

Agenda: Wednesday, October 14th

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Meet the ARPA-E Team



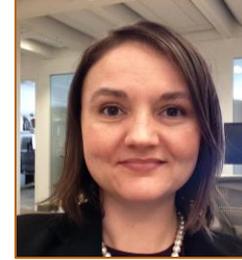
Eric Rohlfig
*Deputy Director
for Technology*



Patrick McGrath
Program Director



Ryan Umstatt
*Senior
Commercialization
Advisor*



Colleen Nehl
*Tech SETA for
ALPHA, Booz Allen
Hamilton*



Kevin Thompson
*Programmatic SETA
for ALPHA, Booz
Allen Hamilton*



JC Zhao
Program Director



**Jonathan
Burbaum**
Program Director



Ron Faibish
*Senior Advisor to
the Director*



Nate Gorence
*Technology to
Market Advisor*



Michael Kane
Fellow



**Addison Killian
Stark**
Fellow

Introduction to ALPHA

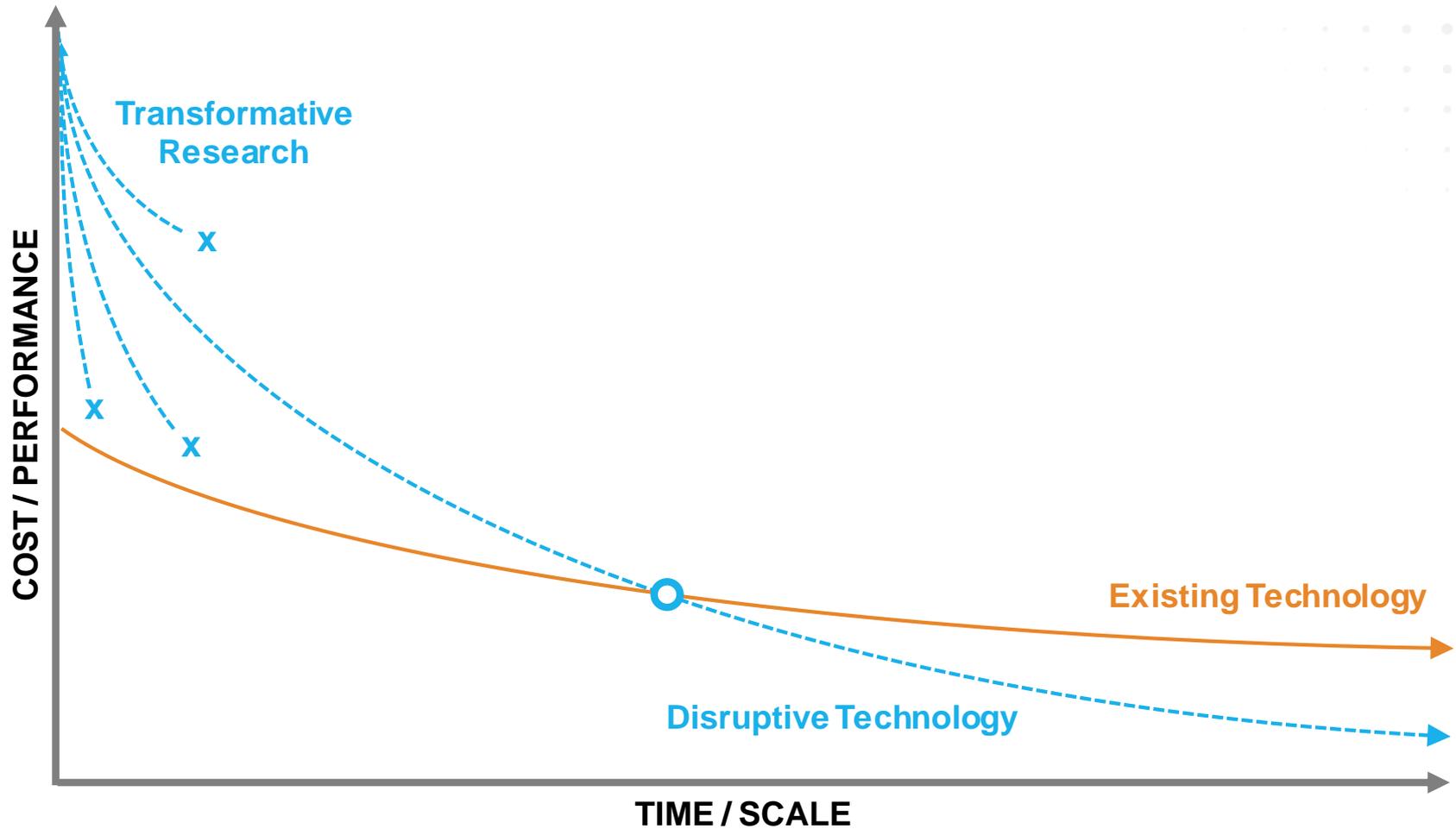
Dr. Patrick McGrath, Program Director, ARPA-E

