

**SUSTAINABILITY**

A new lease on life: rebuilt construction equipment business takes off in China

**URBANIZATION**

Trees, cable cars and bikes: 10 smart ways to improve quality of life in growing cities

**A DAY IN THE LIFE**

Bring your beanie: keeping machines fit in Kiruna, Sweden's northernmost city

**INNOVATION TECH**

Clean, quiet and comfortable: meet Volvo's new concept excavator EX2



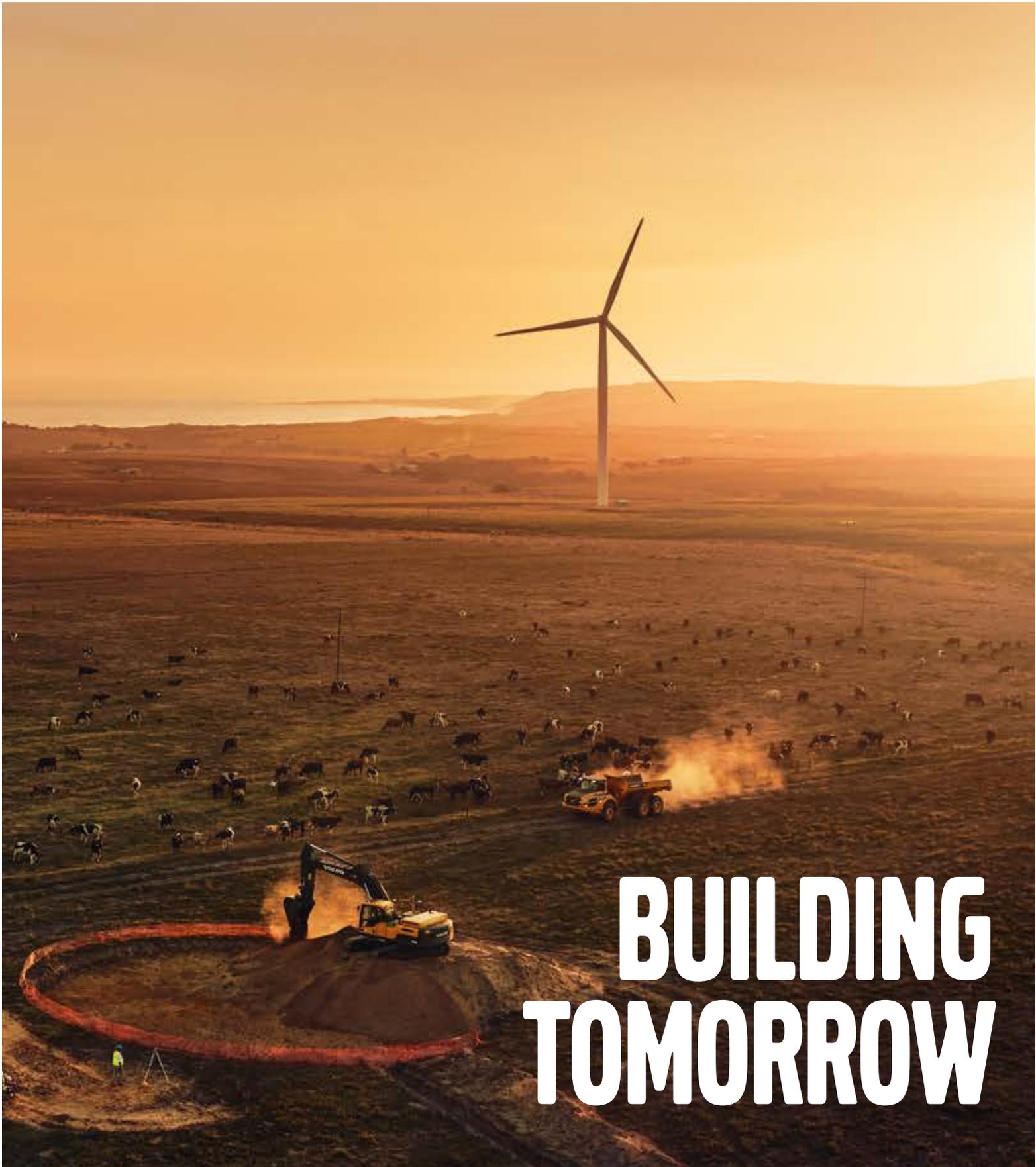
# SPIRIT

Volvo Construction Equipment Magazine, Winter 2017-2018



## THE ROAD AHEAD

Building a faster, safer Interstate 4  
for the growing population  
of Florida



# BUILDING TOMORROW

At Volvo Construction Equipment we are driven by the idea that through imagination, hard work and technological innovation we will lead the way towards developing a world that is cleaner, smarter, and more connected. We believe in a sustainable future. And with the global construction industry as our arena, we work together with our customers to turn this belief into reality for people everywhere.

Together we're building the world we want to live in.

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Volvo Construction Equipment



Welcome

# THE NEW SPIRIT

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**W**hether you are a long-time subscriber, or reading the magazine for the first time, we would like to welcome you to the first issue of the all-new Spirit. Twice a year in print and throughout the year online and on social media, the re-launched Spirit Magazine will bring you exciting stories, key insights and new trends from our industry and also take you to some of the most impressive construction projects around the world.

On these pages and online, our new series The Megaproject Listing presents construction projects that not only build, but transform people's lives, improve connections between communities, enhance transportation and business, and construct smart and sustainable cities.

These megaprojects showcase what the Volvo CE vision is all about – to build the world we want to live in. Volvo Construction Equipment believes that through imagination, hard work, and technological innovation, we will lead the way towards developing a world that is cleaner, smarter and more connected.

**In this issue,** we take you to the complete overhaul of Interstate 4 in Florida. This EUR 2 billion project will use 5.1 million cubic meters of sand and 1 million tons of asphalt to build Florida a state-of-the-art traffic corridor. We also get a glimpse of the second installment of The Megaproject Listing, the story of Kiruna, Sweden's northernmost city and home

to the world's largest underground iron ore mine. With the expansion of the mine, iron ore is being extracted from beneath the city, meaning that much of Kiruna would collapse into the ground over the next century. To protect the city and allow mining to continue, some 6,000 people will move into new homes over the course of the next 20 years, as Kiruna moves 3 kilometers to the east.



**For more exclusive** content and short films about how these megaprojects are becoming a reality, visit Spirit Magazine online at [volvoce.com/spirit](http://volvoce.com/spirit) and follow Volvo CE on social media.

In this issue of Spirit Magazine you can also meet an Icelandic entrepreneur whose family has been a loyal Volvo CE customer for over 30 years, read about how remanufacturing of used construction equipment is gaining momentum in China, and discover Volvo CE's electric star, the EX2, believed to be the world's first fully electric compact excavator prototype.

**Tiffany Cheng**

Director, External Communications  
Volvo Construction Equipment

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# THE ROAD MOST TRAVELED

Interstate 4 in Florida was once built to handle 70,000 cars per day. Today, the amount has more than tripled, which is why the road is being remodeled to the latest standards in design and community enhancement. The I-4 kicks off our series The Megaproject Listing, covering the construction projects shaping our world.

By **Damian Joseph**  
Photos by **Luke Johnson**



## The Megaproject Listing



C

y Wynn doesn't like using the fast lane on Florida's I-4. The 31-year-old drives on the highway nearly every single day, commuting among the several restaurant locations he manages for a regional diner chain. His

work finds him traveling back and forth from Daytona to Orlando, Florida, a significant portion of the roadway that I-4 traverses in the state. The Daytona resident cites safety as his biggest concern and is looking forward to the new I-4, that has put a premium on the well-being of motorists.

"I see accidents every day. I'm cautious and not so quick to jump in the fast lane – I'm scared of that left lane," he jokes. "People speed too often, no matter what time of the day. It's pretty bad, especially around Disney World and the other tourist outfits. You have to understand that you're driving for everyone, not just yourself."

When the new I-4 is completed in 2021, several cutting-edge improvements that should ease Wynn's mind will be introduced. The sharp turning radiuses and ever-changing slopes in elevation that define

the previous design will be transformed, with curves being straightened and roadways being leveled. When drivers travel in more of a straight line with less changes to the terrain, they're less likely to become involved in an accident. This will become even more important over time, as distracted driving

rises with the increasing presence of cell phones in vehicles.

The new roadway will also feature two tolled express lanes in each direction that drivers can use to save time, if they're willing to pay a fee for the privilege. They increase traffic flow by letting users bypass sections of the interstate where they won't need to turn off of the road, avoiding the merging that occurs when others get on or off the highway. It is a design feature that has evolved from the older methods of using carpool lanes or other types of non-tolled express lanes that commuters have tended to abuse or simply didn't work well.

SGL Constructors – a joint venture of Skanska, Granite and Lane – is overseeing the I-4 Ultimate Improvement Project. According to project director Brook Brookshire, a booming population and aging I-4 infrastructure necessitated a full-scale overhaul of the highway system.

"There has been a lot of growth in Orlando and the surrounding communities. It

is the major thoroughfare through Central Florida. We're talking more than 250,000 vehicles per day that transit through the area," he explained. "I-4 was built back in the late 50s and 60s to older design standards. We really needed to upgrade all of I-4 to bring it into line with current standards, increase the throughput and relieve some of the congestion through this corridor."

One of the many new features of the new road is the tolled express lanes, which are appearing in highway projects around the world. They increase throughput and safety and also recover the revenue gained from gasoline taxes, which are dwindling and may someday disappear. Thanks to a transponder system, motorists don't need to slow down to pay the lane fee. For an additional benefit, these taxes

"We're talking more than 250,000 vehicles per day that transit through the area"



Cy Wynn



Photo by Sophie Sollmann



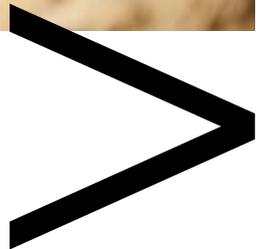
01



Photo by 14Ultimate.com



**01** Motorists make more than 1.5 million trips on Florida's Interstate 4 every day.  
**02** Typical tasks for the Volvo excavators include digging trenches and loading trucks.



help pay for the roadways and highway services that Floridians have come to depend on.

“By adding express lanes, we’re going to generate additional throughput. You can use the general use lane for normal, everyday use, but if you want to get somewhere faster, if you have a need to move through the corridor a little quicker, you have options,” Brookshire said. “You can get into the express lanes, and yes, it is tolled, and you’re paying for an extra service, but that service is also paying for all of the general use lanes that are being provided.”

**The I-4 Ultimate megaproject** serves as a great example for where the future of transportation is headed globally. Its design and engineering is on the cutting edge of infrastructure development, and the support given to the project by Volvo Construction Equipment (Volvo CE) and its dealer Flagler Construction Equipment (Flagler) epitomizes the modern job site.

“What we’re seeing at the I-4 Ultimate project is one of the most advanced infrastructure projects in the world,” explained Tony Spake, commercial business manager at Volvo CE. “Some 600 engineers contributed to the project’s design-engineering, so there are numerous examples of leading safety and traffic flow features. But this project will also help define how future highway systems are financed and managed, and how they will interact with the spaces they inhabit.”

At its essence, the project is a USD 2.3 billion (EUR 2 bln) reconstruction of a 34-kilometer (21-mile) stretch of Interstate 4, cutting through Orlando along the way. In addition to the two tolled Express Lanes in each direction, the work involves the construction of 140 bridges, 15 interchanges, nine toll gantries, architectural features and elements and mixed-use spaces.

