



# Hydrogen Hubs Selection: Developing an Effective, Transparent, Fair, and Timely Process

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The federal hydrogen hubs program will be perceived as a bellwether for U.S. clean energy innovation policy writ large. As such, its process for selecting winning proposals must not only be effective, but also fair, transparent, and timely.

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## KEY TAKEAWAYS

- Big dollars are at stake for potential hydrogen hubs—at least \$8 billion from the Department of Energy’s (DOE’s) Office of Clean Energy Demonstrations (OCED) and more from other federal sources down the road.
- DOE has set forth three sets of selection criteria: congressional mandates, boundary conditions that any application must meet, and direct selection criteria. Other elements of the hubs will be negotiated after selection.
- Some of these criteria have previously been used by DOE, but many have not. There are structural problems in such an extensive list that could open the door to both influencers and later challenges, which could be disastrous.
- DOE should clearly differentiate actual selection criteria from mandates, boundary conditions, and post-selection elements.
- DOE should limit the number of selection criteria to scale and scope, specific demonstration, operational plan, cost, and likelihood of sustained commercial success.
- DOE should establish an independent merit review panel (IMRP) with a majority of reviewers from the private sector and additional reviewers from DOE’s applied programs, labs, and community groups.
- DOE should publish a consultative document that lays out the proposed composition of the IMRP and its plans for utilizing outside expertise.

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**INTRODUCTION**

Many analysts agree that hydrogen will play a key role in decarbonizing the world energy system. But the path to that future faces some formidable hurdles before an economically sustainable hydrogen ecosystem can be built. To address many of these hurdles, Congress is providing substantial support to create regional hydrogen hubs.

Big dollars are at stake for potential hydrogen hubs—at least \$8 billion from DOE’s new Office of Energy Demonstrations (OCED) and more from other federal sources down the road (including a tax credit benefiting downstream users). That funding has already attracted a substantial collection of potential coalitions and alliances, which should lead to a range of exciting proposals. But it also draws heavy political and corporate interest, which will likely exert considerable pressure on DOE selection decisions.

Given the stakes, it is essential that DOE handles the selection process well. Not-selected hubs (and their sponsors and participants) may challenge DOE decisions through the Government Accountability Office (GAO), other dispute resolution options, congressional oversight hearings,

or the courts. The larger objective of growing support for clean energy and climate technology demonstration programs could be undermined if the hubs selection process is not done well.

What does this mean? In our view, the process must meet four core requirements:

1. **It must be effective.** The selection process must enact the intent of Congress in establishing the hydrogen hubs program, and it must be designed to optimize the chances for successful implementation.
2. **It must be fair.** Applications must be considered without bias and decisions made according to the selection criteria described in DOE's upcoming Funding Opportunity Announcement (FOA).
3. **It must be transparent.** All proposers must feel that their applications have been considered fairly. That means DOE's selection process must be open—publishing nonproprietary parts of hub proposals, scoresheets, expert recommendations, and the like. The process needs to be much more transparent than those used for DOE's less visible programs.
4. **It must be timely.** DOE indicates that it expects to complete the first selection round by May 2023. Most of the time before that date is being spent on DOE preparations, so—given the urgency of climate change and the need for an energy transition as soon as possible—it is important that DOE's own internal timeline does not slip.

DOE would surely accept that its process must meet these four requirements—they are not controversial—but the hubs program's Notice of Intent (NOI) to issue the FOA suggests that none of these are guaranteed.<sup>1</sup>

### Summary of Prior Report on Hydrogen Hubs Program Strategy

The Information Technology and Innovation Foundation's (ITIF's) previous paper on hydrogen hubs highlights the strategic choices facing DOE. We concluded that DOE should fund capital expenditures for both the core plant and related infrastructure, and should also support operating expenditures until the core plant reaches full operational capacity. In some limited circumstances, time-capped end-user subsidies might also be appropriate.

We also argued that funding should be delivered directly from DOE to the wide range of projects involved in hubs development, but that these projects should all be included in the overall proposal developed by the hub leadership. This avoids the difficulties that would certainly be generated by a delegated funding model, and also by a model in which DOE simply ran competitions for funding without reference to hub plans.

