Switch Energy Alliance is Raising 'Energy IQ,' Fighting Energy Poverty at

May 2025 | Heather Saucier, Explorer Correspondent

The energy mix is expanding, and options beyond some are purported to be cleaner than fossil fue "sustainable." Most have an impact on the environment

As people and countries grapple with energy solutions become paramount.

Next month's Unconventional Resources and Technolo education in building a strong energy workforce to help Programs for students from elementary school through general public will be shared by the nonprofit Switch Er that is objective, nonpartisan and sensible, said its fou

global energy explorer and educator.

"We've been working passionately to raise awareness of the world's energy challenges and opportunities, while also shedding light on energy poverty and the positive impact energy access has on communities," Tinker said. "The educational strategies we use help bridge knowledge gaps, drive innovation and prepare professionals for the evolving energy landscape."

Having recently retired as the director of the Bureau of Economic Geology at the University of Texas at Austin, Tinker knows a bit about energy. He co-produced the 2012 "Switch" documentary, which explores the world's energy resources amid the energy transition. In 2020, he executive produced the documentary, "Switch On," which addresses eradicating energy poverty. As an on-screen guide, Tinker takes viewers to seven countries in these two films.

In addition to hosting the PBS energy and climate point-counterpoint talk show "Energy Switch" and being the voice of "EarthDate," a weekly program on NPR stations, Tinker works with other nonprofits to help bring energy to the most remote and impoverished areas in the world.

Having visited more than 60 countries to study energy resources, Tinker knows firsthand that energy is a regional issue – greatly influenced by its availability, reliability and affordability. When he works with young students or seasoned professionals, Tinker said the main goal of energy education is to show how energy, economics and the environment are all overlapping parts in the energy evolution.

The Need for Energy Education

As Ethiopia works to bring electricity to many of its rural citizens for the first time, the country looked no farther than the Blue Nile River, the border it shares with Sudan – an ideal source for hydroelectric power. Completed two years ago, the massive project provides 5.5 gigawatts of power – the equivalent of six to seven nuclear reactors – and supplies electricity for tens of millions of people.

The project came with drawbacks, however. An estimated 16,000 to 20,000 people were displaced by the dam's reservoir. Egypt and Sudan have expressed concern that the dam will impact the flow of the Nile, potentially affecting water supply and irrigation. Fish populations and ecosystems also could be affected by the dam, according to various reports.

In Vietnam, hydroelectric power has been a staple for years, but it is quickly being used up by its 100 million citizens. Tinker visited the country in 2019 and learned from Hang Nguyen, an energy planner, that to sustain its grid, the country is rapidly increasing its reliance on coal-fired power plants. Coal mines provide much-needed jobs, and many residents expressed that the need for electricity outweighs the sulfur dioxide and ash being pumped into the air.

The thinking in Vietnam is that coal will provide the electricity needed to build a better economy, which would then allow the country to transition to better energy sources. Earlier this year, the country's prime minister approved a carbon capture plan for older coal-fired power plants or converting them to co-fire

with ammonia or biomass.

On the other side of the world in Colombia, about 2,000 indigenous people in the remote village of Gunchukwa welcomed solar panels and batteries that brought electricity to seven communal huts for the first time. The villagers wanted electricity to power a streetlight, a refrigerator and a health center. Present when the power was turned on in 2018, Tinker marveled at how just 3 kilowatts of power significantly changed lives.

He also noted that the solar panels were made in Singapore, shipped to Los Angeles and trucked to Miami. The batteries were made in China, also shipped to Los Angeles, trucked to Ohio for testing, and then trucked to Miami to join the panels before being flown to Colombia. He reminded viewers in the "Switch On" documentary that the mining and manufacturing of the panels and batteries are not sustainable practices, nor is the transportation to their final destination.

These examples are just a handful that Tinker uses to emphasize that no energy is 100-percent ideal. But its benefits almost always outweigh its costs. And, there is always room for improvement.

As it stands, roughly a billion people in the world have no electricity or modern energy of any kind. Another six billion have limited access to energy because it is either unreliable, dangerous or unaffordable, Tinker said.

What would it take to provide safe, reliable and affordable power to two-thirds of the world's population?

Tinker said that if everyone had access to 50 megawatt-hours of electricity and $50,000 gross domestic product per capita in 50 years, all would be lifted out of energy poverty and begin to thrive.

Currently, the demand for global energy is 620 trillion feet of gas equivalent, which is all types of energy combined, Tinker said. To achieve the 50-50-50 vision for each person, the current demand of 620 TCF must triple.

That means that all energy resources, including fossil fuels, will be needed moving forward. That also means that decision-makers should have a good understanding of the pros and cons of these resources as solutions are sought around the world.

Education will play a key role in making this happen.

