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THE NEED FOR CLIMATE INNOVATORS

The Need for Climate Innovators

It takes more than a single stroke of genius from a single person to create inventions like the telescope, clock, and the microscope that leave an indelible mark on human history. The same concept applies to the climate crisis: it will take all of us—engineers, teachers, politicians, artists, and more—to get to net zero.

0:09

Narrator speaking; clip of a inventor from an old movie experimenting; image of lightning with sound of thunder/lightning playing; clip of a man experimenting with a bike; evil laughter audio

Series of images of world-changing inventions

Two of the same photos of Albert Einstein appear on either side of narrator; photo of two kids wearing inventions on their heads; photos of famous inventors; clip of students using virtual reality

1:04

Clips of machinery building technologies

Clips of people of various professions collaborating

Text box with narrator's name

1:50

Transition music; Text reads: What is Climate Innovation? Photo of a battery-powered car charging

Photos of environment-friendly innovations; graphic depicting carbon emissions

Great inventors are Mythic figures, right? In our mind's eye, we imagine the self-made genius, working feverishly in flickering light with nothing but their own inspiration to guide them. Then lightning strikes from the heavens... and these inspired innovators conjure up their inventions...

That's how earth-shaking innovations like the telescope, the clock, and the microscope, came into being, right?

Nope! In reality, inventions aren't strokes of genius from a single inventor. They involve a lot of trial and error and are built on contributions from others who came before. And for new inventions to get to us (the public) other people need to figure out how to produce them in large numbers, make sure they're safe, tell the public about them, and distribute them to the people who need them.

Innovation isn't about solitary geniuses changing the world, it has always been a team effort.

How does this relate to climate change? For us to get to net zero, we're going to need teams of people with different sets of skills, educational backgrounds, and careers. We will need scientists and engineers, and they will need partners in public policy, law, and education, as we seek to make climate innovations more useful, fair, safe, and effective for everyone.

Hi, I'm Nikki Nejadrasool, and in this video, I'll explain why we need climate innovation to get to net zero, and why the climate innovators we need are a diverse group that will include scientists and non-scientists alike.

If we're going to get to net zero, we need new innovations, and we also need to improve the technologies we already have. Our solutions should be bigger, cheaper, and more efficient, and they'll need public support.

Solar energy, mass transit, and electric vehicles— these are some of the many areas where we already have innovations that work. But there are lots of areas where we just don't have solutions for the technologies and activities that are emitting 51 billion tons of carbon into Earth's atmosphere each year.

Graphic depicting solutions to carbon emissions

2:42

Photos of students, politicians, and marketers; text box listing the people needed to enact change

Text box: Salt Lake City, Utah

3:21

Transition music; Header: Climate Innovators: Increasing Urban Density; map of US that zooms in on Utah

Photo of Salt Lake City

Clip of a densely populated city skyline; photo of a suburb

4:14

Photo of a suburb

Text box: Urban sprawl...

Graphics of a city skyline and a suburb

Photo of a city planner; Image of a Salt Lake City climate action plan sign; Text box: It's goal...

For example, we need scientists and engineers to dream up ways to produce cement and steel without emitting carbon. We need others to invent more efficient technologies to heat our buildings and grow our crops.

But the solution doesn't stop with the innovators. Once we get new innovations, we'll need people in legislatures and universities to develop new public policies to help people afford the innovations we already have, we'll need grassroots and community organizations to advocate for them, and we'll need experts in marketing and advertising to persuade governments, organizations, and the public to adopt them.

This all sounds very abstract, so let's get more concrete. Let's look at two different examples of climate solutions and the diverse teams of specialists will need to implement them. The first example is a real place: Salt Lake City, Utah.

Did you know that Utah is one of the fastest growing states in the United States? Its population is rising twice as fast as the national average.

Much of that growth is concentrated in Salt Lake City County, home to Utah's largest city. The growth is fueled by the city's proximity to stunning natural attractions and a strong local economy.

That's great... but it's not all great. Population growth in the United States is often accompanied by urban sprawl—that's what happens when rapid population growth pushes a city's expansion outward and suburbs consume farmland, forests, and other undeveloped land.

From 2002 to 2010, the growth of Salt Lake City's urban sprawl was the second fastest such expansion in the country.

Expanding suburbs means new housing developments, and these developments usually consist of single-family dwellings with larger lot sizes than houses closer to the city core.

