Innovation Incubator

IN²

ACCELERATING INNOVATION
ANNUAL REPORT 2023

Founded by: WELLS FARGO | NREL

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FROM THE DIRECTORS

The Wells Fargo Innovation Incubator (IN²) seeks to support the transition to a lower-carbon future by tackling barriers that stand in the way of successfully developing and deploying innovative, technology-based sustainability solutions.

We know that successfully transitioning to a resilient, sustainable, and equitable future requires developing net-new technologies, accelerating the pace of deployment for existing solutions, and promoting models that make the benefits of cleantech adoption accessible to more communities. IN² marked 2023 with significant strides in these areas—engaging our partners, expanding our networks, and laying the groundwork for the future.

In 2023, IN² added seven new portfolio companies focused on agtech, continuing our partnership with the Donald Danforth Plant Science Center in St. Louis, Missouri. We collaborated on first-of-a-kind research in biologics, food production, remote sensing, and carbon management. Thriving agriculture portfolio company Peptyde Bio successfully leveraged funding for field testing to validate their innovations in the field, with Invaio seizing the opportunity to acquire Peptyde Bio in the fourth quarter of 2023.

This past year, our dedicated team was at the forefront of exploring novel ideas, embracing emerging technologies, and redefining the boundaries of what is possible. IN²'s Channel Partner network, comprised of more than 60 accelerators, incubators, and institutions across 39 states, also played critical roles in serving their regions and climate sectors.

Collaboration remains central to our impact strategy. In 2023, the inaugural Channel Partner Advisory Board convened in person to discuss new and enhanced ways that IN² could continue to support cleantech innovation across the network. In May, we distributed more than $970,000 in Channel Partner Strategic Awards to seven recipients, including eight collaborative efforts, to support innovative projects intended to strengthen and diversify the cleantech and agtech ecosystems. Two 2022 strategic award winners completed their projects in 2023: Carnegie Mellon University Wilton E. Scott Institute for Energy Innovation and Wisconsin Energy Institute at University of Wisconsin-Madison. Collectively these projects impacted more than 600 people in more than 25 states and 15 countries, supporting multiple geographic regions and serving many different Black, indigenous, and people of color (BIPOC) groups.

The IN² portfolio now boasts 72 companies, which surpassed an impressive $2 billion in follow-on capital and a 100% leverage rate. This comes less than three years since the companies broke through $1 billion in follow-on funding.

In today's dynamic business environment, adaptability and innovation are not just competitive advantages; they are critical to unlocking new opportunities and ensuring long-term sustainability. Accelerating innovation is not only about achieving short-term gains, it also is about laying the foundation for sustained growth for years to come. Convening advisory boards in 2023, we reflected on this market realization, the escalating pressure of climate change, and the imperative to accelerate technology to full-scale deployment. The conclusion was clear: there is a need to create permanent pathways for innovation and develop new ways to support alumni companies towards faster deployment.

As we navigate the ever-changing landscape of clean and climate tech, we remain focused on fostering a culture that encourages bold thinking, experimentation, and continuous improvement. The urgency of our time requires us to accelerate our efforts to create a world where technology and sustainability go hand in hand.

Thank you for your partnership and support in 2023. We are excited to get to work on the next chapter of IN². Onward!

IN² OVERVIEW

The Wells Fargo Innovation Incubator (IN²) is a $50-million collaboration between the Wells Fargo Foundation and the U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL) to provide technical assistance and validation to promising cleantech startups. The technology incubator's goal is to quickly and successfully drive to market innovative technologies that will lower carbon emissions and de-risk them for investment.

Founded in 2014 and administered out of NREL's Innovation and Entrepreneurship Center, we continue to demonstrate better ways to evolve the built-environment and agriculture sectors and find innovative ways to unlock expansion opportunities. IN² has supported 72 companies that each received up to $250,000 in nondilutive funding. The companies use the funding to engage the world-class talent and facilities at NREL and the Donald Danforth Plant Science Center. The program matches each company with an expert researcher in their technology area and uses a team of relevant researchers, labs, and equipment to support a collaborative technical assistance project.

Partnership Demonstrates Success: NREL and the Danforth Center

The access to resources at two of the nation's most highly regarded research facilities sets IN² apart. The research into the built environment (affordable housing and commercial buildings) takes place at NREL's South Table Mountain campus in Golden, Colorado. As a national laboratory, NREL is a global leader in advancing energy efficiency, sustainable transportation, and renewable power technologies and provides the knowledge to integrate and optimize energy systems. Our companies receive not only expert guidance from researchers at the lab, but also the benefit of access to multimillion-dollar user facilities.

Research with our agtech startups takes place at the Danforth Center in St. Louis, Missouri. The Danforth Center is the world's largest independent plant science institute. Founded in 1998, the nonprofit research institute's mission is to improve the human condition through plant science. The Danforth Center has 32 scientific teams; $250 million in competitive research funding from government agencies, industry, and foundations; and a greenhouse complex that provides 54,130 square feet of active growing space. The agtech track, which provides technical assistance from NREL and the Danforth Center, debuted in 2019, and to date, we have welcomed 26 agtech companies to the program.

IN² by the Numbers

Our numbers demonstrate our success:

72
portfolio companies

$2.06B
In external funds raised by companies since joining IN²

101:1
For every $1 invested by IN², portfolio companies raise more than $101

243%
employment growth for the IN² portfolio of companies

14
mergers & acquisitions of IN²-assisted startups

DEMONSTRATING SOLUTIONS

BlocPower

For its 10th cohort, IN^2 brought together participants who were ready to scope and perform a demonstration project and who had a partner ready to install their tech. Two of the teams began their demonstrations in 2023, with the other three launching in 2022. Alongside technical assistance from NREL, this cohort aims to de-risk new customer acquisition by providing a concrete example of success.

BlocPower

Donnel Baird, CEO of BlocPower, likes to say he wants to turn buildings into Teslas, but this goal of electrifying buildings around the country means a bit more.

"We retrofitted a church on my block where I grew up as a kid," Baird said. "I walked past that church every day. As an adult, to come back to that same city block and reduce emissions, that was a nice full-circle moment."

Because buildings contribute to 30% of global greenhouse gas emissions, BlocPower aims to renovate buildings, removing fossil fuel equipment, and changing the buildings over to use electric systems, typically with a heat pump. The company says it has worked with more than 5,000 families in Brooklyn and electrified approximately 3% of the five- to 50-unit apartment buildings in New York City.

"The future of the human race is in our hands," Baird said. "We have all of the hardware and software capability that we need to dramatically reduce emissions."

BlocPower has contracts to electrify three U.S. cities in the next six years: Ithaca, New York; Menlo Park, California; and San Jose, California, the 10th largest city in the country.

"Over the next five years, we're going to decarbonize every single building in these cities," Baird said. "We worked with NREL to build digital twins and predictive models on how to electrify each building."

BlocPower also has smaller contracts in Atlanta, Georgia, and Milwaukee, Wisconsin.

As part of BlocPower's participation in the IN^2 demonstration cohort, it is testing a technology called electric thermal storage (ETS), a radiant heating system, in the New York area.

"It's basically a big ceramic brick that stores and discharges heat," said Matt Leach, NREL senior researcher and the principal investigator for the BlocPower IN^2 project. "It's similar to an old-timey wood stove—that cast iron stays hot for a while once it's hot, and that warms up the space."

The idea is that a heat pump will warm a building in the winter, replacing the traditional steam radiators. These same heat pumps also provide cooling during the summers.

"Many heat pumps go into buildings that maintain a system that uses fuel as a backup," said Dominique Lempereur, BlocPower's chief of engineering. "The ETS can replace gas as a backup, and then you have a 100% electric solution that works."

For its IN^2 demonstration, BlocPower is partnering with Steffes Group, a leader in ETS technology. The hope is to have the demonstration in place within the next year and have the full testing begin in October 2024.

"They're going to install the ETS along with the heat pump and try running it in different operating modes and see: Is the space more comfortable? Is the energy bill higher or lower?" Leach said.

CorePower Magnetics

CorePower Magnetics' supports the electric vehicle (EV) market and power grid by designing, optimizing, and manufacturing high-performance components such as motors, inductors, and transformers for use in various points of the system. The new technology CorePower is testing for EV applications has a lot of potential for urban areas with limited space, and in the future, it can play a role in markets for products that allow EV participation, which can be excellent for the grid and translate into benefits for consumers.

"Essentially, CorePower can offer a solution anywhere a transformer or inductor is required and specializes in providing solutions for cutting-edge applications like EV charging and renewable integration," CEO Sam Kernion said. "We are also in the process of bringing to market high-efficiency, power-dense motors that contribute to extending the range of electric vehicles."

For its demonstration with IN^2, CorePower is partnering with Eaton, a power management company, to test a transformer designed for an EV charging application, especially mass EV charging for things like fleets. When a user needs that much power, the components can get large and inefficient. CorePower hopes to keep its technology smaller and more efficient.

"In the challenging hard-tech sector, the journey from laboratory to a functional product demands significant energy and cost," Kernion said. "It requires a combination of patience and capital to overcome these entry barriers. The crucial support from IN^2 funding has played a vital role in advancing the actual construction of these components. Moreover, it reduced the technological risks for our customers, helping to bridge the gap from development to a commercially viable product."

