

## Project Name [Enter your team’s name]

## Tagline: [Your mission or idea as a single catchy sentence]

# TECHNICAL NARRATIVE TEMPLATECABLE Prize, Stage 2

**Technical Narrative Template**

Write a detailed narrative describing your solution that addresses each of the following four criteria (seven statements) and explain how your conductor concept is for an *affordable, breakthrough material* that is *technically feasible* to manufacture and enables impactful *applications.* The content bullets are only suggestions to guide your responses; you decide where to focus your answers. Responses to these criteria statements must not exceed 5,000 words in total. You may also include up to 10 supporting images, figures, or graphs integrated into the narrative.

The Technical Narrative must be in English. Unless stated otherwise, all files must be submitted in the HeroX platform in an unlocked, searchable PDF form and use the following file name format: Team-Name\_CABLEStage1.pdf. Content that exceeds any word, page, or time limit will not be reviewed. Please refer to the official [CABLE Prize Rules Document](https://americanmadechallenges.org/challenges/cable/docs/rules/CABLE_Prize_Official_Rules.pdf) for each criteria question and its associated suggested content.

The reviewers will score the questions based on the content you have provided in your narrative and your other submission elements.

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| Technical Narrative |
| **Goal 1: Affordability**24 points possible (note: Appendix C must also be complete) |
| Competitors could:* Describe a scenario/pathway for how the sample preparation costs they provided in Appendix C will decrease as their fabrication process is scaled up to the industrial scale for commercialization; specifically, describe how much the cost must decrease from Stage 2 sample preparation to 10 years post-commercialization; describe how the manufacturing cost is reduced by learning, economies of scale, etc., compared with Table 15 and Table 16 (Appendix C).
* Describe how the industrial-scale life cycle costs will compare to the likely conventional life cycle costs of the competing material in the application type chosen in Appendix C.
* For any energy savings and reduced climate impacts that can be monetized, provide an estimate (in dollars) of their value in the proposed application(s) according to the team’s scenario.
* Detail operational cost savings in the widespread energy application(s) that justify material cost premiums (if any). These savings should exceed any of the additional costs beyond manufacturing a state-of-the-art material.
 | Judging criteria (1–6 points per statement): * The extent to which the material’s sample preparation cost-related data (Appendix C) support the competitor’s estimate of their future manufacturing cost: Are future (industrial-scale) costs just a little (e.g., 10%) lower or a lot (e.g., 100 times) lower than sample fabrication costs?
* The credibility of the description of how costs are reduced during the manufacturing scale-up scenario.
* The material’s life cycle potential to become economically competitive with the identified baseline conductor 10 years post-commercialization.
* The credibility of the life cycle cost estimates, including estimates of future manufacturing and operational costs and competing baseline conductor material costs.
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## Your Response:

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| **Goal 2: Conductor Material Breakthrough**6 points possible (plus additional points for testing – see Table 4) |
| Competitors could: * Provide the scientific and engineering underpinnings of the enhanced conductivity in their microscale conductor material
* Provide scientific explanation for why the enhanced conductivity at microscale will persist at industrial scale
* If the material represents a major breakthrough, describe any new scientific understanding.
 | Judging criteria (1–6 points per statement):* The extent to which the competitor’s explanation of their samples’ enhanced conductivity relies on sound scientific and engineering principles, including the credibility of the explanation for why the enhanced conductivity observed at microscale will persist at industrial scale.

