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BRAINSTORMING FOR BREAKTHROUGHS

Workshops, Frameworks, and Exercises to Spark Big Ideas

THE ONWARD HUB: INSPIRING CREATIVITY AND COLLABORATION FOR A NET-ZERO FUTURE

There is nothing more exciting than a great idea and nothing more intimidating than a blank piece of paper.

In the energy sector, complex challenges and the urgent need for sustainable solutions make collaborative problem-solving and energy innovation imperative.

An entrepreneur might come up with a revolutionary renewable energy solution but doesn't have the scientific understanding to understand feasibility or the environmental impact. A geoscientist might identify a new way to convert captured CO^2 into methanol to be used as a clean-burning fuel, but they may not fully grasp the market dynamics or regulatory challenges involved in turning their idea into a commercially viable solution. Neither may have the money to pursue their ideas, no matter how confident they are that they are onto something.

Onward is actively building a community of highly skilled geoscientists, data scientists, entrepreneurs, and investors that support our clients to accelerate the pace of energy innovation by adding new skills, expertise, and diverse thinking to their energy innovation projects.

The Onward hub provides access to tools, data, and inspiration to bring diverse minds together to solve real-world energy challenges. Of course, while diversity of thought is beautiful, and leads to creativity, it can also be difficult to pull diverse points together and create an environment where everyone can play to their skills.

This digital tool kit offers a series of resources and frameworks that will help members of the community work together more effectively and articulate their ideas in structured ways that other people can easily understand, support, challenge, and build upon.

How to use the suggested frameworks

Successful innovation is not just about creativity, it requires structured thinking too.

We have selected five proven frameworks that make collaborative innovation simpler, and more productive.

They have been specifically selected to help you:

- Stretch your thinking in multiple ways.
- Think critically about your ideas.
- Describe your idea in a way that makes it easy to get others involved in evolving it.
- Explore the commercial viability of your idea.
- Begin to tell your story in a way that investors, colleagues, and peers can understand quickly.

We encourage you to try all five approaches and find the tools that work for you, your learning style, and where you are in your innovation journey.

TOOL NO. 1

NURTURE YOUR IDEA THE RIGHT WAY: THE FOUR QUADRANTS OF INNOVATION

Innovation is about solving problems, and there's no one-size-fits-all way to do it.

Not all ideas are created equal, and it's important that you recognize early in your journey where your idea sits within an innovation hierarchy, and you know the right people to collaborate with and seek investment from.

A good place to start is stress testing where your idea fits is by asking yourself two questions:

- How well defined is the problem I'm trying to solve? E.g., commercial geothermal energy.
- And how well defined is the domain you are working in? E.g. high temperature drilling equipment.

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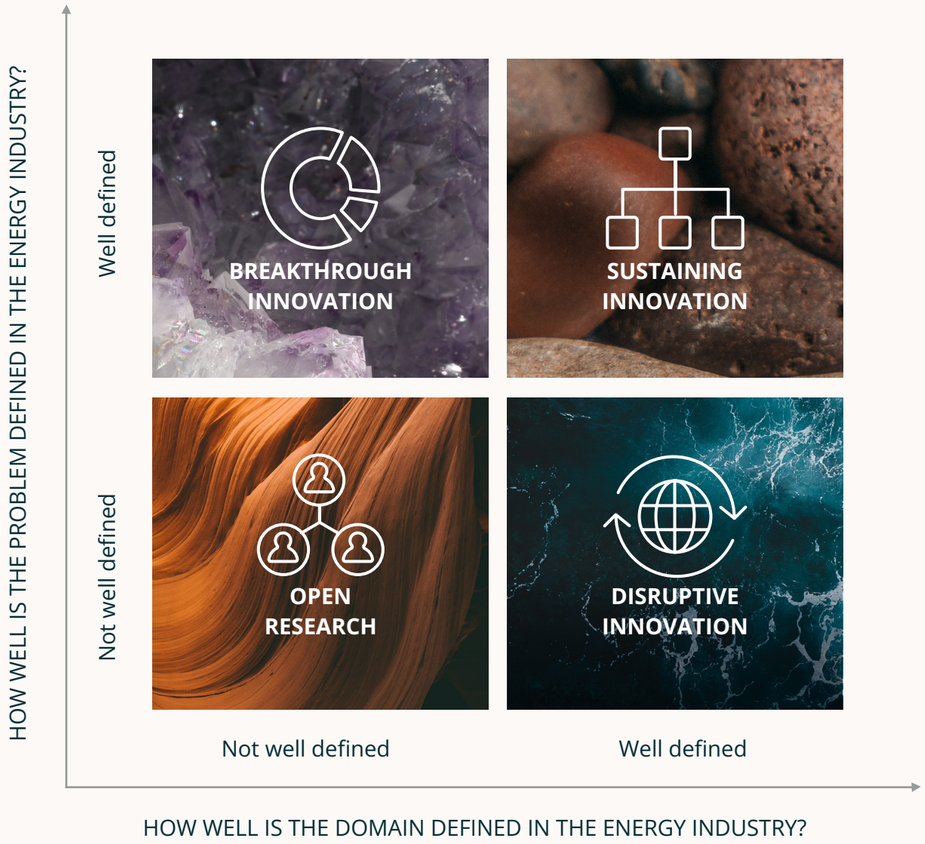
Classifying your idea or innovation in one of these categories will help you focus on who you need to talk to, determine how you need to refine your idea, and identify where your true market opportunity lies.

