



ARPA-E Update

Eric Rohlring, Deputy Director for Technology

DELTA Kickoff Meeting
Portland, OR
May 21



The Brief History of ARPA-E

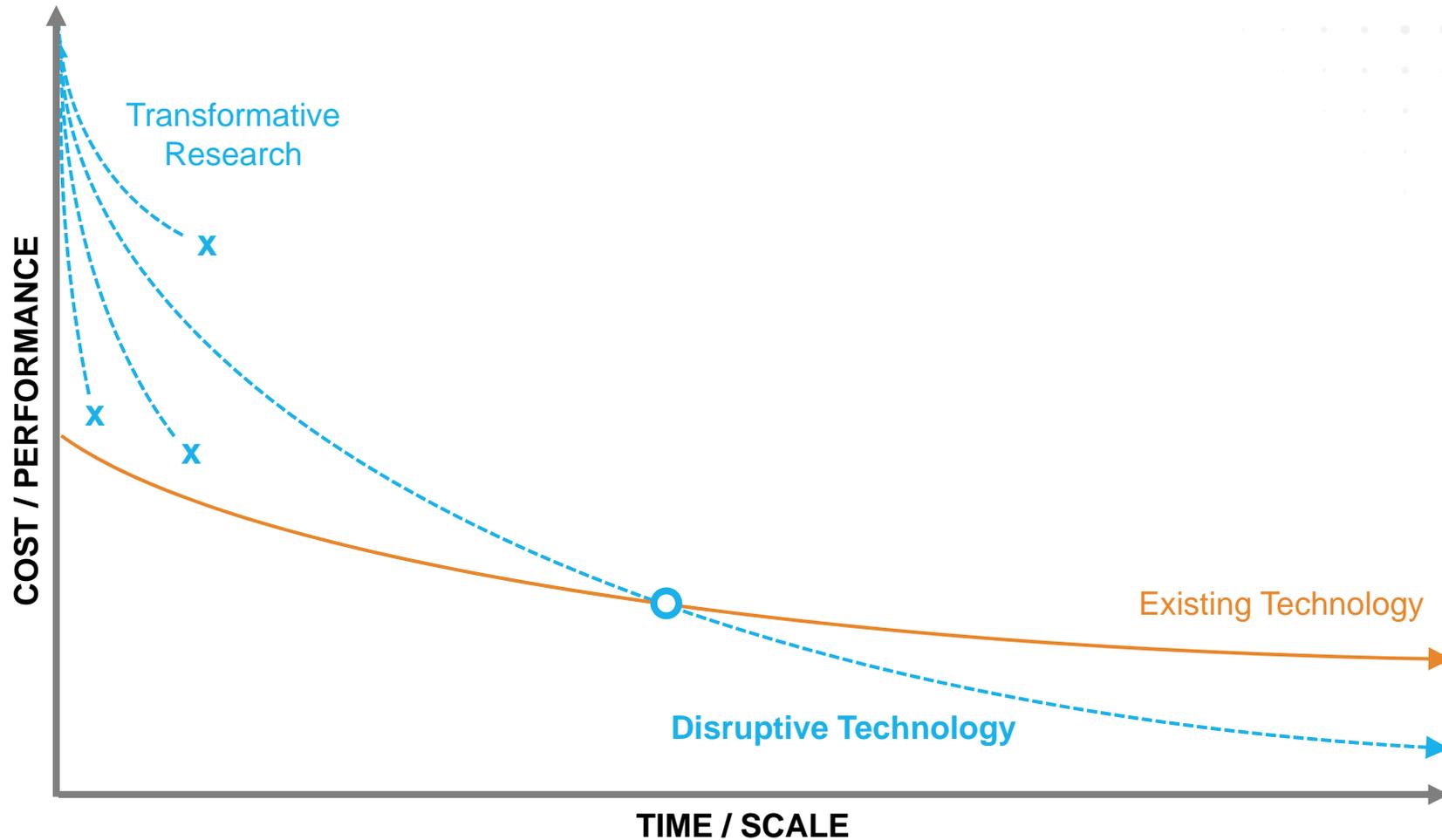
ARPA-E was envisioned in *Rising Above the Gathering Storm*, authorized by Congress in the America Competes Act, and implemented with ARRA funding.