NREL research engineer Omar Jose Guerra Fernandez. is happy NREL is able to provide CorePower with these opportunities. Fernandez does techno-economic analysis for clean energy technologies where he quantifies the benefits and costs of new technologies. He was brought in to analyze solid state transformer technology.

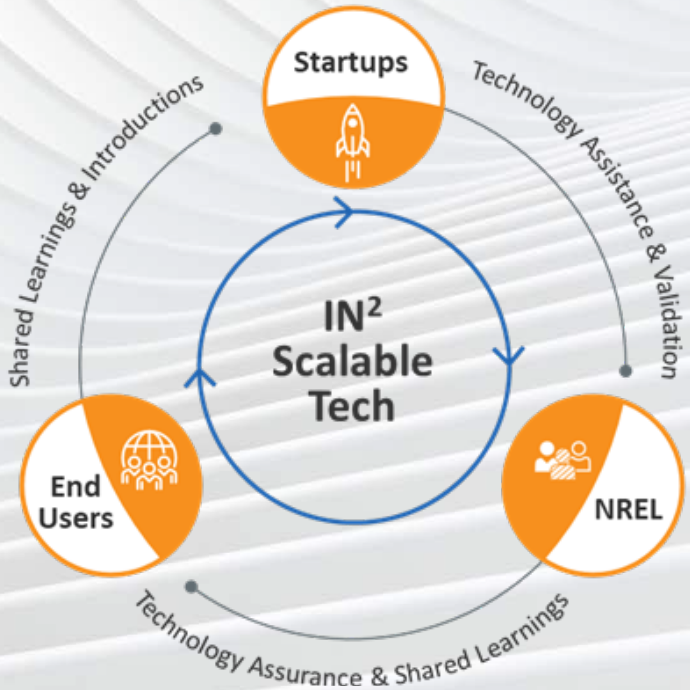
"Demonstration is the key component for the deployment of new technologies," he said. "That is the point where you validate: Is this technology going to be able to provide all of these services? Is this technology going to be stable or able to operate many hours under real-life conditions?"

CorePower already has products in the market for U.S. Navy and Air Force supply chains. Additionally, the startup was recently selected for a $20 million award from the U.S. Department of Energy's Office of Manufacturing and Energy Supply Chains to launch a state-of-the-art domestic manufacturing facility that will produce magnetic components and advanced metals that are currently dominated by foreign supply chains.

"This opens the door to potential new efficiency standards for distribution transformers, contributing significantly to energy savings on the grid," Kernion said. "We're pushing the boundaries, and having a partner like NREL, who comprehends the intricacies of these impacts, has been immensely beneficial."

CorePower Magnetics

PROGRAM EXPANSION



As we commemorate a decade of championing startups, IN² proudly reflects on a journey from nurturing early-stage ventures to ushering them into market readiness. Our portfolio boasts 72 impactful companies, with a remarkable 14 (19%) having been acquired or gone public. Collective follow-on funding for the portfolio now exceeds $2.06 billion. IN² continues to be a driving force supporting rapid innovation in climate tech, de-risking technology and accelerating the pace towards commercialization.

Looking ahead, we asked critical questions: How can we evolve? What do cleantech startups—and the broader cleantech ecosystem—need today? And how do we meaningfully contribute to global carbon reduction goals? These questions fueled our discussions throughout 2023. Engaging with thought leaders, industry pioneers, world class researchers, and startup communities alike, we charted a course for IN²'s next chapter. Our objective is clear: to accelerate the market adoption of cleantech solutions, not only from IN² but also through our expansive Channel Partner network. We aim to amplify opportunities for our alumni companies, fostering scalability and drive towards increased deployment of cleantech technologies.

In 2024, IN² remains committed to supporting emerging technologies, creating a robust pipeline filled with companies in discovery and validation. Simultaneously, we are expanding our bounds by introducing a new scalable technology track that extends our support to encompass end users. Collaborating directly with companies, communities, and end users, we strive to construct well-defined, permanent pathways for innovation adoption. Our focus is on providing startups with direct access to marketability, thus increasing the number of companies that successfully reach commercialization and deployment.

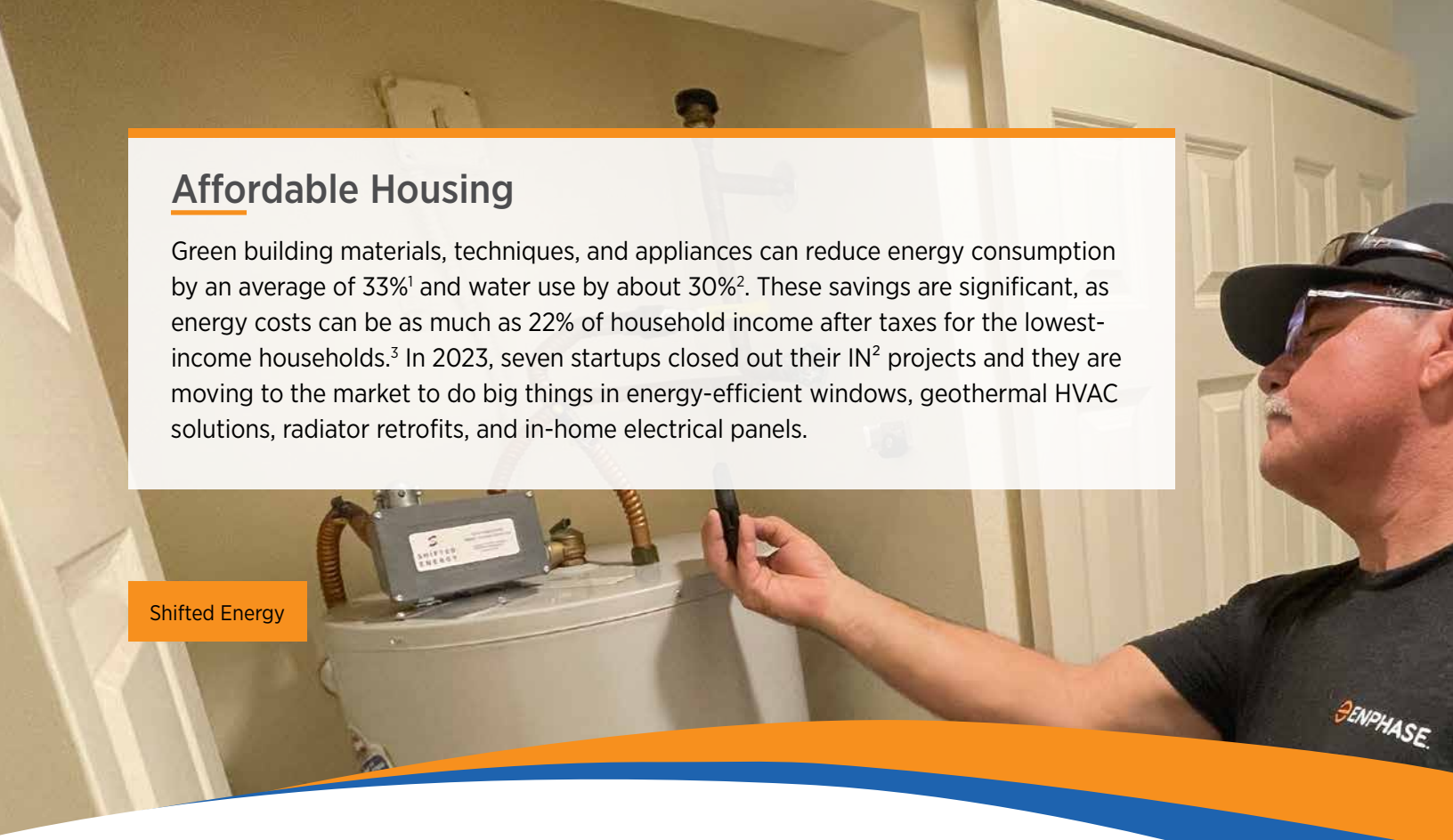
Our mission is to work towards a lower-carbon future by advancing clean and sustainable technologies, and the faster we embrace groundbreaking solutions, the sooner we can reduce emissions and secure a better future for our communities and world.

OUR PORTFOLIO

IN^2 selects startup companies that have a high probability of making a real impact on the cleantech or agtech market. These active projects provide viable solutions in affordable housing, commercial buildings, and sustainable agriculture.

Affordable Housing

Green building materials, techniques, and appliances can reduce energy consumption by an average of 33%[1] and water use by about 30%[2]. These savings are significant, as energy costs can be as much as 22% of household income after taxes for the lowest-income households.[3] In 2023, seven startups closed out their IN² projects and they are moving to the market to do big things in energy-efficient windows, geothermal HVAC solutions, radiator retrofits, and in-home electrical panels.