The project is a Public-Private Partnership (P3) among FDOT and I-4 Mobility Partners (I-4MP). Experts say that these partnerships among private companies, state governments, municipalities and taxpayers are globally on the rise, and that they improve both the operations of megaprojects and their overall success rate.

“What we’re seeing in the I-4 Ultimate project is one of the most advanced infrastructure projects in the world”





### **PUBLIC-PRIVATE PARTNERSHIP**

An agreement between a public agency, in this case the Florida Department of Transportation (FDOT), and a private sector proposer, in this case I-4 Mobility Partners. P3s transfer some of the responsibilities, risks and/or rewards of project ownership from the public sector to a private entity for a fixed period of time.

Volvo machines were picked for the project for their safety, efficiency and versatility.

“I’m hopeful about the new project,” he said. “If you’re doing a lot of work and need to go back and forth on the highway, you don’t want to worry. You don’t want to think about crashes and delay times. That takes away from your whole day. If the new system will help us transport faster and safer, I think that will be a good thing.”

“The infrastructure industry has literally transformed itself through PPPs,” explained Dr. Steven E. Polzin, a director at the Center for Urban Transportation at the University of South Florida. “They improve project financing and increase efficiency in terms of process and timing. They also do a great job in minimizing the disruption of traffic during construction, which is important because the I-4 reconstruction is a lengthy project. This is a good learning experience and will be a model for future endeavors.”

**The use of telematics** and predictive analytics is also an increasing global trend in infrastructure construction, and it’s being used heavily on the I-4 project. Where construction has lagged behind other industries in adopting new technologies, the lower costs of sensors, cloud connectivity and computing power have all contributed to an increase in the adoption of telematics.

Approximately 70 Volvo excavators and compactors are active on the I-4 Ultimate project, and they are all being monitored by Volvo’s ActiveCare Direct telematics program. The program can detect critical machine failures and predict maintenance needs, increasing uptime on the project.

Once again, a partnership is key to the program’s success. Volvo CE and Flagler are working together to maintain the project’s fleet, with Volvo actively

34

The project has SGL constructing 34 kilometers (21 miles) of roadway through central Florida, reconstructing 140 bridges, 15 interchanges and nine toll plazas.

01





02



01 Pile Driving Foreman Steven Scordato in action.  
02 Making quick adjustments on site.  
03 A live video wall at the I-4 traffic control center.



monitoring the machines and alerting Flagler to potential issues. Flagler, which sold and rented most of the equipment on the project to SGL, then employs its field technicians to perform a fix or maintenance action on the job site.

"The use of telematics and predictive analytics is set to explode in the construction industry," said Dave Adams, product sales manager of connected services at Volvo CE. "There are potentially millions, if not billions, in potential savings we could see from increasing machine uptime through a program such as ActiveCare Direct. Not only does it help solve equipment issues more quickly, it helps avoid the catastrophic failures that can bring an entire job site to a halt."

**The I-4 Ultimate Improvement Project** also shows how an infrastructure project can transcend its core function. While the I-4 corridor is essentially 'just' a system of roads and bridges, leading-edge design features will change the face of the communities it serves. The project is on the global forefront of a type of design thinking that creates value where it previously didn't exist.



03



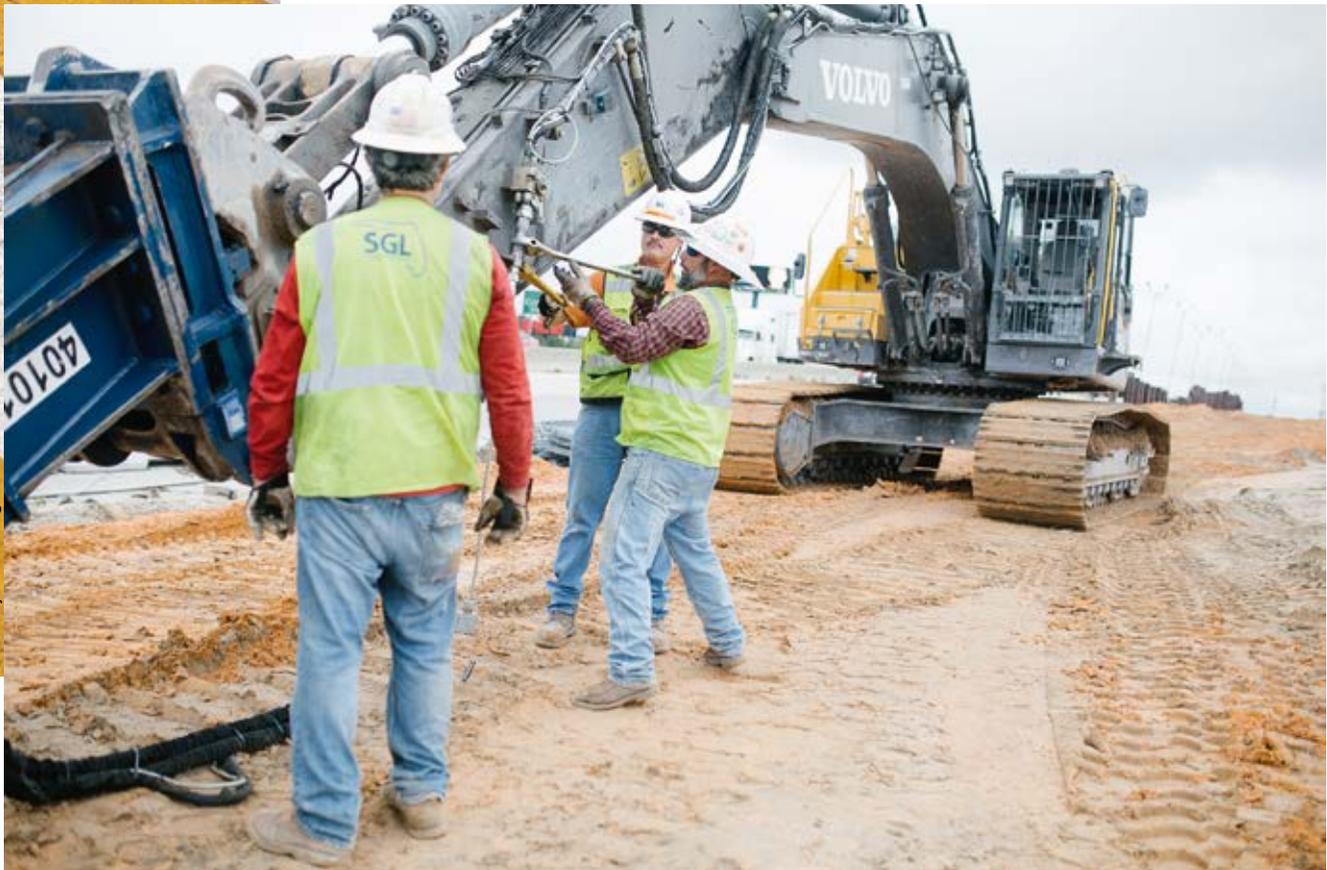


Photo by Alex Rodriguez Santibanez

“It’s a massive, multi-faceted project with a strong Public-Private partnership in an obviously busy corridor that’s critical to the region”

The I-4 construction work is carried out in an urban environment, at times alongside live traffic.

Take for example the project’s environmental considerations, which won the Institute for Sustainable Infrastructure’s Envision Platinum Certification. Some 99 percent of the concrete and steel removed from old roads and bridges has been recycled.

Or take into account the many features being built that serve people not actually driving on the highway: rail and pedestrian crossings, overpasses and bike trails, mixed-use spaces under bridges and overpasses that will be turned into gathering places. Aesthetic features, such as water fountains, city medallions, LED lighting, artwork and dramatic landscapes will contribute to an overall sense of esteem and pride in the communities along the corridor.

Several initiatives that will improve safety and traffic flow along the interstate also reflect global trends, such as the leveling of highway grades and the increased length of acceleration and deceleration lanes for incoming and outgoing traffic.

**Floridians say they** look forward to the new I-4.

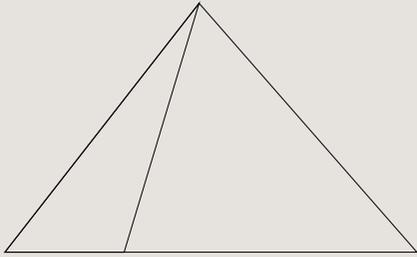
Highways that can move commuters more quickly and safely improve daily life, ease business and contribute to a higher standard of living.

“It’s a massive, multi-faceted project in an obviously busy corridor that’s critical to the region,” Polzin said. “This project will improve mobility in the community, which allows it to thrive, compete, and remain attractive for business and travelers.”

Cy Winn agrees.

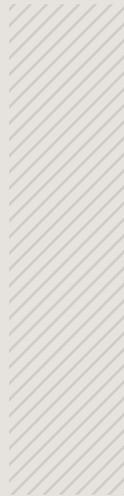
“I’m hopeful about the new project,” he said. “If you’re doing a lot of work and need to go back and forth on the highway, you don’t want to worry. You don’t want to think about crashes and delay times. That takes away from your whole day. If the new system will help us transport faster and safer, I think that will be a good thing.”

## The Megaproject Listing



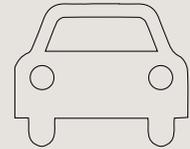
### 5.1 MILLION CUBIC METERS OF SAND

When this magazine went to print, almost 1.7 million cubic meters of sand had already been used by the I-4 Ultimate team, and another 3.4 will be used before it's all done. That's enough to fill the Great Pyramid of Giza – twice.



# 70

The approximate number of Volvo machines working on the project



### 250,000 CARS

When the I-4 was completed in 1965, it was built to handle 70,000 cars per day. Today, the amount of vehicles has more than tripled.

# FACT FILE

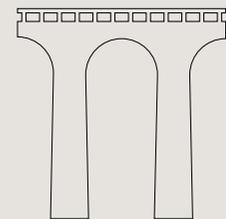


### 1ST IN FATALITIES

When a 2016 survey analyzed interstate fatalities from the last six years, Interstate 4 topped the list as the most dangerous in the US. There is an accident nearly every two miles.

## Why the I-4 is being rebuilt and what makes it one of most significant infrastructure projects in the US.

By **Elna Nykänen Andersson**



### 140 BRIDGES

A total of 53 new bridges will be added along the I-4, while 13 existing ones will be widened and 74 replaced.



### 2 BILLION EUROS

The reconstruction of this 34-kilometer stretch will cost close to EUR 2 billion.

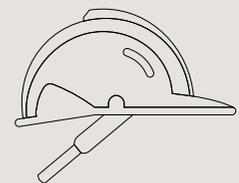


### 14,500 TREES

More than 14,500 trees will be planted in concert with native shrubs and grasses. The ambition is to create a signature highway for the Sunshine State.

# 2021

The year when this megaproject is expected to be completed. Construction began in 2015.



### 2,000 WORKERS

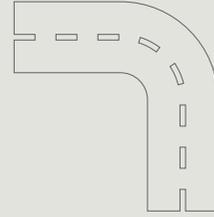
The peak number of workers is likely to exceed 2,000 on the job site, which doesn't include the hundreds of engineers and designers.

# 99

The percentage of concrete and steel removed from the old road and reused for the new I-4.