## SELECTION CRITERIA AND PROCESS

A careful review of the NOI finds three sets of selection criteria embedded in the document: congressional mandates; boundary conditions that any application must meet; requirements directly flagged by DOE as selection criteria (“direct selection criteria”). There are in addition elements that will be negotiated after selection, but these are not part of the selection process.

## Congressional Mandates

Congress imposed four basic conditions on the OCED Hydrogen Hubs program as a whole<sup>2</sup>:

1. **Feedstocks mandate.** DOE must fund at least one hub each to utilize clean energy, fossil fuels, and nuclear. This sets up mini-competitions within these categories.<sup>3</sup>
2. **End-use diversity mandate.** DOE must fund at least one end use in electric power generation, one in an industrial sector, one for the residential and commercial heating sector, and one for the transportation sector.<sup>4</sup>
3. **Geographic diversity.** For all practical purposes, hubs must be located in different regions—it will not be politically possible to fund two hubs in one region while excluding other candidates (at least from the initial hubs funding). At least two hubs must be located in areas of abundant natural gas resources.<sup>5</sup>
4. **Jobs.** Congress is requiring DOE to select hubs that create opportunities for skilled training and long-term employment. This mandate is discussed in detail in the following boundary conditions section.

## Boundary Conditions

While the congressional mandates drive the overall design of the Hydrogen Hubs program, the NOI also describes conditions that must be met for a proposal to be considered. These are boundary conditions rather than selection factors because, while each proposal must meet all of these conditions, meeting them *better* will not convey any advantage to a proposal. They are a set of checkboxes—in some cases because comparative measurement is too difficult, in others because they are in reality binary (e.g., governance).

1. **Governance.** The hub must have a single entity that can accept funding.
2. **Scale.** Funded projects must generate a minimum of 50–100 metric tons (MT) of hydrogen per day. DOE anticipates providing a minimum range of \$400 million to \$500 million and a maximum range of \$1 billion to \$1.25 billion DOE share for each H2Hub.<sup>6</sup> The NOI states that projects seeking more funding are expected to operate at a larger scale, and also that DOE will give preference to larger projects.<sup>7</sup>
3. **Matching funds.** Proposer must provide at least 50 percent non-federal cost share match (which can include state funds).<sup>8</sup> Notably, DOE will accept in-kind contributions.<sup>9</sup> The NOI does not suggest that higher levels of matches will provide any selection advantage.
4. **Regional resources.** The hubs are expected to use regional resources; the NOI provides examples, which lean heavily on inputs into the production cycle: “Each H2Hub should leverage regional resources as appropriate, including water, renewable energy, nuclear energy, and fossil fuels (particularly natural gas with carbon capture and storage).”<sup>10</sup>
5. **H<sub>2</sub> Production carbon intensity.** Section 822 of the Bipartisan Infrastructure Law defines “clean hydrogen” to mean “hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced” (2 kg CO<sub>2</sub>e/kg H<sub>2</sub>).<sup>11</sup> Meeting this CO<sub>2</sub> target at the production site is an initial boundary condition for proposals.

6. **H<sub>2</sub> cost.** The NOI anticipates that the hubs will move H<sub>2</sub> production forward on the pathway first to \$2/kg and then the Hydrogen Moonshot target of \$1/kg by 2033.<sup>12</sup>
7. **Phasing and project timeline.** The hub should fit within the DOE’s four phases and timeline for deployment. It is not clear whether a shorter timeline will become a selection advantage.
8. **Jobs.** Congress expects “DOE shall give priority to regional clean hydrogen hubs that are likely to create opportunities for skilled training and long-term employment to the greatest number of residents in the region.”<sup>13</sup>
9. **Local sourcing.** Hubs should source feedstocks locally wherever possible. For financial reasons, all proposals will likely have to meet this condition.<sup>14</sup>

## Direct Selection Criteria

DOE lists nine criteria it says will be used for selection purposes. The NOI simply lists these as one-word items in a single paragraph.<sup>15</sup> Presumably, details will be provided in the eventual FOA. We have added a description that offers our understanding of each element.