October 14th, 2015

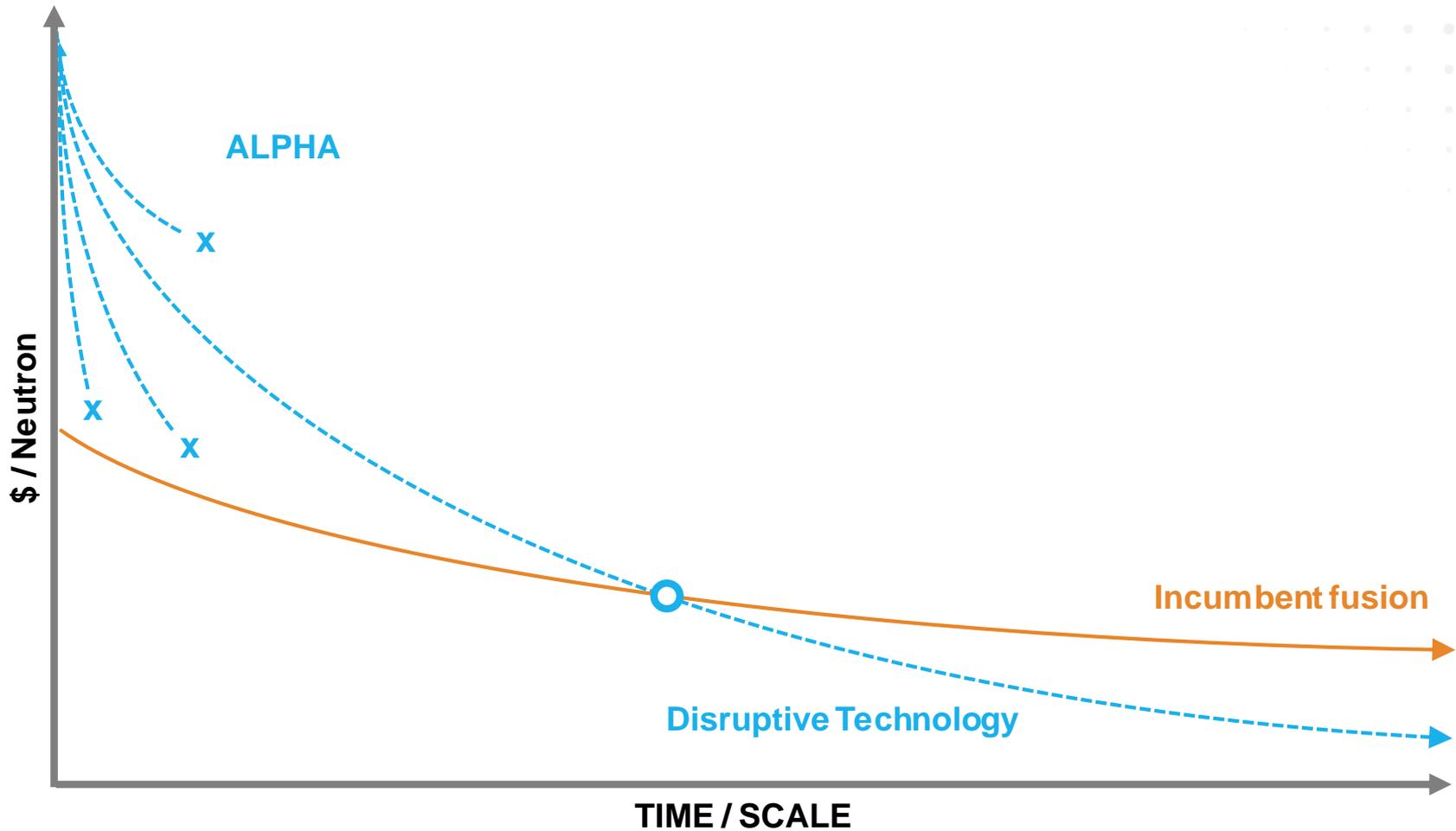
Why are we doing this?

