arpa·e
CHANGING WHAT'S POSSIBLE

01 Design Intelligence Fostering Formidable Energy Reduction and Enabling Novel Totally Impactful Advanced Technology Enhancements (DIFFERENTIATE – D')

Virtual Kick-Off Meeting

29 April 2020

Kick-Off Meeting Agenda

- Welcome to DIFFERENTIATE (D')!
  - Program Introduction
  - T2M Perspective
  - Legal/IP Considerations
  - Working with ARPA-E
- Project Presentations
  - Category 1: Hypothesis Generation
  - Category 2: Hypothesis Evaluation
  - Category 3: Inverse Design

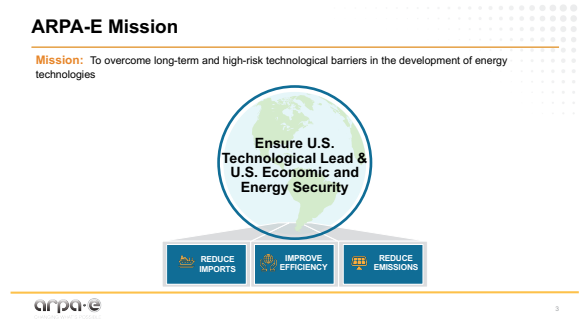
ARPA-E Mission

Mission: To overcome long-term and high-risk technological barriers in the development of energy technologies

D’ Program Objective

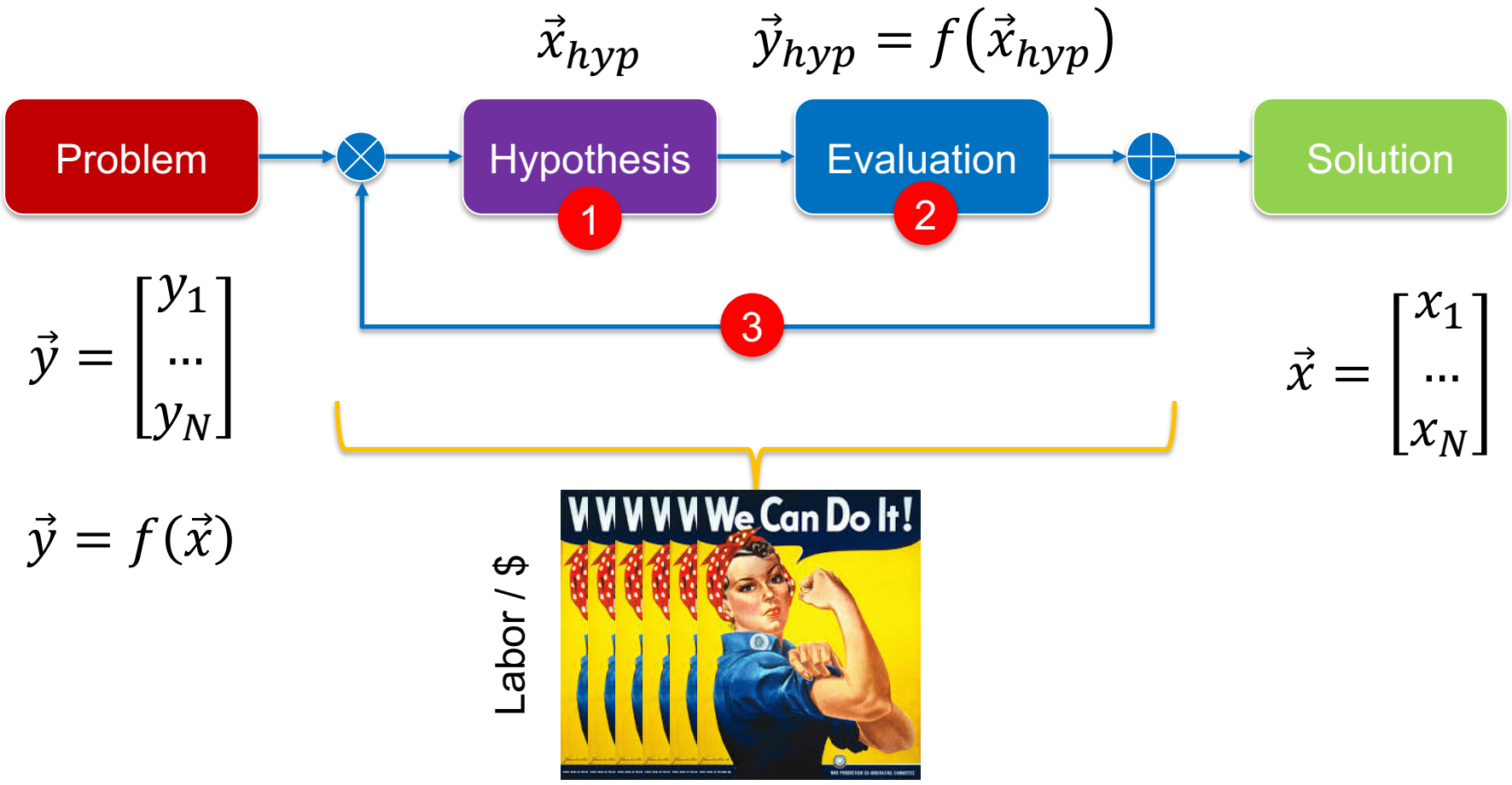
$30M

ML-Enhanced Design Tools → More Creative & Productive Engineers → Better Energy Products → Accelerated ARPA-E Mission



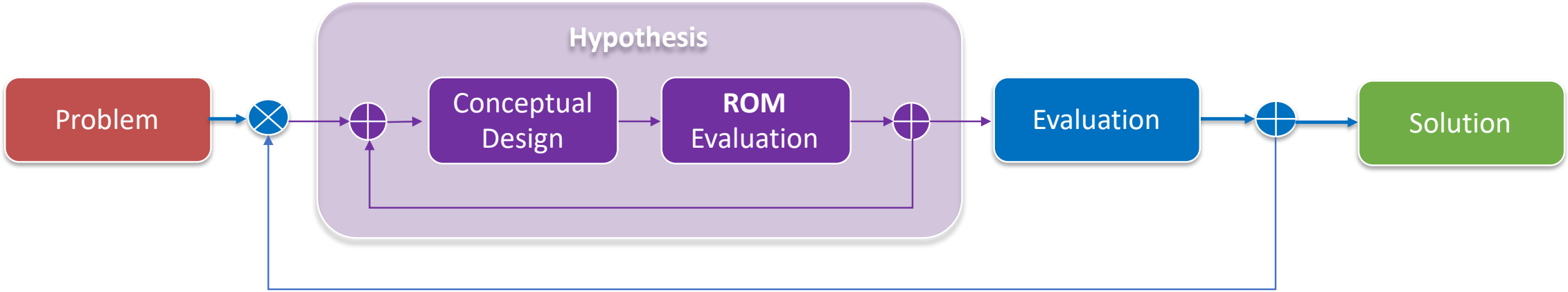
Design Process Framework

Used to identify challenge problem types: Hypothesis Generation, Evaluation & Inverse Design



Hypothesis Generation 1

Enhance the creativity of engineers as they formulate solution hypotheses (i.e. conceptual designs)



Challenge Problem Areas

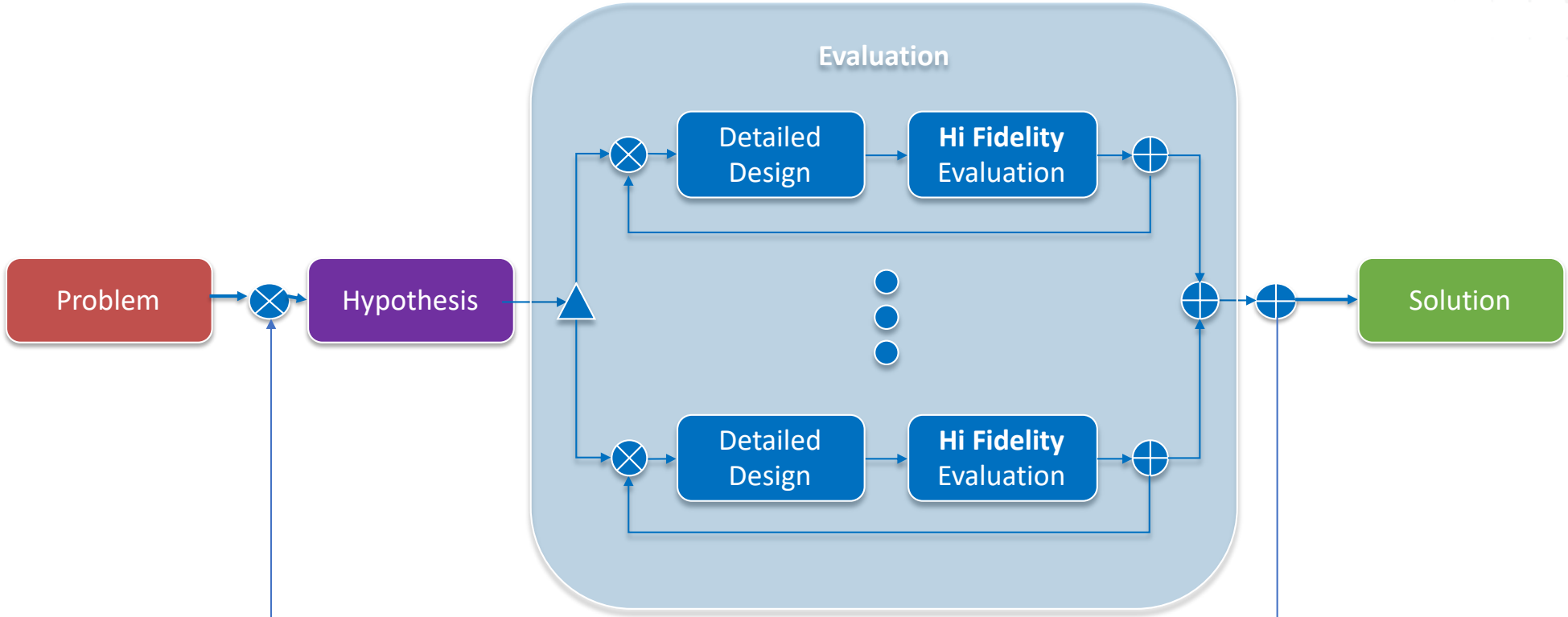
- Thermodynamic systems (3 teams)
- Electrical circuits (4)
- Materials & molecules (4)