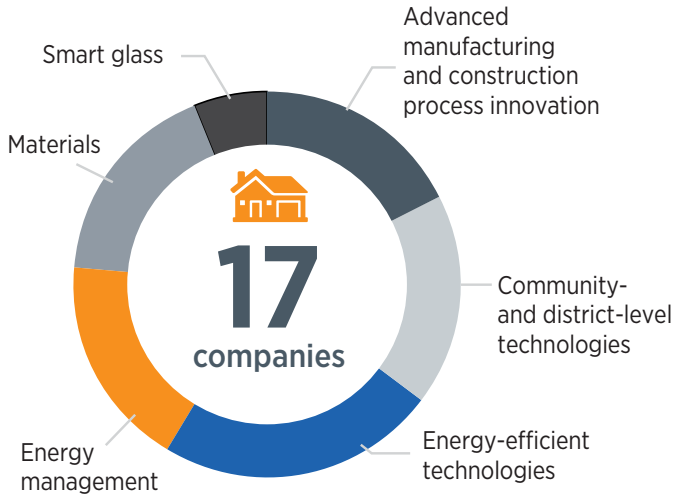
Shifted Energy

> **Being a part of the IN² program and working directly with the scientists and engineers at NREL has been such a rewarding experience for us as an early-stage company. We have been able to quantify and analyze the impact of our thermal barrier technology to reduce greenhouse gas emissions for building owners at a national scale, which has helped us focus our commercialization efforts."**

– Dr. Matthew Aguayo
Co-Founder and CEO, EnKoat

> **The IN² program was transformative for Adept Materials. We worked with world-class building scientists at NREL to validate our material technology, which mimics the transpiration of plants in how it regulates heat and moisture flows in buildings. The IN² program enabled Adept to advance its technology and quantify the value proposition"**

– Derek Stein
CEO, Adept Materials



[1] Good Energies. "Greening Building and Communities: Costs and Benefits." 2008.

[2] Kats, Greg et al. "The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force." 2003.

[3] U.S. Bureau of Labor Statistics, U.S. Department of Labor. Consumer Expenditures in 2009. Report 1029. 2011.

BlocPower helps low- and moderate-income multifamily housing building owners and tenants in cities harness energy efficiency and complete renewable energy retrofits, replacing fossil fuel-based systems with carbon-free technologies, and digitizing components of energy efficiency transactions. For the BlocPower IN^2 project, NREL created physics-based models of typical apartments using a cold-climate heat pump and thermal energy storage device. These apartment models, along with their HVAC equipment, are typical for the buildings that BlocPower will use for demonstrations in New York City.

Kit Switch installs and analyzes its prefabricated kitchen modules with integrated plumbing and electrical systems in underutilized spaces. Each unit can be premanufactured, flat-packed, and assembled on-site for reduced costs and timelines. Instead of demolishing the 6 billion square feet of vacant buildings zoned for housing in the United States, Kit Switch offers to make them viable again. In its work with NREL, Kit Switch installed demonstrations in California while NREL helped with process efficiency and network connections.

NeoCharge's integrated software platform will synchronize charging of electric vehicles and appliances. The company's smart splitters allow fast simple charging at home and reduce carbon emissions by up to 55%. NREL tested load profiles for typical equipment that may pair with smart splitters in real-world applications in its Systems Performance Lab. The rest of the IN^2 project work will involve validating the performance of a prototype in the lab.

Shifted Energy develops a power controller and accompanying software that converts existing electric water heaters into intelligent, grid-interactive water heaters. NREL provided technical assistance with the controller's forecasting algorithm and has performed lab validation of their algorithms using actual water heaters, including both electric and heat pump types. As part of its IN^2 project, Shifted Energy is also working with Hawaii Energy to demonstrate the heat pump water heater controllers in affordable housing units.

Our Alumni

Adept Materials
AeroShield
Blokable—inactive
Darcy Solutions
EnKoat
Glass Dyenamics
Kelvin (previously Radiator Labs)
Pre Framing Corp
SPAN
Stash Energy
STRATIS IoT
Tallarna
Whisker Labs

Accelerating Innovation for Housing

Energy efficiency in the housing market is difficult, but necessary, and startups working with IN² are making great progress in transforming the landscape of sustainable living.

Shifted Energy

Shifted Energy

The family that Shifted Energy helped thought something was wrong. Shifted Energy installed a new grid-connected heat pump water heater system and when the family got the energy bill, the price changed from $910 to $130 in one month.

"They contacted Hawaiian Electric to say: You didn't read our meter correctly," Shifted Energy CEO Forest Frizzell said. "Hawaiian Electric assured them the bill was correct and the family was very emotional when they called us."

Working with IN² provided Shifted Energy with lab space allowing the team to test out theories and design strategies.

"It was a really great way to test it in an environment that was a de facto energy lab," Frizzell said. "The whole team that we've been able to work with, it's been easy; everybody does their job and communicates so well. It allows us to move quickly through innovation. When we went out in the community to ask people to work with us and use our technology, because of IN², we knew it was going to work."

Shifted Energy extended its contract with IN² twice and is looking at a third time. The company is also hoping to work with other IN² startups: It plans to deploy some of SPAN's panels in Hawaii and is in talks with BlocPower on a joint project.

Shifted Energy also works in Australia, Canada, and the continental United States, but in any community, the company focuses on solving the affordable housing crisis.

"You're often asking the most vulnerable people in our communities to pay the highest electric bills," Frizzell said. "So those systems should be updated or retrofitted first. Everything we've ever done has been built with the lens of: Is this is good for our community and as generations pass, will it still be good? It's not just the right thing to do, it's also economical."

Glass Dyenamics (Program Alum)

Dimmable glass technology was historically not durable to ultraviolet (UV) light from the sun's rays. Glass Dyenamics overcame the UV-durability hurdle and created the company.

"The material includes dyes inside the glass," CEO Christopher Angelo said. "When you apply a voltage to a sensor in the window, the glass tints automatically and on demand. This could be the next solar panel."

According to Angelo, dimmable glass helps improve building energy efficiency by modulating the amount of

solar heat entering a building. In the summer, the glass can tint, which reduces the amount of heat entering, and in the winter, the glass can un-tint, which allows more solar heat to enter. DOE and industry studies suggest that this type of glass can save homeowners up to 20% on utility bills.

Glass Dyenamics believes its technology is a better value proposition than traditional residential solar since it costs less and is independent from the utility network. Users can also control the glass tint level through a mobile phone app. The company has its first installation in a home in Bend, Oregon, and is working on commercialization and scaling.

Angelo said they expect to start with additional installations in Arizona, the company's location, Oregon, San Francisco, and Los Angeles.

Glass Dyenamics joined IN^2 in 2017 to test the glass's durability to prove the core advanced material's feasibility.

"The key technical obstacle for any new advanced glass like this is the environmental durability hurdle. IN^2 was crucial for us to utilize NREL's test chambers to validate our glass' durability," Angelo said.

The company got a major boost with homeowners when Congress included the technology in the Inflation Reduction Act (IRA). Over the next two years, there is up to a 50% investment tax credit for installing windows and doors with dimmable technology.

Tallarna (Program Alum)

Money is often the obstacle that keeps both building owners and occupiers from embracing clean energy upgrades. Tallarna hopes to change that through its "Decarbonization-as-a-Service" offering.

"If you can say to the building portfolio owner, technology provider, finance provider, and end occupier, 'We will guarantee not just the performance outputs of decarbonization works, but the resulting financial outputs,'" said Tim Meanock, CEO and co-founder of Tallarna. "They jump at that chance."

Headquartered in the United Kingdom, the company's software links decarbonization project outputs to a unique performance insurance. While building owners and occupiers pay to access the newly installed clean energy technologies, their lower utility bills and maintenance costs offset that expense, with the net savings shared between parties. Essentially, they get the economic benefits of decarbonization without the risks of ownership or initial capital outlay because Tallarna assumes that.

"Our ability to guarantee project savings in kilowatt-hours and their conversion to dollars limits the financial contribution required from the building owner—with the money instead coming from private finance. At the same time, we ensure the occupier is left better off from day one," Meanock said.

The company focused on several key clean energy measures with NREL before and during the IN^2 project, including battery energy storage systems (BESS). As a result, Tallarna generated business in both Europe and the U.S.

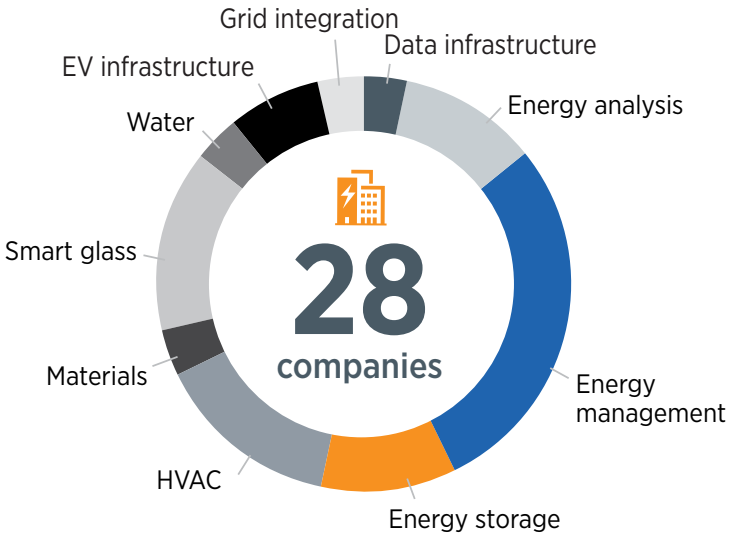
"The amount of experience and knowledge NREL has is incredible," Meanock said. "But it's their great processes that sets them apart. The lab provided us with a first-class way to take our software to the next level, and they coupled this with market references. Our enduring collaboration with NREL will continue to make clean energy adoption the financially smart choice—turning it into the default, not the exception."