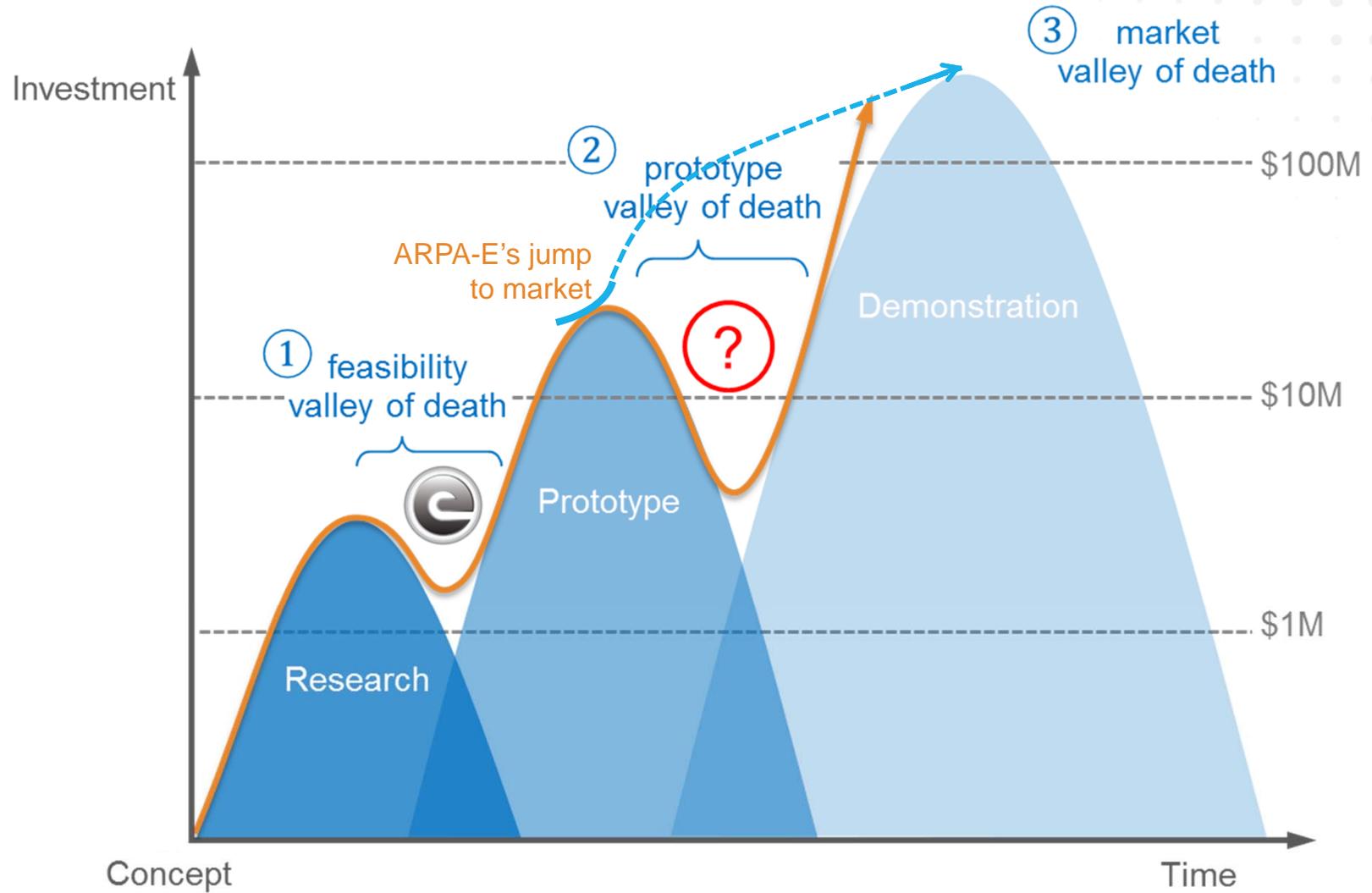
Rising Above the Gathering Storm Published
 America COMPETES Act Signed
 American Recovery & Reinvestment Act Signed

