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How an Increase in Climate Education and Career Development Will Accelerate U.S. Efforts to Meet Its Paris Climate Goals

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The Case for Investing in Nationwide Climate Literacy

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Summary

The United States needs a solid, equitable and large-scale plan, to be implemented in the next two-to-five years, that will provide both general and specialized climate-science and climate-solutions education and training to 100 million Americans. These individuals are either in school or already active in the workforce across the economy. The foundation for succeeding with this plan mostly exists and would not involve massive new investments. We can shape an appropriate response to the need by using many of our existing educational programs, funding sources and institutions. Some new targeted programs will be required. Without a more organized, high-level commitment and mobilization, we will not likely achieve our national goals for climate mitigation and resiliency within a ten-year time window. There are currently at least ten federal agencies that, with current funding, some added funding, and clearer direction, are positioned to take the lead, working with the states, on rapidly filling the educational gap and putting the U.S. ahead of the game on climate literacy and related job and career development.

The Climate Change Education and Career Development Gap is a Potentially Disastrous and Unnecessary Shortcoming of U.S. Strategy

The U. S. is addressing climate change and planetary warming though a combination of: a) supporting advances in new technologies, b) conducting more effective natural resource and land management, and c) promulgating strong and effective regulatory policies, combined with public incentives, for moving businesses and public agencies toward more climate-friendly practices. These are the main focuses of our current public climate mitigation and resiliency strategies, but there is a critical missing ingredient. Unless we also allocate significant resources to organized, large-scale education, training and career development, across many sectors and platforms, these other approaches will fall short of achieving the nation's 2030 and 2050 goals. Early in 2021, the White House announced that by the year 2030, the U.S. will achieve a 50 percent reduction in greenhouse gas pollution. The United Nations has proposed an 80 percent reduction by

the year 2050. Some argue that we will need even more of a reduction than 80 percent by midcentury. These goals cannot be fully achieved without a more serious nationwide education and training effort.

There are clear reasons why greatly ramped-up and equitable education is needed to meet these goals. First, the scale of the climate problem, and the vast amount of societal and economic change that will be required to address it, calls for tens of millions of informed consumers, trained technicians, and educated business leaders, entrepreneurs, public officials and educators. Without such a nationwide force of knowledgeable and skilled Americans, it will take years longer than necessary to implement real climate solutions. This time lag will put the U.S. at serious risk of missing the decade-long window of opportunity sometimes described by scientists as the point of no return. In the absence of an educated populace, it is also likely that our climate response will be implemented at a smaller scale and confined to more energy-specific sectors. It will not effect the broad-based change across the entire economy that is needed.

Instead of ignoring or underplaying this educational challenge and failing to meet our Paris goals, the U.S. could actually accelerate our climate mitigation and adaptation effectiveness via education and training. In so doing, we would become a global model for how to achieve solutions to the greatest global environmental challenge of our time.

Evidence strongly indicates that the subject of and solutions to climate change are not well or uniformly taught across the American education system. Science educators are not all convinced that the science is actually settled and they also tend to avoid the subject, in large areas of the nation, as too laced with public controversy. Moreover, the extensive U.S. system of career and technical education (CTE) has been slow to embrace the sustainability principles required. And, higher education has yet to integrate climate across critical disciplines such as architecture, engineering, natural resource management, agriculture, business management and industrial design. Importantly, future businesses leaders have yet to see the full entrepreneurial opportunities that come with a 30-year goal to lower greenhouse gas emissions by 80 percent.

The good news is that many of the programs and much of the funding that would be needed to bring about a transformation in U.S. climate education is already there. As a nation, we spend more than $1 trillion each year on public education and can fairly seamlessly integrate climate science, social science and climate solutions into those programs. We also have a head start on the necessary education and training content – curricula, project plans, and more. The U.S. education and training sector could, with the right leadership, quickly take on the challenge of educating and activating many millions of knowledgeable allies in the fight for the planet.

Education at Scale Can Accelerate Massive Physical, Social and Economic Changes

Global climate change is the greatest existential threat humanity has ever faced. And, while many would say it is a self-inflicted wound, ignorance and obstinance have played their part in putting us in the current predicament. The solution is to make change on massive scale, and that can only come if we get organized on education and career preparation. As noted, most longer-term projections (2050) indicate a need to reduce greenhouse gas emissions by 80 percent or more. At the same time, we need to brace our cities, towns, businesses, agricultural areas, waterways, transportation systems, energy grids and more for

climate-change impacts that can no longer be avoided. We need to use education to head toward a green economy and to make sure that people from lower-income areas, often in communities of color, are supported and not left behind.

