Introduction to T2M

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Sometimes Congress has really good ideas

- Authorizing legislation:
  - "To ensure that the United States maintains a **technological lead** in developing and deploying advanced energy technologies."
  - "ARPA-E shall…**translat[e] scientific discoveries and cutting-edge inventions into technological innovations**;"
- Success is:
  - Good for companies
  - Good for the economy
  - Good for the environment

ARPA-E Impact Indicators

Since 2009 ARPA-E has provided

$1.8 billion

in R&D funding to more than **660 projects**

136 Projects have attracted more than

$2.6 billion

in private-sector follow-on funding

71 projects

have formed **new companies**

109 projects

have **partnered with other government agencies** to further development

1,724

peer-reviewed **journal articles** from ARPA-E projects

245 patents

issued by U.S. Patent and Trademark Office

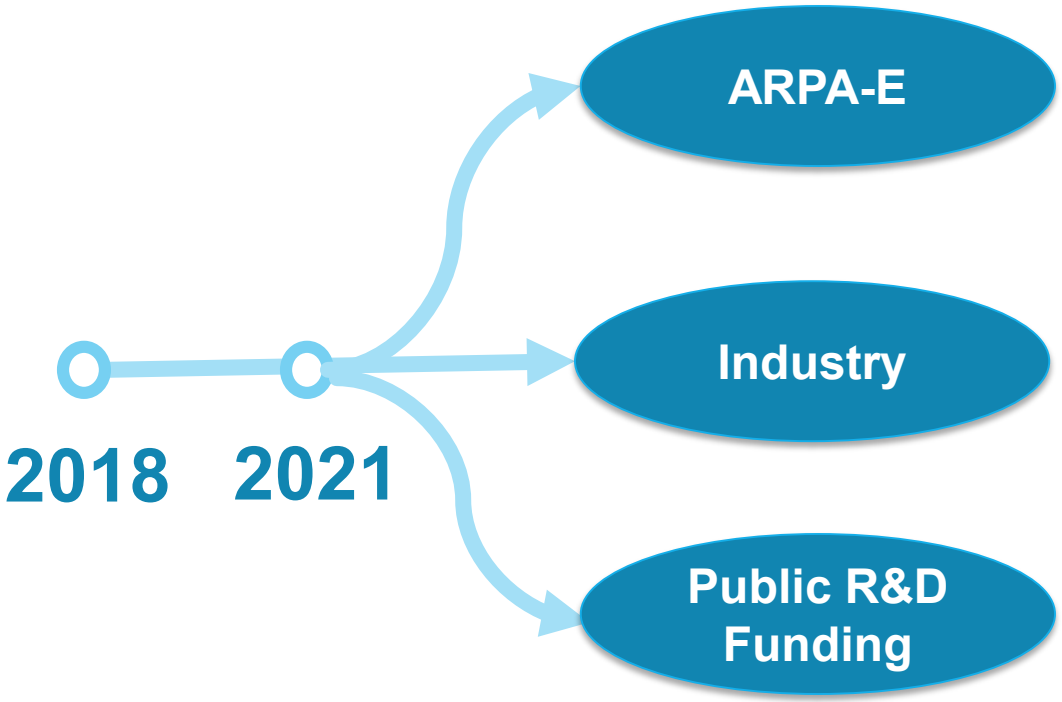
As of February 2018

Succeeding at innovation is an area that even a fractious country can agree upon

- **ARPA-e has succeeded at winning larger budgets;**
- **This is because impact – on competitiveness, emissions reductions, jobs – are key;**
- **T2M's role is to conceive an operationalize strategies toward this end.**

At its core, T2M focuses on the outcome of the project, why it will matter, and to whom

- **Will we have succeeded in changing how the world thinks about nuclear when the funding runs out?**



