ARMSTRONG

Sustainability Report for the 2018 Operating Year

About the company

Armstrong Fluid Technology is known as an innovator in the design, engineering and manufacturing of intelligent fluid flow equipment. With expertise in demand-based control, digitalization, fluid flow, and heat transfer, Armstrong Fluid Technology leads the fluid systems industry, including HVAC, plumbing, and fire safety, providing energy-efficient and cost-effective solutions to building professionals and owners around the world.

Since its establishment in 1934, Armstrong has been focused on the design of high-value solutions. A family-owned business, Armstrong is committed to sustainable solutions. This commitment continues to drive research and development, operations and company culture.

In 2013 the decision was made to bring the company's existing environmental improvement projects together within a global sustainability initiative.

In addition to creating greater cohesion for these projects and encouraging increased international collaboration and transfer of best practice, the launch of the Planet Proposition initiative created a platform from which to initiate and work towards more ambitious and wide-reaching sustainability objectives.

It was decided that Planet Proposition should include three pillars: our product, our environment, and our communities. The appointment of Sustainability Champions, and the creation of teams at each of our seven manufacturing facilities, makes it possible for projects to be managed and directed in concert with our global strategy and according to local priorities.

Planet Proposition owes its success to the fact that sustainability objectives are embedded within our business strategies and company culture. The relatively small global workforce (around 1,200 people in seven sites) means that everyone can take an active role. Each Sustainability Improvement team is comprised of individuals from different job roles and disciplines within the company structure, such as factory operatives, administrative staff, middle-management and senior leadership team personnel. The teams can determine local strategies, communicate ideas and launch projects quickly, leveraging company-wide resources for collaboration.

What are Sustainable Development Goals?

The Sustainable Development Goals (SDGs)

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.

There are 17 goals, and they are integrated, so that action in one area will affect outcomes in others, and so that development must balance social, economic and environmental sustainability. It is broadly recognized that the business sector has a major role to play, and that the SDGs will mobilize trillions of dollars of investment and create new business opportunities.

Each of the 17 goals has a unique representative symbol to make referencing the SDGs clear and simple.

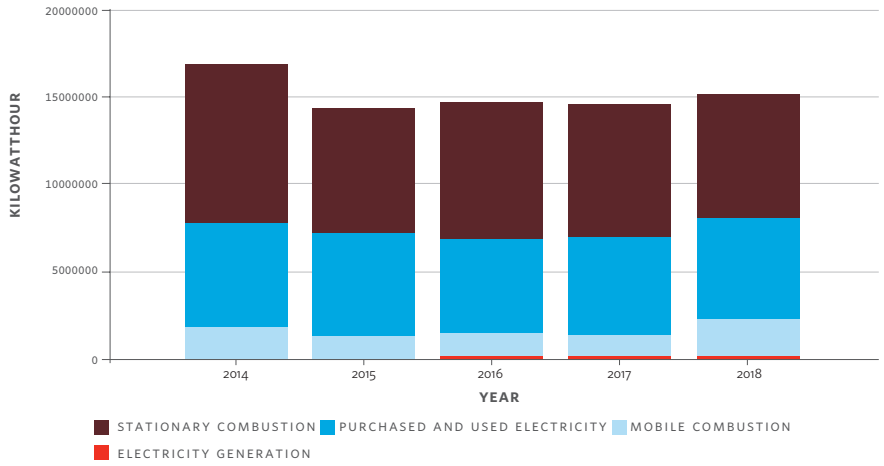
What are the priority SDGs at Armstrong

As a global company, Armstrong's facilities, activities, employees, products and services touch upon and contribute to several of the 17 SDGs. However, from a strategic perspective Armstrong Fluid Technology mainly contribute to the following:

- Goal 7: Affordable and clean energy
- Goal 9: Industry, innovation and infrastructure
- Goal 11: Sustainable cities and communities
- Goal 12: Responsible consumption and production
- Goal 13: Climate action