The UN helped to define the green economy as low carbon, resource efficient and socially inclusive. Under this scenario, growth in employment and income are actually driven by taking on the climate challenge. They are driven by public and private investments in economic services, infrastructure and building assets that allow for reduced carbon emissions and pollution, more energy- and resource efficiency, and the prevention of the loss of biodiversity and ecosystem services. The shift to a new, green economy can also create significant pathways out of poverty for many people and create a more just society.

A simple snapshot of what a green economy and a new American lifestyle would look like can be illustrated as follows:

- **A new U.S. energy profile** -- This will involve greatly ramped-up growth in alternative energy across the U.S. – wind, solar, geothermal, and more.
- **A smart power grid** -- We will also need to build/rebuild a "smart" power grid to distribute all this energy more efficiently and effectively. This will include many new co-generation sources.
- **Revolutionized transportation** -- Our autos, trucks, trains and planes will need to be vastly more energy efficient and even run on whole new energy technologies and systems.
- **A greener built environment** -- Our buildings, residences, offices, industrial sites, schools and more will need massive building and rebuilding.
- **Climate-smart land planning** -- Our cities, towns and other communities will need planning approaches that reduce energy usage and make them more resilient to climate impacts such as flooding, drought, fires, sea level rise, and more.
- **Reformed food and fiber systems** -- We will need greener and more climate-resilient agriculture and forestry systems.
- **Greener manufacturing and retail goods and services** -- Our manufacturing processes, and related service programs, such as food service, will all need to be made more climate-friendly.
- **Effective waste management** – We will need to operate this sector using principles of circularity.
- **Green infrastructure** – Our development of public works needs to be infused with principles that permit us to work *with* the increasingly turbulent forces of nature as opposed to trying to rein them in and control them.
- **Forward looking banking, insurance and investing** – The financial sector will need to support private businesses and public investments that are geared toward lower greenhouse gas emissions and increased resiliency and risk reduction.
- **Social equity and justice** – Vulnerable populations will be protected and supported through new investments in resiliency and public safety, including in the health sciences.

History Shows That Educational Mobilization Can Lead to Societal-Scale Successes

Throughout American history we have recognized that education can foster social change. Indeed, major educational gaps continuously have emerged and we have addressed them through large-scale and well organized education efforts. As a nation with strong agricultural potential, for example, we created the Agricultural Cooperative Extension program in 1914, which in time made us a global leader. This was done by

providing agricultural producers with up-to-date technical skills and knowledge in farming practices and by conducting experiential learning activities across the agricultural sector.

Two decades ago, we recognized the need to mobilize in support of science, technology, engineering and mathematics (STEM) education, and this has resulted in new science standards and practices across the nation to keep America competitive in the science and technology space.

Three decades ago, the U.S. military began making major investments in education and training as it moved to a more decentralized on-the-ground force with advanced digital capabilities. The military rethought its strict command-and-control structure, embraced training and education, and passed decision making down to those working in the field. By so doing, it provided the intellectual architecture for mission success and contributed to more stable civil-military relations, a culture of reflection, and a capacity for critical analysis service-wide.

Six Reasons the Need for U.S. Climate Education and Professional Development Must Not Be Ignored

We need to be thinking at scale and embrace the idea of educating tens of millions of people rather than a few hundred thousand specialists. The American work force consists of more than 150 million people, and active consumers are half again that many people. It is reasonable to say that two-thirds of Americans, when educated on climate and its solutions, can participate in bringing about a more rapid 80% reduction in greenhouse gas pollution and all that would mean for America's and the planet's future.

As noted above, the climate problem and its solutions call for equitable social change on a major scale. Social science research has shown that education facilitates and speeds up such change. It provides consumers, citizens and workers with knowledge, training, and skills, and fosters new thoughts and attitudes among the young. Many of the traditional beliefs and values that slow or even prevent progress, especially in the area of climate change, can be shifted toward more enlightened ideas.