Fiscal Year	Request	Appropriation
2015	\$325M	\$280M
2016	\$325M	??
2017 and beyond	Modest growth??	

Funding Disruptive Approaches to Innovation

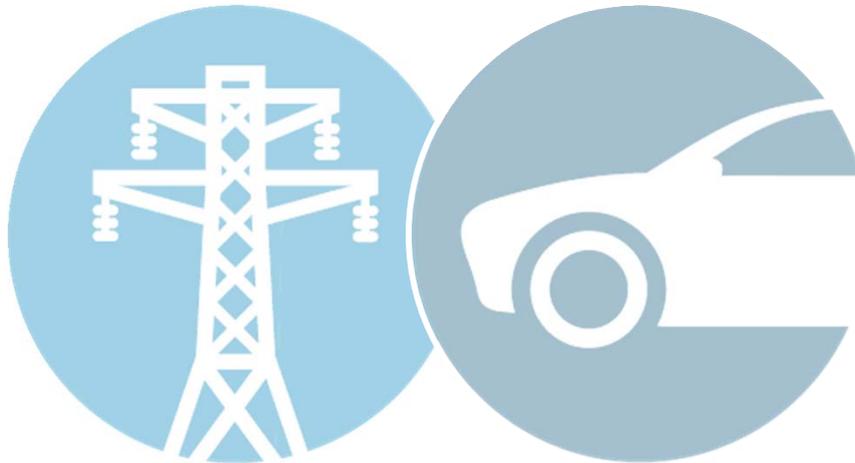


Energy Technology “Valleys of Death”



The ARPA-E Portfolio

As of January 2015, ARPA-E has funded over 400 projects, investing \$1.1 billion across 25 focused programs and open funding solicitations