1. **Cost.** DOE is presumably seeking the most cost-efficient use of funds. However, it is not clear whether this means projects that have the lowest gross cost or cost per unit of H<sub>2</sub>, or some other financial metric.
2. **Schedule.** Presumably, DOE is seeking projects that can ramp up as rapidly as possible. However, there are obvious risks involved in focusing on fast-starting projects while rejecting others that may be more successful in the long term.
3. **Scope.** It is entirely unclear what DOE means by “scope.” Given that the governing legislation describes a regional hub as including delivery and end users, DOE should be thinking of scope expansively—in particular, of ways in which a hub can be designed to demonstrate a sustainable production/user network.
4. **Technology.** “Technology” is such a vague term that it could mean almost anything. Is DOE thinking of selecting projects with innovative technologies? Does it mean technologies that have not yet been demonstrated at scale? Or technologies that are more novel?
5. **Business.** Having a coherent business plan that leads to sustainability for the hub as a whole is one of the core requirements for a successful demonstration program, and the NOI states, “Each H<sub>2</sub>Hub will demonstrate balanced hydrogen supply and demand.”<sup>16</sup> Perhaps this simply means there must be demand for the H<sub>2</sub> generated by the core plant. It is notable and somewhat concerning that DOE anticipates “Feedstock and Offtake plans” being completed by the end of Phase 2.<sup>17</sup> These are absolutely central to successful hub deployment, and while this timeline may be appropriate for finalized plans and contracts, initial versions of both feedstock and offtake plans should be introduced early in Phase 1. Without them, a hub is little more than wishful thinking.
6. **Market.** By including markets among the selection criteria, DOE is emphasizing a focus on the demand side of the hydrogen hub. Simply planning to build a core plant is not enough; end users must be identified (and ideally become part of the proposal).

7. **Financial.** Proposers will have to show that they have the financing necessary to match DOE funds. They will presumably also have to show that their proposed budgets are sufficient to create a successful project and that non-DOE funding matches those budgets.
8. **Management.** Given the complexities of building and operating a regional hub, a strong management team will be essential. DOE should ensure that management strengths extend beyond the core plant into the more complex delivery and end-user aspects of the hub.
9. **CO<sub>2</sub> intensity.** DOE intends to evaluate full life cycle emissions for each application and will give preference to applications that reduce greenhouse gas (GHG) emissions across the full project life cycle, inclusive of hydrogen production, compared with current industry standards.<sup>18</sup>

Some of these criteria have previously been used at DOE—for example, markets and management are both covered by due diligence in the Loan Program office prior to making loans. Others, however, have minimal history at DOE and will have to be developed for the first time (what does “scope” entail in this context, for example?).

There are also structural problems in such an extensive list: Unless DOE provides explicit weighting information for each of them, it will be left with the task of addressing them on the fly, which will open the door both to influencers and eventually to GAO challenges, which could be disastrous. DOE will have to be very careful to avoid these pitfalls.

## ADDRESSING ADDITIONAL CONCERNS DURING POST-SELECTION NEGOTIATIONS

The NOI says that a number of items will be negotiated after the preliminary selections are made:

Examples of factors that may be considered as part of such negotiations include project and risk management processes and team capabilities, cost share amounts, financial contingencies, and engagement of independent monitors such as an Independent Engineer representing DOE interests.... DOE expects to require access to project performance data necessary to track progress against a project baseline (or similar). As these projects are pre-commercial deployments, to the greatest extent possible, project progress and information will be shared with interested stakeholders.<sup>19</sup>

This will be a challenge for DOE, as it will likely be engaged in simultaneous negotiation for up to eight hubs, drawing on expertise that is already thin on the ground within the agency.

