Transformation.

Measurable impact for the future of energy and resources.

BLACKHORN VENTURES

Scaling Through Uncertainty

Blackhorn's 2022 impact report arrives at a time of general uncertainty around the macro-economic environment, the geopolitical environment, and the small corner of the world that is focused on Environmental, Social and Corporate Governance (ESG). Push-back from large public institutions in states with powerful interests tied to fossil fuel and natural resource extraction, controversy over the new climate disclosure regulations currently being advanced by the SEC, and a general state of confusion over exactly what should be part of the impact and ESG equation have all muddied the waters for investors.

At the same time, the technology industry as a whole, and Silicon Valley in particular, are entering a new era of innovation amidst a series of self-inflicted ethical missteps including Sam Bankman-Fried, Theranos, and Twitter. Highly visible companies are being pilloried in the media for fracturing our democracy, invading our public spaces with surveillance capitalism, and exacerbating energy volatility during wartime.

There is a clear value misalignment for the brave new world we've entered.
If tech startups are committed to solving real problems (mRNA vaccines, AI to improve human productivity, digital infrastructure to reduce carbon) founders will need to internalize a new transparency imperative for values-aligned leadership.

Our 2022 impact report reflects our desire to provide our Limited Partners and other stakeholders with transparency.
This report provides a measure of accountability and data access as we track progress towards continuous improvement, not only in relation to emissions reductions, but also with regards to outcomes tied to productivity and inclusivity. Our non-concessionary impact strategy is tied to company-specific goals that ladder up into society scale change via the Impact Management Project (IMP) framework. To achieve this, we've implemented a new ESG and DEI survey that meets teams where they are, and supports them in their performance and accountability journey. While some teams may indeed do the right things for the wrong reasons, empirical data suggests that there is a correlation between company performance and diversity.

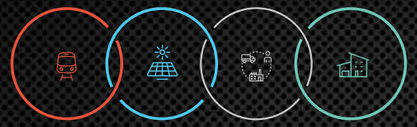
Blackhorn's core investment thesis is that digital infrastructure holds the key to industrial transformation and decarbonization. With the passage of the Inflation Reduction Act, the CHIPS Act, and the Infrastructure Bill, we are entering an unprecedented period of federal investment with the potential to fundamentally transform our economy over the next decade. Together with our portfolio companies, we're leveraging automation to augment human productivity and accelerating industrial decarbonization at speed and scale. Today, legacy industries in our verticals are onboarding resource efficiency solutions to counter the effects of the current inflationary environment, meet their emissions-reduction commitments, and attract and retain the talent they need to succeed in today's economy. The startups you'll read about in this report are building the tools for the energy transition, while taking a thoughtful and deliberate approach to the cultures they're building. While most teams are in the early chapters of their growth, they're well on their way to generating a measurable impact we can all be proud of.

How Impact Gives Us an Edge

There is growing consensus around the idea that ESG issues are highly interrelated, and there is an increasing community of investors that believe the biggest winners will be those companies that intentionally commit to improving ESG. Blackhorn believes that there are tremendous opportunities to improve business model resilience and to help companies adapt to changing conditions in a given market, as well as the broader economy. We believe investors who invest behind social and environmental impact-based theses are anticipating and tapping into future value creation. These teams will have a clear advantage in what will undoubtedly continue to be a rapidly shifting and evolving world.

As a firm, we have also deepened our conviction that deep sector and sub-sector expertise has never been more important. The more clearly we understand our target sectors and the rapid changes occurring in each, the more clearly we see opportunities to facilitate change while benefiting from macro tailwinds transforming these sectors.

We have also seen an unprecedented and rapidly growing demand to capture, process, and leverage data and business intelligence to support businesses trying to understand how market and/or customer preferences are shifting. As investors focused on industrial resource efficiency driven by the Industrial Data Revolution, we feel our investment thesis has never been more timely and mission-aligned.



Our Sectors

The **energy, transportation and mobility, supply chain and logistics, and built environment sectors** form a foundation that drives the U.S. GDP, includes much of the physical asset base, and possesses excellent opportunities to improve their resource efficiency. As such, these sectors comprise an attractive space to support disruptive solutions during a period of transformation. Additionally, these sectors account for almost 70 percent of the total U.S. GHG emissions, giving an outsized impact to the resource efficiency improvements we are targeting. The following sections briefly describe a subset of the opportunities that we see in these sectors.

Electrification of Everything

Over the past year, we've seen an unsettling number of natural disasters that climate scientists have directly linked to human-based activities. These events have generated almost daily horror stories of heatwaves, droughts, violent storms, hurricanes, and floods touching virtually every community. Collectively, these "outlier events" have become the "new normal", and in turn, placed tremendous strain on legacy infrastructure.

At Blackhorn, we see tremendous potential in solutions that improve operational and system resilience in response to these disruptions and the attendant uncertainty. We're equally encouraged by technologies showing potential to dramatically improve resource efficiency in the transportation, built environment, and industrial sectors more broadly through electrification. Generally, increased electrification often leads to a reduction in core resource consumption, frequently lower pollution and/or emissions, and overall risk mitigation.

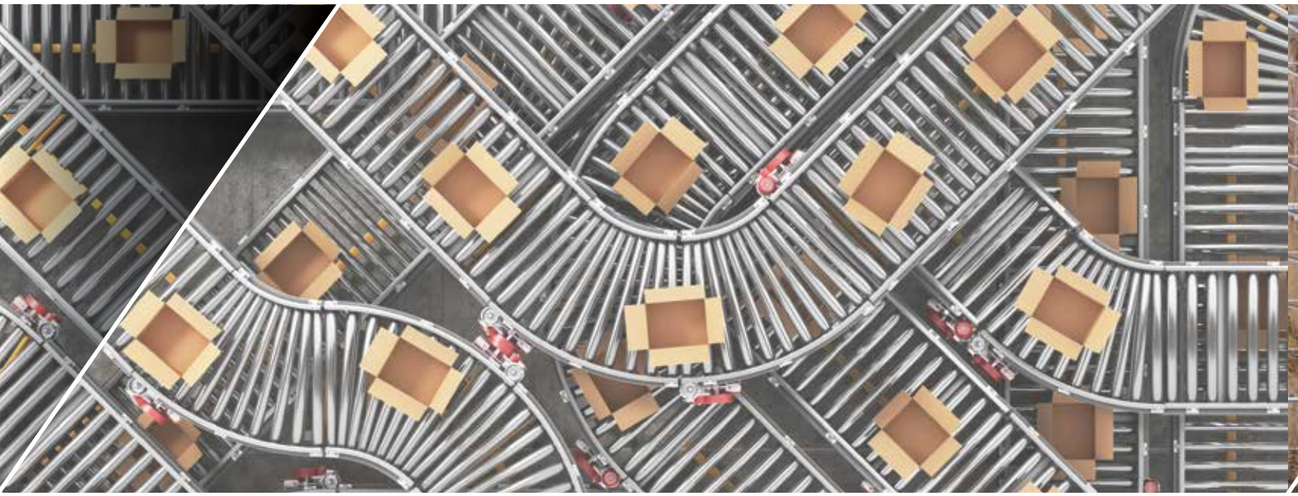
Utilities are not known for being first-movers; consequently, they are forced to catch up in response to rapid changes in public sentiment and recently installed clean energy directives. These energy providers are mandated to deliver both resiliency and reliability irrespective of these evolving and heightened pressures. Consequently, we see an enormous opportunity to enable the sector to proactively address these immediate threats through various technology tools and partners. Fortunately, we also see unprecedented early movement among early adopters to explore and deploy these solutions more rapidly. We see these essential shifts converging with a once-in-a-generation need to further electrify the transportation, built environment, and industrial sectors more broadly. We see this combination of forces creating a strong national and global opportunity for technology startups to address near-term "pain points" that address resiliency and reliability; while also fielding retrofits and updates that will meet the already visible market demands of the not-so-distant future.

Transportation and Mobility

The transportation and mobility sector accounts for approximately 8.5 percent of U.S. GDP, but 27 percent of U.S. greenhouse gas emissions. Within the United States, there has been an unprecedented amount of public investment towards clean transportation with the 2022 passing of the Inflation Reduction Act and the 2021 Bipartisan Infrastructure Law. The Inflation Reduction Act alone includes $97 billion to support transportation electrification beyond the clean vehicle tax credit. States across the U.S. are passing similarly historic policies to address climate change via net-zero commitments and, more recently in California and New York, mandates that all new vehicles sold be either electric or plug-in hybrid electrics by 2035. Corporate commitments to net-zero emissions and consumer demand are also driving transformational changes to the mobility sector. The challenge and opportunities remain massive — an estimated $2 trillion in transportation infrastructure investment will be to electric vehicles – shifting the nature of transportation and mobility, accelerating the need for solutions that provide EV charging optimization, EV grid integration, and innovative vehicle-tied financing and payment systems.

While easily overlooked compared to electric vehicles, the rail industry is the backbone of the global supply chain and responsible for moving the majority of the world's raw and finished goods. Electrification of freight rail in the U.S. is prohibitively expensive today at an estimated $4.8 million per mile. However, digital advancements can radically improve railway operations and enable cost-savings and emissions-reductions immediately. While railways currently consume 9x less energy per tonne-kilometer traveled than trucks, they have yet to benefit from the digital revolution that has drastically improved our planes and cars. We believe that there is a huge opportunity for the rail industry to accelerate its path towards efficiency, and gain market share as the low-carbon option for freight.

[1] Global Infrastructure Outlook, data extracted in JULY 2021; Oecd (International transport forum 2021); press search; 2016 Revision of World Urbanization Prospects, United Nations



Supply Chain and Logistics

By the very nature of the supply chain and underlying logistics, it is a heavily polluting and energy demanding industry. Retail supply chains represent 25 percent of global emissions, 40 percent of which could be abated with readily available and economical levers.[2] This presents us with an opportunity for outsized impact on the decarbonization of globalization by making this movement of goods more efficient through modernization.

The Supply Chain Status Quo Is Breaking

Supply chain stakeholders suffer from lack of real-time, granular visibility into the state of their supply chain. This is due to:

- Incomplete digitization across the value chain, from the manufacturer on the supply side to the retailer at the end of the demand chain
- Lack of standardization of data and tech systems between stakeholders
- Lack of interoperability across each stakeholder in the supply chain

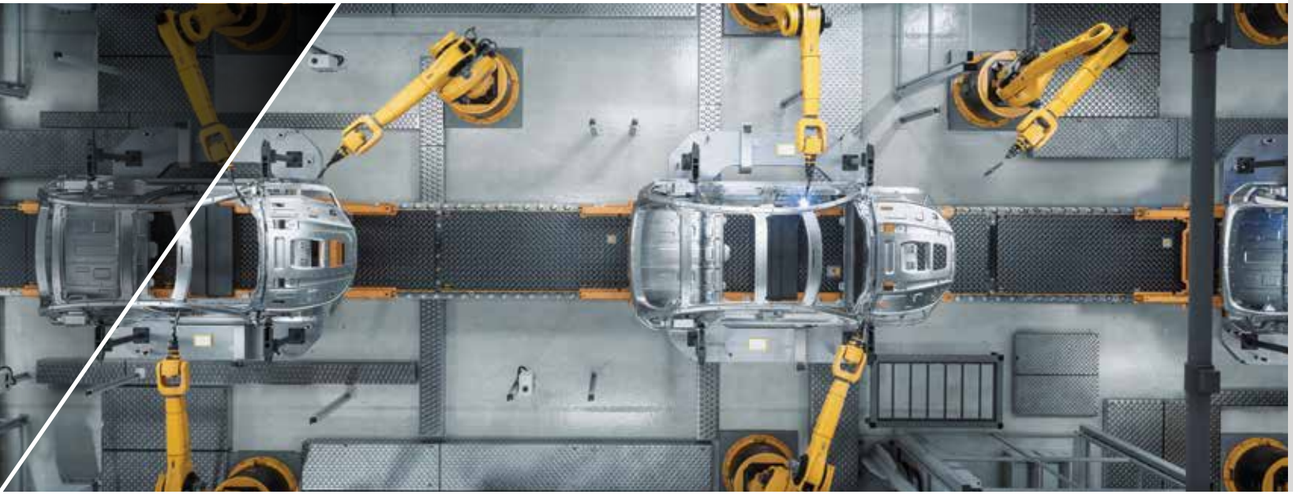
These legacy problems are coming to a breaking point as buyers demand more information and flexibility from their suppliers, and as they rethink their supply chain strategy and struggle to recover from pandemic-driven disruptions. Furthermore, consumers and wholesale buyers demand more supply chain traceability and transparency to inform their purchasing decisions. 91 percent of surveyed consumers want eco-friendly shipping options, but only 18 percent of companies believe they have reliable data to track their supply chain emissions and 64 percent of surveyed companies have no plans to directly reduce the environmental impact of their supply chains. Only solutions that couple emissions reduction with topline or margin improvement can meaningfully move the needle on supply chain sustainability.