	D-T Fusion	Natural Gas (USA)
Emissions (kg CO ₂ /kWh)	10 ⁻⁵	0.55
Fuel Reserves (years)	10 ⁸	250
Fuel Cost per kWh (\$)	10 ⁻⁶	0.02
Capital Cost per kW (\$)	???	978

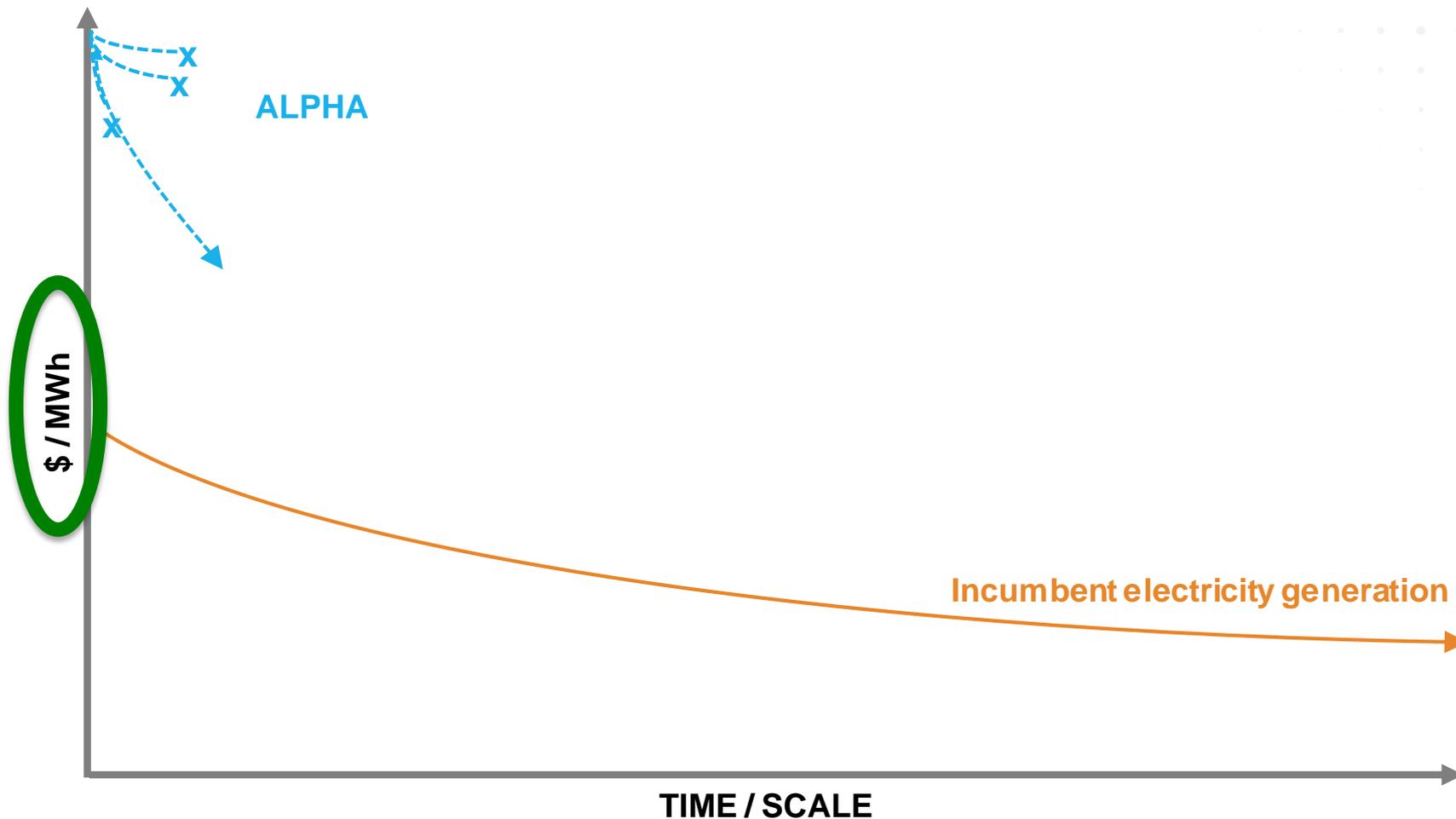
Transformative R&D to disruptive technology



