**TECHNOLOGY TO MARKET PLAN**

**Template and Instructions**

**TECHNOLOGY TO MARKET PLAN INSTRUCTIONS**

# OVERVIEW

During award negotiations, selected awardees negotiate and submit an initial Technology to Market (T2M) Plan to the ARPA-E Program Director and/or designated program staff, and obtain the ARPA-E Program Director’s approval prior to the execution of the award. The T2M Plan is intended to serve as a roadmap for advancing the proposed technology toward commercial viability, and provides an opportunity to set goals and identify issues and opportunities related to technology transfer and commercialization of your ARPA-E funded technology. Development of the initial T2M Plan is not eligible for reimbursement as a pre-award cost and does not qualify as an allowable in-kind cost share contribution, unless approved in writing by the DOE Contracting Officer with the concurrence of the ARPA-E Deputy Director for Commercialization.

A single member of your project team (T2M Lead) should be responsible for coordinating and leading T2M activities for the project, including completion of the initial T2M Plan. The T2M Lead must be an integral team member with intimate knowledge of the project technology and must participate in all project reviews. The lead technical PI with strong interest in the commercial applicability of the technology is an appropriate T2M Lead.

You are required to provide updates on your initial T2M Plan to the ARPA-E Program Director and report on implementation of T2M Plan activities per the T2M milestones in Attachment 3 to the Award (usually every six months). For example, the updates may take the form of Powerpoint slides presented to the ARPA-E Program Director during periodic conference calls or site visits. Once you have submitted the initial T2M Plan to ARPA-E, however, you are not required to submit updated versions of your T2M Plan.

# CONTENT

A template T2M Plan is attached as Appendix A. Please use this template when preparing your initial T2M Plan.

Your initial T2M plan should include a cover page and footers that have the appropriate markings to protect confidential information and data. Full instructions on marking are included in Appendix C.

# ADDITIONAL NOTES

**Budget Justification:** Awarded Project Teams are expected to spend at least 5% of the Federal funding provided by ARPA-E on Technology Transfer and Outreach (TT&O). The project’s TT&O budget should relate to furthering elements of the plan presented here.

**T2M Milestones:** Once reviewed and approved by your Program Director, the final set of T2M milestones will be included in Attachment 3 of the Award.

# APPENDIX A

**TECHNOLOGY TO MARKET PLAN TEMPLATE**

**Technology to Market (T2M) Plan**

Project Title

Project Control Number

Principle Investigator Name

Date

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*Pages [\_\_] of this document may contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source.*

***T2M Lead***

Please provide full contact information for the project’s T2M Lead. Please include name, email address, and primary telephone contact information for this individual.

***Overall Transition Plan***

1. Describe how the proposed technology is expected to transition from its current stage of development to ultimate market deployment. Please note that while some ARPA-E technologies will be ready to transition from ARPA-E funding to a commercial or deployment-focused effort, this is not by any means a requirement.

Please include the following:

* + 1. Likely commercialization approach (startup, license, etc.), including expected handoff at the end of the ARPA-E project (grant funding, license/acquisition – established company, license/acquisition – technology spinout, internal product development, private sector funding, other)
		2. Description of the potential near and long-term markets of entry targeted
		3. Organizations currently involved and/or expected to be involved in the transition of the technology (partners, customers, etc.)
		4. Time to commercialization
1. Using the Commercial Readiness Level (CRL) scale (see Appendix B) to serve as a framework for defining the spectrum of commercial maturity, from basic market research to full deployment, please describe the current level of commercial readiness of the proposed technology and indicate the level of commercial readiness expected at the end of the project period. Note: commercial readiness is **not** equivalent to TRL.
2. What is your current understanding of the following Commercial Readiness factors:
	1. Key players
	2. Competitive landscape
	3. Market needs and requirements
3. Describe the product concept and value proposition of your technology against competing technologies.
4. What specific activities are planned to advance the technology toward market viability during the ARPA-E project? As part of your answer, please be sure to describe your plan to validate the technology value proposition in the market.

***Intellectual Property Strategy***

1. Describe the status of your evaluation of the IP landscape surrounding your technology.
2. What existing intellectual property associated with this technology has been protected by members of the project team (if any)?
3. Describe new intellectual property you expect to create as part of this effort and your plans for protecting it (patents, publications, etc).
4. What plans for disposition/ownership of the intellectual property, including intellectual property agreements or memorandums of understanding, are in place between members of the project team?

***Manufacturing and Scalability***

1. How much is known about the manufacturing or assembly approaches/options at full commercial scale for the proposed technology?
2. Describe any plans to complete quantitative cost/benefit analysis for the proposed technology. This could include a cost/performance model, manufacturing cost model, or other quantitative analysis geared toward validating the value proposition for the proposed technology.
3. What are the key cost, manufacturing, and scalability risks associated with the proposed technology and how will you address these risks?