Our Environmental Performance

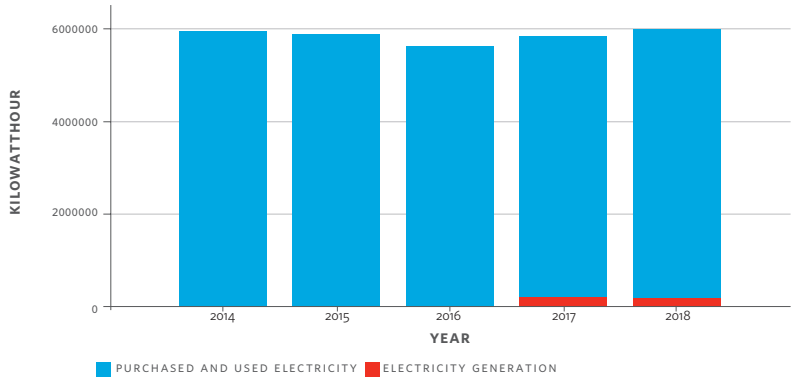
Total Energy Consumption by Energy Source (kWh)



11% REDUCTION

11% reduction over the period.

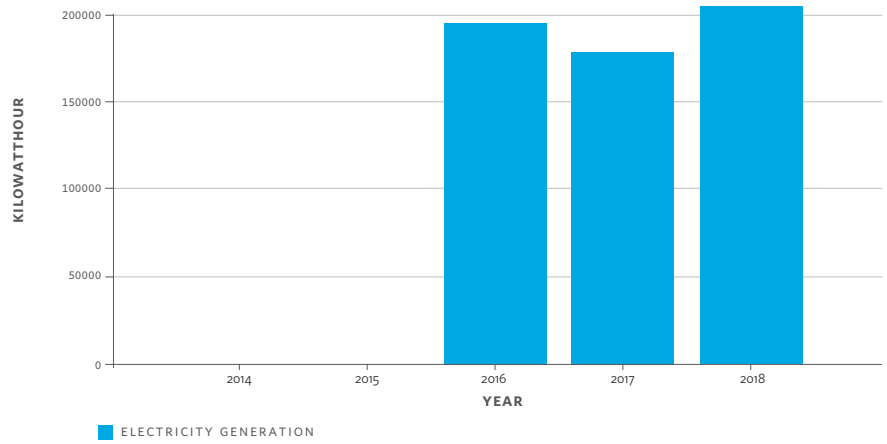
Total Electricity Consumption (kWh)



1% INCREASE

1% increase over the period

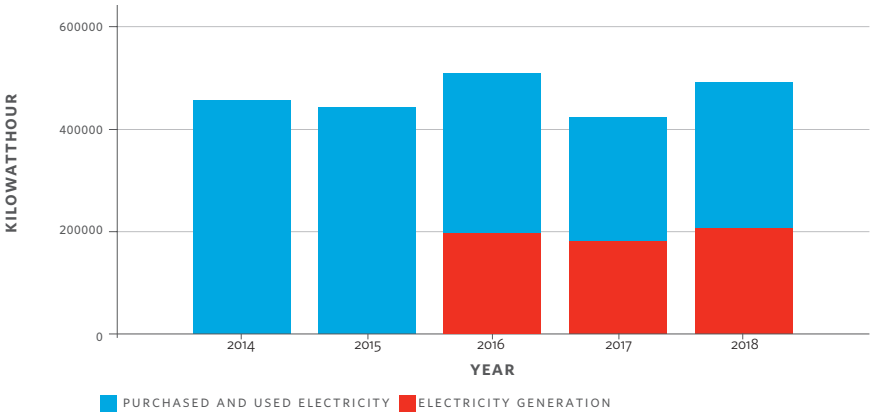
Renewable Energy Generation at the Manchester Plant (kWh)



