

DHVtimes

THE GROUP'S INTERNATIONAL MAGAZINE



Waste + water + energy

Moving with synergy towards *Sustænergy*



Jeroen van der Veer, Shell:

“Technology is the answer to energy challenges”



Energy Valley: frontrunner in energy innovation

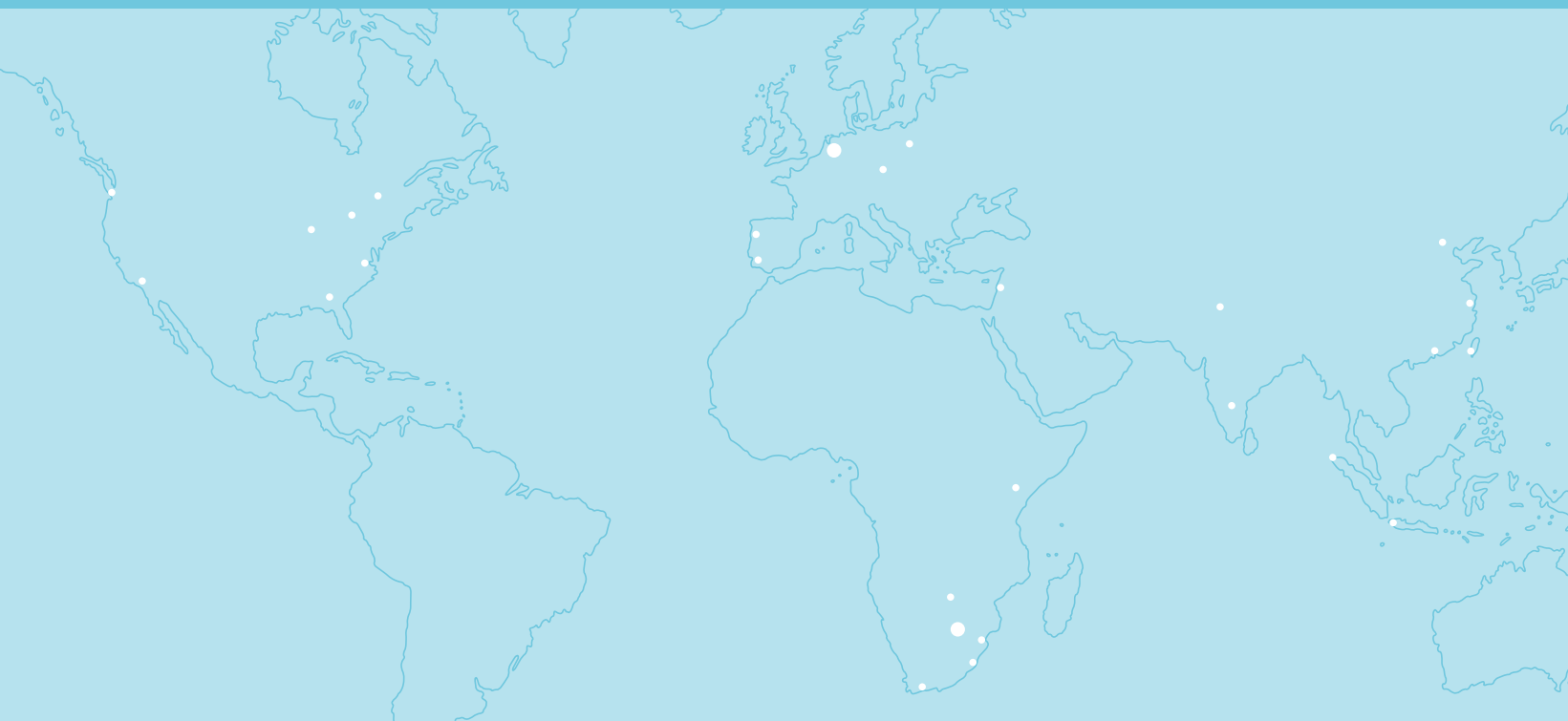
DHV GROUP, CONSULTANTS FOR THE SUSTAINABLE DEVELOPMENT OF OUR LIVING ENVIRONMENT

The DHV Group is a global provider of consultancy and engineering services in the markets of Transportation (including Aviation), Building & Manufacturing, Water, Spatial Planning & Environment. We meet our clients' needs by applying the concept of '*Local Delivery of Global Solutions*': the cutting-edge knowledge of the group is provided through a close-knit network of offices in Europe, Asia, Africa and North America.

Our network of colleagues and alliances is connected through our shared mission, values and projects, focused on the development of innovative concepts and solutions for a sustainable development of our living environment.

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Renovation of our headquarters in Amersfoort, the Netherlands, is about to get under way. The office concept remains up to date even after forty years, but modern times call for modern solutions: increased comfort with maximum energy efficiency. Once renovations are completed in 2011, the office will be as energy-efficient as a new building, complying with the highest possible energy standards. I'm proud that the project will be carried out with maximum input from our own staff - each and every one of them an expert in their field, working together to create an excellent example of sustainable construction. You can get an idea of what the final result will look like on page 7.

With energy as the unifying theme in this issue of DHVTimes, we're highlighting our strength: as a major player in the consultancy field with various areas of expertise, we're bringing people together to drive innovation. One example of this is the work we're doing for our client Energy Valley (see page 17), in the northern part of the Netherlands, where the government is joining forces with the private sector. Or our draft master plan for an energy-efficient school campus in the coastal eco city of Caofeidian, China (page 8). Or a new way of producing high-quality natural gas from organic waste matter under the name Sustænergy (page 14).

Having headquarters with the highest achievable energy rating could also describe the DHV Group: an independent company with a strong commitment to corporate social responsibility and peak performance for a sustainable future. Even in difficult economic times, we're focused on the long term in which problems such as the increasing world population, clean drinking water, and an ever-increasing demand for energy, are becoming more and more pressing. Knowing that we will continue to come up with new and improved solutions gives me confidence in the vital role that consulting, design, and technology will play in creating a more sustainable society.

