

Summary of Input

Request for Information DE-FOA-0001346

September 2015

*Prepared for the Office of Technology Transitions
and Technology Transfer Policy Board*

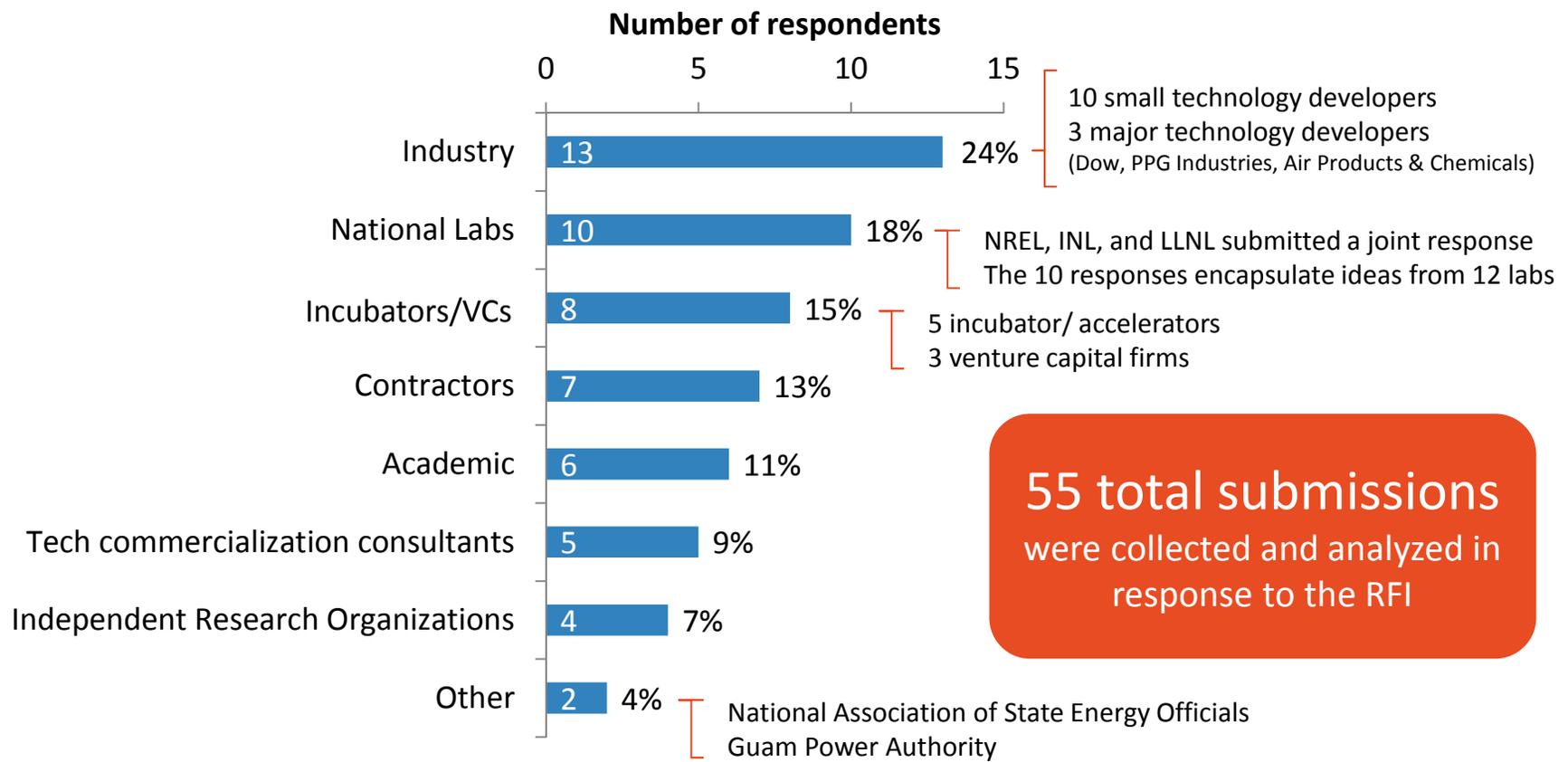
Note: the views expressed in this document solely reflect the input received from the RFI respondents and do not necessarily represent DOE's perspective.

Overview and respondent demographics

RFI DE-FOA-0001346: The U.S. Department of Energy (DOE) seeks feedback from public and private sector stakeholders regarding opportunities to enhance the commercial impact of DOE's portfolio of Research, Development, Demonstration & Deployment activities.