Stationary Energy Technologies

Solar ADEPT	BEEIT	REBELS
GRIDS	GENI	DELTA
IMPACCT	FOCUS	MONITOR

Transportation Energy Technologies

BEEST	Electrofuels	RANGE
PETRO	MOVE	REMOTE

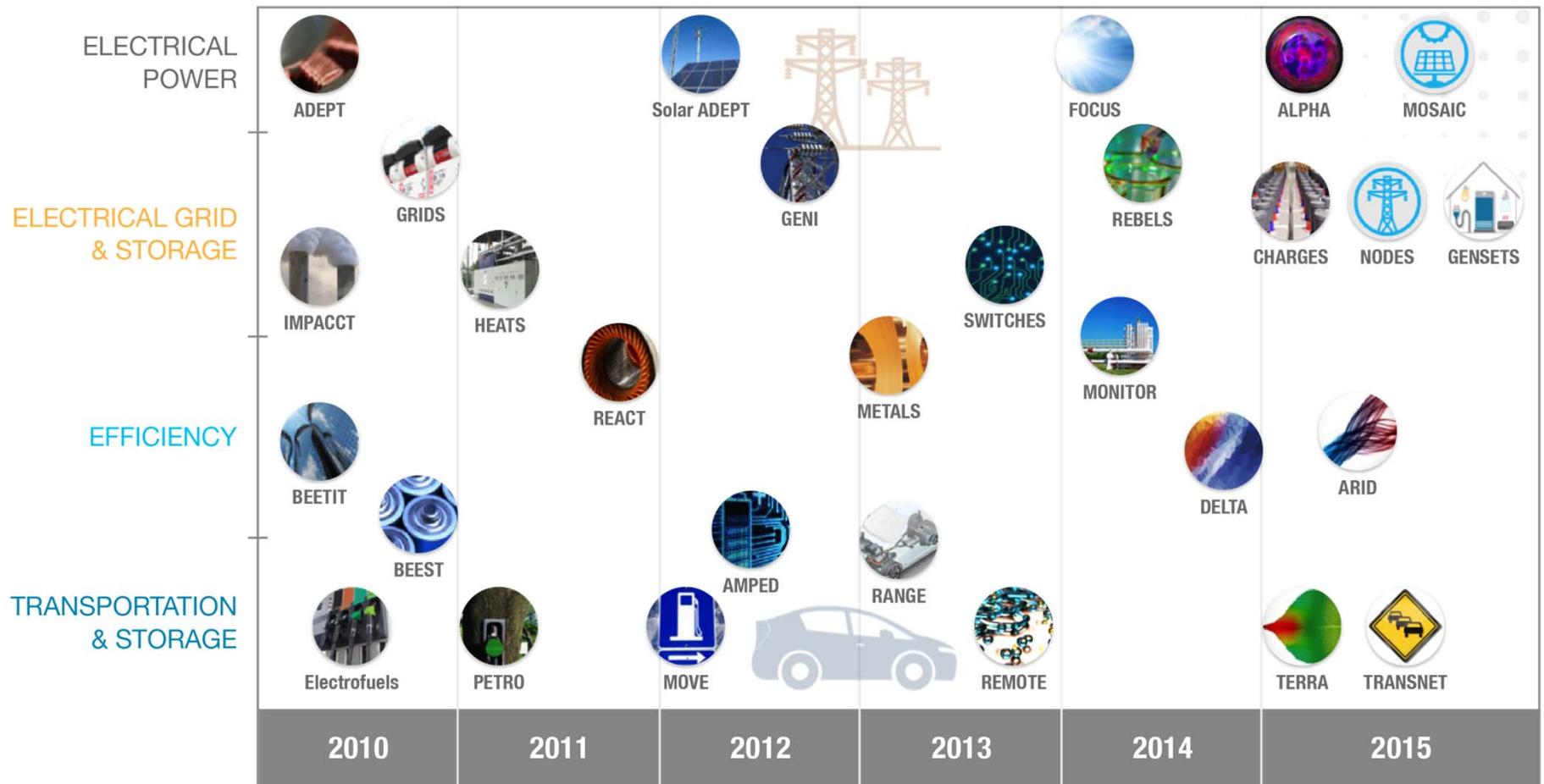
Stationary & Transportation Energy Technologies

ADEPT	AMPED	SWITCHES
HEATS	REACT	
SBIR/STTR	METALS	

Open

OPEN 2009	OPEN 2012	IDEAS
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Focused Programs – Past, Present and Initiated



Measuring ARPA-E's Success

MOVING TECHNOLOGY TOWARD MARKET



- ▶ More than 37 partnerships with other government agencies
- ▶ More than 30 new companies formed
- ▶ 34 Projects have attracted more than \$850 million in private-sector follow-on funding after ARPA-E's investment of \$135 million
- ▶ Established company relationships and developed new communities
- ▶ Several technologies now in products in the marketplace



BREAKTHROUGH ACHIEVEMENTS

- ▶ Technology breakthroughs
- ▶ Patents
- ▶ Publications



OPERATIONAL EXCELLENCE

- ▶ Expedited program development and project selection
- ▶ Aggressive performance metrics