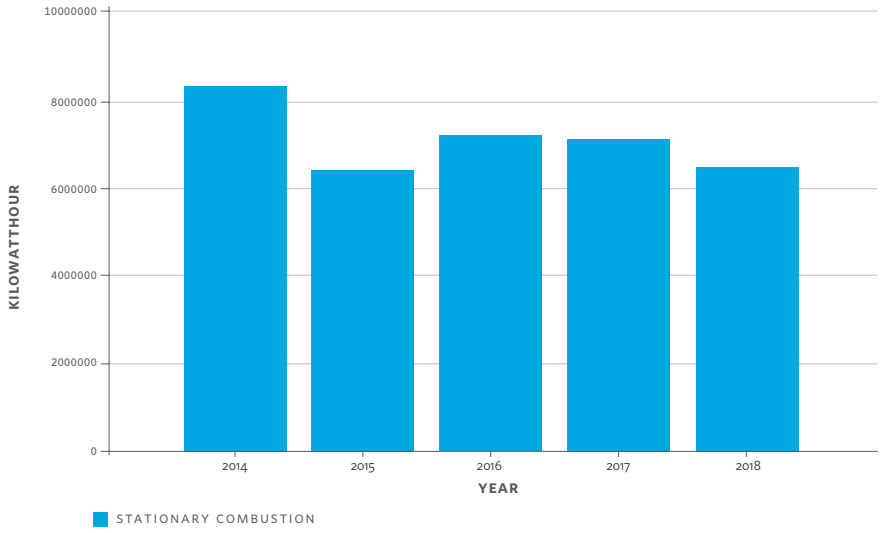
40% OF CONSUMPTION

Locally generated solar electricity accounts for about 40% of local consumption

Electricity Consumption by Energy Source at the Manchester Plant (kWh)



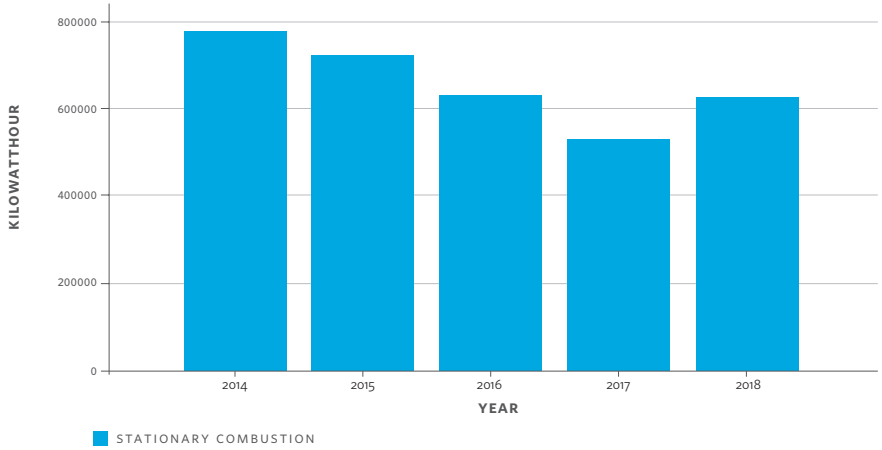
Total Natural Gas Consumption (kWh)



23%
REDUCTION

Natural Gas is primarily used for space heating in the UK, USA and Canada. 23% reduction over the period.