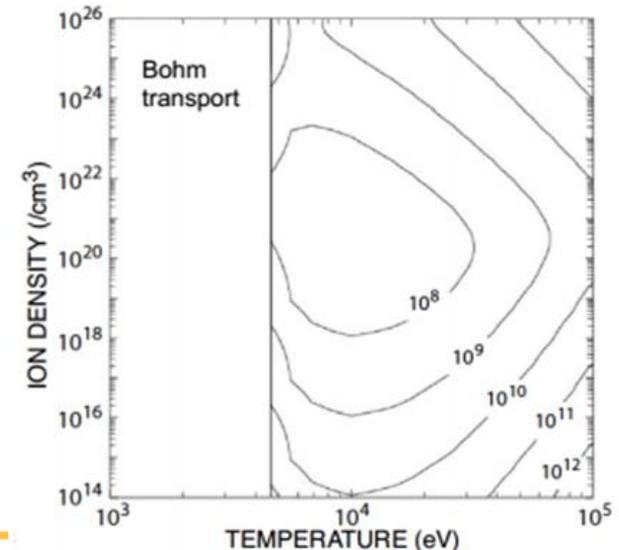
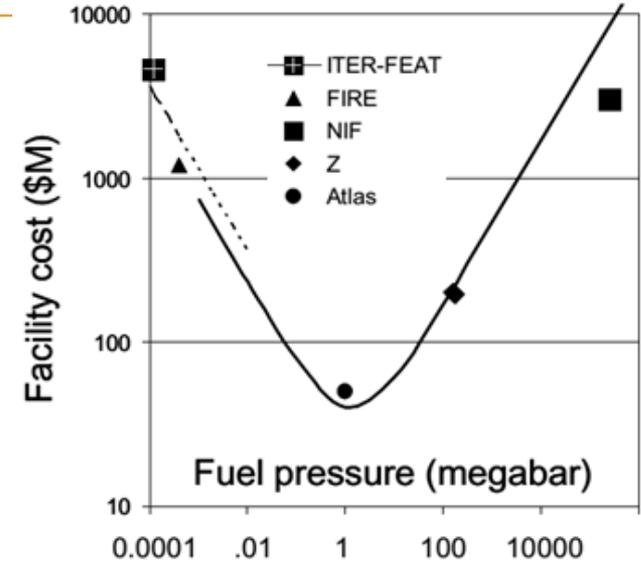
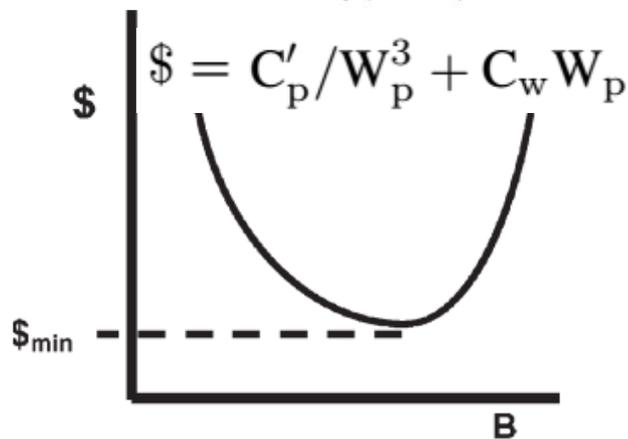
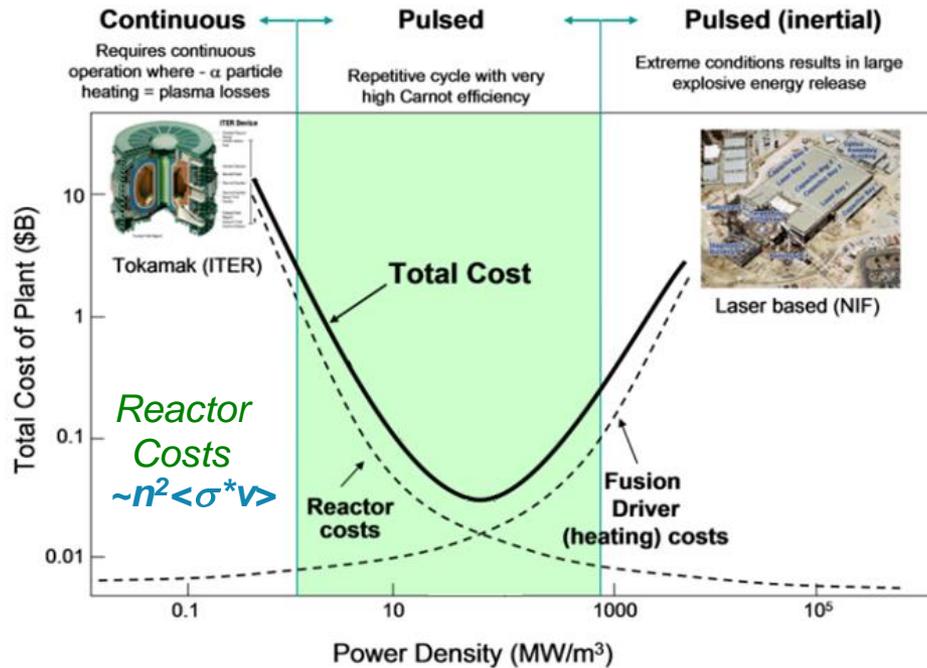
Learning curves for fusion...