Key items for negotiation will include:

1. **Milestones:** The project must include milestones, at least some of which must act as Go/No-Go checkpoints: “[E]ach project would be evaluated against expected project progress (Go/No-Go criteria) at the end of each phase to evaluate the readiness of the H2Hub to move to the next phase. Specific Go/No-Go criteria will be defined further in the FOA and will be negotiated with each selected H2Hub project.”<sup>20</sup> DOE will seek to embed viable Go/No-Go checkpoints in contracts; however, it may be difficult to identify clear checkpoints at the end of each phase. DOE also mentions possible Go/No-Go

checkpoints within phases. These milestones will—if published—reveal DOE’s real preferences and priorities.

2. **Intellectual property:** DOE states in the NOI that the hubs are “pre-commercial” projects and are therefore expected to widely share information. However, in important ways, these demonstration projects are not pre-commercial. They should become sustainable over time, and DOE itself expects that subsidies will taper off. So simply stating that they are pre-commercial and hence will readily share information (including intellectual property and business secrets) seems optimistic at best. Contract negotiations should therefore specify exactly what information hubs can keep secret, what will be shared only with DOE, and what will be made public. It is in the long-term interests of all stakeholders that the project be as transparent as possible, but shorter-term perspectives at both the company and DOE may suggest otherwise.
3. **Team and management:** DOE will negotiate team capabilities—presumably to ask the proposer to beef up capabilities in certain areas and to add personnel DOE requires, such as an independent engineer. This will likely draw on expertise at the loans program office.
4. **Equity and community engagement:** The NOI emphasizes community engagement in multiple ways, and requires that 40 percent of “overall benefits” accrue to disadvantaged communities. Ensuring that engagement and benefits are real requires detailed focus from DOE on areas in which it appears to have minimal expertise. For example, how is “benefit” to be defined in this context? Jobs? Technologies? Siting decisions? And what is engagement? Consultation? With whom, under what aegis, and how often? The letter to DOE from ITIF and other nongovernmental government organizations (NGOs) suggests that introducing an OCED Federal Advisory Committee may help here, but that alternatives should also be considered.<sup>21</sup>
5. **Tracking outcomes:** The NOI in several places anticipates that regional outcomes will be closely tracked: “[E]ach H2Hub will quantitatively estimate and measure lifecycle social and environmental impacts of the H2Hub on the region.”<sup>22</sup> Proposers must provide access to the project performance data necessary to track progress against a project baseline (or similar). But it is not yet clear whether hubs will be responsible for constructing an assessment framework or DOE will provide one in the FOA. The latter is likely to be preferable, as DOE will otherwise be negotiating from the ground up with each hub.

## WHO SELECTS?

The white-paper stage can easily be managed by DOE staff within OCED. But the full application stage will be difficult to handle. Even if selection criteria are simplified in line with the recommendations in section 5, evaluation presents DOE with a formidable challenge.

The letter to DOE from ITIF and other NGOs recommends an independent merit review panel (IMRP) with a majority of reviewers from the private sector, with additional reviewers from the Applied Programs, labs, and community groups.<sup>23</sup> This seems appropriate, although DOE will need to implement strong guarantees against conflicts of interest (as expertise in a given technology and/or market increases, so does the likelihood that the expert will have a direct or indirect financial stake there). The National Institute of Health’s (NIH’s) approach to proposal

review may provide a useful model, although its efforts on conflicts of interest have been criticized as insufficiently rigorous.

As usual, the devil is in the details. Will the review panel have the appropriate balance of insiders and outsiders? How will DOE balance geographical and technical composition? Will there be representatives of local communities—and if so, how will they be selected? Will review panel recommendations be made public? Will the review panel make actual decisions (unlikely)? If not, under what circumstances will DOE overrule panel recommendations? Who at DOE will be empowered to do so? Will there be an opportunity to appeal decisions made by the Panel (or indeed DOE)? How would an appeal work—the Government Accountability Office (GAO) contract appeals process is notoriously slow and rarely results in outcomes accepted by all parties.

Beyond the review panel, our previous paper highlighted the potential role of the hubs themselves in selection decisions. The NOI suggests that hub selection will be a one-time event and that under a cooperative agreement, all subcontracts be included in the original agreement (at a detailed level that includes budgets). This approach seems appropriate, but risks significant delays as circumstances change and the project needs to adjust.

