ISSUE #02

CONNEXXT

ENERGY WITH A FUTURE

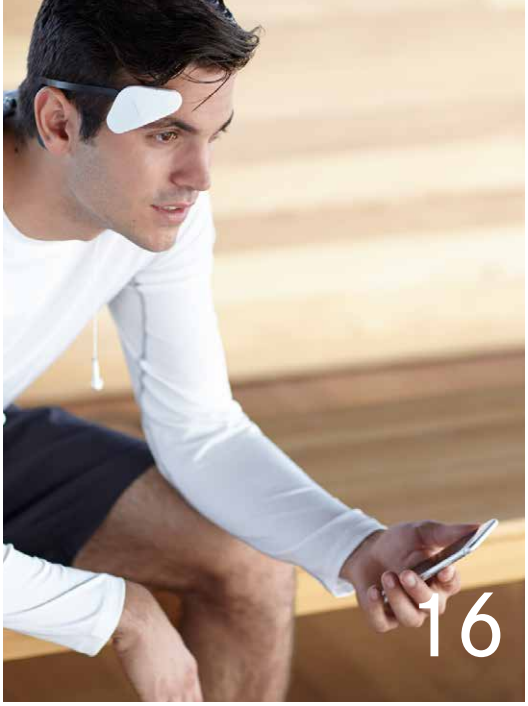
ENERGY
STILL delivers Europe's largest lithium-ion fleet.

ELECTRIFIED
Nikola Tesla – the fateful life of one of electricity's pioneers.

MOBILE
E-bikes were yesterday: the next generation of electric fun vehicles.

CHARGED UP
Some snacks to power you through the day.

STILL



CONTENTS

The solar power plant of superlatives

Ivanpah, located not far from Las Vegas, is the world's largest solar power plant. More than 300,000 rotatable mirrors reflect the sun's light to three solar towers. The tops of the towers are heated to temperatures of up to 1,000 °C. A heat exchanger turns the heat into steam to drive a generator. With a nominal output of 392 megawatts, this power plant of the superlatives can supply electricity for 140,000 households.

Picture: BrightSource Energy, Inc

NEWS

SHIPPING CONTAINERS ON THE SCALES

New regulations introduced by the International Marine Organisation came into force globally on 1 July 2016 for sea freight containers. Every single container used for exporting goods must be weighed and its gross weight determined before it can be loaded on board a ship. This regulation is part of the SOLAS treaty (Safety of Life at Sea) and is intended to avoid ships being overloaded and to optimise safety on board. The verified gross weight of a container must be documented, otherwise it may not be placed on board.
The regulations specify two authorised methods for determining the weight of a container: either weighing the container as a whole using a weigh bridge or calculating the cumulative weight of the empty container, the cargo carrier, the packaging and the goods themselves. These details are the responsibility of the loading agents as specified on the bill of loading.

ECOLINER – 100 % ENVIRONMENT-FRIENDLY

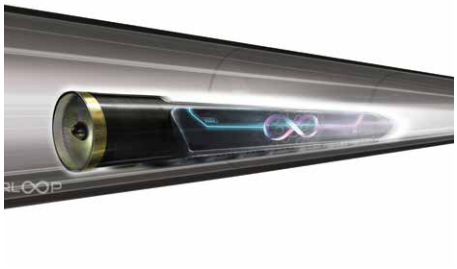
The NABU claims that 90 per cent of global trade involves around 45,000 freighters. It also states that the world's 15 largest ships are responsible for as much sulphur dioxide as 760 million cars every year.
Sailing Cargo, a Hamburg-based company, wants to do something about that. It has a vision: freights of all kinds should be transported across the world's seas emission-free. The design is a modern take on sailing ships. Because of the wind conditions it would be ideal for the Pacific route, and not so much the Mediterranean, where there is often no wind. The state-of-the-art sailing ship is currently only available as a prototype, but in a few years sailing freighters of this kind should help save up to 40,000 t carbon dioxide.

Picture: Dykstra Naval Architects

RWI/ISL CONTAINER THROUGHPUT INDEX: WORLD TRADE CONTINUES TO GROW

The container throughput index improved in July 2016 to a figure of 119.8. This means global trade continues to grow. The index reflects the fact that the international trade in goods is mainly handled by way of container shipping. The container throughput index was previously 119.3 – slightly below the level of the years 2014/15. This is also due to the port of Busan, a key hub in South Korea with a five per cent share of the global market, which has retrospectively reported lower figures.

HYPERLOOP ONE – DOWN THE PIPE AT 1,200 KM/H



Hyperloop One – co-founded by the mastermind of Tesla, Elon Musk – is the concept for a high speed transport system. Powered by solar energy, the plan is for transport capsules to be accelerated to speeds of up to 1,225 km/h. Electromagnets drive the capsule along metal pipes with a partial vacuum. Hyperloop One is planned to commence operations for freight in 2019 and for passenger transport from 2021.

THE LOGISTICS INDUSTRY IS TURNING GREEN

Whether the vehicle is yellow or brown, major transport logistics operations want to become green. For example, the Deutsche Post DHL has just brought its 1000th StreetScooter into service, a vehicle designed specifically with mail deliveries in mind. From 2017, the company plans to have 10,000 new StreetScooters on the road. Its entire German mail fleet is to be electrified over the medium term. UPS is also focusing on sustainability: one year earlier than planned, the company has already achieved its in-house target travelling one billion miles free of emissions. These are two successful examples of how sustainability in logistics is raising the benchmark for commercial transportation and is pushing forward the market demand for clean fuels.

Picture: StreetScooter / Deutsche Post DHL Group

STILL – FIRST IN SUSTAINABILITY

The world's globalised future will belong to those companies who can think and act in a value-oriented fashion. After comprehensive testing the world renowned agency EcoVadis has named the STILL Group one of the top sustainable manufacturers in the areas of "environment" and "labour conditions".The presentation of the "EcoVadis Silver Status" confirmed the credible implementation of activity play a key role amongst customers and purchasers. As far as STILL is concerned, having a sustainable corporate philosophy is therefore a powerful sales argument.

It would be pretty dark in the world's industrial centres and metropolises without electricity – the global demand for electrical power is forecast to climb by up to 80 % by 2040.

Energy with a future

ON THE ROAD TOWARDS AN ELECTRIC SOCIETY Why the world's growing demand for energy requires new concepts in production, storage and use of renewable energies – and what they might look like.

The world is consuming more and more energy. And although Asia has the greatest thirst, Europe is now generating more and more renewables, more and more efficiently. For example, Germany's energy consumption in 2014 was at the lowest level since the 1990s. But even here the subject of energy is not only sweetness and light.

RISING ENERGY DEMAND

On a global scale, the demand for primary energy (i. e. energy sources occurring in nature, such as coal, gas, sun and wind) is climbing continuously, by 39 per cent between 1990 and 2008. The strongest growth was in the Middle East, where it jumped by 170 per cent, followed by China with a 146 per cent hike. India occupies rank three, with a 91 per cent increase in internal energy demand. And this thirst for energy is ongoing: the International Energy Agency predicts that by 2040 global energy demand will have climbed by around 37 per cent, the demand for electrical power by 80 per cent. We are on the road towards a global electric society.

POWER GENERATION

This all raises the question of how power is currently generated. Even if renewable energies are gaining ground, they have by no means taken over the field. Although today no less than 12.5 per cent of Germany's primary energy consumption is now satisfied by renewables, on the other hand Germany currently uses more coal for power production than the average of the last 20 years. 45 per cent of German power comes from coal-burning power stations. In France the lion's share, 75 per cent, is sourced from nuclear power plants. Norway is proof that things can be different: the country satisfies 95 per cent of its power demand from hydro-electricity.

SCARCE OIL RESERVES?

The Scandinavian country is demonstrating its future-credentials, because focusing on renewable energy sources is a prerequisite for our planet. The reason for this is not – as many might think – due to the limited availability of oil, gas and coal. Obviously these finite resources are becoming scarcer and will become more expensive over the medium term. However, estimates of when global oil reserves will be finally consumed are always based on known oil fields – while in fact more and more previously unknown reserves are being discovered. For instance in 2013 the largest oil field discovered in the last 50 years was identified in Australia. With a size of estimated 233 billion barrels it is almost as large as the entire reserves of Saudi Arabia. In 2015 a British oil company also located a new oil field in Great Britain, with an estimated capacity of 50 to 100 billion barrels.