The benefits of educating youth, young adults and active workers on climate change and solutions are:

First, we can better enlist the understanding and support of consumers – More climate-friendly goods and services will take some getting used to by the American public. The more they understand the reasons for and dimensions of these new consumer opportunities the more inclined people will be to adopt them. Recent research supports the impact of education on consumer choices. From an economist's perspective, education permits us to work on the demand side of the equation via greatly increased understanding of the problem, enlightened consumer choices, and more. In a free-market economy this is key. Much of the public discussion around addressing climate change focuses on matters of supply, such as bringing alternative energy or fuel-efficient vehicles to market. But education offers policy makers the opportunity to simultaneously work on fostering demand. Researchers know that education, by itself, has only a mild effect on behavior, but a widespread climate-education program, constructed with abundant opportunities for skill development and application, can help young people and adults better understand the impact of their actions and make consumer- and personal-behavior choices that will reduce their carbon footprints.

Second, we can directly address a huge technical know-how challenge -- The U.S. will need a ready cohort of skilled specialty technicians and workers for the deployment of new climate-friendly technologies. From a technologist's perspective, education and training are needed to prepare for many climate solutions, especially in alternative-energy distribution and the production of greener goods and services. As markets grow in alternative energy, for example, we will need workers with the know-how to install and maintain solar power, wind turbines, geothermal systems and more. In the design world, we will also need architects, planners, engineers and other design professionals who know how to create more climate-friendly buildings, communities, and more.

Third, education can help incubate climate entrepreneurs and creative solutions -- Current technologies and government regulations will not get us to our national greenhouse-gas-reduction goals and will not give us the level of climate resiliency we need. Most experts agree we will need new inventions, new technologies and many new business models to get to our goals. The U.S. has a longstanding history, when faced with a major need or problem, to see creative minds go to work. In our economic system, businesses, colleges and universities support business incubators that unleash the entrepreneurial capabilities of their students. Most analysist see entrepreneurship opportunities in the development of new ways to deliver energy, goods and services, create new businesses and turn the problem of climate change into an exciting new economic and lifestyle future. Technological innovation will catalyze efforts to implement national climate action and realize the above-mentioned vision. The Paris Agreement explicitly refers in Article 10 to the need for such innovation.

Fourth, we would have more enlightened business leaders and public officials -- Even outside of the entrepreneurial world, leaders of established, ongoing businesses who understand how to address climate change will be needed. Our business and public administration schools need to be educating future leaders in both the private and public sectors on the risks of ignoring climate impacts and on the ways to decrease or even avoid them.

Fifth, we will have more support for the "why" of policy solutions -- Improved understanding of why federal policies, such as methane regulation, or carbon taxes, make sense in the fight to reduce greenhouse gas pollution will help to make those policies more palatable to the public. The science of climate change is complex and resists quick and easy bullet points of explanation. Careful and well-presented education, such as is implemented in school curricula, can help generate more public support and faster adoption of needed policy measures.

Sixth, we can better address social and economic inequities and protect public health and safety – Not everyone affected by climate change is impacted in the same way. People from lower-income communities and many communities of color suffer more dire consequences from floods, heat waves, hurricanes, economic downturns and more. Education can help policy makers and members of the public better understand these impacts and address them through economic measures and public health support.

Elements of a U.S. Plan for Closing the Climate Education Gap

The federal government, working with the states, can shape and begin to implement an effective and equitable climate-literacy and career-development strategy using a combination of new targeted funding and

existing education and training authorities and funding. This can be coordinated by the White House using guidance from the Action for Climate Empowerment (ACE) framework.

At least ten agencies can lead the way and help the U.S. become a global model.

The U.S. Department of Education can take the lead on working with states and localities to support climate education and related job and career development through many of its existing programs. These include those funded under the Perkins Career and Technical Education Act, Title 4 of the Elementary and Secondary Education Act (for STEM, social studies and after school education), and other authorized programs. The scientific framework for ramping up education on climate change exists in the Next Generation Science Standards (and similar state standards) and in social studies standards.

The Department of Education could establish a program of Climate and Sustainability Education to coordinate climate education and literacy programs throughout the Department and with other federal agencies and state departments of education.

The Department could also make climate change a specific and better funded focus of its Teachers for a Competitive Tomorrow Program (under the COMPETES Act) to support career-development skills for all students, including those from lower-income, frontline communities. It could work with Congress and the states to increase funding and support for educator professional development on climate change and its solutions.

The Department could likewise help increase public support for the Advanced Placement Environmental Science (APES) program, expand the program to more high schools, and incentivize giving it more of a climate emphasis.

Congress can support new funding for local education agency climate action plans, which include both the greening of facilities and the provision of climate education. An immediate opportunity would be to expand the goals of the Department of Education's Green Ribbon Schools Program to help ensure a connection between making green-school facility improvements and using them as tools for climate literacy and education.