RFI Release Date: May 6, 2015

RFI Response Deadline: June 10, 2015



Technology Transitions focus areas

Respondents provided insight and recommendations in 5 key focus areas.

Most respondents prioritized one area over another, or responded generally to the RFI.

1. Technology Commercialization Fund

- Develop a forward-looking approach to the implementation of the TCF, which will leverage 0.9% of the RDD&D funding in DOE's applied energy programs to pursue high impact technology commercialization activities

2. Cross-Research and Development Linkages and Innovation Cycle Transitions

- Coordinate DOE activities to effectively transition technologies through the innovation cycle and foster cross-research and development linkages involving all programs of the Under Secretary for Science and Energy and other DOE units

3. Central Policies and Procedures

- Clarify and streamline relevant policies and procedures

4. DOE National Laboratory Technology Transitions (Intramural)

- Enhance technology transfer and commercialization at the national laboratories

5. Extramural Technology Transitions

- Enhance the commercial impact of DOE's activities with extramural partners in academia, industry, state and local government, and other entities

Note: The major themes, considerations, barriers/needs, and potential approaches described herein represent the perspectives and ideas generated by the respondents to the RFI.

Technology Commercialization Fund:

RFI Section Prompt

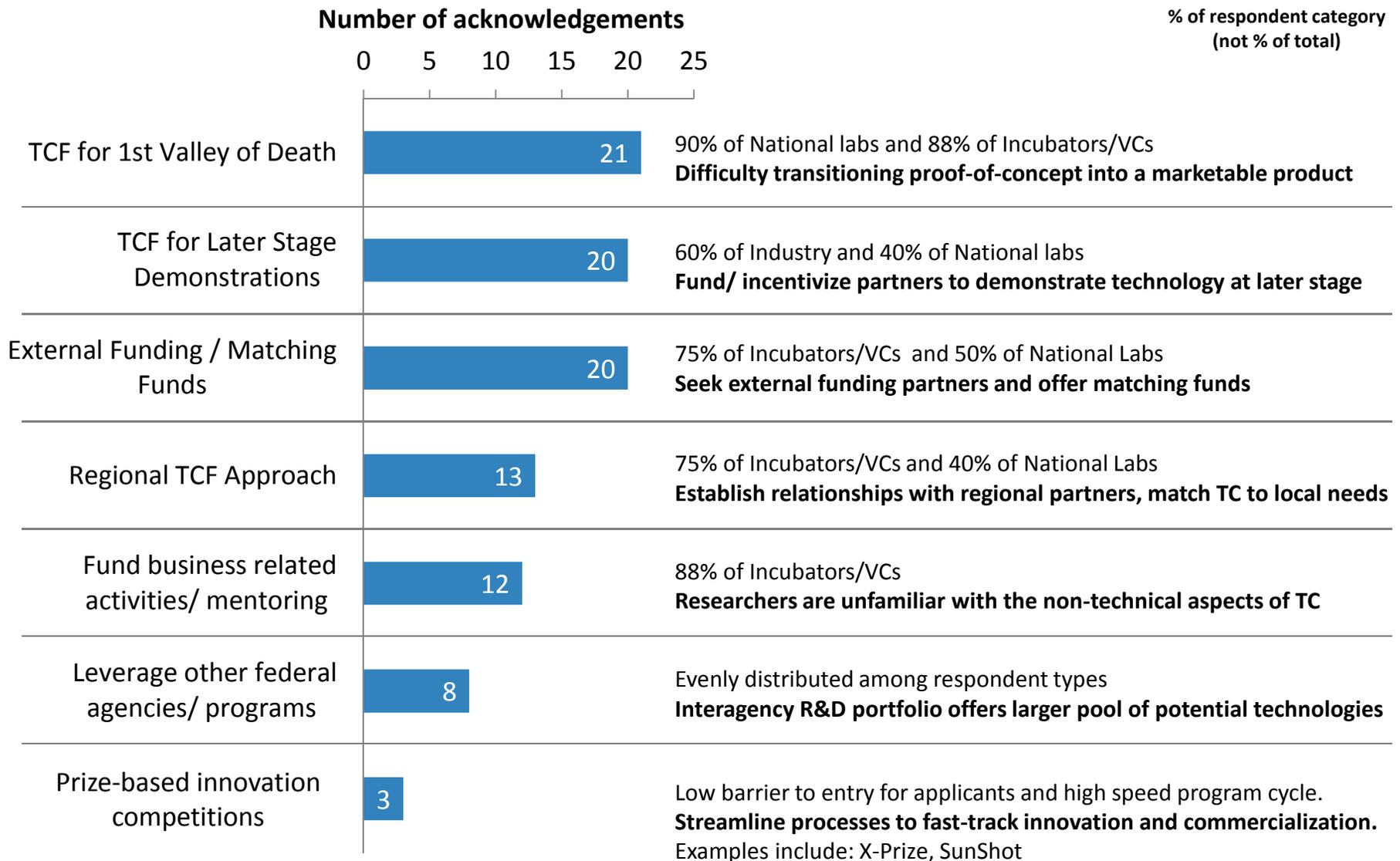
OTT seeks information that could inform the design and implementation of the TCF, including, but not limited to, the following questions:

- What are the most important gaps and areas of need in the U.S. energy technology commercialization system that the TCF should address?
- How can a TCF be designed to most effectively leverage private investment to advance the commercialization of energy technologies?
- Similarly, how can a TCF be designed to most effectively leverage investments made by other federal agencies to advance the commercialization of energy technologies?
- How can a TCF be designed to have a broader, catalytic impact beyond the specific projects it supports?

Technology Commercialization Fund:

Major themes and recommendations

All of the RFI respondents addressed Question 1



Note: 55 total respondents

Technology Commercialization Fund:

Summary of Recommendations

Technology Maturation Funding

- 10 responses recommended the TCF focus on tech maturation funding specifically as #1 top priority; 8 of these responses were from national labs
- Entrepreneurial training: “Inventors seeking TCF for tech maturation should do rigorous entrepreneurial training”
- Two-pronged approach (model: NM Venture Acceleration Fund)
 - Phase 1: Funding for lab tech maturation as CRADA with industry partner
 - Phase 2: Funding to industry partner for early commercialization efforts
- Multi-pronged approach:
 - Authorize labs to designate allowable overhead \$ for tech maturation
 - Multi-lab centers/projects to mature classes of technologies
 - TCF funding for individual labs via DOE RFPs
- Local management of lab tech maturation programs / reduced strictures or operational impediments that cause delay to commercialization
- Note: several responses did not address need for private cost share, no discussion of a SBV-like TCF model

Technology Commercialization Fund:

Summary of Recommendations

Seed-Stage Funding

- 12 responses recommended the TCF focus on seed-stage funding specifically as the TCF's #1 top priority
- Focus on seed-stage funding for businesses attempting to commercialize technologies developed at national labs and universities
- Primary focus on seed funding to support early commercialization activities: business model development, customer identification, team formation
- Focus on “mini-Series A,” following initial seed funding (\$250-750k)
- Partner with impact investors: matching funds with qualified investments would allow TCF funds to be syndicated and “vastly multiply impact”
- Capitalize local/regional investment funds structured as nonprofits, which could match/leverage federal funds & maximize dollars as revolving funds
- Proof-of-concept centers and “bridge” awards (model: NYSERDA program)

Technology Commercialization Fund:

Summary of Recommendations

Technology Demonstrations

- 4 responses recommended focusing TCF on tech demonstration projects as the #1 top priority
- Emphasis on demonstrating technologies “to provide the data needed for end users and purchasers to make informed decisions and drive the entry of technologies into the commercial market”
- “Multiple demonstrations are needed in normal, real-world operating conditions to provide the comfort level required for market acceptance”
- “Any demonstration program absolutely must include a requirement for data collection and analysis that collects performance, usage, maintenance, reliability, cost, and other user data. The collection and dissemination of this data is critical to filling the knowledge gap that exists”
- “Providing real-world demonstration is critical to enable commercial entities to better identify the risks associated with new technologies and more clearly quantify the benefits to their prospective customers”

Technology Commercialization Fund:

Summary of Recommendations

Leveraging Regional Resources

- 8 responses recommended regionally-oriented TCF approaches as #1 top priority
- Make TCF matching funds available to state or regional organizations focused on energy technology development, including existing state programs
- Encourage the development of multi-institutional regional mechanisms to facilitate commercialization of DOE RDD&D portfolio
- TCF-funded companies could be encouraged to work with DOE-sponsored Clean Energy Incubator Network incubators
- Partner with geographically dispersed technology-based economic development entities, which play a critical role at regional level
- “The probability of commercialization success among startup technology companies increases significantly when they take advantage of resources available in their own local or region”