# 10

## IMPRESSIVE ROAD BUILDS



The I-4's scale and design make it a unique infrastructure project – but many other roads have been rebuilt using innovative ideas and technology. These are some of the best.

By **Judi Lembke**



### 01 / BIG DIG, BOSTON, USA

The Big Dig is the biggest infrastructure overhaul in Massachusetts' history, and while it was plagued by cost overruns and scandal, in the eleven years since its completion in 2006 the verdict is in. It has become a huge success. Formerly one of the most congested highways in the US, the John F. Fitzgerald Expressway went underground, while massive road, bridge, and tunnel realignments resulted in not just the improved movement of people and goods but also a boom in cultural, residential, and business development. The Big Dig also made room for the Greenway chain of parks, which have vastly improved life in central Boston.



01

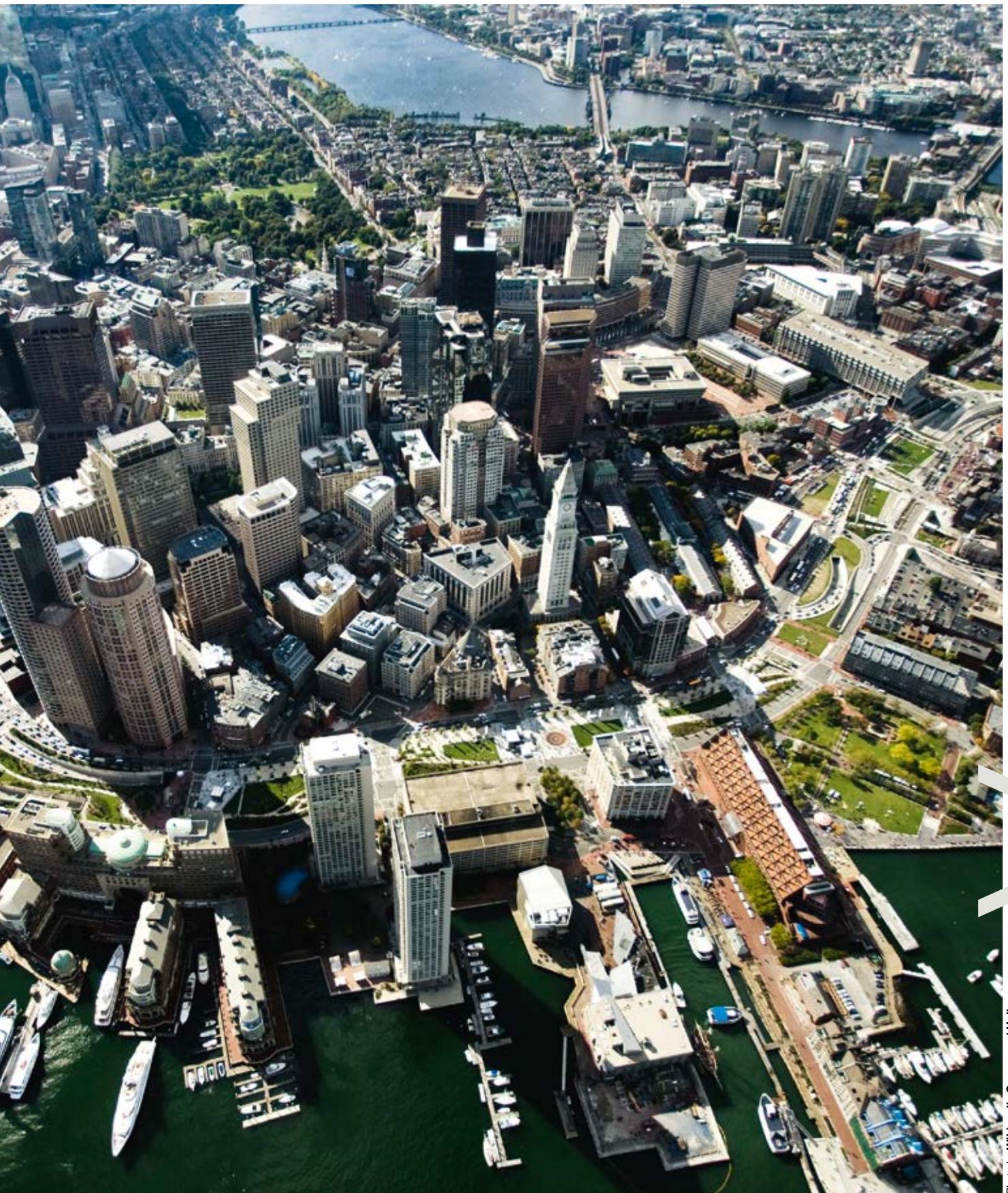


Photo by Wikimedia Commons / Hellogreenway

**02 GREAT KANTO HIGHWAY, NAKA, JAPAN**

When a 9.0 magnitude earthquake hit Naka, Japan on March 11, 2011 it left a 150-meter crater along a stretch of the Great Kanto Highway. Construction crews from highway repair company NEXCO showed proof of the famous Japanese work ethic by repairing the damage in less than a week. They swept in on March 17th and by the 23rd the road was re-opened to traffic.



Photo by John Holland



**04 / SOUTH ROAD SUPERWAY, ADELAIDE, AUSTRALIA**

This project, designed to connect north and south Adelaide with improved traffic efficiency and road safety didn't happen overnight – but its innovations make it a standout. Most notably, by using 4D modeling – a simulation tool which allows you to predict different factors in a construction process – the engineers were able to visualize the construction process, test different options beforehand and even assess the time needed to complete them. The use of an elevated roadway – the first in the region – also reduced impact on local businesses and landowners.

**03 SEOULLO 7017, SEOUL, SOUTH KOREA**

Taking inspiration from New York's High Line, Seoulo 2017 or Seoul Skygarden has taken a former inner-city highway and transformed it into a public 'plant village' – a 983-meter long park that features more than 50 plant families, including flowers, trees and shrubs. The space is connected with hotels, shops and restaurants via a network of newly built bridges and stairs. There are also plans for satellite gardens in other parts of Seoul, making it greener and optimizing the array of disused overpasses that crisscross the city.



Photo by MVRDV



Photo by Shutterstock



**05 / OVERSEAS HIGHWAY, FLORIDA KEYS, USA**

The nearly 200 kilometer highway which connects the Florida Keys with the mainland was originally completed in 1912, and since then has gone through a number of transformations. When the 1935 Labor Day hurricane destroyed much of it, the Florida East Coast Railway, unable to finance a rebuild, sold it to the State of Florida, which not only rebuilt roads but also converted existing rail lines into roads. In the 1970s and 80s there were further modifications, resulting in one of the most scenic highways in the world.

**06 ROAD 73, STOCKHOLM, SWEDEN**

Previously known as “the road of death” this accident-prone route between Stockholm and Nynäshamn was rebuilt and completed in 2011. Monotonous highways can be tiring for drivers and increase the risk of accidents. To avoid that, road, landscape and bridge architects were hired to design a visually stimulating road. The new route offers drivers beautiful, varied views of forests, lakes and fields, as well as 33 unique concrete bridges.



**07 / OCTAVIA BOULEVARD,  
SAN FRANCISCO, USA**

Ripping out a freeway may not seem the best way to ease congestion or improve infrastructure, but following the 1989 Loma Preita earthquake San Francisco did just that, demolishing the massive Central Freeway, which ran through downtown and along the scenic bay. It not only opened up vast amounts of public space, including walking and biking paths, it also turned out to be a cheaper option than rebuilding. New transit routes replaced the double decker freeway, with the highlight being Octavia Boulevard, which distributes traffic smoothly and evenly while maintaining links to major San Francisco arteries.

**08 / A2, MAASTRICHT, THE  
NETHERLANDS**

For years, Maastricht's A2 highway, an important link in the region, suffered from traffic jams. But in 2016 the situation changed when the city became the first in Europe to open a double decker highway tunnel. To pass through Maastricht, drivers now take the lower tubes; to drive into the city, they take the upper ones. A drive through the city used to take 30 minutes; through the Koning Willem-Alexander tunnel, it can be done in 5. On top of the tunnel, the city is building a park with greenery, cycle lanes and walkways.

**09 / SANYUANQIAO  
BRIDGE, BEIJING, CHINA**

As the result of some very careful planning it took workers less than two days to complete the rebuild of the 1,300-ton Sanyuanqiao Bridge, which serves more than 200,000 vehicles each day and connects 48 key routes in the city. Eleven different versions of the rebuild plan were drafted before work began at 11 pm on November 13, 2015. While the work was originally expected to take 24 hours unexpected deterioration of the central beams pushed that to 36. How did they do it? By using innovative, pre-fabricated beams which slid into place with the help of mechanical pulleys.

**10 / AIRSTRIP ROAD,  
MOORA, AUSTRALIA**

As part of Australia's Roads to Recovery program a 4.9 km section of the Airstrip Road in tiny wheat-farming Shire of Moora in Western Australia was bituminized in just two days, at a cost of around EUR 300,000. Given the remoteness of the region and the trying conditions, the speed of the rebuild was extraordinary. It's fascinating to see the road pave its way through the landscape – the drone footage has been viewed more than 17 million times on YouTube.

# SMOOTH OPERATOR

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For many people, being involved with the new I-4 is not just a job – it’s an honor. Machine operator Roberto Rodriguez is one of them.

By **Damian Joseph** Photos by **Luke Johnson**

**R**oberto Rodriguez is feeling proud. He’s doing his part to complete the largest infrastructure project underway in the United States – the I-4 Ultimate Improvement Project to redesign and reconstruct one of Florida’s most vital highway systems.

The 34-year-old machine operator has been on the job for nine months, operating a Volvo excavator at several of the work sites in Central Florida.

“I have three kids. One day I will tell them the story about how I was involved in the construction of Interstate 4 and the sense of pride that goes along with it,” Rodriguez said. “It’s going to be safer for them. They will have more space to drive and it will be easier to get through the traffic from point A to point B.”

**Rodriguez has worked** on job sites all around Florida, Texas and Puerto Rico, where he’s from. As an excavator operator, he has used machines made by several of the world’s leading construction equipment companies, but the Volvo he’s been using since June, the ECR305CL,

“I have three kids. One day I will tell them the story about how I was involved in the construction of Interstate 4. It’s going to be safer for them. They will have more space to drive.”

**ROBERTO RODRIGUEZ**

offers the features that are most relevant and important to his work.

“The Volvos are great machines and I like them a lot,” he explained. “I especially like this ECR305CL because it’s very strong, it has a high capacity and it’s a comfortable ride.”

The features of the machine he op-

erates are indeed impressive: the Volvo ECR305CL is a 35 metric ton capacity crawler excavator. It’s equipped with a 204 hp Volvo D7 engine, can lift 11 tons and dig down seven meters.

The machine, along with the other, around 70 Volvo excavators and compactors on the I-4 Ultimate Improvement Project, is a crucial tool in constructing the bridges, interchanges and toll gantries that comprise this transformative roadway project.

**Alvaro Alonso**, design-build manager for SGL Constructors – the joint venture of Skanska, Granite and Lane that is leading the project’s construction – said that choosing quality construction equipment is one of the keys to its success.

“It is fair to say that we need top-notch equipment for this project. We can’t afford to have breakdowns while we’re constructing,” he explained. “Time is money, and we have a schedule to keep. It’s not just about the machines, though. We also need great people – including skilled operators like Rodriguez.”