Algorithms

- Reinforcement learning
- Differentiable programming
- Graph neural networks
- Gaussian processes

Hypothesis Evaluation 2

Enhance the efficiency of engineers as they evaluate their concepts



Challenge Problem Areas

- Heterogenous catalysts (2)
- Turbomachinery *& Heat Exchangers* (4)

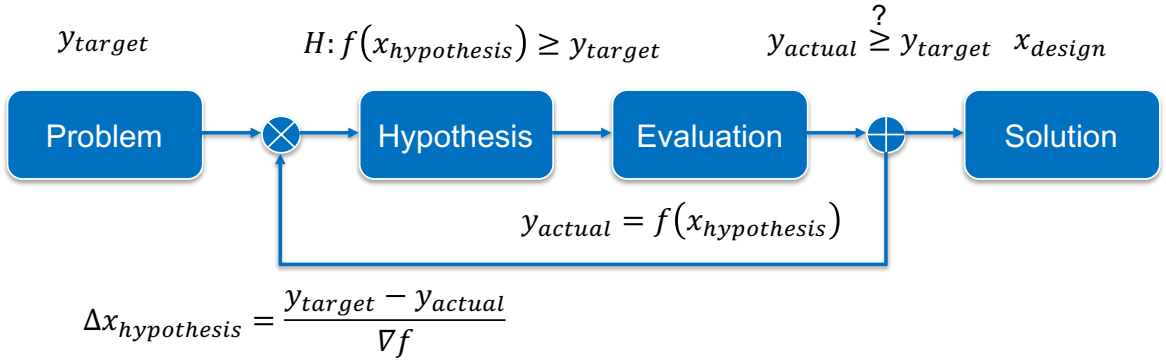
Algorithms

- Deep Neural Networks (CNNs)
- Bayesian Optimization
- Variational Auto-Encoders

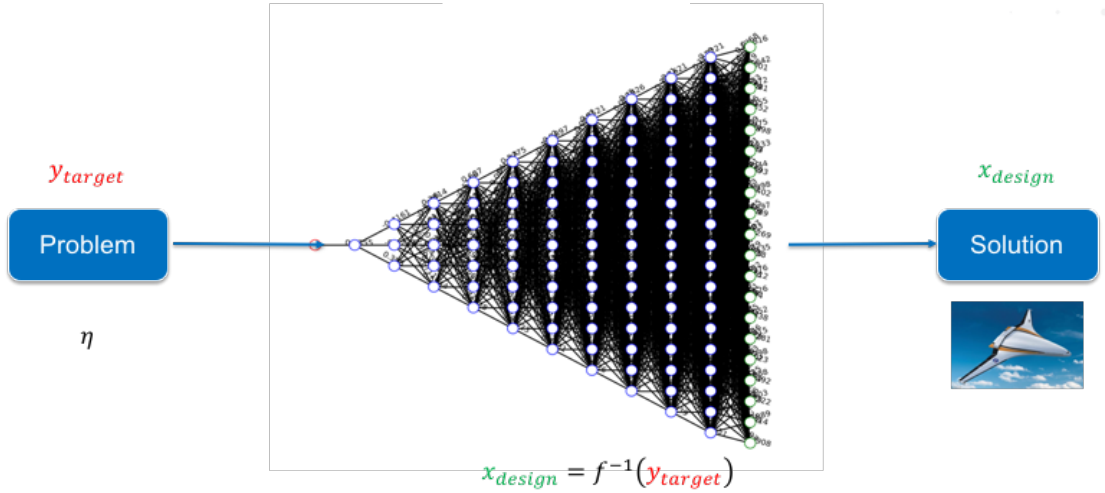
Inverse Design 3

Express designs as explicit functions of their requirements

Traditional (Iterative) Design



Inverse (Once-Thru) Design



Challenge Problem Areas

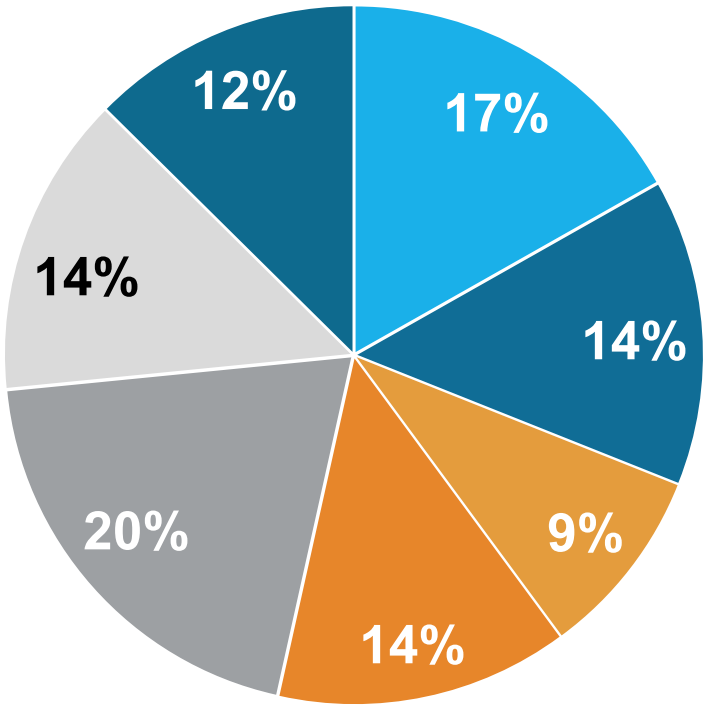
- Aerodynamic Surfaces (3)
- Photonic Devices (3)

Algorithms

- Generative Adversarial Networks (GANs)
- Invertible Neural Networks

Phase I Budget Allocation

Challenge Problem Area Segmentation



$14.8M

- 1.1 Thermodynamic systems/chemical manufacturing processes
- 1.2 Electrical power converters
- 1.3 Composite materials and/or molecules
- 2.1 Heterogeneous Catalysts
- 2.2 Turbomachinery & Heat Exchangers
- 3.1 Aerodynamic Devices/Surfaces
- 3.2 Photonic Devices

} Inverse Design

*Selections that proposed something other than a listed category bookkept in closest specific category

Congratulations & Welcome!

Closing thoughts . . .

- We are thrilled to be underway and are looking forward to working with you!
- We understand that life has been disrupted by COVID-19.
  - Please stay safe & take care of your families and teams.
  - We hope that you can make some progress.
- We would like to discuss your situation as awards are made via a ~30-minute Webex.
- We will set up an in-person Program Review meeting when it is safe to do so.
- We are interested in facilitating collaborations beforehand.

Enhanced Collaboration Proposal

- Objective
  - Accelerate progress by sharing (non-proprietary) lessons learned
  - Build strong community for future commercialization and technical efforts

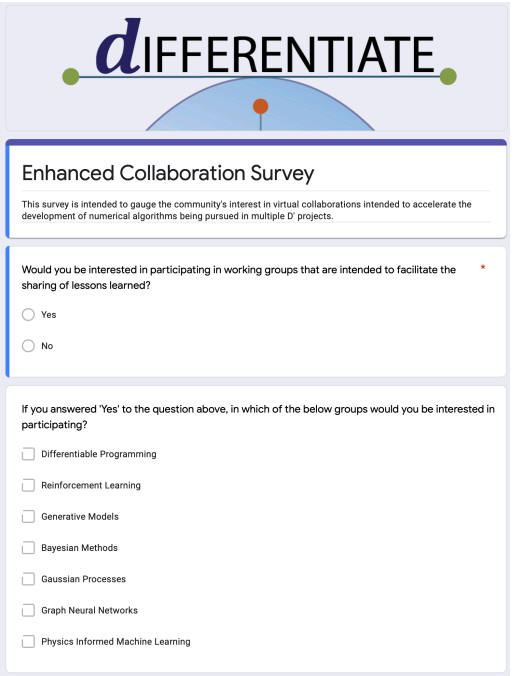
- Proposed Approach (Feedback Encouraged)
  - Open to all D' community members but NOT required
  - Numerical algorithm-based organizational framework
  - Quarterly virtual technical working groups

Notional Agenda

- Algorithm deep dive (30 min) – internal volunteer or external expert
- Lessons learned (60 min) – multiple internal volunteers
- Recent external developments (30 min) – ARPA-E and internal volunteers

Enhanced Collaboration Proposal

- Potential Working Group Topics
  - Differentiable Programming (DP)
  - Reinforcement Learning (RL)
  - Generative Models (e.g., GANs, VAEs)
  - Bayesian Methods (BM)
  - Gaussian Processes (GP)
  - Graph Neural Networks (GNNs)
  - Physics Informed Machine Learning (PIML)
  - TBD . . . Suggestions Encouraged!