Technology Commercialization Fund:

Summary of Recommendations

Market Pull / Customer-Centric Approach

- 9 responses emphasized importance of market pull and a customer-centric approach
- Designate TCF funds to be used by companies for tech commercialization with reputable, early adopters (corporates, utilities, govt, school systems, etc.)
- Focus the TCF on helping early-stage businesses obtain a first “beta” customer, which can de-risk potential investments for corporates and VCs
- Use the TCF to seed the participation of corporate dollars in transitioning technologies from proof of concept to commercially validated
- A portion of TCF funding should be used to sustain “Requirements Definition” programs, regardless of which stage the TCF addresses
- Operate the TCF as much like a private fund as possible, using decision processes of private investors, potentially in partnership with a private investment firm. Short of this, Private sector input into TCF selection decisions is critical for ensuring market discipline.

Technology Commercialization Fund:

Summary of Recommendations

Other Ideas and Recommendations

- Leverage existing test-bed facilities and infrastructure, such as utility and university test-beds; foster a national network of related test-bed facilities
- Link TCF funds to a JOBS-ACT web-based funding platform focused on early-stage cleantech deals to participate in qualifying investment syndicates/funds
- Fund an advisory group of experts (from DOE, universities and companies) to meet with investor groups and explain key emerging technologies
- Partner with a trade organization in each industry vertical to hire a tech scout to cull labs for technologies, similar to DHS Transition to Practice program
- Serve as a patient, high-risk capital pool that nonprofit incubators and accelerators need to support their startups and small businesses
- Subsidize IP licensing costs for small businesses
- Scale up existing programs, both at DOE and at the regional level
- Use to TCF to break down DOE silos, stay open to cross-cutting and novel ideas outside of existing, defined programmatic areas

Cross-Research and Development Linkages:

RFI Section Prompt

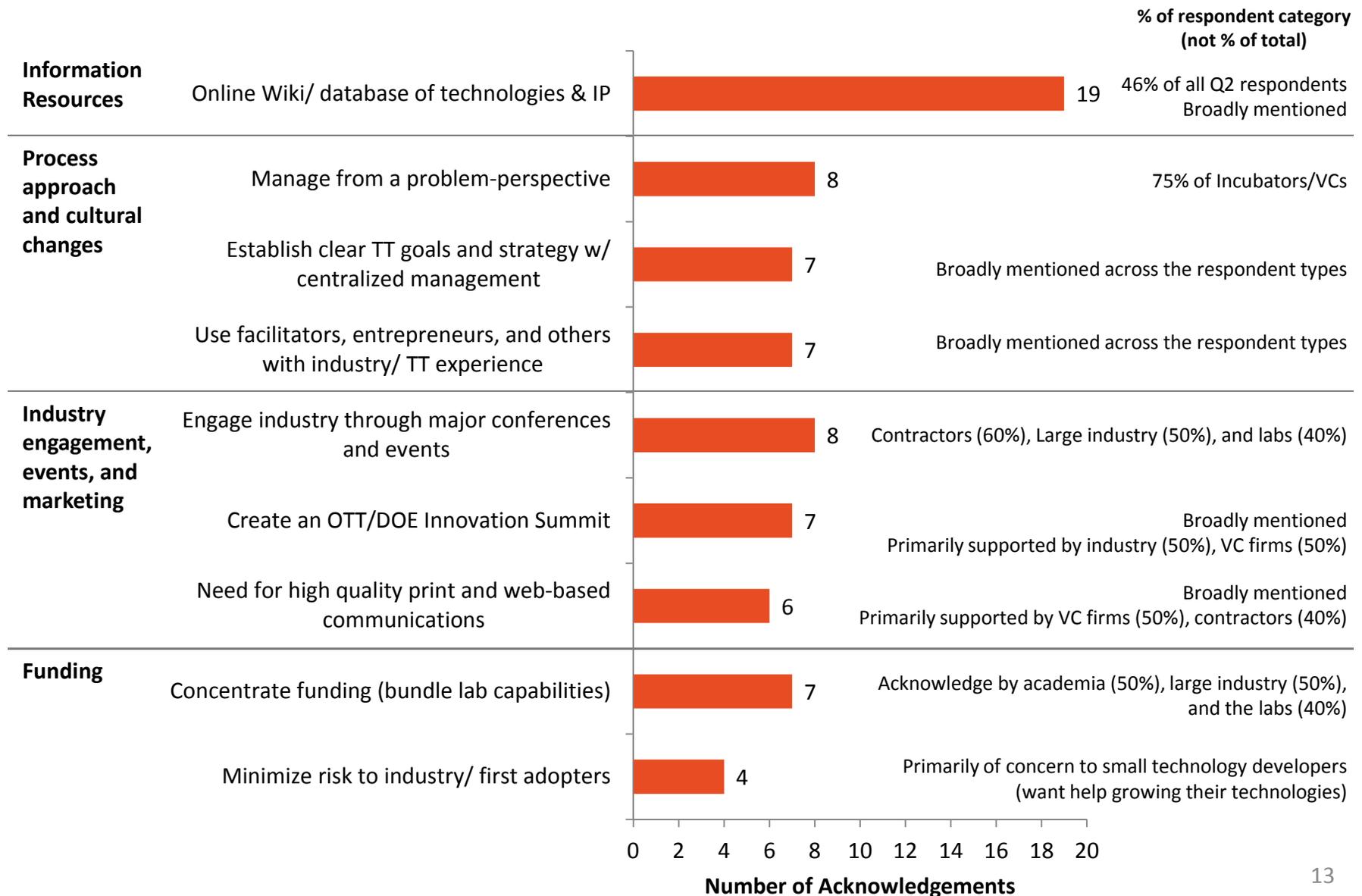
OTT seeks information that could inform its approach to coordinating DOE activities to effectively transition technologies through the innovation cycle and foster cross-research and development linkages, toward the goal of enhancing the commercial impact of DOE's RDD&D portfolio.

