

BUILDING CLIMATE CAREER PATHWAYS

IN K-12 SCHOOLS AND DISTRICTS



MakeKnowledge

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MAKEKNOWLEDGE

“THE CLIMATE CRISIS IS THE SINGULAR STORY OF OUR TIME; IT’S THE BIGGEST BUSINESS STORY IN THE WORLD, AND AN OPPORTUNITY TO BUILD A COMPLETELY NEW ECONOMY. THIS IS THE INDUSTRIAL REVOLUTION AND THE INTERNET AGE ALL IN ONE; WE HAVE THE CHANCE TO REINVENT EVERYTHING NOW.”

- MOLLY WOOD, JOURNALIST AND INVESTOR, 2023

START HERE

If you are interested in helping your school or district create inclusive pathways to the new green economy, you have come to the right place.

There's no wrong place to start. We know that many districts and schools have strong career technical education (CTE) programs, and may be curious about launching and improving pathways leading to green careers. Other schools and districts may be starting from strengths in environmental and sustainable education, but maybe they have not formalized any green career pathways. That's a good starting place too.

Likewise, there's no wrong way to read this guide. Read it front to back, or skip around. At the end of the document, there's a link to submit feedback and questions, so we can continue to make this more helpful to more people.

DEFINITIONS

WHAT ARE CLIMATE (OR GREEN) CAREER PATHWAYS?

The simple answer is that climate and green career pathways are all of the scaffolding (courses, skills, mindsets, experiences, and relationships) that schools can provide to guide students to careers that help society with all of the urgent and creative work needed in mitigation, adaptation, and societal transformation. The climate crisis creates urgency for us to bring our creativity to these overlapping issues. Along with urgency, there is great hope, too: a new green economy is a moment of giant opportunity for our students.

WHAT'S A GREEN JOB? WHY SO MANY DEFINITIONS?

If you poke around, you'll quickly discover that there are many different ways to talk about green jobs. Even the names can differ: green jobs, sustainable careers, blue jobs (generally, green jobs that are ocean or water related), climate jobs, and so on. Many people default to a few basic ways of describing green jobs. From our point of view, it is not about picking the "right" definition. Each definition has its place, and can be useful in different parts of your work.

GREEN JOBS ACCORDING TO O*NET AND THE CENTERS FOR EXCELLENCE

California's regional [Centers of Excellence for Labor Market Research](#) help track regional labor market information, and anticipate future demand in each career sector. The Centers for Excellence use the definitions developed by O*NET, a federal resource. O*NET sees the greening of jobs as both contributing to the green economy (protecting and enhancing the environment) and using green technologies. It recognizes a number of [green sectors](#) (from agriculture to renewable energy production). And it calls our attention to the fact that the greening of jobs will look different across different parts of the economy. Some existing jobs will see increased demand. Some jobs will require new skills as their industries become more green. And some occupations will be entirely new.

When should I use the O*NET definitions?

When you are building a case for a new career pathway in your school, you will need to show that there is current and future demand for that pathway in your region. To apply for [Career Technical Education Incentive Grants](#) (CTEIG), [K-12 Strong Workforce Program](#) funds, and other state and federal funds, you have to show that your students will be launched into high-demand, high-skill opportunities appropriate to your region. It is vital to show that you understand the anticipated demand for the kind of program you are dreaming about.

“EVERY JOB IS A GREEN JOB/ CLIMATE JOB”

You may hear that every job is (or should be) a green job, or a climate job. This has been popularized by organizations like [Project Drawdown](#), which has a wonderful guide to help employees understand how to see their own jobs can help contribute to taking climate action. Of course, this definition isn't literally saying that all existing jobs are already green or can become climate-friendly. Manufacturing cigarettes, extracting fossil fuels, and fishing in wasteful ways are examples of jobs that cannot be green or climate-friendly.

When should I use this definition?

The [Project Drawdown definition](#) (and the accompanying guide) shows people across a variety of roles how to use their positions to take positive climate action. This could be very helpful in career counseling context, for students who are growing in interest but may have not figured out which career path to choose. It can also be powerful work for district and school staff, to show that all adults in school/district community can be part of building a healthier community and planet, and part of creating more onramps to opportunity for our students.

