# Sustainable AI Project Guide
## Focus 2: Tracking Data Center Energy Use

**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):**

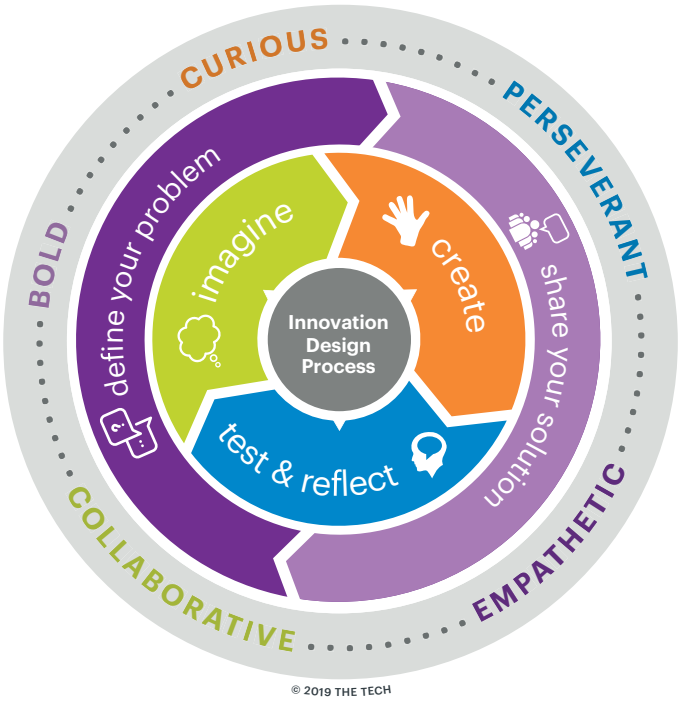
- Read the background information for your focus area.
- Take notes on the problem and the approaches others are taking.

**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 2: Tracking Data Center Energy Use

## 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.

**Tracking Data Center Energy Use**

Open source communities and researchers are developing tools for tracking AI model's sustainability and impact on the environment. Companies are competing to create AI systems and may not want to share their proprietary data, so it is helpful to have independent actors to track sustainability.

Hugging Face global community has developed a rating system for scoring both open source and corporate AI models for sustainability. The community maintains an AI Energy Score and leader board where AI models are given energy efficiency ratings, one to five stars, similar to efficiency ratings that you find on a new dishwasher or refrigerator. This is **crowdsourced** data, where anyone can submit results to contribute to the ratings system. It builds an international community working towards AI sustainability and helps people to feel that they can contribute to solving AI's sustainability problem.

## 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. |
| **Crowdsourcing** | Obtaining services, ideas, or content from a large group of people |
| **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 |

**Learn More**

**Video:** "What is Hugging Face? (in about a minute)," *Eye on Tech, (1:26)*

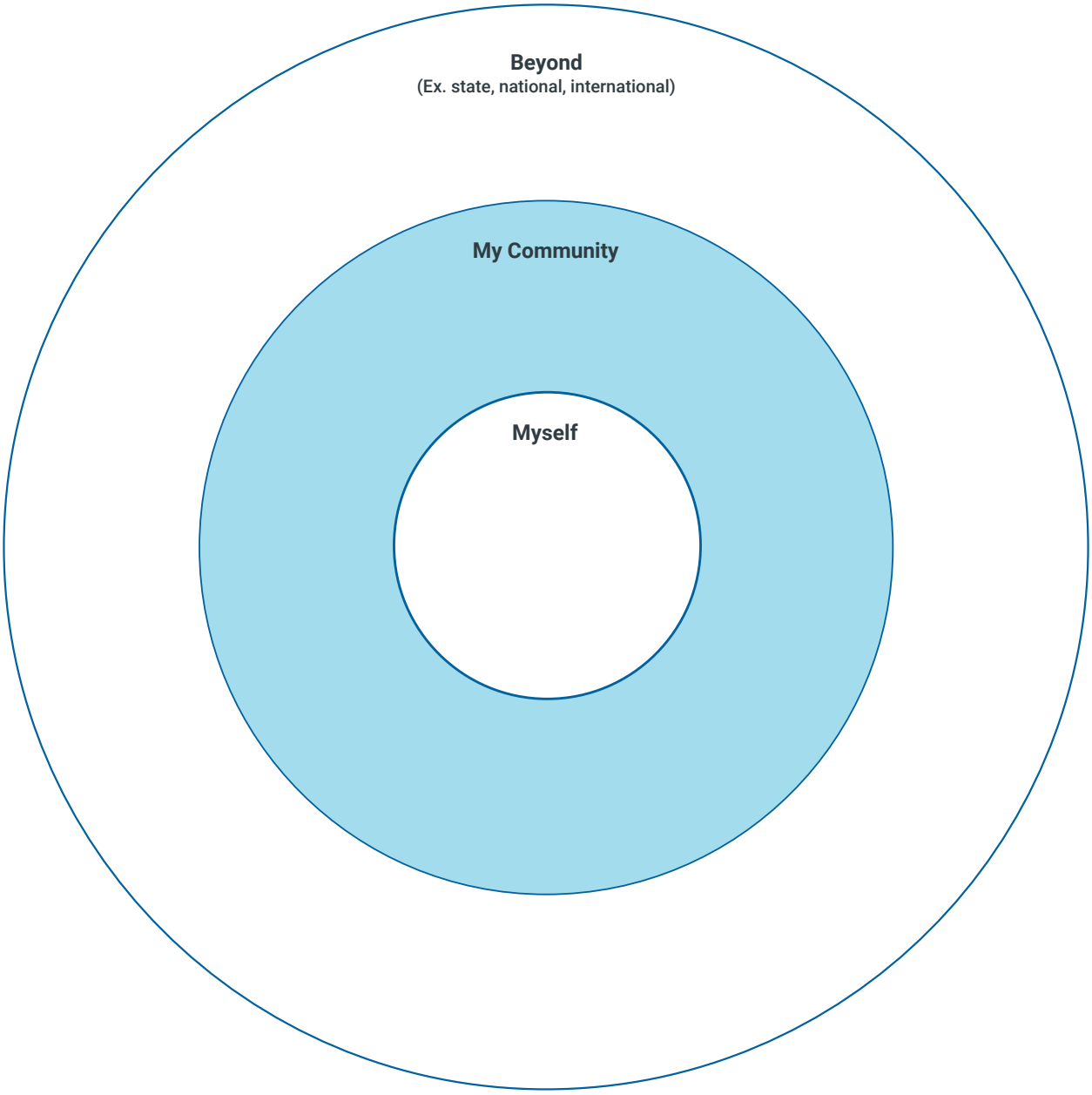
**See Who's Ahead:** AI Energy Score Leaderboard

## 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.