A handwritten signature in black ink, appearing to read "B. van Ee".

Bertrand van Ee
President of the Executive Board



According to Jeroen van der Veer, Chief Executive of the oil company Shell, the world will continue using fossil fuels to meet its energy needs for the next fifty years since the current generation of new forms of energy aren't a viable alternative yet. He argues for subsidizing research and developing know-how to bring about technological breakthroughs.

Jeroen van der Veer, Chief Executive of Royal Dutch Shell:

“Technology is the answer to energy challenges”



The real energy issue today is transitioning from fossil fuels to sustainable forms of energy. What effect has this transition had on Shell? —

“The demand for energy is growing fast – it’s possible that by 2050 we’ll be using 100% more energy than we do now. Why aren’t we producing more sustainable energy, for example by using solar panels? These types of energy are technologically feasible, but still too expensive for consumers, which is why the market for such energy is still so limited. So for the next few decades, we’ll still need to use mostly fossil fuels to meet our energy demands. The challenge is to steer both CO₂ reduction and the energy transition toward creating an optimal result. Although it can be politically advantageous, it doesn’t make sense to heavily subsidize technology that’s proven, but currently not economically viable. Subsidies often promote the repetition of projects and existing technologies, which may result in increased volumes of products that remain economically unfeasible.”

Shell is often criticized for not investing enough in alternative energy. Are you too focused on oil and gas as primary sources of energy? —

“The increase in population and prosperity has led to increased energy usage. Even if renewable energy had a market share of just 30 percent by 2050, the world would already have accomplished a huge feat. But fossil fuels would still be required to meet the majority of our energy needs. The most sensible policy is to subsidize research and technology development, and also support pilot projects, so that we’ll go through the learning stage of new technologies and products faster. The same goes for biofuels, wind, and especially solar energy technology. We

CURRICULUM VITAE J. VAN DER VEER

Jeroen van der Veer (The Netherlands, 1947) became Chief Executive of Royal Dutch Shell in 2004. He completed his mechanical engineering studies in Delft in 1971, and completed his economics studies in Rotterdam in 1976. Van der Veer began his career at Shell in 1971, working in various manufacturing and marketing positions in the Netherlands, Curacao, and the United Kingdom. He became Managing Director of Shell Netherlands in 1992, and was named President and Chief Executive of Shell Chemical Company in 1995. Mr. Van der Veer will retire as Chief Executive on June 30, 2009. At the next shareholders’ meeting, the Royal Dutch Shell Board of Directors will announce their plan to name him Non-Executive Director as of July 1, 2009.

need technological breakthroughs to reduce the production cost of these technologies.

Energy-saving technology should receive at least as much attention as sustainable energy sources – saving energy reduces costs, decreases energy dependence and CO₂ emissions, and increases the amount of time we have to realize the energy transition.”

Have the economic crisis and low oil prices impacted your investments in alternative energy sources and CO₂ capture and storage? —

“We don’t make investments that are only profitable when oil and gas prices are high. And it’s not just about today’s prices, but rather prices over the course of the entire lifecycle of an investment, which may take dozens of years. We’ll continue to make relatively large investments even in the current market. >>



I don't believe in a start-and-stop policy. It just weakens your entire critical mass of knowledge, skills, and people's morale. Everything that we've previously invested so much in, such as improving project management quality, would come to a complete standstill. That's highly undesirable – we've made that mistake in the past.”

Shell is embarking on CCS, large-scale capture and storage of CO₂. Wouldn't it be better to prevent CO₂ from being emitted in the first place? — “No matter what happens, we're definitely going to have to produce more fossil fuels until at least 2050. The CO₂ footprint created by this extra fossil fuel production can be greatly reduced through CCS, but as far as technology and especially the cost are concerned, we're still in a very early stage. Capturing and sequestering CO₂ deep in the ground could be a solution, but not in great amounts by 2030. The development of CCS must first result in the best and most efficient technology. Capturing CO₂ from flue gases still requires a lot of energy and is very expensive. Coal gasification could be an important contribution to making CCS technology more cost-effective. A coal gasification facility produces concentrated CO₂ that's already pressurized at 40 bar, which means the entire CCS energy budget looks a lot better than post-combustion CCS in a conventional coal-fired power plant.”