Congress and the states can support the refurbishment and greening of low-income schools in local school districts. These redone school buildings and campuses can also be used as laboratories for science students and CTE students to learn about climate solutions.

Congress can also provide funding to community colleges and other institutions of higher education to create career and technical education certification programs and centers of excellence for climate-solutions education and training, and to support entrepreneurial incubators. This would generate more climate-skilled technicians and would encourage major professions such as architecture and engineering to adopt more sustainability principles and applications in their programs. An immediate opportunity would be to incorporate (and pursue funding for) a focus on climate change and sustainability into the Higher Education Act (via the University Sustainability Program) and also into the COMPETES Act, to help colleges, universities, and community colleges develop equitable career paths for students in lower-income, frontline communities.

The National Oceanic and Atmospheric Administration can apply its education-grants programs and its weather- and climate-monitoring capabilities to schools and non-formal educational venues as a resource for climate education and training.

Congress can provide increased funding to NOAA for climate-science education and professional-development grants to support innovative approaches to education in primary, secondary and higher education and through non-formal venues.

NOAA is also uniquely positioned to develop and support programs for the climate education of meteorologists, particularly broadcast meteorologists, who represent Americans' leading regular interaction with science.

The National Aeronautics and Space Agency could expand its Earth Science education programs, including those fostered by satellite technology, and focus them more effectively on climate-change education and literacy. NASA has a long tradition of making its technologies available to the education system.

The National Science Foundation, working with Congress, could reinstitute and fund the Climate Change Education (CCE) program under the auspices of the COMPETES Act. This would help with educational research on the most effective approaches to climate education and training.

The Environmental Protection Agency can apply its existing environmental-education grants program (under the aegis of the National Environmental Education Act) and related professional-development programs in environmental education to foster more effective climate education in K-12 schools, in higher education, and in non-formal venues.

EPA can support climate literacy, climate-solutions education and climate-friendly consumerism through its other public-information programs, including its EnergyStar designation for energy-efficient vehicles and appliances, its SunWise program, its air quality and solid waste programs, and others.

Congress can reauthorize and/or increase funding to the EPA environmental-education program with language directing the agency to emphasize climate and climate justice.

The Department of Energy can apply its energy-efficiency education programs to support more effective climate-change-solutions education and expand its efforts to share those solutions with schools.

The Department of Labor can increase its capacity to study and forecast emerging climate-related employment markets and support climate-related technical-skills development through cooperative programs with unions, community colleges, work-study programs, and lower-income youth workforce programs.

More specifically, DOL could infuse climate-change education and skill development into its youth-education and training programs, such as Job Corps, apprenticeships, Youth-Build and others, to help build pathways out of poverty for lower-income youth in frontline communities.

The Department of Agriculture can support climate education throughout Agricultural Cooperative Extension. The Department could work with Congress to increase funding for its educational work

with agricultural specialists and practitioners on creating more climate-resilient farms, grazing areas and forests. More specifically it could incorporate climate-change principles and education into the educational programs at the National Institute for Food and Agriculture and the Natural Resource Conservation Service and into Conservation Education at the Forest Service.

The National Institute for Environmental Health Sciences, working with Congress, could increase funding for professional-educational programs to help health care professionals better address the health impacts of climate change, particularly on lower-income, frontline communities of color.

The National Institute of Museums and Library Sciences and the Endowments of Arts and Humanities could each support nationwide climate literacy by helping build the capacity of museums, libraries, aquariums, zoos and other non-formal educational venues to educate children, educators and the general public on climate change.

Conclusion

A large-scale educational response to the climate crisis is crucial and is within our reach in the next two-to-five years. The advantages of committing to such an effort are in how it would facilitate technological, economic and policy changes and help shape our institutions of the future. Some new funding would be needed and sharply focused new programs and direction would likewise be needed. But much of what must be done to educate 100 million students and workers/professionals can be achieved through existing programs and funding at the federal, state, and local levels.

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An attorney and education policy specialist, Kevin J. Coyle is Counsel to the CEO of the National Wildlife Federation. He is former CEO of the National Environmental Education Foundation and served as Vice President for Education at the Wildlife Federation for 15 years. In his tenure, the Federation initiated the Eco Schools USA program, ClimateClassroom.org, the initial curriculum for the Climate Reality training program, and the Eco Leaders program. He also was an executive for the U.S. Department of the Interior, is former CEO of American Rivers and was Chair of the Natural Resource Council of America.