THERE IS NO ALTERNATIVE TO THE ENERGY TRANSITION

There is no doubt that the energy of the future (and preferably also the energy of today) must be independent of fossil fuels. In the first case it is blatantly obvious that it is wrong to put all of one's cards on a finite energy source which will become more and more expensive over the medium and long term. Secondly, using fossil fuels always creates dependency on those countries who are "sitting on" the reserves. And third, even if today's oil reserves may appear limited, as has previously been the case, there is absolutely no doubt about the limited capacity of the atmosphere to absorb greenhouse gases.

DECARBONISED PROCESSES

If we want to conserve our environment, we have no choice but to generate our energy in the most CO_2-neutral way possible. In scientific terms the process replacing those processes which release carbon dioxide (CO_2) with processes which do not, is referred as decarbonisation. And this is exactly what we need now: in order to achieve the internationally agreed goal of preventing the earth's warming from exceeding two degrees Celsius, many experts estimate that between 80 and 98 per cent of the world's present known reserves of fossil fuels need to stay in the ground. And even if this might seem a little utopian, it clearly underlines that our future is absolutely linked with renewable energies.

ENERGY HARVESTING

The upshot of the above is that the future is electric – because most renewable energy sources deliver electrical energy and not chemical compounds. In so doing they exploit the principle known as energy harvesting: energy is "harvested" and converted into electrical energy where it involves the least effort. This means that wind turbines extract power from the wind, solar plants exploit the sun's radiation to generate electricity. So far, so good. But there are a many other promising approaches.

INNOVATIVE ENERGY GENERATION

An example demonstrated in London involved an underground station where piezo-electric tiles were installed: the special panels on the floor converted the energy of walking feet into electrical power. The power generated was sufficient for all of the station's lighting needs. Although it might be the case in many energy harvesting projects that only small amounts of energy are generated, because electronic devices are becoming more and more efficient and require less energy to operate, there are many sensible applications in the pipeline. For instance, in 2013 students at the University of Southampton developed a sleeping bag and a pair of trousers which convert body heat into electricity: enough to charge a mobile phone. They made use of the thermo-electric Seebeck effect, exploiting a potential difference between the ambient temperature and body temperature.

A SEA OF POSSIBILITIES

The source of renewable energy with by far the largest power generating potential is the sea: waves, actually. Experts are convinced that theoretically the power of waves could cover no less than one fifth of the global energy demand. Wave-driven power plants are, however, still in the pilot stage. Although having said that, a Swedish company recently announced a breakthrough in the form of a buoy for which they claim five times the efficiency of previously tested systems. According to the company, one single buoy is enough to supply 200 average households with electrical power. The biggest advantage of these buoys is their scalability. In response to demand the number of these floating wave power plants can be increased very flexibly. To date these buoys have, however, only been tested as a prototype in the lab. Many previous designs for wave power ultimately failed because they could not withstand the overwhelming forces contained in the ocean's moving waters. A practical test will soon show whether the buoy is all it claims to be and really is a new ground-breaking technology. The use of the ocean's waves to generate power has one crucial advantage: unlike the wind and the sun, the swell of the sea is comparatively constant and predictable.

Robust and efficient – one single buoy is claimed to be sufficient to supply up to 200 households with power. Picture: CorPower Ocean AB

FLUCTUATING ENERGY YIELD

And this describes the central challenge which renewable energy sources face in reality: their energy output is subject to extreme fluctuation. Wind turbines only generate power when there is wind; solar systems only generate power when the sun is shining. And so what the world needs are new energy storage concepts. The demand is for high performance storages which can flexibly adjust to power demand. Ultimately, a society's demand for energy is not present only when the wind blows. The most promising and currently almost the only technology available is that of the pumped storage power plant.

3
Li
Lithium
6,94

LITHIUM

SYMBOL: Li
MELTING POINT: 180.5 °C
ELECTRONS PER SHELL: 2,1
ATOMIC NUMBER: 3

Lithium is a light metal discovered 1817 by Swedish chemist Johan August Arfwedson. It is used only in battery technology. Lithium is a trace element, the salts of which are frequently present in mineral water. Lithium is also used in medicine. Some lithium salts are used in lithium therapy to treat bipolar disorders, mania and/or depressions.

PUMPED STORAGE POWER PLANT

Pumped storage power plants can be pictured as giant ecological batteries capable of storing any excess power generated and making it available at a later time. They are built to exploit height differences of many metres and comprise an upper reservoir (the storage reservoir) and a lower reservoir. Both are connected by pipes of diameter measured in metres, at the lower end of which is the power plant proper. Whenever renewable energy sources generate more power than is consumed at the time, this electrical energy is used to pump water from the lower reservoir to the upper reservoir. Vice versa, water is released from the upper storage reservoir through the system of pipes to the lower reservoir, driving turbines on the way which are connected to generators to generate power which is fed into the grid.

BATTERY STORAGE POWER PLANTS

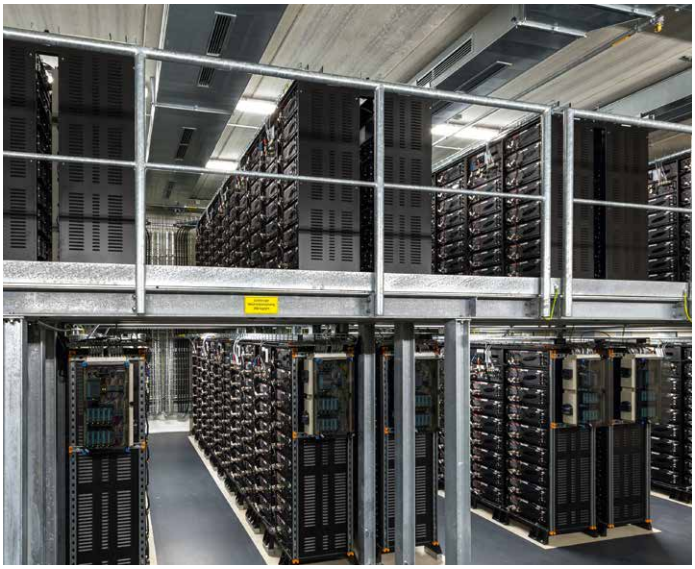
A second kind of storage power plant makes use of batteries as we are familiar with from electronic devices and modern electric fork-lift trucks: these are known as battery storage power plants. In 2014 in Schwerin/Germany, one such massive battery plant was connected to the grid in order to equalise local power fluctuations: a group made up of 25,000 lithium-ion batteries with a combined capacity of five megawatt hours (MWh). A Daimler AG subsidiary based in Hannover/Germany has announced that it intends to commence construction of a large-scale storage system this year which would also be made up of battery units originally intended for electric cars. With a planned storage capacity of 15 MWh this would be one of the largest such system in Europe. Even these figures are, however, put into shade by the world's largest battery storage power plant, located in southern California. This also makes use of lithium-ion technology and offers a massive capacity of 400 MWh.

E-MOBILITY

In order to reduce our dependency on fossil fuels and protect global ecosystems, the importance of electric mobility will increase. The automotive sector and its importance for the energy transition should not be underestimated – after all 30 % of Germany's CO_2 emissions are due to the burning of fuels for road use. E-mobility promises not only emission-free operation but also that the generation of the electrical energy is possible without polluting emissions. Electrically-powered industrial trucks have already been carrying the burden, literally, for many years in the intracompany movement of goods. And electric cars will soon realistically be able to play a serious role in road traffic. Almost all well-known car manufacturers now offer e-powered cars in their ranges; although it is above all Tesla which plans to help electric vehicles achieve the all-important breakthrough in 2017 when it launches its Model 3. A mid-range car with prices starting at 35,000 dollars, effectively pushing down the entry price for electric cars of this quality. When Tesla announced it would take orders for the vehicle on 31 March 2016, the Tesla dealerships were overwhelmed by queues of people all over the world, just like in the good old days of Apple's I-phone. According to Tesla orders were placed for almost 300,000 Model 3 cars in the first three days.

LITHIUM-ION BATTERIES

These successes have primarily been made possible by advances in lithium-ion technology. One result of the strong growth in the availability is that prices for Li-ion batteries have been falling steadily. Martin Winter, a battery expert at the Münster Electrochemical Energy Technology company (MEET), says that Li-ion technology is the most viable battery system available in the foreseeable future: "Before a new system is anywhere near as well developed as today's lithium-ion technology, and ready for the market, many years will have passed by. And during that time lithium-ion technology will also further evolve," Mr. Winter explained in talks with the Frankfurter Allgemeine Zeitung newspaper (FAZ).