[2] World Economic Forum & Boston Consulting Group; Net-Zero Challenge: The supply chain opportunity, 2021. FMCG = Fast-moving consumer goods.

Built Environment

The built environment has historically faced significant hurdles to innovation, and the adoption of burgeoning technologies has broadly lagged the rest of the economy. However, today we are seeing the industry realize these technological advancements, as many companies are beginning to deploy technology solutions that leverage the abundance of accessible data, to generate valuable business insights. Moreover, this leap forward has created a catalytic movement for other innovations throughout the built environment space. Prime examples of this are the new capital-efficient supply chain integration business models that employ radically outsourced manufacturing and assembly enable efficient and resilient startups to prefabricate housing, hospitality, medical office buildings, and other constructed facilities. This has the potential to generate massive efficiencies and greatly enhanced safety, compared to onsite construction.

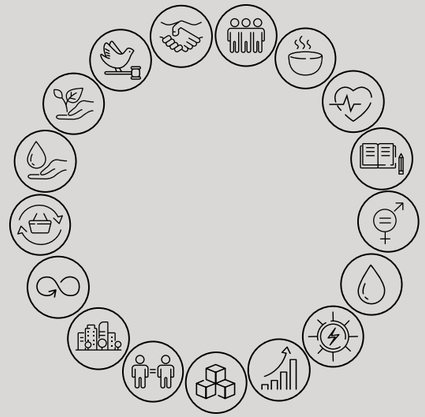
A second new business model for offsite manufacturing of housing and other constructed facilities that is being driven by digitization of designs and advances in robotics and AI is one we call "fractal prefabrication." In this business model, startups look at parts of the value chain for a single construction trade like wood framing, metal framing for interior partitions, or rebar cage production. These are labor-intensive, face-skilled worker shortages, and can be automated with very high Saas-like gross margins. These dramatically speed up onsite construction for the trades involved (and for the overall project if the work of the trade is on the critical path), reduce labor costs and materials wastage, and enhance worker safety, providing new high-paying jobs for low or moderately skilled workers while addressing the growing skilled labor shortage faced by the industry.



Cross-Cutting Technologies

Throughout our primary target sectors, there have been a growing number of catalytic technologies that benefit not only one, but a multitude of our sectors through efficiency-enabling breakthroughs. These opportunities offer newfound potential for growth and innovation that otherwise would not occur, creating broad implications across the energy, transportation, and logistics and built environment sectors. Oftentimes, these advances lay the groundwork for future opportunities that will undoubtedly lead to further impact and change in our core sectors. We have seen this manifested in different ways, ranging from better data optimization models and greater usage of edge device computation, to increasing deployment of AI/ML and robotics. Often, we see multiple use cases across our sectors, ranging from the logistics of various supply chains, to the energy infrastructure that supports our cities and various means of production. There will be a continually growing demand for these technologies across the spectrum. In turn, this has led to an impressive opportunity set that creates synergistic outcomes and truly gives impetus to more radical change.

Our Approach to Impact & Sustainability



We believe taking a triple bottom line approach is not only the right thing to do, it also provides real economic opportunities to create more value for our portfolio companies, investors, and the world. We apply frameworks established by international standard-setting bodies and industry experts to ensure we take an objective and non-political approach to impact.

SDG Alignment

The Sustainable Development Goals (SDGs)[3] were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated—that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability. Blackhorn Ventures is currently working to contribute to the Sustainable Development Goals of Affordable and Clean Energy (#7), Decent Work and Economic Growth (#8), Industry, Innovation and Infrastructure (#9), Sustainable Cities and Communities (#11), and Responsible Consumption and Production (#12).

Impact Management Project Analysis

The Impact Management Project (IMP) convened over 3,000 enterprises and investors to build consensus on how to measure, improve, and disclose our positive and negative impacts. Blackhorn applies the IMP's Five Dimensions of Impact as part of our investment due diligence process and thereafter to determine an enterprises impact on people and the planet. This framework helps us focus on each enterprise's target outcomes, expected beneficiaries, expected contribution, and the risk to people and planet if that impact does not occur as expected.

[3] "Sustainable Development Goals | UNDP". 2020. UNDP. https://www.undp.org/content/undp/en/home/sustainable-development-goals.html.

Industrial Impact Fund II in Numbers

YEAR ESTABLISHED

2022

INVESTMENT COMMITTEE

3

NUMBER OF EMPLOYEES

15

COMBINED INDUSTRY EXPERIENCE

200 years

INVESTMENTS REVIEWED

516

INVESTMENTS CLOSED

9

TARGET FUND SIZE

$200M

Portfolio Outcomes

As part of our updated impact approach, we aim to report measurable outcomes for our companies whether through a direct resource productivity impact or through a critical enabling technology. This presents a snapshot of outcomes further discussed in the following pages.

Direct Resource Productivity Impact

KING ENERGY

- 1,186 tons of CO_2 emissions avoided
- 1.33 mW of new installed renewable energy capacity
- 1,673 mWh of new renewable energy generation

optera

- 32 million metric tons of CO_2 emissions under management
- 20 percent of customers set science-based reduction targets

CAMP SIX

- 67 percent less steel and 40 percent fewer posts than traditional solar support structures
- 20 percent project cost reduction, making more solar financially viable

ecoworks

- Target of increasing life cycle of buildings by 50+ years
- 63,994 kg/a CO_2 savings and 152,340 kWh/a energy savings

Critical Enabling Impact

datch

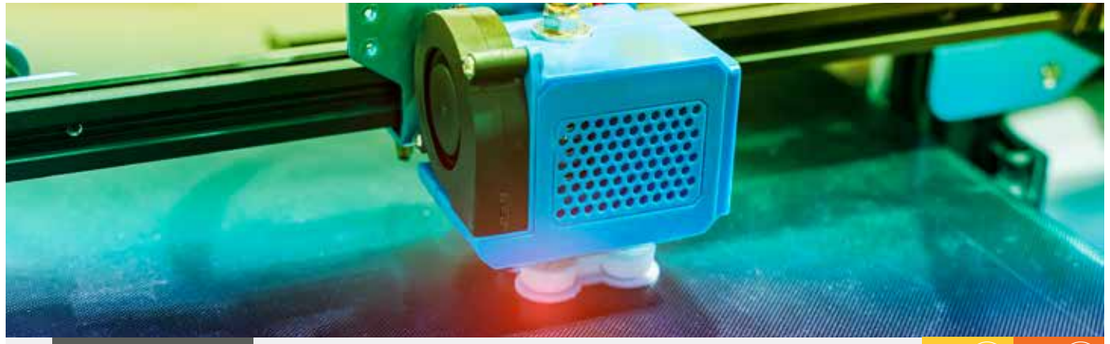
- Average 11 percent increase in worker productivity
- 9 percent reduction in waste
- 30 percent of customers operate in sustainable industries

CIRCUIT MIND

- 9000x faster electronic circuit designs relative to current methods
- 23 percent boost in power efficiency due to fewer materials used

ISO

- 40 percent less time manually reconciling data per operator
- $15M reduction in penalties in the first six months of use for two early customers



Camp Six

KEY SDGS SUPPORTED

PRIMARY TARGET: 9.4

7 AFFORDABLE & CLEAN ENERGY

9 INDUSTRY, INNOVATION & INFRASTRUCTURE

AN EFFICIENT SOLUTION FOR METAL LATTICE STRUCTURES.

Steel prices continue to increase and the cost of support structures for solar installations continues to escalate despite the price of solar PV falling. The industry standard approach is to mount rails onto roofs using multi-component systems comprised of roof mounts, module clamps, and mounting rails, which generally cost about 10 percent of an average solar system. These systems have high steel consumption, low design flexibility, and large lead times.

Camp Six Labs has developed a 3D printing system for metal lattice structures. Their solution replaces structural steel with 3D printed tubes for faster builds, less material usage, lower weight, and a reduced carbon footprint. Camp Six is initially targeting solar carports. They plan to continue with roofing and flooring for larger structures, and eventually expand to warehouses, factories, and utility towers.

SDG ALIGNMENT

Camp Six is a more resource-efficient solution to support structures for lightweight loads such as solar panels. Their innovative latticework design significantly reduces costs and environmental impact via lower steel and concrete usage. This addresses SDG 9.4, which seeks to upgrade infrastructure and retrofit industries to make them sustainable by 2030, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes. Additionally, their solution will increase adoption of renewable energy by lowering the barrier for solar installations due to lower costs and increased structural advantages. All of this points towards a greater likelihood of projects adopting solar as a result of the solution that Camp Six is offering.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Solar installers
- Society at large – reduction of fossil fuels and materials waste

Target Outcomes

- Solar installers receive decreased commodities costs.

Contribution

- Camp Six canopies require 67 percent less steel and 40 percent fewer posts.
- Reduction of steel, concrete posts, and skilled labor reduces cost of a project by over 20 percent for solar installer customers.
- 20 percent reduction in costs makes previous expensive solar projects viable.

Risk

- There is significant execution risk with this technology.

Datch

KEY SDG SUPPORTED
PRIMARY TARGET: 8.2

8 DECENT WORK & ECONOMIC GROWTH

AI VOICE INTERFACE FOR DESKLESS WORKERS TO REDUCE TIME SPENT ON DIGITAL PROCESSES.

In today's industrial environment, deskless workers use outdated technology (pen and paper for most, and laptop terminals for the lucky few) to collect data. As a result, the quality of data captured by frontline workers can be low quality, inaccurate, quickly outdated, and unactionable. Companies are faced with day-to-day challenges related to the lack of structured data that inherently limit broader AI adoption. In an attempt to solve for this, frontline workforces are being asked to become digital workers, but they lack the requisite time and skills to keep up with these demands.

Datch has built an AI voice interface that allows workers to talk through their jobs conversationally and in real time, while structuring and routing that information to their system records. The Datch platform is powered by a highly adaptable natural language processing (NLP) engine. This provides frontline workers with a digital workspace that allows them to capture and transmit information securely and syndicate it appropriately for the highest and best use case.

