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A Division of Exide Technologies

GNB® Industrial Power

Shaping the future through energy

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Securing our energy future

European Commissioner for Energy, Gunther H. Oettinger discusses the new Energy Strategy and how it will help to tackle Europe's energy challenges…

Energy is the lifeblood of our society. Our way of life is inconceivable without reliable and affordable supplies of energy: electricity, heat and fuel. Never before has the world needed so much energy: we use almost twice as much as in 1980. If this trend continues, it will be difficult to avoid a major energy crisis, with electricity cuts, petrol or gas shortages.

We cannot afford to wait

The energy challenges are among the greatest tests which Europe has to face: We have to act to prevent global warming. At the same time, we need affordable energy prices as our economic competitiveness depends very much on competitive energy prices and a reliable energy supply. Growing EU dependence on imports from third countries is also a matter of great concern, in particular for oil (85%) and gas (65%). All these challenges must be addressed and require strong action.

A new strategy for the next decade

National policies are not sufficient anymore to allow a strong economic recovery and maintain our welfare. Any decision taken by one Member State has an impact on the others. Fragmented markets undermine the security of supply and limit the benefits of a fair competition while our investments for the future will only be profitable and efficient within a continental market. We must promote a common energy policy serving our joint policy objectives: competitiveness, sustainability and security of supply.

An example of the need to think internationally is gas supply. Many Member States are reliant on gas imported from Russia. We all agreed that diversifying our gas supply will benefit citizens and businesses across the EU and we are looking to bring new, additional gas from the Caspian region to the EU. In the past few years, the EU Commission has held

continuous talks with governments and companies alike to convince them to deliver gas from this region to Europe. And in June, this European effort will finally bear fruits. In Azerbaijan, the final decision will be taken on how much gas will be delivered to Europe and which pipeline project will be chosen for the first ever direct supply of Azeri gas to the EU.

In very general terms, I see 5 pillars for action to the benefit of all Member States and citizens.

Focus on energy savings

First, there is a vast amount of untapped potential to save energy, which would save money for individuals and businesses alike. Faced with commitments to drastically reduce our emissions and achieve the objective to increase energy efficiency by 20% by 2020, action on energy demand has the most potential with immediate impact for saving energy, reducing waste and maintaining our competitiveness. To this end, the EU has adopted a new energy efficiency directive which obliges Member States to implement binding measures such as an obligation scheme for energy companies to cut down energy consumption at customer level and an obligation for Member States to annually renovate 3% of the central government's building. It also encourages energy audits for SMEs and an obligation for large companies to assess their energy saving possibilities.

A strongly integrated European Energy Single Market

We should no longer tolerate barriers which impede energy flow within the EU. National borders can threaten the benefits of the Single Market, the competitiveness of our industry and the supply of basic needs to all our citizens. Fair competition, quality of service and free access must be guaranteed. The full and proper application of EU legislation is a must. But the existence of the adequate infrastructure is a condition sine qua non. It is time energy is given comparable pan-European infrastructure, as other sectors of public interest such as telecommunication and transport have enjoyed for a long time: by 2015, no Member State should be isolated from the European internal market in energy supply. This means that we have to concentrate our efforts on concrete projects necessary to achieve our goals: solidarity, an inter-connected market, new power capacities, an "intelligent grid" and large scale production of renewable energies available to all at competitive prices. A single European

Energy Market will also increase the competitiveness of renewables, allowing excess energy generated in the sunny South to power homes in Northern Europe during times of light wind or vice-versa on blustery days in the North for cloudier days in the South.

Citizens first

These efforts should always focus on the impact on citizens. Consumers should benefit from wider choice and take advantage of new opportunities. Energy policies have to be more consumer-friendly and this will require further transparency and information: I would like all tools, like the Consumer Check List, to be improved and applied more widely. This also implies that all consumers enjoy their right to basic energy needs at all times, including in a supply crisis.

EU energy policy also aims to achieve more transparency, access to better and more information, better functioning of the retail market, development of adequate infrastructure and safety nets for vulnerable consumers. This is in addition to constant efforts for more safety and security in energy production and processing. Today, the EU represents a decisive added-value for all citizens by ensuring that the highest standards are applied in all Member States for nuclear safety and security, offshore oil and gas extraction or the development of new energy technologies. We must keep on track and continue to be vigilant.