Currently active programs

There are currently 8 active FOAs, including OPEN 2015

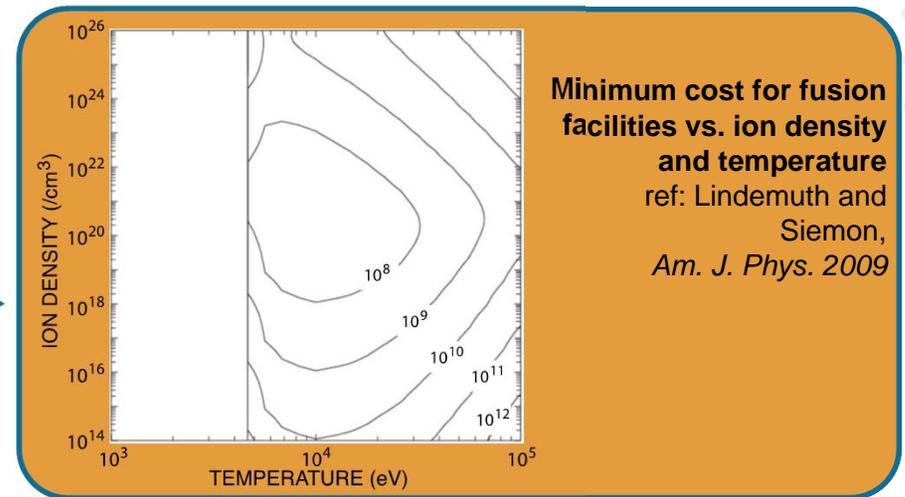
<p>The Accelerating Low-cost Plasma Heating and Assembly 9 projects</p> <p>ALPHA</p>	<p>Advanced Research In Dry cooling 14 projects</p> <p>ARID</p>	<p>Transportation Energy Resources from Renewable Agriculture</p> <p>TERRA</p>	<p>GENerators for Small Electrical and Thermal Systems</p> <p>GENSETS</p>
<p>Awards announced 5/14/15</p>		<p>Awards coming soon!</p>	
<p>Traveler Response Architecture using Novel Signaling for Network Efficiency in Transportation</p> <p>TRANSNET</p>	<p>Micro-scale Optimized Solar-cell Arrays with Integrated Concentration</p> <p>MOSAIC</p>	<p>Open Funding Opportunity Announcement 2015</p> <p>OPEN 2015</p>	<p>Network Optimized Distributed Energy Systems</p> <p>NODES</p>

ALPHA: Drivers and targets to enable low-cost fusion

- ▶ Low-cost fusion development requires:

- Intrinsically low-cost technologies to heat and confine plasma
- High shot rate for rapid learning

- ▶ Opportunity exists in intermediate density regimes, optimal balance of energy costs and power costs