## RECOMMENDATIONS FOR DOE

### Selection Criteria

Getting selection criteria right is a key step in successfully implementing the Hydrogen Hubs initiative. However, the numerous criteria scattered through the NOI and the confusion between boundary conditions, selection criteria, and post-selection negotiations means DOE's process may very well not be fair—and there is no guarantee that it will be effective. We therefore recommend the following:

#### Clear Distinctions

DOE should clearly differentiate between boundary conditions, actual selection criteria, and additional characteristics to be negotiated after a selection has been made. Confusing these elements will result in unhappy bidders and complaints about outcomes. Thus, formalizing the boundary conditions and differentiating them from selection criteria should be seen as a way to clarify and *reduce* the number and complexity of selection criteria.

#### Limited Number of Criteria

As far as possible, DOE should limit the number of selection criteria. We recommend five core selection criteria, based on the need for a fair, effective, transparent, and timely selection process:

1. **Scale and scope.** The scale of the project matters. So does the extent of the hub's ambition to spark the creation of a multifaceted regional hydrogen economy. Larger and more ambitious is better.
2. **Specific demonstration.** Demonstration programs should be designed to demonstrate specific outcomes—in this case, the development of sustainable businesses around hydrogen production and utilization—along with key proposed milestones. This element must include downstream linkages from the core plant and should not be overly focused on testing specific technologies at scale. The point is the market test; it may also involve

advancing previously nonscaled technologies, but that is not the point of the demonstration.

3. **Operational plan.** Hydrogen hubs are inherently complex. Their success will largely rest on execution. It is therefore critical that hub proposals include an operational plan explaining how the hub will be built and operated. Presumably this plan will deepen and broaden as projects move from Phase 1 through Phase 2, but an initial plan must be required.
4. **Cost.** DOE needs to favor projects that are cost effective. A number of metrics are available, but perhaps the most useful is simply the relative cost of a project to DOE, cast in terms of projected DOE costs per tonne of hydrogen delivered to end users over a set period of time (e.g., 5 or 7 years). Alternative metrics may emerge, but in any event, DOE should include a clear cost-effectiveness metric in its selection process.
5. **The likelihood of sustained commercial success.** The point of demonstration programs is to show that a new approach can be successful and sustainable. However, prior to the demonstration, none of that can be known for sure. Accordingly, at the proposal stage—Phase 1—hubs should be providing plans that fully address the conditions needed for a successful demonstration. These should include several elements specifically mentioned in the NOI:
  - a. **Clear plans for market development,** emphasizing the existence of market relationships for the project either already in place or soon to be finalized. This would include plans for delivering hydrogen to end users. Allowing proposals to avoid this component until the end of Phase 2 is not acceptable.
  - b. **Strong finances** able to support the project over time.
  - c. **Risk management plans** in place to address in particular the possibility that energy prices will remain volatile. However, DOE also says that this element can be part of post-selection negotiation.
  - d. **An effective management** team with experience operating projects at this scale, and with deep operating expertise in the hydrogen/energy sector. Again, DOE sees this as also part of the post-selection negotiation.

Some potential criteria in the NOI should be eliminated. For example, DOE mentions “technology” without specifying it further. Using technology as a selection criterion diverts attention from the core issue at hand: building a successful and sustainable business. Whether that business uses a specific technology should not in itself be a DOE concern. Similarly, “schedule” should not be a selection criterion. In fact, while rapid implementation is in general a positive element, DOE should be cautious about favoring “shovel-ready” projects when others may have better long-term prospects.

Note that in this formulation, jobs are not a selection criterion. Implementing a sustainable hydrogen hub will create jobs, but using jobs as a selection criterion is to put the cart before the horse: Successful economic activity will create long-term jobs, while using jobs as a selection criterion may lead to suboptimal selections that could undermine long term economic

sustainability. Negotiations should be used to ensure that the jobs created by the proposal are well paid—perhaps union jobs—and that they are fairly accessible to local residents, especially in historically exploited communities.