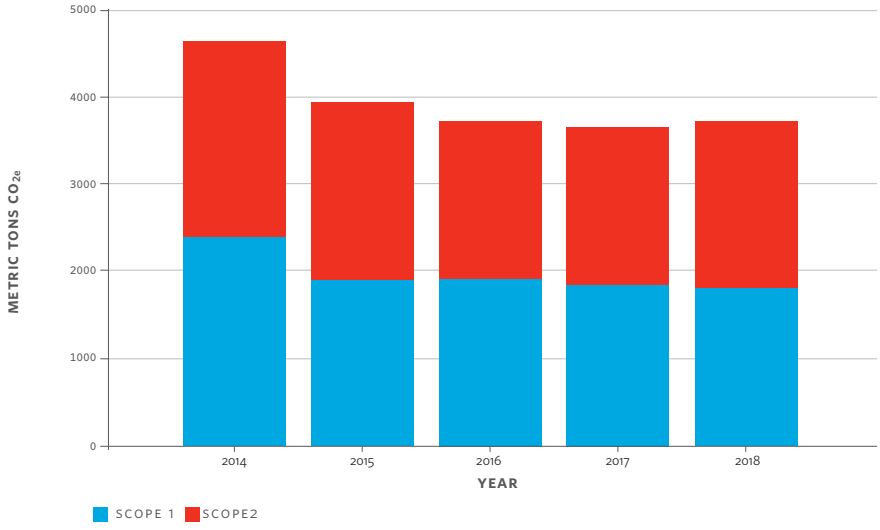
Total Diesel Consumption for Production (kWh)



19%
REDUCTION

19% reduction over the period.

Total Greenhouse Gas Emissions (tCO_{2e})



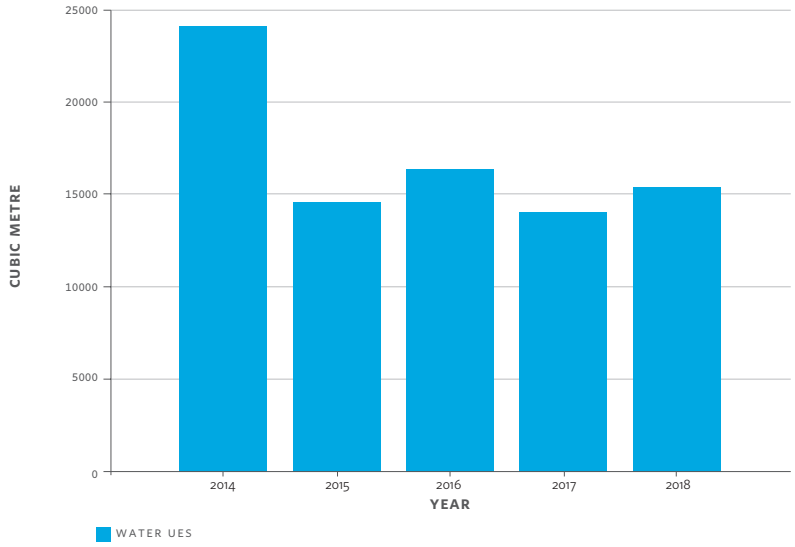
25% REDUCTION SCOPE 1

15% REDUCTION SCOPE 2

20% REDUCTION SCOPE 1+2

Scope 1 emissions at Armstrong include Greenhouse Gas emissions from the direct use of fuels on site. Scope 2 emissions are the Greenhouse Gas emissions associated with the off-site generation of the electricity that Armstrong facilities consume.

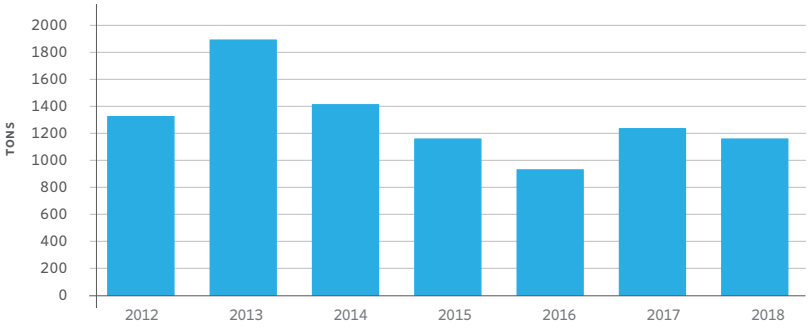
Total Water Consumption (m^3)