SDG ALIGNMENT

By providing a core enhancement for frontline workers, Datch addresses SDG 8.2, which seeks to achieve higher levels of economic productivity through diversification, technological upgrading, and innovation, including through a focus on high-value added and labor-intensive sectors. They connect the workforce with broader company systems, improving the data capture process for deskless workers and creating structured data to improve the overall efficiency of the business.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Deskless workers are spending 1-2 hours a day on digital processes, leading to millions of hours lost globally each day.
- Organizations in need of higher level of data quality, leading to massive operational inefficiencies.

Target Outcomes
- A frontline interface that is turning frontline workers into hubs of intelligence.
- The platform can extract trends and insights in the form of standardized structured data that directly feed into data-dependent systems.

Contribution
- Datch's platform leads to a 75-90 percent reduction in the time spent on these digital processes.
- Teams using Datch's optimized VUX are able to capture 180-400 percent more data.

Risk
- Data collection would continue to be disorganized and unstructured.

Ecoworks

KEY SDGS SUPPORTED
PRIMARY TARGET: 7.3

7 AFFORDABLE & CLEAN ENERGY
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES

ENERGY RETROFIT BUSINESS USING PREFABRICATED BUILDING ENVELOPES.

European multi-family residential landlords must retrofit their buildings to meet new EU building energy efficiency standards by 2030, but the high customization required for energy renovations compound the already slow and expensive process. According to the Royal Institute of Chartered Surveyors, "…the data indicate a significant opportunity exists for energy efficiency retrofits to both residential and non-residential buildings throughout the EU."

Ecoworks identifies portfolios of buildings with uniform typology, and then designs and installs a custom kit-of-parts over and within the buildings. Ecoworks' modular design and prefabrication technology stack, comprising both a quick-connect physical module retrofit kit and workflow automation software, allow it to retrofit non-compliant buildings faster and more cheaply, while maximizing energy efficiency improvements.

SDG ALIGNMENT

Ecoworks significantly improves energy efficiency of apartment buildings by modernizing their insulation and heating/cooling systems. Outdated buildings are currently causing an energy and environmental crisis from inefficient use of fossil fuels, which is especially pertinent due to the Russian invasion of Ukraine, and will cause a housing crisis if not renovated by 2030. Their solution enables the rapid and widespread change that must occur for the EU to meet SDG target 7.3 which aims to double the global rate of improvement in energy efficiency by 2030. Additionally, Ecoworks provides tenants with lower energy bills, thus addressing SDG target 7.1, improving access to affordable, reliable, and modern energy services by 2030.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Tenants
- Landlords
- Society at large – lowered carbon emissions

Target Outcomes
- Energy efficiency of aging buildings across Europe through renovation.
- Prevents the removal of affordable housing and reduces carbon emissions.
- Tenants receive lower energy bills without having to vacate their units during renovation.
- Landlords can upgrade their properties, which increases their value.

Contribution
- 38 percent of the EU housing stock was built before 1970, before regulation – Ecoworks can modernize.
- Dramatically reduce carbon emissions and avert an affordable housing crisis.
- Ecoworks projects currently require 2-4 months of on-site work, compared to an industry standard of 4-6 months.
- Landlords can earn €0.5-2.0/sq-meter more after renovation.

Risk
- Short-term execution risk.
- Develop technology stack to reduce cycle times and enable scalability.

Electric Era

KEY SDG SUPPORTED
PRIMARY TARGETS: 9.1, 9.4, 11.2

9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES

ENABLING EV FAST CHARGING WITH A MODULAR BATTERY AND SMART SOFTWARE SYSTEM.

Electric Era has created a modular electric vehicle battery and smart software charging system to enable the installation of EV fast charging units without the need for direct grid upgrades. Installing fast chargers directly to the grid is very time-intensive today because it requires costly grid upgrades, and real-time energy usage can be expensive depending on demand. Their hardware + software solution manages peak load by refilling its battery when renewable energy is most abundant, reducing the cost of energy for site owners and customers. Given the existing macroeconomic tailwinds for electric vehicle adoption, Electric Era will enable fast charging infrastructure to be built quickly and cost effectively. According to BloombergNEF lifecycle analysis, EVs produced in 2030 will emit 70 percent to 90 percent less carbon dioxide than equivalent internal combustion engine vehicles. By lowering emissions through more electric vehicle adoption, Electric Era's solution will help reduce the adverse environmental impact of fossil fuel powered cars.

SDG ALIGNMENT

Electric Era provides an easy-to-implement infrastructure upgrade that allows for fast charging installations without direct grid updates. Their product promotes the adoption of electric vehicles rather than fossil-fuel powered vehicles by making clean infrastructure more affordable and accessible. This addresses SDG 9.1 and 9.4's goals of upgrading and developing sustainable, affordable, and equitable infrastructure with an emphasis on encouraging the adoption of clean and environmentally friendly technologies. Electric Era also addresses the SDG 11.2 goal of providing access to affordable and sustainable public transport systems by enabling affordable fast charging installations along highways and other public avenues.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Convenience store/gas station owners, car dealers, and fleet network owners
- Utilities
- Society at large (everyone) – through access to affordable, public fast charging units

Target Outcomes
- Affordable public EV charging stations by simplifying installation of EV chargers.
- By 2030, the U.S. needs an estimated 180,000 non-home DC fast chargers.
- Enable the proliferation of EVs.

Contribution
- Goal to deploy 1,600 PowerNode units by 2026.
- Goal to enable 3,200 fast chargers (2 per PowerNode) by 2026.
- As it commercially deploys, it will also track:
  1) Number of miles charged.
  2) kW of energy delivered to estimate emissions impact.

Risk
- Expensive and timely grid upgrades, making it uneconomical to install fast charging.
- EV adoption would not have an equitable distribution.

Isometric Technologies

KEY SDGS SUPPORTED
PRIMARY TARGET: 9.1

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION & PRODUCTION

THE FIRST COLLABORATIVE PERFORMANCE MANAGEMENT PLATFORM FOR SHIPPERS AND CARRIERS.

Retailers, shippers, and carriers all operate on different siloed systems of record. This makes it challenging to reconcile data to arrive at the source of truth, establish accountability, and attribute cost back to the appropriate party. Shippers have no way to differentiate carriers other than price and personal relationships because there is no verified source of service data available to evaluate the 500,000+ carriers in the U.S.

Isometric Technologies ("ISO") has developed a web-based, collaborative data reconciliation tool for shippers and their carrier partners. It includes dynamic scorecards, allowing shippers and carriers to operate on a shared performance management platform to identify the root causes of supply chain failures and reveal their financial impacts. ISO's cloud-hosted system-of-record is updated in real time and collects data across multiple sources (ERP, TMS, carrier inputs), creating a single source of truth.

SDG ALIGNMENT

ISO's increased accountability will provide convenience for retailers and improve the efficiency of the global shipping industry. More comprehensive information about shipments will eliminate confusion and delays. With stronger recognition and rewards for more reliable providers, ISO helps the overall supply chain and consumers downstream. Thus, ISO addresses SDG 9.1, which seeks to develop quality, reliable, sustainable, and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being. Moving forward, ISO will also address SDG 12.6, which seeks to encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Retailers
- Reliable suppliers and shippers
- Society at large – lower costs and a more efficient supply chain

Target Outcomes
- Out-of-stock sales losses will decrease due to improved accountability.
- Suppliers and shippers will no longer face unrealistic and punitive delivery standards from retailers.
- Improved accountability will lead to efficiency gains and lower costs for the end consumer.

Contribution
- Globally, out-of-stock losses cost retailers $1T of sales each year.
- Early customer results are showing:
  - 40 percent reduction reconciling data per operator.
  - 400 percent data improvement compared to previous score-carding methods.

Risk
- Without ISO, legacy methods would likely continue to dominate.
- Siloed data.

King Energy Services

KEY SDGS SUPPORTED
PRIMARY TARGET: 7.2

7 AFFORDABLE & CLEAN ENERGY

9 INDUSTRY, INNOVATION & INFRASTRUCTURE

INNOVATIVE MODEL CRACKING THE UNDERSERVED C&I MULTI-TENANT SOLAR MARKET.

The multi-tenant commercial and industrial ("C&I") market has historically been very difficult for solar providers to penetrate. Building owners lack a direct and meaningful financial incentive and project management/financing are difficult due to the numerous, varied tenants.

King Energy has solved these problems. They rent unused roof space on C&I properties, generating revenue from an unused asset for property owners, and then install solar panels, providing power to the tenants at a lower price than traditional utilities. Their proprietary software allows King to track, apply, and optimize for the appropriate tariff rates for each tenant. Furthermore, their OneBill service provides the tenant with a single integrated bill, improving transparency and convenience from traditional utilities.

SDG ALIGNMENT

King provides access to solar energy for businesses that would otherwise be forced to buy from traditional utilities, which predominantly rely on fossil fuels. They are upgrading infrastructure and retrofitting industries to make them sustainable. This enables businesses such as malls and shopping centers to access an innovative source of renewable energy and addresses SDG 7.2, which seeks to increase substantially the share of renewable energy in the global energy mix by 2030. Additionally, this energy source is affordable, reliable, and modern.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Multi-tenant C&I property owners who are unable to take advantage of solar
- Tenants in malls, shopping centers, and other multi-tenant C&I buildings
- Society at large – reduction of fossil fuels

Target Outcomes
- Enables the proliferation of solar energy.
- Multi-tenant C&I market access to solar energy.
- Unlocking affordable and renewable energy for C&I retailers will significantly reduce emissions and help large chains accomplish their ESG commitments.

Contribution
- Only 1 percent of C&I electricity demand is served by on-site solar compared to 3 percent for the total U.S. energy demand – despite large/flat rooftops being well suited for larger projects.
- Unused U.S. C&I roof space is sufficient for 145 gigawatts of new solar capacity – nearly double the entire existing U.S. solar capacity.
- Tenants receive energy at a 10 percent discount compared to traditional utilities.
- Provide ~20 MW of clean energy with plans for expansion.

Risk
- Lack of enterprise-scale property owners.

Optera

KEY SDGS SUPPORTED
PRIMARY TARGET: 12.6

8 DECENT WORK & ECONOMIC GROWTH

12 RESPONSIBLE CONSUMPTION & PRODUCTION

SOFTWARE TO ACCELERATE CORPORATE SUSTAINABILITY.

Companies across every industry are getting pressure from society, customers, and employees to provide greater levels of disclosure with relation to carbon emissions, supply chain management, and traceability. Customers need finance-like SaaS platforms to track their organizational footprint so that they can directly tie their operations to both their short-term and long-term emissions reductions goals.

Optera specializes in Scope 3 Emissions, which are particularly hard to track and important to large companies. Their Flagstaff platform captures and stores corporate sustainability data, calculates carbon emissions metrics and forecasts, and provides customers with the tools needed to identify efficiency opportunities and to achieve strategic corporate goals.

SDG ALIGNMENT

Optera helps large corporations understand their supply chains, enabling them to cut out waste in production. Their platform is specifically designed to improve global resource efficiency and decouple production from environmental impact. They directly address SDG 12.6, which seeks to encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle by providing access to carbon emissions data and forecasts for large companies. Furthermore, Optera's focus on Scope 3 Emissions allows these businesses to capture more complete sustainability information than other carbon accounting solutions.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Large corporations who can more effectively track their carbon footprints
- Society at large – lower carbon emissions

Target Outcomes
- Better understanding of supply chain carbon emissions for reporting.
- Increased accountability, which will lead to greater efficiency and emissions reductions.

Contribution
- 8,500 companies are currently reporting emissions annually and the majority have very ambitious reduction targets.
- 100 of the largest companies are responsible for 71 percent of global emissions.

