

Big boys optimise the total lifecycle emissions

The price per megawatt used to be the sole decision-making criteria in sustainable energy sources. Now the tide is beginning to turn – the whole energy value chain needs to be taken into account when assessing feasibility.

Power purchase agreements are on the rise. Most active are those energy intensive players who see sustainability and a low carbon footprint essential for their future business success. Many of them have an ambitious goal to use renewable energy sources only.

You might argue that this is something that is reserved only to the big boys such as Google, Facebook and likes. But be assured, the rest of the business will follow these trailblazers.

Call it good corporate citizenship, call it

sound business sense. The fact remains the same; there is a growing demand for low carbon footprint energy solutions.

For example, Facebook has signed a 294 MW wind power purchasing agreement with Vattenfall. The power for their data centres in the Nordics will come from the Norwegian Bjerkreim wind farm.

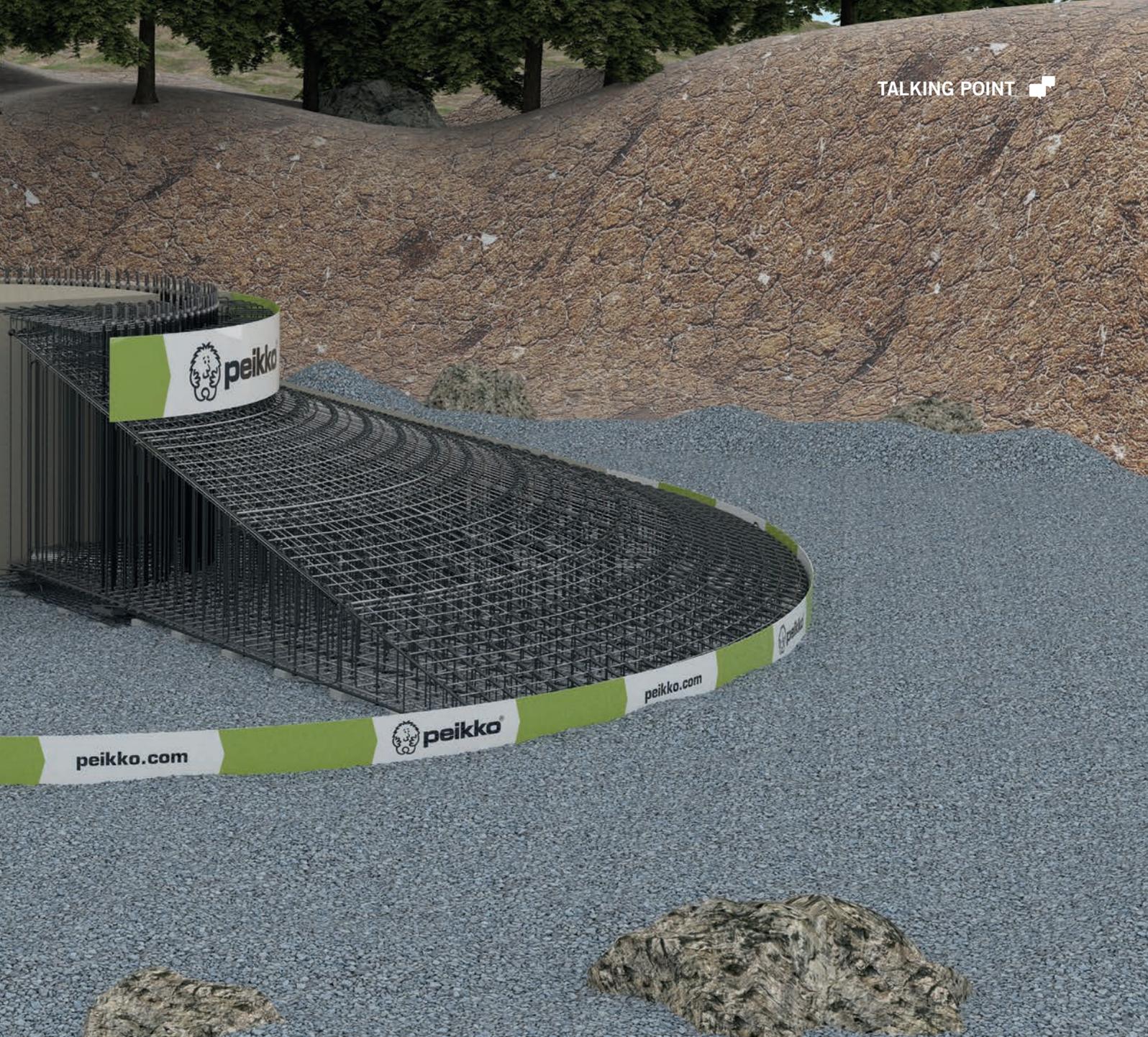
'Bjerkreim wind farm is built on our rock foundations, which will help Facebook to reach their renewable energy goals,' says Kari Tuominen, the business director for Peikko wind turbine foundations.