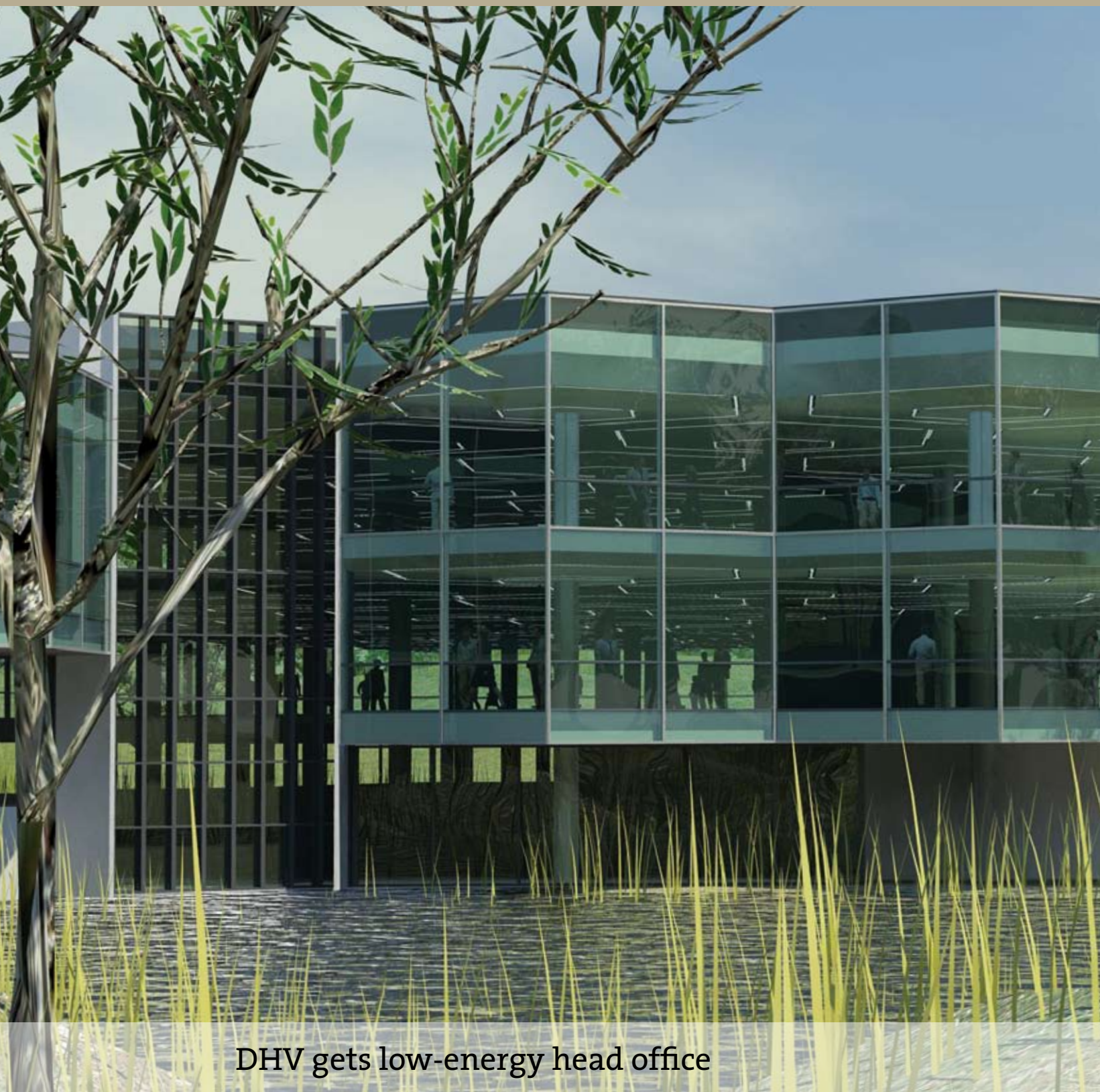
Shell is arguing for close collaboration between nations and companies: the Blueprints scenario. What would this collaboration look like? — “This scenario would involve forming numerous cross-border coalitions to tackle the challenges of economic development, energy

security, and environmental pollution. Large cities would forge connections with industry to reduce local emissions. Governments would introduce taxes and other policy instruments to improve the environmental performance of buildings, vehicles, and transportation fuels.

In addition, policies around the world would converge as the call for harmonization increases. Cap and trade mechanisms to lower emissions would gain increasing international acceptance. Rising CO₂ costs would spur innovation, leading to breakthroughs. More and more vehicles would run on electricity or hydrogen, while industrial facilities would be fitted with technology to capture CO₂ and store it underground.”

All hope centers on technology solving our energy problems. What do you envision Shell's role in this process will be?

— “No matter what happens, we're going to need a lot of new technology. Even with oil prices at more than \$100 a barrel, the production costs of most sustainable sources of energy are not yet competitive in the market. There's definitely room for improvement – alternatives need to become less expensive, which is why we need more research, development, and pilot projects. Shell is paying close attention to operational costs in the current economic climate, but our strategic policy on research and technology development remains unchanged, and we're continuing to invest in this area. Technology is the answer to the energy challenge and continues to drive our recruitment goals: just as in 2008, we're filling 300 European positions with recent graduates again this year. Two out of every three openings are technical positions, and the rest are commercial positions.” ●



DHV gets low-energy head office



DHV is going to renovate its 40-year-old head office. The renovation will give the building energy label A, meaning that it delivers the same energy performance as a new office. The present office still has energy label G. Renovating an old building thus has the twin benefits of enhancing user comfort and conserving energy. The entire sustainable renovation will be completed in January 2011. It will slash DHV's annual energy bill by € 100,000. Innovative solutions are being used for the renovation. New systems will make more efficient use of energy for cooling and heating. Residual heat and humidity will be

recaptured for reuse. The building will get a facelift through a completely transparent glazed facade that combines better daylight entry with solar-controlled sunshades. The distinctive DHV building was the first to feature a large landscaped office in an open configuration. The open-plan office will be fully retained. DHV is carrying out the renovation entirely on its own. ●

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Energy-efficient design in China



DHV designed the conceptual masterplan for Tangshan Industrial Vocational College's new campus.

In 2008, DHV won an international competition for its Caofeidian Coastal Eco City design. A number of follow-up projects are now being carried out in this model Chinese city, which is envisioned to ultimately house one million residents. One such project is the conceptual master plan for Tangshan Industrial Vocational College's new campus. Energy efficiency and sustainability are central elements of the design.

Situated on the Tangshan coast east of Beijing, coastal ecological city Caofeidian has a planned area covering some 200 square kilometers in the northern part of the densely populated Hebei province. In addition to a new port as big as Rotterdam, the city will also have an expansive industrial area. Tangshan Industrial Vocational College, a school for low and mid-level vocational training, decided to build a new main campus in Caofeidian's Science and Education Park. The new campus plans to span two square kilometers and sets the bold vision to eventually accommodate some 25,000 students.