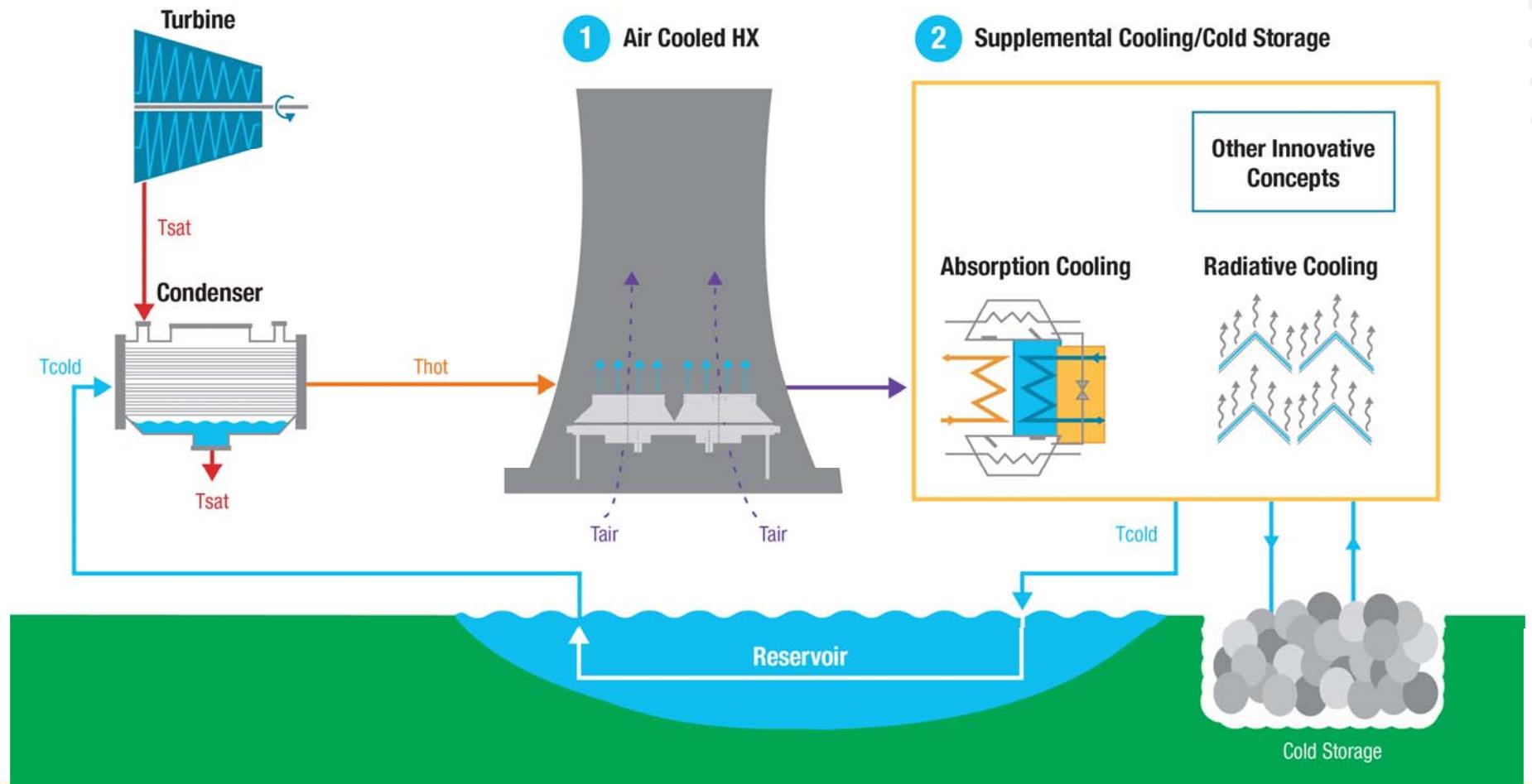


- ▶ ALPHA program will develop low-cost tools to:

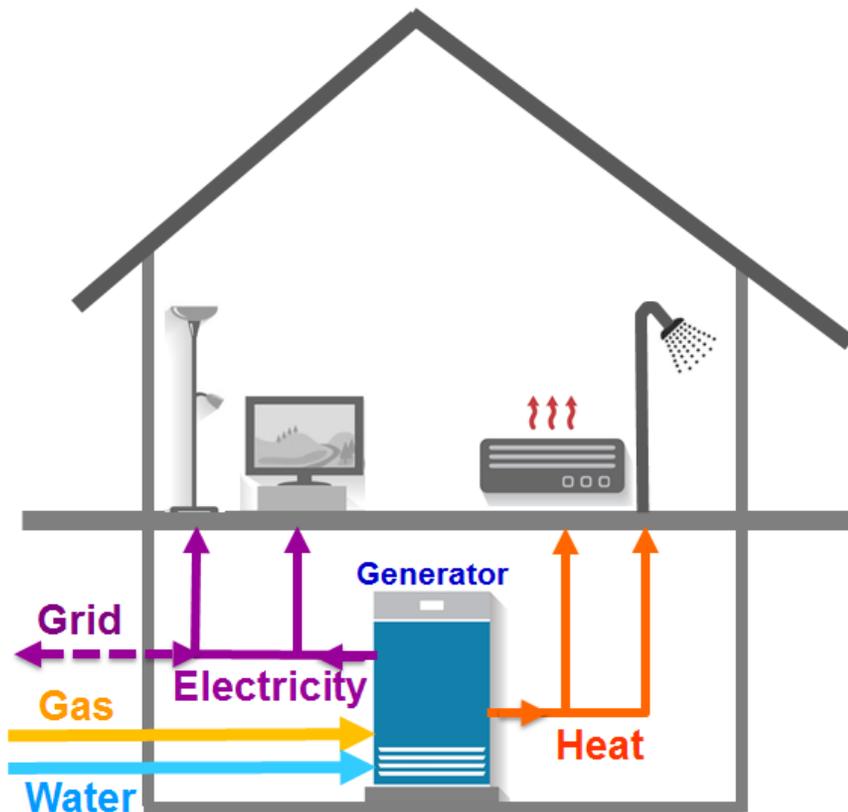
- Exploit physics of intermediate density regime
- Allow rapid experimentation at low cost
- Enable development and demonstration for full-scale reactors