Some other criteria need to be accelerated or added into the selection process. DOE anticipates “Feedstock and Offtake plans” being completed by the end of Phase 2.<sup>24</sup> Bluntly, this is far too late: DOE should not fund any hub proposal that doesn’t have a clear and convincing plan for using the hydrogen produced by a core plant, and those plans should be visible from the start (see #5a)—although they may of course be changed as circumstances require.

The NOI list of selection criteria is also missing some necessary items, notably a strong operational plan, without which the hub is not likely to be successful. The NOI mentions a “robust” operational plan elsewhere, but this too needs to be included in the selection criteria.<sup>25</sup>

### Weighting

DOE should formally weight the five criteria. We recommend doing so as follows on a preliminary basis (with a strong emphasis on item 5), although these weightings should be taken as the basis for detailed discussion prior to publication of the FOA:

Criteria	Weight
1. Scale and scope	20%
2. Operational plan	10%
3. Specific demonstration	10%
4. Cost effectiveness for DOE	10%
5. Commercial potential	50%
a) Market development plan	25%
b) Finances	10%
c) Risk management	5%
d) Management team	10%

### Selection Process and Outside Inputs

The hub selection process is the responsibility of DOE, not an outside body. But the complexity and ambition of the hubs program mean DOE must acquire substantial outside expertise, especially expertise focused on commercial development and the regional development aspect of the hubs, which should extend far beyond the core plant. DOE will clearly need an expert group, with an emphasis on private sector experience, especially in energy and the construction of large energy projects.

We support the recommendations included in the letter from ITIF and other NGOs to DOE regarding a review panel with a majority of reviewers from the private sector and with additional reviewers from the Applied Programs, labs, and community groups. However, we also recommend that DOE publish a consultative document that lays out its proposed composition for the IMRP and its plans for how to utilize this outside expertise. Ideally, DOE should provide such a document well before publication of the FOA so public comments can be integrated into the latter.

We also recommend that DOE adopt a hybrid selection process regarding the role of the hub proposers. Their input is valuable, and DOE should not be funding subprojects unless they are included in hub proposals (which can be modified over time as needed). However, as shown in our earlier paper, hubs are not well situated to take on the selection burden themselves. Accordingly, DOE should review and fund subcontracts directly.

## Post-selection Negotiation

The NOI lists project characteristics to be considered during negotiations. Among the most important will be:

1. **Transparency.** We believe the hubs program demands far more transparency than would normally be required for government-funded programs. This program is pivotal for both the administration’s climate agenda and its demonstration portfolio in particular. Full transparency is the best way to ensure that the program is working fairly and effectively. But this is especially challenging for hubs, which are closer to the market than most projects funded by DOE. Winners will have to be persuaded that openness is a virtue.

The NOI anticipates that technical and economic results will be widely shared—and that relevant outcome metrics will be agreed upon between the hubs and DOE. We agree that is necessary; DOE must stand especially firm on this issue.

2. **Milestones.** DOE must also ensure that Go/No-Go and other key milestones, as well as agreed outcome metrics, are made public *prior to project launch*, and that data related to those milestones as the project proceeds are fully disclosed by the hubs to both DOE and the general public. Supporters and critics alike must be able to tell whether a project is on track.
3. **Community engagement.** Local participation in hub decision-making must extend far beyond standard nods to “consultations.” There is extensive literature on effective community engagement.<sup>26</sup> At the same time, DOE should ensure that every funded hub not only has an effective engagement plan but also implements it fully. Independent reports to DOE from community stakeholders should be an integral part of the information flow, and DOE should be prepared to impose penalties on projects that do not follow through on their commitments.
4. **Justice 40.** The Biden Administration requires that the hubs demonstrate that benefits (and indeed costs) are shared equitably. Key elements in implementing Justice 40 for hubs would include the acquisition and publication of data concerning jobs (including a detailed understanding of which jobs are opened to which communities); profits (which the hub can share via a range of mechanisms), subcontracts, and environmental impacts of the proposed hub. The results of negotiations should be published, and hubs should be required to report annually on their progress in meeting those requirements. DOE should develop a template for defining and measuring Justice 40 outcomes and apply it to all hubs.