### ECR305CL

Roberto Rodriguez operates a ECR305CL excavator. It's a short swing radius machine that allows operators to work in confined spaces, such as trafficked roads or next to buildings on busy streets. There are several features which make the machine comfortable to work in. The optimized cab space, for instance, is roomy, yet designed to stay within the swing radius. A vibration dampening system reduces fatigue and a high-capacity climate control system controls the temperature inside the cab.



01



01 During his nine months on the I-4 Ultimate project, Roberto Rodriguez has worked on several work sites.

02 Rodriguez putting his ECR305CL to the test.



02

# CHANGE THROUGH DESIGN

Landscaping, lighting and innovative use of space. Design is one of the main forces transforming the I-4 to a safer, greener and more beautiful commuting experience.

By **Damian Joseph** Photos by **Luke Johnson**

**W**hen Alvaro Alonso was studying civil engineering at the University of Florida some 20 years ago, little did he know that he would someday go on to direct one of the largest construction projects his state has ever seen. Alonso is the design-build manager of the I-4 Ultimate Improvement Project, the massive Public-Private Partnership venture to redesign and reconstruct Florida's Interstate 4.

“When the new I-4 is complete, it will be a driving experience like no other in the state of Florida, I can tell you that”

“I am always excited to come to work,” Alonso said. “The magnitude of this project can baffle the mind. It is the largest infrastructure project underway in the United States and has involved 600 engineers from all over the world. I am often challenged but always go home satisfied every single day.”

Alonso is the key interface among the project's several stakeholders – the designers, operations team and a consortium of companies that comprise SGL Constructors – leading the design, engineering and construction of the improved I-4.

**Before any shovel** could pierce the ground, though, the project began with a vision. Commuter experience has been at the center of that vision for its designers and engineers. That means the new I-4 will see increased traffic flow and improved safety, as well as a host of attractive and mixed-used features that will contribute to a more pleasant overall environment when using the highway system. This experience is especially important considering I-4 spans the state of Florida, cutting through Orlando, one of the world's busiest tourist destinations.

“When the new I-4 is complete, it will be a driving experience like no other in the state of Florida, I can tell you that,” Alonso said. “Be-

cause of its great design-engineering, we will be able to move people and goods a lot faster through the region with a better aesthetic experience, creating value for the driver. The economy is going to be positively impacted in ways we don't even know of yet.”

#### THE I-4 DESIGN

New roadway signs, LED lighting and dedicated turn lanes will assist motorists, while pedestrians will be provided easier access between attractions, retail and hotels. Cycle lanes have also been added on both sides of the I-4. The landscaping features nearly 14,500 trees.

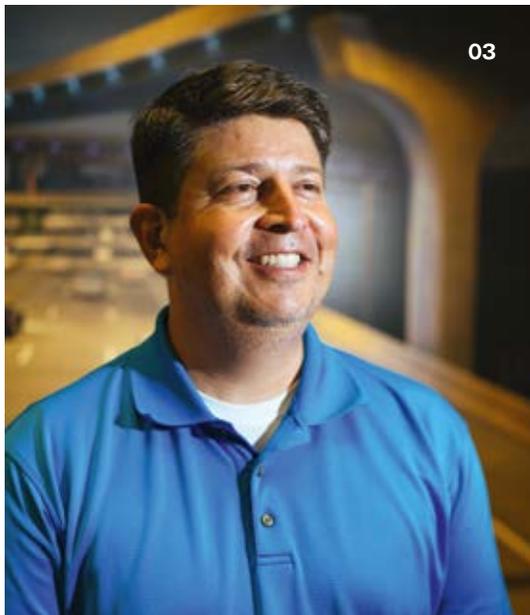


01

- 01 The new I-4 on Alvaro Alonso's drawing board.
- 02 LED lighting will be embedded in the new bridges.
- 03 Design-build manager Alvaro Alonso in his office.

02

These aesthetic features include landscaping, such as water fountains, medallion seals on signs and structures that represent cities along the route, and LED lighting under bridges and overpasses that will change colors to celebrate events and holidays. Mixed-use spaces under sections of the highway, for example, will also be home to shopping centers, sports venues and more.

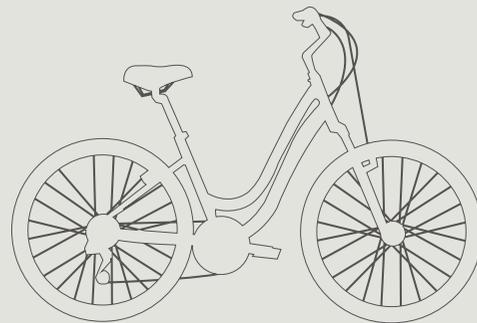


03

**Environmental concerns were** an important consideration for the project — so much so that it won a prestigious Envision Platinum Certification from the Institute for Sustainable Infrastructure (ISI), marking the first time that the award has been bestowed to a roadway project in the state of Florida. The project's environmental considerations include relocating protected wildlife; the planting of non-invasive vegetation; the recycling of 99 percent of the concrete and steel removed from roads and bridges; the integration of rail and pedestrian crossings, including overpasses and bike trails; and the use of efficient machinery.

"We are very proud of the Envision Platinum award because it's a recognition of our sustainability efforts that will impact the entire state," Alonso explained. "All of the challenges we've come up against are magnified because of how big the project is — one decision can have much larger implications than one would consider on a smaller project."

Two decades ago, when Alonso was studying his craft in a university classroom, he could not have guessed just how impactful his decisions would eventually become — and how much the state of Florida would truly benefit from them.



# 10 WAYS TO TACKLE URBANIZATION

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More than half of the world's population lives in cities. United Nations figures show that by 2050, 66 percent of the world's population will be urban. To ensure environmentally, economically and socially sustainable cities, updated solutions that secure quality of life and safety are needed. Luckily, many cities have found innovative ways to cope with the issue.

By **Charlie Ebers**



Photo by AFP Photo / TT

01

← **01 / PUBLIC BIKESHARING SCHEME, CHINA**

The Chinese city of Hangzhou boasts one of the world's largest public bike-sharing schemes. Approximately 84,100 bikes are available for shared use on a short-term basis, allowing each bike to serve several users per day. Advantages of the initiative include reduced traffic congestion, fuel consumption and emissions as well as improved health benefits and financial savings for users.

**02 / GREEN ROOF, GERMANY**

A green roof is a rooftop where plants are grown to replace the vegetation that was destroyed when the building was constructed. Germany has the highest number of green roofs in the world. On top of a shopping mall, in the heart of Frankfurt, the Skyline Plaza Garden offers people an area to relax or take part in activities like yoga or table tennis. It also provides ecosystem services in an urban area such as improving urban habitats for wildlife. Other benefits include storm-water management through slowing and reducing water runoff, and regulating building temperature by using vegetation to help shade the building and keep it cool in the summer and insulate it to retain heat in the winter.

Photo by Shutterstock



04

↑ **04 / CONGESTION CHARGING, ENGLAND**

London was an early adopter of the congestion charge and the scheme is still one of the biggest of its kind. It works by charging a fee on most motor vehicles operating within the Congestion Charge Zone in Central London between 7:00 a.m. and 6:00 p.m. Mondays to Fridays. Exempt vehicles include all-electric cars and some plug-in hybrids that meet strict emission levels. The charge aims to reduce high traffic flow in the center of the city, reduce pollution, encourage people to use public transport and raise investment funds for London's transport system. The immediate impact of the scheme was a 15 percent reduction in traffic in the heart of the city. In the almost 15 years since the charge was launched the city's population has significantly increased. Today, traffic volume is close to pre-charging levels but it is widely accepted that without the scheme, conditions would be a lot worse.

**03 URBAN FARMING, UF002 DE SCHILDE, THE NETHERLANDS**

Urban farming, the practice of growing or producing food in a city or heavily populated town, is becoming increasingly popular. Europe's biggest urban farm is in a former office in The Hague, the Netherlands. Known as UF002 De Schilde, the business produces 45 tons of vegetables and 19 tons of fish in its rooftop greenhouse and fish farm. The idea behind the initiative is to reduce waste and food miles by producing supplies where they're eaten.

05



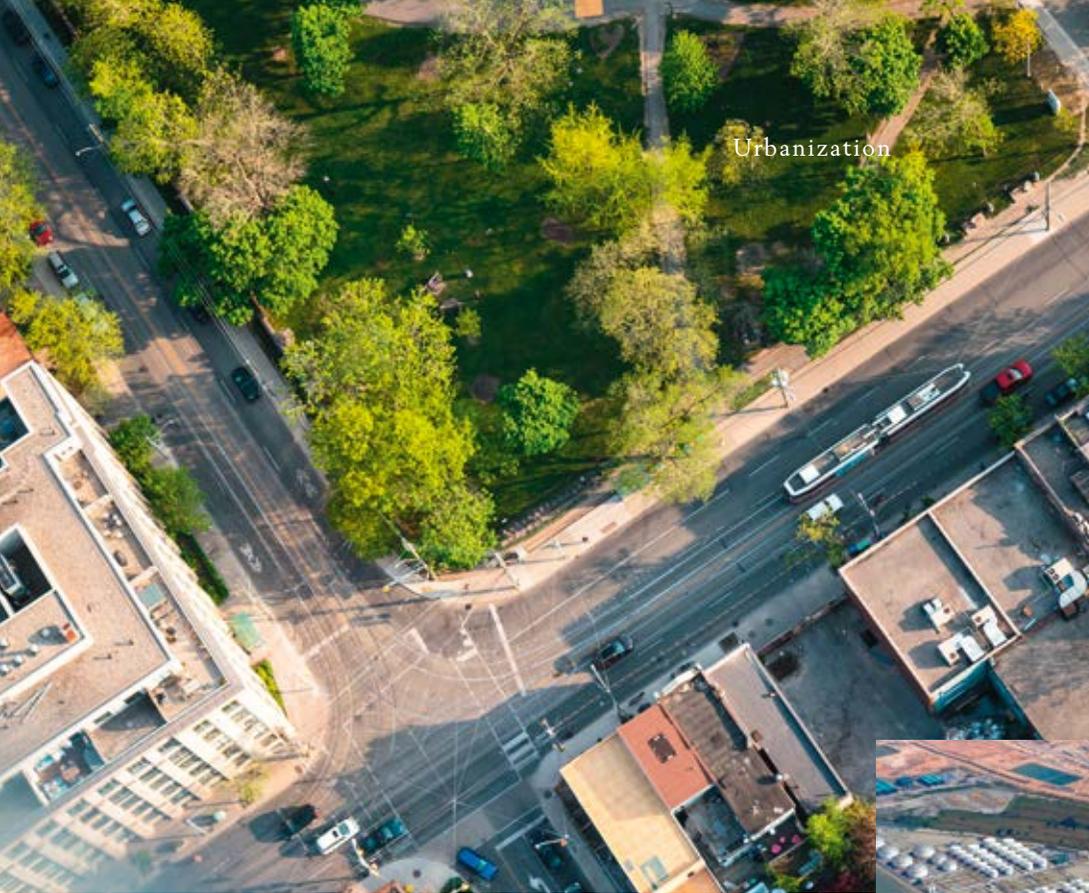
Photo by Shutterstock

↑ **05 SOCIAL INTEGRATION, COLOMBIA**

Medellin was once considered one of the most dangerous cities in the world. It has now been transformed after focusing on mobility infrastructure as a means of improving social inequality and reducing poverty and violence. A cable car system and giant hillside escalators were constructed to connect low income, marginalized communities in the hillsides to the wealthier city center. The urban renewal project also included creating new public spaces and health, education and sports facilities in the poorest communities.