Towards a technological shift

In energy technology, we must consolidate and extend Europe's lead. I would like to develop a European reference framework in which Member States and regions can maximise their efforts to accelerate market uptake of technologies. Europe has some of the world's best renewable energy companies and research institutions: we need to keep this leadership. Beyond the implementation of the Strategic Energy Technology Plan, we have already launched a few large scale projects with strong European added-value:

- Smart grids to link the whole electricity grid system to individual households and give better access to renewable sources of energy;

- The 'smart cities' innovation partnership to promote throughout Europe integrated energy systems at local level and facilitate energy savings.

Strengthening the EU leadership in the world

The EU should be a favoured partner in international negotiations. The present situation, where external partners can "divide and rule", is untenable. The EU has the world's largest regional energy market – 500 million people. It accounts for one fifth of the world's energy use. We import on average around 3 million tonnes of oil equivalent every day. The EU is also the world's biggest economic trading block. We must exploit our

geopolitical weight in the world and enjoy the benefits of the Single Market. Every time that the EU has spoken with one voice, for instance in the nuclear international cooperation, it led to results. The integration of energy markets with our neighbours is a must which contributes to both our, and their security. But our international relations must go further and should aim at establishing strategic partnerships with key partners. A common European policy is a strong leverage to strengthen our position in difficult negotiations, and secure our international leadership.

Time for action

This year we will discuss our energy and climate goals for 2030. We will decide whether we choose three targets as we did for 2020 – CO_2 reduction, increase of renewables, and energy efficiency – or just one or two, and whether they should be binding or not. We must decide it this year to allow Member States to prepare and to give certainty to investors in industry. As Jean Monnet said: "Where there is no vision, people perish". Our generation must take the opportunity to make this strategic vision a reality.

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Comment from Ed Davey

Investment in the energy sector is crucial to help secure the UK's future power supply. The UK government is committed to ensure enough is being done to prevent the growing investment crisis.

Secretary of State for Energy, Ed Davey has expressed his concern for energy investment and has pledged support for renewable energy including offshore wind, and large-scale solar schemes.

Davey has welcomed the European Commission's new climate and energy White Paper, predicting that it will help to mobilise "massive investment" in low-carbon energy.

"The proposals are a step in the right direction towards an ambitious emissions reduction target for Europe. They provide the flexibility to tackle climate change in the most cost-effective way, so that British consumers aren't paying over the odds to go green.

"A 40% GHG target for Europe is a good start which the UK fought hard for, and will lead to massive investment in low carbon energy, including many more renewables."

The energy secretary said that investors are queuing up to express their interest in these contracts, and the UK is now on track to double the amount of electricity generated from renewables, from 15% to 30% by 2020.

"This shows that we are providing the certainty they need, our reforms are working and we are delivering ahead of schedule and to plan. Providing a framework for investors and the energy sector that gives long-term certainty, with predictable returns, lowering risk and the cost of capitals."

https://www.gov.uk/government/news/response-to-the-european-commission-2030-white-paper-on-climate-change

GNB® Industrial Power – Shaping the future through energy

GNB® Industrial Power, a division of Exide Technologies, is one of the world's leading producers of lead-acid batteries for industrial applications such as renewable energy, telecommunication systems, railways, uninterrupted power supply (UPS), fork lift trucks and electric vehicles.