- What opportunities exist to enhance linkages and technology transitions across different DOE RDD&D performers, ranging from national laboratories and universities to small businesses and other parts of industry? How might OTT address these opportunities?
- How can DOE more effectively track RDD&D projects and technologies at different stages of development to identify connections and transition opportunities?
- What opportunities exist to enhance RDD&D linkages and technology transitions across DOE Program Offices? How might OTT address these opportunities?
- What best practices exist at other institutions for fostering RDD&D linkages and technology transitions, including industry, universities, national laboratories, government agencies, and other entities?

Cross-Research and Development Linkages:

Major themes and recommendations

41 of the 55 RFI respondents addressed Question 2



Cross-Research and Development Linkages:

Summary of Recommendations

- DOE should support enhanced digital solutions including :
 - Substantial support for and expansion of the Energy Innovation Portal
 - Development/Improvement of Patent Landscape solutions
 - Development of an open source and licensable software portal
 - Investing in a CRM solution for account management and opportunity velocity measurement
 - Partnering with external IP and TT solutions such as iBridge and Flintbox and utilize more online social networking opportunities
- Support a broad strategy of increased live TT/Innovation event attendance and promotion of DOE partnership opportunities both with HQ and the Labs. Including:
 - Developing a co-branded exhibit booth
 - Engaging in national and regional Technology transfer events
 - Sponsor an annual Technology Transitions Summit and/or Event
 - Develop hard copy and digital promotion content for TT opportunities, events and successes at DOE and the labs.
- Consider mechanisms for DOE to provide enhanced direct support for technology transfer offices.
- Consider and analyze how to best incentivize collaborations among labs/programs

Central Policies and Procedures:

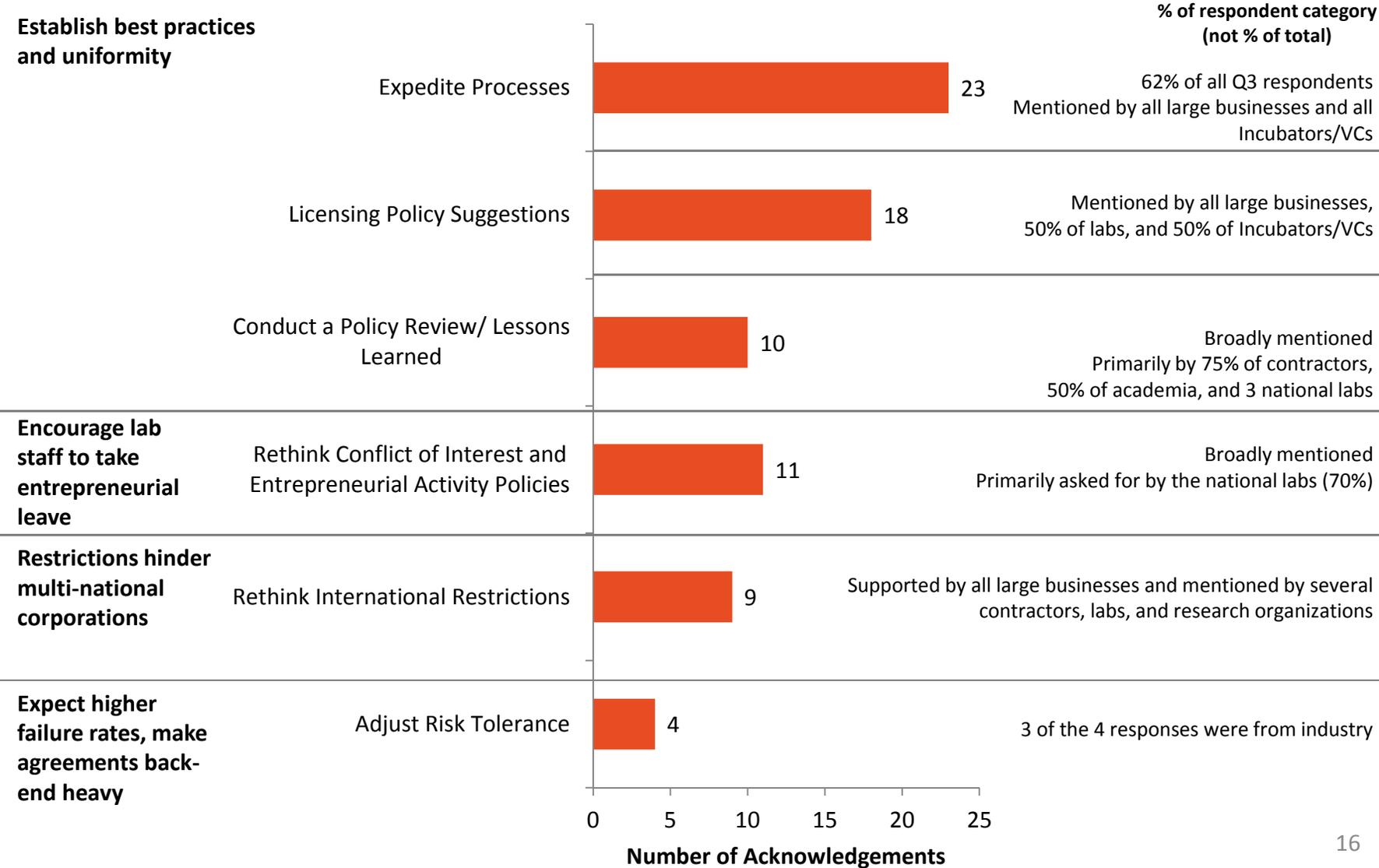
RFI Section Prompt

- What opportunities exist for DOE to clarify, streamline, or otherwise improve existing central policies and procedures related to the following areas, toward the goal of enhancing the commercial impact of DOE's RDD&D portfolio?
 - Conflict of interest and entrepreneurial activity policies;
 - Agreement mechanisms, approval, and speed of business;
 - DOE risk tolerance and risk mitigation approaches;
 - Contract requirements pertaining to technology transfer and commercialization;
 - Government information that is classified or has export controls; and
 - Data and metrics collection, aggregation and reporting.

Central Policies and Procedures:

Major themes and recommendations

37 of the 55 RFI respondents addressed Question 3



Central Policies and Procedures:

Summary of Recommendations

- Consistent, standardized, defined and clear policies across all labs and field offices (COI, entrepreneurial leave, contracting, CRADAs)
 - Encourage lab staff to take entrepreneurial leave or provide time for outside consulting
 - Limit data calls and mandated reporting (coordinate to limit number and frequency)
- Continue to expedite processing speed is key
 - Expand contracting options (more flexible terms, FedACT), simplify paperwork and reduce approval times (pre-approved templates, model foreign CRADA, improved patent waivers, master/blanket agreements, better foreign partner review)
- Focus on desired outcomes of commercialization
 - Compare existing processes to efforts on a blank slate; where are they similar, where do they differ?
 - Operational knowledge of what can be done and what has been done
- Make TT a priority and factor in all DOE/ lab strategic planning
 - OTT can advocate within DOE for TTOs and staff
 - OTT can serve as convener between industry and DOE
 - OTT can remain a high level office, empower the labs and DOE offices to commercialize their own technology
- Regularly seek external feedback on tech transfer efforts
 - Adopt best practices of other agencies
 - May need multiple organizations to take an idea from proof-of-concept to commercial
 - Understand personnel limitations (e.g., not all researchers can adopt an entrepreneurial mindset)