Raising ‘Energy IQ’

The Switch Energy Alliance has been developing educational programs to impart objective information about the energy resources used in all parts of the world. The programs are tailored to fourth- through 12th-graders, university and post-graduate students, energy and other professionals, and the general public. Tinker said he wants to raise people’s “energy IQs” to strengthen the industry’s talent pipeline across multiple generations.

Even for the youngest of students, the Alliance’s modular, video-based lessons are packed with content, detail and the most current statistics available. Used by more than 10,000 teachers and 100,000 primary and secondary students in the United States, the benefits and drawbacks of all energy sources are thoroughly examined and topped off with challenging assignments such as:

u The average American uses a 100,000 watt-hours of energy each day. For comparison, the average Ethiopian uses about six watt-hours per day. That is energy inequality. Research one achievable way your age group could conserve energy.

u Eighty percent of global energy comes from fossil fuels. Biomass makes up about 8 percent of global energy. Four percent is generated by nuclear reactors, another 4 percent from solar and wind, 3 percent from hydro-facilities, and 1 percent from other sources. Do some research on your own using reliable resources, such as the U.S. Energy Information Administration website, and provide the most recent data available about the current global energy mix. What did you find?

The SEA built its curriculum with the guidance of master teachers, and it is available at no cost to administrators, teachers and students on its website.

“Teachers are thrilled to finally find something that is free that does not require a lot of preparation or expensive kits,” said Meghan Morgan, SEA’s manager of education. “They love that energy is being presented from a balanced perspective.”

Tinker added: "People have been heavily funded (by activists) to pump fear into our kids. But we are more candid. We have hope. We don't say the world will end in 15 years."

In fact, he stresses that energy underpins healthy economies, and healthy economies invest in the environment.

"We need to understand the impact of mining and landfill disposal of low-density electricity," Tinker said. "Panels, turbines, batteries … that's not renewable energy. Mining isn't clean or green."

These concepts are carried over to university and post-graduate students all over the world through an annual case competition. Self-formed teams of three or four students and a professional mentor from the energy sector solve real-world challenges in impoverished countries by identifying actual needs and solutions, as they compete for $25,000 in distributed prize money.

Last year, 145 teams representing 34 countries, with the help of 152 volunteers, participated. This intense competition requires students to work within the maximum budget of a country's GDP and existing energy budget to lift its people from energy poverty over a 30-year timeframe. They can include external funding sources if they can specify how the funding would be obtained, used and dispersed.

Two years ago, a team from India published a detailed presentation on the energy dearth in Ghana, which has an energy poverty rating of 38 percent. This rating is based on measurements of accessibility, reliability, environmental factors, affordability, safety and quality of energy services. The team discovered that 78 percent of households use unclean cooking fuels, which cause 18,000 deaths a year, as reported by the World Health Organization. Only 22 percent of households have access to liquified petroleum gas, the only clean cooking source in the country.

The team introduced ways to bring additional LPG supplies and cookstoves to rural areas and to increase biogas feedstock – all of which could increase the number of households with clean cooking fuels to at least 90 percent by 2050, according to the team's report. Part of their solution included improving the sourcing of biogas from municipal solid waste, animal waste, field crop residue and human excreta that would be used in a new biogas dome plant.

To address the fact that only 42 percent of Ghanaians have access to reliable and affordable electricity, the team proposed that all new electricity installments should come from solar photovoltaic panels subsidized by carbon credits. They recommended that Ghana's existing hydroelectricity and fossil fuel plants be used through 2050 with no new additions, with an end goal of solar PV comprising 75 percent of the country's total electricity mix.

Addressing government policy, the team recommended that the country reduce transmission and distribution losses from 25 percent to 5 percent over a 10-year period; that the government open its electricity sector to private parties; and that revenue from carbon emission taxes be used for renewable development.

The team's target was to give at least 90 percent of Ghana's residents affordable and reliable electricity by 2050 and to reduce the cost of that electricity by at least 60 percent.

Continuing Energy Education

As a child growing up in Pakistan, Syed Talha Tirmizi, 26, never had access to reliable or affordable electricity. Power was too expensive to run an air conditioner, and daily power outages lasted three to six hours, making life extremely difficult. Tirmizi often studied using a flashlight or a candle – the experience ultimately motivating him to pursue a career in the energy sector.

Now studying for his doctorate degree in petroleum engineering at UT-Austin, Tirmizi has become an asset to the SEA, having volunteered as a co-organizer for the case competition and as former president of the UT Switch Energy Club.

"It excites me to help train the next generation of energy leaders. In 20 years, all of us in university now will be in important positions," Tirmizi said.

He sees firsthand that participants from different cultures approach solutions to energy poverty in unique ways, and he believes that a diverse group of people is best for coming up with a wide range of approaches. "The competition allows the talents around the world to be seen," he said. "Otherwise, nobody would know about them."

The SEA is preparing to launch a program for professional development that will be a video-based, online platform on vital energy topics for those in the energy and government sectors.