MITIGATION & ADAPTATION & SOCIETAL TRANSFORMATION (MAST FRAMEWORK)

If we want to address the urgency and opportunity of the global climate crisis, we will need to use three broad strategies, each one of which has implications for jobs. The first strategy is a rapid mitigation of our carbon emissions. This includes moving away from fossil fuels, electrification of most industry sectors, and mitigating emissions from other sources.

Mitigation of carbon emissions may get the most press, but it is now generally accepted that mitigation alone won't solve the climate problems that have already come: increasingly unpredictable weather, a vast increase in the number of high head days in our cities, the health impacts of air pollution in and around our schools and homes, flooding, and so on. There is an urgent need to adapt our cities, communities, and lifestyles to deal with the present and expected effects. Jobs involved in adaptation including improving energy efficiency in the built environment, and creating protection for our cities and communities from sea level rise. Finally, we also need broad societal transformation in the way we do things, so that our lifestyles and economies are not dependent on extraction, but can be regenerative, sustainable, and in balance with the living world around us. Jobs that fall under the societal transformation banner include education, regenerative design, and developing new, more sustainable economic models.

When should I use this definition?

This way of defining green/climate jobs comes from interdisciplinary work done at the Pontifical Academy of Sciences, especially in their 2022 work “[Resilience of People and Ecosystems under Climate Stress](#),” and their recent three-day summit “[From Climate Crisis to Climate Resilience](#).” [MakeKnowledge](#) has taken up this framework and begun to develop additional tools and resources around it.

To us, this framework is a wonderful brainstorming tool, and helps to identify opportunities the others may miss. Where are the regional opportunities for adaptation, and what's already happening there? For instance, how is the LA region starting to grapple with sea level rise? Heat islands? Air quality around warehouses? Where might there be new ways to transform our relationship with nature and the land? This framework is also good at opportunities for student climate entrepreneurship, because it can elicit the need for new kinds of jobs, skills and mindsets, and organizations. So it works well for longer-range strategic planning about pathway development. We encourage you to try using this framework for brainstorming with your school community.

WHAT SKILLS AND COMPETENCIES DO STUDENTS NEED?

We love this question, because it gets at the heart of what makes green/climate career pathways different from other kinds of pathways, and different from a lot of existing CTE work. In many existing CTE fields, we have a good idea of what kind of career we're pointing students at. If you want to be an electrician, a teacher, or a nurse, we know what the state of the art is. We have had those professions for a long time, so we can point to people already doing that work. Of course, even in existing job there will be new tools, regulations and codes that come along. But we know the big picture of what the job of a teacher (or nurse, etc) entails, and we know how to break it down and scaffold those skills for students in our traditional CTE pathways.

In green careers, the future is a little less certain—we know that the economy will require the greening of many existing careers, and also the creation of many new jobs. We will need some new things from our CTE programs to get there.

We want to highlight three big changes in our career pathway work to prep our students:

1. First, we have to make sure we know how to respond more quickly to changes. If we have an existing pathway, how can we make sure it is responsive to the greening of that field? How ready are we to spin up a new pathways to meet the coming demand? This part is about our work as educators and education leaders.
2. The climate crisis will require new jobs and careers, many not invented yet. We cannot wait for the market to declare a definitive slate of skills. We have to ensure that all of our students are prepared to become green entrepreneurs, able to identify needs in the community and world, and then invent the tools, organizations, and solutions to help move us forward. In order to do that, we will need to build in innovation skills and mindsets into all of our K-12 programs, including Career Technical Education (CTE) pathways.
3. The third thing we need to build in is some fundamental green skills, mindsets, values, and relationships. [Marilyn Krasny](#) calls these “intermediate outcomes”. This is different from just

learning facts about climate change. It absolutely connects to that, but it includes overlooked facets such as identity, agency, nature connectedness, and social capital.

The good news for K-12 schools is that this important work does not all have to fall solely on the CTE departments and teachers. The work can, and should, be owned by the whole school and district. The work of creating inclusive climate career pathways is not just for high school and higher education; K-8 schools and districts also have a critical role in this work.

WHAT GREEN JOB OPPORTUNITIES SHOULD WE BE PREPARING OUR STUDENTS FOR?

It would be unfair to declare a few specific green sectors, job titles, or companies as the anointed ones to look at. It is important that you hone the skill of discerning the answers for your school and district, so I want to give some tips for growing in that way. This is a muscle you should be exercising as a school and team—practicing this collaborative discernment will only help you develop your short and long term goals.