ARID: Transformational Power Plant Cooling

- No net water dissipation
- No loss in plant efficiency
- Less than 5% increase in LCOE



GENSETS: GENERATORS for Small Electrical and Thermal Systems



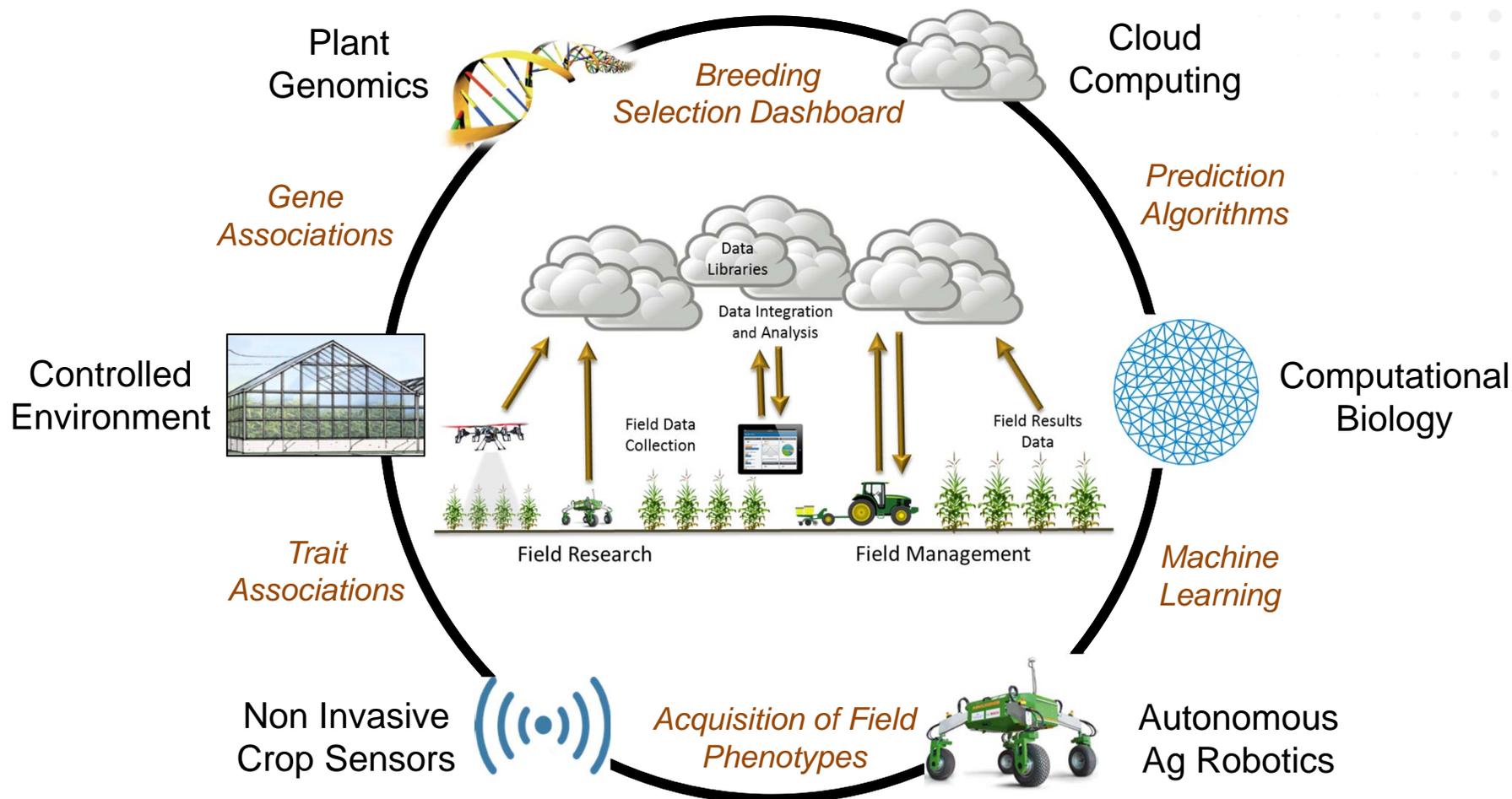
Technologies to enable widespread deployment of CHP systems for residential & commercial sectors