***Next Stage Funding***

1. What resources are needed for the next phase of development that follows the end of the ARPA-E project?
2. Who is expected to serve as the next source(s) of private or public funding and what is your plan to engage them during the ARPA-E project?

***Team Development***

Please describe any gaps in the capability, knowledge, and availability of current team resources necessary to advance the various development areas described above. Please describe how and when the team plans to address each gap (new partnerships, advisors, consultants, conferences, etc.).

***ARPA-E Assistance***

ARPA-E may provide assistance to funding recipients in order to help prepare for market adoption and deployment of technologies developed with ARPA-E funds. Please indicate from the list below any specific areas or activities with which ARPA-E can provide help. Your responses will allow us to tailor our assistance programs to address areas of greatest need.

|  |  |
| --- | --- |
|  |  |
|  | Specific Need (Describe below) |
| Market and Industry Knowledge |  |
| Intellectual Property Management |  |
| Cost-Performance Modeling |  |
| Regulatory Issues |  |
| Business Model / Plan |  |
| Manufacturing / Scalability / Supply Chain |  |
| Next Stage Funding |  |
| Team Development |  |
| Other (please explain) |  |

Additionally, ARPA-E can help facilitate connections with companies, organizations, and individuals who may be valuable to the project’s future success (subject matter experts, potential advisors, next stage funding partners, etc.). Please list the top five connections we could help facilitate in the table below. You can name specific people/companies or list categories of people/companies.

|  |  |  |
| --- | --- | --- |
| Rank | Company/Organization/Individual  | Role/Function/Title |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |

# APPENDIX B - COMMERCIAL READINESS LEVEL SCALE

Please note that proposed technologies are not expected to be commercially mature at the start of the project period, nor must any specific CRL be reached by the project’s end.

|  |  |
| --- | --- |
| **CRL** | **Description** |
| 1 | Knowledge of applications, use-cases, & market constraints is limited and incidental, or has yet to be obtained at all.  |
| 2 | A cursory familiarity with potential applications, markets, and existing competitive technologies/products exists. Market research is derived primarily from secondary sources. Product ideas based on the new technology may exist, but are speculative and unvalidated. |
| 3 | A more developed understanding of potential applications, technology use-cases, market requirements/constraints, and a familiarity with competitive technologies and products allows for initial consideration of the technology as product. One or more “strawman” product hypotheses are created, and may be iteratively refined based on data from further technology and market analysis. Commercialization analysis incorporates a stronger dependence on primary research and considers not only current market realities but also expected future requirements.  |
| 4 | A primary product hypothesis is identified and refined through additional technology-product-market analysis and discussions with potential customers and/or users. Mapping technology/product attributes against market needs highlights a clear value proposition. A basic cost-performance model is created to support the value proposition and provide initial insight into design trade-offs. Basic competitive analysis is carried out to illustrate unique features and advantages of technology. Potential suppliers, partners, and customers are identified and mapped in an initial value-chain analysis. Any certification or regulatory requirements for product or process are identified.  |
| 5 | A deep understanding of the target application and market is achieved, and the product is defined. A comprehensive cost-performance model is created to further validate the value proposition and provide a detailed understanding of product design trade-offs. Relationships are established with potential suppliers, partners, and customers, all of whom are now engaged in providing input on market requirements and product definition. A comprehensive competitive analysis is carried out. A basic financial model is built with initial projections for near- and long-term sales, costs, revenue, margins, etc. |
| 6 | Market/customer needs and how those translate to product needs are defined and documented (e.g. in market and product requirements documents). Product design optimization is carried out considering detailed market and product requirements, cost/performance trade-offs, manufacturing trade-offs, etc. Partnerships are formed with key stakeholders across the value chain (e.g. suppliers, partners, customers). All certification and regulatory requirements for the product are well understood and appropriate steps for compliance are underway. Financial models continue to be refined. |
| 7 | Product design is complete. Supply and customer agreements are in place, and all stakeholders are engaged in product/process qualifications. All necessary certifications and/or regulatory compliance for product and production operations are accommodated. Comprehensive financial models and projections have been built and validated for early stage and late stage production.  |
| 8 | Customer qualifications are complete, and initial products are manufactured and sold. Commercialization readiness continues to mature to support larger scale production and sales. Assumptions are continually and iteratively validated to accommodate market dynamics.  |
| 9 | Widespread deployment is achieved. |

# APPENDIX C – MARKING INSTRUCTIONS

1. Please include the following marking on the cover page of the **initial** T2M Plan.

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1. Please include the following markings on the cover page of allT2M Plan **updates** presented and/or submitted to ARPA-E.

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1. Please include the following footer at the bottom of every page of the **initial** T2M Plan and all T2M Plan **updates**.

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