Battery storage in Schwerin: view inside the battery hall. Picture: WEMAG AG

Picture middle: The Tesla mid-range Model 3 scheduled to appear on our roads from 2017. Picture: Tesla Motors

ADVANTAGES FOR INDUSTRIAL TRUCKS

Lithium-ion technology is also the centrepiece of a new generation of efficient industrial trucks. Compared with conventional lead-acid batteries, Li-ion batteries offer many advantages: "Because of the much higher energy density, truck availability is much higher," is its key advantage says STILL developer and lithium-ion expert Dr. Bernd Bücher. "The service life is greater than lead-acid batteries, by a factor of four to seven," added Dr. Bücher.

"Another big advantage is the much faster charging rate, so after only 30 minutes a STILL Li-ion battery can be up to 50 per cent charged using our in-house charging unit," explains Florian Ellerkamp, responsible for the development of charging units in the KION Group. "This new technology means opportunity charging is possible at any time without any loss in capacity and because of the battery encapsulation design, it can also take place decentrally."

Trucks with Li-ion batteries stand out thanks to higher performance and are also suitable in particular for multi-shift operations. Opportunity charging means batteries no longer need exchanging.

Experience which has been gained from the first STILL electric forklift, the EGS 1000 (1949) through to the latest RX 20 Li-ion generation.

Additional benefits derive from the batteries being absolutely zero maintenance and the negligible self-discharge when the truck is not in use. Lithium-ion batteries are also good for approximately double the number of charge cycles than conventional lead-acid batteries.

STILL LITHIUM-ION TECHNOLOGY

STILL in-house Li-ion systems make use of a sophisticated battery management system which monitors individual modules equipped with high performance Li-ion battery cells. This control and monitoring ensures that each battery delivers a constant voltage throughout the period of use. This is also pay-back for STILL identifying the potential of battery technologies at a very early date, investing in comprehensive research in the industrial truck sector, and being able today to offer an entire Li-ion fleet with a spectrum of truck types. As an example, STILL recently delivered a 66-truck Li-ion fleet to Brüggen, a famous food manufacturer, with the fleet comprising fork-lift trucks, low-platform trucks, horizontal order-pickers and tractors. One thing is very clear: the energy future is to a very large extent based on the generation, storage and use of electrical energy. Producing this in a climate-neutral fashion, storing it effectively and using it efficiently are all key challenges. With respect to intralogistics, STILL has proven, by way of its strong focus on electrical systems and with the STILL lithium-ion technology, that it has not only identified this trend, but that it is proactively forcing the pace with its innovative products.

DONZO DISCO SHOWERHEAD

This showerhead has a built-in water turbine so that when showering the water pressure is used to generate power. Colour LEDs in the shower head use the energy to light up in changing colour patterns.

Picture: Amazon / DONZO Design

LUMIR C:

A lamp which converts the heat of a tea warmer candle into electrical energy to supply four LEDs with power. This system applies thermo-generating technology derived from space travel. The light yield is actually doubled and produces a soft, diffuse 360° light.

Picture: Lumir Inc.

SOLEPOWER ENSOLES:

These insoles can be ordered for 199 dollars and shall be launched during winter 2016. The soles are placed in the shoe to generate sufficient power to charge a Smartphone. Each hour of walking (6,750 steps) is said to provide enough energy for a 30-minute phone call with an iPhone 6.

Picture: SolePower EnSoles

“EVERYTHING WILL BE BASED ON ELECTRICITY”

Prof. Martin Faulstich, of the Technical University of Clausthal and former chairman of the German government’s environment council, discusses why renewable electricity is becoming more and more important.

MR. FAULSTICH, YOU COINED THE TERM “ELECTRIC SOCIETY”. MANY PEOPLE THINK OF POWER GENERATORS, BUT NOT YOU. WHAT EXACTLY ARE YOU DRIVING AT?

This term was of course deliberately chosen to astonish, in order to motivate people to think about a very important issue: because of climate change in the future we will have to convert almost all of our power generation to renewable energies. These are primarily wind, water and sun, and these produce electricity.

SO THE “ELECTRIC SOCIETY” IN THE SENSE OF ELECTRICITY BEING THE MOST IMPORTANT FORM OF ENERGY IN THE FUTURE?

No doubt. Not only to run classic electrical consumers such as refrigerators, computers and irons. Electricity will also be the basis for transport and heating sectors. The subject of electromobility is already gaining pace. And as soon as aspects like vehicle range and charging point infrastructure have been solved for the most part – which is already on the cards – zero-emission electrical drives will not only play a role in intralogistics and logistics, but also for “normal” road traffic.

YOU ALSO MENTIONED THE HEATING SECTOR – WILL OIL AND GAS HEATING SOON BE REDUNDANT?

No, not that soon. But in the sector of heat provision, the increasing use of electric underfloor and wall heating systems will increase. In addition, we already have access to more and more sophisticated technologies which enable us to use chemical processes to, for example, convert electricity into synthetic “natural gas”, which can then be used in industrial processes. Even kerosene for aircraft can be produced synthetically. This means that in the future all kinds of energy services, as are required in households, industry and transport, can ultimately be based on electricity. And that is exactly what the metaphor of “the electric society” is intended to express.

ELECTRICITY AND ELECTRICITY GENERATED FROM RENEWABLE SOURCES ARE TWO SIDES OF THE SAME COIN. DESPITE ALL ADVANCES MADE IN THE ENERGY TRANSITION, GERMANY, FOR EXAMPLE, STILL FIRES MORE LIGNITE FOR POWER GENERATION THAN IN THE LAST 20 YEARS. THE SITUATION IS SIMILAR IN MANY OTHER EUROPEAN COUNTRIES...

It is true that the energy transition really does have a positive problem. Anyone who travels through the country and sees solar systems and wind turbines everywhere might get the impression that our electricity is generated almost exclusively from renewables. In fact in many areas the base electricity supplies are still from coal. It will be decisive here to plan the phase-out of coal based on a consensus and to carefully implement that plan by 2040, for example.

SOUNDS LIKE A VERY LONG-WINDED PROCESS.

It is the only way to be successful. No one wants to phase out coal overnight, that would not work anyway. However, an extended phase-out offers all involved the benefit of a robust plan. I do, however, still have the impression that some people are trying to stop this structural change. This structural change is, however, already in full swing and instead of trying to oppose it, it makes much more sense to take proactive part in shaping it.

A PROCESS WHICH IS ALREADY VERY COMPLEX EVEN IN EUROPE. HOW REALISTIC DO YOU THINK IT IS THAT THE REST OF THE WORLD WILL JOIN IN THIS CHANGE TO RENEWABLE ENERGIES?

Ultimately – and that is not intended to sound pompous – the whole world needs renewable energies. They are in principle the only option with which all the world’s countries can achieve the goals as agreed in the Paris climate summit. And as far as solar, wind and hydroelectric power are concerned, continents like Africa actually have much better prerequisites in terms of climate and geographical features than, for example, Germany. And whereas gas, oil and coal will become more expensive over the coming decades, the opposite is true for renewable energies. That means the energy transition also makes economic sense.

Mister electricity

THE NAME IS TESLA, NIKOLA TESLA – Anyone who hears the name Tesla today will probably picture an e-car. In fact, he was an inventor, a genius; a man whose life has enough material for a Hollywood blockbuster. Who was the man after whom Elon Musk named his new car?

NT

10.07.1856
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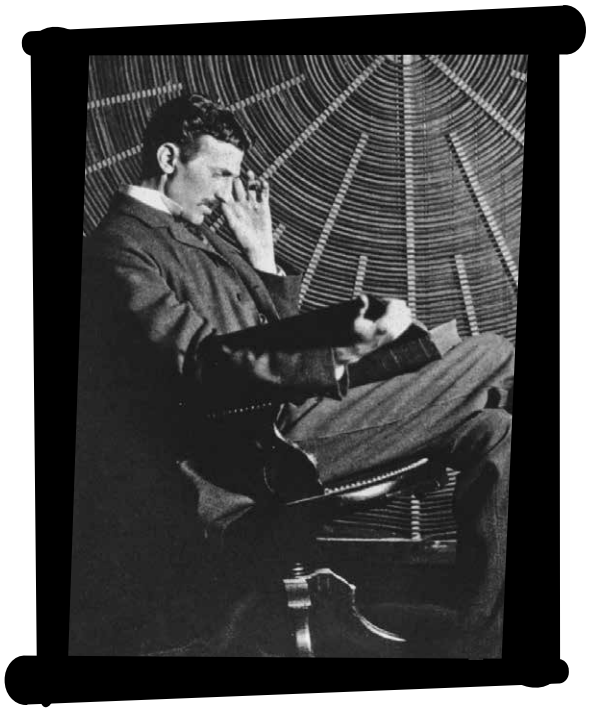
NIKOLA TESLA

“IF WE USE OIL TO GENERATE ENERGY, THEN WE ARE LIVING FROM OUR CAPITAL. THIS METHOD IS BARBARIC.”