DESIGNING FOR SUSTAINABILITY

"Energy efficiency and sustainability are top priorities in the campus design plan," according to Tiffany Tsui, Project Leader for Sustainability at DHV. "Integrated design is the key to sustainability and DHV is well equipped with all multidisciplinary expertise that are required for such a complex plan. Furthermore, due to our long establishment in China, we have a good comprehension of the local situa-

tion. In order to achieve sustainable energy management, we started with a solid urban development plan. Effective organization of people and traffic flows plays a crucial role in the design with the aim to reduce automobile traffic as much as possible." The integrated concept includes a central ring road around which all of the student housing buildings will be grouped, so the students will have excellent access to public transportation. The buildings will also be optimally oriented towards the sun in order to achieve maximum benefits of passive solar energy, thus keeping energy usage to a minimum. The central ring design will provide the residents with a healthy, pleasant working and living environment. The factory area where the students will perform their internship will have a separate network of roads. This clear spatial division will mitigate the traffic and noise burden on the campus. Another key design issue for the Campus is to connect to the green and water infrastructure of the Eco-city. Due to the area's scarce, unpredictable rainfall, the plan

PROJECT

Tangshan Industrial Vocational College

LOCATION

Caofeidian Coastal Eco City, China

DHV SERVICES

Conceptual master plan design

PARTNER

KOW Dutch Design Consultants Shanghai, principal architect: Tjerk Reijenga

DELIVERY

The plan was presented December 2008. Tendering for the follow up design will start in June 2009.

provides for the construction of a system of canals and Wadis for temporary water storage. Along with other green spaces, this network will give the area a park-like feel. Green buffer and small rivers provide security instead of a security fence. "From green buildings to eco-city development, energy and resource efficiency should be addressed at all stages: master planning, design, construction and operation", remarks Tiffany Tsui. ●

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DHVnews

Alqueva-dam / Train station expertise / Traffic management system
in Sofia / Innova Aviation joins DHV Group / MOT maintenance plan /
Water storage study / Kisumu airport Kenya

The new Olympic ice rink in Vancouver (right) is situated close to the Fraser River dike.

ANALYZING FLOOD RISKS AROUND VANCOUVER

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Upon request from the cities of Surrey, Richmond, New Westminster and Delta, DHV and Delcan are currently investigating flood risks in the suburbs of Vancouver in Canada. The suburbs are located in the delta of the Fraser River, one of the longest rivers in North America. A safety analysis of the current state of the water defense structures indicates that the areas behind the dikes are not sufficiently protected against high water from rivers and the sea. Maintenance backlogs and climate change were considered, and current and future developments were also taken into account in order to assess the desired level of flood protection. DHV expects to work on these projects throughout 2009. The projects are valued at a total of CAD 400,000. ●

DHV: CRADLE TO CRADLE

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DHV will join forces with the Environmental Protection and Encouragement Agency (EPEA), enabling EPEA to more quickly realize its 'Cradle to Cradle' mission. DHV's contribution is to incorporate this sustainable development vi-

sion into its projects and services. In March, an initial group of DHV consultants received intensive training at EPEA in Hamburg, Germany, where they learned how to tackle issues in areas including transportation and infrastructure, construction and industry, spatial planning and regional development, water management and aviation, all according to the Cradle-to-Cradle methodology. Michael Braungart, EPEA's scientific director: "DHV's expertise and

market position can significantly accelerate the establishment of a Cradle-to-Cradle society. DHV is taking a broad approach, with commitment from every discipline in the company." ●

GLOBAL REPORTING INITIATIVE

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Late last January, a kick-off meeting of the GRI Airports Sector Supplement group was held in Denver, Colorado (U.S.). Representatives from airports in Europe, Asia, North and Central America, and interest groups are establishing specific guidelines for socially responsible enterprise in the airport sector. NACO is providing support in terms of content and process. GRI, which stands for Global Reporting Initiative, wants to make it the norm for companies to provide standardized annual reports on their social, environmental and economic performance.



The cherry tree symbolizes the Cradle to Cradle philosophy. Each spring it makes thousands of blossoms. The fallen blossoms become food for other living things. The tree's abundance of blossoms is both safe and useful, contributing to the health of a thriving, interdependent system.



DHV S.A. provides services for the Alqueva Dam Power Reinforcement Project.

GRI has recognized that for certain industries such as airports, general guidelines need to be supplemented with specific guidelines known as Sector Supplements. The Airports Sector Supplement should be ready by the end of 2010. At that point, input from a large number of experts will be sought, after which a verification and approval process will take place. ●

ALQUEVA-DAM

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Energias de Portugal (EDP), the largest electricity company in Portugal, commissioned DHV S.A. to provide inspection and work safety coordination services for the Alqueva Dam Power Reinforcement Project. This project is part of EDP's hydroelectric capacity expansion plan, aiming at reinforcing the installed power in this hydroelectric installation from 240 MW to 480 MW. This project has an estimated duration of

45 months and includes general contract works and equipment supply. General contract works include the execution of all civil works regarding the power production plant, as well as the entire hydraulic circuit and related works. The Equipment Supply includes all plant's equipment, namely the generating set and auxiliary equipment, the transformer and all the electric installations. ●

TRAIN STATION EXPERTISE

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With the consultancy and project management firm NPC having recently joined the DHV Group, DHV has significantly strengthened its position in the international railway (stations) market. NPC was previously part of NS (Dutch Railways), and is one of the major consultants for the development and design of railway stations and their sur-

roundings. NPC is also active in the healthcare market. As part of DHV, NPC will be able to offer a broader range of services to its clients. In addition, NPC will have the opportunity to export its train station expertise through DHV's international network of companies. Vic Prins, Managing Director of DHV's Environment and Transportation business group, commented: "NPC's knowledge complements DHV's expertise and strong position in the areas of train stations, airports, healthcare facilities, and spatial planning." NPC will keep its five branches which are

close to its principal clients, ProRail and NS, and will continue to operate in the market under its own name. Rudolf Mulder, DHV's Director of Transportation, will become the managing director. ●

INNOVA AVIATION JOINS DHV GROUP

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U.S.-based Innova Aviation Consulting has joined the DHV Group and Delcan Cor-



NPC is one of the major consultants for the development of railway stations and their surroundings.