Here are a few guidelines to help:

1. Even within greater Los Angeles there are regional differences in employer demand, and in new/emerging green career opportunities. One place to start is to have conversations with your K-12 pathway coordinator and your local community college about what they are seeing—and what your local community college partner may already be doing and planning. This is also a good way of finding relevant industry partners. If employers want to reach out to students, they are likely to start with the community college. There are already some diverse and amazing climate and green programs happening in the LA regional community colleges.
2. You should also be getting familiar with all the good reports and data coming out of our regional Centers of Excellence. It is their job to keep an eye on Labor Market Information, and make it digestible. As you know, they are tracking this information in helpful ways, differentiating between new careers and existing careers with new skills.
3. There are other good data sources to look at. One good place to look is the [Los Angeles Regional Consortium's Regional Plan \(2022-2027\)](#). Keep your eyes open for other broader clues too — what are politicians planning for? What will be needed in LA for the state to keep its ambitious climate targets? To be ready to pull off a sustainable LA Olympics in 2028? Which startups are doing interesting things? What kind of projects is the LA Cleantech Incubator (LACI) supporting? Both in their startup incubators, and in their outreach programs, they are doing powerful work.
4. Then there are school and district opportunities. Are you already running a CTE pathway that might be easily greened? Are there other local assets you have (staff, industry relationships, etc) that might help you launch a pathway? Does your school or district have other green commitments like board resolutions, facilities plans, or curriculum initiatives that might suggest pathway tie-ins?

5. Two more pieces of advice. First, think carefully about *who* should be deciding. Build a team in your school and district, early on. Open up the conversations between CTE site leaders, principals, and district CTE folks. Many of our grant applications need to come from district staff, but are implemented at local sites, so start these conversations early and plan, dream, and discern together. The same goes for conversations and collaboration with community college partners.
6. Lastly, when you think about pathway implementation, think about *two distinct timescales*. The first is short-term, what you might be able to do in the next 1-3 years (for instance, with the 2024-2025 K-12 Strong Workforce Program funding in mind. At the same time, you can build your team and brainstorm about what deeper work your district and school need to do (and dream of doing) in the next 10 years. This is equally important work.

WHAT DO K12 SCHOOLS AND DISTRICTS NEED TO KNOW ABOUT THIS THE CLIMATE/SUSTAINABILITY SECTOR?

The most important thing is to know that **the climate crisis is real** and affects everyone, especially those already vulnerable and at the margins: these are many of our students, families, and staff. Second, we are also in a time of great opportunity and promise, with California as a whole and Los Angeles developing tremendous climate ambitions and goals. All of this promises many new industries and jobs, and thus many new opportunities for our students and communities.

One more key point. This is a bigger moment for K-12 and higher education than would be true if we were talking about any other single career sector. If we are engaging with this moment in all of its complexity—both human and environmental, using the three responses of mitigation, adaptation and transformation—we will help position schools to reconnect to their deepest civic purposes and their fiercest creativity. In this light, it is an exciting time to be an ambitious educator and school leader.

HOW CAN WE INTEGRATE SUSTAINABILITY PRINCIPLES AND CONCEPTS ACROSS SUBJECTS IN THE CURRICULUM?

We love this question, because it gets at the something that is real and persistent. We have known for a long time that climate change is real, and that it has widespread impacts. But it is still fairly common to find climate content segregated to particular classes like Environmental Science, or special events (Earth Day assemblies, and so on), and extracurricular activities. Sometimes this separation happens to Career Technical Education, too. At some schools, there are “CTE kids” and “AP kids” or some artificial distinction between college and career.

Part of the change we need has to come from school and district leadership. School and district leaders need to see this as a giant opportunity to prepare all of our students for this new economy, and to become future leaders in resilience and innovation for their communities. School and district leaders cannot simply delegate this work to CTE staff, or to environmental science teachers. Creating and implementing a plan to make this real will take some deep strategic planning by cross-functional teams. This is absolutely possible. It might sound overwhelming, but you can start where you are, with a 1-3 year plan and the next few grants, while you map out the bigger 5-10 year vision. The funding is out there, so start where you are and build from there.