- Registered meeting attendees will receive Google Form-Based Survey

- Based on feedback will down-select/merge to yield 3 groups with staggered quarterly meetings (i.e. 1 per month) -- or will cancel if not enough interest

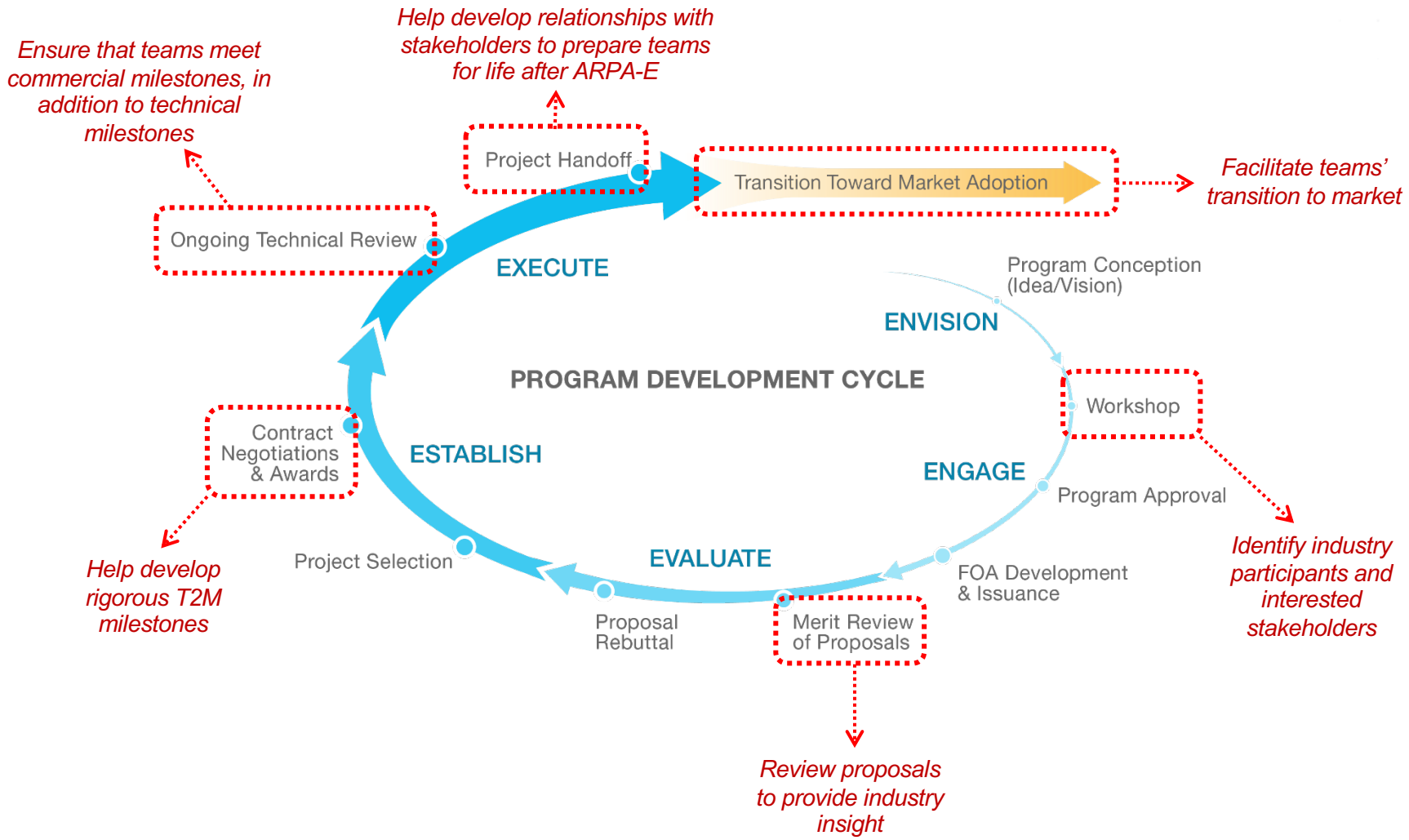
CHANGING WHAT'S POSSIBLE

02 Technology-to-Market at ARPA-E

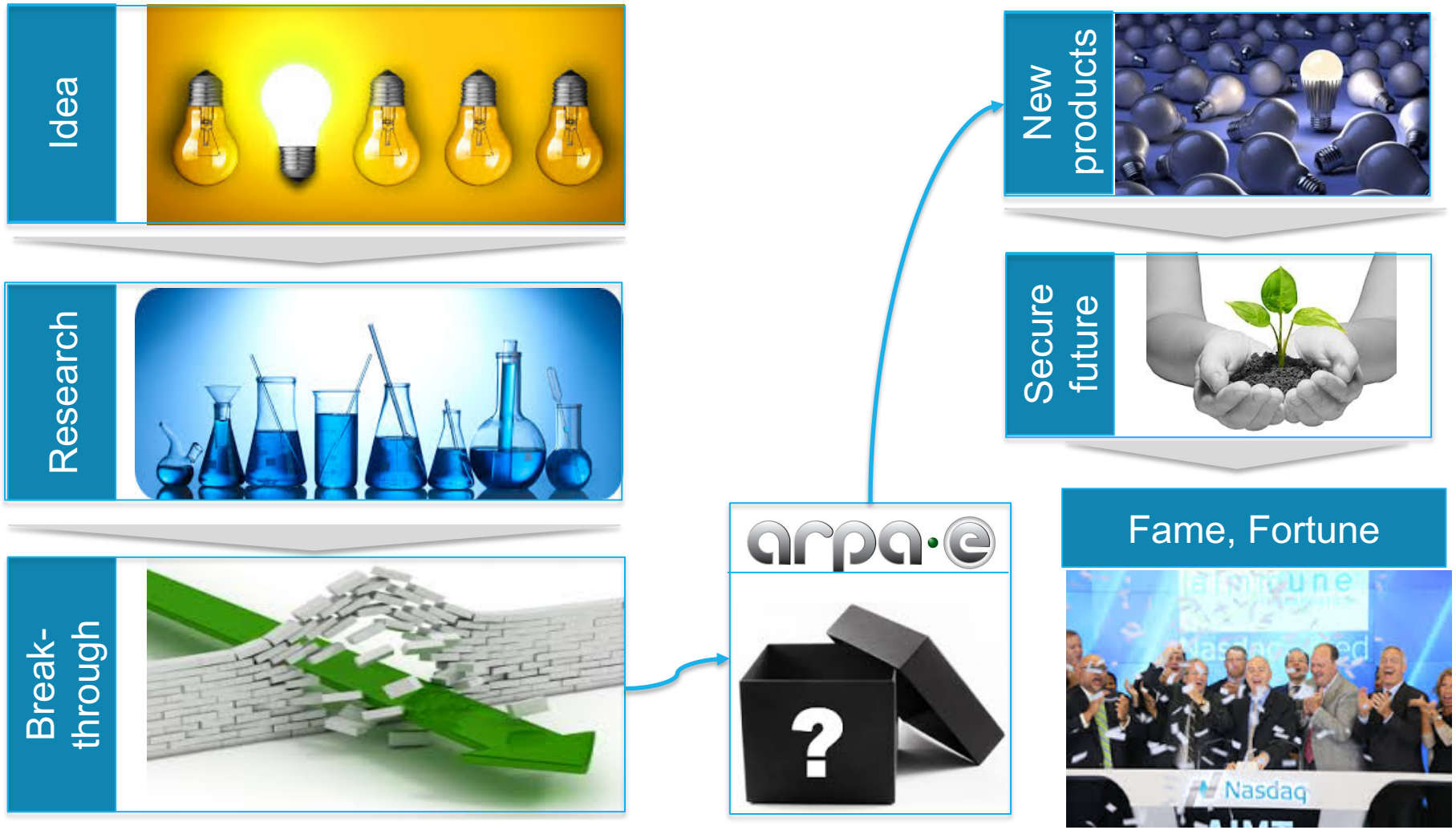
Overview

ARPA-E Motivation

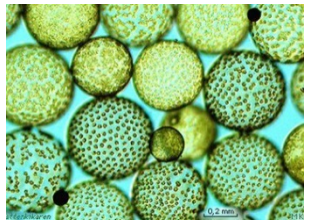
Tech-to-Market in the Project Lifecycle



What people sometimes think T2M is



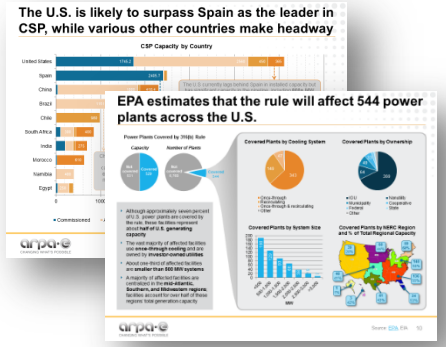
But realizing the full potential of technology is longer process

Technology	First market	Intermediate Markets	Market disrupted
Li-Ion Batteries 	 Long lived, energy dense cells	 Long lived, energy dense, rechargeable	 Long lived, energy dense, rechargeable, cost-effective
Photovoltaics 			
Algae Fuels 	 Nutrtiton supplements, pharmaceuticals	 	Commodity fuels? 