Greg Stell, writing in Harvard Business Review, suggested that any idea you create will fall under one of four types of innovation.



Source: https://hbr.org/2017/06/the-4-types-of-innovation-and-the-problems-they-solve

HOW DOES YOUR IDEA FIT?

BREAKTHROUGH INNOVATION

This is for the toughest challenges, where the energy industry needs a wild card idea to solve a well-defined problem (e.g., how to reduce the energy required for the gas-to-liquid transformation for hydrogen to allow commercially viable storage and transportation).

SUSTAINING INNOVATION

This is about fine-tuning what the energy industry is already good at. Your innovation is solving a known problem in a new way. Think of an oil company using generative AI to proficiently process vast quantities of data (e.g., seismic surveys or historical drilling records to optimize and accelerate extraction strategies).

OPEN RESEARCH

If your ideas are sparked by academic research or open exploration of an idea, you're still part of the commercial innovation process. Sometimes the smallest of discoveries can be the missing piece in a bigger problem, and interesting breakthroughs often come from bringing different disciplines into the energy innovation process.

DISRUPTIVE INNOVATION

Here's where things get interesting. You've got the skills, but the problem is a bit fuzzy. This is where big shifts happen, like a much-anticipated breakthrough in how to capitalize on the theoretical potential of nuclear fusion as a future energy source.

HINTS AND TIPS

BREAKTHROUGH INNOVATION

- Focus on evidence, data, and the rigor behind your idea.
- Be prepared to convince people that your breakthrough works.
- Identify the pivotal point, perspective, or thought that sparked your “Aha!” moment.

SUSTAINING INNOVATION

- Emphasize how you are tackling a known challenge differently, more efficiently, and more cost-effectively.
- Focus on why your unique approach will scale.
- Approach established energy businesses that rely on the process or technology you are improving, and explain how they will see clear, scalable return on investment.

OPEN RESEARCH

- Think how your area of interest could tangentially impact energy transition.
- Join the Onward Community, explore what other people are working on, and contribute what you’ve learned.

DISRUPTIVE INNOVATION

- Get ready to approach VCs for support to scale and take your innovation to market.
- Protect your intellectual property immediately!

TOOL NO. 2

BUILD YOUR IDEA WITH BETTER BRAINSTORMING

Onward believes that the future of energy innovation must be creative and collaborative.

The Onward community is all about facilitating productive interactions between people from different backgrounds, skill sets, and perspectives. But that has its own challenges — getting people from different backgrounds to coalesce around an idea and brainstorm effectively requires preparation, stimulus, and rules.

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A three-phase agenda for effective brainstorms

PHASE 1: SET UP

FRAME THE QUESTION

1. Ground the collaboration in a specific question. What are you trying to achieve/learn/enhance/challenge?
2. Share inspirations and insights from research you have done.
3. Embrace a curious mindset.

PHASE 2: FACILITATION

SET A CREATIVE TONE

1. Start with a creative exercise to get everyone in the room out of the day-to-day and into a creative pattern.
2. Start with heads-down, individual brainstorming to ensure everyone can contribute.
3. Share as a group and build on concepts — use different techniques to push thinking (see examples).