Tallarna

Commercial Buildings

Commercial buildings are responsible for 40% of global energy consumption and 33% of global greenhouse gas emissions.[4] To help improve these numbers, portfolio companies accelerated innovation in 2023, including building a solid-state transformer to improve electric vehicle efficiency, streamlining adaptive reuse of unused commercial buildings as affordable housing, and updating residential water heaters to save money in low- and moderate-income communities while optimizing grid energy use.

> **"It's hard to overstate how much more reliable, maintainable, robust, and reusable the translation pathway is now compared to the first time. And this is almost entirely because of IN² and the fact that both the team at NREL and Ladybug Tools had funding to work on this together, bringing together best practices from both sides."**
>
> **– Christopher Mackey**
> *Co-Founder, Ladybug Tools*



[4] Tricoire, Jean-Pascal. "Why buildings are the foundation of an energy-efficient future." 2021.

Community Energy Labs (CEL) builds technology for clean, all-electric, self-driving buildings, focusing on installations in public school district buildings. CEL provides an innovative platform for carbon-free, affordable, and reliable building control without disrupting power markets or the grid. As part of its IN^2 project with NREL, CEL is conducting demonstrations of its product on several K–12 schools in the Pacific Northwest. NREL assists in evaluating CEL's model predictive controls and applications in schools.

CorePower Magnetics designs, optimizes, and manufactures high-performance electric motors, inductors, and transformers that are 10 times smaller, lose half as much power, and can withstand next-generation operating conditions. These components enable electric vehicles to travel farther and redefine the operational limits of the power grid to accelerate renewable adoption. As part of its IN^2 project, CorePower is working with Eaton to demonstrate its power-dense transformers in electric vehicle applications. NREL is also providing technical guidance and techno-economic analysis.

NineDot Energy works with Fermata Energy and Revel Transit, Inc., to support grid reliability by using the batteries in fleets of electric vehicles (EVs) to supply energy back to the grid during times of peak demand. The project uses Fermata Energy's bidirectional charging stations and software to perform vehicle-to-grid (V2G) operation with the energy stored in Revel's EV fleet. NREL and NineDot continue to evaluate data after the first installation in Brooklyn, New York. NREL is helping NineDot to identify the "golden spots" in the New York grid where V2G vehicles could be most effective.

UbiQD produces nanomaterials for energy harvesting that provide a simple, scalable, low-cost, and aesthetically pleasing approach to solar windows. NREL has conducted durability assessments of UbiQD's prototype devices using an appropriate industry standard for window technologies, as well as relevant standards from the photovoltaics industry. NREL also conducted varied materials characterization studies related to fundamental properties of UbiQD quantum dots and Luminescent Solar Concentrator devices. The project also includes a demonstration of five windows installed at the NREL Café on the Golden, Colorado, campus, plus one other demonstration that is currently in the scoping phase. These five windows were upgraded in 2023 to incorporate recent research and development that has resulted in higher efficiencies and the capability to include milder colors. NREL and UbiQD will compare the performance of these newer windows to the previous installation. UbiQD also earned the top award, Best Overall Venture, at NREL's Industry Growth Forum 2023.

Yotta Energy develops modular energy storage integrated with solar, designed to reduce cost and expand development of energy storage and grid resiliency on commercial buildings. NREL characterized the technology performance of two Yotta Energy prototype units as compared to a baseline unit, first in a laboratory environmental chamber, subjected to a range of ambient conditions. The final phase of Yotta's IN^2 work includes the integration of a modeling capability for the Yotta system type into NREL's REopt® tool, plus a demonstration of several Yotta SolarLEAF units on NREL's café.

Our Alumni

- 75F
- 7AC Technologies
- Apana
- Blue Frontier
- Cypris Materials
- EdgePower
- ESS
- Geli
- Go Electric
- Heliotrope —inactive
- J2 Innovations
- Ladybug Tools
- LiquidCool Solutions
- Maalka
- NETenergy
- NEXT Energy Technologies
- PowerFlex
- simuwatt (buildee)
- Thermolift
- Transformative Wave
- Turntide Technologies
- VG SmartGlass
- WattIQ

Accelerating Innovation for Commercial Buildings

Since its inception, IN² has prioritized supporting startups that drive clean energy technologies and practices in commercial buildings. Many alumni companies are making great progress in transforming the built environment.

NEXT Energy

NEXT Energy Technologies (Program Alum)

In the process of creating photovoltaic smart glass, or window coatings that also absorb light and turn it into electricity, there is no one-size-fits-all solution.

"The thing about the window business," NEXT Energy Technologies, Inc., COO Brenton Taylor said, "is there's no such thing as a standard-size commercial window. It's all custom."

NEXT Energy developed a coating for windows based on organic semiconductors that allows the window to absorb light from infrared rays and convert it into electricity which channels into a junction box and then into inverters.

"Our objective is to design a product that looks and feels and behaves exactly like a normal window, but with an added benefit of providing electric power," NEXT Energy Co-Founder and CEO Daniel Emmett said.

The coating is printed onto windows during fabrication, similar to ink printing onto paper. NEXT Energy can also tailor the coating to allow different wavelengths of light through and change the colors of the windows.

Through IN², NREL helped NEXT Energy calculate a key metric important to architects: the solar heat gain coefficient. Because the coating absorbs light and converts it to electricity, the calculation required a modified method to properly account for the impact of the technology.

"One of the big 'A-ha's' was being able to show people the improved solar heat gain coefficient," Emmett said. "We now have a result that is essentially not just us saying, but NREL validating, 'This is how to calculate it, and this is an improved solar heat gain coefficient.' We didn't even get to tell that part of the story before, and it's been huge."

After an installation at the Patagonia headquarters in the San Francisco Bay area, NEXT Energy continues to scale up the size of their windows, with more installations planned in the future.

Turntide Technologies (Program Alum)

When Turntide Technologies joined IN² in 2017, they had a small group and an untested product. Now the company has more than 500 employees, and its motors help cool and heat hundreds of commercial buildings and dairy barns worldwide for a fraction of the energy typically consumed.

"We have a really unique motor that can run efficiently at all speeds without requiring rare earth magnets," Turntide CEO Ryan Morris said. "IN² was one of the first times our science project went from the lab to the real world, where it created measurable economic value."

Turntide retrofits HVAC systems in commercial buildings ranging from quick-serve restaurants to retail stores, shopping malls, factories, and even a stadium. A big box retail chain in the United Kingdom installed 800 units while retrofitting their stores and saw a 40% energy savings.

The entire Turntide team credits IN² for launching the company forward. They believe the work with NREL allowed them to make a greater impact on the market, because most potential customers asked for

a vote of confidence from a technically reputable institution like NREL.

"Having reports from NREL enabled us to scale," said Brian Chang, product marketing manager for Turntide. "We are bringing something new to the market. Third-party validation allows us to leverage unbiased and convincing proof points when we're discussing our technology with new customers."

Additionally, utility companies in several states have approved the motor for upwards of an 80% rebate.

WattIQ (Program Alum)

The lessons WattIQ learned from IN^2 helped them discover they needed to make a pivot for success.

Instead of focusing on commercial building energy savings and reduction, WattIQ now specializes in lab equipment at research and development facilities, specifically with the use of sensors to help lab equipment run longer and more efficiently.

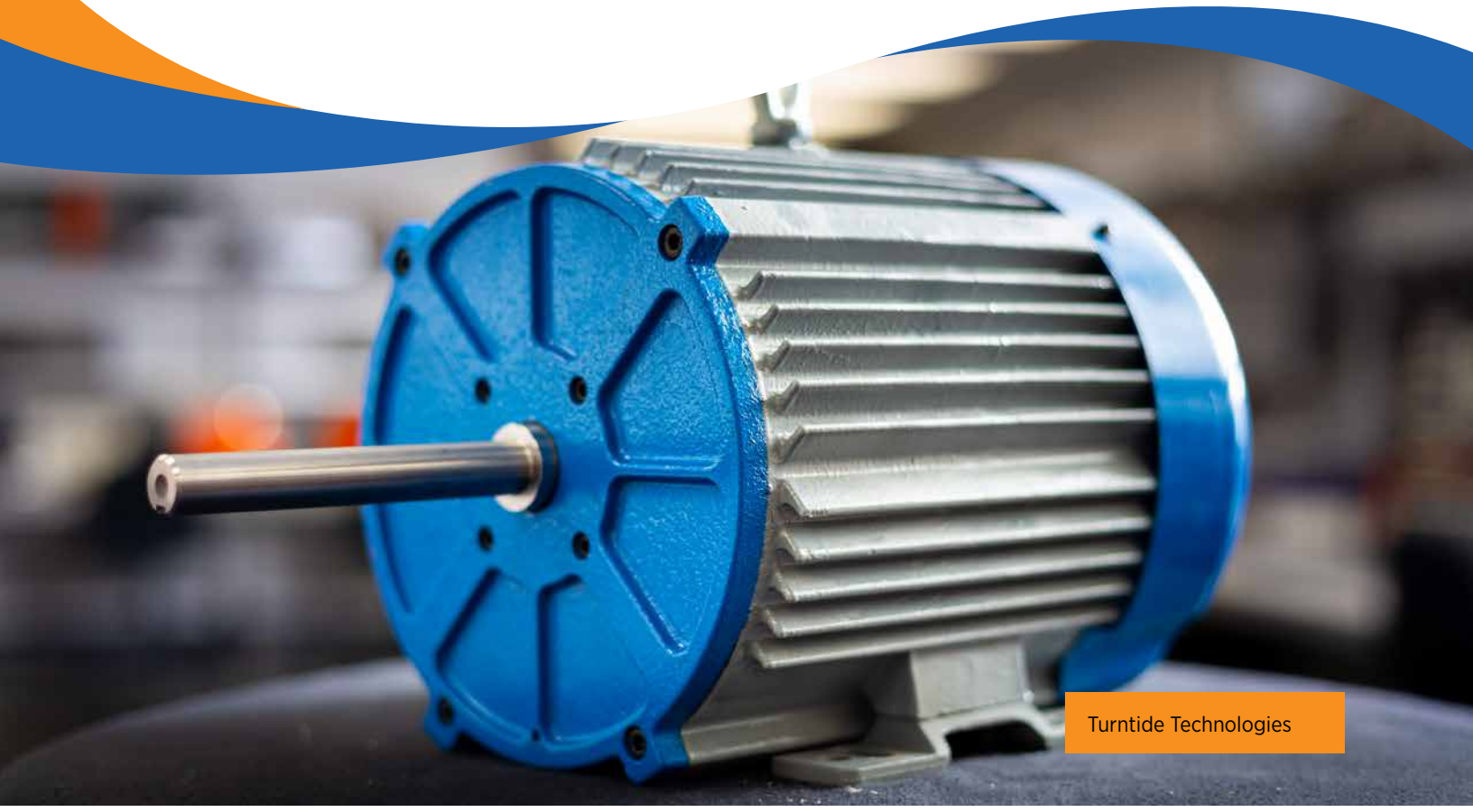
"With our sensors, we help people understand when things are going to fail before they fail," WattIQ CTO Mark Madsen said. "We run a cloud-based service that uses sensors to understand how their equipment is used, and the health of their system."