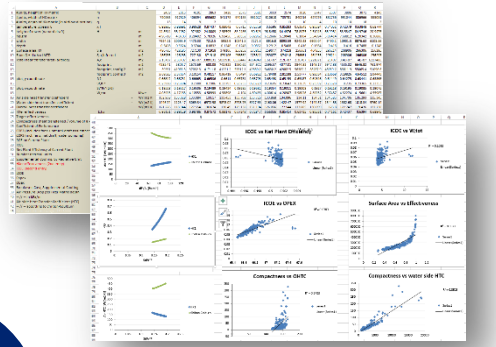
Decreasing cost

Major Responsibilities of Tech-to-Market Team

Market Studies



Techno-economic Analysis



T2M

Relationship-Building

General Coaching & Milestones

Project Milestones

Negotiation and Setting of T2M Milestones

- Awardees are required to have T2M milestones along with technical milestones

Ongoing Management of T2M Activity

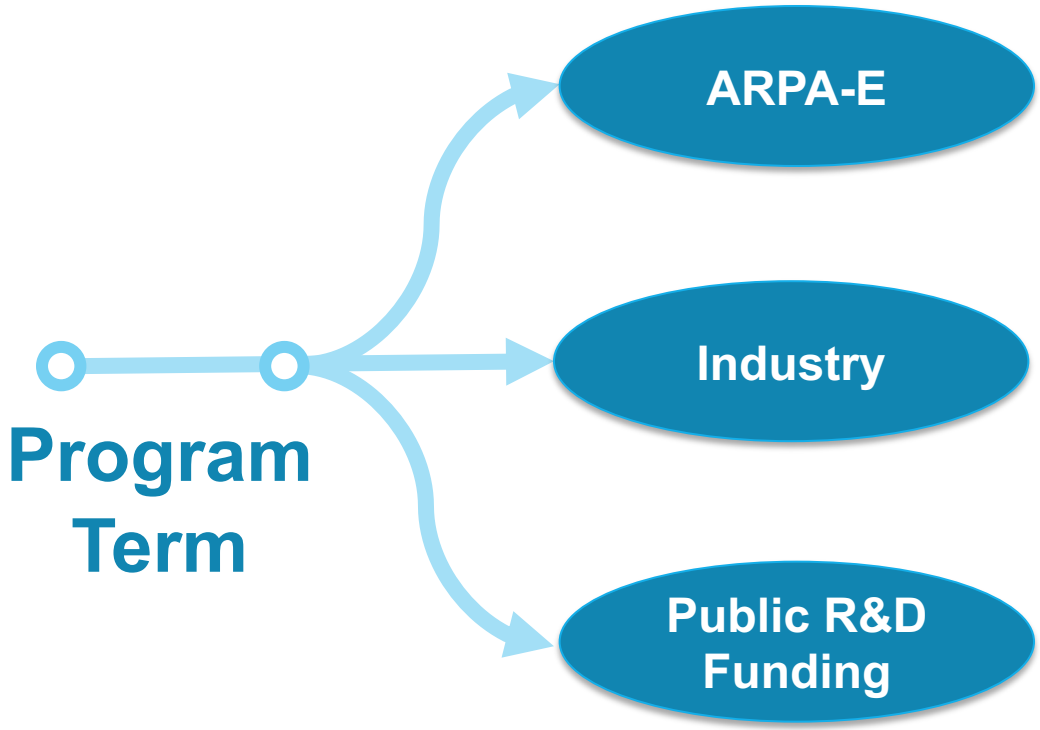
- Frequent discussions with awardees
- Content includes milestone review, market observations, advising, ideation, and analysis of opportunities

Team Approach:

- Participation from PD's, Tech SETA's, other T2M Advisors

A better way of thinking about T2M

- What happens to this project when the funding runs out?



Why month 25 matters so much

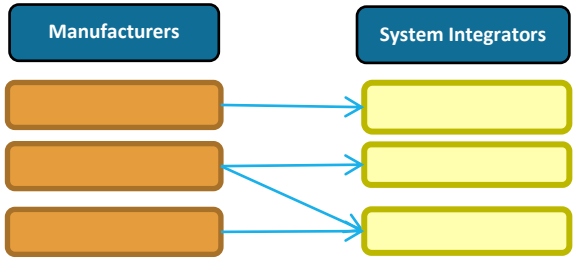
- **Return on the public dollar** – Publishing is great, but we're here to move a market
- **Momentum –** Teams have clear view on what's required next
- **Team** – Maintain institutional knowledge
- **Thought leadership** – Validate that we've hit upon an idea that really matters

Market Knowledge Throughout Program Lifecycle

Value Chain Analysis

*Describes the **sequence of activities** currently used to serve the market; useful for identifying entry points*

Partnerships Analysis



*Defines **number and strength** (JV, supply agreement) of relationships between parties*

Competitive Analysis

*Illuminates the **competitive pressures** that exist in the market*

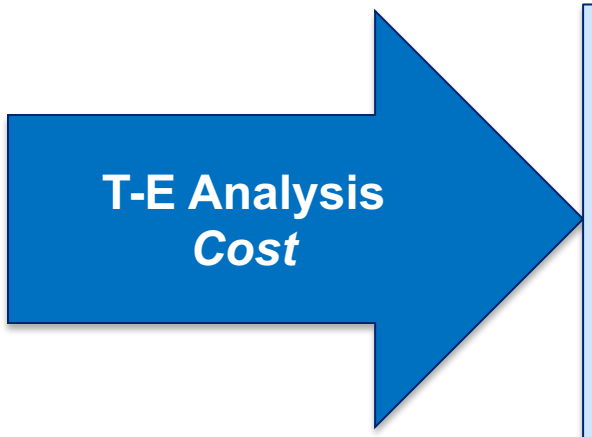
Market Analysis

Defines:

- Size
- Segmentation
- Barriers to Entry
- Regulation
- Competition

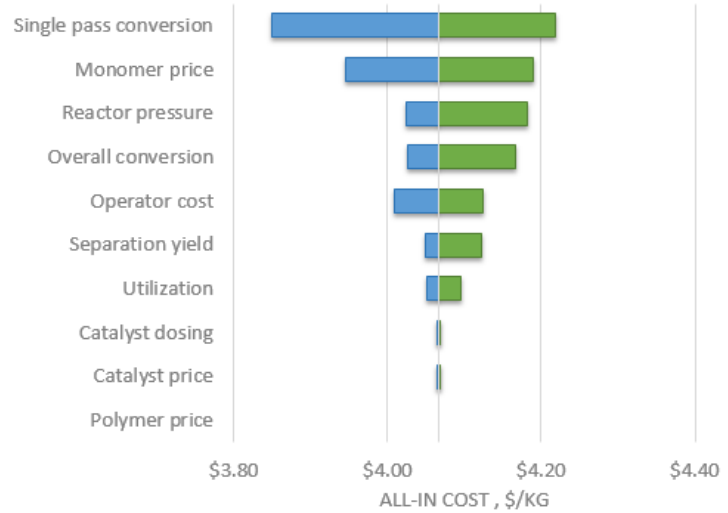
Customer & Value Proposition Discovery

- Who is the **customer**?
- How is their **need met now**?
- What is performance of **incumbent** technology?
- What **capabilities and resources** are needed to get to the next stage of development?



- Establish **theoretical limits**
- Identify Most **Valuable Improvements**
- **Inform** Potential **Trade-offs,** Targets, and Metrics
- Ultimately…Understand the **Minimum Viable Pricing**

Techno-Economic Modeling



Settings	Worst	Expected	Best	Units	Reference
Utilization	90%	95%	98%	-	95.0%
Overall conversion	90%	95%	97%	of monomer	95.0%
Separation yield	95%	98%	99%	-	98.0%
Single pass conversion	3.0%	4.0%	7.0%	of monomer	4.0%
Catalyst dosing	0.0015	0.0010	0.0008	kg/kg monomer	0.0010
Reactor pressure	4.0	5.0	5.5	bar	5.0
Polymer price	$13,500	$14,100	$14,600	/t	$7,000
Monomer price	$1,155	$1,050	$945	/t	$1,050
Catalyst price	$2,310	$2,100	$1,890	/t	$2,100
Operator cost	$76,000	$74,000	$72,000	/yr	$72,000