"Different from existing continuing education approaches, we will help companies and organizations establish a minimum energy IQ for all staff, covering topics from energy fundamentals to energy transition and beyond," explained Gary Hines, SEA's executive vice president.

Programs for the general public include Tinker's two documentary films, "Switch" and "Switch On," the "Energy Switch" PBS television series and a 5-minute museum film, "Energy Makes Our World." To date, SEA's video portfolio has been viewed more than 10 million times.

In the end, Tinker hopes the educational programs will open minds about energy poverty, energy challenges and energy choices.

"We should not be thinking that one type of energy is bad and another is good. It's much more complex than that," he said. "Ultimately, it is about bringing power to people in the best possible way."

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An aerial view of the Grand Ethiopian Renaissance Dam

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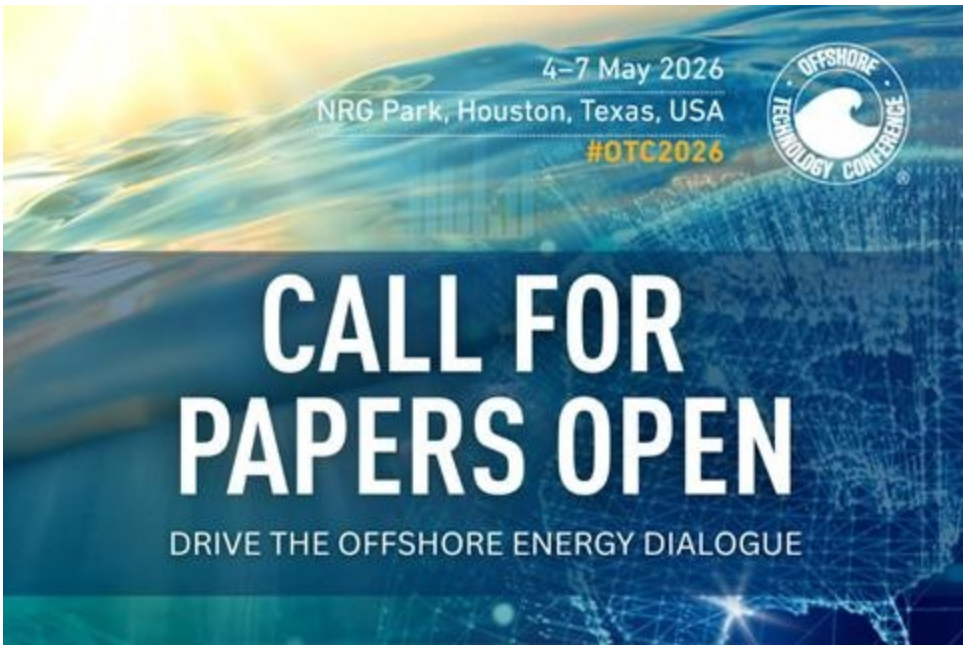

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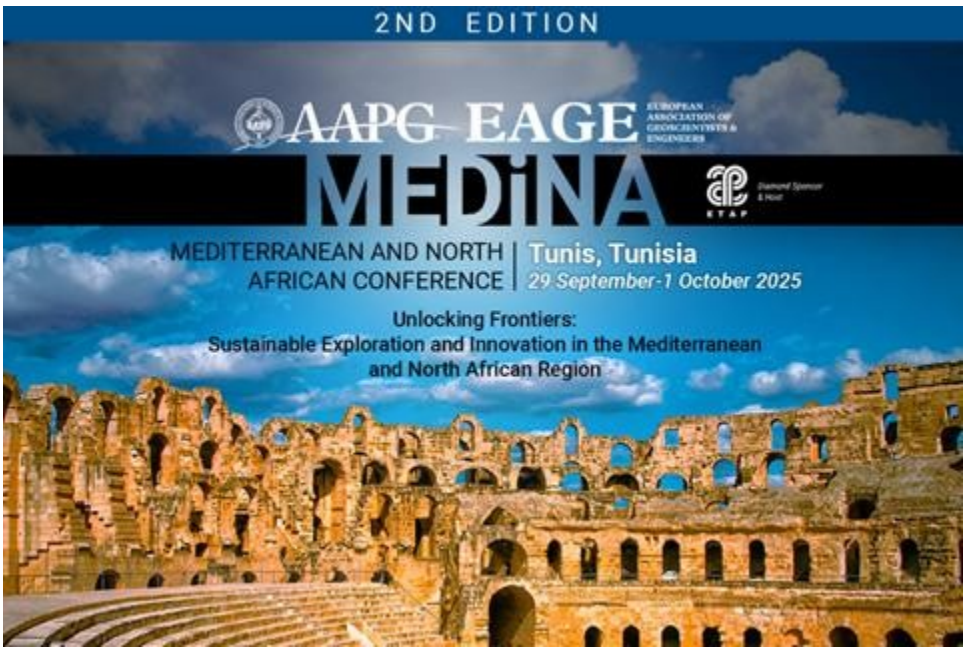

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