PHASE 3: FOLLOW UP

STRUCTURE OUTCOMES

1. Group the ideas into buckets or themes.
2. Prioritize the outcomes and ideas generated.
3. Define next steps and actions and record them.
4. Thank everyone for their input.

LET'S START WITH THE RULES

SET CLEAR OBJECTIVES

Begin with a clear understanding of what you want to achieve. Define the problem or topic of the brainstorm in simple terms and make sure everyone understands the session's goals. This will help you to stay on track.

FOSTER AN OPEN AND INCLUSIVE ENVIRONMENT

Encourage an atmosphere where all participants feel comfortable sharing ideas, however unconventional they may seem. Discourage criticism or judgment of ideas during the brainstorming phase. This openness fosters a more diverse and creative set of ideas.

ENCOURAGE LEFT FIELD IDEAS

The best brainstorms come from thinking outside the box. Encourage participants to suggest bold, even outlandish, ideas. The goal is to spur creativity, not immediately find a practical solution.

BUILD ON OTHERS' IDEAS

Use "Yes, and ..." to start critical analysis to promote an environment where participants build on or combine each other's ideas fairly. This collaborative approach can lead to more refined and comprehensive solutions.

KEEP IT TIME-BOUND

Set a strict time limit for the session. This creates a sense of urgency that can stimulate quicker, more focused thinking and prevents the discussion from losing momentum.

SET A CLEAR, TIMED AGENDA

Use the three-phase agenda on page 6. Make sure you allocate equal time to each of the phases and don't compromise on making time for phase 3 — the resulting action plan is the most important part of the process.

RECORD THE OUTCOMES AND FOLLOW UP

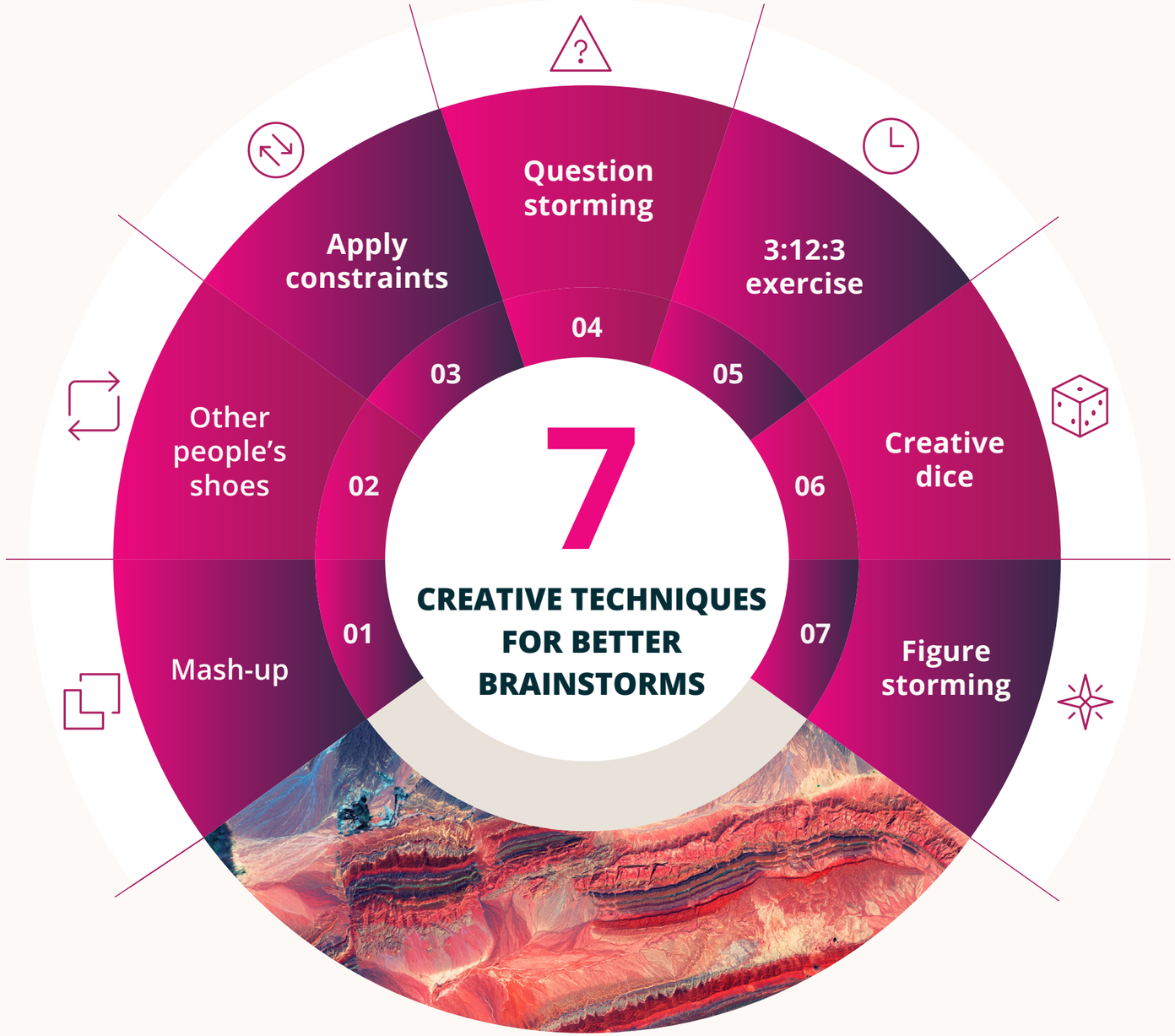
It's easy to feel the work is done when the brainstorming ends, but the real value is what you do because of the session.

