

Wells Fargo Innovation Incubator (IN²) Webinar Series

Sept 15, 2020



Agenda

Welcome from IN²

• Trish Cozart, IN² Program Manager, NREL

Cleantech Group

- Todd Allmendinger, Director of Consulting & Research, Cleantech Group
- Anthony Deorsey, Consultant, Cleantech Group
- Louis Brasington, Senior Associate, Cleantech Group



About the Wells Fargo Innovation Incubator (IN²)

Launched in 2014 with an initial \$10 million commitment by the Wells Fargo Foundation, and expanded in 2017, the Wells Fargo Innovation Incubator (IN²) is now a **\$50 million program** supporting innovative technologies and innovators. The program is managed and run out of the National Renewable Energy Laboratory (NREL).

IN² provides technical assistance that leverages the capabilities, facilities, equipment and the deep expertise that exists at NREL and the Donald Danforth Plant Science Center to help companies **de-risk technologies and ease their path to market adoption and deployment.** IN² also fosters the cleantech ecosystem through our Channel Partner awards program.



Technology Incubator



Channel Partner Awards Program



Cleantech Group Award for 2020 Technology Briefing Series

- Define the value chains, business activities and relate the trends to stakeholders and portfolio companies
- Geographic focus in North America
- Focused on the technology sectors of IN²



IN² Focus Areas

•

•

Water



Energy-efficient technologies •

Founded by: Wells Fargo | NREL | 5

Briefings Schedule

April	Macro Trends & Overviews
May	<u>Commercial Buildings</u>
June 23 rd	Sustainable Agriculture
Sept 15 th	Housing





Briefing Housing



WELLS FARGO | CNREL

15 Sept 2020

Cleantech Group: Introduction

Our research, consulting and events catalyze opportunities for sustainable growth powered by innovation.







2020 CLEANTECH FORUM 2020 CLEANTECH FORUM FUROPE SAN FRANCISCO

2020 CLEANTECH FORUM ASIA

ECT-TO-CONSUM FOOD DELIVER



50 TO WATCH SUMMIT MEET THE COMPANIES FIGHTING OUR BIGGEST BATTLES



BUILDINGS: ANALYTICS &

INNOVATION IN THE BUILT ENVIDONMEN

GREEN NEW DEAL FO



Urban Planning and Public Transportation: Ecosystem landscan

Research

Markets change. Companies evolve. Our research delivers the insight you need to stay ahead of the trends. For deep dives into the market, our expert analysts publish Sector Insights, Investment Insights and provide customized briefings.

eantech

Group

Events

Engage with industry leaders and innovators from across the breadth of the global sustainable innovation ecosystem. Find capital, advisors, partners and coinvestors at our international events. In person events or through Cleantech Interactive - a single platform that will introduce you to an entire community every month.

Consulting

Build strategies to engage external innovation and thrive as your industry transforms. We'll help you set priorities and determine where and how to find the partners and investment opportunities that take your business forward.

Sustainable Innovation is our focus



Enabling technologies, Business models and Themes



Our research methodology

We help corporate strategy teams, investors and innovators identify, evaluate and connect with the best of global innovation