36% REDUCTION

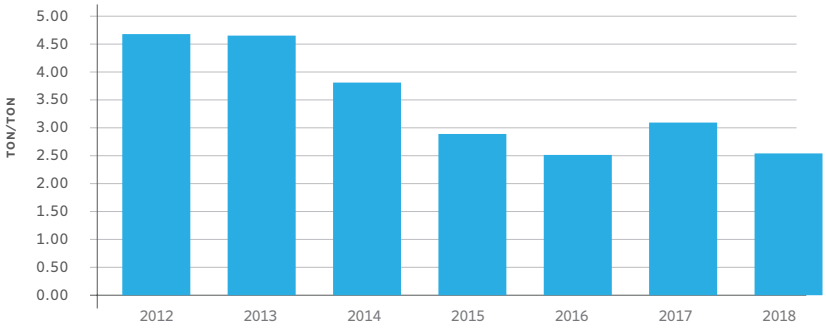
Water consumption at Armstrong is mostly linked to product testing. The actual amount used depends on product type and production fluctuations.

Bangalore Foundry Sand Use (Ton)



Sand is used in the foundry to form the molds for the casting process. Sand consumption is therefore linked to production volumes.

Bangalore Foundry Sand Use Per Product (Ton/Ton)



46%
REDUCTION

Sand consumption is tracked based on purchase records and not on actual use. In 2017, more sand was purchased compared to the increase in production. This causes the sand use-per-product index to falsely suggest an increase in sand consumption. In 2018, sand purchase was correlated again with production and the use-per-product ratio returned to 2016 levels, representing a 46% improvement over 2012 levels.

Absolute Consumption and Emissions figures for 2018

PARAMETER	VALUE	UNIT
Stationary Combustion	7,055,613	Kilowatt Hour (kWh)
Purchased Electricity	5,783,358	Kilowatt Hour (kWh)
Mobile Combustion	2,074,172	Kilowatt Hour (kWh)
Solar Electricity Generation	203,715	Kilowatt Hour (kWh)
Water Use	15,440	Cubic Meter (m^3)
Sand Consumption	1,160	Ton (t)
Greenhouse Gas Emissions Scope 1	1,799	Ton CO_{2e}
Greenhouse Gas Emissions Scope 2	1,923	Ton CO_{2e}

Toronto, Canada

In Toronto, our local team sponsored a group of students from the University of Toronto as they engage in real business and industrial sustainability challenges. Guided by Armstrong employees and their teachers, the students study the challenge or the need and then propose solutions

Halesowen, UK

The Halesowen Planet Proposition team continued its support for the Mary Stevens Hospice. Part of this year's activities included the installation of an Electric Car charging spot for the use of the hospice visitors.

Shanghai, China

In Shanghai, several employees participated in the Shanghai International Marathon while other employees volunteered as a rescue team.

Buffalo, US

Our North Tonawanda (US) Planet Proposition team continued its partnership with the Boys & Girls Club, celebrating Arbor Day with a visit to the North Tonawanda Spring Break Youth Camp. Armstrong employees talked with about 200 children about the importance of bees, trees and plants and helped them all plant seedlings for a summer vegetable garden. Some of the children also participated alongside Armstrong employee families and local business people in a neighbourhood clean-up on Earth Day.

Bangalore, India

The bonds between our Bangalore (India) foundry team and the local school grow stronger every year. Every year, in consultation with the school management and teachers, the Armstrong Planet Proposition team try to accommodate the urgent needs of the school.

Manchester, UK

The community garden at Armstrong's Manchester facility is by now an annual tradition. The money raised through the sale of the garden allotment was donated to charity.

Why is this important? The global perspective

We are already seeing the consequences of 1°c global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice. The Paris Agreement adopted by 195 nations in December 2015 included the aim of strengthening the global response to the threat of climate change by holding the increase in the global average temperature to well below 2°c above pre-industrial levels while pursuing efforts to limit the temperature increase to 1.5°c above pre-industrial levels. A follow-up report by the Intergovernmental Panel on Climate Change that was published in 2018 established that overshooting the 1.5°c mark will cause devastating consequences to both the natural environment as well as human society and economy. Limiting global warming to 1.5°c would require rapid and far-reaching transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO_2) would need to fall by about 45 percent between 2010 and 2030, reaching 'net zero' around 2050.