In a sprawling city, people take up more space and we become more reliant on cars. That means higher emissions and the problems don't end there: sprawling cities also require more concrete and steel to build infrastructure and more energy to heat and cool all the new buildings.

To reduce its greenhouse gas emissions even as its population grows, Salt Lake City will need to build up, not just out.

Now imagine you work for Salt Lake City. Like many urban areas, the city has a climate action plan. Its goal is to reduce its greenhouse gas emissions by 80 percent by the year 2040. Meeting the needs of a growing population by increasing urban density, rather than sprawl, will be one part of a larger effort to meet this goal. Who will help create a denser Salt Lake City?

5:14

Clips of people in different professions fills the screen; Textbox: List of necessary professions

Well, it'll be a community-wide collaborative effort, that's for sure. But specifically, the city will need people in government to convince the public of the need, people who can write speeches and press releases and graphic artists to design the materials the public will see, even musicians, writers, and videographers, for ad campaigns. They'll need architects to design taller, more energy efficient buildings and retrofit existing buildings. They'll need engineers and people in construction to build and renovate those buildings.

Ideally, the city will also need innovators in geo or material science to develop a new, low-carbon cement. Salt Lake City will need urban planners to help it become more walkable, bikeable, and connected to mass transit.

6:07

Graphic of a city skyline; transition music; header: Batteries

Images of batteries; textbox: batteries

They'll even need lawyers to make sure it's all legal. Building Salt Lake City up and not just out will be a total team effort.

Wow! I need to recharge before the next example— it has both a positive and a negative side. But if done right, it'll be just the jolt we need to address climate change. That's right, it's time to talk about batteries. But be warned— these things don't come free of charge!

Chart depicting population growth; textbox: 9 billion; graph of CO2 emissions by power source

Salt Lake City isn't the only city whose population is growing. Today the world has 8 billion people, but by 2050, that number is projected to be 9 billion. For 9 billion people to plug into power, we ought to accelerate the development of clean, renewable electricity options, like wind and solar. And we'll need ways to reliably store all that carbon-free power.

6:59

Clip of a lithium ion battery being assembled; textbox: Lithium ion batteries; clip of battery power

To do that, we're going to need more powerful, longer-lasting, faster charging batteries than we have today. We may even need to invent a grid scale battery that could power an entire city. That's not possible—yet.

Currently, lithium ion batteries—the ones that power our laptops, phones, and electric vehicles— are the best battery technology available. But they can't power an entire city's electricity grid. Still, they're critical. And frankly, it's really hard to improve on them in terms of energy efficiency.

Photo of people mining for metals

But there's a trade-off: Lithium-ion batteries contain metals such as nickel and cobalt that are toxic and can contaminate water supplies and ecosystems.

7:43

Photo of a man mining for metals

Plus, mining precious metals is carbon intensive. The machinery used to dig up and process lithium emits a lot of greenhouse gases.

How do we create more and better batteries without increasing the demand for mining lithium? That's a puzzle wrapped up in a riddle, and it requires a collaborative team of climate innovators to solve.

Textbox: What do we need...

Let's say a government or tech company wanted to fund this effort, who could make the effort successful? And what academic backgrounds and professional experience would they need?

Photos of engineers, architects, and mechanical engineers

8:25

Photo of a city hall

Photos of a volunteer sign up sheet and a hand drawing illustrations

8:56

Graphic of a diverse population of people; transition music; header: Who's on your...

Outro music; OER logo

Electrical engineers would develop batteries that store more energy more efficiently, mechanical engineers and architects would invent non-lithium batteries and zero carbon manufacturing processes to make them.

If it's not profitable for tech companies to achieve this on their own, we need policy makers to create financial incentives for them. The ultimate net zero solution is to build these batteries with recycled materials so on a smaller scale people could be encouraged to recycle their smartphones, computers, and tablets, so the lithium batteries in them can be recovered and repurposed.

That might require a grassroots campaign that would include community organizations, artists, and others.

And we'll need even more people to make this effort successful—many more. Can you think of some I missed?

Building up and making better batteries aren't the only solutions for which we'll need a new generation of climate innovators. As you're learning, there are many different solutions to get to zero.

Each solution must be supported by a diverse group of people with specialties and experiences in many fields.

Sure, we could use a few brilliant geniuses in lab coats, but we'll need a lot more scientists, engineers, politicians, activists, educators, lawyers, media creators and other climate innovators if we're going to get from 51 billion to zero.



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