Metric: **All-in cost , $/kg**

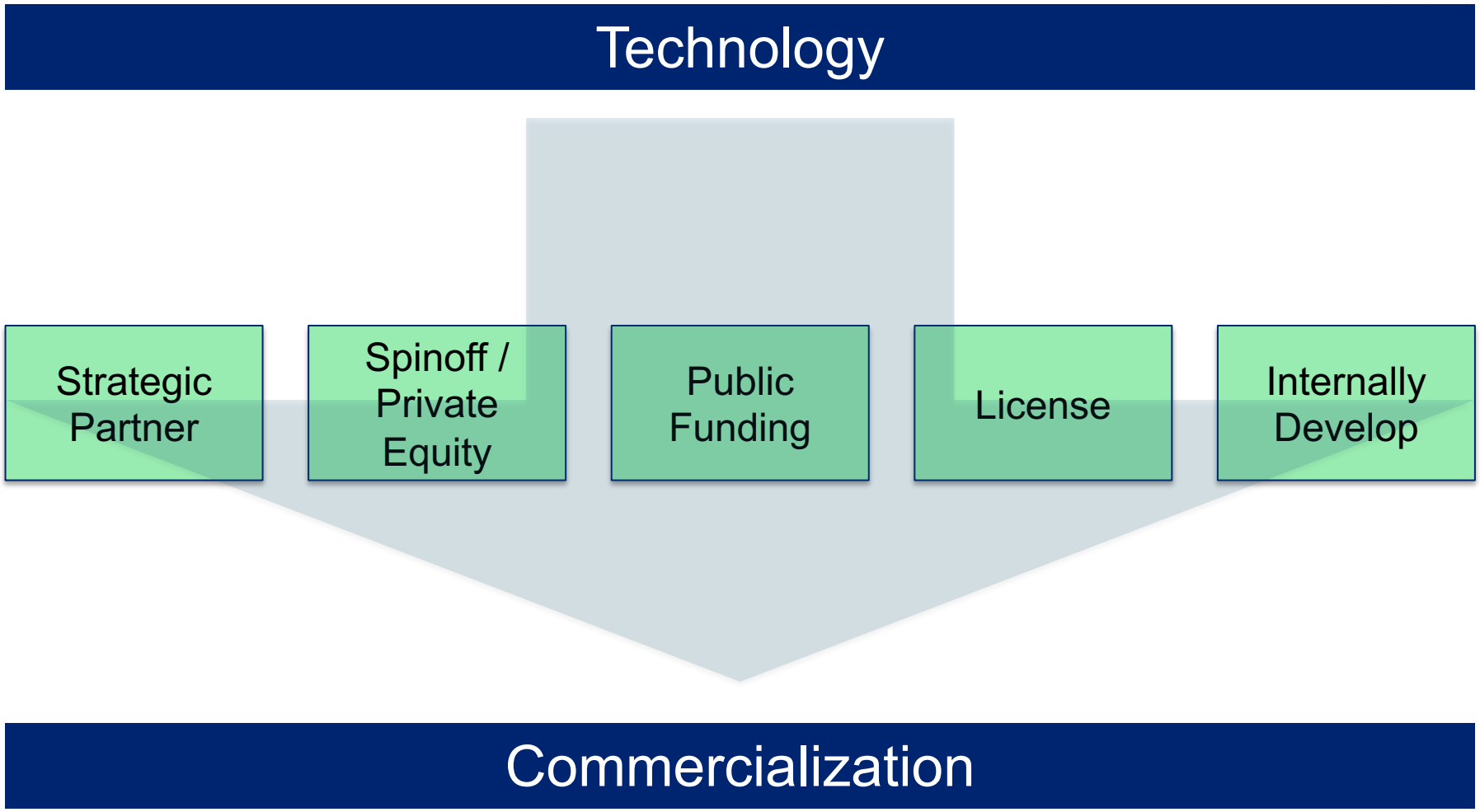
Documentation | Dashboard | **Tornado** | Process model | Equipment sizing | Equipment costs | CapEx | OpEx & Rev | Cash flow | Constants

IP and Competitor Analysis

Evaluation of the IP landscape in and around your technology?

- What IP do you own?
- What IP do you expect to create?
- What limits could your competition create?

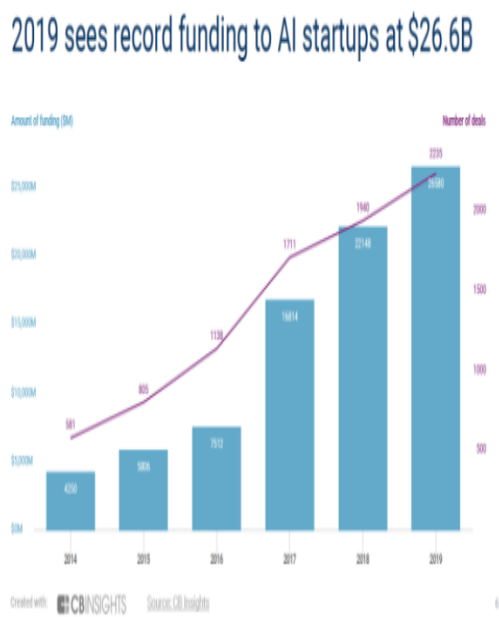
Post-Program Financing Models



AI Investment Trends

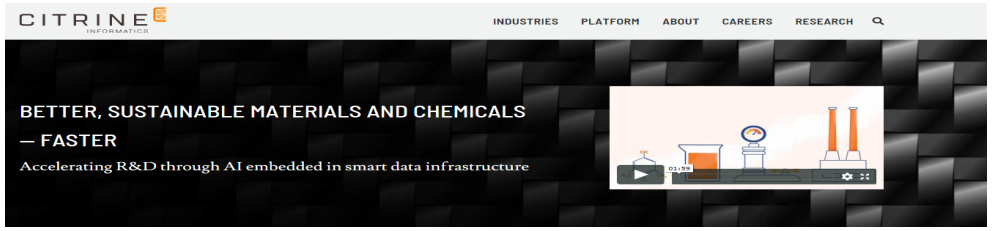
CB Insights: AI startup funding hit new high of $26.6 billion in 2019

KHARI JOHNSON @KHARIJOHNSON JANUARY 22, 2020 6:00 AM



Corporate venture capital funding for AI increased by 81% in 2017

Corporate VC investment (1/2)



Likely Commercialization Pathways

Open Source

- How will your raise awareness?
- Support and enhancements?
- Consulting engagement?
- Educational/training sessions and literature?

Internal Tools

- What existing tools are being modified / supplemented by models developed under differentiate?
- How will access to tools be rolled out internally?
- Who will maintain and update tools?

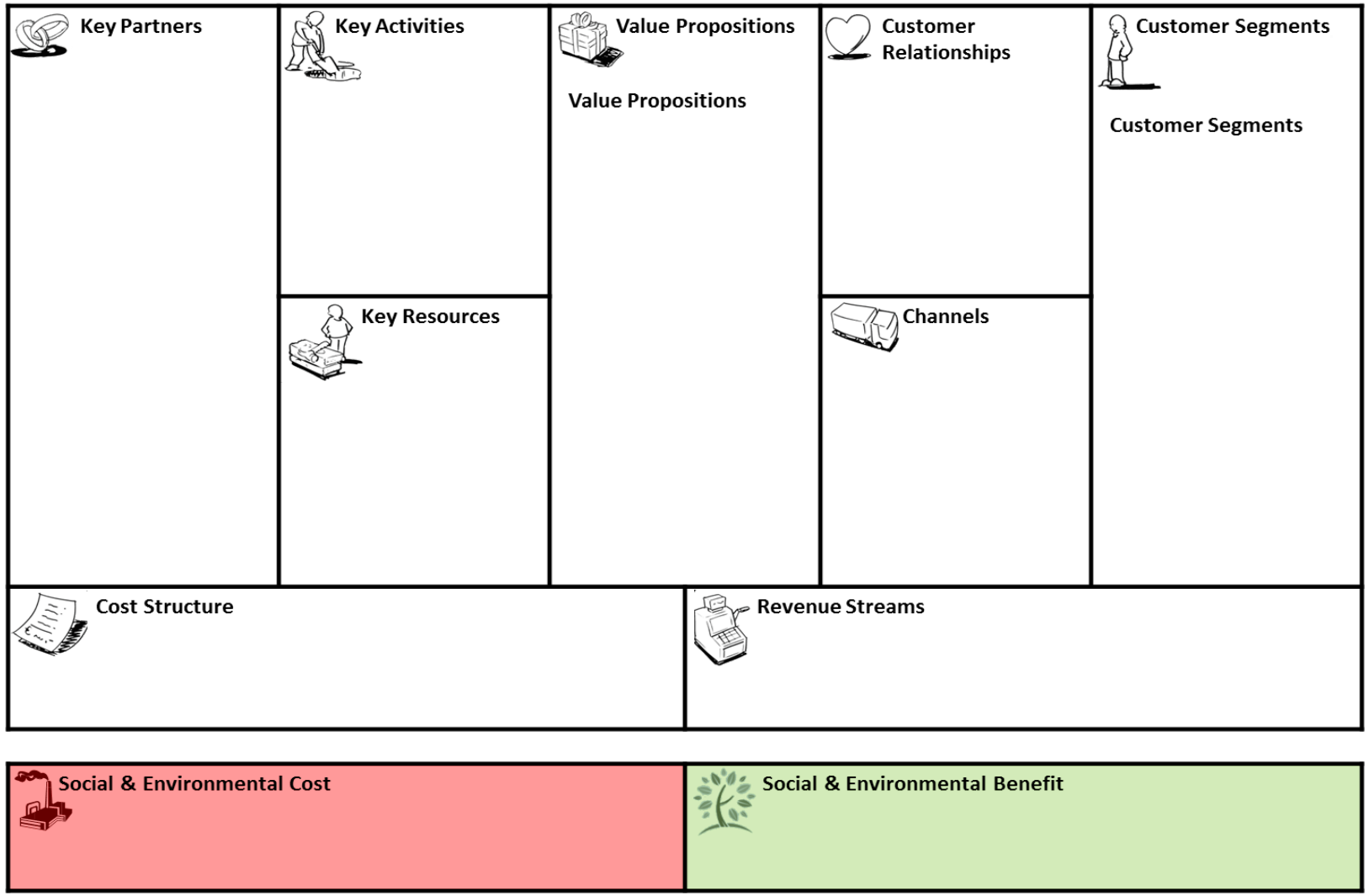
Licensing

- What is the licensing process within your individual organizations?
- How will you identify potential licensees?
- What will be the terms? Price? Restrictions of use? Etc.