- 1 kW electricity system
- 40% electrical efficiency
- 10 year durability/life
- \$3,000 system cost

- Save energy (5 quads)
- Save \$ (~ 4-5 year payback)
- Reduce CO₂ by 200 million tons
- Reduce fresh H₂O withdrawal (8% of US total)
- Increase power resiliency
- \$240 billion business opportunity

TERRA Program Vision

Integrated Technologies Provide Platform for Breeding Innovation



OPEN 2015

“The objective of an ARPA-E OPEN FOA is simple, yet comprehensive: to support the development of potentially disruptive new technologies across the full spectrum of energy applications.”

- ▶ **\$125M total funding**
- ▶ **Project scope 18-36 months; \$1-10M**
- ▶ **OPEN solicitations provide are important to ARPA-E:**
 - **Complement focused programs**
 - **Support innovative “one off” projects**
 - **Provide a “snapshot” of energy R&D**

Program Directors

ARPA-E is continually recruiting new Program Directors, who serve 3-year terms

ROLES & RESPONSIBILITIES

Program development

- ▶ Perform technical deep dive soliciting input from multiple stakeholders in the R&D community
- ▶ Present & defend program concept in climate of constructive criticism

Active project management

- ▶ Actively manage portfolio projects from merit reviews through project completion
- ▶ Extensive “hands-on” work with awardees

Thought leadership

- ▶ Represent ARPA-E as a thought leader in the program area

ATTRIBUTES

- ▶ R&D experience; intellectual integrity, flexibility, and courage; technical breadth; commitment to energy; communication skills; leadership; and team management
- ▶ ***A passion to change our energy future***

Fellows

ARPA-E also hires Fellows, who serve 2-year terms

ROLES & RESPONSIBILITIES

Identification of high-impact energy technologies

- ▶ Perform technical and economic analyses to identify high-impact energy technologies.
- ▶ Publish original research papers and reviews.

Program director support

- ▶ Help develop future programs through technical analysis, discussions, and workshops.
- ▶ Assist with management of current projects, including site visits.

Organizational support

- ▶ Review proposals for funding opportunities.
- ▶ Contribute to the strategic direction and vision of the agency.

ATTRIBUTES

- ▶ Ph.D. in science or engineering; strong analytical and communication skills; ability to work independently and across disciplines; leadership.
- ▶ ***A passion to change our energy future***

DELTA & SkyMall – An opportunity missed!



SkyMall Files for Bankruptcy
Owner of In-Flight Catalog
Crippled by Wi-Fi and
Smartphones on Jets
WSJ Jan 23, 2015





U.S. DEPARTMENT OF
ENERGY

www.arpa-e.energy.gov