DHV Asset Management will draw up a ten-year maintenance plan for the Maasvlakte Oil Terminal (MOT) in Rotterdam.



Together with Innova, DHV Aviation has 300 consultants throughout the world.

poration, strengthening the group's position in the North American market. NACO (Netherlands Airport Consultants) and the InterVISTAS Group, are now formally joined by Innova to provide integrated services to the aviation sector. Innova's aviation consultancy activities will be merged into the InterVISTAS Group, which joined the DHV Group and Delcan Corpora-

tion in October 2008. The combined skills of Innova, InterVISTAS, Delcan and NACO create an integrated mix of expertise that, to this point, has not been available in the aviation sector. Innova's entry into the DHV Group expands DHV's Aviation business unit to 300 highly-skilled and richly-experienced aviation consultants throughout the world. ●

MOT MAINTENANCE PLAN

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Maasvlakte Oil Terminal (MOT) has asked DHV's Asset Management unit to draw up a ten-year maintenance plan for a large number of assets including pumps, oil pipes, scaffolds, buildings, and fire prevention systems. The largest crude oil terminal in the world, MOT manages strategic oil reserves for some of the largest refineries in the Netherlands including Shell, BP and Exxon. Because of their essential role, it's critical that the assets be reliable and available for MOT as well as its clients. MOT's aim is to be a knowledge intermediary for the terminals of its clients. DHV has been asked to envision and flesh out the details of the knowledge management model, as well as to facilitate the implementation of the process. DHV will also test the MOT site against the PAS-55 asset management standard. ●

WATER STORAGE STUDY

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DHV will execute a planning study on water storage in the Volkerak Lake in the southwestern section of the Dutch Delta in the Netherlands. The aim is for the lake to capture water that wouldn't be able to flow to the North Sea in the event of a combined severe ocean storm and extremely high water levels in the Rhine and Meuse rivers. Should such an event occur, the lake's water level would rise about two meters. The Directorate-General for Public Works and Water Management asked DHV to inspect 100 kilometers of dikes along with 20 civil engineering works, including the Volkerak locks. Capturing water in the lake would prevent a potentially dangerous situation from developing around the cities of Rotterdam and Dordrecht. The study will take the possible future salination of the Volkerak



DHV and its Canadian partner Delcan will complete a feasibility study on an intelligent traffic management system the Bulgarian capital of Sofia.



DHV is inspecting 100 kilometers of dikes and 20 civil engineering works in the Volkerak Lake.

Lake into consideration and will also be part of the national 'Space for the River' program in the Netherlands, which is designed to protect the country against river floods. The contract value is approximately 1.2 million euros. ●

TRAFFIC MANAGEMENT SYSTEM IN SOFIA

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This May, DHV and its Canadian partner Delcan will com-

plete a feasibility study on an intelligent traffic management system to optimize traffic flows in the Bulgarian capital of Sofia. In consultation with city authorities, local partner Cetra Sofia, and Vialis Traffic, a number of recommendations will be made regarding the purchase of centralized software and the need to train local staff. As part of this study, DHV and Delcan recently implemented a very successful 'green wave' on a three-kilometer stretch of road with eleven intersections, allowing vehicles to drive through the stretch with virtually no interruptions. ●

KISUMU AIRPORT KENYA

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The Kenya Airport's Authority commissioned NACO to supervise construction of upgrading works for the Kisumu airport. The project consists of a 1 km extension and widening of the runway from 2,000 m to 3,000 m, construction of a new taxiway, apron and terminal building. When completed, the

airport will be capable of handling not only domestic flights as it does at present, but will also handle international flights. This will greatly enhance the economic potential of the area and open it up to commercial and tourist traffic from abroad. Kisumu is the capital of Nyanza Province in north-western Kenya, the birthplace of Barack Obama's father. This has recently caused much interest to visitors to Kenya. Construction commenced in September 2008 and is scheduled to be completed in April 2010. ●



NACO/SSI is supervising the construction of upgrading works for Kisumu Airport in Kenya.

Power station in the Oder



Last year, the prominent Polish design and consultancy firm Hydroprojekt delivered its latest showpiece with the completion of a hydroelectric power station near Dobrzen. Poland and many other countries are currently boasting many opportunities to harness hydropower.

Hydroprojekt, an engineering firm that joined the DHV Group last year, has over 55 years of experience in the areas of hydropower, hydraulic-engineering works, and water management. In addition, the firm has been delivering turnkey projects since 2001, including their most recent project: a new hydroelectric power station in the Oder river near Dobrzen.

“A design & build project like that remains a challenge,” says project manager Ryszard Lewandowski, vice-president and technical director of Hydroprojekt in Warsaw. “Even though the Dobrzen design & build project was the third in a row, it still presented us with some new surprises, including a flooded construction site. In spite of all that, we were able to complete the project successfully and on time.” The hydroelectric power station in Dobrzen (costing 4.77 million euros) went online in November of 2008.

HARMONIOUS DESIGN

Constructed in the southwest of Poland, 164 kilometers from the Oder source, the power station was integrated into an existing dam. In order to create the optimal design, a number of physical modeling tests

were conducted in Hydroprojekt’s own hydraulic laboratory. “We always take all relevant environmental issues into consideration from the very start of the design process,” says Lewandowski, “and we follow up by consulting with the local community, authorities, and interest groups. Our motto is designing in harmony with nature, and this approach has proved to be productive. Whether it’s building a hydroelectric power station, creating a recreation lake on degraded mining land, or implementing flood basins for high-tide protection, the project implementation proceeds harmoniously. In addition to the design of the Dobrzen power station, DHV/Hydroprojekt was responsible for half of the construction work, supervision of the entire construction project, training, application of the operating permit, and the test phase.

