INFUSE Survey Results

Rebecca Gruener, PhD
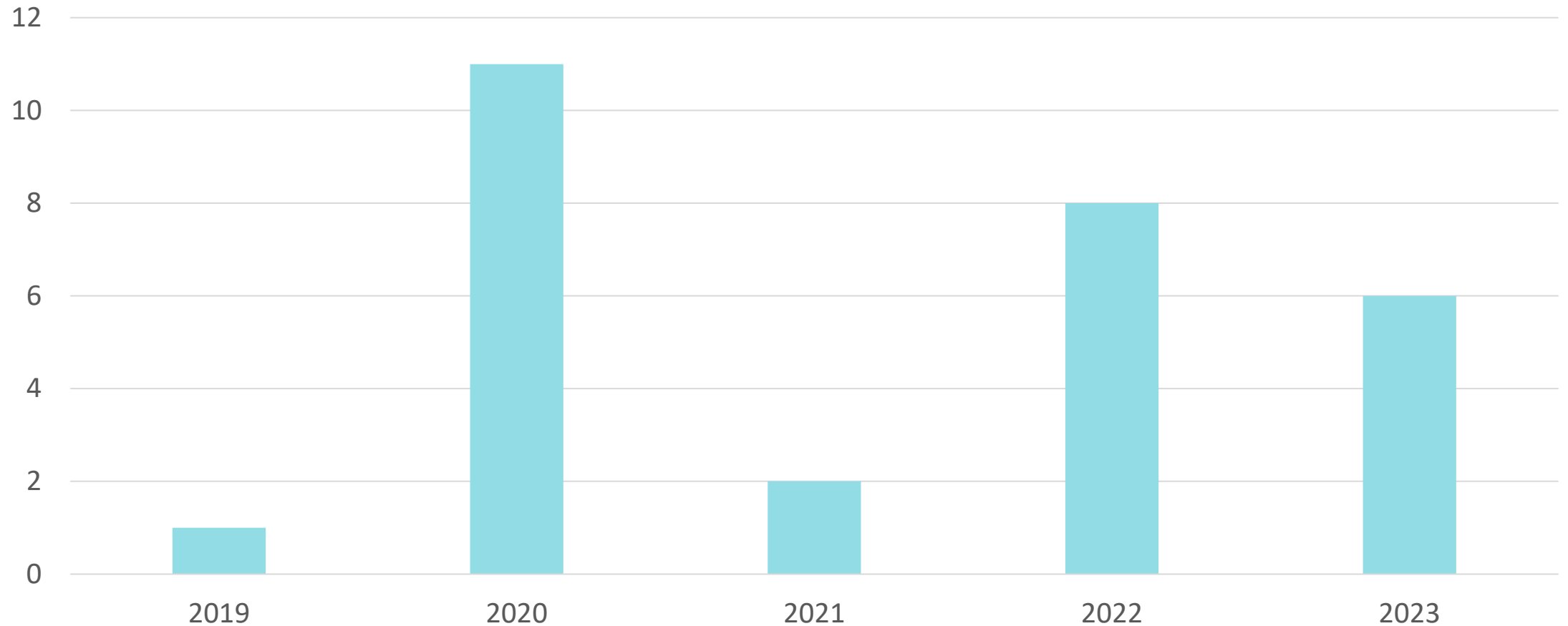
28 companies responded to the INFUSE Outcomes Survey (mostly from 2020 and 2022)

The majority of the survey respondents worked on projects in the modeling topic area

On average more than 50% of business and technical goals were accomplished across all topic areas
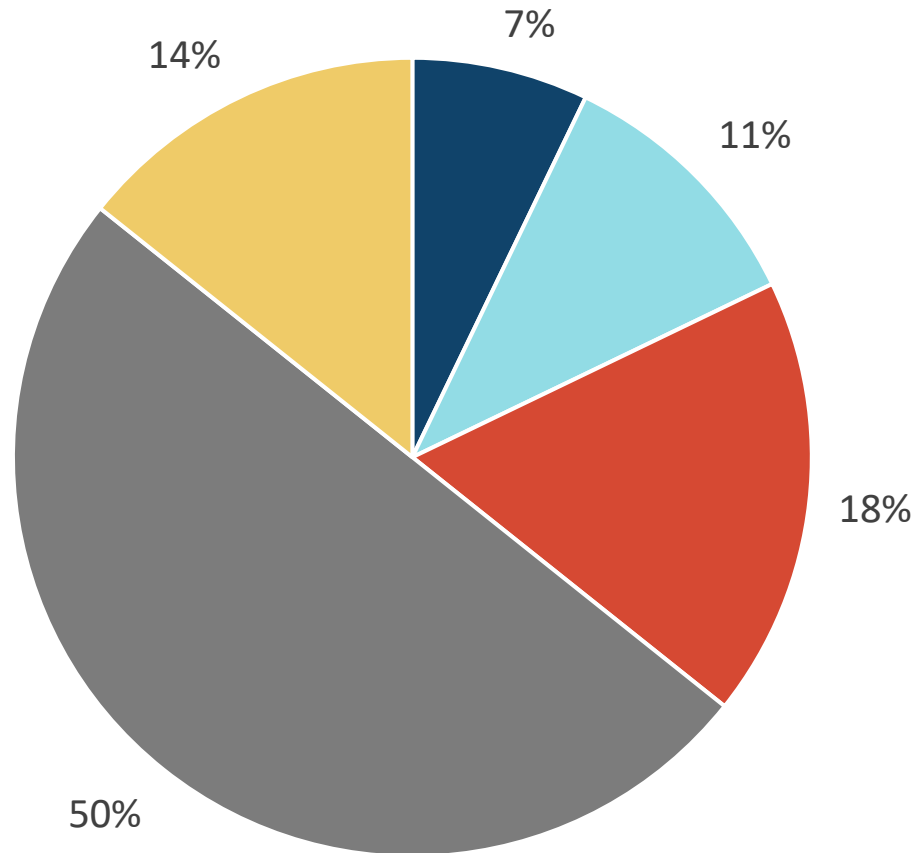
Topic Area (number of responders)	Business Goals Completed (avg %)	Technical Goals Completed (avg %)
Magnetic fusion experimental capabilities (3)	90	95
Enabling technologies including new and improved magnets (2)	88	88
Materials science including engineered materials, testing, and qualification (5)	83	77
Modeling and simulation, high-performance computing, codes, and methods (14)	73	67
Plasma diagnostic development (4)	53	52