...and for the real prize



Why do we think this is even possible?



Of course, it always helps to have data

PRL **113**, 155003 (2014)

PHYSICAL REVIEW LETTERS

week ending
10 OCTOBER 2014

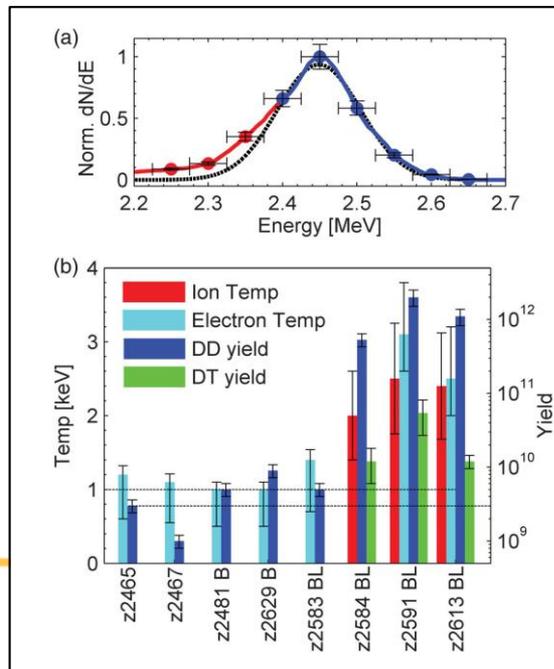


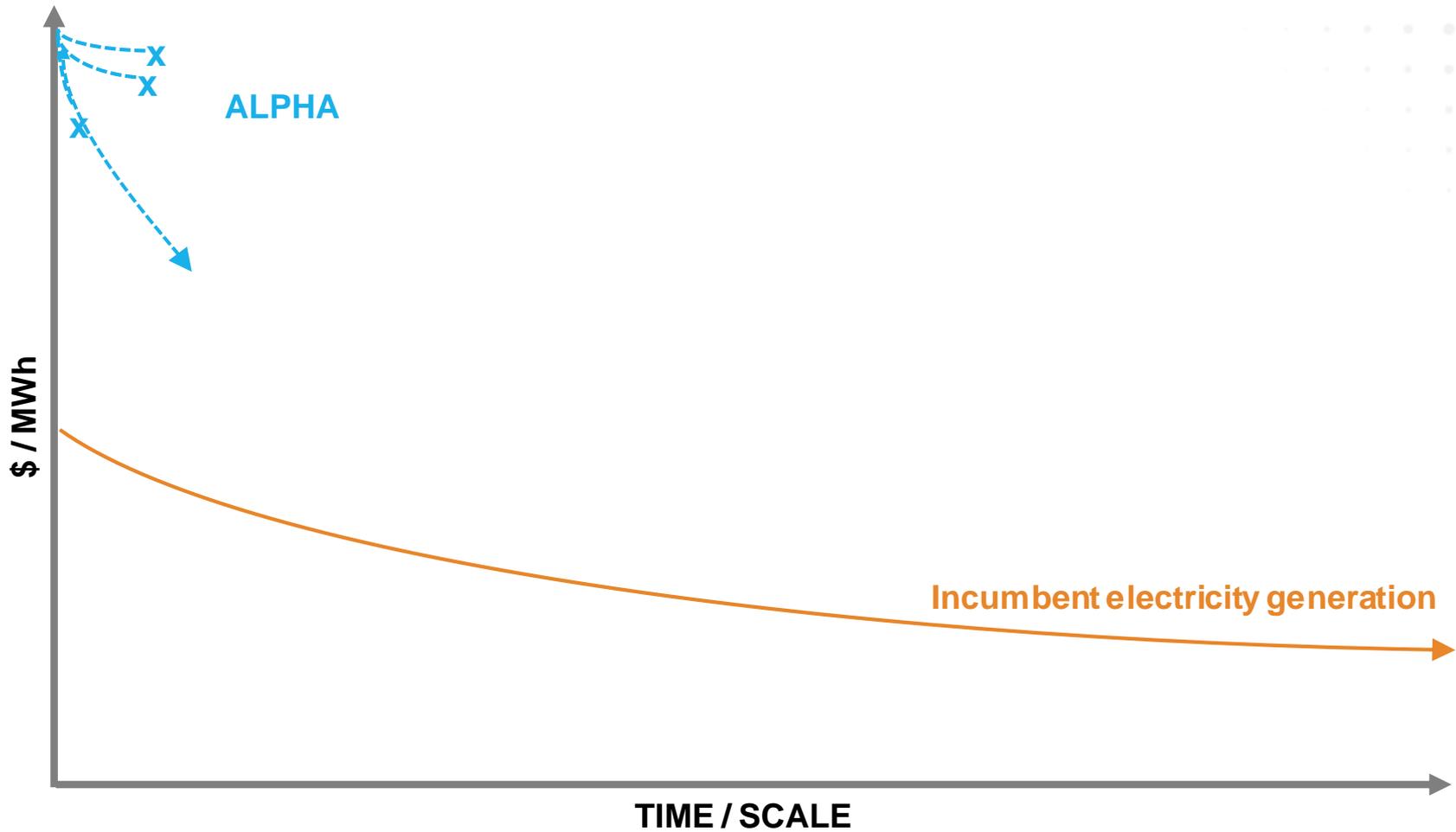
Experimental Demonstration of Fusion-Relevant Conditions in Magnetized Liner Inertial Fusion