Company Formation

- What is your business model - Software or Software-as-a-Service?
- Who are your customers and what are they willing to pay?
- What resources will be required (people, financial, strategic partners etc.)?

T2M Output: Business Model Canvas



03 Legal Considerations: Intellectual Property and Commercialization Plans

Overview of Patent Rights in ARPA-E Awards

- The goals of DOE/ARPA-E patent provisions are:
  - Strengthen U.S. energy and economic security
  - Maintain or establish U.S. scientific and engineering leadership in key energy fields
  - Encourage development, manufacture, and deployment of new inventions in the U.S.
  - Establish new industries
  - Strengthen the U.S. manufacturing base
  - Create new sources of employment
  - Retention of limited government rights for use of inventions and data by the US government.
  - Maximize the retention of IP rights in awardees to facilitate commercialization
- Certain patent requirements and rights are mandated by law, regulation, or policy as the quid pro quo for the recipient receiving financial assistance.
- Under certain circumstances, there is some flexibility to vary from the standard patent requirements and rights

Patent Rights Clause

- If you elect to retain title to an invention, you must file a patent application.

- Government Patent Rights:
  - Government license: Royalty-free right to practice invention by or on behalf of the Government
  - March-in Rights: Insurance Policy that you will commercialize the invention
  - Require substantial manufacture in the U.S. for any use or sale worldwide
  - U.S. Preference in licensing: Grant of exclusive right to use or sell invention in U.S. must be to party who agrees to substantially manufacture in the U.S

U.S. Manufacture Plan

- The U.S. Manufacture Plan, submitted with the Full Application, represents the Applicant's measurable commitment to support U.S. manufacturing of subject inventions resulting from its award in a manner that benefits the U.S. economy.

- It includes the recipient's commitment to substantially manufacture any products embodying a subject invention or produced through the use of a subject invention in the United States for use throughout the world.

- U.S. manufacturing and commitments made in U.S. Manufacture Plans may be waived or modified upon a showing that domestic manufacturing is not feasible; however, other benefits to the U.S. economy must be demonstrated.

IP and Data Management Plans

- Needed when there is more than one team member
- The IP and Data Management Plan is due 6 weeks after the award is made
- Starting point is that each team member performing R&D must have an appropriate IP attachment 2 included in their agreement or the equivalent for an FFRDC which each address IP issues between each team member and DOE/ARPA-E
- ARPA-E has posted a model template on the ARPA-E website
- Must include statement that Agreement takes precedence over the IP and Data Management Plan
- Addresses IP issues between team members:
  - Data management/Sharing of technical data
  - Dealing with joint inventions
  - Licensing of technology
  - Dispute resolution

Technical Data Types

- **Limited Rights Data** is proprietary data that was developed at private expense before you received this award. The Federal Government does not have any rights to this data, unless the parties negotiate rights. To protect Limited Rights Data, you should not disclose it to ARPA-E, unless it is necessary for us to evaluate your work under the award. If you anticipate the need to deliver Limited Rights Data, you should notify DOE patent counsel.
- **Restricted computer software** is proprietary computer software
- **Unlimited Rights Data** is data produced under the award that is suitable for immediate public release. Data produced under government sponsorship is generally classified as public information.
- **Protected Data** is data produced under the award that is protected from public release for a limited period of time. You may be eligible to designate data first produced under the conduct of this award as Protected Data; such data may be protected from public release for a period of 5 years from the time it is first produced. Automatically authorized for for-profit awardee. Others must request that right.

Special Software Provisions & Commercialization Plan

Draft Commercialization Plan is a milestone in Attachment 3 to the Award

- Identifies specific software/data sets that are expected outcome
- Template has been provided which lists suggested factors to address
- To be negotiated and has no minimum requirement
- Government right to publish waived

Reporting Software and Data Sets

- Report software and data sets when specified in the Commercialization Plan. Instructions on reporting and utilization still being developed.
- Provide annual utilization reports:
  - One track for software that is to be restrictively licensed
  - Separate track for software to be made available as open source

CHANGING WHAT'S POSSIBLE

04 Project Management Overview: *Expectations, and Lessons Learned*

Presented on behalf of the ARPA-E SETAs by

Huthaifa Ashqar

Agenda

- ARPA-E cooperative agreement reporting requirements
- ePIC Project Management System
- Quarterly Reporting
- Invoicing
- Lessons Learned

ARPA-E Active Program Management

DIFFERENTIATE awards are Cooperative Agreements

- ARPA-E carefully tracks technical and T2M progress against the project milestones and offers feedback/recommendations for the project
- Pivots and redirections may be necessary during the project to ensure technical & commercial success
- ARPA-E ends projects that are not going to meet the goals of the award so that the remaining funds can be re-deployed

Reporting requirements are in Attachment 4

ATTACHMENT 4:
ARPA-E REPORTING CHECKLIST AND INSTRUCTIONS

1. Identification Number: **DE-AR0000XXX**	2. Program/Project Title: The Best Energy Technology Ever!		
3. Recipient: **Awesome Energy, Inc.**			
4. Reporting Requirements (see attached "ARPA-E Reporting Instructions"):	Frequency	No. of Copies	Addressees
I. PROJECT MANAGEMENT REPORTING (DURING AWARD)			
☒ A. Research Performance Progress Reports	QR	1	https://arpa-e-epic.energy.gov
☒ B. Financial Reports	QR	1	https://arpa-e-epic.energy.gov
☒ C. Scientific/Technical Conference Papers/Proceedings	Y	1	http://www.osti.gov/elink-2413
☒ D. Intellectual Property Reporting	Y	1	See block 5 for instructions
☒ E. Intellectual Property & Data Management Plan	X	1	https://arpa-e-epic.energy.gov
☒ F. Subject Invention Utilization Reporting	A	1	https://arpa-e-epic.energy.gov
☒ G. Lobbying Activities Reporting	Y	1	https://arpa-e-epic.energy.gov
☒ H. Special Status Reports	Y	1	https://arpa-e-epic.energy.gov
☒ I. Annual Indirect Cost Proposals	FY	1	See block 5 for instructions
☒ J. Annual Audit of For-Profit Recipients	RFY	1	See block 5 for instructions
☒ K. Annual Property Inventories	A	1	https://arpa-e-epic.energy.gov
☒ L. Subaward/Subcontract Reports	Y	1	See block 5 for instructions
☒ M. Human Subjects Research Reporting	A	1	See block 5 for instructions
☒ N. Animal Subjects Research Reporting	A	1	See block 5 for instructions
II. CLOSEOUT REPORTING (UPON CLOSEOUT OF AWARD)			
☒ A. Final Scientific/Technical Report	F	1	http://www.osti.gov/elink-2413
☒ B. Final Invention and Patent Report	F	1	See block 5 for instructions
☒ C. Final Property Report	F	1	https://arpa-e-epic.energy.gov
☒ D. Software Deliverable Submission	F	1	http://www.osti.gov/estsc/241-4pre.jsp
III. POST-AWARD REPORTING (FOLLOWING CLOSEOUT OF AWARD)			
☒ A. Subject Invention Utilization Reporting (see Section I.F above)	A	1	https://arpa-e-epic.energy.gov

FREQUENCY CODES AND DUE DATES:

A – Annually; within 90 calendar days after the end of the annual reporting period.

F – Final; within 90 calendar days after closeout of the award.

FY – Annually; within 180 calendar days after the close of the fiscal year.

QR – Quarterly; within 30 calendar days after end of the quarterly reporting period.

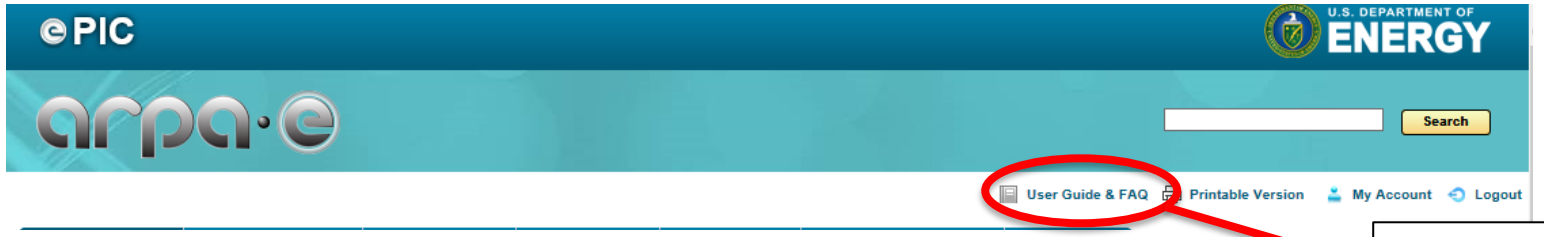
RFY – Recipient's Fiscal Year; within the earlier of 30 days after receipt of the auditor's report or 9 months after end of the audit period.

X – Within six (6) weeks of the effective date of ARPA-E Award.

Y – Within five (5) calendar days after the event or as specified.