The pivot came in 2019 when a pharmaceutical company asked WattIQ about power and cost savings. That pharmaceutical became one of the first and larger COVID vaccine manufacturers, which means it uses many coolers that run constantly. The company asked WattIQ for power monitoring, and what seemed simple turned into a multiyear journey. After developing better algorithms for this type of equipment, WattIQ now monitors 3,000 coolers at one facility.

WattIQ uses a combination of temperature, power, and other sensors to understand when the equipment is functioning properly and when it needs service.

WattIQ credits IN^2 with laying the building blocks of where the company is today. Researchers at NREL helped WattIQ develop algorithms that look at plug loads and decide when it is acceptable to shut equipment off. WattIQ observed a building on the NREL campus for many years, ultimately making it easier for personnel who work there to determine when they should turn equipment on and off.

"That's not about characterizing equipment, it's about characterizing human behavior, which is variable and hard to predict," Madsen said. "However, we have scheduling functionality in our system today and it really dates from the work we did with IN^2 and NREL."



Turntide Technologies

Sustainable Agriculture

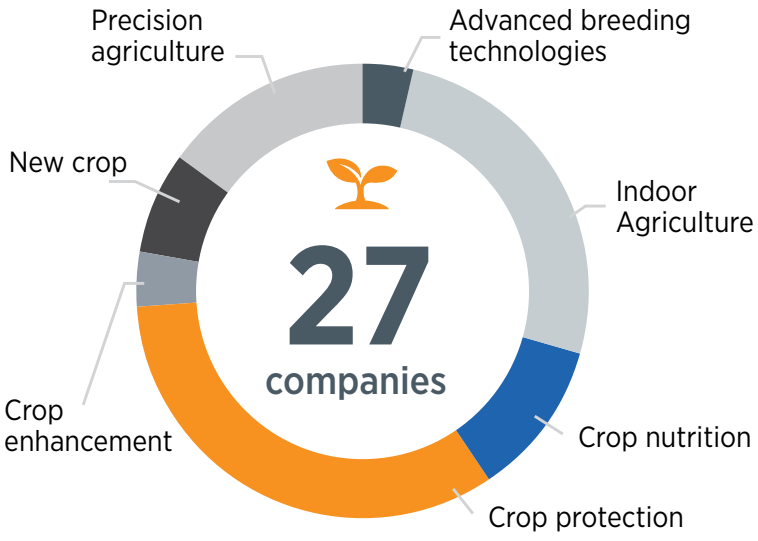
The food system alone contributes up to a quarter of all global greenhouse gas emissions and uses 50% of habitable land and 70% of freshwater withdrawals worldwide.[5] In 2023, seven new companies joined our agtech portfolio focused on mitigating and adapting to the impacts of climate change on global food systems.

Edison Agrosciences

"The IN² program has been tremendously supportive of Robigo and opened doors to the agriculture industry through the partnership with the Donald Danforth Plant Science Center. Their leading scientific experts and state-of-the-art equipment has helped Robigo develop an impactful research program. We feel incredibly lucky to be a part of a program that has been flexible to ensure our time in IN² is as valuable as possible."

– Andee Wallace

Founder and Chief Executive Officer, Robigo



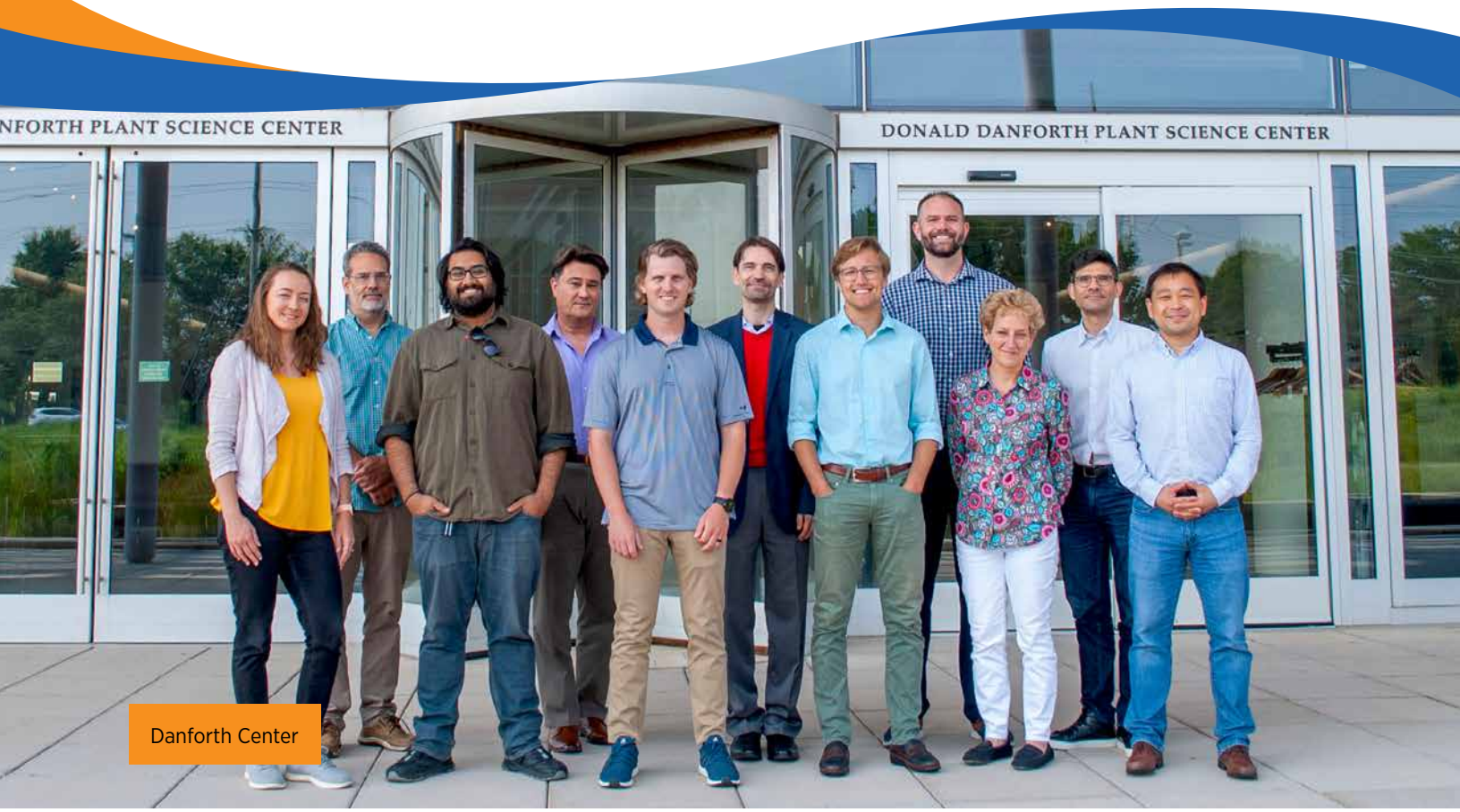
[5] Schrempf, Bridget et. al. "Hungry for Change: Are companies driving a sustainable food system?" 2020.

Atlas Sensor Technologies develops real-time water hardness sensing combined with sensors to detect nitrogen compounds for improved crop development. Atlas successfully developed a new in-line nitrate sensor, the prototype of which will be tested at the Danforth Center for functionality and fit with applications in different greenhouse environments.

Cytophage Technologies uses synthetic biology to generate bacteriophage products that specifically target and eliminate problematic bacteria. They are currently working with scientists at the Danforth Center to extend their technology, previously demonstrated effective in humans and animals, to commercially important crops.