M. R. Gomez, S. A. Slutz, A. B. Sefkow, D. B. Sinars, K. D. Hahn, S. B. Hansen, E. C. Harding, P. F. Knapp, P. F. Schmit, C. A. Jennings, T. J. Awe, M. Geissel, D. C. Rovang, G. A. Chandler, G. W. Cooper, M. E. Cuneo, A. J. Harvey-Thompson, M. C. Herrmann, M. H. Hess, O. Johns, D. C. Lamma, M. R. Martin, R. D. McBride, K. J. Peterson, J. L. Porter, G. K. Robertson, G. A. Rochau, C. L. Ruiz, M. E. Savage, I. C. Smith, W. A. Stygar, and R. A. Vesey

Sandia National Laboratories, P.O. Box 5800, Albuquerque, New Mexico 87185, USA

(Received 18 June 2014; published 6 October 2014)





More players in the field



To reach one of the world's most secretive nuclear-fusion companies, visitors must wind their way through a suburban office park at the foot of the Sierra Nevada Mountains. **General Fusion's reactor would use massive pellets to smash fuel** launched at least half a dozen companies to pursue alternative designs for fusion reactors. **Some are expected to be a combination of sand and lead**

Energywise | Energy | Nuclear

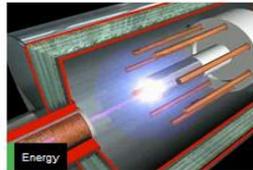
Advertisement

Silicon Valley Goes Long on Nuclear Fusion

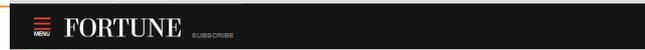
By Mark Anderson
Posted 20 Aug 2014 | 17:00 GMT



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How Far Can Crowd-funded Nuclear Fusion Go?
A net-roots campaign to finance



Why Jeff Bezos, Peter Thiel, and others are betting on fusion

by Brian Dumaine SEPTEMBER 28, 2015, 9:00 AM EDT



The energy source has been long on promise and short on reality. Now private companies think they can succeed where the government has failed.