That electricity was his destiny became apparent very early on. As a child, born on 10 July 1856 in the village of Smilijan in Croatia, son of Serbian parents, he saw flashes of light in the sky. “In some cases all the air around me was filled with living, flaming tongues,” reminisced Tesla later in New York. It was in New York, in his own studio on 5th Avenue, where he stunned bankers, captains of industry and society ladies with balls of fire or stood on a platform connected to an electrical source. Flashes and flames sprang from his fingers.

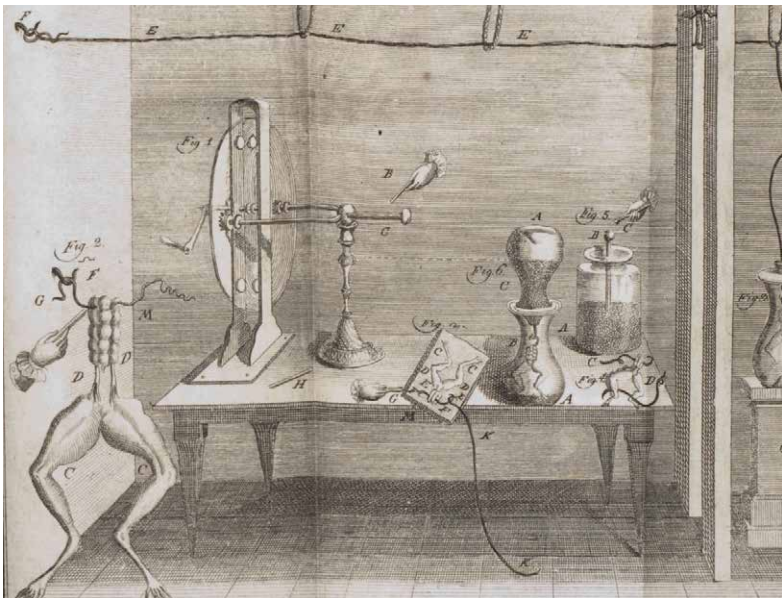
The guests themselves were electrified, and a number of major financiers, such as J.P. Morgan, were prepared to invest their money in this person who combined the roles of entertainer and inventor. But it was the spectacular displays which most disturbed his successful colleague, Thomas Edison. He described Tesla as a “scientific poet”. In truth, Tesla worked very successfully on lucrative inventions in Edison’s laboratory. The inventor of the light bulb sold not only his own products but also demanded licence fees for their use. But the two men disagreed on one key issue: Edison believed in direct current (DC) which he thought was less dangerous, but which could not be transported over long distances without voltage losses. Tesla, on the other hand, was in favour of alternating current (AC), and so started the “war of electricity”, which during its course resulted in some grotesque PR gags and culminated in the invention of the electric chair – with AC. Disappointed with Edison, Tesla founded his own company with the help of investors. He developed the arc lamp, the first remote control and a radiation canon but was forced out of his own company by investors and ultimately robbed of his shares. For a year afterwards he had to survive as a day-labourer working on the roads. And then a certain Mr. Westinghouse discovered his talent.

He purchased Tesla’s patents, agreed a licence fee of two and a half dollars per horse power of “Tesla electricity” sold and also made alternating current popular. Within two years Westinghouse had built more than 30 power stations, supplying 130 American towns with Tesla’s alternating current. The financial break-through was just within reach, because based on the licence contract Tesla would receive fees for each electric motor sold and for all AC patents. But Westinghouse’s investors then forced him to renegotiate the contract.

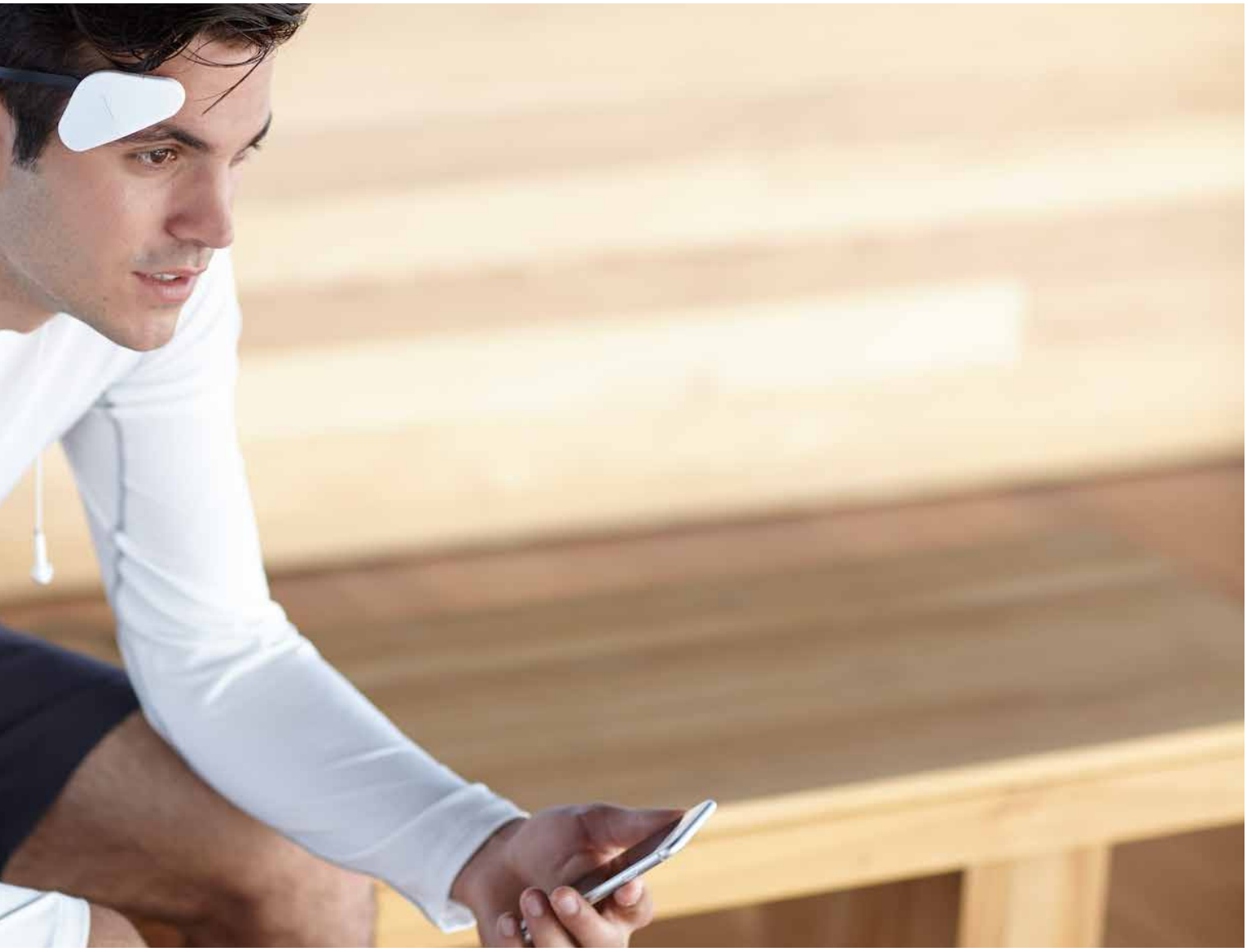
Tesla, who thought of Westinghouse as a friend, tore up the contract and swapped the royalties for his patents for a lump sum of 216,000 Dollars. As a result the pioneer of electricity, despite fame and 700 patents, failed financially. Nikola Tesla died in poverty on 7 January 1943 in a New York hotel room aged 86. Even 70 years after his death, the “Tesla” file is still open. Elon Musk, who continues with Nikola Tesla’s visions in the 21st century, sharing his inexhaustible optimism and ambition with the person after whom the company is named. When asked how he came up with the name Tesla, Elon Musk replied: “We had a long list of great pioneers. Right at the top: Faraday, who actually invented the electric motor. Tesla happened to sound better. Some ‘crazy guy’ in Sacramento had the rights. One of us literally camped on his veranda to get hold of him and we paid 75,000 Dollars for the name rights. That was a lot of money for us at that time.” And how does he see Nikola Tesla as a historical figure? “Crazy person.”