Risk
- Existing solutions in the space, but none of them track scope 3 emissions as effectively as Optera.

RailVision Analytics

KEY SDGS SUPPORTED

PRIMARY TARGETS: 9.4, 11.2

9 INDUSTRY, INNOVATION & INFRASTRUCTURE

11 SUSTAINABLE CITIES & COMMUNITIES

POWERING THE RAIL INDUSTRY INTO A NEW ERA OF EFFICIENCY.

RailVision Analytics' intuitive tablet-based application provides train operators with real-time suggestions to improve their fuel efficiency. Trains continue to act as the backbone of our supply chain and are 9x more efficient than trucks at moving goods at one-third the cost. Yet, more than two-thirds of the global rail market, and 99 percent of U.S. rail, still relies on diesel fuel, which is the second biggest expense for the rail industry after labor. In 2021, the U.S. transport sector consumed approximately 47 billion gallons of diesel fuel, an average of 128 million gallons per day, according to the EIA. By integrating data sources already captured on locomotives, RailVision has created a smart algorithm that suggests real-time driver adjustments that reduce fuel costs and associated emissions by up to 20 percent. The growth and success of RailVision is directly tied to reduced diesel usage and therefore reduced carbon emissions.

SDG ALIGNMENT

RailVision Analytics supports SDG 9.4's goal to retrofit industries to make them more sustainable with a focus on greater resource-use efficiency and SDG 11.2's goal to provide affordable, sustainable transport systems. By enabling lower diesel fuel usage, RailVision's solution results in fewer greenhouse gas emissions and improved air quality for communities located along rail routes and at rail depots. Due to a history of discriminatory policies, it is more likely that marginalized communities live or work near railroad tracks and depots.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Rail owners and operators
- Individuals living near railroad routes and depots
- Society at large – reduction of fossil fuels

Target Outcomes

- In 2021, the U.S. transport sector consumed approximately 47 billion gallons of diesel fuel, an average of 128 million gallons per day, according to the EIA.
- Drive a 10 percent to 20 percent reduction in diesel fuel consumption and associated emissions while maintaining current routes and productivity levels.

Contribution

- Average fuel reduction of 10 percent to 20 percent through its real-time operational improvements.
- As it commercially deploys, it will also track:
  1) gallons of diesel fuel avoided per year.
  2) estimated emissions avoided due to reduction in fuel consumption.

Risk

- Without RailVision, it is unlikely rail operators would materially change their driving practices to improve their energy efficiency.
- Adoption of new digital technologies can be slow in the rail industry, but tends to be sticky once adopted.

Industrial Impact Fund in Numbers

YEAR ESTABLISHED

2019

INVESTMENT COMMITTEE

4

NUMBER OF EMPLOYEES

10

COMBINED INDUSTRY EXPERIENCE

108 years

INVESTMENTS REVIEWED

607

INVESTMENTS CLOSED

20

COMMITTED CAPITAL

$100M

Portfolio Outcomes

As part of our updated impact approach, we aim to report measurable outcomes for our companies whether through a direct resource productivity impact or through a critical enabling technology. This presents a snapshot of outcomes further discussed in the following pages.

Direct Resource Productivity Impact

Aperia Technologies

- 60,000 bolt-on tire inflators deployed
- Estimated 1.8 million metric tons of avoided CO2 emissions

AGORUS

- 15 percent to 20 percent less lumber material waste per project

LatentAI

- Reduces memory requirements by up to 10x while achieving 4x lower latency

HYPERFRAME

- 10x to 15x faster wall framing than traditional methods
- Eliminates need for dangerous tools at height, lowering workplace injuries

Critical Enabling Impact

DRAWBOARD

- Saved over 26,000 hours on avoided manual tasks during 100-user pilot
- Generated $2.5 million in net savings during 100-user pilot
- 189 tons in CO2 emissions avoided during 100-user pilot

VECNA robotics

- 100 percent safety track record compared to an average of 95 forklift injuries occurring daily and ~35,000 accidents annually
- Operate up to 85 percent more efficiently

safesite

- 57 percent reduction in workplace incidents
- Up to 60 percent reduction in insurance premiums for customers

7 AFFORDABLE & CLEAN ENERGY

BLACKHORN VENTURE'S CASE STUDY

OPPORTUNITY FOR IMPACT:

Energy remains the dominant contributor to climate change, accounting for around 60 percent of total global greenhouse gas emissions. UN Sustainable Development Goal 7 seeks to provide affordable and clean energy at scale. This is being accomplished through a directed focus on three pillars: energy access, energy efficiency, and level of renewable energy used.

RHYTHMOS' IMPACT SOLUTION:

rhythmos

Our electrical grid is built upon aging and outdated infrastructure that we all rely on every day. On average, most installed equipment was put in place over 60 years ago and has an average lifespan of 50 years. Failures are increasingly frequent as climate events are stressing the aging infrastructure, and the market continues to bring renewables, storage, EVs, and other new technologies online, and in turn, creating an increasingly complex operating ecosystem that the legacy grid was not built to accommodate. Over the past 15 years, there has been a 600 percent increase in power outages and over the next 10 years there will be an estimated $177B investment gap for necessary repairs to this installed infrastructure base.

As alternative and distributed energy deployment continues to increase the demand placed on utilities and the energy grid infrastructure that supports distribution, there are even greater requirements to provide utilities with access to data and business analytics in order to effectively serve their customers. Rhythmos seeks to bolster the resiliency of our energy system by aggregating data and creating real-time actionable insights that enable utilities to better design, maintain, and operate reliable, resilient, and cost-effective smart grid systems.

A wave of enhanced AMI metering, new devices and sensors, and externally sourced customer and environmental data is currently being deployed. The resulting data streams are being captured at an accelerating rate to complement an already vast and largely un-digitized body of historical data to provide the granular detail needed to support the future design, maintenance, and operation of this increasingly complex ecosystem.

Rhythmos

KEY SDGS SUPPORTED

PRIMARY TARGETS: 7.1, 12.2

7 AFFORDABLE & CLEAN ENERGY | 9 INDUSTRY, INNOVATION & INFRASTRUCTURE | 11 SUSTAINABLE CITIES & COMMUNITIES | 12 RESPONSIBLE CONSUMPTION & PRODUCTION

RHYTHMOS SOLVES THE SMART-GRID ANALYTICS ISSUE BY BRINGING THE CONCEPTS AND PRACTICES OF BIG DATA TO THE POWER UTILITY SPACE.

Rhythmos combines advanced analytics, innovative research, and user-intuitive design to offer simple and customizable solutions to utilities. Their technology helps utilities manage their energy more efficiently, incorporate renewable energy resources, and make better operational and financial decisions. It provides modular smart grid SaaS solutions that empower utilities to optimize their operations and customer service and it also aggregates data from disparate systems, completes multi-layered analytics, and recommends real-time actionable insights. Finally, it offers simple and customizable solutions to help utilities make sense of their data and implement data-driven change.

SDG ALIGNMENT

The U.S. Energy Information Administration predicts the world's power demands will increase by nearly 60 percent between 2010 and 2040. As these demands increase, so too does the complexity of distribution and transmission of the energy supply needed to meet these demands. Even the most sophisticated utilities are unable to quickly synthesize their existing datasets, therefore limiting their ability to generate meaningful insights and share key findings across their businesses. Rhythmos can help utilities plan for the generation, distribution, transmission, and storage of energy to address increasing energy needs. This contributes to SDG target 12.2 of achieving sustainable management and efficient use of natural resources and ensuring the rate of improvement in energy efficiency required for SDG target 7.3.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Customer service and AMI service workers
- Energy supply management professionals
- Distributed energy resource managers

Target Outcomes

- Support mandates to enable expansion of renewable resources more effectively.
- Increase reliability, safety, and performance/ cost transparency for energy grid operators and their customers.
- Enable utilities to proactively monitor, manage, and reduce their carbon footprint.

Contribution

- Rhythmos's out-of-the-box software has proven to reduce utilities' operating expenses by up to 70 percent, while simultaneously increasing their reliability by up to 60 percent.

Risk

- Without the Rhythmos platform, even the most sophisticated utilities are challenged by their inability to quickly synthesize data to investigate complex system challenges in the energy domain.

8 DECENT WORK & ECONOMIC GROWTH

BLACKHORN VENTURE'S CASE STUDIES

OPPORTUNITY FOR IMPACT:

SDG 8 seeks to achieve higher levels of economic productivity through diversification, technological upgrading, and innovation, including a focus on high-value-added and labor-intensive sectors. In addition, through 2030, the goal seeks progressive improvements in global resource efficiency related to resource consumption and production, as well as in relation to endeavors to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programs on sustainable consumption and production, with developed countries taking the lead.

ALICE

Foresight

GRIDRASTER

HYPERFRAME

safehub

SUSTAINMENT.

TOGGLE

VEGNA robotics

FORESIGHT'S IMPACT SOLUTION:

Foresight's Safesite solution is a mobile-first, safety management solution. After 45,000+ live safety data points collected daily from 4,000+ heavy industry companies, their product has proven to drive improvements to workforce engagement tied to safety and facilitates behavior change on construction job sites. During the first six months of their offering, use of the application has shown a 31 percent average incident reduction rate for the 351 companies using the solution. This, combined with their Insurtech product, focused on workers' compensation, means Safesite reduces the incidence of accidents and injuries on job sites and rewards safety-focused customers through four pathways:

Sustainability for businesses: For medium-sized businesses with 10 to 500 employees operating with single-digit profit margins, discounting premiums through the Safesite tool allows more businesses to keep their doors open. Driving down insurance premiums by up to 50 percent (9 percent is average, which leads to about 1 percent net margin increase for these small businesses) adds meaningful incremental savings.

Human-centric claims approach: Use of the platform not only reduces the cost of claims under an insurance claim, but also allows the injured employee to obtain their claims more quickly. By using a third-party claims representative to call the claimant to understand context (life, family, financial situation), the average number of days away from work are reduced by taking a more humanistic approach.

Total human help: The app holistically helps employers improve other aspects of their labor force's quality of working conditions such as mental and physical health, flexibility, and general well-being improvements. By doing so, there is not only a decrease in incident rates, but also an increase in the general well-being of employees.

62 percent reduction in job transfer: Often when a worker is injured, they are forced to change their type of work, depending on the nature and severity of their injury. By decreasing the number of injuries and also the severity of worker injuries, they may be allowed to maintain their current work or trade.

Alice

KEY SDGS SUPPORTED

PRIMARY TARGET: 8.2

8 DECENT WORK & ECONOMIC GROWTH

9 INDUSTRY, INNOVATION & INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION & PRODUCTION

ALICE TAKES THE GUESSWORK OUT OF RESCHEDULING CONSTRUCTION PROJECTS IN NO TIME AT ALL.

ALICE provides a powerful AI-powered schedule simulation and optimization platform that parametrically runs thousands of scenarios to help large general contractors understand the time and cost trade-offs of utilizing different sequences and resources. ALICE explores schedule sequences and gives teams the power to explore "What if?" scenarios that assist them in evaluating changes to plans or schedules in just minutes. By creating alternative schedule scenarios and making it easy for users to weigh their options, ALICE helps projects achieve greater efficiency in labor, equipment, material, and energy savings.

SDG ALIGNMENT

The ALICE platform allows general contractors to quickly simulate thousands of schedule scenarios. With ALICE, users develop a construction plan that best matches their specific business goals, and, if circumstances change along the way, they can re-sequence their scheduling during the construction process. Through this work, ALICE contributes to its primary SDG target 8.2 of achieving higher levels of economic productivity through technological innovation in labor-intensive sectors.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Contractors
- Subcontractors
- Construction workers

Target Outcomes

- The planning process is reduced to a matter of days versus traditional methods of planning and scheduling that generally take three to four months.
- In recent case studies, firms saw on average:
  - Less than a week to train and implement.
  - Construction durations reduced by 17 percent.
  - Construction costs reduced by 11 percent.