Why month 37 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

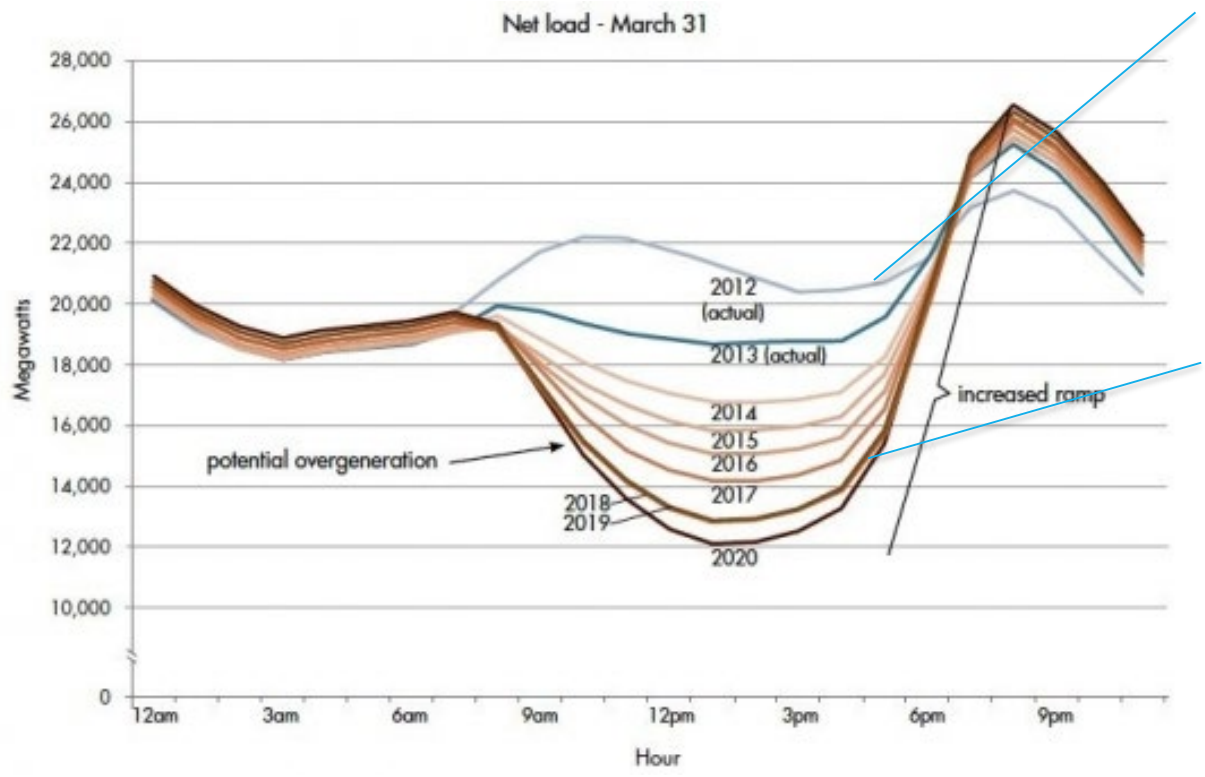
Nuclear poses unique challenges to the T2M model that we'll adjust to

- **Timescale to impact is long** as technology needs to be developed, scaled up, secure regulatory approval
- **Capital intensive** to develop scaled up plant designs
- **ARPA-e structure is not currently** set up to follow a long-term, structured approach to guiding our investments

- **Focus of T2M:** How does this program change the conversation on the viability of nuclear?

