Sustainable AI Project Guide
Focus 3: Improving AI Inputs and Outputs

Name(s): **Date:**

Design Scenario

You and your team run a sustainable design firm that develops innovative technology processes. You are looking more closely at the systems that develop artificial intelligence (AI), the infrastructure that supports them, and the resources that they require. Your team will use your skills as communicators, researchers, collaborators, and creative

Design Problem

Develop an idea for reducing AI's impact on the environment. Your solution could fit into the system at an individual, community, or global level.

As you complete this project you will use the Innovation Design Process.

1. Understand the Design Problem (pg 2-3):

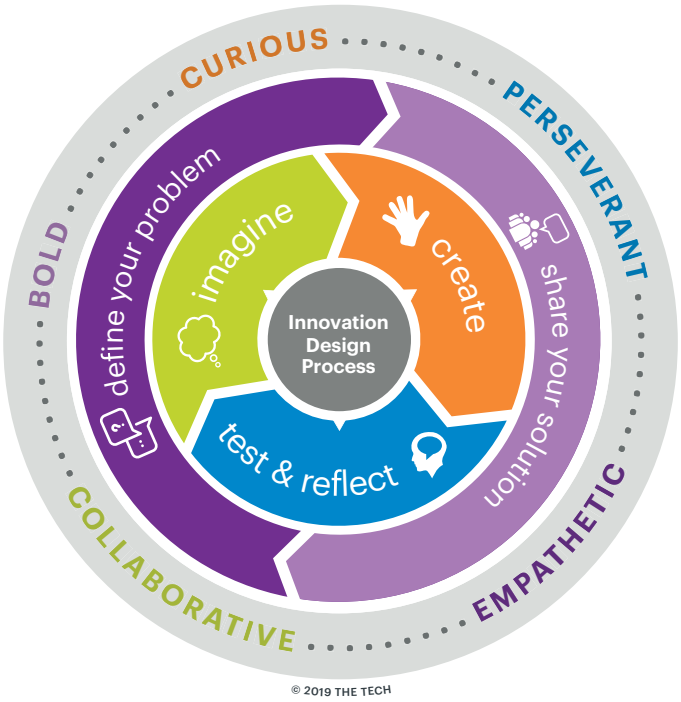
- Read the background information for your focus area.
- Take notes on the problem and the approaches others are taking.

2. Brainstorm and Create (pg 4):

- Use the template to brainstorm ideas.
- Be creative! Think of as many wild ideas as possible.
- As a team, choose some of your favorite ideas to share.

3. Share Your Ideas (pg 5):

- Share your solution with others and get feedback.



Understand the Design Problem

What problems are caused by growing Artificial Intelligence (AI) use?

The race to develop AI is demanding immense energy. Companies are in a hurry to be the first to build AI systems that will be reliable and profitable. In the state of Virginia, 25% of all power produced goes to **data centers**.[1] In 2023, data centers used about 50 gallons of water for each U.S. resident[2]—nearly half of what we each drink annually. This amount is expected to increase exponentially in only a few years.

Demand is growing so fast because AI requires greater storage on the **cloud** (remote servers); expanded computing infrastructure to handle huge amounts of data; faster processing; and quick cooling of these faster, more powerful machines. Because most of the energy that we use still comes from non-renewable sources, the result is unsustainable and threatens the climate.

Meanwhile, concerns about sustainability are growing. Local communities are becoming more wary of data centers. Their electricity and water bills are going up with the added demand for power. Noise and light pollution has negative health effects, and threatens birds and animals.

1. "Data Center Energy Consumption Statistics & Data (2026)," The Network Installers, Jan. 12, 2026
2. "United States Data Center Energy Usage Report," Lawrence Berkeley National Laboratory, Dec. 2024, and "Fast Facts: Data on Water Consumption," Center for Disease Control, Jan. 2024.

Take notes on the problem

Focus 3: Improving AI Inputs and Outputs

What are people doing to reduce AI's negative effects on the environment?

Experts are using several different approaches to increase the sustainability of AI data centers and reduce their negative impact on the environment.

Improving AI Inputs and Outputs

Researchers are looking at ways to reduce the energy that it takes to process AI's complex math equations. This might mean simplifying the equations or using more efficient models to train AI systems on data, which makes up a significant proportion of their energy consumption. **Large Language Models (LLMs)** are trained continuously on vast amounts of data to produce their responses. Sustainability might mean limiting the length of the responses of an LLM chatbot to its users.

Darren Nguyen, Harsh Malik, and Vishnuvardhan Kandala, three undergraduate students at the University of Washington Bothell, won a hackathon prize by creating a prototype for a Green AI app that allows users to turn on a setting asking their AI chatbot to provide 80% shorter answers. "Small tweaks at the code level can lead to giant impacts globally," the team said in their presentation.

Vocabulary

Term	Definition
Artificial intelligence (AI)	A device or program designed to mimic aspects of human intelligence to complete complex tasks, such as learning, problem solving, and decisionmaking.
Cloud	Storage, servers, and applications that exist on the internet, instead of locally on your computer or local server.
Data center	Cooling systems that immerse data center infrastructure into liquid that does not conduct electricity.
Equitable	To be just and fair, often in a way that accounts for existing disparities
Large Language Models (LLMs)	A language model AI trained with self-supervised machine learning on vast amounts of text.