## Urbanization



Photos by Shutterstock

09

10



07

### 06 / FLOOD PREVENTION, BRAZIL

Curitiba is the capital city of Parana state in Brazil, located on the Upper Iguacu River Basin. The river has a low capacity and has frequently flooded in the past. Several factors related to urban growth exacerbated the natural flood risks. To tackle this, the state bought the land along the river and resettled the population to other areas. An artificial channel was dug to increase the river's capacity and to act as a border to prevent development in the parks and green spaces which provide a natural floodplain. Some areas were reserved for constructed wetlands to improve water quality. A flood warning system was also developed.



### 07 / TREE PLANTING, CANADA

Planting trees in cities can help cut pollution, conserve energy, increase land value and even make people feel younger. Using data from Toronto residents, a team of researchers found that people living on tree-lined streets reported health benefits equivalent to being seven years younger, moving to a neighborhood with a USD 10,000 (EUR 8,500) higher median income or receiving a salary raise. The city is working towards the ambitious goal of growing Toronto's urban forest by 3.8 million trees over a decade.

### 08 / REPURPOSING SPACE, AUSTRALIA

Demands on spaces in cities are constantly changing as a result of economic growth, demographics and consumer preferences. To keep up with these changes and get more from its land, Melbourne has repurposed 86 hectares of underutilized road and other spaces in the last 30 years. New residential areas have been built on land around its rail stations and public transport routes.

### 09 / TRAIN NETWORK, HONG KONG

The train system in Hong Kong – known as the Mass Transit Railway (MTR) – is one of the best in the world. It has a punctuality record as well as cleanliness and efficiency levels that rival systems can only dream of – around 99.9 percent of trains run on time. The key to Hong Kong's success is a business model called 'Rail plus Property'. When MTR builds a new rail line, it partners with private developers to build properties around the line. MTR then receives a share of the developers' profits and uses the money to fund operations, maintenance and new rail projects.



### 10 / WATER TREATMENT, SINGAPORE

Singapore is recognized as a model city for water management. With a rising population and finite freshwater resources, innovative water solutions are needed to secure the country's future water supply. Singapore now takes advantage of three water management innovations: reuse of reclaimed water, rainwater catchment systems and saltwater desalination. Two thirds of Singapore's land surfaces are now water catchment areas, with water stored in 17 reservoirs, including the Marina Basin in the heart of the city. Wastewater is collected and treated to produce water that's good enough to drink. This water is called NEWater and it currently meets 40 percent of the city's water needs.

# EX2

## ALL ELECTRIC, ALL STAR



Meet the EX2 – the latest prototype from Volvo Concept Lab. This fully electric compact excavator is cleaner, quieter and more efficient than its conventional cousins.

By **Charlie Ebers**

**W**e have seen the future, and it's electric. Volvo CE is constantly developing technologies connected to electromobility, as well as intelligent construction equipment and total site solutions that will benefit both customers and the environment by contributing to increased machine performance, productivity, efficiency, safety and sustainability.

**The EX2** – a revolutionary machine that's believed to be the world's first 100 percent electric compact excavator prototype – is just one example of the futuristic technology the company is working on. The EX2 delivers zero emissions, 10 times higher efficiency, 10 times lower noise levels and reduced total cost of ownership. To make the machine fully electric, the combustion engine has been replaced with two lithium ion batteries, totaling 38KWh, which store enough electric energy to operate the machine for eight hours in an intense application, such as digging compact ground.

**The hydraulic architecture** has also been replaced with electric architecture which incorporates electromechanical linear actuators that help to optimize the transmission chain. Removing the hydraulic system and the combustion engine, as well as reducing the cooling needs, has led to significantly lower noise levels. At this stage, the EX2 is purely a research project and there are currently no plans for industrialization. But if the machine were to go into production, how would it benefit our customers and the society? Here are some highlights.

→ The EX2 is a zero emissions machine. Environmental impact is reduced as no particulate matter, nitrogen oxide or carbon dioxide are released.

→ With 10 times higher efficiency than its conventional counterparts, average power consumption is comparable to that of a large iron (3.5kW). This means that operating costs and total cost of ownership are significantly reduced.

→ The EX2 has 10 times lower noise levels – making it suitable for use in densely populated areas, even at night. Reduced noise levels also decrease operator stress and fatigue.

→ Because the EX2 is fully electrified and there are no mechanical joysticks, it can be controlled remotely from a mobile phone or tablet. This increases safety in hazardous working environments.

→ The EX2 can recover energy, it's a fully reversible system so energy is recovered when the boom is lowered and the cab is rotated.

→ With no engine or hydraulics, maintenance requirements are reduced, resulting in a lower total cost of ownership.

→ This prototype machine offers the opportunity to incorporate operator assist functions that help operators deliver higher quality outcomes, in less time and with less effort.

→ Unlike a conventional machine, the EX2 does not use any power when it's in idle mode. This type of small excavator usually spends approximately 40 percent of its time in idle mode on a job site, so this improvement will significantly reduce operating costs.

→ Modular power sources including different battery combinations, a fuel cell system and a diesel range extender are offered with the EX2 to increase flexibility and allow customers to use the most convenient solution for them. The machine can also be plugged in to the grid to get its power and/or to recharge the batteries.

→ The EX2 delivers the same power and force as its conventional counterparts, as well as faster speeds in combined movements. As this type of movement is the most common kind for this machine, productivity is improved.

The loyal customer

# THREE DECADES WITH VOLVO

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For Icelandic customer Ellert Alexandersson, the connection with Volvo Construction Equipment runs in the family. Ellert and his father have put their trust in Volvo for over 30 years. And with the country's economy rapidly recovering, his business is booming.

By **Oliver Halls** Photos by **Jón Guðmundsson**





**S**tanding in the middle of Reykjavik, you could be forgiven for mistaking it for another Scandinavian city, with colorful wooden houses, stores and hip cafés lining its streets. However, just a short drive away, the landscape drastically transforms. Rugged moss-grown lava fields stretch out as far as the eye can see. In the distance, steady plumes of steam emerge from hot springs – natural oases amid the craggy earth. Snow-capped mountains and spent volcanoes form the dramatic backdrop.

About 10 km south of Reykjavik, just outside the small town of Hafnarfjörður, we find a large open quarry called Vatnsskarðsnámur. It's owned by Alexander Ólafsson, a contracting company that specializes in crushing and screening.

For over 30 years, the company has mined basalt and produced aggregates for concrete. It also crushes, screens and cleans the material, used for a variety of applications across the country including road building and residential development.

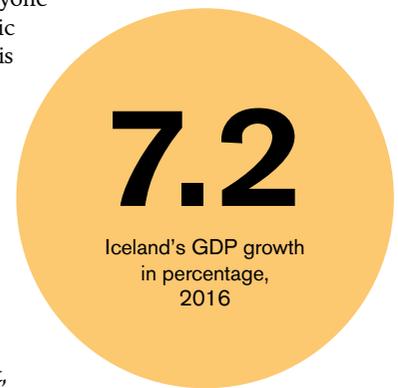
**These days**, there's hardly a quiet moment at Vatnsskarðsnámur. Around 150 truckloads of material are mined from the quarry every day, equaling about a

million tons per year. Anyone familiar with the Icelandic economy will know this is good news. The country took a hit from the 2008 financial crisis, causing the GDP to drop by 10 percent between 2007 and 2010. A new era of economic growth took shape in 2011. Last year, the Icelandic economy grew by 7.2 percent, largely off the back of increased tourism, which in turn has spurred a construction boom.

"We've grown by 20–30 percent each year for the past three years, and I think next year will be good too," says Ellert Alexandersson, the company's owner and son of founder Alexander Ólafsson. "After the crisis, nothing was built for several years, so things had to pick up. It's not only hotels; there's also a lot of road maintenance, for instance."

Most of the heavy-duty work at Vatnsskarðsnámur is carried out by a fleet of Volvo L180 wheel loaders. They work day and night to keep up with the growing demand.

"Six L180s carry out the work – one L180E,





04

- 01 Iceland's characteristic moss-grown lava fields.
- 02 Ready for another day shift.
- 03 Alexander Ólafsson uses a fleet of six Volvo L180s.
- 04 Ellert Alexandersson at the Vatnsskarðsnámur quarry.

one L180F and four new L180Hs, including one bought this year," says Alexandersson. "We also own an L90H and an older L180E, which are used in smaller quarries elsewhere in Iceland."

**Alexandersson's father established** the business in 1983 and always put his trust in the Volvo brand. "My father bought his first Volvo wheel loader in the late 1980s; I think it was the old Volvo BM 4600," continues Alexandersson. "After that, it was the L180C, L180D and so on. I took over the company in 2004 and continued the tradition. Together, my father and I have bought many Volvos over the years!"

A key factor in the company choosing Volvo has been the relationship with Iceland's Volvo dealership, Brimborg, based in Reykjavik. "We have a very long and close relationship with Brimborg," says



Alexandersson. "The service is consistent, reliable and fast. We can call them anytime, and they will be here. In fact, the first ever unit we bought back in the late 80s was sold to us by the same salesperson who sold us our most recent L180H – Ólafur Árnason! Our relationship with him has always been good, first with my father and now with me."

Alexandersson and his father have tried other brands over the years, but they have always come back to Volvo.



The loyal customer

“After the crisis,  
nothing was built for  
several years, so things  
had to pick up”

ELLERT ALEXANDERSSON

150 truckloads of material are mined from the quarry daily.



## The loyal customer

“For this quarry, Volvo machines are the best choice,” he says. “They are cost-effective, high-end units. The performance and overall quality of the machines are outstanding.”

**The new L180H**, Alexandersson’s latest machine, features a premium Volvo Tier 4 Final/Stage IV engine and perfectly matched drivetrain and hydraulics, delivering power, productivity and reliability. “We don’t even use any special adaptations or options on the machines. They do what they need to do straight off the factory floor.”

Besides an impressive bucket capacity the L180H features state-of-the-art technology such as OptiShift – a unique system that reduces fuel consumption and increases machine performance. All those features come in handy in Iceland, where the weather conditions are famously demanding.

“The cold weather can be a big factor,” comments Alexandersson. “Temperatures in winter are regularly below freezing, which can put a lot of strain on equipment. But it doesn’t appear to affect the Volvo wheel loaders.”

01



### ICELAND WEATHER

On Iceland, construction machines are exposed to extreme conditions. The landscape is characterized by black sand and steaming lava fields, and the weather is very humid and unpredictable, often changing in an instant. In the winter, wind and snow storms can be severe.