TOOL NO. 3

CHALLENGER EXERCISES TO INSPIRE CREATIVITY IN BRAINSTORMS

Providing structured techniques to move your brainstorm along will challenge your thinking, provide focus, add energy, and make work more fun.

When you and your collaborators are relaxed, focused, and working together to accomplish specific tasks within a set time, productivity and creativity increase.



Here are seven creative techniques to build into your brainstorm agenda. Each delivers different things, so find the one best suited to your idea, the people you're working with, and the challenges you're facing.

BRAINSTORMING TECHNIQUES

MASH-UP

Bring odd or unexpected things together to spark fresh ideas. For example, how could you improve a handheld car vacuum? Brainstorm the ideas, now add a bottle of water. Using the bottle of water as a stimulus, what else could you do to innovate the vacuum?

When to use:

- You're focused on incremental improvements to an existing idea/design.
- You've reached a lull in creativity/idea generation.
- You want to expand your ideas through adjacent thinking and apply that to your idea/design.

OTHER PEOPLE'S SHOES

Role play or draw a storyboard of your challenge from the perspective of a specific persona (e.g., geoscientist, sustainability advocate).

When to use:

- Your idea is highly technical, and you want to explain it to people who may not be.
- You want to stress test the real-life applicability of your idea to potential customers.
- You're struggling to bring your idea to life and tell a story.

APPLY CONSTRAINTS

Try putting different limitations on your brainstorming prompt to push your thinking. For example, what would we take out if we wanted to cut the cost of production in half? What would we do if there was new legislation prohibiting the use of a specific part of your design?

When to use:

- You need to find a way to simplify your idea.
- You've lost sight of your idea's core value or uniqueness (overdesigning).
- You're moving into what-if territory, when your goal is to solve a specific problem.

QUESTION STORMING

Question storming invites participants to push thinking by brainstorming questions, rather than solutions. That is, dissect your problem statements with questions as a starting point for a deeper brainstorm: Why is this a problem? What's behind this problem?

When to use:

- Your collaborators aren't subject matter experts and can ask questions but do not necessarily provide solutions.
- You need to get deeper on a problem statement or design feature.

BRAINSTORMING TECHNIQUES

3:12:3 EXERCISE

Add time pressure to drive creativity: Allow 3 minutes for observations, 12 for combining observations into rough concepts, and 3 for presenting concepts. Rinse and repeat.

When to use:

- You and your team tend to go down idea rabbit holes rather than sticking to your goals.
- You need everyone to participate and need structure to make sure that happens.
- Your collaboration is feeling low in energy, and you need to enliven the process.

CREATIVE DICE

Conduct timed, 3-minute bursts and work on six specific issues. For example, if you're thinking about software, you might choose: 1 = specification, 2 = investigation, 3 = ideation, 4 = incubation, 5 = iteration, and 6 = integration based on a roll of a die. By approaching your brainstorming goals from rapidly changing perspectives, you'll force the team to focus on getting to solutions more quickly.