Louis Brasington, Lead Analyst, Energy & Power

Housing

Overview

Business Activity

Circular Economy

Decarbonization & Electrification

Cities & Urbanization

Digitalization, Decentralization, Automation

Resilience





Group

Key Trends

Consumer sentiment towards climate change

Digitization & consumer connectivity

Residential solar + storage adoption

Operational and environmental convergence

Desire for resiliency and self-sufficiency

Increased US support for prioritizing climate change

% U.S adults who say __ is a top priority



Source: PEW Research Center, 2020



Challenges

Security and privacy breach concerns

Lack of standardization & inter-operability

US Home technology purchase Inhibitors, 2020

81%

risks of data collection by

the benefits



40% Privacy ľ 35% Cost × Installing 20% the products

Source: Dataprivacymanager, PCMag ,2020

Need for flexible, customized products and services

Willingness to pay



Covid-19: US Housing Impact

8% increase in residential energy demand

Energy efficiency paused by pandemic, but poised to prevail

Demand for air quality / environmental monitoring

Demand for resiliency and flexibility

Indoor COVID-19 Monitoring



Source: msystems, 2020



Housing: Business activities across the value chain



Housing Five Macro Trends

Resilience

Circular Economy



Digitalization, Decentralization, Automation



Cities & Urbanization



Decarbonization & Electrification





Housing *Business activities for deep dives*





Housing

Overview

Business Activity

Circular Economy

Decarbonization & Electrification

Cities & Urbanization

Digitalization, Decentralization, Automation

Resilience



Housing

Business activities for deep dives





Material Reuse



Circular Economy Framework

- Reusing waste as building feedstock material
- Reducing waste and feedstock emissions

- •A •R
- •Addressing affordable housing deficit
 - Reducing waste costs
 - Reducing building time & soft costs

Opportunity or innovation

- Reusing plastic waste for house construction
- Reacting carbon dioxide with mineral substances
- Integrating building construction value chain



Source: Ellen Macarthur Foundation



Material Reuse: Innovators and ecosystem



brickify.xyz

Brickify (Nigeria) – Converting plastic waste into water, fire, and heat-resistant bricks for housing construction, founded in 2019



Crate (United States) – Multi-unit housing made from recycled shipping containers



Neustark (Switzerland) - Concrete from carbon dioxide and waste concrete. Accepted onto the Kickstart and MassChallange accelerator cohorts, 2020



CleanFiber (United States) - Building insulation from recycled corrugated cardboard. Raised \$2.8 million, March 2020







Building Lifecycle Analysis



Life cycle building framework

Trends

- Evaluating environmental impact of building
- Modelling embodied carbon for reduced emissions

- Mandating building information modelling (EU)
- California green building regulation (CALGreen)
- Estimating to account for data gaps



- Computer aided architectural life-cycle assessment
- Assessment automation
- Real-time building environmental feedback



Source: Andrea Belleri

Building Lifecycle Analysis: Innovators and ecosystem





Caala (Germany) - Software for architects to design sustainable buildings using real-time feedback on the financial and environmental building performance over its life cycle.



Vizcab (France) – Life Cycle Analysis tools for building professionals, to optimize and validate the achievement regulatory carbon levels. Raised \$1.8 million seed June 2020 from Banque des Territoires & A / O Proptech



Extergy (Canada) – AI building energy consumption / optimization model to simulate energy consumption of buildings to propose improvement. Accepted onto Ecofuel Spring 2020 cohort



One Click (Finland) – Rapid life-cycle automate software for integration at any stage of the project





Greywater Reuse



Greywater Reuse System



Source: Khalifeh Associates



Description

Trends

- •Capturing and filtering residential water for reuse
- Reducing indoor water consumption

- Increasing national water shortage
- Increasing US water rates

Opportunity for innovation

- Modular, small-scale, automated systems
- •Advanced, low-cost ultrafiltration membranes

Greywater Reuse: Innovators and ecosystem





Greyter Systems (Canada) - Home water recycling system for toilet flushing and/or irrigation. Raised \$3 million Series A March 2020 from Lennar

INDRA Indra (UK) – Modular water recycling and wastewater treatment systems in residential buildings and for off-grid applications. Won Global 2019 Urban Water Challenge, Sept 2019.



Aquaco (UK) - Membrane Bioreactor Grey water recycling and rainwater harvesting systems for residential homes.



Nexus eWater (United States) – On-site water recycling and energy recovery system, recycles 67% of indoor water, reduces energy related to water heating by 80% and reduces sewer flow by up to 70%.



Housing

Overview

Business Activity

Circular Economy

Decarbonization & Electrification

Cities & Urbanization

Digitalization, Decentralization, Automation

Resilience



Housing *Business activities for deep dives*





Grid Integration

Trends

- Integrating residential assets for grid services
- •Creating income opportunities for homeowners

- Increasing self-consumption (savings, resiliency)
- Monetizing assets through California Self-Generation Incentive Program (SGIP)
- Adopting more personal electric vehicles
- Opportunity for innovation
- Standardized low-cost connectivity for solar and other DERs
- •Localized, real-time flexibility management
- Vehicle-to-house enablement

Residential Asset Integration



Source: Moixa