PLENTY OF OPPORTUNITIES

“Hydropower and solar energy are clean energy sources that place the least burden on the environment,” says Lewandowski. “And unlike sunlight, there’s no shortage of hydropower in Poland. The Dobrzen power station proves once again that the slow-flowing rivers in the expansive Polish low-

PROJECT

Turnkey project to construct a hydroelectric power station at the existing Dobrzen dam

COMMISSIONED BY

Elektrownie Szczytowo-Pompowe S.A

DHV/HYDROPROJEKT SERVICES

Design, construction supervision, training, trial runs, application

PARTNER

Contractor - BHE Dychow S.A

DELIVERY

November 2008

lands are wonderful sources of energy that we can harness.” This is currently taking place on a very small scale: hydropower now accounts for 7.5 percent of Polish energy production. “We’re only using twelve percent of our rivers’ hydroelectric potential to accomplish this. Both within our country and beyond, there are major opportunities in this area!” ●

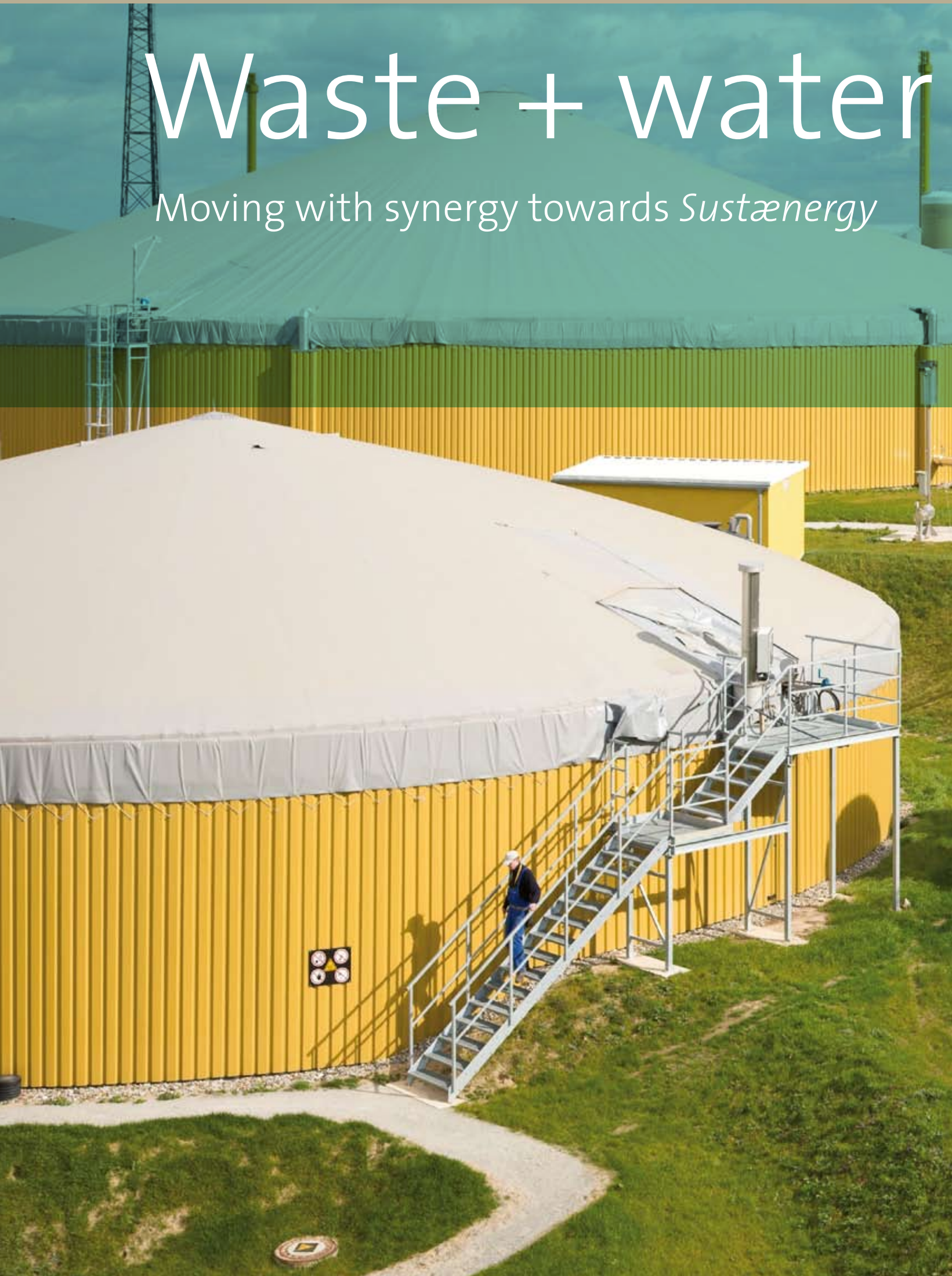
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Waste + water

Moving with synergy towards *Sustænergy*



+ energy

Biomass fermenting in large tanks.

What do wastewater treatment plants, slaughterhouses, sewage sludge, and bus companies all have to do with each other? Conventional thinking would conclude nothing at all, but DHV sees things in a different light. Using the revolutionary *Sustænergy* concept, these completely different entities are being combined to create a new, environmentally responsible and people-friendly way to generate energy.

ustænergy - green gas is a major step towards transitioning from fossil fuels to bio-fuels. Removing fine particles and nitrogen dioxide emissions will also benefit our climate, the air quality, and our health. Water treatment plants across the globe produce tons of sewage sludge every year, and most of it ends up being incinerated. The same

goes for the agricultural sector, slaughterhouses, restaurants, and the food industry, where waste often ends up in garbage dumps or is burned. "It's a shame, really," say Katrien Hemmes and Helle van der Roest, senior energy consultant and leading consultant at DHV, respectively. "If we could use that waste in a more clever and creative



Vehicals running on green natural gas emit 80% fewer fine particles and 95% less nitrogen dioxide compared to diesel.

way, we'd have a huge source of energy at our disposal. We don't see waste as useless, but rather as raw material for other processes, like generating energy. By doing so, waste becomes material that other companies can use. It all comes down to becoming more aware. We pair up companies and organizations that usually don't need anything from each other."