Limiting global warming to 1.5°c compared to 2°c could go hand in hand with ensuring a more sustainable and equitable society. This is a challenge we can overcome with clear added benefits to both people and natural ecosystems. However, the decisions we make today and in the coming decade are critical to ensure a safe and sustainable world for everyone. Energy efficiency is the easiest most cost-effective mean to reduce Greenhouse Gas emissions and it can deliver swift, robust emissions cuts.

The Building Sector

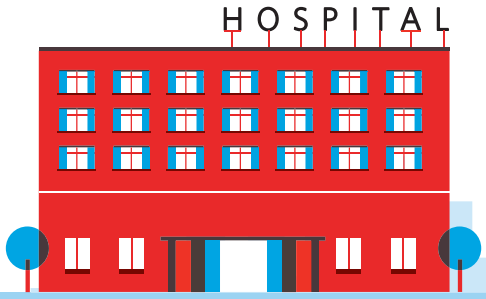
Fluid flow management is an increasingly vital component of urban life. With the current growth rate of cities and the obvious need for larger more condensed buildings, fluid flow management becomes even more crucial. From water and wastewater, to climate control and fire safety, the demand from these systems is rising, as are the potential energy consumption and associated adverse environmental impacts. In addition to new construction, the current building stock represents a major challenge as a substantial portion of houses and commercial buildings that will be standing in 2050 have already been built. Many of the installed systems were improperly sized so they are not efficient in meeting the demands of the building. Adding to that, HVAC systems typically show performance drift and so become even more inefficient. There are few building systems that can have such a dramatic impact on tenant comfort, productivity, operational efficiency, and overall business sustainability as an HVAC system. The construction and operation of buildings is responsible for over 39% of energy related GHG emissions, a large part of which is due to inefficient HVAC technologies. Energy efficiency is an urgently needed climate solution, It can deliver swift, robust emissions cuts.

The majority of building owners and operators are unaware of how inefficient their HVAC system is, largely because of a lack of transparent, actionable information from their HVAC systems. Moreover, energy efficiency progress has been slowing since 2015, down from almost 3% annual improvement in energy intensity to just 1.3% in 2018. The new IPCC report state that without tackling the existing building stock the targets will not be met.

Armstrong's products and services can help mitigate these adverse consequences. Our solutions are designed to enable the smart cities of tomorrow and lead the industry on energy efficiency.

What is Armstrong doing

A key component of Armstrong's sustainability strategy is to reduce the Scope 2 emissions (mainly through electricity consumption) of our customers through the development of highly efficient, smart, and connected solutions that deliver a new level of energy savings and sustained system optimization. In line with the results of independent research, Armstrong found that the Carbon emissions from the use-phase of its pumps represents well over 90% of the overall product lifecycle emissions. This finding has helped focus R&D efforts on further reductions to energy consumption of the products and expansion of their system integration capabilities to drive energy savings and carbon reductions on a system level. To further advance this effort, Armstrong has made a commitment to reduce Greenhouse Gas emissions among its installed customer base by 2 million tons by the year 2022 (see below for more info on the 2 by 22 commitment).



Tango

The Tango pump is a Pipe-mounted 2-pump unit with integrated intelligent controls for space-saving installation, superior energy performance, and parallel-pumping or full redundancy operation. A Tango pump saves up to 75% in energy compared to traditional pump installations.

