

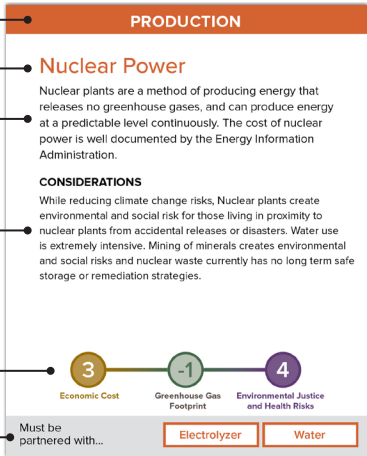
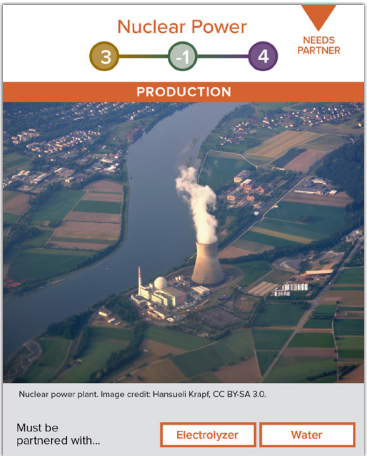
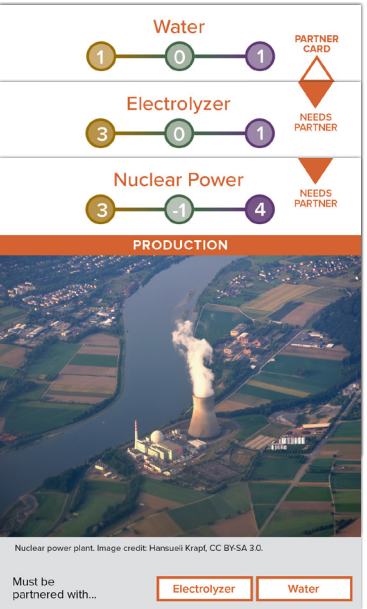
Welcome to Harnessing Hydrogen a collaborative activity in which you'll learn about how Hydrogen can be made and used. You'll also explore the economic costs, climate impacts and environmental and energy justice issues associated with different hydrogen production processes and uses.

In this activity you'll be working as a team to explore how you would design a hydrogen infrastructure that most helps to address climate change and most reduce the risks of hydrogen systems.

- 1 Deal the cards
- 2 Review the different parts of the cards (see below)
- 3 Build the supply chains described below

3–4 Participants: 5 cards each  
 5 Participants: 4 cards each  
 6–8 Participants: 3 cards each

### SAMPLE CARD

	Front	Back	Stacked with partners
<p>Category</p> <p>Name</p> <p>Description</p> <p>Economic, Climate, and Environmental Justice considerations</p> <p>Scores Range -3 (lowest harm or most benefit) to 5 (highest harm or least benefit)</p> <p>Partner Cards To be played some cards require additional cards.</p>			

### ROUND 1

#### Build a Supply Chain with the **Lowest Economic Cost**

1. Start with the **Production Cards**.
2. Have each participant review their orange production cards.  
  
If no options are available in that card category, i.e., no one has a production card, participants can discard three cards and be given three new cards by the facilitator.
3. Read any of their cards in the production category (orange cards) and note the lowest economic score (the dark yellow circle).
4. Participants should discuss options and add the lowest scoring production card to the supply chain.
5. Move onto the next card category, **Transport**.

If no options are available in that card category, i.e., no one has a transport card, participants can discard three cards and be given three new cards by the facilitator.

6. Go through each card category until the supply chain is complete (**Production, Transport, Storage, End Use, Permitting and Safety**)
7. Tally up the total scores for the supply chain's *economic, greenhouse gas and environmental justice* score and add the total scores in the scoring circles.
8. Record the supply chain with a photo.
9. Discuss what the participants think about this supply chain.

### ROUND 2

#### Build a Supply Chain with the **Lowest Greenhouse Gas footprint**

1. Provide new cards to any participants who played their cards in the last round.
2. Repeat the steps in the previous round but focus on the Greenhouse Gas score, the middle circle on the card.
3. Try to build the supply chain with the lowest Greenhouse Gas Score.

Hint! Participants can add more than one end use to further reduce the Greenhouse Gas Footprint.

4. Tally up the total scores for the supply chains economic, greenhouse gas and environmental justice score.
5. Record the supply chain with a photo.
6. Discuss what the participants think about this supply chain.

### ROUND 3

#### Build a Supply Chain with the **Least Environmental Justice & Health Concerns**

1. Provide new cards to any participants who played their cards in the last round.
2. Repeat the steps in the previous rounds but focus on the purple score, the far-right circle on the card.
3. Try to build the supply chain with the lowest Environmental Justice Concern Score.
4. Tally up the total scores for the supply chains economic, greenhouse gas and environmental justice score.
5. Record the supply chain with a photo.
6. Discuss what the participants think about this supply chain.

### ROUND 4

#### **Build your own**

#### *Optional*

1. Decide if your table would like to try to build your own supply chain optimized for your values.
2. Participants can choose from any of the cards and reuse cards from other supply chains.
3. Participants can add multiple end-uses and multiple production, transport and storage pathways.
4. Tally up the total scores for the supply chains economic, greenhouse gas, and environmental justice score.
5. Record the supply chain with a photo.
6. Discuss what the participants think about this supply chain.

## Discussion

Once all the supply chains are built, lead the table in discussing what they learned.

- What are the significant differences between the supply chains?
- What similarities do they see?
- Are there any cards they didn't play?

#### **Based on the supply chains they have built:**

- Which do they feel most comfortable with and why?
- Which do they have the most concerns about and why?

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Disclaimer: The cards in this workshop are for discussion purposes only. The scores and technical descriptions reflect current estimates of economics and technologies, which will change as the hydrogen economy evolves and we get closer to reaching the DOE Hydrogen Shot targets. The scores are relative to designate a scale and are imperfect. The cards do not reflect DOE technical guidance.

Scoring disclaimer. Participants be aware that the scores included in the cards are approximations based on greenhouse gas emissions models, and economic and justice factors. They are intended to create conversation and provide a rough guide for beginning to examine the trade-off and benefits of different hydrogen technologies. The values assigned can also be debated by the workshop participants. Are they fair? What would you assign for a value? Please see appendix for further information on scoring.