Google is also a prime example.

'The 148 MW output of the Lehtirova wind farm is used by Google. These megawatts are also produced on Peikko gravity foundations.'

A couple of years ago, Google made another power purchase agreement from the Tellenes wind farm in Norway.

'The fifty 3.2 MW turbines built on Peikko's rock foundations produce more than 500 GWh annually. The recent development is a clear proof that the investors will choose



the low carbon alternatives. All other things being equal, the low emission option will always prevail,' Tuominen predicts.

Another international giant, IKEA purchases renewable power which is generated on Peikko's low emission foundations.

Total lifecycle emissions matter

The quest for lowering emissions has led to fierce competition between different technologies. Be it solar, wave or wind, every energy source will need to be more transparent in their overall emissions.

So how green is wind energy after all? You could say, it depends.

But to give a more educated answer, you need to take the entire value chain into closer scrutiny by conducting life cycle assessments for all the system components. This will bring to focus the

emissions generated during the hardware manufacture, transportation and assembly – in addition to the emissions generated during the day to day energy production.

Peikko is the first player in the market who has made a life cycle assessment for its wind turbine foundations.

Using the Markbydgen wind park in Piteå, Sweden, as a pilot project, Bionova Ltd has assessed both the construction materials and the transportation on site. The comparison was made between two different gravity designs and Peikko's rock foundation.

'We found out that everything that's done before the actual building of the foundation – the design, the choice of steel and concrete quality – has the biggest impact to CO₂ emissions,' Tuominen notes.

Depending on the design, a traditional

shallow gravity foundation can use up to 70 tonnes of steel and 700 m³ of concrete. With these quantities, the choice of material source and quality can really make a difference to the emissions.

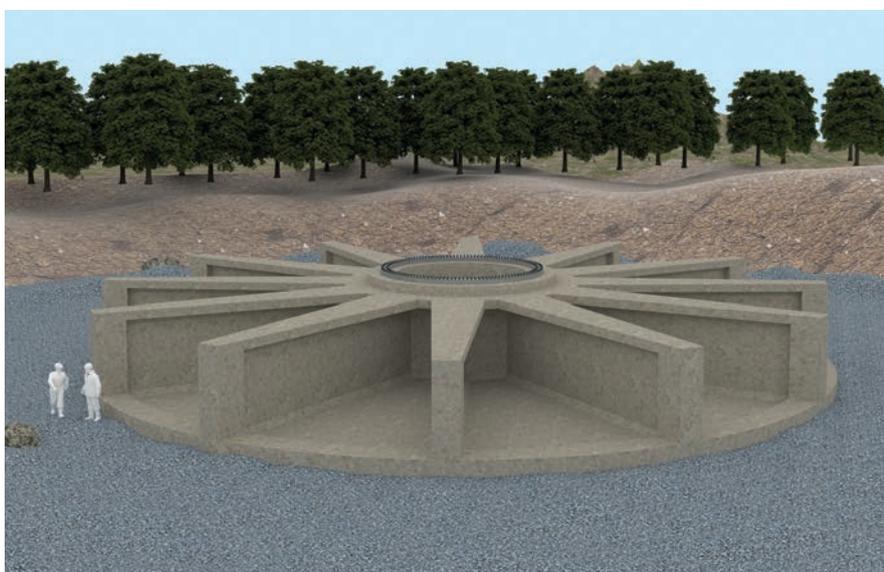
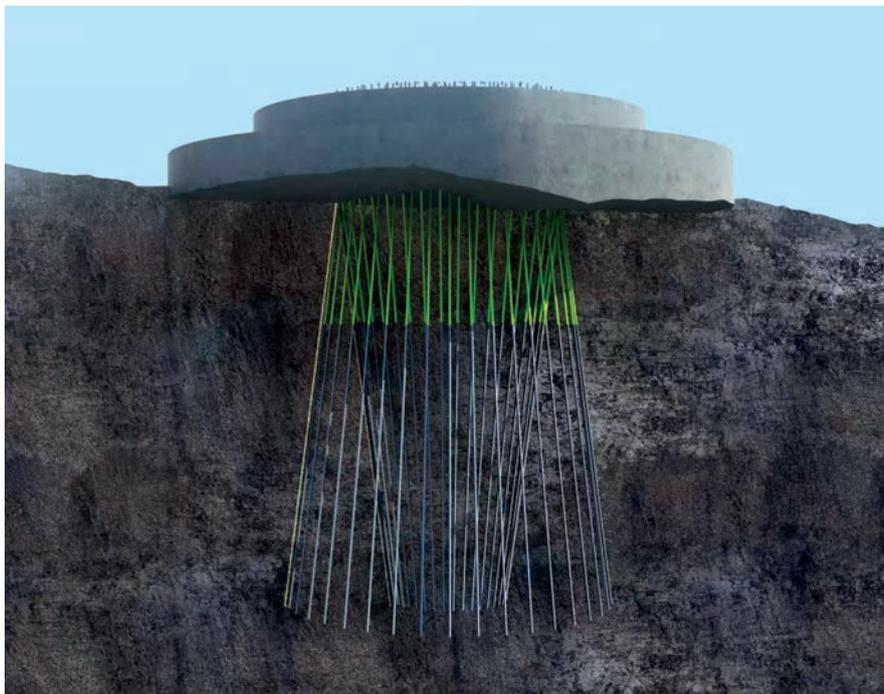
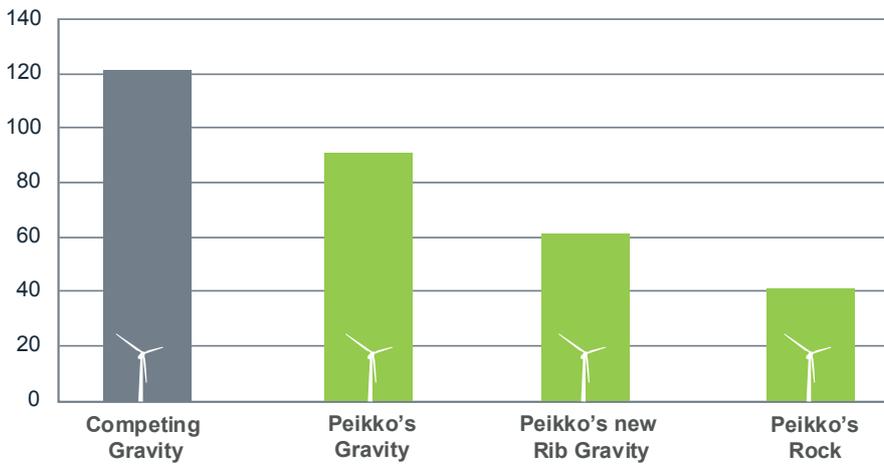
'For the gravity foundations, there was a +28% increase in emissions if you opted for steel which had been manufactured in a polluting factory faraway.