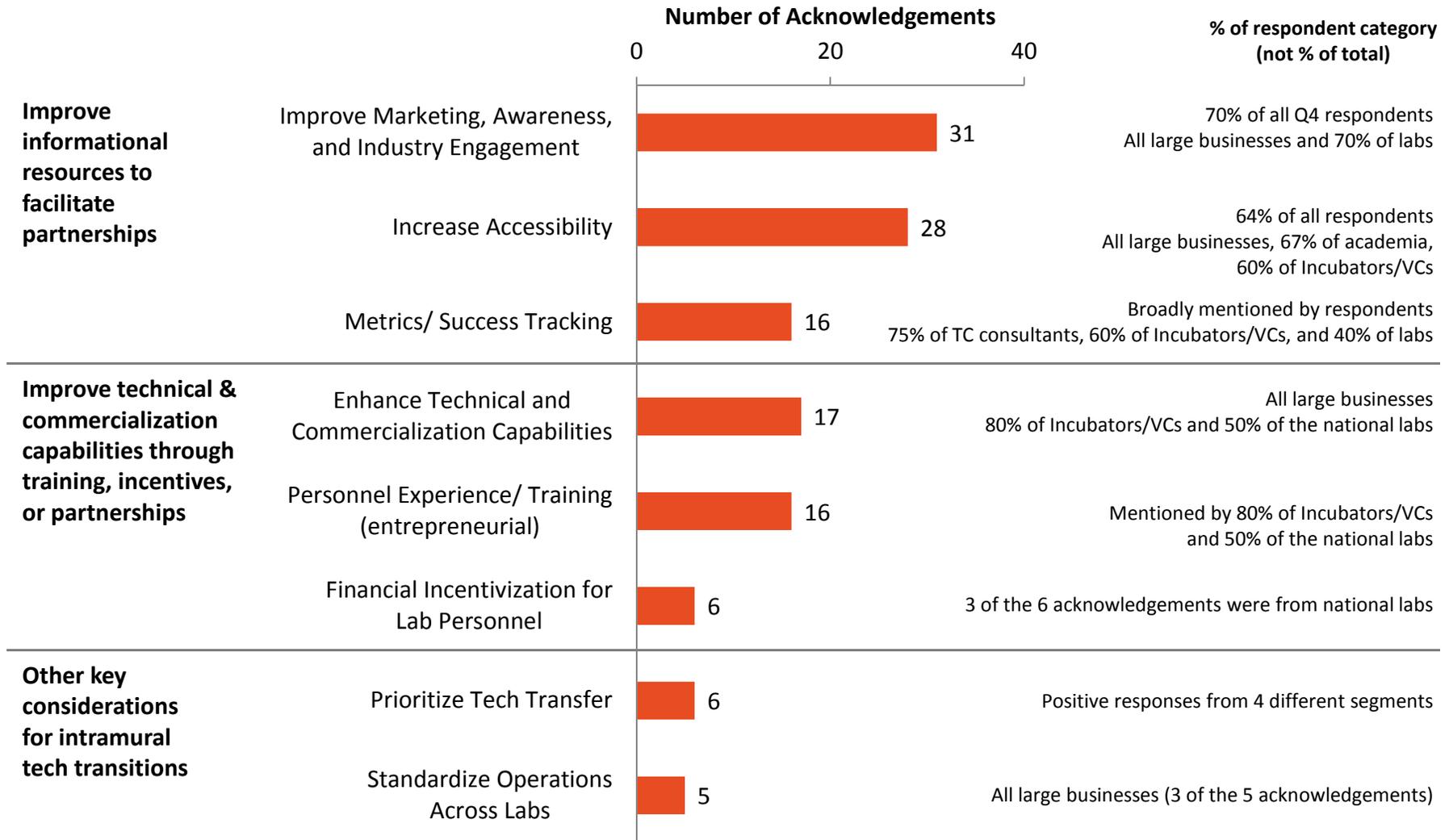
DOE National Laboratories (Intramural Tech Transitions): RFI Section Prompt