Edison Agrosciences leverages selective breeding technology to increase the amount of rubber already produced by the sunflower plant to create a domestic supply, prevent further tropical deforestation, and reduce forced/child labor. Their project will be conducted in the field, with planting planned for spring 2023.

HabiTerre uses remote sensing, process models, and artificial intelligence to create a holistic picture of farm production systems' past, present, and future cropland performance, including net greenhouse gas emissions, soil carbon sequestration, crop rotation, management history, yield, water use, and nutrient dynamics.



Danforth Center

Impetus Ag is developing next-generation crop insect control products with an eco-friendly insect control platform that dramatically enhances the performance of current biological products for topical and transgenic applications.

Impossible Sensing boosts soil management, merging in-situ sensors with regular farming operations. The solutions aim to capture real-time data on nutrients, soil health, and carbon levels, empowering growers to maximize land potential, participate in carbon markets, and improve profitability through sustainable practices.

InnerPlant develops seed technology to tap into plants' natural response pathways and code crops to communicate early, specific stresses via easy-to-collect optical signals. The technology helps farmers understand plants' needs and prescribe the right amount of fertilizer and crop protection products at the optimal time.

Mirai Solar uses photovoltaic shade screen technology, the Mirai Screen, to provide greenhouses and smart buildings the means to reduce their operational costs and achieve net-zero energy targets. The Mirai Screen transforms the need for shade into a source for renewable energy by acting as a simple drop-in replacement for conventional passive shade screens.

Peptyde Bio discovers, designs, and develops novel biofungicides based on natural plant-derived antimicrobial peptides. They successfully completed their IN^2 project in June 2023 and were acquired by Invaio in December 2023.

Robigo is creating the next generation of sustainable microbial pesticides that are more effective in controlling disease, environmentally friendly, and nontoxic to field workers. They are currently designing and scoping their collaborative project with the Danforth Center, which will likely begin in spring 2023.

Running Tide is on a mission to restore ocean health, rebalance the carbon cycle, and revitalize coastal communities. The company designs and develops integrated software and hardware systems, including monitoring and measurement capabilities, to deploy nature-based interventions that remove carbon, combat ocean acidification, and increase the scientific understanding of ocean ecosystems.

Sentinel Fertigation leverages remote sensing and geospatial data to empower precision nitrogen management, particularly for farmers who fertigate. Sentinel's N-Time software program helps farmers improve nitrogen use efficiency by 23% and save 42 pounds of nitrogen per acre on average.

Our Alumni

AgroSpheres
Aker Technologies
CarbonBook —inactive
CoverCress
EarthSense
Growflux
Intrinsyx Bio
mobius
New West Genetics
Plastomics
Pluton Biosciences
RNAissance Ag
SolGro
TerViva

Accelerating Innovation for Sustainable Agriculture

The agriculture industry needs innovative, sustainable solutions that not only increase productivity, but do so without causing harm to our planet. Startups working with IN^2 are reimagining the future of food and farming.

Cytophage Technologies

Broad-spectrum antibiotics have been the go-to medication since the 1940s. However, due to the rise of antibiotic-resistant bacteria, Cytophage Technologies Inc., aims to put phages—viruses that only target bacteria—front and center.

"Antibiotics come in and remove everything, killing all the bacteria, while phages work differently," Dr. Tasia Lightly, a staff scientist at Cytophage, said. "Individual phages are very specific for their hosts, so they don't kill everything. However, they don't interfere with the microbiome the way antibiotics do."

Up until recently, ranchers often gave livestock antibiotics, even if they were not sick. This preventative measure also had the side effect of helping the animals gain weight. Those antibiotics get into the groundwater and stay in the meat itself, leading to human consumption. That means not only do the animals start to harbor antibiotic-resistant bacteria, but so do the people who consume the meat. The goal is to convince the agricultural community to start using phages instead of antibiotics, especially since new regulations no longer allow antibiotics.

Lightly credits IN^2 and the Danforth Center with putting the company on this more agricultural-focused path.

"Because of our connection with NREL and the Danforth Center, we got access to strains that were causing problems for a primary food staple around the world," she said. "After we received the disease-causing strain, we were able to find phages to fight against it."

Phages are also cost-effective because Cytophage can produce a high amount at once and make them more affordable. The company plans to launch its first product that will be sold by a distributor in 2024.

"We'd really like to see phages become more popular in the next 5 to 10 years, especially in Canada and North America," Lightly said. "We're working hard with regulators to make phages accessible as quickly as possible."

Peptyde Bio

The smell of freshly cut grass is a scent many people enjoy, but from the grass, it is a warning. That smell is something grass emits in response to an attack. Another expression plants give to an attack are peptides, which are strings of amino acids. Peptyde Bio uses these peptides to replace traditional pesticides with something found in nature.

"All plants produce peptides as part of their immune response to attacks," said Tom Laurita, Ph.D., who, until recently, served as interim CEO of Peptyde Bio. "Plants can't run away, so they have very complex natural chemical immune systems. That led us to think differently about pesticides—rather than just producing a synthetic chemical, what about utilizing something that's naturally occurring? We worked to discover which peptides are active against various fungal diseases different crops face. When we found ones that are potent, we tested them against many diseases to see if it can stop the process or the harm."

The Danforth Technology Company (DTC) spins off early-stage startups from technologies developed at

the Danforth Center and launched Peptyde Bio in 2022 based on antimicrobial peptide technology developed by Danforth Center scientists. IN^2 played a key role in the company's development after including it in Cohort 11 in the spring of 2022 just as Peptyde Bio started its growth.

"The IN^2 funding was used to hire top scientists to create a knowledge base of all the peptides in the public sphere," Laurita said.

In early December 2023, Cambridge, Massachusetts-based Invaio Sciences acquired Peptyde Bio, marking the first startup to successfully exit the DTC. Invaio, founded by Flagship Pioneering, is a bio platform company that aims to accelerate the leap to nature-positive agriculture.

Edison Agrosciences

Thomas Edison focused on more than lightbulbs. He also spent time investigating alternative supplies to natural rubber. Edison attempted to use goldenrod as a rubber substitute but was unsuccessful. Today, Edison Agrosciences believes the sunflower offers a more sustainable and climate-friendly solution to rubber production.

"Sunflower leaves already have some natural rubber in them, so we're coaxing the plant into producing a little bit more," said Edison Agrosciences CEO David Woodburn. "Ideally, this will be a dual use of the crop where it's still harvested for the seeds and oil, but farmers will also be rewarded for collecting the leaves."

Nearly all current rubber production is in Southeast Asia, and rubber trees often demand the mass deforestation of crucial rainforests.

"At some point the disease that wiped out rubber production in South America," Woodburn said, "is likely going to transfer somehow to the plantations in Southeast Asia. Because of that, there's a strong desire to develop alternatives."

Many U.S. farmers already use sunflowers as part of their crop rotation. According to Woodburn, there are a million and a half acres of sunflowers in the United States, with much more worldwide.

"Without any improvements, sunflower plants already being grown in the U.S. produce around 50,000 tons of rubber in their leaves each year," Woodburn said.

As part of their IN^2 project, Edison Agrosciences is using a predictive breeding approach. That is what they worked on during the summer of 2023 with a crop grown at the Danforth Center.

"With the IN^2 funding and Danforth Center resources, we were able to evaluate hundreds of sunflower varieties for rubber content, develop that predictive breeding model, and put it to use," Woodburn said.

The data gleaned from the summer of 2023 will allow the company to plan a pilot program in summer 2024.

Peptyde Bio

THE WOMEN OF IN²

While women have historically been underrepresented in STEM fields, women are increasingly assuming pivotal positions, driving innovation, and spearheading initiatives that address pressing climate challenges. In the rapidly evolving landscape of cleantech and sustainability, the prominence of women in leadership is a testament to the industry's transformative potential. From pioneering groundbreaking technologies to championing eco-conscious business strategies, women in cleantech are driving transformative change, embodying resilience, and inspiring the next generation.

These women of IN² are challenging norms and illuminating pathways for other women to follow towards a more sustainable and inclusive future.

"Looking back on my experience in the U.S. Peace Corps forming a women's cooperative in Madagascar to support eco-tourism, my work with corporations on environmental and sustainability issues and all the way up to today as Chief Sustainability Officer for Wells Fargo—it's always been about creating a positive impact. That is why I value my engagement with IN². Supporting entrepreneurs and scalable solutions to address the sustainable production of agriculture and housing affordability is creating positive impacts for entrepreneurs, for communities, and for our world."

-Robyn Luhning, Chief Sustainability Officer, Wells Fargo

"We are fortunate to be surrounded by women and mentors who ran so we could walk. We still do come up against biases in our work, particularly as young women creating a new business in a male-dominated industry, but a lot of my drive comes from co-founding Kit Switch with a team of women I admire. Realizing that we do not stand alone and that opening up to and leaning on one another can be more of a strength than a weakness has been an important personal arc towards weathering the obstacles."

-Armelle Coutant, Co-Founder and Chief Executive Officer, Kit Switch

"The way I've found most successful in encouraging more women to join ag or cleantech is for other women to willingly advocate and encourage them. Starting this process at an early stage of a woman's career is essential. This enables them to observe successful women leaders, talk about the not-so-pleasant biases they encounter and more importantly build the confidence to persist and lead fiercely."