It was no surprise that the rock foundation had the lowest emissions as it uses a minimum amount of concrete.'

Designing for lower price and smaller carbon footprint

From the CO₂ perspective, the wind turbine foundations have so far been shunned as something that's but not very interesting. But anticipating the trend towards reducing the emissions in also in wind turbine component manufacturing, Peikko has

Relative CO₂ emissions of different foundation types



done methodological research and development work.

‘Developed specifically for the Markbydgen wind park in Piteå, Sweden, our current gravity foundation design uses 60 to 80 m³ less concrete compared to the previous one. On top of that, it needs 6 tons less reinforcing. This is good news for anyone interested in lowering their CO₂ emissions,’ Kari Tuominen explains.

As the icing on the cake, Peikko has also been able to lower the average foundation price by EUR 20,000. Tuominen argues further that the Peikko gravity foundation designs use up to 20% less concrete and steel than the competing foundations.

A new approach in the works

Recently Peikko designers have been busy with a totally new approach, which will meet the requirements of the ever increasing turbine sizes and the demand for lower carbon footprint.

‘We hope to launch it next autumn. Compared to the more traditional design, the new one will use up to 10.000 kg less steel and 500 m³ less concrete. That translates into 50 concrete mixer loads.’

According to Kari Tuominen, Peikko is the de facto technology leader in the Nordic wind power market with solutions encompassing all the onshore foundation needs.

‘We expect that the market will follow the big boys that see low total emissions as a must in their operations. That’s why we are continually looking for ways to reduce emissions of our foundation designs.’

www.peikko.com

The Peikko Group

The Peikko Group Corporation is a leading global supplier of slim floor structures and connection technology for precast and cast-in-situ applications.

Peikko’s innovative solutions offer a faster, safer, and more efficient way to design and build.

Peikko has subsidiaries in 30 countries in Asia-Pacific, Europe, the Middle East, and North America, with certified manufacturing operations in 7 countries.

Peikko’s turnover in 2017 was EUR 188 million.

Peikko is a family-owned and run company that employs over 1,700 professionals.

Peikko was founded in 1965, and is headquartered in Lahti, Finland.

Further information: www.peikko.com