Under the brand name *Sustænergy*, DHV is developing sustainable energy services that highlight the synergy between water, energy, and waste streams. DHV is able to create synergy by thinking outside the box and is able to make unique connections between various parties, specific areas of expertise, and markets. Core expertise on water purification and specialized knowledge of biomass and energy give rise to exceptional and innovative projects, >>

“Green gas will benefit our climate, the air quality, and our health.”



Sustænergy

Energy with an eye on the future

such as projects involving green natural gas, biorefining, mineral cycles, or fuel cells.

“Our added value lies in the combination of subject-matter expertise, process knowledge, ability to connect parties, and a strong network,” says Helle. “Collaboration is key. It’s the only way to achieve a win-win situation for everyone involved. After all, at the end of the day it’s all about the money.”

GREEN NATURAL GAS

Green natural gas is created when organic waste streams such as leaves, grass, manure, sludge and food waste start fermenting. Refining this gas produces a “green” gas, which has the quality of natural gas and can be used not only as a transportation fuel, but also as a fuel for homes and industrial purposes. Some of the advantages of this green natural gas are that it is carbon-neutral and 100% sustainable. Vehicles running on green natural gas emit 80% fewer fine particles and 95% less nitrogen dioxide compared to diesel. This makes it ideal as a fuel for city buses. According to Katrien, we’re on the cusp of large-scale use of green natural gas. “And we really need this since the Dutch government has set a goal of having 20% of the country’s energy supply come from sus-

tainable sources by the year 2020. Green gas is a huge step forward in transitioning to clean energy sources.”

DHV has the vision, expertise, and experience required for this transition. “We’ve already carried out numerous projects for water regulatory authorities, local governments, industrial companies, energy companies, and the agricultural sector. We have the network and are very familiar with the interests of the various parties. DHV provides advice about green natural gas to one of the largest energy companies in the Netherlands. Since green natural gas can dramatically improve air quality, our projects are also very interesting in urban areas. Conventional buses emit large amounts of fine particles and nitrogen dioxide, which often leads to sub-standard air quality in downtown areas. As a result, new construction is often impossible here. Buses running on green natural gas can help improve the air quality, which enables cities to carry out construction projects in downtown areas. We consider our role to be that of broker, change agent, and negotiator. We don’t produce energy, but we ensure that the right conditions exist for everything to fall into place.”

The eye in the Sustænergy logo represents DHV’s vision for water, energy, and waste streams: we’ve got an eye for possibilities and opportunities. It’s a matter of awareness and creativity. Protecting our planet is also key. The fire symbolizes DHV’s passion for sustainability.

ENERGY FROM WATER PURIFICATION

DHV considers green natural gas to be part of an integrated concept for sustainable processing of organic waste products and waste water, which transforms waste streams and water into sustainable energy and high-quality green products. In addition to green natural gas, this concept also comprises elements like waste water purification, chain efficiency, mineral cycles, green raw materials, fermentation, biorefining, and hydrogen.

‘CRAMER CRITERIA’ PROOF

In addition to the advantages listed above, green natural gas has another important benefit to offer: it meets the requirements of the Dutch Minister of Housing, Spatial Planning and the Environment, Jacqueline Cramer. These “Cramer criteria” stipulate that switching from conventional fossil fuels to biofuels should not be at the expense of food production and the environment, for example by logging old-growth forests. Green natural gas is truly environmentally friendly, since it’s made from waste that will always be available: manure, roadside grass, industrial waste, and sludge. ●

“Waste isn’t useless. It’s new raw material for generating energy.”

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Energy Valley: frontrunner in energy innovation



Max van den Berg: "DHV is a valuable partner for us."

The northern region of the Netherlands is emerging as the European frontrunner in energy innovation. Several energy projects are going full steam ahead, in part thanks to the commitment and support of the Energy Valley Foundation. "We're leading the pack in the Netherlands," says Max van den Berg, the governor of the province of Groningen and enthusiastic Energy Valley chairman.

Some fifty years ago natural gas was produced for the first time in the Netherlands in the northern province of Groningen. This marked the launch of the area's large energy industry, which now employs some 20,000 people. The sector saw significant expansion in recent years under the auspices of the Energy Valley Foundation. Says Van den Berg: "We encourage and support both public and private parties in their efforts to launch initiatives that benefit the economy of the northern region in the Netherlands, boost employment, and combat climate change. The area is truly bustling with energy initiatives." Mr. Van den Berg points to the new power plants and the liquefied natural gas terminal in Eemshaven, as well as the goal of becoming a major logistic hub in north-western Europe – with pipelines to Berlin, Britain, and Russia – for the storage and transportation of natural gas from various supply directions. "And now we have an undersea electrical cable that connects us to Norway as well."

NORTHERN CO₂ PLAN

After producing gas, the natural gas fields in the north of the Netherlands also have

the capacity to store carbon dioxide (CO₂). Mr. Van den Berg submitted a proposal regarding this matter to the government in early February. The Dutch government responded enthusiastically. Says Van den Berg: "The northern region of the Netherlands is an ideal location for a pilot project, and we're making every effort to get funding from the European Union so that we can get it off the ground. It should be running by the year 2013." DHV is carrying out a study on the 'Northern CO₂ Plan' at the request of a joint venture between industry partners, knowledge institutions, and local authorities in the north of the Netherlands. According to Mr. Van den Berg, the report provides a "strong, down-to-earth, and realistic narrative." "DHV is a valuable partner for us, since the company is involved in a large number of energy projects here in the region and has so many disciplines and specialists in house. This enables DHV to handle complex projects. They're proactive, coming up with opportunities and projects on their own." Another Energy Valley project currently under way is the '100,000 homes' plan, which lays out the goals for existing homes and new construction in the north of the Nether-

ENERGY

"DHV has been focusing on energy issues since 2006," says Wilko Huyink, DHV's Northern Netherlands unit director. "We have focused our national and international expertise and activities around energy. The problems we face are becoming more and more complex, and energy projects typically require an integrated approach, with solutions impacting various sectors."

