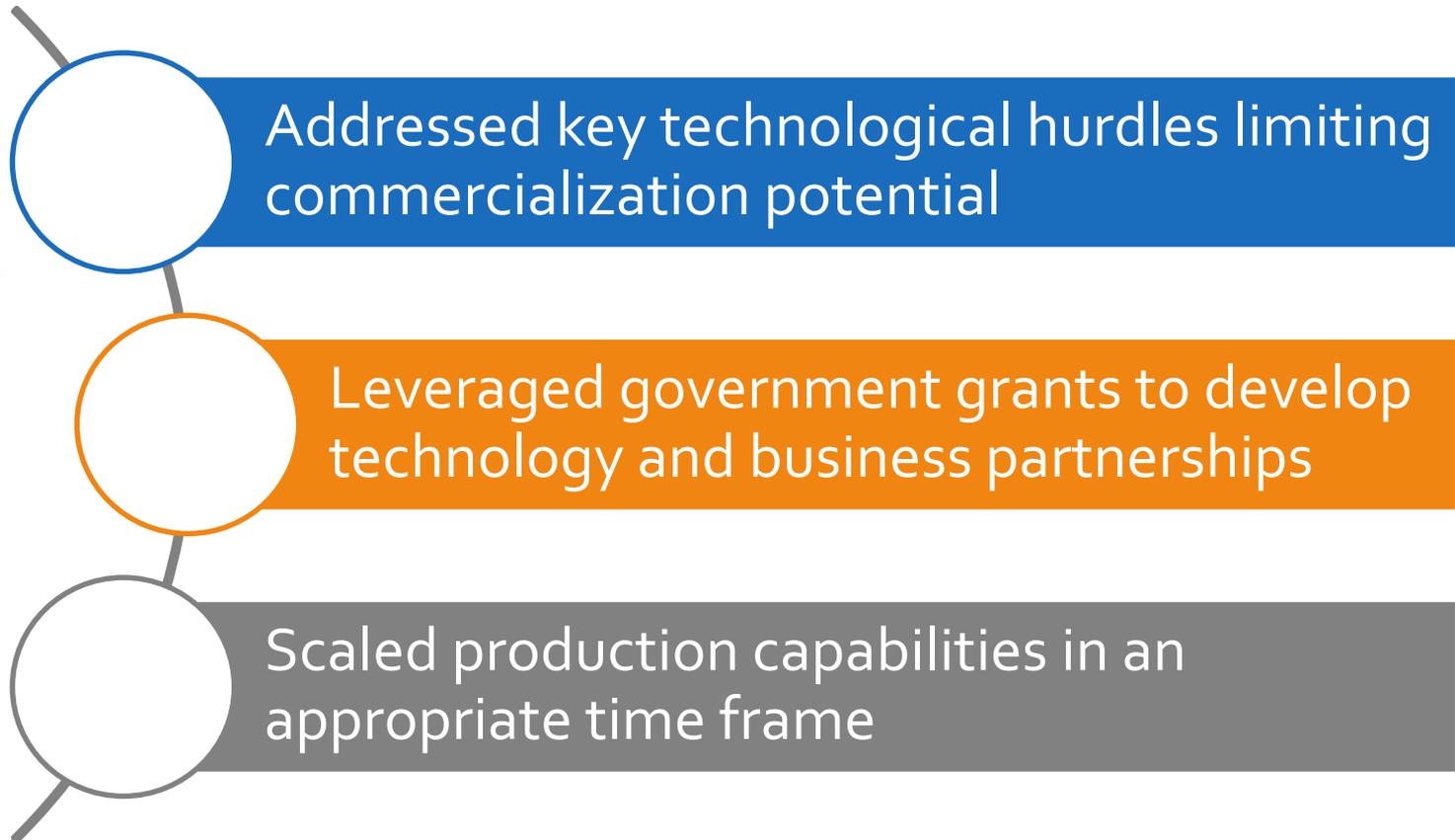


Losers
Non-winners

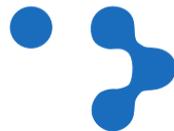


The
Investors

Seeo's overcame poor market timing with a balanced approach to development



Thank you



luxresearch

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