MEITNER (and related programs) T2M strategy

1. Understand revenue opportunities for systems that will work an electricity future that will be different



Before:
- Steady operation
- High capacity factorsv

Future:
- Diurnal swings
- Large ramp rates
- Emphasis like on services, not kwh

Revenue study for flexible reactors

What we'll do

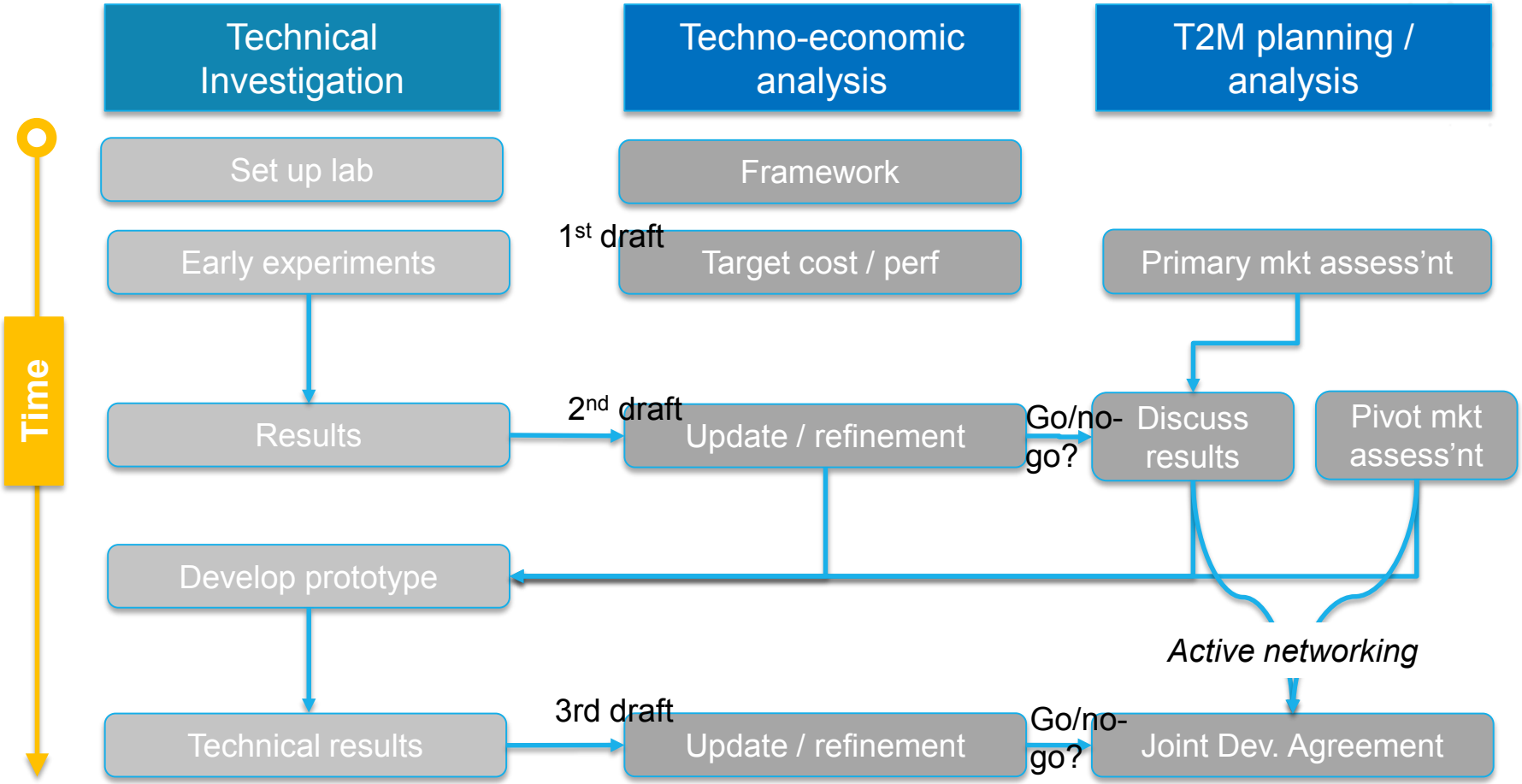
- Quantify the value that a reactor with flexible power output could earn from the market
  - $/MW
  - $/MWh
- Illuminate key performance requirements to be "flexible".
- Baseline alternative forms of providing system flexibility.

