

GROWERTALKS

Cover Story

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Heated Up

Jennifer Duffield White

It's been a while since U.S. growers have experienced a cold winter with soaring fuel prices. And for many, the incentives to go renewable—be it for heating or electricity—vary from robust to fading.

In the last few years, U.S. growers have met roadblocks and just plain uncertainty with the USDA's Renewable Energy for America Program (REAP) seeing ups and downs in funding. Today, its future funding is unknown—unless it's included in a new Farm Bill and approved by Congress (which, as of this writing, it has not). Historically, REAP has provided grants that have funded solar, biomass, geothermal and wind for U.S. greenhouses. While renewables typically provide a cheaper energy or heat, it's the initial investment that usually gets in the way.

Even so, many growers—both large and small—find a way to invest. They do it to save money in the long run, to improve the sustainability of their businesses, and for many, because they also feel a social responsibility.

Skewed view

In many ways—the future of renewables is a stacked question; it depends on where you are. And it depends on what you think a reasonable return on investment is.

Back in 2013, [when GrowerTalks looked at renewables](#), the mood was fickle. Already, declining gas prices and a more stable oil price had started to slow the rate of implementation.

And yet, the big picture is that consumption of biofuels and other renewables (excluding hydroelectric) more than doubled in the U.S. from 2000 to 2017. Worldwide, it's estimated that a fifth of energy comes from renewables.

The prices on technologies like solar photovoltaic (PV) systems have steadily dropped (until the 2018 tariff, that is). Meanwhile, other countries are pushing renewables in a more forceful fashion. Our neighbors to the north implemented a carbon tax on end users emitting greenhouse gases (though they recently gave horticulture greenhouses a break on heating costs). And many other countries are finding ways to speed up the adoption of renewables in order to reduce carbon emissions.

A.J. Both, an associate extension specialist in Bioresource Engineering at Rutgers, says of the U.S., “It is not likely that the current administration will implement any carbon pricing, so the true environmental cost of using fossil fuels will remain unpaid. So unless growers felt a personal responsibility (and found a way to pay for new energy systems), there still is little incentive to seriously consider alternative energy systems.”

With our price of fuels remaining low, the savings aren't as dramatic. Without assistance, renewable projects can take five to 10 years to see a payback (a grant, rebates and energy credits can often cut that in half). But some are taking the long view that they're still investing in a more affordable energy and that fossil fuel prices will eventually go

up.

A.J. adds that he thinks the system will need another shock, or crisis, before greenhouses begin to show a renewed interest in alternative energy in the U.S.

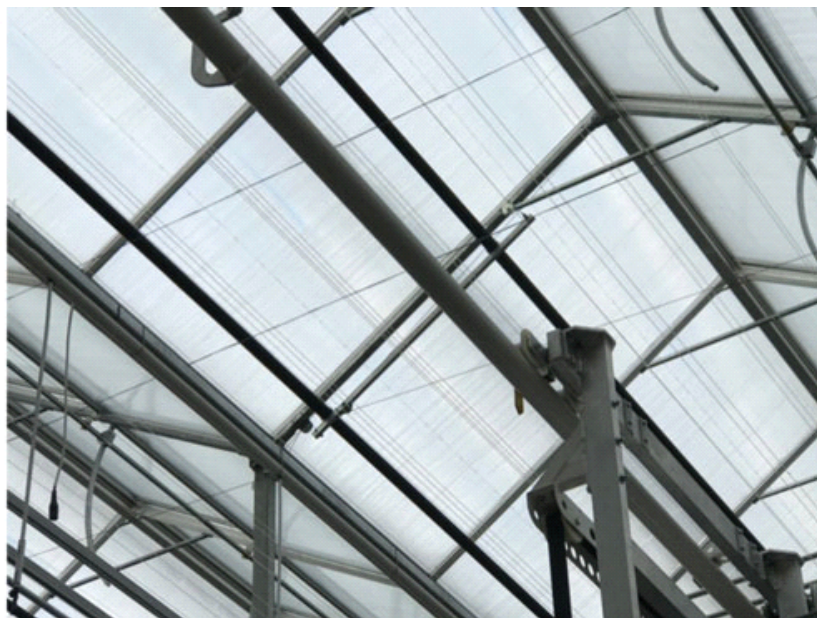
The thriving

And yet, we do seem to have a storm brewing—of growers around the world adopting new technologies, of U.S. growers seeking transparency about their environmental footprint, all the while many of the technologies becoming more affordable and proven.

In the Netherlands, the horticulture industry has had to adapt to growing with some of the highest oil and gas prices in the world. Groups of growers have taken advantage of their close proximities and created heat networks with geothermal wells.

While solar photovoltaics (PV) often get most of the attention, it's not the only form of solar. There are other ways to store and collect thermal energy. Eduard Ter Laak's new 5-hectare (12-acre) greenhouse in the Netherlands has glass with plastic Fresnel lenses that focus the sunlight on steel pipes. The pipes hold water that's pumped to storage tanks, giving Ter Laak an endless supply of hot water. They can store cool water the same way. (See the March 2018 GrowerTalks for more.)