Learn More

Read more: "A Shared Passion for Sustainability in Tech Generates 'Green AI'," University of Washington Bothell, Sept. 3, 2025

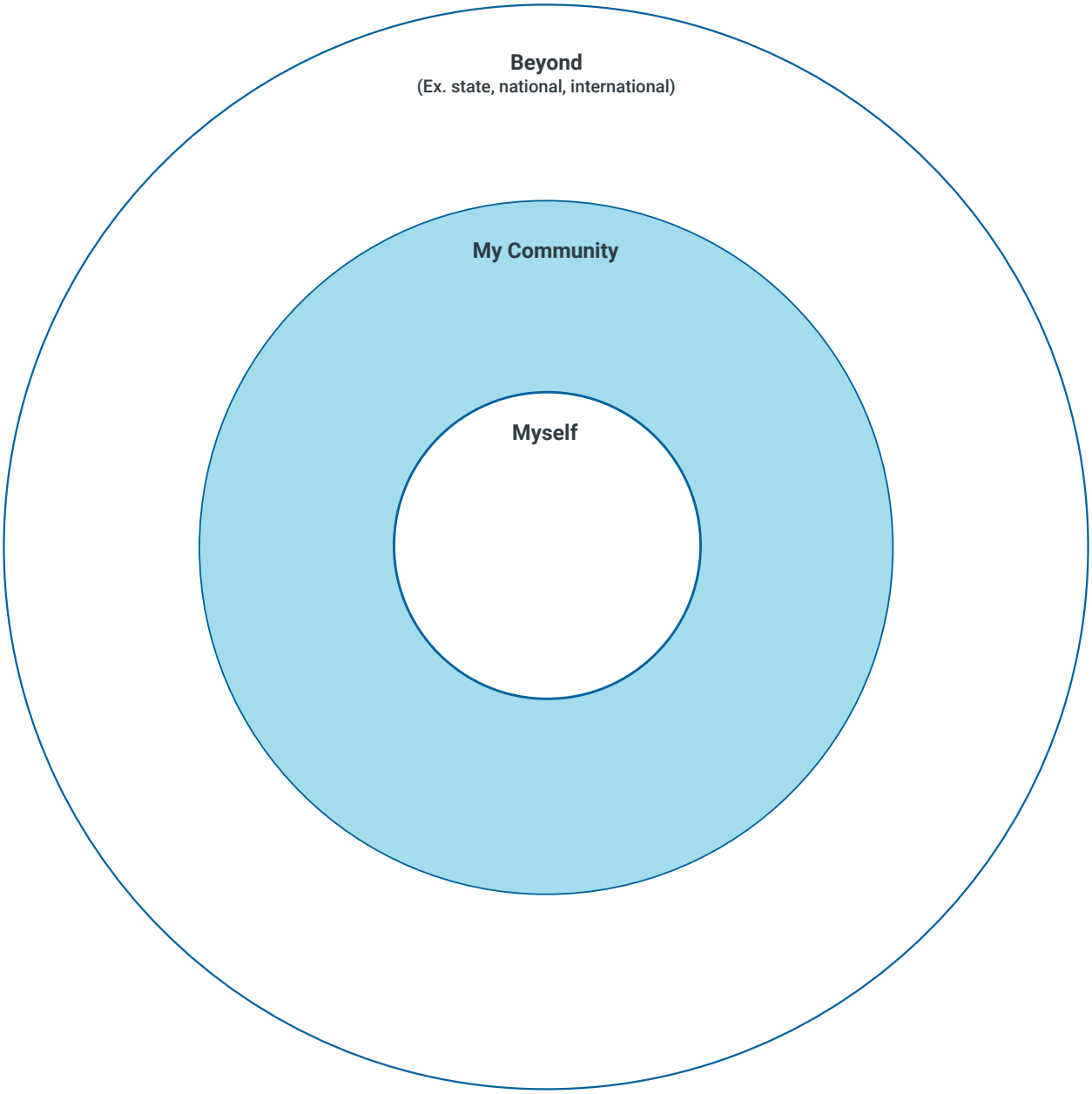
Try Their App: Green AI, DevPost (use the QR code on the last slide of their presentation to open the Green AI app)

Review the background information and take notes on what you learn:

How does this solution reduce impact on the environment?	
How does this solution fit into the larger system?	
What else stands out about this approach?	

Brainstorm and Create

Brainstorm some individual, community, and global solutions to the problems of AI sustainability.



Consider:

- **Individual**: *Are there things that you can do yourself to reduce AI's impact on the environment? How much impact will these interventions have on the system?*
- **Community**: *Are there ways that you could organize with your community to address AI sustainability? Some communities have pressured politicians not to allow data centers to be built in their area. Is this the most* ***equitable*** *solution? Why or why not?*
- **Global**: *Besides changes made internally by companies, are there ways to transform the design of all AI systems overall? How?*

Share Your Ideas

- What ideas have inspired you so far?
- Looking at the design of AI systems, what areas have the most potential for greater change towards sustainability?

Choose a few ideas to share with others.