**01** A Volvo L180H working on the black Icelandic terrain.

**02** For Alexander Ólafsson and its employees, Iceland's economic boom is good news.



“For this quarry, Volvo  
machines are the best choice.  
They are cost-effective,  
high-end units”

ELLERT ALEXANDERSSON

# HIGH MAINTENANCE

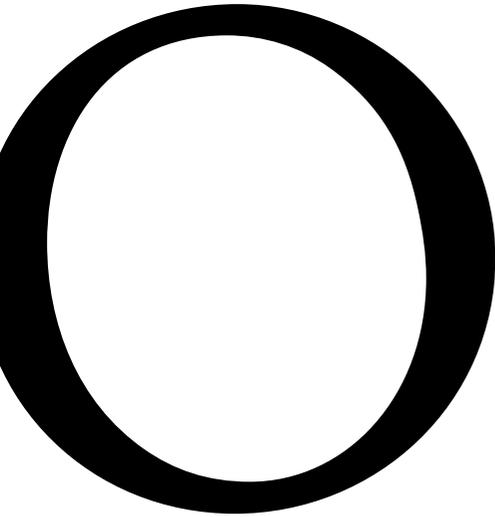
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Working in Kiruna, a Swedish mining town above the Arctic circle, puts special requirements on a technician. One day, Anton Laitamaa is a thousand meters underground and the next, servicing machines in the new center. Spirit followed him on the job.

By **Jens Kärrman** Photos by **Anna Hållams**







Outside, snow is falling, and beanie season has started for Anton Laitamaa. Today, however, he'll be spending most of his day indoors. A machine at the far end of Swecon's Kiruna workshop requires servicing.

"It's a medium-sized wheel loader used underground in the mine," Anton explains.

When the machines used in LKAB's iron ore mine in Kiruna require repairs, the work is usually carried out on site. Only particularly complicated problems warrant going through the trouble of transporting the machinery to the workshop.

Today is one such occasion.

"The wheel loader's gears have started to slip, so I'm going to have to replace the gearbox. First, I'll lift out the old gear box and then I'll lift the new one into place. Then I'll need to test and calibrate the new equipment."

**For as long** as Anton can remember, he has been tinkering or working with machines. Even as a child growing up in the Torne Valley area of northern Sweden, he enjoyed taking things apart to see how they worked.

"When I was 13 or 14 years old I was allowed to buy a moped, but my mum told me that I wasn't allowed to drive it off our property. I thought that was pretty boring, so I took the moped to pieces. Of course, this gave my mother a right shock. But she was happier when I put it back together again," he recounts.

Anton has been working as a service technician for Swecon, Volvo CE's dealer in Sweden, for almost ten years now. During this time, along with two other Swedish technicians and in hot competition with 425 teams from around the world, he has managed to bring home the bronze medal in the Volvo CE Masters competition, the company's internal world championships for technicians.

A normal working day, however, is a little more ordinary.

"In the morning, I make my way here, get changed and wash the car. You check what jobs you have

lined up, then get packed up and head out," he says.

The environment 150 km north of the Arctic circle is something special. The mine has been Kiruna's defining feature for more than 100 years.

No matter where you are in the town, you can always see the dark silhouette of the classic ore-filled mountain, Kiirunavaara.

Mining has been going on underground for many decades, and in search of the coveted iron ore, LKAB has ventured ever deeper into the bedrock. The main level at which ore is extracted lies 1,365 meters below ground level.

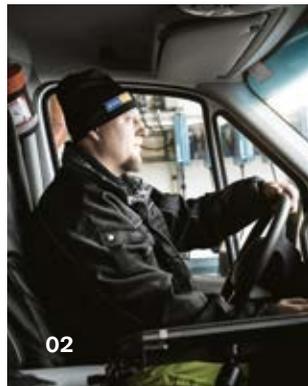
The facility in Kiruna is the largest underground iron ore mine in the world. Under the ground lie kilometer upon kilometer of roads.

"From where we are, it's a 16 kilometer roundtrip to the mine. But if I need to head underground, it can be 40 kilometers there and back," Anton says.

**Most of his** working hours are spent out at various different worksites. The mine in Kiruna is naturally a frequent destination, as is the mine in Svappavaara, 50 kilometres away.

It's also these mines that are at the center of the biggest change in Kiruna's history. To be able to expand the mine, LKAB is moving the entire city a few kilometers to the east. Due to the ongoing move, there is plenty going on above ground, too. In 2018 work will also be started on a new stretch of road forming part of European Route E 10.

01



02

01 A Volvo machine at the workshop.

02 Anton heading out for an assignment.

03 A view of Kiruna, Sweden's northernmost town.

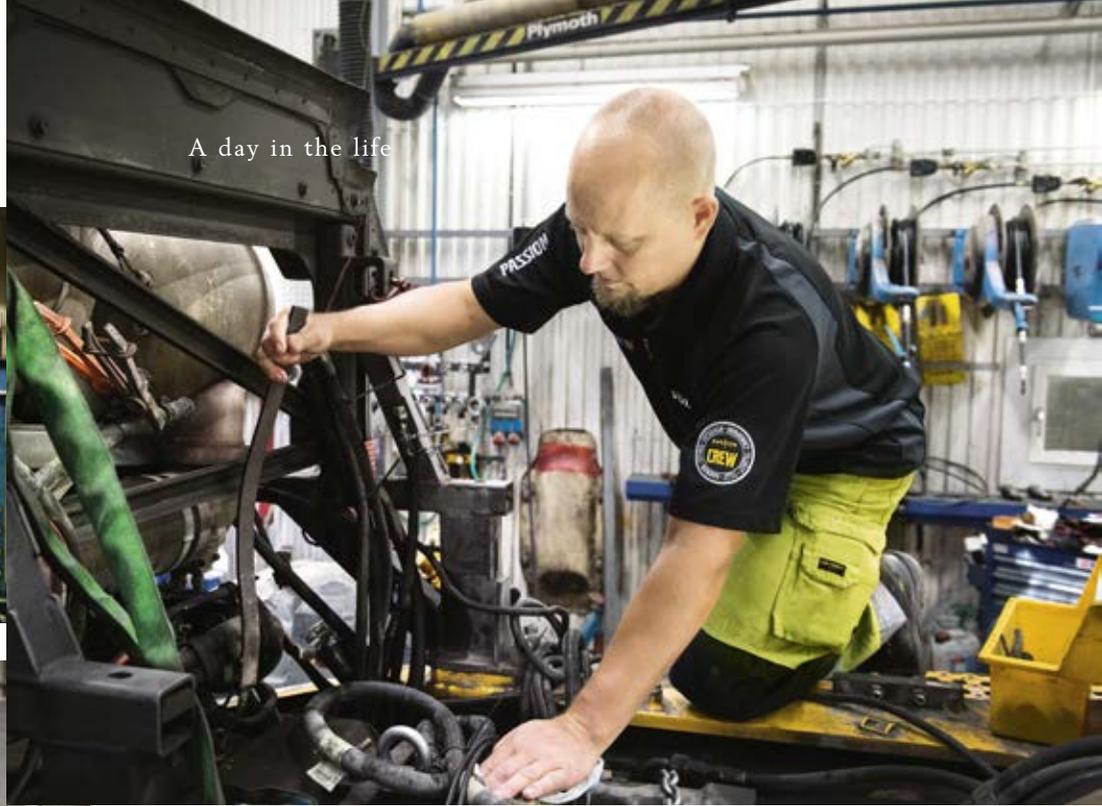


“I like solving problems  
– it’s what I’ve always done”

03

ANTON LAITAMAA





The machines used in Kiruna's mines are exposed to extreme wear and tear due to heavy use and a humid environment.

"The job is very varied, and no two days are alike," Anton says. "I'm not stuck doing the same thing every day. Sometimes you find yourself in the mine, 1,365 meters underground. The next day you might be at the Esrange Space Center, servicing machines there.

**The wheel loader** due for a brand new gearbox, sitting on the floor of the workshop, shows clear signs of having been used underground in the mine. White mining dust can be seen on its enormous wheels.

"And look at this," says Anton, pointing at a spot of rust. "The water is incredibly aggressive underground, which means that everything starts rusting very quickly. Everything wears faster."

The vehicles being used in Kiruna are subject to levels of strain that construction equipment elsewhere does not encounter.

"Ore is relatively heavy. It places a significant load on the machines," Anton states.

But it's not just the tough and particular environment that the machines in Kiruna are exposed to. They are also in use for extended periods of time.

"Elsewhere, a machine might be used for 6–7 hours a day. Here, they're on the go for two, even three shifts in a row. That can mean 18–20 hours' work a day. It certainly places a strain on them."

This is where Anton Laitamaa and his colleagues at Swecon come into the picture. If the machines are to be kept going for longer, they require servicing and maintenance.

"I spend a lot of my time troubleshooting. I like solving problems – it's what I've always done. When you fix a problem, it gives you a little buzz," says Anton.

**Volvo CE has** a major market share when it comes to construction equipment in Kiruna. The project to move the town, along with the construction of the new center and new infrastructure, means that contractors from other parts of Sweden are heading up to Kiruna for work.

For Swecon's technicians, it poses a challenge when new machines arrive in the town.

"Machines are all individuals, and we know those that are already in Kiruna. When new ones appear, we don't know them, and we don't know how they've worked in the past, so we have to familiarize ourselves with their backgrounds," explains Anton.

The wheel loader Anton is working on now is one of the machines he knows well. To mount the new gearbox, he uses an overhead crane which lowers the box into the machine. After the proper tests, it's ready to work again – and Anton turns his attention to the next problem to be solved.

## My Top Tip

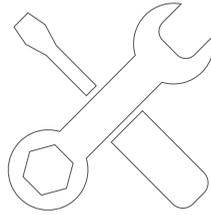


In every issue, we meet an expert and ask them to share their advice on how to keep your construction equipment in tip-top condition. Swecon's technician **Anton Laitamaa** in Kiruna, Sweden, praises eco-driving.

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“Learning how to drive economically will save you a lot of fuel. Swecon offers eco-driving courses for drivers. It’s best to go easy on the gas and hold back a little. You need to actively think about it and not just do what you’ve always done.”

ANTON LAITAMAA



# MAKING EVERY PART COUNT

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China is embracing the concept of remanufactured components with enthusiasm. One of its approved dealers has gone one step further – creating the world’s first fully ‘Certified Rebuild’ Volvo excavator.

By **Brian O’Sullivan**

**W**e don’t throw our shoes away when the laces break – so why do we discard machine components that merely need a bit of loving care to get them back to as-new condition? It doesn’t take much to win the argument for reconditioning components. ‘Reman’ as it is known, typically uses 85 percent of the material and consumes 80 percent less energy than manufacturing new parts. The component performance is as good as new, the machines are just as reliable, and a customer can pick one up for a fraction of the price of a new part. Everybody wins – the customer, the manufacturer – and the planet.

**Restoring performance and** extending the lifecycle of parts has been embraced with enthusiasm by Volvo CE in China. Licensed by the National Development and Reform Commission in 2013, Volvo CE’s Remanufacturing Center in Shanghai and approved “Certified Rebuild” dealers are driving the message that there is another option when

components and machines approach the end of their ‘first’ life.

“Equipment rebuild is not a new concept in the Chinese market and across the world,” says Leo Zhao, Vice President of Used Equipment Sales & Operation. “However, Volvo CE is committed to building the rebuild business as an important service from the group level, embodying the corporate philosophy of quality, safety and environmental care.”

**After eight or 10 years** of operating time, when the hours creep over the 12,000-hour mark, many users choose to sell or scrap their machines. But what if you could give the machine to a Volvo CE dealer – who could turn back the clock and make it like new again? Well, that’s exactly what is offered by Volvo CE’s dealer-based rebuild teams in China, and the world’s first Certified Rebuilt excavator – an EC360BLC – was delivered to a customer in Xi’an in central China in July.