-Tania Seger, Chief Executive Officer, Plastomics

"Cleantech is more hospitable to women than high tech, but the representation continues to lag the percentage of the population which women represent. Women are 51% of the population, and yet we attract 5% of the private equity available for new ventures, notwithstanding the fact that we start and succeed at leading companies as often or more often than men. Having said that, cleantech and other impact companies attract and retain women at a slightly better rate than high tech. Why? Because women care and want to change the world, and we are damn good at it."

-Maggie Kavalaris, Founder and Chief Legal Officer, Terviva

OUR ECOSYSTEM

To boost impact, IN^2 fosters an ecosystem of expertise and support. The IN^2 Channel Partner network includes more than 60 incubators, accelerators, and universities that mentor and refer companies to the program. The Wells Fargo Board of Directors reviews applicants, providing business expertise and guidance. Two external advisory boards, the Commercial Buildings and Housing Board and the Sustainable Agriculture Board, select the final participants.

In 2016, IN^2 launched the $5-million Channel Partner Awards program to support events, strategic meetings and trainings, and large collaborative initiatives between the Channel Partners. The program expanded in 2020 and will deliver an additional $5 million in Channel Partner Awards through 2024.

Accelerating Innovation with Channel Partners

In early 2022, IN² chose seven winners for its sixth cycle of the Channel Partner Strategic Awards. This funding addresses gaps in the cleantech ecosystem and aims to eliminate barriers startups face on the road to commercialization.

Many awardees focused on improving diversity, equity, and inclusion support, thereby driving significant change for underserved communities often most affected by climate change. This community is just as essential as any other to the energy transition, because for it to work, it must include everyone. Here is how six of the winners used their awards and the impact they made in just one year:

Innosphere Ventures

For CEO and General Partner of Innosphere Ventures Mike Freeman, the IN² Channel Partner award was the continuation of a U.S. Department of Energy grant won less than a year earlier. Innosphere and Colorado State University (also a member of the IN² Channel Partner network) were awarded $1 million from the Energy Program for Innovation Clusters (EPIC) Prize to form the Rockies/Plains Energy Accelerator for Commercializing Hardtech (REACH Energy Accelerator). With REACH's initial success, Innosphere saw an opportunity to expand, so it applied for the IN² Channel Partner Strategic Award, which supported three additional companies in the REACH cohort.

"We're very appreciative of IN²," Freeman said. "It saw the opportunity we had to scale our impact by supporting more founders of energy hard-tech startups, and the Channel Partner Strategic Award from IN² will help to eliminate the barriers that startups face on the road to commercialization."

All companies in the REACH Energy Accelerator are early stage and share a unifying theme of strong technical founders with real IP. Due to the need for a physical product, hard-tech startups often need more support. The program runs for 12 months, with Innosphere helping each participant map out objectives, achieve milestones, and raise capital.

"Ultimately, we're advisors and work hard to help founders find the right game plan to be successful," Freeman said. "Our program pushes them pretty hard on business aspects they haven't yet considered."

FORGE

FORGE used the IN² Channel Partner award to expand its Product Development Grant program and bring new support to diversely led cleantech startups. These companies historically come in with less funding than the average startup.

Browning the Greenspace

"We wanted to better understand the pain points for these diversely led companies," Anya Losik, chief of staff for FORGE, said. "It was important that the people who we were targeting with this award felt seen and meaningfully supported."

Based on input from leaders of startups from historically marginalized communities, FORGE refined the questions in its application process, opened a question-and-answer period, and provided application materials in Spanish to increase the accessibility to information.

FORGE supported three startups with the IN^2 Channel Partner funding.

For Atacama Biomaterials, the funding helped the company create a pneumatic gantry system for the robot that manufactures its product. Robigo purchased a bioreactor to establish a fermentation process and expand the company's ability for field testing. For SEED, the grant helped the startup develop more ruggedized product housing for its sensor. All three companies are led by BIPOC women.

"It feels like a big victory, both for FORGE and for diversity in cleantech in general," Losik said.

The initiative led to more inclusivity overall for FORGE, with 43% of its portfolio now composed of minority-led startups.

"For us, it's been a really great way to connect with other startup support organizations across the country," Losik said.

Browning the Green Space

When Browning the Green Space (BGS) Executive Director Kerry Bowie used to go to cleantech and energy conferences, he could count the Black and Brown people on one hand, even though there were thousands of attendees. That is why he co-founded BGS.

"How do we get more underrepresented groups—African-Americans, Latinx, and indigenous communities—into the green space?" Bowie asked. "We're not trying to address one piece of the picture. We're looking to tackle the big picture, and we've already started to do it."

To that end, BGS used its IN^2 Channel Partner award to create the Accelerating Contractors of Color in Energy for Sustainable Success (ACCESS) program. The goal is to support more Black and Brown entrepreneurs in establishing their own contracting businesses and securing work with clean energy developers and project managers. ACCESS runs an 8-week program that offers a crash course in entrepreneurship to support the development of minority-owned startups.

"Minority-owned businesses are more likely to hire from communities of color," Bowie said. "That's how we get this technology to the people who need it the most."

About half of the 14 people who completed the first program already have their own companies or started one. A few of the graduates also worked together to create their own LLC. The program is funded for at least two more years, but BGS wants to keep it going beyond that.

Wisconsin Energy Institute

Home to the Great Lakes Bioenergy Research Center, the Wisconsin Energy Institute used its IN² 2022 Channel Partner award to build place-based connections in the local bioeconomy ecosystem through a series of workshops.

"We focused on three areas," Mary Blanchard, associate director of the Wisconsin Energy Institute, said. "These include renewable natural gas, carbon management, and sustainable aviation fuels. We designed our workshops to identify gaps and opportunities in those fields, and we tailored them to appeal to local audiences."

For example, with the high number of dairy cows in Wisconsin, a tremendous amount of manure is available as feedstock for anaerobic digestion. In this process, microbes convert the waste to biogas. Further processing purifies the biogas into renewable natural gas, which can be injected into the pipeline for distribution and use instead of fossil-based natural gas.

Similarly, the carbon management workshops examined how farmers, foresters, and some industries can capture, utilize or sequester more carbon in the soil, plants, products, or even underground, and how to access more carbon credits. For sustainable aviation fuels, workshops presented many technologies that convert biobased feedstocks into fuels and other products, and how fuel refiners are now putting steel in the ground to build refineries.

"The range of expertise that's part of the IN² Channel Partner network amazes me," she said. "We're learning from each other, and the network provides that opportunity."

Carnegie Mellon University

As Dr. Destenie Nock strolled through her old neighborhood in Pittsburgh, she realized most of the houses did not have off-street parking, let alone a garage.

"I work in the electricity space, and I find it difficult to fathom getting an electric vehicle (EV) because I cannot charge it in my house," said Nock, an assistant professor at Carnegie Mellon University. "As we electrify transportation, equity must be at the forefront. What does an equitable charging system look like?"

That is why she sought out Dr. Corey Harper, also an assistant professor at Carnegie Mellon, who regularly focuses on equity issues.

"Our preliminary work was to understand where chargers are right now," Harper said. "They are often concentrated in central business districts, not near homes. If we are going to put all these EVs out on the road, we must have the infrastructure. Up until now, installers have just been thinking about where the demand is."

Nock and Harper started with a map of existing EV charging stations on an island off the coast of San Diego. Then they added a layer of where the stations should be if installers placed them in an equitable way, like far from the city center near more remote areas.

Wisconsin Energy Institute

Rice University

With the funding assistance from the IN^2 Channel Partner network, Nock said they were able to scale. They now have maps of four states and continue to work on a nationwide map.

"Our maps show state and local policymakers where we need incentives for charging stations," Nock said. "Here are your gaps in charging. We want decision makers to understand where those inequities are located before we mandate EV use because the people who are going to be left behind in the transition are the ones we are going to find and address first."

Rice Alliance for Technology and Entrepreneurship

Since 2001, the Rice Alliance for Technology and Entrepreneurship has held the Rice Business Plan Competition (RBPC), the self-proclaimed largest and richest intercollegiate startup competition. Teams of student-led startups participate in a pitch competition for millions in cash and prizes. Its alumni have raised more than $5 billion in funding, but in 2022, the planners led an initiative to bring about change.

"We wanted to increase the number of diverse energy startups in the competition, which focuses on a range of industries," said Catherine Santamaria, director of the RBPC, part of the Rice University Business School in Houston, Texas.

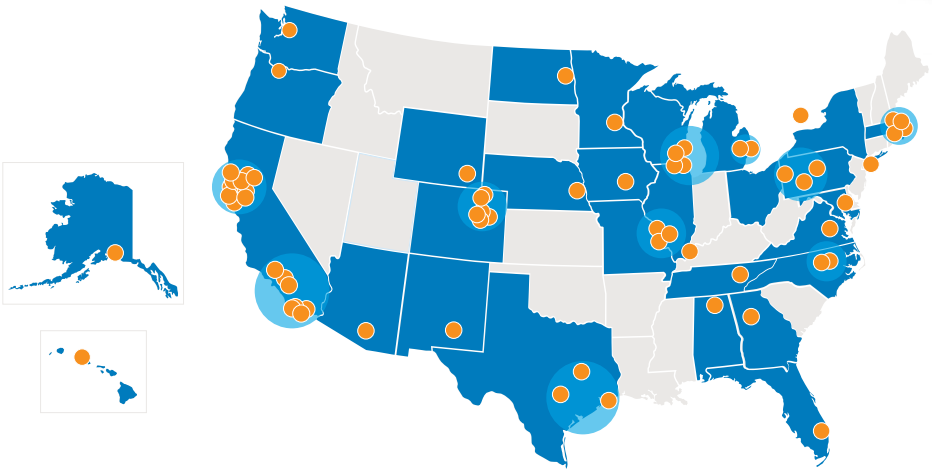
The competition aims to give students a real-world experience of what it is like to pitch to investors. At times, there are 30 to 40 judges in a room, scoring teams and moving the best forward, but also providing feedback on strategy and presentation.