U.S. DEPARTMENT OF ENERGY | Office of Science
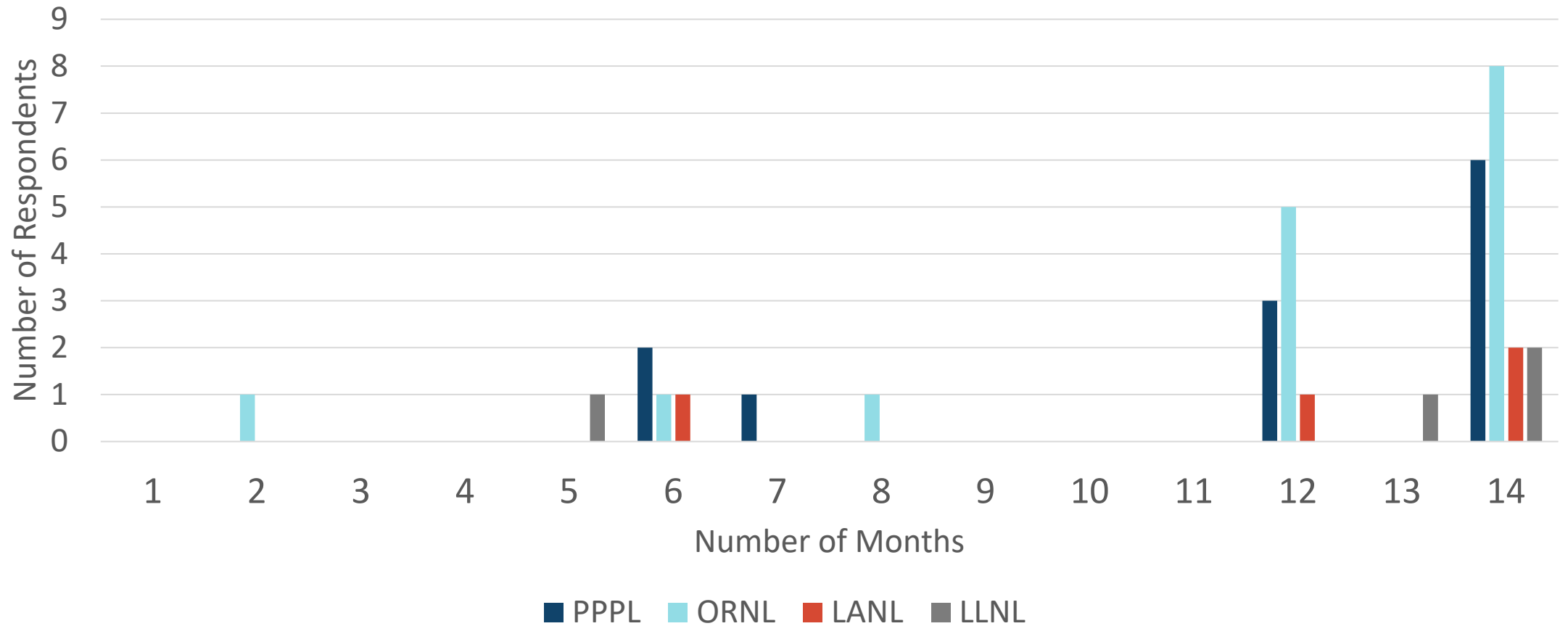
Suggestions for improvement

Decrease time to CRADA approval

Allow for larger teams with subcontractors and multiple labs

The majority of CRADAs delay projects by ~1 year across all participating labs

8 responders reported unanticipated achievements from their award, including:

Simulation

Improved TriForce making it a primary simulation and design tool for HB11 Energy USA LTD

Energy Transfer

Discovered a new compressional mode which led to further detailed studies of wave mediated transfer of energy