The "ignition facility" at Lawrence Livermore National Laboratory
Photo: Damien Jamison—LLNL

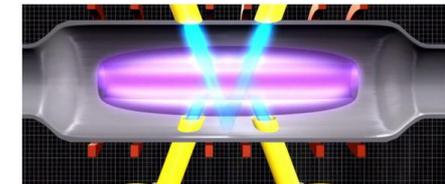


A CALIFORNIA COMPANY THINKS THE SECRET TO FUSION IS A LONG TUBE

TAKE WITH A BOULDER OF SALT

By Kelsey D. Atherton Posted August 25, 2015

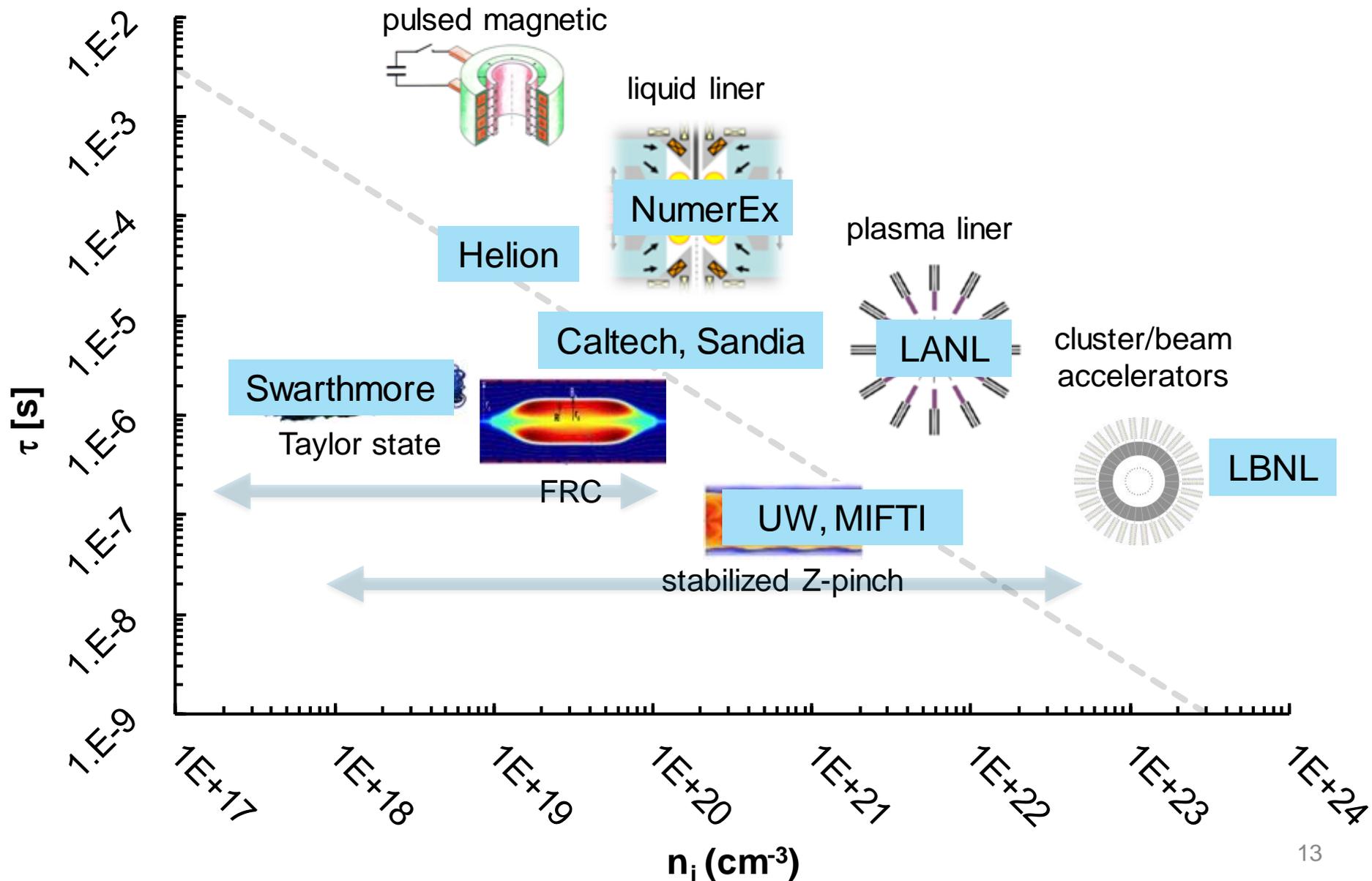
58 Shares



Tri Alpha Fusion Reactor Tube
Screened by author from [YouTube](#)