Remember, this is not just about “preparing our students for the future.” It is also sound pedagogy that impacts students in the present. As the authors of *In Search of Deeper Learning* say, students need experience with the kind of innovative, interdisciplinary work they’ll encounter in the world. They need to “practice the whole game at a junior level.” Project based learning is certainly part of this, but the work goes way beyond that. There is no lack of good curriculum out there. Sites like the [CLEAN Project](#) (Climate Literacy and Energy Awareness Network), curate vetted high-quality teaching materials. MIT just launched another good hub for interdisciplinary curricula, [Climate Action Through Education](#).

HOW CAN K12 EDUCATORS BE SUPPORTED IN THEIR EFFORTS TO INCORPORATE SUSTAINABILITY EDUCATION? WHAT RESOURCES ARE NEEDED?

There are a number of structural, pedagogical, and workplace issues that district leaders, county offices of education, and the state can help with. If you are an educator, you should not feel overwhelmed by the things below that are out of your hands. If you are in a leadership role, these things will take time, and a lot of teamwork. Inside schools, it is critical to build a team, and loop your district CTE folks in right away.

School and district leaders should be willing to learn and stay curious about the multiple opportunities and impacts of the climate crisis. The biggest challenge for site and district leaders is to move away from a delegation model that reinforces silos, to a leadership of modeling owning the pieces, and connecting things that have been disconnected. Here are some suggestions for school and district leaders:

- Find the spots where teachers are trying to build, and help them figure out how to take the next steps. If you are a district CTE coordinator, take time away from grant deadline season to figure out where interesting climate pathway work is happening, or might happen among your schools.
- Encourage collaborative planning, prototypes, and projects among school, community, and industry. Build and support relationships across porous school boundaries.
- Build a one-year plan for experimentation and early funding, and then convene a wider group for creating a five to ten year vision. Use your early funding to build a deep foundation, create the collaborative partnerships you will need, and to create internal alignment among your LCAP, vision, staff, and administration.
- Make a fiscal plan to grow the work, coordinating funding streams including the Golden State Pathways Program, K12 Strong Workforce Program, and CTE Incentive Grant.

There are also vital roles for those outside of schools and districts. As in Los Angeles, County Offices of Education should aim to convene, not compete. They play a large role in the region, and can be

helping connect schools and districts to regional opportunities, encouraging knowledge sharing. Over time, districts and county offices can become more of a commons, a sustainable ecosystem of opportunity for the students and educators. County offices can help bridge the connection between districts that are K-8, high-school, and unified. Finally, the California Department of Education's CTE staff can help by creating guidance and support for climate careers that matches the state's level of climate ambition.

HOW DO WE ENSURE EQUITABLE ACCESS TO GREEN/CLIMATE EDUCATION AND OPPORTUNITIES FOR ALL STUDENTS?

This is a critical question, and we have to make sure it is a fundamental part of our planning. From the beginning, our goal must be to build strong career pathways open to everyone. Some specific suggestions:

- **Pathways, Not Pipelines.** Move away from the language of “pipelines” to describe student journeys from school to career. We have heard a lot of well-intentioned discussion about “leaky pipelines” to STEM careers, for instance. But underrepresented students are not petroleum or toothpaste, mindlessly pushed or pulled through a pipe. They have agency. Likewise, our schools are not inanimate, they are communities of human people. The quality of all the interactions in the community matters for student success, and the “leaks” are often structural and pedagogical issues that can be fixed. Instead of pipelines, imagine the *pathways* we can build for students. As you imagine student journeys through your school, keep your focus on building many new on-ramps for your students along the way.
- **Academic Identity.** When looking at the field of obstacles that your underrepresented students face, consider the idea of academic identity. Academic identity is how students see themselves as learners, and its formation is often invisible to schools, and even to families. A student may decide “I’m not a math person” after a series of invisible conversations with her grades, parents, teachers, and peers. There is terrific research available about these factors and what schools can do to preserve student academic agency in K-12 and beyond.
- **Program Evaluation.** Evaluate your efforts. Keep an eye on who is participating, and who is persisting, and dig into the why’s. Keep a careful eye on unintentional gatekeepers, people and structures that make it harder for students to persist on these pathways. Make sure you understand the obstacles your students face, or will face in new programs. Build and evaluate integrated student supports. Ensure your curriculum is culturally responsive.
- **College AND Career.** As a high school, work to break down any artificial divide between college OR career. Along the lines of the Golden State Pathways Program, and the LinkedLearning framework, develop integrated courses of study that prepare all students for high-wage, high-demand, high-growth jobs.