When to use:

- Your collaborators have differing strengths, and you want to ensure everyone contributes where they are best suited.
- You and your team tend to focus too much on one of the activities and not enough on the others (e.g., you get hung up on specification and don't get to integrate everyone's ideas into solutions).

FIGURE STORMING

The group picks a well-known figure and discusses how that person would approach the problem or think about this idea. For example, how would Richard Branson of the Virgin Group approach this? What would Jamie Dimon, CEO of Chase, say about our idea, and how would he approach our problem? What would we have to do to convince Sting to be a spokesperson for our energy innovation?

When to use:

- You need to reengage everyone's creative side and add a lighter perspective in a deeper technical or process-related discussion.
- You want to add a higher layer of critical assessment through the lens of people you respect and admire in your industry or beyond.

TOOL NO. 4

GET STRUCTURED WITH THE SCAMPER TOOL

The SCAMPER tool is another example of how to structure collaboration and co-creation to evolve your climate tech solution or energy innovation.

SCAMPER is an acronym for a useful list of words that can also be applied to make your team think differently about a problem.

SCAMPER Tips and Tricks:

- Follow the process in the given order because each step builds on the previous one.
- If you are meeting in person, print the questions out on large-format pieces of paper and have them around the room.
- Record everyone's ideas on completing the sentence, not just the final ones that you settle on.
- Repeat the question format as you are generating ideas to keep yourself on track.

S	C	A	M	P	E	R
Substitute	**Combine**	**Adapt**	**Magnify or Modify**	**Put to other uses**	**Eliminate**	**Rearrange**

S — Substitute

What could you substitute as a solution to the problem? Is there another place, approach, or material could you use?

Q: Instead of _____, we can _____

C — Combine

What could you combine or bring together as a solution? This could be partners, ideas, assets, etc.

Q: We can bring together _____ and _____

A — Adapt

What could you adapt for use as a solution?

Q: We can adapt _____ in this way _____ to _____

M — Magnify or Modify

What could you change? What could you add or remove? What could you make stronger or weaker? Higher or shorter? Duplicate or omit?

Q: We can change _____ in this way _____ to _____

P — Put to other uses

How could you use something in a new way or modify it?

Q: We can reuse _____ in this way _____ by _____

E — Eliminate

What could you remove? What are you wasting? Can you reduce time spent or cut costs?

Q: We can eliminate _____ by _____

R — Rearrange

What could be rearranged? Could you use a different pattern, workflow, or schedule?

Q: We can rearrange _____ like this _____ to _____

TOOL NO. 5

FROM IDEA TO OFFERING USING LEAN CANVAS

A good way to describe the Lean Canvas model is the Swiss Army knife for innovation.

It's a super handy tool adapted from Ash Maurya's Business Model Canvas, and it's all about getting to the heart of business challenges quickly and efficiently. Let's break down why it's a useful tool for energy innovators.

Straight to the Point Problem-Solving: Lean Canvas zeroes you in on specific problems and who you're solving them for. If you're dealing with a complex challenge — whether it's figuring out more efficient drilling techniques for oil and gas or contemplating an exponential innovation around hydrogen compression — Lean Canvas helps you to determine exactly how your idea will make a difference.

Making Your Value Proposition Crystal Clear: To make an impact in the energy industry, which is dominated by large, mature businesses, your innovation needs to stand out. Lean Canvas helps you spell out why your idea rocks and how it's better than what's already out there. This clarity is crucial when you're chatting with potential investors or convincing someone like Shell or ExxonMobil to give your idea a shot.

Keeping It Lean and Mean: Climate tech lives in a world filled with industry giants and complex operations, but Lean Canvas keeps you focused on the essentials. It's all about cutting through the noise and not getting lost in too much detail — something that's extremely important when you're trying to innovate in the energy sector.

Tracking What Matters: Lean Canvas helps you pinpoint the metrics that really count. In an industry where efficiency, safety, and environmental impact are top priorities, this means you can make sure your innovation is hitting the right marks. Think of it like having a dashboard that keeps you on track, whether you're optimizing oil drilling operations or radically enhancing the efficiency of enterprise-scale solar energy.