In each case, DOE must successfully negotiate these key elements. And because these elements are negotiated, it is especially important that DOE publish any agreements reached with the hubs. DOE assurances that these objectives have been met will in themselves not be sufficient.

## CONCLUSION

The massive funding now being deployed through demonstration programs managed by OCED is, of course, encouraging for those seeking to address climate change, but it is also something of a high-stakes gamble. The hydrogen hubs program provides a *lot* of money, even by Washington standards; it is highly ambitious (effectively aiming to jump-start new energy ecosystems); it reflects current thinking about the importance of public-private partnerships; it is in itself a demonstration project for demonstration projects (to show that they can be successful); and it focuses on the difficult and expensive Valley of Death between prototypes and pilot projects on the one hand and fully commercial operations on the other.

For all these reasons, it's important that DOE get this right. Hub selection will also be under intense scrutiny from applicants, their supporters and sponsors, and indeed top corporate management in the energy sector. DOE won't be given the benefit of the doubt.

Finding ways to be fair, effective, and timely, and to demonstrate beyond doubt that the process meets these goals, will be difficult. DOE will have to go beyond the procedures it uses for much of its work. While participants in smaller grant programs may be prepared to accept a private selection process within DOE, with only limited information about why projects did or did not get funded, that won't wash here.

To begin with, DOE must implement maximum transparency. That baseline requirement will underpin everything else in the process: If there is insufficient transparency, the actual details of the selection process won't be enough to protect DOE (and the Biden administration). This means publishing applications in full (except for redacted material marked as a business secret by the proposer), expert recommendations, selection scores, and perhaps (anonymized) reviewer comments.

That said, DOE also needs to make sure that the process *is* actually fair—that proposers can fully understand the terms of the competition, and that the process is implemented as described in the FOA. DOE must use a short and clear list of selection criteria that fully match the needs of an ambitious program, and must make sure that the selection criteria and weighting do not unfairly advantage one group of proposers over another—based, for example, on technology. An appeals process will also be needed. Selecting and integrating expert help will be key, but DOE also has to ensure that conflicts of interest don't intrude.

Finally, of course, DOE needs to ensure that the selected hubs are those with the best possible chances of success. The weightings previously described seek to reflect the operational realities of building ambitious and complex projects that have a large market component. They are only a draft—and DOE would be well advised to ensure that whatever weightings it eventually settles on are not only public, but are also subject to extensive public comment and debate. That will both improve the final structure and also help to give the project *fairness momentum*: the belief that DOE is taking every possible step to ensure that the program and selection are fair, and that they give the program the best possible chances of success.<sup>27</sup>

## APPENDIX A. SELECTION TIMELINE AND STAGES

The process described in the NOI begins with proposers submitting a white paper. Typically, at DOE, the white paper is used to weed out applications that do not meet the boundary conditions for an award. It is unlikely that any serious applications will be denied at the white paper stage.

Those meeting requirements are then invited to submit a full application, on which selection for awards is based. The NOI does not reference the Advanced Research Projects Agency–Energy (ARPA-E) model wherein selection finalists are asked to present in person (a model also in use at NSF), so it appears that DOE will simply evaluate the proposals submitted. After selection, winners negotiate a cooperative agreement with DOE (likely based on existing DOE cooperative research and development agreements [CRADAs]).

The process has six stages, kicked off by publication of the FOA in September/October:

Stage	Timing
1. FOA	Sept/Oct (assume October 1)
2. Concept paper	+ 6–8 weeks
3. Approval/disapproval	+ 4 weeks
4. Full application	+ 16 weeks (assume February 1)
5. Selection	May 2023
6. Negotiation	May 2023 onwards

As described, the proposed timeline meets fairness criteria, although it's worth noting that most of the time prior to selection is actually used by DOE to develop the FOA and then to go through the various selection stages. Proposers have a relatively short amount of time to finalize their proposals.