Note: Evaluation of the actual magnitude of the enhanced conductivity (any metric) will come directly from the ranked sample testing results in Appendix D based on a curve developed by the Prize Administrator. |

## Your Response:

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| **Goal 3: Life Cycle Impacts**12 points total |
| Competitors could describe:* Non-GHG emission and other environmental and non-economic impacts related to the material’s associated energy, resource extraction, product energy use or reuse/recycling for the most likely application(s).
* How will this contribute to Biden administration climate goals of:
	+ 50% greenhouse gas emissions reductions by 2030
	+ Carbon-free grid by 2035
	+ Net-zero greenhouse gas emissions economy by 2050.
 | Judging criteria (1–6 points per statement):* The size and credibility of the non-greenhouse gas, non-cost savings positive life cycle environmental impacts (e.g. reduced air criteria pollutants and toxics emissions related to reduced energy and resource extraction impacts and/or energy use and/or recycling impacts) of the competitor’s application(s) for 10 years post-commercialization.
* The size and credibility of the net greenhouse gas emissions reductions by 2030, 2035, and 2050 from the new material.
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## Your Response:

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| **Goal 4: Manufacturability**12 points possible (plus additional points from Table 9 and additional points for testing; see Table 4) |
| Competitors could: * Provide evidence that the sample fabrication technique (or proposed alternate technique that leads to industrial scale) is scalable. For example, describe the current technology readiness level (TRL) and pathway toward achieving the desired TRL.

Note: Competitors should include any and all assumptions and calculations and/or references and supporting data. These can include schematics, drawings, or sketches. | Judging criteria (1–6 points per statement):* The credibility and reasonableness of the manufacturing technologies and processes for the proposed manufacturing scale-up intended to make the material economically competitive in the contest market.
* The credibility and reasonableness of the magnitude of annual production in kilograms claimed 10 years post-commercialization. (Commercialization Statement 1B in Appendix C).
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## Your Response:

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| **Goal 5: Commercialization**36 points possible (Note: Appendix C must also be complete) |
| Competitors could include:* Market data that describes:
	+ The innovation and the market need that it is fulfilling
	+ How the team collected data on market needs, which may include but is not limited to customer discovery
	+ For Table 1 Contests 2 and 3 competitors (Beat Aluminum!; Beat a Conductor System!), how the market and application space for the team’s material differ than those for materials exceeding Contest 1 (Beat Copper!)
	+ The problem the team is trying to solve that isn’t currently being addressed by another similar product
	+ What the Total Addressable Market, Serviceable Available Market, and Serviceable Obtainable Market are
	+ How the technology is positioned for commercial viability, private sector investments, and market impact.
* Intellectual Property (IP) that describes:
	+ Intellectual property protections and next-stage resource factors.
* Company/team that describes:
	+ Why the company/team the best suited to address this market need.
* Customer discovery that:
	+ Answers who the end customer is/will be
	+ Provides evaluations of expected market segments and end customers
	+ Describes how the commercialization plan was reviewed with relevant advisors and how their feedback was incorporated.
* Technology scaling data/narrative that estimates:
	+ The manufacturing cost of the conductor (including both the material and process) in a relevant metric, (e.g., $/kg for non-superconductors or $/kA-m for superconductors) that can be compared with 10-year-plus forecasts for conductors (e.g., now $15/kg for copper and $13/kg for aluminum).
 | Judging criteria (1–6 points per statement):* The current and forecasted future market size of the conductor/conductor system that the new material would replace.
* The extent to which the market data provided are complete and credible, including examples of potential markets and partners that the team will likely pursue or already has pursued.
* The extent to which the IP information described is complete and reasonable.
* The extent to which the company/team description supports commercialization.
* The quality of the customer discovery and how data from potential customers are incorporated.
* The magnitude and credibility of the manufacturing costs and industrial-scale commercialization using statements 1A and 1C in Appendix C.

Note: The “Complete” criteria is also assessed by the completeness of data entries and calculations in the Appendix C template for commercialization estimates and sample data. The “Credible” criteria also include how reasonable the assumptions are in the template in Appendix C.Note: Prize Administrator will complete and provide Appendix D testing data results to the Expert Reviewer panel based on the information that the competitor provides in Appendix C. A copy of Appendix D will be provided to competitors by Nov. 18, 2022.[[1]](#footnote-2) |

## Your Response:

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1. Anticipated, subject to change [↑](#footnote-ref-2)