Manufacturing

Demonstrated resiliency of a W-W FAST-bonded interface under high heat flux with no observable delamination or other damage

Respondents report measurable success from their awards

1 Patent
- 2020 Awardee Tokamak Energy, Inc. | Magnetic Fusion Experimental Capabilities

**9 Papers Published[1]**
- By 8 different respondents

44 Conference Presentations
- Conferences include APS DPP, ANS, IAEA, PSI, LTSW, ZNetUS, Z Fundamental Science, etc.

U.S. DEPARTMENT OF **ENERGY** | Office of Science

Energy.gov/science

Self reported impact of the INFUSE award

- Increased **credibility**
  - Independent modeling of the Staged Z-pinch concept confirmed its potential as a fusion energy source
  - Company recruitment aided
  - Company visibility and access to investors increased

- Allowed **access**
  - Unique measurement capabilities at the National Lab partners
  - Expert assistance at National Labs

- Accessed **resources**
  - Bi-2212 HTS wire for making a cable
  - Equipment for testing performance of REBCO wires which they did not have the capabilities to do in house

- Generated **confidence**
  - That learnings about confinement and turbulence in SPARC will predict ARC
  - In low-fidelity models and pointed to areas of improvement of the design of equilibrium facility
  - In evaluation of error field physics as an input for design work

- Hastened **progress**
  - Generated insight on the effects of material composition and manufacturing steps on material performance
  - Shed light on potential instabilities caused by Neutral Beam Injection
  - Created assessment of the divertor region in ST40

U.S. DEPARTMENT OF **ENERGY** | Office of Science

Almost 80% of respondents extended their partnership following the end of their award
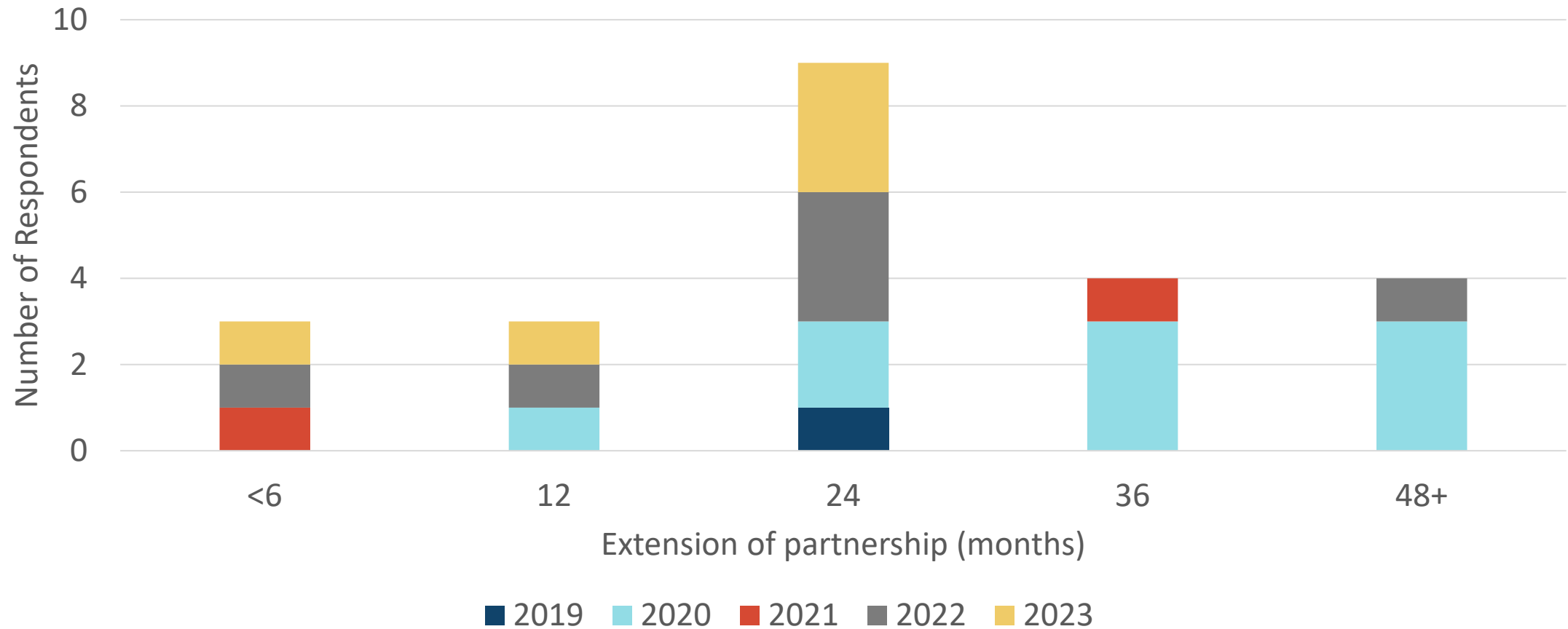
Awardees have sought additional funding to maintain their partnerships

- 57% of respondents reported having applied to additional funding

- 5 respondents report being awarded additional funding
  - Some from multiple sources

INFUSE – 3

Milestone – 2

FIRE – 1

DOE FOA – 1

ARPA-E – 1

ALCC Compute – 1