The electric high

THE HUMAN BODY IS ELECTRIC: from the healing of wounds to the co-ordination of all bodily and brain functions, many of the biological processes involved do not work without electricity.



Using experiments on frog legs, Luigi Galvani (1737 to 1798) developed the fundamentals of galvanic cells: the basic principles of how batteries function.



Digitally relaxed: Thync can “fine tune” moods using electrodes and an App Picture: Thync

It’s nothing less than a revolution, originates in the Silicon Valley and has a pretty cool name: Thync. This does not describe some new iPhone from Apple, but is actually more a white “worry stone” which you hold to your temple to change the way you feel. A digital high thanks to App fingertip control – a kind of Iphonisation of the mind. This device has been available on the American market for almost a year now. Thync stimulates specific nerve cells in the brain using electric currents through skin contact. Whether he is concentrated or calm, wide awake and communicative – the self-optimised person always has the free choice. But how is it actually possible to influence the brain’s function using electric impulses? Are people electric beings? The answer is: yes. And our forefathers knew all about it.

Even the Romans used electric current for healing. At that time they used conger eels and electric rays to generate the electric impulses, as a way of reducing pain or to numb those parts of the body against which they were held. One summer evening in 1789, the year of the revolution, Luigi Galvani, a professor of anatomy, saw how frogs’ legs, hung out by his wife to dry on the railing of their balcony, started twitching in rhythm. The contraction of the muscles was caused when the legs came into contact with copper and iron. Galvani’s wife had inadvertently created an electric circuit made up of two different metals, an electrolyte, the salt water on the frogs’ legs, and a “power indicator”, the muscles in the leg. “Galvanism” provided the fundamentals for electro-biology and hence for devices such as the Thync. Even though we have no sense to identify electromagnetic fields, the body does conduct electric current through ions in the body’s fluids. For example, when transferring information to the synapses in our nerve cells. Our body is in effect a quasi biochemical plant, powered by electric currents – without us noticing. The most powerful electrical energy is actually produced by the heart, the body’s most powerful muscle. In the case of humans, the energy transition actually took place during the course of human evolution – we are electric beings.

Outstanding performance

RX 20 LI-ION – the most efficient battery technology of all time unlocks the full potential of the compact RX 20 electric forklift. The lithium-ion battery (Li-ion) is 50 per cent charged in only 30 minutes. And that is just the start, because STILL Li-ion technology offers a whole lot more.

PRECISION: Perfectly tuned

Constant, efficient performance every single second – a hallmark of the RX 20 Li-ion. This is achieved by ensuring optimised communications between the truck, the Li-ion battery and the battery controller. This gives the compact electric forklift an even longer service life. The equalisation charge required by conventional batteries is a thing of the past.

COMPACTNESS: Flexible charging

This marks the end of complex, centralised charging stations – thanks to STILL Li-ion batteries the charging process is now as flexible as it always should have been. The compact chargers can be located anywhere without restrictions, for example where the truck is anyway, or where it might be during a longer wait period. So that even brief breaks in work can be profitably used for short opportunity charging cycles.

Li-Ion TECHNOLOGY

Li-ion power for the whole (truck) family:
Whether it is the low-platform trucks, horizontal order-pickers, tractors or forklift trucks – 90 per cent of all STILL trucks are now available with Li-ion technology. The batteries and charging technologies deployed are solutions developed by STILL: perfectly tuned to each specific truck and customised to satisfy customer requirements. The batteries offer exceptionally high performance, making them suitable in particular for multi-shift operations.

POWER:
Full power – all the time

The high energy density of Li-ion batteries means the RX 20 Li-ion can work even longer hours. Throughout usage periods voltage remains stable and constant, so that the forklift can always deliver top performance. This battery also has no problems at sub-zero temperatures and at full power – making it ideal for cold storages.

SAFETY:
Smart & acid-free

The individual high performance Li-ion battery cells in the modules are controlled and monitored by a sophisticated battery management system. An additional safety advantage is the acid-free operations, which in turn means no more battery gases.

ERGONOMICS:
More power, less work

The plus in performance and the simple opportunity charging means there is basically no need for tiring battery changes. Li-ion batteries are maintenance-free, which reduces the organisational and physical work to a minimum. No water needs to be topped up, no acid levels need to be checked.

ENVIRONMENT:
Longer lasting

Li-ion batteries are especially environment-friendly because their service life is more than double that of conventional lead-acid batteries. The significantly higher level of efficiency when charging and discharging also helps reduce the energy requirements still further.

STILL delivered a total of 66 new counterbalanced, low-platform and high-lift trucks fitted with lithium-ion technology to Brüggen.

Trail-blazing beacon project

LITHIUM-ION FLEET – In April 2016 STILL successfully completed a trail-blazing project in the lithium-ion technology (Li-ion) sector. As the first key account, food manufacturer Brüggen has converted the entire fleet at its Lübeck site to STILL Li-ion technology. STILL delivered a total of 66 new counterbalanced, low-platform and high-lift trucks of various designs to Brüggen.

QUICK FACTS

INDUSTRY:
Food industry

COMPANY:
Family company based in Lübeck, approx. 830 employees

THE SOLUTION:
Counterbalanced trucks, low-platform and high-lift trucks featuring Li-ion technology, online fleet management tool

STILL PRODUCTS:
RX 50 Li-Ion, SD 20Li-Ion, EXV Li-Ion, EXU Li-Ion,
SU Li-Ion, STILL FleetManager 4.x

Take a look! Future of e-mobility in action at H. & J. Brüggen.

Unlike lead-acid batteries, Li-ion batteries can be given an opportunity charge at any charge level. They can be easily charged using the external charge connector.

A DECISION FOR THE FUTURE

Last year Brüggen decided to replace its current fleet of forklift trucks. The main goals of this comprehensive project were to have predictable costs thanks to a leasing and service package, high levels of availability in conjunction with maximised flexibility in operations, shorter battery charging times and an online fleet management tool. In the course of the tender, STILL provided persuasive arguments with its Li-ion trucks, premium service from a single source and a customised leasing option: every six years the trucks at the Brüggen plant will be replaced with new units and repairs by the customer service are included in leasing payments.

TAILORED EFFICIENCY

The first review following completion of this key project shows that, thanks to STILL providing comprehensive advice combined with an in-depth deployment analysis, the Li-ion trucks mean Brüggen can now fully exploit the efficiency potentials without any compromises while also significantly reducing operating costs.
This is exemplified by being able to reduce the truck fleet size by 23.8 % thanks to the Li-ion trucks. “Everything Brüggen uses to move its pallets has been changed since May”, says Marek Schröder, head of logistics/purchasing manager non-food. In the lead-up each department organised a thorough review of exactly which requirements the new equipment had to satisfy. Based on these specifications, STILL delivered trucks in various versions adapted to specific tasks. In the course of this process the production assistants were able to view the various models available directly at STILL, and select the appropriate features. 39 different models offering different lift heights, fork lengths and battery capacities are currently deployed at Brüggen.

LI-ION TECHNOLOGY ADVANTAGES

The distinctive aspect of this project is not in fact the broad range of different equipment features but undoubtedly the conversion from lead-acid to Li-ion batteries. A change which brings with it a whole spectrum of advantages: the improved performance of the Li-ion battery is particularly worthwhile wherever the previously deployed

A clear classification of all units using the STILL FleetManager software ensures that the right trucks are actually available in the departments on a need basis.

STILL delivered a total of 66 new counterbalanced, low-platform and high-lift trucks fitted with lithium-ion technology and a range of features to Brüggen.

lead-acid batteries were working at their limits, such as in locations where higher performance is demanded or when multiple shifts made it necessary to change batteries. A Li-ion battery having the same dimensions has double the quantity of energy, which in turn can waive both the need and the effort of changing batteries as well as the necessary infrastructure. Each single battery cell is monitored in real time, which means that battery discharge indication is extremely precise. A fact which enables performance to be used especially efficiently. For employees the change has above all reduced workloads and created more comfort. Instead of having to handle replacement batteries, connect them to charging stations where they then charged for more than six hours, top up the batteries with distilled water, it is now only necessary to straightforwardly connect the Li-ion batteries to the external charge connector.