But what exactly does “certified rebuild” mean? “Certification refers to the process in which the



“Certification refers to the process in which the manufacturer approves the equipment and provides a performance and service guarantee in collaboration with dealers”

manufacturer approves the equipment and provides a performance and service guarantee in collaboration with dealers. Volvo CE has a total of 39 dealers in China, but not all dealers can carry out the certified rebuild business, and only those with ‘certified rebuild’ qualifications can carry out related business,” Leo explains.

#### 5 FACTS ABOUT REBUILT MACHINES

1. Remanufacturing parts uses 80 percent less energy than manufacturing new ones.
2. Up to 85 percent of the original material can be reused.
3. Volvo CE’s program covers three categories: hydraulic system rebuild, power train rebuild and complete machine rebuild.
4. The performance of remanufactured components is as good as new in the rebuilt machines.
5. A rebuilt machine is typically 30–40 percent cheaper than a new one.

**By mid-2018** it is expected that up to 10 dealers will be qualified to conduct these rebuilds.

The Certified Rebuild program covers three main zones – the hydraulics are overhauled, the power train rebuilt and the undercarriage, superstructure and boom/arm are all brought back to peak performance. The process follows a very strict agenda that involves cleaning, dismantling and analysis of wear and defect detection. A long list of parts must then be replaced and then everything thoroughly tested. The finished machine is so close to new equipment in performance and appearance that Volvo CE zeros the operating hours and updates the machine’s serial number and nameplate.

# TAPPING RESOURCES

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As EU countries seek to balance their growing energy demand, natural gas plays an important role. The Trans Adriatic Pipeline, or TAP, is part of a major energy infrastructure project bringing gas from the Caspian Sea to Europe for the first time.

By **Derrick Butterfield** Photos by **Didier Degen**





**S**panning 878 kilometers across Northern Greece, Albania and across the seabed to connect to the Italian gas network, the TAP represents the final link in the 'southern gas corridor', which will bring gas from Azerbaijan's Shah Deniz II gas field in the Caspian Sea to Europe and beyond. The project will take approximately three years to complete.

The TAP will eventually be connected to the TANAP – Trans Anatolian Pipeline – crossing Turkey, and the TANAP connected to the SCP – South Caucasus Pipeline – carrying the gas across Azerbaijan and Georgia to the Turkish border. The total distance of 3,500 km makes this one of the most complex energy value chains ever developed and will increase energy security and diversity in the markets it will serve as well opening up potential, new markets. Designed to enable connection possibilities to a number of both existing and proposed pipelines along its route, TAP will offer the ability to make Caspian Sea gas available to many different markets in Western and Eastern Europe and the Balkans.

The operator, Trans Adriatic Pipeline AG, awarded three LOTS, or sections, of the TAP's construction – one in Greece and the remaining two that make up the Albanian portion – to French-based, global pipeline contractor, SPIECAPAG. A subsidiary of the French ENTREPOSE Group, itself part of the larger VINCI Group, the company, with 50,000 km of pipeline construction to its credit in some of the most formidable environments in the world is no stranger to projects such as this.

**To support this** project, Spiecapag has 97 Volvo machines – 34 in Greece and 63 in Albania – of which 81 are heavy excavators. Commenting on the number of Volvo machines on the TAP, Per-Erik Lindström, Volvo CE's VP Global Key Accounts, said, "Whilst having pipelayers in our range can open discussions with pipeline contractors, the scale of this project clearly demonstrates the huge pull through potential for other large machines."

It's the first time Spiecapag has used Volvo excavators. "We consider many factors such as price, any

requirements for repurchase or service contracts, project scope, project duration and site conditions and whether they permit economic use of the equipment. Machine availability to meet the mobilization time is also a crucial factor and especially in a case such as this where that time was very short following signature of the contract," said Bruno Pomaré, Technical Director at Spiecapag's headquarters in Colombes on the outskirts of Paris. "Once on site we like to compare factors such as actual machine usage, reliability, ergonomics, fuel consumption, service time and cost as this can help with future deliberations," he continued.

"It was a discovery for us, but we are very satisfied with the quality of the machines"

PATRICK POULARD

"It was a discovery for us, but we are very satisfied with the quality of the machines," said Construction Manager in Albania, Patrick Poulard. Pleased with the model mix of excavators, he

explained "It's exactly what we need. We use the big machines in rocky areas, the medium machines for other options and the smaller EC300s we use to create access for the larger machines arriving on trucks."

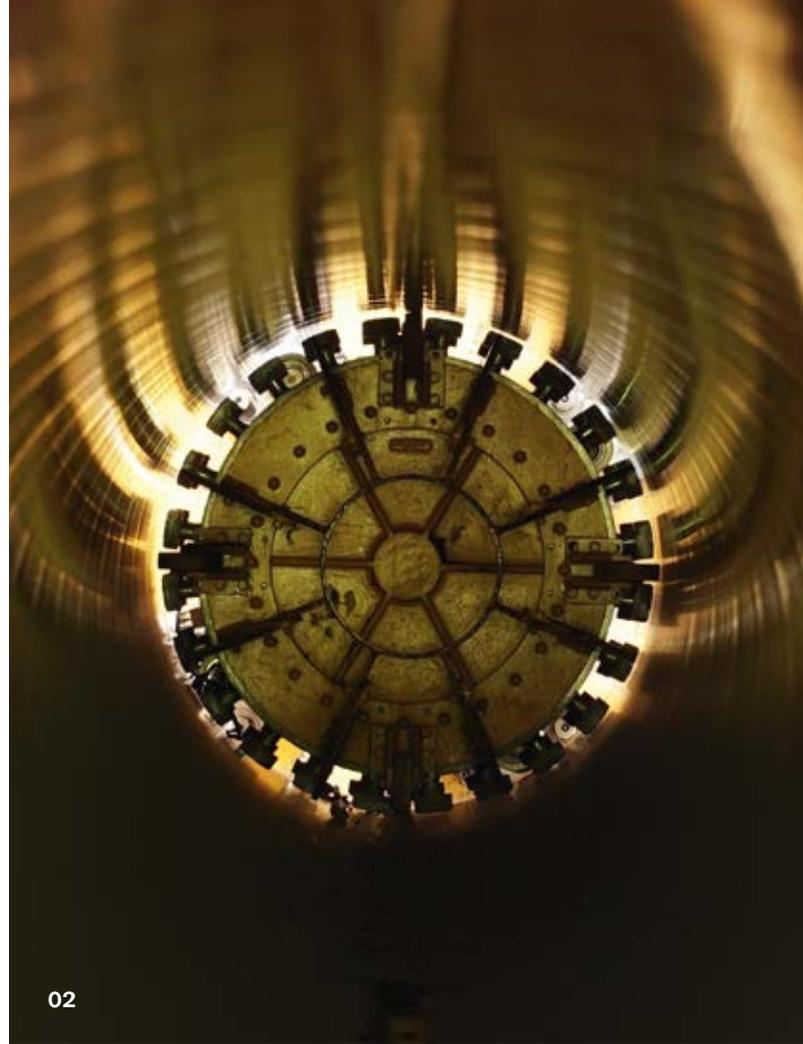
The EC300s are also being used to power the pipe facing machines to support welding operations and to prepare the many crossings – over 1,200 – encountered along on the route.

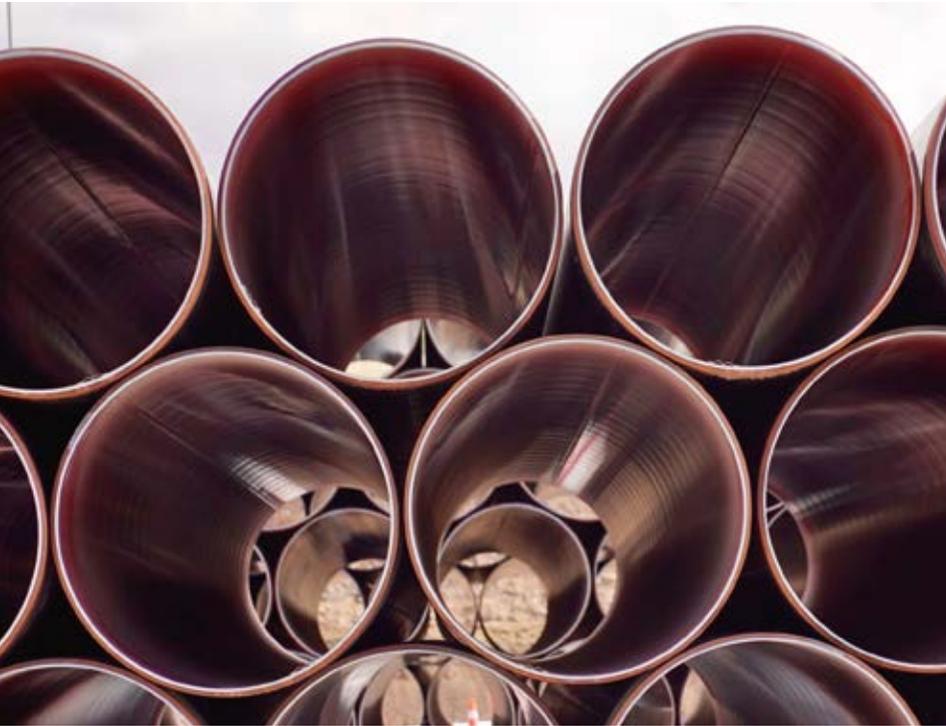
#### THE TAP PROJECT

The Trans Adriatic Pipeline is expected to be completed in 2020. It will carry gas from the Turkish-Greek border across Greece, Albania and the Adriatic Sea, finally connecting to the Italian gas network. French-based, global pipeline contractor SPIECAPAG is using 97 Volvo machines to support the project.

- 01** The terrain in Greece features flat areas and lower mountains.
- 02** Detail of the pipeline.
- 03** Drilling the Greek terrain.
- 04** 2–3 years of work remain until the TAP is completed.







- 01** Pipes destined for the TAP in Albania.
- 02** Inside a Volvo excavator.
- 03** The excavators are used, among other things, for trenching and opening the pipeline's route.



01

02

**The Greek section** will run for 187 kilometers from the Turkish border towards the port of Kavala and is being handled as a joint venture between Spiecapag and Greece's largest construction equipment company, Aktor, working as a sub-contractor. Here Spiecapag's fleet comprises 30 Volvo excavators – 22 x EC380EL and 8 x EC480EL – plus two PL4611 and two PL4809D pipelayers. The terrain here – a mixture of low-level mountains and flat areas – is not so difficult, although ground conditions can be tough. Work includes delivering the pipeline under the Marista River onto Turkish territory for connection with the TANAP once completed.