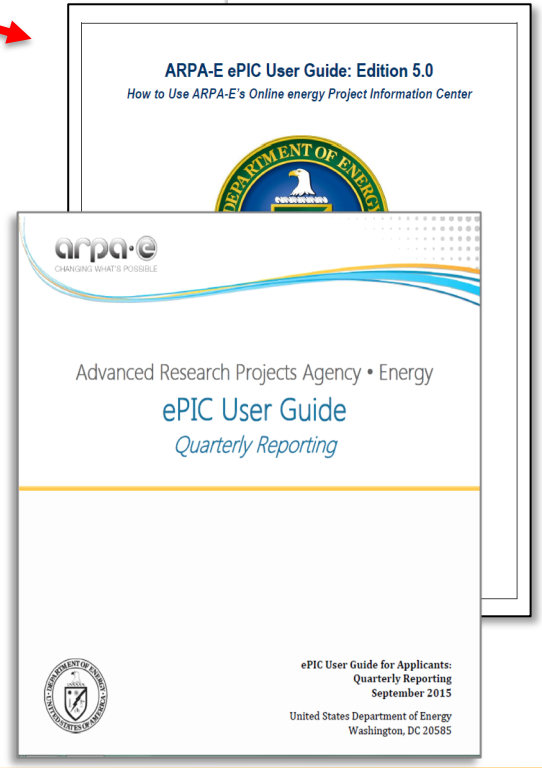
ARPA-E ePIC Project Management System

https://arpa-e-epic.energy.gov/

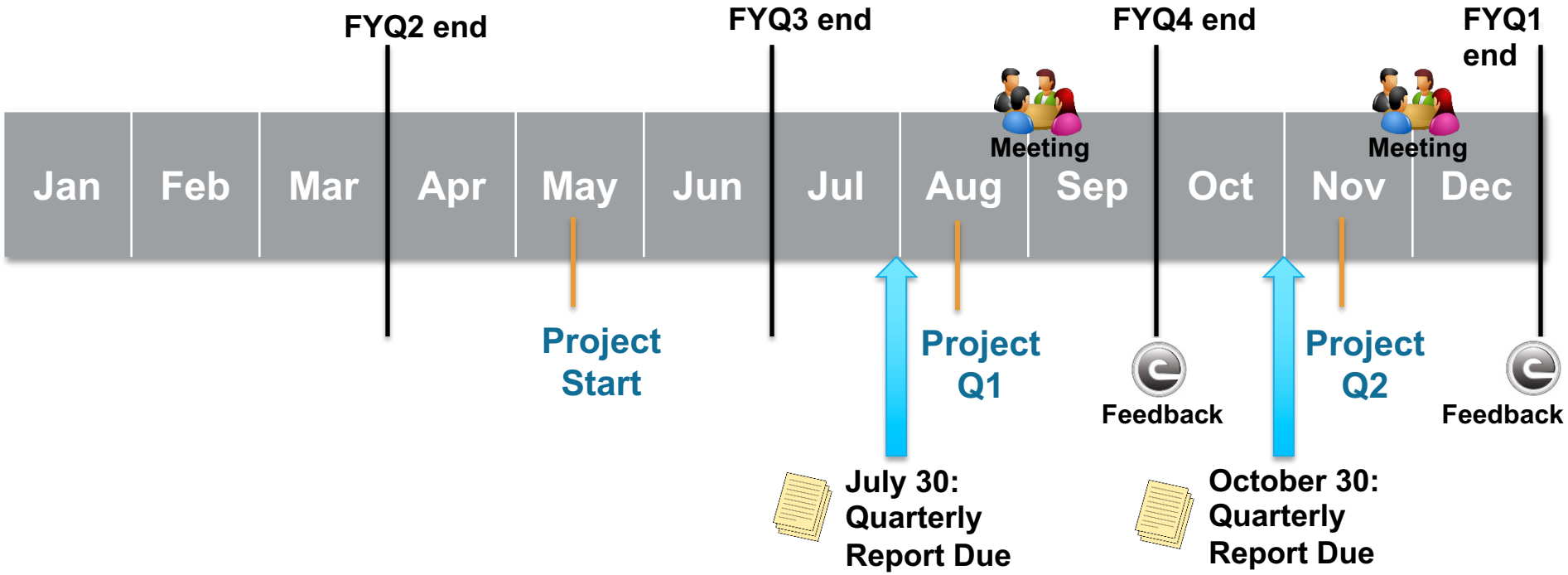


- ePIC is ARPA-E's project management tool available to both performers and ARPA-E staff

- ePIC is used to:
  - Submit quarterly technical reports
  - Submit quarterly financial report (SF-425)
  - Submit most annual reports + closeout reports
  - Review ARPA-E technical/T2M status feedback
  - View ARPA-E tracking of expenditures, invoice status



Project/FY Schedule and Reporting Offset



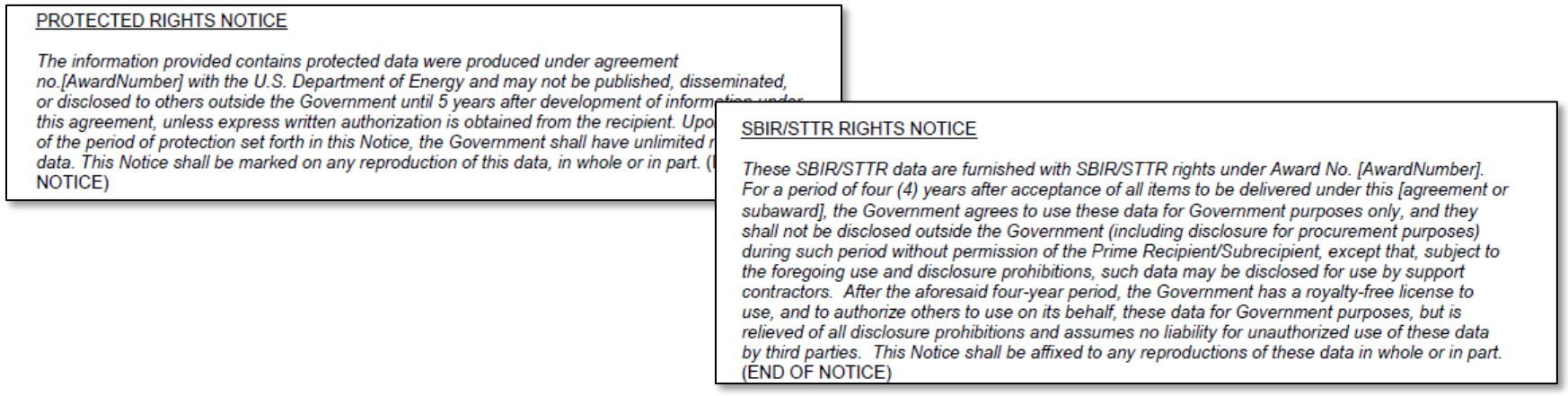
- Timing of quarterly report submission follows the Fiscal Year (FY) calendar
- Report progress against milestones due according to Project Quarters

Expectations for all technical/T2M reports

- Orient reporting around the milestones in your Attachment 3
  - To us, this is the foundation of your project

- Emphasize charts and data on current or upcoming milestone completion over secondary efforts underway in your labs
  - Please be succinct, use charts/figures, provide key data

- Remember to mark protected data as such with your reports



PROTECTED RIGHTS NOTICE

The information provided contains protected data were produced under agreement no.[AwardNumber] with the U.S. Department of Energy and may not be published, disseminated, or disclosed to others outside the Government until 5 years after development of information under this agreement, unless express written authorization is obtained from the recipient. Upo of the period of protection set forth in this Notice, the Government shall have unlimited r data. This Notice shall be marked on any reproduction of this data, in whole or in part. (
NOTICE)

SBIR/STTR RIGHTS NOTICE

These SBIR/STTR data are furnished with SBIR/STTR rights under Award No. [AwardNumber]. For a period of four (4) years after acceptance of all items to be delivered under this [agreement or subaward], the Government agrees to use these data for Government purposes only, and they shall not be disclosed outside the Government (including disclosure for procurement purposes) during such period without permission of the Prime Recipient/Subrecipient, except that, subject to the foregoing use and disclosure prohibitions, such data may be disclosed for use by support contractors. After the aforesaid four-year period, the Government has a royalty-free license to use, and to authorize others to use on its behalf, these data for Government purposes, but is relieved of all disclosure prohibitions and assumes no liability for unauthorized use of these data by third parties. This Notice shall be affixed to any reproductions of these data in whole or in part.
(END OF NOTICE)

Expectations for Quarterly Written Reports

- Technical report submission in ePIC consists of:
  1. Technical narrative
  2. Summary milestone status *(including % complete)*

- Technical Narrative Structure
  - Executive Summary (<1 page)
  - Summary table of milestones due/past-due *(re-use for #2 in ePIC)*
  - Major risks to future milestones (< 2 pages)
  - Supporting data & additional information (~10-20 pages)
  - Budget summary (<1 page)