SIMPLE CHARGING

Lithium-ion technology is having a noticeable effect on operating costs and significantly raises truck availability. Unlike lead-acid batteries, opportunity charges can be made at any time irrespective of charge status. “Some of our trucks are operated 24 hours and we are dependent on them in logistics as well as in production. The new batteries can, as we all know from our own mobile phones, be charged at any time even for just a few minutes,” explains Marek Schröder. This means members of staff can even use their trucks a fresh charge of energy. After only 40 minutes two thirds of the charge capacity is available. lithium-ion batteries have a lifetime of up to 2,500 charge cycles, which is about twice that offered by a conventional lead-acid battery. Another plus is that lithium-ion batteries do not suffer from the negative memory effect.

SAFETY AND SOFTWARE

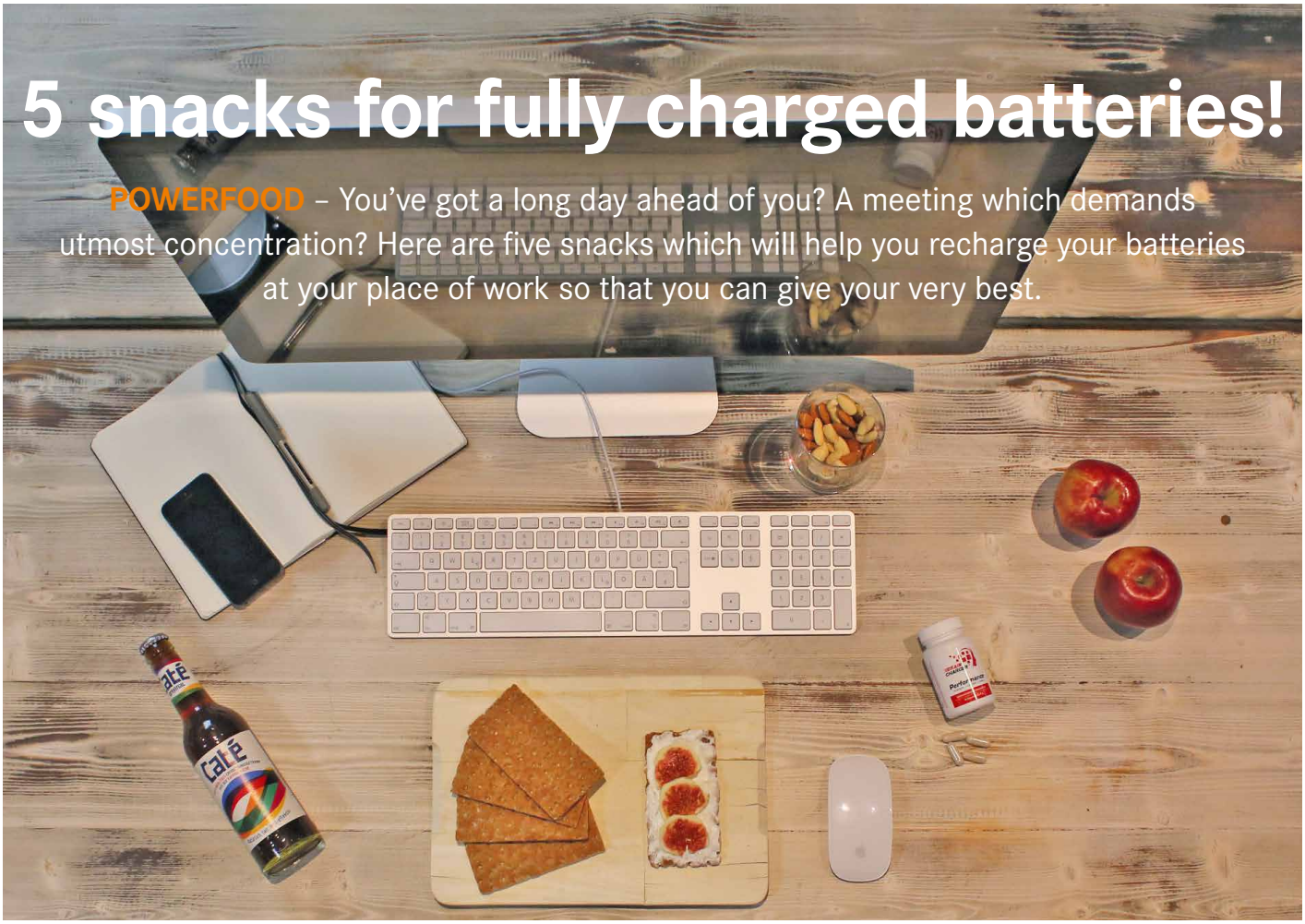
Safety is also an issue in which this forward-looking technology sets new standards. Li-ion batteries are maintenance-free, which means that all maintenance work required for lead-acid batteries relating to battery acid is waived. The new trucks are also all connected to a state-of-the-art fleet management tool, STILL FleetManager 4.x. In addition, all units are fitted with a SIM card, similar to that used on mobiles. Before using the truck, the employee logs in to the truck and checks whether any defects are present. “In the past, we had major problems with damage on the trucks. The costs for repairs and defective merchandise were high,” explains Marek Schröder. “Even on the new units, impact damage is not covered by the customer service agreement. Having an individualised access authorisation does ensure that only qualified staff can use the trucks.” If there is an accident, the trucks are automatically switched to crawl speed. Only after the incident has been reported will the unit reset. “There is no point system and the STILL FleetManager 4.x is also not used as a control tool. The focus is on safety. After all, industrial trucks can move quite quickly”, says Schröder.

CUSTOM SOLUTION

“The successful conclusion of the project and the high level of customer satisfaction at Brüggen with our Li-ion technology and our approach to consultation and advice mark the way ahead for us”, explains Holger Brandt, manager of sales Germany at STILL. “For us every project focuses on providing the best solution for the specific tasks of the customer. We have found that more and more users from logistics and from the logistics and industry sectors appreciate the advantages offered by Li-ion batteries compared with classic lead-acid batteries”. The successful implementation of this major project featuring Li-ion industrial trucks means STILL has again underpinned its leading role in the field of electric mobility. The plan is that by 2017, almost the entire truck family will be available with Li-ion batteries.

5 snacks for fully charged batteries!

POWERFOOD – You've got a long day ahead of you? A meeting which demands utmost concentration? Here are five snacks which will help you recharge your batteries at your place of work so that you can give your very best.



CRISP BREAD:
Invented in Sweden, crisp bread is now famous worldwide. Not surprising really because this flat crisp bread is an excellent provider of good, complex carbohydrates, which give the body long-term energy (72 grams per 100 grams). With some cocktail tomatoes or figs, they also provide vital vitamins as well.

APPLES:
Apples are ideal for giving a quick energy kick. They are full of easily absorbed fructose and provide quickly available energy. Apples also contain a lot of potassium – a mineral vital for nerves and muscle metabolism. Making apples the ideal power snack for both physical as well as mental activities.

NUTS:
Nuts are one of the classic sources for nutrition to help cope with stress. They are full of healthy, unsaturated fatty acids and also provide a weighty portion of minerals such as potassium and magnesium. This combination gives the brain energy while also supporting intellectual activities. Salted nuts are somewhat less healthy, not only because of the relatively large amounts of salt but the roasting process also destroys some of the valuable nutritional content.

BRAINCHARGER:
The power of nature: these capsules bundle together various pure natural ingredients to counteract fatigue and promote mental powers. Guarana, caffeine, maca, ginkgo, carnitine and vitamins all promote concentration, alertness and full mental capacities. The caffeine content is similar to that of an espresso: these natural vegan capsules are above all effective because of the combination of active ingredients. Available online.

CATÉ:
Fluids are absolutely vital for our physical and mental powers. When working, many people use cola or coffee for that extra helping of energy. Caté is a new healthy alternative which is also persuasive because of its fair and sustainable production process. This fruity lemonade is made from the peel of the coffee fruit and combined with various other natural ingredients. A beverage has much less sugar than cola and is brimming with antioxidants, vitamin B and natural caffeine – all ingredients which boost both body and spirit. For information and order details: www.caté-original.com

A day in ... Paris

WITH THIERRY LEGRAND

Thierry Legrand has been head of personnel at STILL in France for four years. He originates from a Paris suburb, knows every single nook and cranny of the French capital and adores everything which is authentic, festive and off the beaten tourist track. His ideal Sunday in Paris takes him to all those places which he especially likes. Get ready and join him!