Ready to Pivot: Lastly, the energy industry doesn't stand still. Lean Canvas remains flexible and lets you tweak your plan as things change, like when new regulations are in force or other new alternative energy innovations disrupt your market.

In short, Lean Canvas is your go-to starting point — a way that makes sure you're focused, clear, and adaptable. It's like having a roadmap that guides you and your invited collaborators through the industry's twists and turns, so your big idea doesn't just sound cool but does the job in the real world too.

HOW TO BUILD A LEAN CANVAS

PROBLEM

What is the energy industry problem you are trying to solve? What is the engineering, data, economic, or environmental pain point your idea will address? How prevalent or significant is this problem? **Outline the top 3 problems you intend to solve.**

What are the existing alternatives to the problems you are tackling — of course, there might not be any? Research other technologies that might exist already and understand how your idea will either complement, enhance, or overtake the current solutions. **Outline your competition here.**

YOUR SOLUTION

How does your proposed solution ease existing energy industry pain points? Is it a radically new way of solving the problem or is it about approaching the industry pain point more efficiently or economically? **Summarize your solution succinctly in this section.**

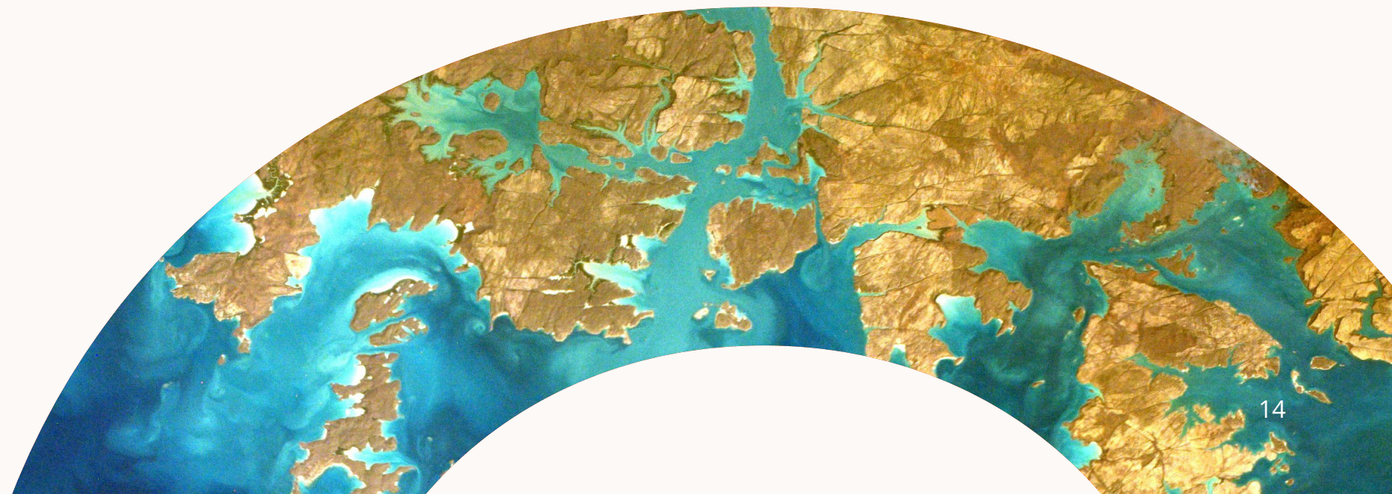
UNIQUE VALUE PROPOSITION

What specifically about your idea is different from existing solutions or services? Will you differentiate on service, price, innovation, or in some other way? **Write down why your idea is unique and why potential customers will get value from it.**

High-Level Concept subsections convey the value proposition in the most succinct manner possible. Create an X for Y analogy. E.g., YouTube = Flickr for videos, Uber = taxis for the digital generation.