- Highly-sensitive confidential information should be saved for meetings/WebEx

Further information in the "DIFFERENTIATE Project Reporting Guidelines" document

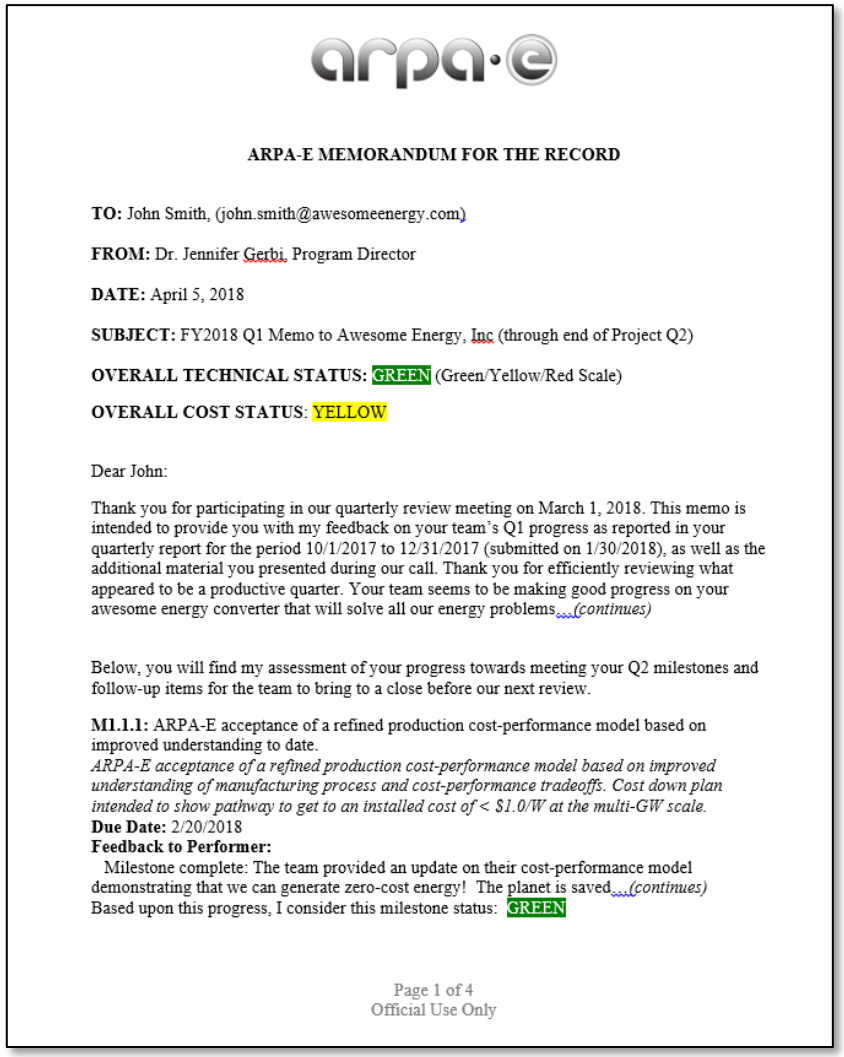
Expectations for Quarterly Review Meetings

- Generally scheduled following Project Quarters
- Typically 2-3 hours for the discussion
- May be in-person (at your facilities or at ARPA-E) or over teleconference/WebEx
- Lab/facility tours during on-site visits are strongly encouraged
- Please allow plenty of time for questions and discussion when preparing the slides, particularly around tasks/milestones experiencing difficulty
- Please add lunch to the agenda if the on-site meeting spans the lunch hour.
- Please provide briefing slides at least 24 h in advance to the PD, tech SETA, and T2M advisor (w/o commercially-sensitive info)

Further information in the "DIFFERENTIATE Project Reporting Guidelines" document

ARPA-E Feedback is Provided Quarterly

- Provides you with our view of the status of the milestones
  - Output from quarterly report & quarterly review meeting
- Provides follow-up items and constructive feedback to aid in meeting short/long term goals
- Accessible in ePIC as “Feedback to Performer” on Technical tab (also sent via email)
- Overall cost status reflects timeliness of invoicing, comparison to spend plan, or other budgetary issues



ARPA-E MEMORANDUM FOR THE RECORD

TO: John Smith, (john.smith@awesomeenergy.com)

FROM: Dr. Jennifer Gerbi, Program Director

DATE: April 5, 2018

SUBJECT: FY2018 Q1 Memo to Awesome Energy, Inc (through end of Project Q2)

OVERALL TECHNICAL STATUS: GREEN (Green/Yellow/Red Scale)

OVERALL COST STATUS: YELLOW

Dear John:

Thank you for participating in our quarterly review meeting on March 1, 2018. This memo is intended to provide you with my feedback on your team’s Q1 progress as reported in your quarterly report for the period 10/1/2017 to 12/31/2017 (submitted on 1/30/2018), as well as the additional material you presented during our call. Thank you for efficiently reviewing what appeared to be a productive quarter. Your team seems to be making good progress on your awesome energy converter that will solve all our energy problems….*(continues)*

Below, you will find my assessment of your progress towards meeting your Q2 milestones and follow-up items for the team to bring to a close before our next review.

M1.1.1: ARPA-E acceptance of a refined production cost-performance model based on improved understanding to date.
ARPA-E acceptance of a refined production cost-performance model based on improved understanding of manufacturing process and cost-performance tradeoffs. Cost down plan intended to show pathway to get to an installed cost of < $1.0/W at the multi-GW scale.
Due Date: 2/20/2018
Feedback to Performer:
Milestone complete: The team provided an update on their cost-performance model demonstrating that we can generate zero-cost energy! The planet is saved….*(continues)*
Based upon this progress, I consider this milestone status: GREEN

Page 1 of 4
Official Use Only

Project Color Status Interpretations

	Q3 FY16				Q4 FY16				Q1 FY17				Q2 FY17			
	Apr 16 - Jun 16				Jul 16 - Sep 16				Oct 16 - Dec 16				Jan 17 - Mar 17			
Project 1	$339,230				$339,230				$527,122				$527,122			
	T\Y	$\Y	S\Y	T2M\R	T\Y	$\Y	S\Y	T2M\R	T\Y	$\Y	S\Y	T2M\Y	T\R	$\Y	S\R	T2M\R
Project 2	$212,791				$452,843				$452,843				$568,362			
	T\R	$\Y	S\R	T2M\Y	T\Y	$\Y	S\Y	T2M\g	T\G	$\Y	S\G	T2M\Y	T\G	$\Y	S\G	T2M\G
Project 3	$565,306				$565,306				$565,306				$565,306			
	T\G	$\Y	S\G	T2M\Y	T\G	$\Y	S\G	T2M\G	T\G	$\Y	S\G	T2M\G	T\G	$\Y	S\G	T2M\G

	CONTEXT	
Rating	**Overall Project**	**Individual Milestone**
Green	Project on-track	Milestone complete, all requirements satisfied
Yellow	Behind schedule, problems may have been encountered, but project appears to be recoverable	Milestone is incomplete, but still likely to be met at some time: performance may not quite meet the required target, it may be slightly behind-schedule, or there are outstanding questions about whether the milestone has been achieved.
Red	Overall project is unlikely to meet final targets or is significantly behind schedule, recovery is difficult or unlikely	Milestone not achieved, actual performance significantly worse than required performance, incomplete and significantly behind schedule

Qualitative assessment based on performance data

Enhanced Financial Reporting

- GOAL: Facilitate assessment of project financial status

- REQUESTS:

1. Once (C_i) → Estimate of cost associated with milestones

$$Total\ Project\ Cost = \sum_{i=1}^{N} C_i$$

2. Quarterly (P_i) → Update progress in ePIC

ARPA-E Calculation

$$Cost\ Variance(\$) = Actual\ Cost\ (ePIC) - \sum_{i=1}^{N} C_i P_i$$

Expectations on Invoicing

- Invoice at least quarterly, no more frequently than every 2 wks
- When submitting a reimbursement request to VIPERS you'll also need to submit supporting documentation via email to:
  - PM SETA
  - Financial Analyst
- This supporting documentation includes:
  - SF-270
  - Reimbursement Request Spreadsheet
  - Supporting documentation
- Any reallocations between budget categories should be communicated to the PD/PM SETA/Tech SETA
- Please stay in close contact with your PM SETA

Invoice 30 day timeline

Day 1: Invoice Submission

- Submit SF-270 and supporting documentation to both VIPERS and ARPA-E representative
- Requests may be submitted no more frequently than every two weeks
- Expenses submitted should be relevant to the technical performance of the project for the period being reported

Day 2-10: Data Input & Financial Review

- ARPA-E reviews to assess both your Project's adherence to Government cost principles and in meeting established tasks
- ARPA-E will issue questions to performer within 10 days

Day 11- 15: Performer resolution

- If we don't have any questions, the invoice is sent for final approval from the PD
- If we have any questions the Performer returns follow-up information by day 15

Day 16-30: PD & VIAS Approval

- Final review of all documentation and cost against project
- Invoice processed through ARPA-E systems

ARPA-E will work to meet this notional timeline, we ask performer teams to partner with us to achieve it.

Best Practices

ARPA-E Project Status GREEN

- Meeting key project milestones on time
- Have a clear project management structure and dedicated personnel
- Maintain regular communication with ARPA-E Program Directors and SETAs
- Identify and engage additional help when needed – internally and externally
- Are flexible enough to quickly redeploy personnel and adjust technical approaches when necessary
- Submitting succinct quarterly reports on time and with appropriate detail about milestone and project status

RED Flags for ARPA-E

- Lack of a sense of urgency
- Disregard for the milestones or reinterpretation of milestones without discussing with ARPA-E
- Omission of key data/results, avoiding detailed technical conversations on milestone challenges
- Challenges in hiring personnel or getting key pieces of equipment running
- Significantly behind on invoicing
- Project funds spent out of proportion with work accomplished

Final Reminders/Suggestions

- **Please** send quarterly review slides at least 1 day in advance!
- **Please** stay up-to-date on your invoicing
- **Please** be transparent – talk to us!
  - we know R&D is challenging
  - we want to help you to succeed while making the best use of everyone's time/money
- Please remember to report subject inventions, patents submitted/granted, and publications (in ePIC)

Welcome to the DIFFERENTIATE program community!

Wrap Up

- Thank you!
- We'll be in touch about--
  - Awards
  - Quick Conversation
  - Collaboration Survey
  - Quarterly Review
- Please let us know if we can help!
- Good luck!