Contribution

- Currently, manual approaches to construction scheduling can evaluate only a small subset of scenarios.
- Through AI, general contractors can consider numerous possibilities, with increased visibility and improved understanding of the various trade-offs of cost, time, and resource needs.

Risk

- With the status quo, contractors risk dramatic schedule and cost overruns.
- According to McKinsey & Company, large construction projects are typically completed 80 percent over budget and take 20 percent longer than originally scheduled.

Foresight

KEY SDGS SUPPORTED

PRIMARY TARGET: 8.8

8 DECENT WORK & ECONOMIC GROWTH

9 INDUSTRY, INNOVATION & INFRASTRUCTURE

TRANSFORMING THE WAY COMPANIES IN HIGH-RISK INDUSTRIES MANAGE THEIR EVERYDAY SAFETY AND COMPLIANCE NEEDS.

Foresight's product, Safesite, utilizes technology that creates a safer work environment by digitizing safety and compliance processes, which supports safer work environments through a reduction in safety-related incidents. Safesite is a new, technology-driven commercial insurance provider for the U.S. heavy construction industry. Safesite harnesses cutting-edge risk-management technologies to reduce incidents, and rewards customers with safer performance with lower insurance costs, all while beating incumbent insurance provider pricing by 25 percent. The platform prioritizes safety and technology, enabling SafeSite to reward safe businesses with performance-based pricing, all while driving down loss ratios and significantly reducing collected premiums. The current loss ratio for the industry stands at 79 percent, due to the high cost of claims. Safesite has the ability to bring loss ratios to below 55 percent with their platform, yielding significant savings for the customer, all while generating additional margin via the Safesite product.

SDG ALIGNMENT

Safesite allows the construction industry to utilize mobile technology in a way that reduces risk, increases compliance, and generates valuable data that can be used for corrective measures. With relation to SDG 8, specifically target 8.8 to promote safe and secure working environments, Safesite's system enables the construction industry to create a safer and more efficient work environment. Their data collection, ML/AI technologies, and mobile application improves safety and risk management, resulting in fewer and less severe incidents on the jobsite.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Small and medium-sized contractors
- Insurance actuaries
- Insured workers

Target Outcomes

- Mobile-first safety management solution that prevents injuries, saves lives, and makes the construction workplace more sustainable.

Contribution

- Safesite has reduced insurance premiums by up to 60 percent, standing at approximately 9 percent for several mid-sized businesses. In such cases, there are net margin improvements for these companies, leading to 25-33 percent increases in profit.
- On average, Safesite has a 57 percent proven reduction in workplace incidents.

Risk

- Without external audits and compliance checks, the construction industry puts workers and managers at high physical risk.

Gridraster

KEY SDGS SUPPORTED

PRIMARY TARGETS: 8.2, 9.5

8 DECENT WORK & ECONOMIC GROWTH

9 INDUSTRY, INNOVATION & INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION & PRODUCTION

SCALING THE EFFICIENCY OF CLOUD PROCESSING POWER FOR VR/AR/MR.

As VR/AR/MR gain broader market adoption, challenges related to managing large environment models with high complexity are emerging. These models require significant processing power, which suggests the need for a cloud-based approach. But data latency often leads to delays in displaying graphics on the headset, causing users to experience extensive wait times — impeding real-time user review potential and leading to user disorientation.

GridRaster provides a platform solution that is hosted on edge computing resources that are geolocated near the user to allow for the power of cloud processing, but with a minimization of the latency that is commonplace with AR/VR/MR. Its solution enables more efficient scaling of VR/AR/MR by decoupling processing from the user's viewing device. This also opens the door to less expensive VR/AR/MR devices, as the core rendering hardware can be located in an edge server that is more efficient to run rather than in the device itself.

SDG ALIGNMENT

GridRaster's platform allows firms to utilize AR technology more effectively, giving workers real-time instruction overlaid on surfaces or materials that allows for a remote review work processing. These processes significantly increase organizational throughput and productivity while reducing errors, and it decreases the need for excessive travel that can be associated with the team review process. This technological innovation works towards increasing both the capability and economic productivity of workers in high-value add, labor-intensive sectors, which contributes to the SDG targets 8.2 and 9.5.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Workers using the system
- Companies adopting the platform
- Downstream consumers of products produced with GridRaster's assistance

Target Outcomes

- Customers are experiencing a 40 percent increase in productivity and an 85 percent decrease in training time through the use of AR/VR/MR applications.

Contribution

- Although similar solutions exist, GridRaster is focused on offering a greater level of precision and expansiveness than other current market players.

Risk

- Without the implementation of VR/AR/MR technology, industrial sectors will continue to spend excessive resources training employees, while experiencing errors in assembly and longer completion times on projects.
- Lack of efficiency and benefits from environmental impact.

Hyperframe

KEY SDGS SUPPORTED
PRIMARY TARGETS: 8.8

8 DECENT WORK & ECONOMIC GROWTH
11 SUSTAINABLE CITIES & COMMUNITIES
12 RESPONSIBLE CONSUMPTION & PRODUCTION

HYPERFRAME BUNDLES MIXED REALITY SOFTWARE WITH CUTTING-EDGE METAL FRAMING PREFABRICATION.

Metal framing has not evolved in decades. 81 percent of interior wall framing is steel, and currently every piece is custom-cut and screwed by hand, resulting in a high dependency on measurement, use of cutting, drilling, and screwing tools, and visual alignment. Quality depends on the skill of the worker, and injuries are common.

The Hyperframe solution significantly improves the efficiency and speed of the process for framing installation. Components are manufactured at the appropriate length with no steel waste from the roll form coil. The beams are shipped to job sites where a worker uses the HoloLens app to see where the piece should go and then easily snaps it into place.

SDG ALIGNMENT

Hyperframe dramatically lowers the expected frequency and severity of traumatic and repetitive stress injuries by eliminating the need for dangerous tools. In addition to workplace accidents, these tools are also very loud and can cause hearing loss. Hyperframe's solution is practically silent while chop saws, commonly used for cutting metal framing, operate at ~106 decibels, and the CDC states that any sound over 85 decibels is dangerous if heard over prolonged periods. By improving worker safety, Hyperframe addresses SDG 8.8, which seeks to protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment. Furthermore, installers can be trained to use the Hyperframe system in minutes. Through reducing the skill level needed to complete the task, the Hyperframe solution is also removing an education barrier and expanding the accessibility of framing work to a broader portion of the population. Faster installation speeds and enabling unskilled labor will also lower costs, improving access to affordable housing that is desperately needed.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Framing contractors
- Low-skill construction workers
- Commercial construction project owners

Target Outcomes
- Hyperframe achieves a safer and virtually silent installation.
- Hyperframe is also an enabling technology for broader employment opportunities and increased affordable housing.

Contribution
- Hyperframe is 10-15x faster than traditional framing with 20 percent less cost.

Risk
- Traditional interior framing is needlessly complex, inefficient, and dangerous.

Safehub

KEY SDGS SUPPORTED
PRIMARY TARGETS: 8.8

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES

IOT SENSOR-BASED ANALYTICS PLATFORM TO REDUCE BUSINESS INTERRUPTION LOSSES FROM CATASTROPHIC EVENTS.

Safehub is building the world's first IoT sensor-based analytics platform that remotely monitors real-time structural damage to reduce interruption losses for enterprise customers, caused by catastrophic events. As seen during the recent global pandemic, business interruption is one of the most important risk factors that companies must manage. Catastrophic events like earthquakes and hurricanes have the potential to cause significant disruption to operations and supply chains, resulting in major long-term economic impacts.

Through a combination of proprietary sensors, analytics, and third-party data, Safehub is building the world's first IoT sensor-based analytics platform to provide building-specific structural damage information, with an initial focus on earthquakes. The platform analyzes data and deploys actionable information through a web-based dashboard, text messages, and email alerts used to estimate damage to buildings and real estate portfolios, gauge business interruption losses, and inform customers within a matter of minutes.

SDG ALIGNMENT

Safehub's data capture and risk modeling dramatically improve the accuracy and awareness of building management teams and insurance underwriters, enabling higher levels of economic productivity through more efficient use of capital and greater risk reduction and prevention. With relation to SDG target 8.8, Safehub's products enable building construction and management to monitor risk with much greater accuracy, supporting the goal of ensuring a safe and secure working environment. This leads to savings in upfront insurance costs and a reduction in business interruption losses as a result of increased reporting and risk reduction capabilities.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Structural engineers
- Insurance underwriters
- Building owners
- Risk managers

Target Outcomes
- Companies more accurately monitor the safety, operational viability, and risks of their buildings.
- More accurate and competitive insurance underwriting leads to more efficient use of capital in relation to disaster-related insurance.

Contribution
- Platform allows greater accuracy in data capture and risk modeling and risk reduction.
- Creates accurate and competitive pricing models for insurance underwriters.
- Decreases losses due to real-time data.

Risk
- Catastrophic events cause significant business interruption, resulting in major long-term impacts on businesses of all kinds.

Sustainment

KEY SDGS SUPPORTED
PRIMARY TARGET: 8.3

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE

LOCALIZING, DIVERSIFYING, AND OPTIMIZING INDUSTRIAL SUPPLY CHAINS.

There is a fragmented ecosystem in the U.S. of 291,000 manufacturing businesses, 99 percent of whom have less than 500 employees. These machine shops are typically generational businesses that lack websites or marketing, making it difficult for customers to find them. This makes the bidding process on the buyer side time consuming and cumbersome. The relationship-based, insular nature of the industry makes it difficult for minority-owned businesses to gain customers.

Sustainment is a SaaS platform that connects their growing network of more than 3,000 U.S. manufacturers with enterprise customers to enable efficient, secure, and U.S.-first supplier networks. Additionally, minority-owned businesses can include that certification on their virtual storefront, making it easier for customers to search for and source from manufacturers that fulfill their DEI initiatives. They also increase supply chain resiliency by providing greater insights into all of the available manufacturers for a part. Sustainment recently converted to a Public Benefit Corporation to reflect the importance of their mission to help American manufacturers.

SDG ALIGNMENT

Sustainment fulfills its primary SDG target 8.3 by providing support for decent job creation and supporting the growth of SMBs. They bridge the gap between vendors and SMBs and they target a major pain point that commonly affects U.S. manufacturing vendors and suppliers. The USAF alone does $7B worth of transactions over 9k-12k sourcing activities annually, with each bid requiring an average of 14 days of vendor discovery per sourcing activity. That is the equivalent of more than one million hours lost annually due to inefficient vendor matching processes. The platform reduces sourcing time and promotes workforce efficiency for SMBs and vendors that would otherwise struggle to identify each other in what is currently a highly inefficient market.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Small and medium-sized enterprises
- Manufacturing and materials inputs vendors and suppliers

Target Outcomes
- To streamline the vendor discovery experience and support demand planning to provide predictive models for buyers and vendors, in addition to providing market intelligence services.

Contribution
- Sustainment estimates that their solution will reduce sourcing time and costs by an estimated 30-40 percent annually by offering vendor matching.

Risk
- One customer's average lead time for parts was 550 days without Sustainment, leading to an estimated $1M per day in lost value.
- U.S. manufacturing and minority-owned U.S. businesses will continue to struggle to secure contracts and lose global market share.