Pictured: Eduard Ter Laak of Ter Laak Orchids in the Netherlands recently built a 5-hectare (12-acre) greenhouse with plastic Fresnel lenses that focus the sunlight on steel pipes, which hold water that's pumped to storage tanks, giving Ter Laak an endless supply of hot water.



Coupled with utilities and the government investing in other renewable energy, the Netherlands horticulture industry has managed to reduce their emissions from 7.5 megatons to 5 megatons.

In Ireland, where they're quickly closing in on the country's 2020 renewable energy targets, a new program called Support Scheme for Renewable Heat recently launched. They provide both an installation grant and ongoing operational support to encourage horticulture (as well as other commercial and agricultural heat users) to install renewable heat. The goal is to bridge that gap between the costs of renewable systems and conventional fossil fuel systems.

In British Columbia, Canada, the provincial government put a \$25 million grant towards developing a world-class

bioenergy capability.

Sundrop Farms in Australia broke new barriers when they built a 50-acre greenhouse there in 2017 for hydroponic tomatoes. The pioneering project has an integrated energy system. Their solar setup has 23,000 computer-controlled mirrors that redirect the sun's rays towards a tall solar tower. That concentrated solar energy produces temps warm enough to desalinate seawater, run a steam turbine that produces electricity and heat the greenhouses, though they still use some on-grid electricity. Sundrop is able to supply Australia with about 15% of the country's tomatoes.

Breaking barriers, however, has its costs. Sundrop had an AUS\$100 million investment from a private equity firm and the build cost was double that. While they initially began building greenhouses in Chuckey, Tennessee, with plans to expand Sundrop and use their new technology, the project stalled in 2017 and was put up for sale.

One has to question: Is the U.S. just slow in adopting these technologies? Take cogeneration—or combined heat and power (CHP)—systems, which provide heat, power and supplemental CO₂. While they're often run off natural gas, they can also be set up for biofuels and the system's ability to recover heat from the engine helps growers create a closed-loop system with little waste. They're now quite common in Europe and we're starting to see larger North American greenhouses adopt the technology.

Me or them?

But really, who's on the hook? Should it be governments or utilities driving the growth, or should businesses be lighting out on their own? It's an age-old argument.

In Europe, utility companies pass the cost of investing in renewables onto the end consumer (thus their high electricity rates), and both local and regional entities are setting ambitious emissions goals. But in the U.S., the growth of renewables is largely based on state and regional incentives. Others believe the free market alone should be the driver (or the failure) of renewables.

California just finalized a new rule that will require solar panels on new houses in the state (they give an exception to houses built in too much shade). But outside of horticulture, many U.S. companies are still taking the long view that they should be going renewable, regardless of the rules.

The tipping point

In the big picture, renewables are in an exciting place. In 1977, a solar PV system was \$77 per watt. That has declined to 77 cents per watt. At GreenBiz.com's Verge 18 conference, Bill Gross, founder of Idealab and several solar energy companies, said we've reached an interesting point in renewables where both solar and wind are now cheaper than a new or existing power plant. The problem, of course, is that neither solar nor wind put out energy all of the time. They still can't replace a gas-powered plant and fulfill peak energy needs.

"We need a dramatic scale of storage," says Bill. "It will change everything if we dramatically ramp up the amount of storage we have."

And then we have to drive down the price of storage. That, according to Bill, is the next frontier of renewable energy, and as a serial (and successful) startup guy, his newest venture is Edisun Solar Microgrid, a company working to make baseload solar power practical and scalable with a new method of closed-loop concentration and a patented Rock-Air battery.

Innovation has many forms. It may mean partnering on a cogeneration system or geothermal. It may be pushing the bounds of technology. Or it may mean crunching the numbers and taking a stand on what your products represent.

In the long run, it's an investment that can protect a business from less-stable energy costs and make it more resilient in the long run. But always, it requires a little vision. **GT**

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Why is the Netherlands So Focused on Geothermal?

In some ways, it's simple math. Consider a 2018 gas price in the Netherlands: \$7.46 per gallon; in the U.S. it's \$2.99. Wouldn't you want to find a way to heat with the heat of the earth and not pay \$7.46 per gallon?

Already, Dutch greenhouses have capitalized on geothermal. And now, the Dutch government and seven other entities signed the Green Deal Ultra-Deep Geothermal Energy in June 2017, creating a research program that's looking at how to harness ultra-deep geothermal heat, including conducting seismic research. If their work looks safe and economically viable, they could move forward into drilling preparations by the end of 2019.

What happened to solar?

The price of solar dropped about 17% from July 2015 to September 2017, though the myth of solar being "too expensive" still persisted.

In January 2018, the Trump Administration placed a 30% tariff on solar cells and panels imported into the states. That tariff will fall 5% each year, ending at 15% in 2021. While many expected prices to continue to drop and hopefully ease the hurt of the tariff on U.S. installers, it seemed that solar installers kept quoting higher and higher prices.

By the end of 2018, EnergySage, an online marketplace for buying and selling solar, concluded that, "the cost of solar is 5.6% higher now than it would have been if costs had been allowed to fall at their preexisting rate of decline."

While this has had less of an effect on small-scale residential installations, bigger installation projects have taken a hit. According to Reuters, by June 2018, U.S. companies had cancelled or frozen \$2.5 billion in large solar projects.