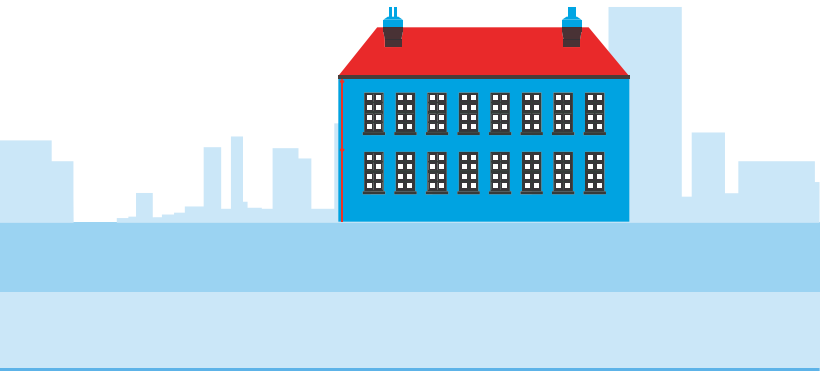
The Armstrong Tango has been designed to reduce the metal requirement of each pump-set. A new casting procedure has made it possible to reduce the volume of material (cast iron) needed to make the volutes. The design of Armstrong Tango also requires less pipework and fewer connectors than a traditional installation, as well as less preparatory work on site. Most importantly, however, by eradicating the need for a full duty/standby configuration, the Armstrong Tango typically halves the embodied carbon for this aspect of the project.

2 by 22

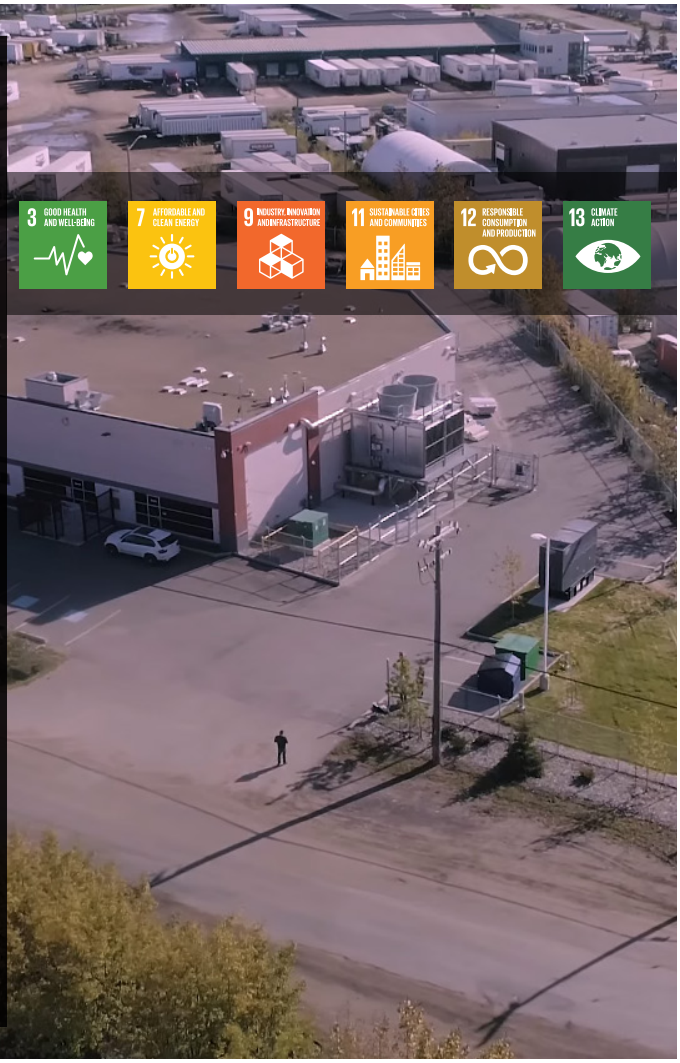
At the 2018 Global Energy Summit in Toronto, Armstrong announced a commitment to reducing Greenhouse Gas emissions among its installed customer base by 2 million tons by the year 2022 and issued a challenge to industry participants to set similarly aggressive targets for the same 4-year time frame.