Toggle

KEY SDGS SUPPORTED
PRIMARY TARGET: 8.4

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION & PRODUCTION

AUTOMATING THE ASSEMBLY OF REBAR CAGES VIA ROBOTICS.

Rebar is a necessity due to the abundance of reinforced concrete that is used in major construction projects. However, there is a lack of supply of sufficient skilled ironworker labor to assemble rebar cages accurately from shop drawings. This often leads to delays, increased costs, and a host of safety issues involved with working on rebar.

Toggle is automating the assembly of rebar cages — the high-skilled, labor-heavy part of the fabrication process — to meet the global construction demand for rebar much faster, with higher quality, increased safety, and at dramatically lower cost. They provide a capital-light, software-enhanced, robotically manufactured component that requires scarce skilled labor and can be automated very cost effectively.

SDG ALIGNMENT

Using its state-of-the-art technology and processes to manufacture rebar components, Toggle moves the construction site's complexity into a safe, controlled environment. By boosting productivity and efficiency for the foundational processes required to construct city buildings and infrastructure, Toggle supports SDG 8.4, which seeks to improve global resource efficiency to decouple economic growth and environmental impact. In terms of labor productivity, the company's approach to rebar assembly has demonstrated the ability to reduce the number of labor hours per ton of rebar produced by 50 percent.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Urban development construction project owners
- Renewable energy facilities

Target Outcomes
- Develop technology for the construction industry that will bring a new level of safety, efficiency, and precision to the production of foundational construction components.

Contribution
- Toggle's full-stack robotics and automation solution for rebar fabrication and assembly multiplies labor productivity by 3x and allows for an increase of overall production by up to 5x.

Risk
- Reinforced concrete is one of the most used construction products in the world, and it comes with an unnecessary level of worker risk, pollution, time, and material wastage.

Vecna Robotics

KEY SDGS SUPPORTED
PRIMARY TARGETS: 8.2, 8.8

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION & PRODUCTION

A SYNERGISTIC WORKFORCE THAT OPTIMIZES HUMAN AND ROBOTIC COLLABORATION.

E-commerce has created a massive shift in how consumer products are purchased, stored, and shipped. This creates a logistical nightmare, as warehouses fail to adapt and scale along with market demand. These facilities are almost entirely staffed by a human workforce and the cost of rising wages, lack of efficiency, and high levels of seasonality and demand variability results in challenging work environments and a major labor shortage.

Vecna Robotics provides the hardware needed to automate the warehouse space and pairs this with an AI-based platform that orchestrates the warehouse supply chain's entire workflow. This focus on software development allows for more efficiency and coordination by maximizing levels of warehouse automation while keeping humans engaged in the process.

SDG ALIGNMENT

Vecna Robotics transforms the intralogistics industry by creating a synergistic, hybrid robotic and human workforce. Its orchestration engine accounts for multiple variables that fluctuate due to seasonal and inconsistent supply and demand peaks. Vecna's supply chain optimization methods directly contribute to SDG target 8.2, achieving higher levels of economic productivity through technological innovations in labor intensive sectors like the logistics and warehousing industries, by alleviating the serious worker shortage that these industries face. Additionally, Vecna's solution is significantly safer than manual forklifts, addressing SDG target 8.8. OSHA estimates that 95 people are seriously injured in a forklift accident every day in the U.S. alone. 11 percent of forklifts will be involved in an accident each year. In contrast, Vecna boasts a 100 percent safety track record, without a single accident to date.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- E-commerce platforms
- Warehousing companies
- Warehouse workers
- Society at large – consumers of e-commerce

Target Outcomes
- Workflow optimization of warehouses through both software and hardware.
- By offering flexible, adaptive automated environments, human-robot teams can operate up to 85 percent more efficiently than either humans or robots independently, improving quality of worker experience and safety.

Contribution
- Accelerating the hardware-agnostic approach at the fastest pace, through a software platform that connects hardware to humans.
- Reducing the 34,900 forklift accidents resulting in serious injury annually in the United States.

Risk
- Without automation, the industry is likely to be on a much longer trajectory to sustainability.
- By operating in a hybrid environment, the industry can create increased safety, efficiency, and prevent job elimination.

OPPORTUNITY FOR IMPACT:

By 2030, UN Sustainable Development Goal 9 seeks to upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes.

briq

CoFi

LatentAI

RMBX RHUMBIX

LATENT AI'S IMPACT SOLUTION:

According to a 2020 report by the IDC, by 2025, there will be an estimated 75 billion IoT devices creating 90 zettabytes of data. However, today's Artificial Intelligence and Machine Learning ("AI/ML") developments are narrowly focused on specific AI models and related types of hardware. Latent AI's solution enables Adaptive AI across the edge continuum of devices, with an end-to-end workflow to manage the lifecycle of edge AI models. This is done through four primary modalities: training and compression, compiling and optimizing, run and manage, and continuous connection/monitoring.

Through this work, models can be compressed to use 1/10th the memory, 4x lower latency, throttle down to 30 percent utilization, and create significant energy savings. By moving their efficient, smaller models to the edge devices, their customers will not only see speed and power optimization, but continual improvement as the model refines itself over time.

Briq

KEY SDGS SUPPORTED
PRIMARY TARGETS: 9.2, 9.3

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES
12 RESPONSIBLE CONSUMPTION & PRODUCTION

TURNING DATA INTO ACTIONABLE FINANCIAL INSIGHTS.

Briq has developed a set of Robotic Process Automation (RPA) bots that extract relevant data from existing key installed applications, including legacy corporate Enterprise Resource Management (ERP) systems. From this unified "data lake," they derive reports that synthesize extracted data and then display them using Briq's own simple visualization tools, or through an export of the data into Business Intelligence (BI) apps like Tableau where customers can then also create custom dashboards. Briq is also creating a set of Machine Learning (ML) algorithms to derive actionable insights about market opportunities, project financial performance, and human resources.

With the recent launch of Briqpay, a B2B payment platform that provides payment solutions for business-to-business online sales with instant credit lookups and credit rules, Briq has made control of online credit exposure fully digitized. Briqpay also helps with valuable customer insights that will improve user experience and increase sales via a personalized business-to-business experience on a local or global basis.

SDG ALIGNMENT

Briq products allow for higher levels of economic productivity through enhanced decision making, technological upgrading, and innovation. The company's RPA technology allows firms to understand the wealth of data that is currently unused, giving them better insights into market opportunities, past and future project performance, resource utilization, and increasing resource efficiency. Through Briq's unique approach they can support SDG 9, industry, innovation, and infrastructure, specifically with regards to promoting inclusive and sustainable industrialization as in target 9.2, in promoting sustainable industrialization and target 9.3, providing infrastructure resources to small-scale industrial enterprises.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- General contractors and sub-contractors
- Project financial planning teams
- Construction laborers

Target Outcomes
- In a recent case study, the client experienced:
  - Freezing overhead costs by revealing inefficiencies leading to 82 percent efficiency gains.
  - Forecasts up to 40 percent more accurate.
  - Achieved ROI increases of ~10 percent by automation and winning larger projects.

Contribution
- Briq's competitors are mostly focused on data collection, rather than on data aggregation. Briq's unique approach helps companies have newfound access to their data and can change the way they are managing their business.

Risk
- Without data aggregation and the provision of deeper insights, the construction industry would continue to see less than optimal utilization of resources (both capital and human).

CoFi

KEY SDGS SUPPORTED
PRIMARY TARGET: 9.3

9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES

COFI AUTOMATES AND MODERNIZES THE CONSTRUCTION PAYMENT PROCESS FOR RESIDENTIAL, COMMERCIAL, AND SBA LENDERS.

CoFi has built out a construction loan marketplace that connects contractors with lenders that use CoFi to pay on demand. Construction payments are complex and risky. There is an estimated $1 trillion globally in construction fraud each year, with payment fraud making up over half of all cases. It takes an average of 43 days for money to flow from the lender to the borrower and then eventually to the builder. It takes up to 90 days or even longer for subcontractors to get paid. They need to finance their installed materials and labor costs for this time and at very high interest rates. A commitment to pay subcontractors faster can reduce their bid prices significantly.

SDG ALIGNMENT

This is an enabling technology that will allow for further innovation in the built environment sector. With easier access to capital, new construction and renovations are more likely to occur. This will increase access to affordable housing. It will also reduce greenhouse gas emissions as newer buildings are far more energy efficient. Identity verification and managed inspections also help reduce fraud — a major problem in the industry.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Commercial construction lenders
- Contractors and subcontractors who no longer have to take on as much financial risk
- Building owners and users

Target Outcomes
- Provide easier access to capital for contractors and subcontractors to enable further innovation.

Contribution
- Using CoFi, it takes contractors ~5 days to get paid, 14x faster access to capital.
- This increases opportunities/demand for lenders as well.

Risk
- Without CoFi, fraud will remain rampant in this industry and overall innovation for sustainable cities and affordable housing will be inhibited by this high time-cost of capital

Latent AI

KEY SDGS SUPPORTED
PRIMARY TARGET: 9.5

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION & PRODUCTION

LATENT AI ACCELERATES AI IMPLEMENTATION AND WORKFLOWS FOR ENTERPRISES ON THE EDGE CONTINUUM.

AI needs to be faster in development, deployment, and responsiveness and use less power to be effective. Most AI models are simply too compute- and resource-intensive to operate independently on compute constrained edge devices. Standard models either fire all parts of their neural network or none of it. That limits their potential, especially when computing requirements can change and models may not. It's easy to see how most AI projects fail.

Latent AI offers a complete hardware agnostic edge device AI deployment, configuration, and maintenance solution. It's Adaptive AI that can only engage the parts of the neural network that need to be engaged, drastically reducing power demands while maintaining model robustness and accuracy. Adaptive AI can not only perform when disconnected from the network, but also offer built-in ML security protections against model theft and tampering. Adaptive AI is key to giving organizations a path to unlock the true potential of what AI can do when moved to the edge.

SDG ALIGNMENT

Latent AI technology helps organizations meet SDG 9.5 obligations surrounding resilient infrastructure, sustainable industrialization, and innovative R&D. Latent AI quantization-guided training, continuous optimization, conditionally gated networks, and adaptive AI runtimes can help organizations reduce their power requirements while delivering secure models more quickly

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Companies implementing AI/ML processes.
- Provide a level of privacy and security mostly nonexistent in current models.
- Society and communities at large, via lowered power consumption.

Target Outcomes
- Support the development of intelligent and efficient embedded edge processing.

Contribution
- Latent AI hybrid quantization improvements help reduce memory requirements up to 10x while achieving 4x lower latency.
- Latent AI technology helps make edge AI practical by reducing training times from months to minutes, allowing updated secure models to be deployed quickly and efficiently.

Risk
- Without Latent AI, data generation causes bandwidth, latency, and connectivity issues.
- Excessive energy consumption.
- Latent AI makes edge AI far easier and faster to deploy and maintain.

Rhumbix

KEY SDGS SUPPORTED
PRIMARY TARGETS: 9.2, 8.2

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION & PRODUCTION

DIGITIZATION OF WORKER-LEVEL AND FIELD-LEVEL DATA OPTIMIZES THE LABOR FORCE.

In 2014, Rhumbix began building a "worker first" platform to replace paper and the construction industry's reliance on the use of spreadsheets in the field. This platform began with digitizing timecards for payroll and production tracking for labor productivity, and has since expanded into the provision of daily construction reports and the tracking of time and materials (T&M) tags (a.k.a. field work orders) for change order management. Today, Rhumbix is the industry leader in digitizing field data from workers on construction project sites, and its platform is being used by several top general contractors and specialty subcontractors in the U.S.