WE HAVE A FEW MONTHS UNTIL THE NEXT ROUND OF GRANT APPLICATIONS. WHAT SHOULD WE BE DOING?

Developing a good green career pathway proposal for K12 Strong Workforce or another funding stream shouldn't be a four week sprint. (And even less should it be one-week mad dash!)

Think of the groundwork for the next rounds of funding as a marathon, or better, as a trip to ascend Mt. Everest. If you just show up the week before, you are not likely to make it. Just like planning an ascent of Everest, it is never too soon to build your team and plan. Both the CTE Incentive Grant RFA and the RFA for next round of the K-12 Strong Workforce program are expected in August 2024, with the submission deadline likely in October 2024.

If you are a school CTE teacher/leader, start reaching out to your district CTE staff as soon as possible. School leaders and teachers can start aligning on your short term vision, while raising the issues of a longer 10 year vision. Schools can work on aligning vision among site leaders, administrators, and faculty, then ask them to help dream and plan. Invite collaborators to join you in exploring the data, and making field trips to potential industry partners, community colleges, and other regional sites for inspiration. The administrative team will need to own the bigger vision of how green skills and mindsets are introduced and integrated.

District CTE staff, you can offer to join your schools in their dreaming and planning. District and county office staff can offer to hold some of the bigger strategic conversations, strategic planning resources, and become backbone support to share learnings from school to school. In the district and county office discussions, bring your CTE staff together with your sustainability/ environmental literacy staff. You will need this collaboration to brainstorm, align on vision, and to help integrate sustainability skills in K-12.

HOW CAN WE PREPARE STUDENTS FOR THE FUTURE WHEN WE DO NOT KNOW WHAT THE FUTURE HOLDS?

Building an inclusive vision for student opportunity in climate careers is not about finding the "right" answer. It is collaborative work of knowledge creation, as you build trust and relationships among different constituencies (teachers and administrators, K-12 and higher ed, industry and community). We need to build knowledge, and a collaborative vision together. (Fun fact: the theory of knowledge creation is why our organization is called MakeKnowledge.) In doing this work together, it also matters *how* we work. It needs to be built on trust, and to the end of creating a vibrant, healthy ecosystem of opportunity for all.

RESOURCES (LOS ANGELES, CALIFORNIA, & BEYOND)

Background Reading: Understanding the Landscape

[Los Angeles Regional Consortium Regional Plan 2024-2027](#)

[Green Jobs Report \(LA Cleantech Incubator\)](#)

[The Future of Work is Green \(Climate Action Pathways for Schools\)](#)

[Centers of Excellence for Labor Market Research \(Los Angeles Region\)](#)

[Project Drawdown](#)

Curriculum

[CLEAN Project \(vetted, high-quality curricula from many sources\)](#)

[Climate Action Through Education \(from MIT\)](#)

[Energize Schools \(SEI\)](#)

[The Energy Coalition](#)

Grants & Funding Opportunities

[K-12 Strong Workforce Program, LA regional information and links](#)

[CTE Incentive Grant \(RFA expected August 2024\)](#)

Frameworks and Tools

[Linked Learning](#)

[Fast Forward CA](#)

[Career Ladders](#)

IMPROVE THIS GUIDE

Have other questions that we should answer?

Please fill out this form if you have more questions that you think we should cover, or if you have comments on the content of the form.

<https://forms.gle/JtRE3A27h4Gaem4bA>



WORK WITH US

Follow our work here: <https://news.makeknowledge.org/> (subscribe to stay in the loop) or contact info@makeknoweldge.org with any specific questions or to learn more about our work with districts and schools. We would love to hear from you.

ABOUT MAKEKNOWLEDGE

MakeKnowledge is a California nonprofit organization focused on creating the rich and inclusive K-16 career pathways needed to meet the urgency of the climate crisis, and the opportunity of the new green economy.

For schools and districts, we can help envision, develop, and implement specific pathways tailored to your local and regional opportunities, and make them sustainable by integrating various CTE funding streams, including Golden State Pathways Program, CTEIG, and K12 Strong Workforce Program funds.

We also help school districts develop the **strategic plans** and relationships needed to innovate, stay informed, and sustain this work. We are constantly exploring the state of the art across the climate and sustainability career landscape in California, and well beyond.

From time to time, we offer conferences and webinars on important aspects of this work, including our upcoming gathering on **Youth Climate Entrepreneurship** (Fall 2024).