- OTT seeks information that could inform Intramural Tech Transitions, including, but not limited to, the following questions:
 - Supporting the transition of laboratory technologies for commercial uptake and addressing barriers that impede the progression of laboratory technologies through the innovation cycle, such as through technology maturation activities, personnel recognition or incentives, and other measures;
 - Encouraging partnerships between national laboratories and the private sector that support core DOE mission priorities and enhance the science and technology capabilities of the laboratories, while also meeting private sector needs;
 - Developing greater capabilities at the national laboratories to support technology commercialization activities, including the capabilities of the technology transfer offices, the commercialization capabilities of laboratory researchers, and the effectiveness with which the technology transfer offices and researchers work together;
 - Fostering industry connections and awareness of laboratory and user facility capabilities and available intellectual property or licensable software applications, such as through outreach activities, events, webinars, digital information resources, and other efforts to increase visibility and provide ready access to information;
 - Better identifying market opportunities and industry needs through more proactive customer discovery, customer relationship management, value proposition identification, and techno-economic analysis;
 - Improving the ease and affordability of industry access to laboratory capabilities, especially for small businesses;
 - Identifying, measuring, and monitoring key tasks and paths to success for interested parties and potential customers during their engagements with DOE and its national laboratories; and
 - Other laboratory policies, procedures, and culture related to commercial impact.

DOE National Laboratories (Intramural Tech Transitions):

Major themes and recommendations

44 of the 55 RFI respondents addressed Question 4



DOE National Laboratories (Intramural Tech Transitions):

Summary of Recommendations

- Development an Annual Technology Transfer Summit and an Industry Partnership workshop series
 - Encourage lab staff to take entrepreneurial leave or provide time for outside consulting
- Commission OTT or independent analyses
 - Industry specific needs (matched to RDD&D portfolio)
 - Techno-economic analyses and studies assessing the barriers to technology transitions activities in DOE and the Labs
 - The effectiveness with which DOE-funded labs deliver on collaborative R&D with industry vs generating revenue from lab generated IP (develop best practices and lessons learned)
- Increased support for digital solutions
 - An improved/expanded Energy Innovation Portal (list of technologies available for distribution)
 - Use of a CRM or marketing measurement solution
 - Central IT solution enabling improved data collection and reporting
- Enhance the consistency and standardization of TT processes, activities and policies
 - Unify IP agreements, NDA protocols, COI's
 - Clarify what terms are/are not negotiable
 - Clear long-term positioning of DOE role in tech transitions/ commercialization
- Recognize personnel limitations (change the culture, incentivize TC, or find partners)
 - Not all staff can/need to be focused on TC (roles)
 - Researcher TC education: IP protection, royalty agreements, publishing v. patenting, etc.
 - Clearly defined roles (e.g., proof-of-concept, tech maturation, commercial applicability, business development) by multiple entities may be needed to overcome personnel experience limitations

Extramural Technology Transitions:

RFI Section Prompt

- OTT seeks information on opportunities to enhance the commercial impact of DOE's RDD&D portfolio by transitioning and commercializing DOE-sponsored technologies in collaboration with the following external partners:
 - Universities and other research-based institutions
 - Startups and incubators
 - Small and large businesses
 - State governments, local governments, and other intergovernmental partners
 - Industrial consortia
 - International partners
 - Project developers and financiers
 - Angel investors, venture capitalists, and other early-stage investors
 - Other regionally-based organizations

Extramural Technology Transitions:

Major themes and recommendations

16 of the 55 RFI respondents addressed Question 5

(relevant recommendations were captured in responses to the other questions)



Extramural Technology Transitions:

Summary of Recommendations

- Use a multi-organizational tech commercialization approach to leverage existing capabilities and resources, establishing clear roles in the TT development pipeline
 - Encourage academic institutions and other research organizations to work jointly on R&D
 - Focus on technology maturation at the labs before attempting to develop full commercialization capabilities
 - Evaluate how incubator networks, universities, industry, and other entities can be leveraged
- Use external resources to accelerate commercial readiness of technologies
 - Leverage existing state and regional technology commercialization organizations (see Cleantech Incubator Network)
 - Provide mentoring and coaching to innovators and entrepreneurs
 - Encourage an entrepreneurial culture at the labs
- Use portfolio reviews and technology showcases to identify potential markets
 - Leverage existing extramural partners networks and knowledge
- Incentive industry to try new technologies
 - Support clean energy procurement actions to include innovation clauses in performance contracting RFPs that gives larger organizations an incentive to work with startups or higher risk technologies.
 - Make the lab IP portfolio easier to search (wiki/database) and access (ease of contracting)
- Reduce restrictions on international collaborations