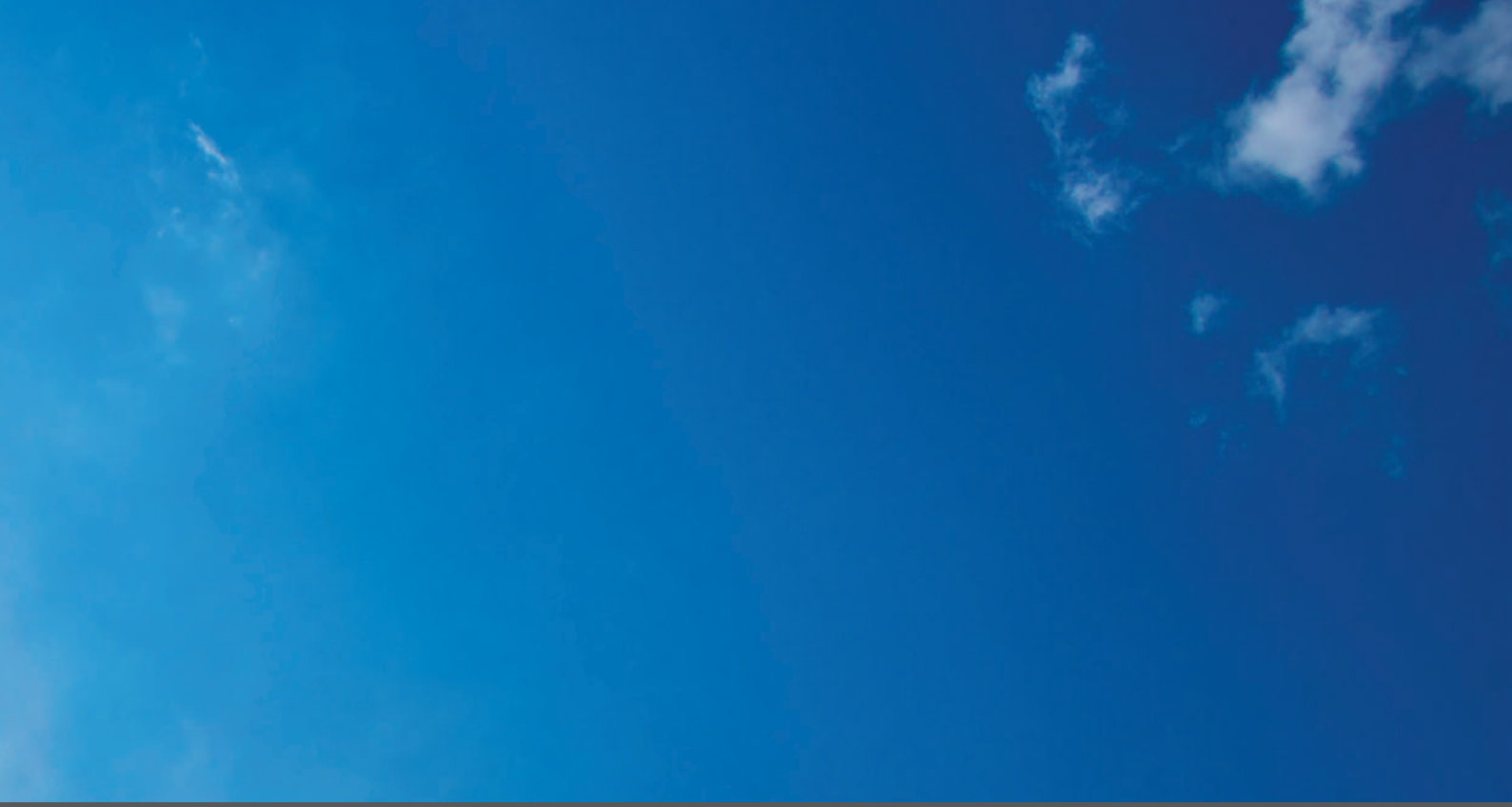
Around the world Network Power batteries from GNB® Industrial Power provide energy solutions for critical systems that require uninterrupted power supply as well as cyclic and renewable applications. Renewable energy resources such as solar, hydro and wind power are now, more than ever, being considered a viable alternative to fossil fuels thanks to the new developments in energy storage.

GNB® has a long history of successfully developing innovative and cost effective battery storage systems for the integration and optimisation of renewable energy sources and the stabilisation of electric grids. Since the 1980's, GNB® has been involved in highly successful projects demonstrating the economic viability of using batteries to integrate renewable resources on the grid and to support island grid operation.