There is no better way to start a day than with a brunch in the cosy atmosphere of the Tea Room Angelina (01), ordering a big breakfast and enjoying – so they say – the best hot chocolate in the world.

Angelina I 226 Rue de Rivoli I www.angelina-paris.fr

Leaving the Tea Room simply cross the Rue de Rivoli bringing us directly into the peace of the Jardin des Tuileries (01), surrounded by sculptures by Rodin and Giacometti. We move on to the Place de la Concorde. Walk down the Avenue des Champs-Elysées to the Place de l'Étoile and the Arc de Triomphe.

A little peckish after that nice walk? It is definitely time to enter into the underground world of the Paris Metro, to travel to the 9th Arrondissement and enjoy the offerings of the Brasserie Chartier (03) for a midday snack. This large, listed hall is definitely worth discovering. Just sit down at a table and give the interior time to do its work. Like the many drawers in which the serviettes of regular customers are stored or the painting by Germont, who painted it in 1929 to settle his restaurant bill. The service is fast, the atmosphere is always friendly.

Bouillon Chartier I 7 Rue du Faubourg Montmartre, 75009 Paris I www.bouillon-chartier.com

We now move on with a saunter up to Montmatre. It is best to take the steps rather than the funicular. After a brief sojourn in the sun, the best way to avoid the many tourists is the Metro to the Île de la Cité, and spend the afternoon strolling from Notre Dame Cathedral to the Conciergerie. By the evening you will be in the west of Paris. A scarf in the right colours is the perfect accessory to visit the Stadium Parc des Princes (04) to watch a game with Paris Saint Germain.

Afterwards join some friends in the Discothèque Les Planches (05) to celebrate the win with some rousing music.

Les Planches I 40 Rue du Colisée, 75008 Paris I www.lesplanches-paris.com

And then delve into the nightlife while thinking about work tomorrow and that Paris has definitely improved its position in the world's list of most attractive metropolitan cities – currently number four and not without reason.

Transport Logistics on mission E

FINALLY THE GREEN CONSCIENCE OF MANUFACTURERS AND CONSUMERS CAN BREATHE A SIGH OF RELIEF.

Zero-emission logistics solutions on land, at sea and in the air are at an all-time high. The growth in online business and the trend to individual deliveries are boosting this development.

Green logistics is one of the top priorities amongst today's business issues, and that is only right. Because most internal combustion engines work by burning fossil fuels, which are finite. The steady growth in the world's population and the increasing level of industrialisation and urbanisation in emerging economies is steadily pushing up demand. And together with the growing business enjoyed by internet platforms and the associated small-scale delivery traffic is pushing up the demand for zero-emission, i. e. e-logistics. It is above all logistics for packages of 30 kg plus which is increasing because more and more consumers are ordering furniture, electrical appliances and other heavy consumer goods online.

It is in particular environmentally-aware consumers who are demanding low-emission alternatives for delivery, of which there are now many: electrical delivery vehicles – in particular for the "last mile" – emit neither nitrous oxides nor fine dust particles and hardly any noise. For short haul journeys of up to 50 km, battery-powered trucks are a future-viable alternative – because route lengths of this type make up to 65 % of all delivery rounds in Germany. In inner-city stop-and-go situations involving many braking and acceleration phases, electric drives are much more viable than conventional drive concepts. A current example is the StreetScooter recently introduced by the Deutsche Post DHL. Although electrically-powered delivery vehicles are nothing new: in Great Britain during the 60s and 70s milk was delivered in the early morning hours to almost every front door in the country – using silent, electric "milk floats".

For intralogistics, all the signs are pointing to now mission: zero emission. The market share of electric forklift trucks has been rising continuously for many years now because electric drives were always more efficient and offered higher performance. At the same time the regulations for emission protection have become more stringent. "The introduction of a new Euro standard will raise the market opportunities for electric trucks in the years ahead, because the development costs in order to comply with valid particle and CO_2 emissions are rising and as a result also the sales price of forklift trucks with internal combustion engines," explains Thomas A. Fischer, CSO STILL EMEA.

Even on the world's oceans a paradigm change is in full swing: solar cells and towing kites, which are attached to the bows of ships like giant paragliders, are ways with which shipping lines would like to reduce the fuel consumption of container vessels. It is the case today that virtually all freight ships and above all cruise liners still ply the world's seas firing environment-polluting bunker oil. At long last some ports have now prohibited this. Hamburg premiered the use of shore-side electricity connections in Europe, basically "plugs for cruise liners". Shutting down the diesel engines in ports helps not only reduce air pollution, it also reduces the level of sound emissions in the port areas, which are increasingly being used for residential purposes. Once on the open sea it is not only desirable to have water, but also electrical power under the keel – thrust reversers actually have a long history: Siemens actually tested its first electric boat in 1886 on the river Spree in Berlin. It was intended to operate as a water taxi delivering

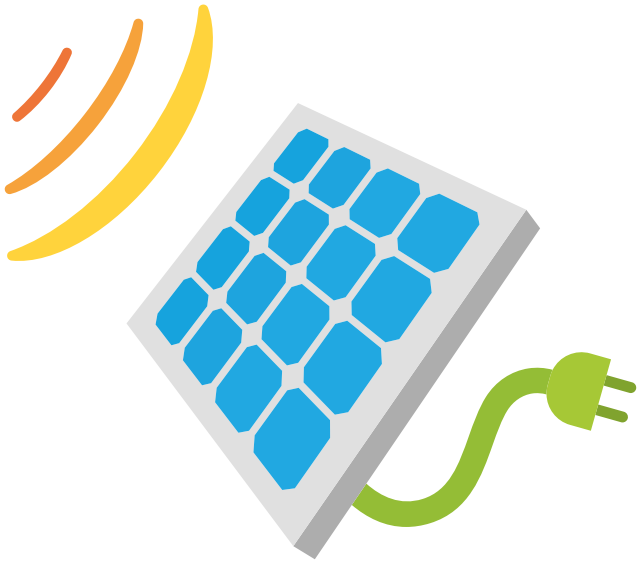
Picture: Shutterstock.com/Igor Karasi/Roi Brooks

food and solving local public transport problems in the metropolis. The “Elektra” had a capacity of 25 passengers and a speed of up to 14 km/h. A new beacon project in electro-maritime ferry logistics: the ferry operating between the villages of Lavik and Oppedal on the Norwegian Sognefjord is a good example. A fully electric ferry crosses the fjord 34 times every day absolutely free of emissions. The capacity of the batteries of 1,000 kilowatt-hours is sufficient for regular trips between the two fjord communities.

Electric drives are also good in the air. It has not only helped drones become masters of the airways, e. g. for individual deliveries into people’s front gardens. Major companies such as Airbus and Siemens are currently involved in a competition with high-tech devices to deliver the first electric aeroplanes suitable for every day and logistics tasks. Recently Gologan, a company based in Munich/Germany, flew an electric aeroplane, the “Elektra One” over the Alps: not once, but twice. Air travellers and logisticians like e-aircraft because of their simple operation and comfort. Electric motors are barely audible and basically free of vibrations. This is why electric aircraft will not be subject to take-off and landing bans on Sundays or public holidays. There is nothing to prevent them being used at night either. Because they do not need air to operate, unlike internal combustion engines, electric aircraft do not lose power as they gain height. In fact, the opposite is true. Film-type solar cells covering the wings will actually boost energy as they reach higher elevations.

The ultimate challenge is the heavy centrepiece of every electric drive system: the battery. At the moment electric vehicles almost exclusively use lithium-ion batteries. They boast a high energy density, can be recharged many times and are free of any noticeable memory effect. Their heavy weight, their high price and their unsatisfactory charging capacity (today at least) are the challenges. The main profitability factor is the cost per kilowatt-hour of a battery – currently around 300 Euro. The threshold is thought to be 130 Euro. Once this value per kilowatt-hour is achieved, they will be on equal footing with conventional drives. Mass production, as just commenced by Tesla in the desert near Nevada, is also a factor here.

Whether on land, at sea or in the air: “We are experiencing the end of stupidity”, is future researcher Lars Thomsen’s description for the success of e-mobility in transport logistics.