SDG ALIGNMENT

Rhumbix's technological offering and value are directly correlated to the promotion of a safe and secure working environment and creating opportunities for wage-level workers to progress in their training, certification, and career development. Through its data-driven approach, Rhumbix powers the construction industry and allows growth within the industry to be both sustainable and efficient. Its platform allows the construction industry, which has lagged behind other sectors in its adoption of technology, to increase overall levels of productivity through access to increased levels of data. With real-time reporting, foremen can actively track raw materials needed at job sites, ensuring less waste from unused materials and less time spent coordinating with the central office. Overall, Rhumbix promotes SDG target 9.2 of promoting sustainable industrialization by this optimization of labor and materials usage in the construction sector, which accounts for a reduction of 23 percent in all GHG emissions. As a result, Rhumbix promotes higher economic productivity in labor-intensive industries in accordance with SDG target 8.2.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Foremen
- Workers
- Project owners and engineers

Target Outcomes
- One client realized a 790 percent ROI within a month of deploying Rhumbix, resulting in a significant savings in resources.
- 30 percent reduction in time to collect data from timecards.
- Digital timekeeping shows 90 percent accuracy improvement rates.

Contribution
- Most of Rhumbix's competitors offer individual product features that the Rhumbix product offers; however, the market is shifting toward a single-platform, all-encompassing solution.

Risk
- Without access to the field-level data generated on the Rhumbix platform, decision makers are ultimately too far removed from daily operations to gain full understanding of the complexity on job sites that is required for both value creation and maximizing productivity.

OPPORTUNITY FOR IMPACT:

Cities and metropolitan areas are powerhouses of economic growth — contributing about 60 percent of global GDP. However, they also account for about 70 percent of global carbon emissions and over 60 percent of global resource use. UN Sustainable Development Goal 11 aims to achieve a reduction in the adverse per-capita environmental impact of cities, including paying special attention to air quality and municipal and other waste management by 2030.

Aperia TECHNOLOGIES

HUMATICS

LOCOMATION

modulous

LOCOMATION'S IMPACT SOLUTION:

With the rise of e-commerce and an increase in the demand for faster delivery times, the need for more efficient and sustainable transportation of these goods continues to grow. In addition, the trucking industry is ill-positioned to meet currently surging levels of freight demand, largely in part due to historically steady declines in the supply of trucking laborers. Locomation seeks to address this market need through an autonomous trucking model that does not fully automate away trucking, but rather, utilizes a semi-autonomous platooning model to create an immediate near-term solution that not only helps the end consumer, but also supports and improves conditions for truck drivers and rest of the supply chain.

The company's semi-autonomous trucking solution offers customers a compelling value proposition from day one, by allowing for twice the amount of cargo to be transported, twice as far and twice as quickly. Their value is further demonstrated by an estimated 30 percent reduction in operating costs, a 31 percent increase in equipment utilization, a 250 percent increase in driver utilization, and an estimated 66 metric tons of CO_2 eliminated per year per convoy deployed.

Aperia

KEY SDGS SUPPORTED

PRIMARY TARGETS: 11.2, 12.5

8 DECENT WORK & ECONOMIC GROWTH

9 INDUSTRY, INNOVATION & INFRASTRUCTURE

11 SUSTAINABLE CITIES & COMMUNITIES

12 RESPONSIBLE CONSUMPTION & PRODUCTION

MAINTAINING OPTIMAL TIRE PRESSURE FOR SAFER TRANSPORTATION.

Aperia offers the only available bolt-on solution for maintaining optimal tire pressure for tractor trailers. The "Halo," Aperia's bolt-on solution, keeps tires at optimal pressure levels for maximizing fuel economy and tire life. Leaky valve stems, temperature changes, natural leakage, uncalibrated air pressure gauges, and other factors can cause tires to become under-inflated, making tire pressure nearly impossible to manage manually. Tires that are not operating at their recommended pressure experience heating and flexing of the sidewall, which is the primary cause of catastrophic tire failure. Properly inflated tires maximize traction, reduce wear, and reduce rolling resistance. By decreasing tire rolling resistance, properly inflated tires can increase fleet MPG by up to 2.5 percent for every 10 percent a tire was improperly inflated. Fleets may also realize an up to 15 percent longer tire life.

SDG ALIGNMENT

Aperia's bolt-on Halo product dramatically improves trucking efficiency. By maintaining proper tire inflation, trucking companies can extend tire life; reduce tire waste, fuel consumption, and GHG emissions; and experience fewer catastrophic failures requiring downtime and roadside assistance. Aperia makes valuable contributions to SDG 11 of sustainable cities and communities; specifically they support target 11.2 of providing safe, affordable, accessible, and sustainable transport systems.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Commercial trucking industries
- Other drivers and motorists on roadways
- Customers of trucking and logistics operators
- End consumers

Target Outcomes

- Estimates show that proper tire inflation could save over 5.5 million tons of CO_2 and over $1.5 billion in fuel savings for the U.S. trucking industry alone per year.

Contribution

- Given the current competition it is unlikely that another solution this simple, yet effective would likely emerge in the immediate future.
  - Most current solutions can operate only on the trailer and do not function on the hub, but rather from a centralized system.

Risk

- Without this technology, the trucking industry will continue in its path with excessive fuel consumption and tire blowouts, compromising both efficiency and safety of everyone on the road.

Humatics

KEY SDGS SUPPORTED
PRIMARY TARGET: 11.2

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES

ADVANCING AUTOMATION THROUGH ULTRAPRECISE TECHNOLOGY.

Highly precise location, positioning, and navigation data is critical for advancing automation across medical, transportation, manufacturing, warehousing, and other industrial sectors in the built environment. Global positioning systems (GPS) and global navigation satellite systems (GNSS) provide positioning data but are limited both in accuracy and by physical environment. Autonomous industrial operations currently rely on visual or proximity recognition systems, which routinely fall short of precision requirements and suffer in difficult environmental conditions.

Humatics' patented positioning and navigation technology delivers rich, precise data in GPS constrained areas including manufacturing facilities, rail tunnels, surgical rooms, warehouses, and underground. Humatics' products make it possible for autonomous assets including robotic arms, autonomous vehicles, and most importantly, humans, to locate, navigate, and collaborate safely and productively. Adoption of their platform will usher in new capabilities and the seamless and safe interaction between robotic systems and humans while delivering a new standard of collaboration across disparate systems.

SDG ALIGNMENT

Humatics' technology platform allows subway systems like the NYC MTA to gain insights into how subway cars can be operated more efficiently. This has become more imperative during and after the Covid-19 pandemic, as cities struggle to operate public transportation systems more safely and efficiently. The ability to precisely locate the position of a subway car while underground allows for a higher throughput of traffic and helps the city to continue operating without delays or disruptions to urban mobility. Greater utilization of energy-efficient public transportation attracts more riders, thereby reducing reliance on less energy-efficient modes of transportation. With relation to SDG 11, target 11.2 seeks to provide safe, affordable, accessible, and sustainable transport systems and the platform enables efficiency breakthroughs to address this goal, while enabling the consumption of less core resources to deliver greater output.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Downstream passengers and consumers
- Society at large

Target Outcomes
- Enables and improves the efficiency of many customer operations, including:
  - Warehousing, manufacturing, rail, public transportation
  - Major transportation authorities

Contribution
- With the adoption of technology, greater efficiencies and reduction in emissions can be achieved.

Risk
- Without increasing automation, accelerating technological adoption, and improving efficiency, it will be increasingly difficult for cities and municipalities to meet their targeted emission reductions goals.

Locomation

KEY SDGS SUPPORTED
PRIMARY TARGET: 11.2

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES
12 RESPONSIBLE CONSUMPTION & PRODUCTION

TACKLING THE PROBLEM OF DRIVER SHORTAGES AND TIME EFFICIENCY IN THE TRUCKING INDUSTRY WITH SEMI-AUTONOMOUS PLATOONING.

According to the American Trucking Association, the shortage of truck drivers in the U.S. is predicted to grow to over 100,000 by 2023. In addition, the sector is further challenged by the fact that human drivers are regulated as to how long they can operate a truck continuously.

Locomation's system directly addresses this problem by allowing a lead driver to guide a platoon of semi-autonomous trucks with a simplified automation solution that allows trucks equipped with the system to join a convoy platoon led by a human driver.

SDG ALIGNMENT

Locomation's system allows operators to unlock system capacity, while also generating substantial fuel savings and reducing GHG emissions. By improving the asset utilization of trucking fleets, operators can more effectively optimize the use of their trucking physical asset base. These gains allow trucking systems to be competitive in an e-commerce-driven environment, making trucking competitive with rail-based routes and often with air freight alternatives. Locomation ensures SDG 11.2 by providing access to affordable and sustainable transport systems via their semi-autonomous platooning platform.

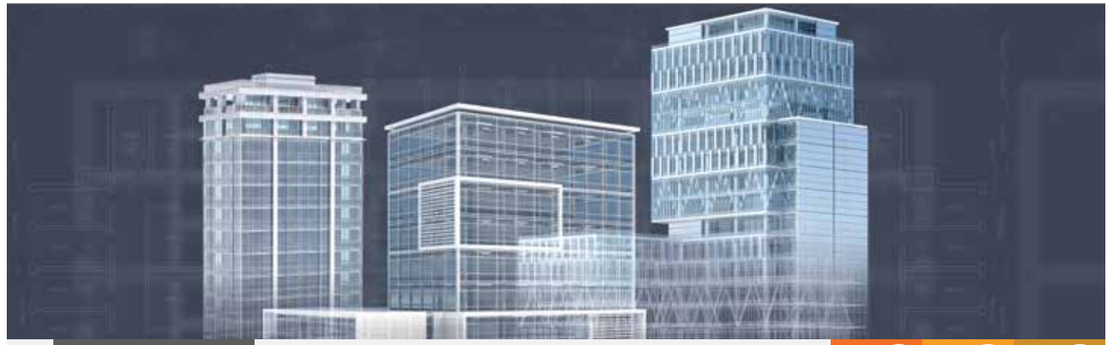
IMP FRAMEWORK ANALYSIS

Beneficiaries
- Truck drivers
- Trucking and logistics operators
- Supply chain managers

Target Outcomes
- ~8 percent average fuel saving per truck (~5 percent leader and ~10 percent follower), equating to >44 tons per year CO_2 reduction per truck.
- Fuel savings combined with 50 percent labor savings results in ~30 percent overall OpEx reduction, yielding a 10x improvement in an industry with 3–5 percent profit margins.
- The autonomous convoy system unlocks previously unavailable capacity, delivering 2x cargo, at 2x the distance, 2x as fast.

Contribution
- There are many players in the autonomous vehicle sector, but Locomation's model is one of the few that balances near-term applicability with a balanced mix of human action and automation.

Risk
- Locomation's technology may serve as a catalyst for the broader adoption of autonomous vehicles.
- Without the advancement of technologies like Locomation's, the transportation industry will be unable to achieve the fuel and time savings that are required to improve efficiencies in one of the world's largest and most polluting industries.



Modulous

KEY SDGS SUPPORTED
PRIMARY TARGET: 11.1

9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES
12 RESPONSIBLE CONSUMPTION & PRODUCTION

REDEFINING THE DESIGN AND DELIVERY OF AFFORDABLE, SUSTAINABLE, AND SMART HOMES BY LEVERAGING DISRUPTIVE DIGITAL TECHNOLOGIES.