Photovoltaic Systems

There are already numerous photovoltaic (PV) systems in use in the UK, albeit it on a small scale. Many households use this form of energy for innovative and attractive lighting in their gardens or for powering water features and have done so for a number of years. In the leisure industry solar power is frequently used for charging the batteries on caravans, motorhomes and boats. This form of power is also in use in the UK for street lighting and road signs. In fact it is around ten years ago that GNB® provided batteries from its solar range to power illuminated bus shelters, transforming them into reliable, independent power units. The sun is an important and often overlooked source of energy and the sun's rays can be turned into electricity using photovoltaic cells. Photovoltaic panels today are able to produce energy even on dull days but performance is, of course, enhanced when the sun is shining. However, on occasions there will be more energy produced than is needed and in these instances it makes good sense to have an economic method of storing this energy for future use.

In order to meeting the growing demands for renewable energy, GNB® has taken up the challenge of developing



a comprehensive range of innovative and cost effective energy storage systems including the TENSOR Solar™ high performance battery and the Classic and Sonnenschein Solar ranges.

It has been predicted that 10 million homes could be using solar power by the end of this decade if the UK is to fulfil its renewable energy potential. As energy prices continue to rise, self-consumption of solar generated energy becomes more and more appealing. The demand for a system suitable for use in private households has led to the introduction of Sonnenschein@home, where the use of premium batteries enables reliable storage of regenerative energy sources such as photovoltaic. The system is ideal for home on grid applications and is supplied in a modular cabinet which can be configured depending on individual requirements.

Sonnenschein@home batteries are from the inventor of the worldwide proven gel technology and are especially suitable for the increase in self-consumption of electricity generated by photovoltaic systems due to their operational reliability and safety.

In addition the dryfit® gel technology used in the batteries has a low carbon dioxide (CO_2) footprint giving an even more environmentally friendly solution. The dryfit® gel battery is a valve regulated lead acid battery where the electrolyte is fixed in a gel. This means that no water needs to be added during the entire lifetime of the product making it completely maintenance free. The battery is leak proof and offers superior cycling performance and outstanding durability.

Sonnenschein@home is easy to install as the batteries are a front terminal design, instead of the standard terminal which sits on top of the battery; especially useful when the batteries are placed in a modular cabinet system.

Manufactured in Germany, these batteries are offered with a 7 year warranty and can be configured for small to medium storage units depending on the available space and the individual energy storage demand. Sonnenschein@home offers reduced energy consumption through self-generated power and gives reliability in case of a grid outage.

Energy Management Systems

The world is ever more focussed on renewable energies as we contemplate our dwindling oil reserves so storing and using the natural power from the sun in our own houses is a giant step forward in the development of more responsible technologies.

The increasing use of wind and PV to meet electricity needs in Europe, the US, China and elsewhere, means new storage solutions are called for. GNB® have developed a modular battery energy storage system for industrial use, an innovative and cost effective method based on lead-acid battery technology. Development of such scalable Modular Energy Management Systems (MEMS™) began back in 2009 with the aim of creating a storage system that is easy to both install and manage. At present, Exide Technologies with its business unit GNB® Industrial Power is engaged in a large scale battery energy storage project in Germany called “M5BAT” which is funded by the German Government where two “Energy Modules” with a total energy capacity of 1 MWh will be installed and tested for a period of four years.

The MEMS is based on using reinforced standard twenty foot sea shipping containers as compact and low cost battery rooms – these are known as ‘energy modules’. Separate ten foot containers are used for the AC/DC converter and the AC grid connection and these are the ‘power modules’. Each module serves as a building block from which complete solutions can be delivered and installed at a customer’s site with minimal preparation. The systems will quickly connect to the customer’s local grid via standard 3-phase plugs and a single communications connection. These containers can be daisy-chained in order to deliver from 500 kW hours and 100 kW up to around 10 MW hours and 10 MW, depending on requirements. The control system needed for optimal operation of the batteries is included in the Energy Module as well as sensors for safe and reliable operation.

GNB® works with strategic partners to provide turnkey solutions which include the inverter units for grid connection and can be installed in short time at the customer site of operation.

Such modular storage systems can be adapted to several applications including peak shaving for the utility industries and industrial sites, time shift for renewable energy, such as in PV applications, long term storage of renewable energy, grid voltage stabilisation and UPS applications. Various combinations are possible to maximise the customer’s investment.