The NOI says that DOE expects to make 6–10 awards. Given possible movements among existing players, it's quite possible that there will be only 10 or fewer serious proposals to evaluate.

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## About the Author

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## About ITIF

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## ENDNOTES

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1. U.S. Department of Energy, "DE-FOA-0002768: Notice of Intent to Issue Funding Opportunity Announcement No. De-Foa-0002779 — Bipartisan Infrastructure Law: Additional Clean Hydrogen Programs (Section 40314): Regional Clean Hydrogen Hubs" (2022), <https://oced-exchange.energy.gov/Default.aspx#Foald4e674498-618c-4f1a-9013-1a1ce56e5bd3>. Throughout this report, further citations of DOE's NOI include the page number where the cited material may be found in the publicly available copy of the NOI, plus the specific line number(s) where cited material may be found in a reference copy of the NOI created by the author, available at: <https://www2.itif.org/2022-hydrogen-hubs-noi-reference-copy.pdf>.
2. Notice of Intent DE-FOA-0002768, page 4 (lines 120–130 in the author's reference copy).
3. Notice of Intent DE-FOA-0002768, page 4 (lines 120–121 in the author's reference copy).
4. 42 U.S.C. § 16161a(c)(3)(B).
5. 42 U.S.C. § 16161a(c)(3)(C)-(D); U.S.C. § 16161a(c)(3)(E).
6. Notice of Intent DE-FOA-0002768, page 7 (lines 187–188 in the author's reference copy).
7. Notice of Intent DE-FOA-0002768, page 8 (line 202 in the author's reference copy).

8. Notice of Intent DE-FOA-0002768, page 7 (line 189 in the author’s reference copy).
9. Notice of Intent DE-FOA-0002768, page 7 (lines 190–191 in the author’s reference copy).
10. Notice of Intent DE-FOA-0002768, page 8 (lines 205–207 in the author’s reference copy).
11. Section 40315 of the IJJA42 U.S.C. § 16166(b)(1)(B).
12. Notice of Intent DE-FOA-0002768, page 5 (lines 156–158 in the author’s reference copy).
13. Notice of Intent DE-FOA-0002768, page 4 (lines 128–130 in the author’s reference copy).
14. Notice of Intent DE-FOA-0002768, page 8 (lines 205–207 in the author’s reference copy).
15. Notice of Intent DE-FOA-0002768, page 8 (lines 219–221 in the author’s reference copy).
16. Notice of Intent DE-FOA-0002768, page 3 (line 86 in the author’s reference copy).
17. Notice of Intent DE-FOA-0002768, page 7 (line 178 in the author’s reference copy).
18. Notice of Intent DE-FOA-0002768, page 5 (line 139 in the author’s reference copy).
19. Notice of Intent DE-FOA-0002768, page 8 (lines 209–215 in the author’s reference copy).
20. Notice of Intent DE-FOA-0002768, page 8 (lines 229–232 in the author’s reference copy).
21. David Hart, et al. “DOE Office of Clean Energy Demonstration: Implementation Recommendations” (ITIF, October 2021), <https://www2.itif.org/2021-DOE-OCED-letter-recommendations.pdf>.
22. Notice of Intent DE-FOA-0002768, page 4 (lines 150–151 in the author’s reference copy).
23. Ibid.
24. Notice of Intent DE-FOA-0002768, page 7 (line 178 in the author’s reference copy).
25. Notice of Intent DE-FOA-0002768, page 8 (line 223 in the author’s reference copy).
26. See, for example: Mark S. Reed, “Stakeholder Participation for Environmental Management: A Literature Review,” *Biological Conservation* 141, no. 10 (October 1, 2008): 2417–2431, <https://doi.org/10.1016/j.biocon.2008.07.014>.
27. Getting it right up front will be especially important because the long timeline for these projects and the requirement to spend most of the money at least relatively soon mean that there will be little feedback within the hubs programs: We won’t know what worked and what didn’t until the original funding at least is fully deployed.