For the blink of an eye, nuclear fusion appears possible. Nuclear reactors today are fission reactors, where decaying nuclear material heats water to power generators. Fusion reactors, in theory, create a sustained reaction, like at the heart of actual stars. Humans have attempted to create fusion reactors since the 1950s. This decade, Lockheed notably announced a secretive reactor in development in 2013. The typical way to get to the point of fusion is by superheating a ball of gas and then sustaining that

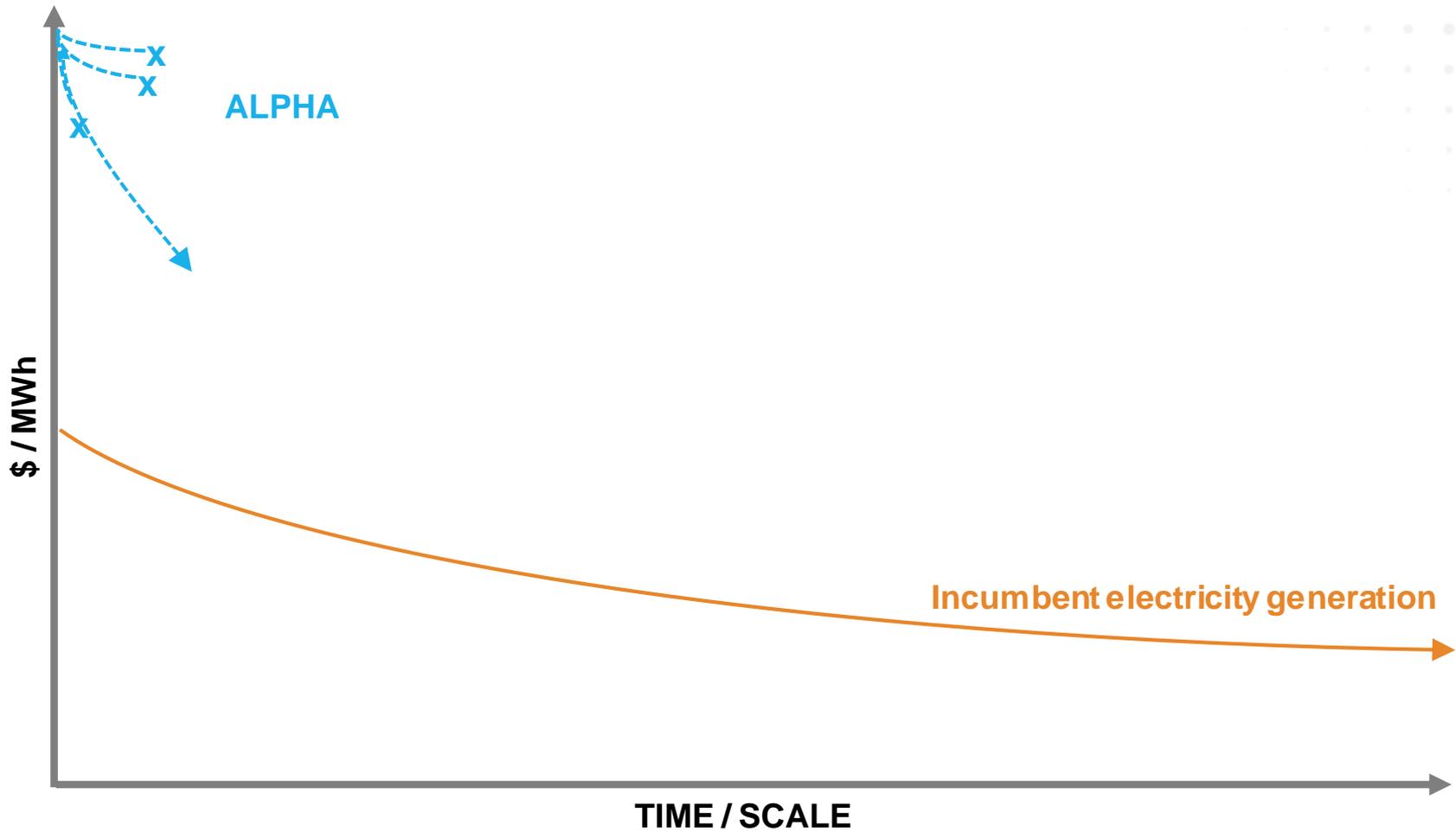
Breadth of portfolio



ALPHA teams

- 3 University Leads
- 3 Small Business Leads
- 3 Nat'l Lab Leads





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www.arpa-e.energy.gov