Working with customers, GNB® is also utilising the modular components in installations in existing buildings and battery rooms. The use of standard components and the control system enable good cost control while meeting stringent customer needs for the total cost of ownership. Such systems can provide mega-watts of power for hours. GNB® knows that customers need reliable, cost effective solutions to enable them to differentiate their products and are committed to working with them to ensure success. Renewable energy is high on everyone’s agenda and finding ways of harvesting and storing energy is an ever increasing dilemma. The Modular Energy Management System will allow many more companies to store and use renewable energy more efficiently, and, more importantly, more cost effectively.

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Solar Power

The TENSOR Solar™ is another addition to GNB's expanding renewable energy range and was developed in order to meet the challenge of efficiently storing fluctuating renewable energy. This innovative high performance battery offers maximum storage capacity with peak power output.

This highly efficient storage solution is robust and reliable, fully recyclable and offers low storage costs per KWh. TENSOR Solar™ offers excellent cycling endurance as well as superior charge and discharge power. The modular tray design means the battery is a complete building block.

The Sonnenschein Solar is a premium quality range and is a compact alternative for smaller solar applications. This range has been specially designed for small to medium requirements in leisure and consumer applications.

The Sonnenschein Solar block is very powerful and reliable and the robust design is resilient in harsh conditions. With good cycling performance, the Sonnenschein Solar block is completely recyclable meaning the product has a low CO_2 footprint. Proof against deep discharge means a greater long-term energy delivery and cost savings can be made due to lowest energy consumption.

The blocks incorporate dryfit® gel technology and are of a valve regulated lead acid design. The gel batteries mean that transport is trouble free as there are no restrictions for rail, road, sea and air transportation. They also have a long shelf life up to 2 years at 20°C without recharge due to the very low self-discharge rate.

The Sonnenschein Solar Block is the ideal energy source for medium industrial solar systems, holiday and weekend houses, wind power stations and other safety equipment power supplies.

The Sonnenschein A600 Solar batteries have been specifically developed for applications where cycling is required. For example they provide good energy savings in combination with diesel generators in hybrid off-grid installations. In addition they are robust and reliable which has been proven for many years in numerous installations worldwide.

This range also incorporates dryfit® gel technology with a strong tubular plate design which means longer life in even the toughest of conditions. Proof against deep discharge gives greater long-term energy delivery and cost savings can be made on account of the lowest energy consumption. The batteries also offer exceptional cycling performance and the CO_2 footprint is low as they are completely recyclable.

Horizontal mounting is possible making installation and maintenance much simpler. Trouble-free transportation is a further advantage.

Solar Batteries

The Classic Solar batteries includes the Classic OPzS Solar, a range which has been well proven over many years and is suitable for medium to large power requirements. The design has been optimised for renewable energy applications and offers the highest cycling ability and long life. They are low maintenance which gives cost savings as their special alloy and large electrolyte reserve offers long intervals between topping up. The batteries feature screw connectors which give better contact and therefore increases reliability. The high quality transparent containers make maintenance easier and they are also completely recyclable. The very thick tubular positive plate design makes them suitable for even the most demanding applications and they are ideally suited for use in solar and wind power stations and many harsh environments.

The Classic Enersol T batteries are a universal low maintenance energy supply and are ideally suited to medium industrial solar systems. The lead acid design, which has liquid electrolyte, is renowned for being safe and reliable as well as giving a high performance. The positive tubular plates are robust and give an enhanced cycling performance. They are low maintenance and completely recyclable and are also ideal for small solar and wind power systems, holiday and weekend houses.

Energy Storage

The Classic Enersol range offers a cost effective method of energy storage and are low maintenance as well as being completely recyclable. The thick grid plate design gives excellent resistance to corrosion and the short intercell connections mean improved DC voltage. Internal pocket separators made of micro porous glass mat ensure that the cell characteristics are retained over the full life of the cell. This range has a longer design life in cyclic applications in comparison to a standard automotive battery. They are ideal for leisure and consumer applications.

Successful ways of harvesting and storing energy are constantly being explored and the range of solutions from GNB® Industrial Power allows individuals and businesses alike to store and use renewable energy much more efficiently and cost effectively. The continuing development in battery technology will help us to face the challenges in the supply of energy. Rechargeable lead-acid batteries are a reliable method of storing power and will continue to play an increasingly important role in the supply of sustainable energy in the future.


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