UNFAIR ADVANTAGE

What's your secret sauce? What do you have that will ensure that your product or service cannot be copied? Maybe it's a new technology, or maybe you have a new scientific process that no one has commercialized before. **Articulate the ONE thing that really sets you apart. Think of IP, things you can protect, something only you can do.**



HOW TO BUILD A LEAN CANVAS

CUSTOMER SEGMENTS

Breaking into the energy sector is difficult. It's mature and dominated by large players with their own, well-funded innovation teams. You must have a very clear idea of who your customers will be and what their innovation priorities are. Highlight size, sector, industry, and the individuals within the businesses that you need to get interested in your idea. **Research and describe the types of business and the type of decision-makers that you need to sell to.**

KEY METRICS

How will you define success for your idea/startup? This might involve growth and adoption measures such as revenue or target market share. For an engineering business innovating a new extraction or energy storage device, it may be efficiency, carbon reduction, or reduction in cost for customers. **Describe the measures that will show that your idea is successful in the market. Set goals and targets if you're ready (e.g., I want to have a 20% market share by 2035).**

CHANNELS

How do you plan to reach your customers? Which channels will you use to connect with your target market? Do you need to be at trade shows? How will you use your network? **Describe how you plan to get to market.**

COST STRUCTURE

No matter what stage you're at with your idea, it's never too early to start thinking about how you'll get your idea into the market. Consider operational costs, both variable and fixed, and forecast how much money you'll need to give your idea a change to succeed. This will be an indication of the level of investment that your idea will need. While the numbers only need to be indicative, make sure you do some initial research into manufacturing and distribution costs to give some weight to the numbers. **Build an initial estimate of the investment you might need to make your idea successful.**

REVENUE STREAMS

How will you make money? If you are developing SaaS technology, how will your subscription model work? If you're selling and installing engineering equipment, how will your customers pay? You don't have to know all the answers — the important thing is to ask yourself if you've described something that is commercially viable. **Define how you will make money and, based on the now complete Lean Canvas information, estimate how much you think you'll be able to make in year one, two, and five. This won't be perfect, but it will be a good start. Use our template to get started.**

The Lean Canvas

Designed for:

Designed by:

Date:

Version:

Problem

Top 3 problems

Solution

Top 3 features

Unique Value Prop.

Single, clear, and compelling message that states why you are different and worth buying

Unfair Advantage

Can't be easily copied or bought

Customer Segments

Target customers

Existing Alternatives

List how these problems are solved today

Key Metrics

Key activities you measure

High-Level Concept

List your X for Y analogy (e.g., YouTube = Flickr for videos)

Channels

Path to customers

Early Adopters

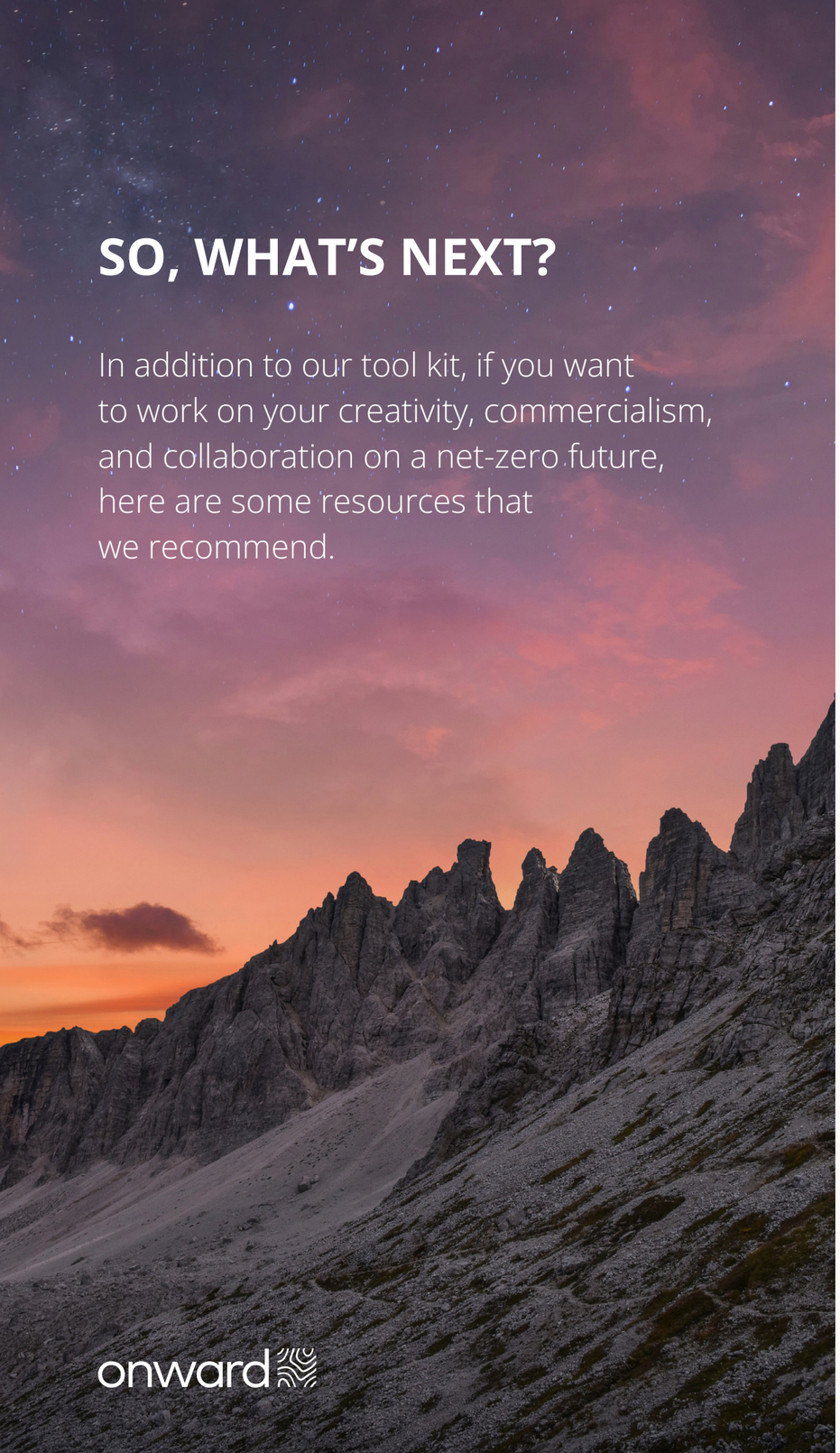
List the characteristics of your ideal customers