The fun of electricity

ELECTRIC GADGETS – e-bikes, also known as pedelecs, are almost old hat – the next generation of fun vehicles powered by electricity is already on the starting blocks.

The Boost – autonomous wave rider

LONG BOARD 12.940 40 MINUTES

54 KM/H WWW.LAMPUGA.DE

A long board with a very special kick – the 15 hp motor accelerates “The Boost” to a top speed of 54 km/h, about 29 knots. Unlike jet skis, it is always quiet, pushed by a rear-mounted water jet, suitable for all types of water. Novices can buy the “Air” model, which has higher buoyancy.

Smart Wheel – the E-Bike-Upgrade

E-BIKE UPGRADE 999 40 KM

25 KM/H WWW.FLYKLY.COM

For those who fancy an e-bike but want to keep their favourite wheels, why not choose this upgrade: Smart Wheel, available in 20, 26 and 28 inch sizes, converts all pushbikes with either hub or derailleur gears into an intelligent e-bike. An app is used to control acceleration, read the route and also lock and unlock the bike. GPS ensures you never get lost anywhere in the world.

FlyKly, Inc.

Future Motion, Inc

Onewheel – the On- and Off-Road Monocycle

MONOWHEEL $1,499 10–11 KM

24 KM/H WWW.ONEWHEEL.COM

Onewheel claims to give that snowboard-deep snow feeling to every asphalt cowboy. The Onewheel is steered by balance, i. e. the position of one's centre of gravity. Those after real thrills can travel at speeds of up to 24 km/h and, thanks to the wide tyres, on- as well as off-road. A charge time of up to 20 minutes is enough to give the Onewheel a range of 10 – 11 km of cycle fun.

Smart Ped – the City-Cruiser

PEDAL SCOOTER 999 30–50 KM

25 KM/H WWW.FLYKLY.COM

Basically the perfect "Last Mile Vehicle" (from the station to work) or for simply cruising along a street – it is licenced for road use – this electric pedal scooter, the "Smart Ped", is a hot tip for getting to work and everything else as well. An app is used to set e.g. the maximum speed and check battery status. And when the trip is over, simply fold the Smart Ped together for easy transportation.

FlyKly, Inc.

Evolve Skateboards

Evolve Bamboo – the Asphalt-Snowboard

SKATEBOARD/LONGBOARD 1129 30 KM 25 KM/H

WWW.EVOLVESKATEBOARDS.DE

The Evolve Bamboo transfers that much loved surf- and snowboard feeling to smooth blacktop. Although it looks much like any other long-board, the difference is this one has a 350 watt motor on board. This evolutionary board can travel at speeds of up to 35 km/h. For a slower ride, the Bluetooth remote control lets you change down a gear.

READ

BLACKOUT

It's the middle of winter in Europe and all electricity grids break down – the total blackout. Piero Manzano, an Italian IT professional, suspects a hacker attack and tries to get in touch with the authorities, but without success. When Europol commissar Bollard finally stops to listen, dubious e-mails are discovered on Manzano's computer. Now a suspect himself, he realises: the opponent is both clever and merciless. The whole of Europe is now in the dark, and people have to face up to their biggest challenge: survival.

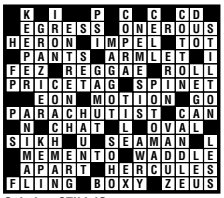
Elsberg, Marc (2012): BLACKOUT. Tomorrow will be too late
Blanvalet. Price: 19,99

ROCK YOUR IDEA

Only when you question your habits will you come up with anything new. The new is initially always an unusual mixture of apparently unsuitable ingredients. But by asking the right questions, everything can be changed and result in ideas with which we can become familiar. New perspectives and unusual opinions boost the flow of ideas and open up new opportunities. Creating successful ideas is a process which has many stages; a process which can be trained. Criticism, contradiction and curiosity are the basis for good ideas – coupled with a sense of humour, surprise and risk. "Won't work" is the most useless statement, according to Martin Gaedt. Sometimes you only come up with the right idea because you have tried to realise the wrong one.

Gaedt, Martin (2016): Rock Your Idea. Changing the world with ideas.
Murmann. Price: €22

Solution conneXXt #01



Solution: STILL iGo neo

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APPS

TODOIST

For all those who never ever want to lose touch with all their tasks and to-do lists, there are now many different tools to choose from. Todoist is available on ten different platforms and works online and offline. This practical aid can also deal with sub-tasks, or to-dos can be shared and handled even faster.

Laden im App Store

GET IT ON Google Play

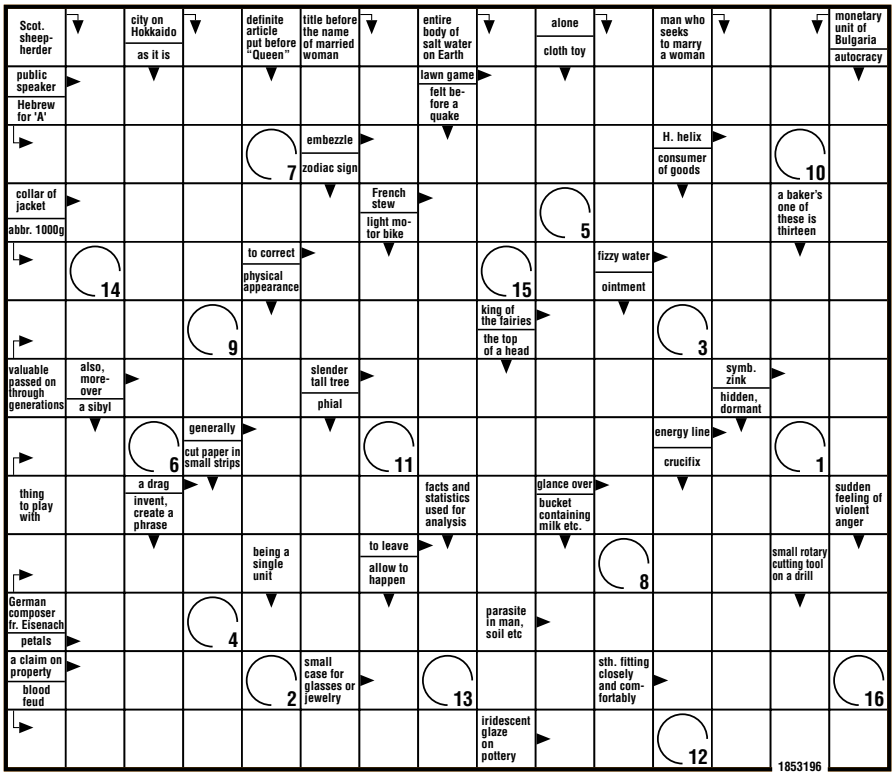
MEKORAMA

3D puzzle for those who like tinkering – in Mekorama a robot has to be guided through 50 isometrically designed dioramas. Control is very easy: pointing a finger tells the figure which direction to more in or moves it around the 3D puzzle.

Laden im App Store

GET IT ON Google Play

PUZZLE



SOUND EVERYWHERE

Anyone who travels a lot and can't do without the best sound will find the JBL Flip 3 is exactly what they need. Thanks to its 3,000-mAh-lithium-ion battery it provides powerful, room-filling stereo sound in top quality for up to 10 hours. And with its space-saving design and long-lasting splash-proof cover, the JPL Flip 3 is ideal for on the desk and at the pool.

We have got three JBL Flip 3 up for grabs – all in orange!
Just send us the solution by e-mail to: connexxt@still.de

The closing date for entries is 31/03/2017– STILL Group employees are not allowed to enter the competition.

NEWSLETTER

KEEP UP WITH WHAT'S HAPPENING IN THE INDUSTRY!

The STILL Newsletter.
Make sure you're always in the know with us and order the STILL Newsletter.
We will keep you regularly updated about news from STILL and the industry as well as dates for specialist articles, events and special offers.

Why not follow us on Facebook: /STILL

Innovative STILL forklift trucks: powerful, efficient and environmentally-friendly

Since 2009 more electric forklift trucks have been sold in Western Europe than engine trucks. Even in Eastern Europe, where engine trucks still dominate, their lead has slipped to a minimum since 2009. The reasons for this, why engine forklifts are still vital, and what makes all STILL forklift trucks in the RX-series so unbeatable, powerful, efficient and environmentally-friendly, is explained online at: www.still-zero-emission.com

first in intralogistics

STILL