DHV's energy expertise includes sustainable energy, energy in the built environment, energy and industry, spatial planning and energy, emissions trading, sustainable transportation, and power plants.

lands. DHV is also closely involved in this project, including acting as the process lead in order to reach an agreement with the northern Dutch provinces and the national government to set a regional energy efficiency standard for new homes. The residential building plan is an elaboration of the Energy Agreement for the Northern Netherlands, which the Energy Valley Foundation, the northern Dutch provinces, and the national government signed in 2007. Van den Berg: "With this agreement, we're leading the way in the Netherlands." ●

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Essent Moerdijk will expand the production capacity of its power plant in Moerdijk to include a 400 Megawatt gas-fired unit. DHV is helping the Spanish engineering firm Técnicas Reunidas meet Dutch regulations and apply for building permits.

Electrical power plant expansion

Essent Moerdijk will be expanding the production capacity of its power plant in Moerdijk to include a 400 Megawatt gas-fired unit, more than doubling its current capacity. The 58% return on investment is quite high. A DHV team is helping Técnicas Reunidas (general contractor), the Spanish engineering firm hired to carry out the expansion, meet Dutch regulations and apply for building permits. The team specializes in checking and verifying all required documents. Using its broad expertise, DHV is also involved with other projects at the power plant, such as the water intake and outlet, the cooling water infrastructure, and the high-voltage switching field.

In addition to working on the Essent project, DHV is also creating an architectural master plan for energy producer Electrabel, as well as designing power plants in Wilhelmshaven in Germany and Rotterdam in the Netherlands. DHV is able to provide all the necessary expertise for power plants (including permits, architectural design, engineering, and fire safety). ●

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Saving energy in existing homes

The owners of these 40-year-old houses want to increase the energy efficiency by 30%. DHV helps them with an energy plan.

An exciting initiative was recently launched in one neighborhood of the Dutch town of Leusden. Some 500 home owners agreed to increase the energy efficiency of their nearly 40-year-old homes by no less than 30%. The energy plan, which DHV produced for them, is also useful for owners of other older homes, such as housing corporations. In addition to buying materials in bulk, such as double-pane windows and heaters, the project also enables the home owners to enjoy significant energy savings, as most Dutch homes were built in an era when energy consumption was not considered important. DHV created the energy savings plan based on a residents' survey, infrared imaging, and calculations of the homes' energy performance. The images unequivocally show the areas where the greatest amount of energy is leaking and where the most substantial gains can be achieved. Then, a list of energy-saving measures allows home owners to choose which measures will yield the greatest savings in their homes. A helpdesk gathers all data so home owners can receive volume discounts from vendors or apply for subsidies from local authorities.

DHV used its extensive knowledge of asset management, sustainable construction, and process management when creating the energy savings plan. The Dutch Ministry of Housing, Spatial Planning and the Environment has embraced the plan as one of the pilot projects in the national 'More With Less' energy savings plan. The plan will continue through 2009. ●

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Katrien Hemmes, DHV

“Sustainability isn't just some empty phrase to me”



CURRICULUM VITAE

Katrien Hemmes is a senior strategic energy consultant at DHV. She completed her studies in chemical technology at the University of Twente in 1992, specializing in process technology and business economics. Katrien joined DHV in 2006. Prior to that, she worked at the Energy Research Centre of the Netherlands (ECN) for 15 years as a bio-energy project leader. While there, she gained extensive experience in bio-energy systems (gasification, fermentation, gas refining) and alternative fuels. At DHV, she's currently involved in green natural gas, the future of energy-producing water purification facilities; algae, hydrogen, gas cleaning, and gas turbines, as well as fuel cells and (bio)refining processes.

“Producing profitable, sustainable energy demands more awareness and creativity. The Dutch government's goal is to have 20% sustainable energy by 2020, but we can't achieve this with solar and wind energy alone. That's why we also need widespread commitment to green natural gas. DHV is working relentlessly on numerous green gas projects as well as chain efficiency, green raw materials, and biorefining, which are also important to us.

Energy isn't an isolated entity, but rather something I view as part of a whole. In order to achieve a sustainable society, I believe a variety of factors are important. For instance, we need to make optimal use of solar power and waste streams. The sun creates 8,000 times more energy each day than all of us put together are using! We also produce an enormous amount of waste streams which contain useful components in the form of energy and (finite) minerals. That's why it's so important to create a mineral cycle so that we can reclaim certain substances.

We can optimally utilize waste streams and biomasses through biorefining: turning raw material with a low or even negative economic value into high-quality products such as transportation fuel, green raw material, chemicals, and sustainable energy. The whole purpose of green refining is to create value.

We also need to look into the synergy between water, waste, and energy. The shared attributes of these entities provide countless opportunities to make sustainability more economically viable. Mimicry is another interesting option, where we look to nature for examples of solutions. And lastly, an integrated approach is essential. Cooperation between individual parties and companies throughout the entire chain – from production to sales – must be front and center.

Sustainability isn't just some empty phrase for either me or DHV – it's one of the central tenets of how we do business. We have a social commitment to making a structural contribution to a clean and sustainable society. It's within this framework that we launched *Sustænergy*, an umbrella term covering all sustainable energy services which highlight the synergy between water, energy, and waste streams.

At DHV, we're well on the way towards making green natural gas commercially viable without being completely dependent on subsidies. What distinguishes us from the competition are our subject-matter expertise, process knowledge, ability to connect parties, and a strong network. Green natural gas is a good start, but for us it's just one of the components of an integrated concept to sustainable processing of organic waste products and sewage. And

that's just one of the steps towards increased awareness and a *sustainable* sustainable society.” ●

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