Cost Structure

List your fixed and variable costs
Customer aquisition costs
Distribution costs
Hosting
People
Etc.

Revenue Streams

List your sources of revenue
Revenue Model
Lifetime Value
Revenue
Gross Margin



Technology for Brainstorming

- Zapier: Lists several brainstorming tools including Coggle, Miro, Lucidchart, and AI apps like ChatGPT
- People Managing People: recommend their top 10 tools for brainstorming
- TechRepublic: Discusses budget-friendly brainstorming tools such as Bubbl.us, Coggle, MindMeister, WiseMapping, and Scapple

Books for Creative Thinking:

- Tom Kelley and David Kelley, **"***Creative Confidence: Unleashing the Creative Potential Within Us All.***"**
- Michael Michalko, **"***Thinkertoys: A Handbook of Creative-Thinking Techniques.***"**
- Tom Kelley, **"***The Art of Innovation.***"**

Books on Innovation Thinking for Climate Tech:

- Clayton M. Christensen, **"***The Innovator's Dilemma.***"**
- Naomi Klein, **"***This Changes Everything: Capitalism vs. The Climate.***"**
- David J.C. MacKay, **"***Sustainable Energy — Without the Hot Air.***"**

Books on Climate Tech Business Startups

- Eric Ries, **"***The Lean Startup.***"** While not specifically about climate tech, it's a foundational book on startup methodologies.
- Ron Pernick and Clint Wilder, **"***Clean Tech Nation.***"**
- Ron Pernick and Clint Wilder, **"***The Clean Tech Revolution.***"**

Some background reading on the examples we have shared

The future of fusion in energy production:

- Santina Russo, *"Explained: a milestone in nuclear fusion energy production."*
- Philip Ball, *"What Is the Future of Fusion Energy?"*

How to reduce the energy required for the gas to liquid transformation for hydrogen:

- Hydrogen liquefaction and storage: Recent progress and perspectives, ScienceDirect
- Strategies to Improve the Performance of Hydrogen Storage Systems by Liquefaction Methods: A Comprehensive Review, ACS Omega

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Are you ready to get involved?

Get creative. Get collaborative.
Join our platform for change now.

If you have a fledgling idea, a skill, or a passion that you want to share with the Onward Community, JOIN US TODAY!

Join Onward

If you're an innovator ready to take your idea to market, learn more about our annual accelerator cohort.

Learn more

If you're a geoscientist or data scientist, we have projects and challenges ready for you.

View projects

View current challenges