"The expectation is that these student startups will actually go on and form as a company," Santamaria said. "We want the startup to be their job after they leave the university."

With help from the IN^2 Channel Partner award in building deeper relationships with historically Black colleges and universities (HBCUs) and minority-serving institutions (MSIs), among other efforts, they began to see a shift in both applicants and participants.

"If we can support more diverse founders while they are still students, we hope they go on to launch multiple startups and get funding in the rest of the world," said Brad Burke, managing director of the Rice Alliance for Technology and Entrepreneurship.

IN² Channel Partners



Activate | Berkeley, CA

AgLaunch | Memphis, TN

AgStart | Woodland, CA

BioGenerator | St. Louis, MO

BRITE Energy Innovators | Warren, OH

Browning the Green Space | Boston, MA

California Institute of Technology - Rocket Fund | Pasadena, CA

Carnegie Mellon University - Wilton E. Scott Institute for Energy Innovation | Pittsburgh, PA

Cleantech Group | San Francisco, CA

Cleantech Open | Los Angeles, CA

Cleantech San Diego | San Diego, CA

Coachella Valley Economic Partnership | Palm Springs, CA

Colorado Cleantech Industries Association | Golden, CO

Colorado State University - Energy Institute | Fort Collins, CO

Dominion Energy Innovation Center | Ashland, VA

Elemental Excelerator | Honolulu, HI

Evergreen Climate Innovations | Chicago, IL

F3 Tech Accelerator | Easton, MD

FORGE | Somerville, MA

Georgia Institute of Technology - ScaleUp Lab | Atlanta, GA

Grand Farm (Emerging Prairie) | Fargo, ND

Greentown Labs | Somerville, MA

Grid Catalyst | Minneapolis, MN

HBCU Clean Energy Initiative | Miami, FL

HudsonAlpha | Huntsville, AL

Imagine H2O | San Francisco, CA

Innosphere Ventures | Fort Collins, CO

Innovation Corridor | Denver, CO

Iowa State University | Ames, IA

Larta Institute | Los Angeles, CA

Launch Alaska | Anchorage, AK

Lawrence Technological University - Centreoplis Accelerator | Southfield, MI

Los Angeles Cleantech Incubator | Los Angeles, CA

MaRS Discovery District | Toronto, Canada

MassChallenge | Boston, MA

New Energy Nexus | San Francisco, CA

New Mexico State University - Arrowhead Center | Las Cruces, NM

New York University - Urban Future Lab | New York, NY

NextEnergy | Detroit, MI

North Carolina Biotechnology Center | Research Triangle Park, NC

Northeast Clean Energy Council | Boston, MA

Penn State University | University Park, PA

Powerhouse | Oakland, CA

Prospect Silicon Valley | San Jose, CA

Rice University - Rice Alliance for Technology and Entrepreneurship | Houston, TX

Stanford University - TomKat Center for Sustainable Energy | Stanford, CA

Syracuse University - Syracuse Center of Excellence | Syracuse, NY

Texas A&M University - Engineering Experiment Station, Clean Energy Incubator | College Station, TX

The Water Council | Milwaukee, WI

The Yield Lab | St. Louis, MO

University of Arizona - Center for Innovation | Tucson, AZ

University of California Berkeley | Berkeley, CA

University of California Davis - Energy and Efficiency Institute | Davis, CA

University of Colorado Boulder - Venture Partners | Boulder, CO

University of Nebraska - Daugherty Water for Food Global Institute | Lincoln, NE

University of North Carolina - Institute for the Environment | Chapel Hill, NC

University of Texas Austin - Austin Technology Incubator | Austin, TX

University of Texas Austin - Texas Venture Labs | Austin, TX

University of Washington - Buerk Center for Entrepreneurship | Seattle, WA

University of Wisconsin Madison - Wisconsin Energy Institute | Madison, WI

University of Wyoming - Impact 307 | Laramie, WY

VertueLab | Portland, OR

EXTERNAL ADVISORY BOARDS

The IN^2 External Advisory Boards determine the companies accepted in each cohort. They provide insights and expertise in sector trends, challenges, and opportunities and technical understanding of the technologies, both traditional and emerging. The two boards have expertise in either (1) the commercial and residential built environment or (2) agriculture and the food-energy-water nexus.

Nick Brozović
Director of Policy, Daugherty Water for Food Global Institute

Craig Collin
Senior Vice President, Tavistock Development Company

Christine Daugherty
Deputy Director Business Development, Bill & Melinda Gates Foundation

Laura Dwyer
Business Development, DuPont Ventures

Vonnie Estes
Vice President of Technology, Produce Marketing Association

Diana Fisler
Principal, Buildings ADL Ventures

Jennifer Fortenberry
Sustainability Innovation Leader, Schneider Electric

Tom Hardiman
Executive Director, Modular Building Institute

Andrew Jordan
Owner, Jordan Associates

Christine Karslake
Senior Director, Bunge

Nanda Kumar Puthucode
Chief Investment Officer and Global Head of Ventures, Bunge

Luke Leung
Director of Sustainable Engineering, Skidmore, Owings and Merrill LLP

John Mangano
Regional President, Toll Brothers

Bob Morris
President, AndMore Associates LLC

Betsy Scott
Executive Director, Program & Engagement, Housing Innovation Alliance

Rusty Smith
Associate Director, Rural Studio, Auburn University

Phil Taylor
Open Innovation Lead, Bayer

Renée Vassilos
Director of Ag Innovation, The Nature Conservancy

Steve Welker
Venture Partner, Lewis and Clark Ventures

Millie (Mulumebet) Worku
Professor of Animal Sciences, North Carolina A&T State University

Wells Fargo IN^2 Advisory Board

The Wells Fargo IN^2 Advisory Board is composed of executives and senior managers from Wells Fargo, representing more than a dozen lines of business, who support the IN^2 program through direct input, expertise, engagement, and influence. This group serves in an ad hoc advisory capacity and is invited to participate in cohort downselection discussions, kept apprised of portfolio company milestones, and invited to attend key events as appropriate. Members are also encouraged to adopt the role of IN^2 ambassadors, increasing awareness of IN^2 within their networks and elevating opportunities for continued programmatic evolution.

Romie Basra, Commercial Banking Group
Mary Brown, Public Affairs Group
Tim DiGiulio, Commercial Banking Group
Kim Erlichson, Public Affairs Group
Jenny Flores, Public Affairs Group
Fady Hanalla, Public Affairs Group
Tom Harper, Commercial Banking Group
Phil Hopkins, Commercial Banking Group
Ramsay Huntley, Commercial Banking Group
Matt Jernigan, Corporate Properties Group
Chris Johnson, Public Affairs Group
Akhlaq Khan, Technology Group
Jennivine Kwan, Corporate Properties Group
Bill Lawler, Corporate Properties Group
Robyn Luhning, Public Affairs Group
James Madson, Commercial Banking Group
Jennifer Manfre, Public Affairs Group
John Moon, Public Affairs Group
Steve Nelson, Corporate Properties Group
Geneviève Piché, Corporate and Investment Banking Group
Molly Porter, Public Affairs Group
Curt Radkin, Corporate Properties Group
Tim Rafalovich, Commercial Banking Group
Tom Richardson, Commercial Banking Group
Jeff Schub, Public Affairs Group
Matt Servatius, Commercial Banking Group
Kelly Souza, Corporate and Investment Banking Group
Robin Wenzel, Commercial Banking Group

Team

The program management team at Wells Fargo, the National Renewable Energy Laboratory, and the Donald Danforth Plant Science Center work together to grow the IN² ecosystem and to help our cleantech and agtech companies realize success.

Mary Brown
Sr. Sustainability Specialist, Sustainable Finance Integration & Sustainability Philanthropy, Wells Fargo

Trish Cozart
Innovation and Entrepreneurship Center Director, NREL

Sarah Derdowski
IN² Program Manager, NREL

Catherine Dolezal
Channel Partner and Portfolio Network Lead, NREL

Kristin Field-Macumber
IN² Buildings Technical Project Manager, NREL

Christopher Johnson
Product & Innovation Lead, Wells Fargo

Elliott Kellner
Director of Commercial Innovation—Innovation Team, Danforth Center

Peggy Littleton
Communications Lead, NREL

Jennifer Manfre
Sustainability Communications, Wells Fargo

Tonya McCabe
Project Controller, NREL

John Moon
Sr. Vice President, Climate Aligned Philanthropy and Partnerships Lead, Wells Fargo

Minna Onken
Project Coordinator, Danforth Center

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IN²ecosystem.com
February 2024

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