Organizations globally are being driven to achieve a zero-footprint future and we believe this can best be achieved through enabling technologies, solutions and services. At Armstrong we are committed to develop and supply solutions that are lowest installed cost, lowest operational cost, and create the lowest environmental footprint. To validate our claims, we launched a global validation effort across a wide range of customer types and applications with the results being validated by Bureau Veritas. The results are available on our website. The company also significantly expanded the team of energy-savings specialists that will work closely with existing and new customers to measure, manage and enhance their current operations, and to reduce their Scope 2 Greenhouse Gas emissions.

Achieving the 2 by 22 goal would be equivalent to taking 600,000 cars off the road for one year, or offsetting the average annual CO_2 emissions generated by 100,000 people. Since June 2018 when the initiative was first announced, Armstrong has ramped up efforts to release new energy-savings solutions and to work with customers to convert existing installations.



Alberta Green Biotech



Agriculture accounts for about one-third of global gross-domestic product and over 1 billion people are employed in world agriculture, representing 1 in 3 of all workers. However, agriculture also accounts for 70% of global water use and generates unsustainable levels of pollution and waste. As demand for agriculture products rise, and climate patterns change, the sector goes through a digital revolution and its energy consumption increase. One of the resulting trends is the move to grow products in controlled environments closer to the end markets.

Alberta Green Biotech (AGB) in Edmonton, Canada is a producer of medical marijuana under the Canadian federal Marijuana for Medical Purposes Regulations. They are dedicated to producing the finest quality products for patients suffering from chronic pain, seizures, nausea, anxiety, muscle spasms, insomnia and loss of appetite. Their new building in Alberta has 35,500 square feet of floor space with self-contained 'grow pods' and a full laboratory for Quality Assurance testing and research. When in full production, this building will be capable of producing up to 6 million grams per year. Armstrong Fluid Technology supplied this project with various fluid flow components including Design Envelope pumps, circulators and expansion tanks. The system will help maintain the required conditions while keeping energy consumption and Scope 2 Greenhouse gas emissions to the minimum.

From a factory to a green office building

The former Cooper Canada sporting goods factory in Western Toronto is undergoing renovation and transformation into a green office building. The new design includes a much improved building envelope, a 298 kilowatt solar PV array, a 275 ton geothermal field, a rainwater collection system, and a six ton energy recovery ventilator. Elliott Strashin, the owner and president of Strashin and Sons, believes that re-using and repurposing existing buildings is the greenest option when it comes to renewing the built environment. To prove it, he is targeting LEED Platinum Certification for this redevelopment.

To help the project achieve this target, Armstrong Fluid Technology was chosen to supply four Design Envelope 25 hp pumps, two Design Envelope 15 hp pumps for geothermal, plus two 5 hp pumps for ice melting, and a heat exchanger.

The Brick Works

The Don Valley Brick Works in Toronto dates back to 1889. The 53-acre property includes buildings constructed as a series of industrial barns, that are now heritage-protected, and are encroached by a floodplain and protected wild areas. It is a Toronto tourist destination, family place, and the flagship location for Evergreen, a key Canadian environmental projects organization, which is also leading the international Future Cities Initiative.

When it was time to renovate the site in the 2000s, Evergreen management decided that the Brickworks should be a demonstration project for the decarbonization and electrification of buildings, conforming with the mandates of both Evergreen and the Future Cities project. The newly designed heating and cooling system is based on geothermal and solar thermal energy with radiant delivery. To make the system as efficient as possible, Armstrong's Design Envelope variable speed pumps, IPC 9500 plant automation system, expansion tanks and heat exchangers were selected, complimented by Armstrong's Pump Manager Active Performance Management service. Pump Manager is a cloud-based service that tracks and manages pump performance. It provides early diagnostic warnings, web accessible data, IMB Watson analytics and automated reports and alerts. Pump Manager helps customers make informed decisions and take immediate action to deliver the best possible HVAC performance and extended equipment life.

Design Envelope solutions, together with novel geothermal and solar thermal approaches have resulted in a comfortable, low carbon multi-purpose campus that accommodates numerous commercial and public uses, and is LEED Platinum certified.

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To find out more about
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our-sustainability-vision

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