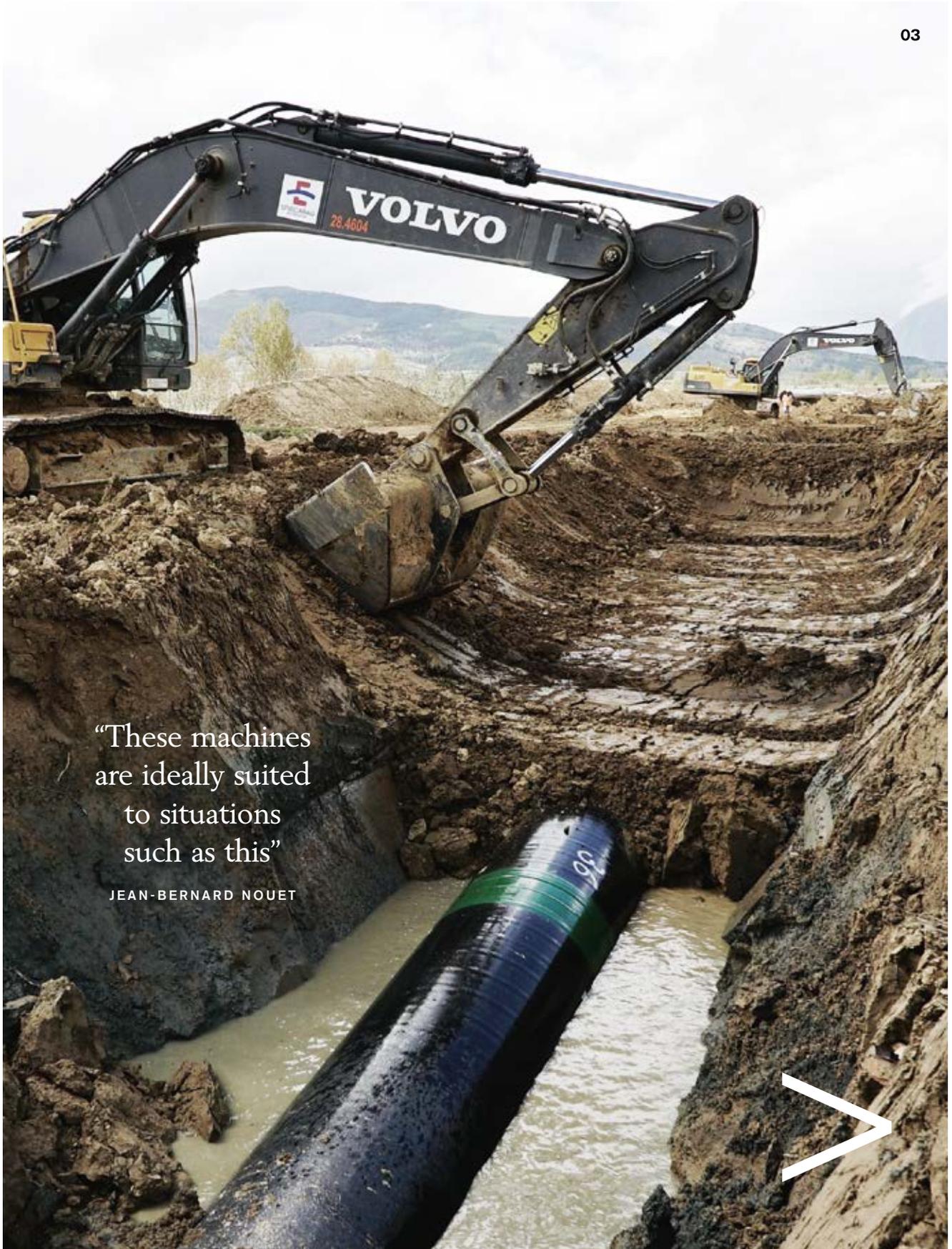
**Albania poses bigger** challenges as this 215-kilometer stretch includes nine mountain peaks over 500 meters high to be crossed, a climb to 1,800 meters at its highest elevation and a 40-degree gradient at its steepest point; the toughest challenge in the Çorovodë region – Albania's own Grand Canyon.

Work undertaken by TAP to enable transportation of the 48" pipes across the country started here back in 2015 with infrastructure improvements that will benefit the country long after project completion.

Partnering here with Dutch pipeline contractor, A. Hak, Spiecapag's even larger fleet includes 51 Volvo excavators – 8 x EC300DL, two of them long-reach, 35 x EC380DL, including eight long-reach, and 8 x EC480DL, plus ten A30F articulated haulers and two PL4611 pipelayers.

In both countries, most of the excavators are used for opening the Right-of-Way (ROW) – the route the pipeline will follow – trenching, rock breaking and backfilling operations. The articulated haulers are used mainly for clearing blasted rock and transporting soil on the ROW, but five can be converted to pipe haulers as required; their ability to go anywhere enables them to move pipes from the stock yard to the site when tough mountain slopes deny access to other pipe-carrying vehicles.

The PL4611s, shipped as soon as the pipes started to arrive, bring their huge, 110-ton tipping capacity to bear in the pipe stock yards, lifting and stocking pipes weighing up to 12 tons each, whereas the PL4809Ds in Greece are used to support tie-ins, especially where crossings are involved. "With their long booms these machines are ideally suited to situations such as this where we need to go deeper and especially where space is restricted," said Jean-Bernard Nouet, Site Plant Manager in Greece. "Their ease of transportation is also a great advantage to us. We just load the machine onto a low boy and lay down the boom."



“These machines  
are ideally suited  
to situations  
such as this”

JEAN-BERNARD NOUET





## Infrastructure

**Various attachments are** also in use, including Volvo HB38 and HB48 hydraulic breakers, screening buckets for pipe bed preparation, mulching attachments for clearing undergrowth and one EC480DL has been used with a vacuum shoe for pipe handling. Some of the excavators are equipped with quick couplers, increasing versatility and efficiency and the long-reach excavators can also switch to standard digging equipment.

Camps set up at key locations to serve the project provide accessible stocking areas for parts and other supplies and space for equipment maintenance and repair.

Volvo CE dealer Saracakis supports the project in Greece with two full-time mechanics and, as project coordinator, Giovanni Ragazzini, an ex-Volvo employee who has delayed his retirement until September to support the project. He troubleshoots, guides technicians on where they need to go and prioritizes actions. His familiarity with Volvo systems such as Tech Line and Tech Tool is of great benefit and has minimized machine downtime.

**In Albania, T-C Equipments** has provided a dedicated team comprising Service Supervisor Edvin Kallabaku, currently on loan to Volvo, together with Parts Supervisor Rommel Garcia and with Seit Hajdini and Besmir Kuka providing technical support.

Quality, safety and environmental care are values shared between Volvo, TAP and Spiecapag. The TAP's quality design is based on recognized national and international safety standards and industry best practice; the mission being to deliver a pipeline of which all stakeholders can feel justifiably proud. Like Volvo both companies operate Corporate Social Responsibility policies and safety programs, recognizing the high stakes for those involved and for the environment and mitigating any negative effects.

The 'zero casualties' target is supported by comprehensive training programs and safety networks, sharing and learning from any incidents. Spiecapag has an excellent record of zero accidents leading to work stoppages during 22 million hours worked on international projects since September, 2012. On site, Spiecapag operates a Safety Challenge every 90 days, covering a different subject each time, with prizes awarded. It could be for best driver, best machine operator or even the best team. "It's an educational process, enabling us to repeat and reinforce our golden rules of safety," explained Mr. Pomaré. In addition, a Safety Forum takes place every two weeks to discuss

*"It's an education process, enabling us to repeat and reinforce our golden rules of safety"*

**BRUNO POMARÉ**



01



02

**01** Spiecapag's fleet in Albania includes excavators, articulated haulers and pipelayers.

**02** Material for the Greek part of the pipeline.

specific topics with supervisors; content can then be shared within their teams. In the camps, details of any incidents are on display for all to share the lessons learned and how to avoid any recurrence.

Environmental considerations, guided by Environmental and Social Impact Assessments (ESIAs) in each host country, respect not only the environment, but also social and culturally sensitive areas wherever possible. To further reduce the pipeline's footprint, facilities will be located and operated in such a way that any physical and ecological impacts are reduced. The pipeline's construction and operation will minimize energy consumption, emissions to air, discharges of liquid effluents and the generation of waste.

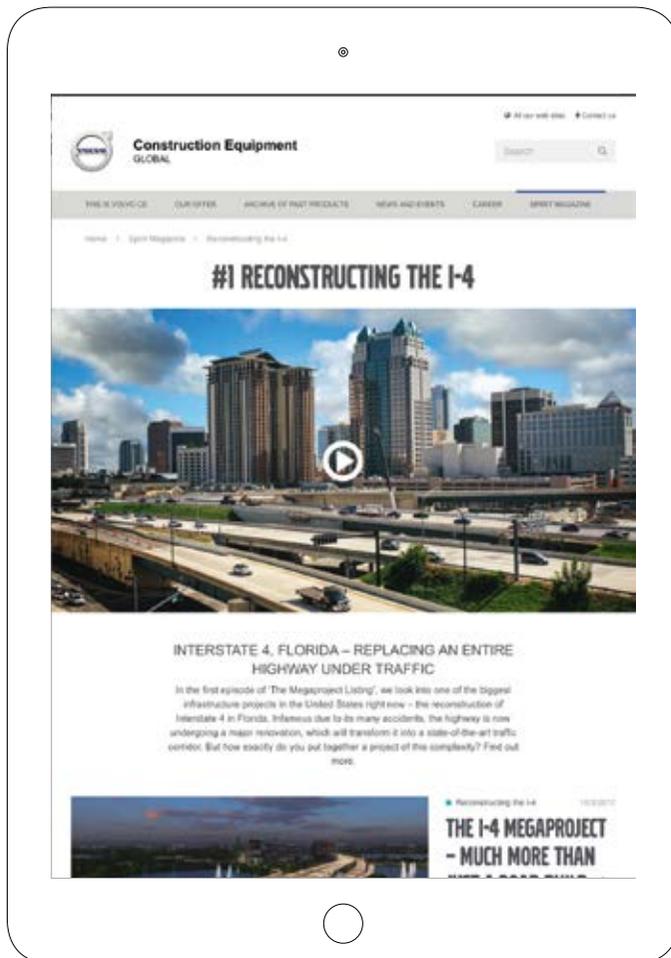
**With an initial** capacity to deliver 10 billion cubic meters (bcm) – sufficient to meet the needs of 7 million homes in Europe – capacity could be increased to 20 bcm in the future with the construction of two additional compressor stations.

As EU countries seek to balance their growing energy demand, clean, natural gas will continue to play an important role for decades to come.

# SPIRIT ONLINE

The magazine you're holding in your hands is just one part of the new Spirit. On our global website [volvoce.com](http://volvoce.com), you'll find more exclusive content from films to articles from around the world.

Here are some highlights.



## ↑ THE MEGAPROJECT LISTING, EPISODE #1

You've read all about it – now, it's time to see how an entire highway can be replaced under traffic. Spirit's team of filmmakers document the projects we cover for our series The Megaproject Listing, starting with the reconstruction of

Interstate 4 in Florida. In this film, you get to peek behind the scenes of this important road reconstruction, the magnitude of which, in the words of its design build manager Alvaro Alonso, will "baffle the mind."



### A SMART DESERT CITY

As Qatar's population grows, the country needs more housing. The solution is Lusail, a city being built from scratch in the middle of a desert. With smart central cooling and waste management systems, it aims to set an example for future cities in the Middle East.



### SAFETY FIRST

Assar Gabriëlsson and Gustaf Larson, founders of the Volvo car business, declared as far back as 1927 that "the basic principle behind all design work is, and always must be, safety." Learn about the history of Volvo CE's safety innovations such as the Care Cab.

### MOVING HEAVEN AND EARTH

Thanks to the support of a South Korean priest, Jacaranda Farm in Zambia is now the proud owner of a second-hand Volvo excavator. Following the donation, the students at this agricultural training center can look forward to a much brighter future.

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