Modulous' platform offers a digitized solution that rapidly creates home designs from a defined kit of parts, enabling third-party, local builders to assemble and install high-quality, sustainable, and affordable homes. Their system utilizes generative design alongside their assembler algorithm to create efficient usage of space for construction. The algorithm also matches assemblers to projects, creating an integrated network that works with the assemblers' supply chain.

The data set enables the digitization of procurement and logistics, providing the Modulous network of third-party assemblers with a kit of parts, design, and full support such that they can deliver modular homes local to the project at a price and speed that is currently not feasible on the part of large manufacturers. This approach protects local employment and the environment, and provides the developer and local government with a robust solution for delivering reliable and cost-efficient homes at scale.

SDG ALIGNMENT

Modulous is directly addressing the efficiency of the construction process though savings in residential construction costs and improvements in building efficiency metrics. The company addresses SDG target 11.1 by providing access to safe, affordable, and sustainable housing, through their focus on modular design, with an emphasis on production efficiencies that use less core resources and deliver higher quality outputs. This has a waterfall effect on capital allocation, dispatch processes, and distribution networks. With a focus on the public affordable housing market, Modulus delivers a scalable industry-wide solution that challenges the existing housing and construction sphere and generates positive outcomes for low-income residents. Their model allows public providers of multi-family housing to address currently underserved levels of demand for new housing inventory in a more cost-efficient way, with reduced timelines and project development cycles.

IMP FRAMEWORK ANALYSIS

Beneficiaries
- Local city planning officers
- Housing developers
- Local governments

Target Outcomes
- Providing planning data, market intelligence, and optimized designs to developers and planning officers to establish sustainable homes.

Contribution
- Their platform generates multiple design options that can then be used to build and deliver the most sustainable, robust housing solution.

Risk
- Without the Modulous platform, the traditional construction process produces large amounts of physical waste and causes project overspending and program overruns.

OPPORTUNITY FOR IMPACT:

UN Sustainable Development Goal 12 states that by 2030, measures should be taken to substantially reduce waste generation through waste prevention, resource reduction, and the recycling and reuse of materials. The goal also encourages companies, especially large and transnational companies, to adopt sustainable practices and reporting related to sustainability-focused initiatives.

AGORUS

DRAWBOARD

AGORUS' IMPACT SOLUTION:

Agorus sets out to address the lack of sustainable and affordable housing through their approach to software-enabled, offsite, and robotic automation-supported residential construction. Through their panelized approach to construction, which is supported by a digitized design and planning process, the company seeks to decrease excessive waste and time spent on residential housing job sites.

The company is currently working to complete residential housing panels that will ultimately be completed and assembled up through the rough-trades, for example including both plumbing and electrical. By moving assembly off-site from a home site and into a factory, Agorus is able to reduce the overall consumption of lumber material by approximately 15-20 percent. This equates to an off-set of 8,000 lbs. of waste that would have been generated for each 2,000 sq. ft home. By shifting this process off-site and working to construct a home through panelization, there is a significant reduction in the number of extra lumber cuts and resulting materials wastage.

Residential housing construction is plagued by delayed completion times and schedule overruns. This is primarily due to a lack of skilled labor a "slinky effect" caused by the gig economy, whereby skilled workers jump from job site to job site. Typically, for a single in-fill residential housing build, a six-week timeline represents a quick build for the framing process. Oftentimes, this can take up to 10-12 weeks. In contrast, Agorus can build and assemble a house frame in ~2 days, with one to two additional days required for on-site tacking.

Agorus

KEY SDGS SUPPORTED

PRIMARY TARGET: 12.5

8 DECENT WORK & ECONOMIC GROWTH
9 INDUSTRY, INNOVATION & INFRASTRUCTURE
11 SUSTAINABLE CITIES & COMMUNITIES
12 RESPONSIBLE CONSUMPTION & PRODUCTION

DESIGN, MANUFACTURE, AND ASSEMBLE HOMES THROUGH ONE INTEGRATED SOFTWARE PLATFORM.

Agorus' software solution, Talós, transforms an architect's custom design into a detailed digital design file. The file breaks up the build into panels that are created on an automated, just-in-time manufacturing line. These panels are then transported to the jobsite and assembled by their field assembly and site technology team in days rather than weeks, as is seen through the traditional approach. This value engineering approach has generated a 15-20 percent reduction in overall lumber material usage.

SDG ALIGNMENT

Agorus provides a digital construction technology that allows for speed, customization, and scalability, all of which are needed to meet currently rising levels of housing demand. Their proprietary platform Talós helps them target key inefficiencies in the residential home construction market, promoting SDG 12, responsible consumption, and production. Specifically, they are working towards the targets of achieving the sustainable management and efficient use of natural resources as listed in target 12.2 and enable a substantial reduction in waste generation through the prevention, reduction, recycling, and reuse, as listed in target 12.5.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Contractors
- Home buyers

Target Outcomes

- Shifting a 10–12-week process to a multiday home build, while improving labor, and environmental and social outcomes.

Contribution

- Agorus uses value engineering to create a 15-20 percent reduction in waste lumber materials.
- A relevant labor productivity metric the company tracks is linear feet per hour; at the moment, they stand at approximately 50 and hope to reach 150 feet per hour soon.
  - This equates to a full 2,500 sq. ft. home in an eight-hour shift with installation possible within an additional three days.

Risk

- Fewer homes are built due to throughput limitations of existing approaches.

Drawboard

KEY SDGS SUPPORTED

PRIMARY TARGET: 11.1

9 INDUSTRY, INNOVATION & INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION & PRODUCTION

REAL-TIME COLLABORATION AND RESOURCE EFFICIENCY FOR THE INDUSTRIAL SECTOR.

Drawboard creates easy and collaborative PDF software for architecture, engineering, construction, and other document-heavy industries. This solution increases efficiency by enabling a collaborative approach via an online solution. Drawboard's usability, syncing, and digital inking approach offers promising advances in the way things are done, offering a potential future with intuitive, rapid, and paperless workforce collaboration and documentation. Currently, the design and construction industry both rely heavily on paper and available PDF programs for mark-ups. These are expensive, difficult to use, and have antiquated user-interfaces resulting in slow design review processes. As a result, conventional pen and paper mark-up experience has been favored since previous technology-enabled solutions lacked real-time collaboration and can only be used for locally stored files.

SDG ALIGNMENT

Drawboard allows a massive industrial sector to use technology to go paperless, making them more resilient, efficient, and sustainable. Their technology helps make the design and construction industry more resource efficient and reduces costly travel needs for design iteration sessions, further pushing the future of construction towards sustainability. Drawboard's system integrates complex workflows into their seamless technology, allowing users easy-to-use UX and UI, real-time collaboration, and easy documentation. Drawboard has been supporting SDG target 12.2 of the sustainable management of resources, by allowing for a paperless future and unlocking new opportunities that come along with digitization.

IMP FRAMEWORK ANALYSIS

Beneficiaries

- Large design firms
- Teams that need to plan remotely asynchronously, and simultaneously

Target Outcomes

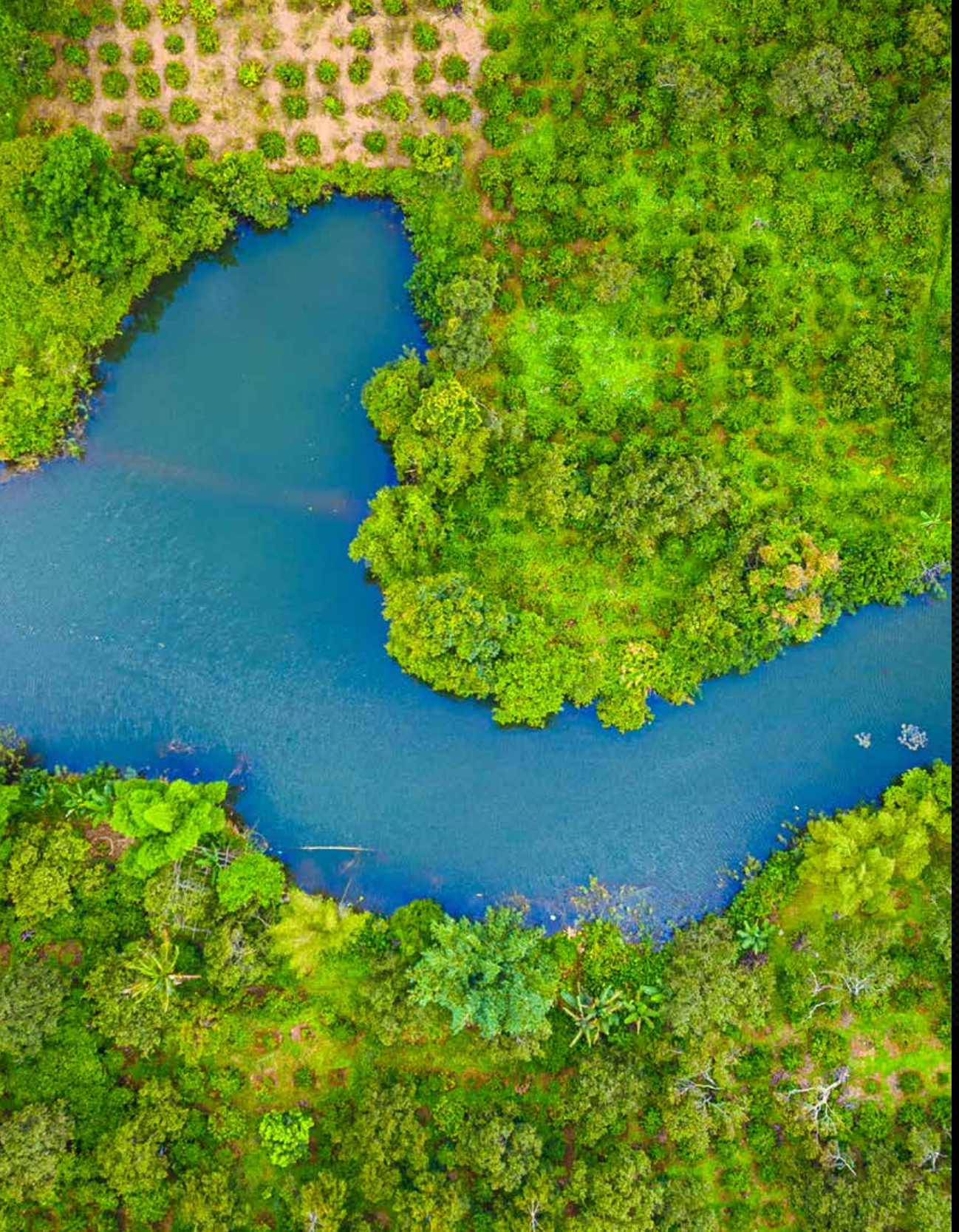
- In a 100-user pilot, the clients experienced significant gains in their processes, and if annualized, would result in:
  - Internal review cycles increasing in speed by 92 percent
  - 26,280 hours saved on manual tasks
  - $2.5M in net savings
  - 189 tons in CO_2 savings
  - A 97 percent paperless process

Contribution

- Drawboard's superior advantage over other similar market solutions is created by the simplicity and ease of use of their application.

Risk

- At present remote teams are faced with multiple challenges as it pertains to asynchronous collaboration, as it often requires extensive travel, numerous repeated meetings, and hours of physically working together with paper and pencil to accomplish what is possible through the Drawboard platform.
- Lack of efficiency has an immense environmental impact due to travel requirements.



Blackhorn Ventures, founded in 2017, is an investment management firm focused on supporting companies whose business success is fully aligned with generating positive societal outcomes, with the potential to drive deep, collinear social and environmental impact.

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