How we're doing it

- Lucid analysis using PROMOD Simulation tool which:
  - Incorporates future demand, generating unit operating characteristics, transmission grid topology and constraints
  - Produces a unit commitment and security constrained economic dispatch while optimizing bid production costs
- Results expected in the first year of programming

2. Support TEA to provide data-driven, cost-focused technology development

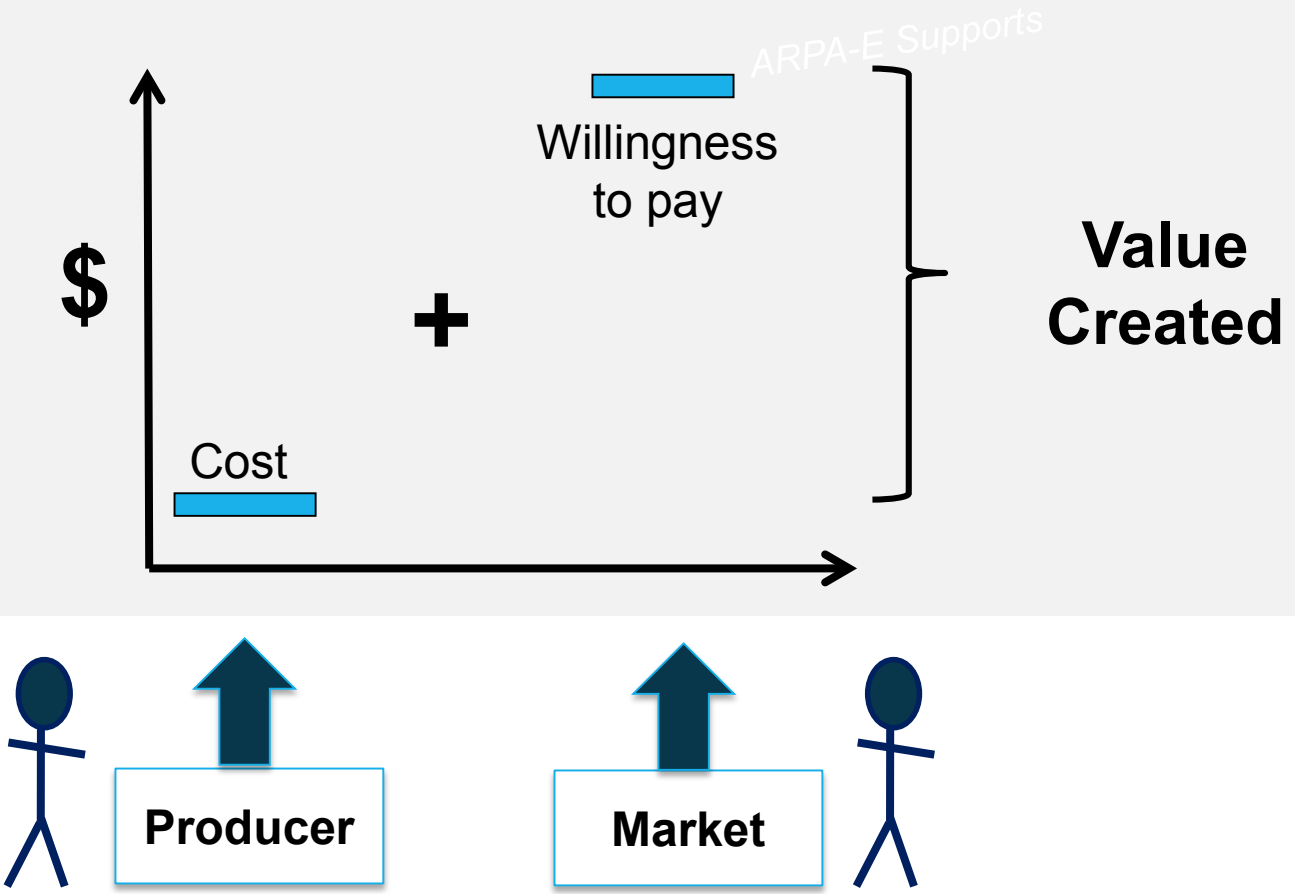
Each milestone should be purposefully assigned to <u>inform</u> or <u>build on</u> other milestones, and they should stem from the <u>technical investigation</u>



In sum, we seek to determine why, and to whom, our work matters

Objective:

Define where & how the product creates value



3. Stakeholder group – Building community to address multifaceted problems