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SUSTAINABILITY ADVISORY SERVICE

A benchmark evaluation on current trends and best practice approaches in the pharmaceutical, material science and agribusiness industries

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KEY RESULTS

In summary, the benchmark evaluation on current trends and best practice approaches in Bayer's business revealed a number of insights:

- (a) While companies are generally making advances on managing the *risks* associated to their business from a changing natural environment, societies' expectations and government regulation, they are only beginning to develop business models around the *opportunities* arising from these changes. In Bayer's business it is the Material Science industry with chemical companies such as BASF and Dow Chemical, who have best captured the new business potentials. At the same time new challenges and requirements are on the horizon, which are demanding from companies to adapt further. The agroindustry is advised to keep such new developments in mind when hoping that draught resistant seeds and crops will by themselves bring about new business opportunities.
- (b) *Water scarcity and energy/climate change issues* are important to each of Bayer's three business lines and being taken seriously by all but one peer company. While Monsanto seems to be ignoring the signals, the most ambitious targets and related projects have been identified at GlaxoSmithKline, BASF, and, with a general decline in the agroindustry's ambition, at Syngenta. Most interestingly, these leading companies are looking at their entire value chains when managing their carbon and water footprints.
- (c) *Pharmaceutical foundations* are stronger than ever and operating very focused on their companies' business case. Both the Novartis and GSK foundations are enabling healthcare provision to the poor, thereby using social innovation business models; furthermore, they are funding think-tanks to investigate approaches for access to medicine, developing practical programs and pilot projects in the areas of international health and corporate responsibility and creating platforms and working environments that bring together leading scientists to help develop new medicines that treat diseases of the developing world.
- (d) The dangers of *endocrine disrupters* have been discussed openly for more than twenty years already, without eliminating them from the human body, the environment or the political agenda. Current trends show that the debate has gotten more precise, with more data available, and thereby pointing especially at (a) the vulnerability of unborn babies as well as (b) on rising infertility rates amongst men, something that up to 40% of the families in some European countries are suffering from. These discussions are affecting all three of Bayer's business lines.

(2) INTRODUCTION

As sustainability is now starting to become integral part of global companies' value proposition it is critical to have a good understanding of where leading competitors are heading and what opportunities have been identified. Therefore, the sustainability department at Bayer asked WEC to evaluate

- (a) Current sustainable development trends in the pharmaceutical industry
- (b) Competitors global targets and related projects on water issues
- (c) Competitors global targets and related projects on energy efficiency and GHG-emission reductions
- (d) Core topics at competitor's foundations and their integration into the companies' sustainability strategy
- (e) Current trends in the public discussion about endocrine disrupters

The analysis is part of WEC's Sustainability Advisory Service program for its member companies and therefore free of charge as long as limited to only 3 working days. Given the rather large number of topics and the complexity of Bayer's business with three business lines (pharmaceutical, material science, and agribusiness) the evaluation is simply capturing the major trends – thereby not getting very deep into any of these topics.

(3) METHODOLOGY

With respect to WEC's day-to-day work with multinational companies, NGO's and academia WEC is in a position to quickly identify the scientific sources and practical insights that can be used for an analysis. Based on this information WEC's European office prepared a concise evaluation on the main findings.

When evaluating trends and achievements of Bayer's competitors we concentrated on the major two peers for each business line. In the pharmaceutical industry we looked at Glaxo Smith Kline (GSK) and Novartis, in the material science industry at BASF and Dow Chemical, and in the agribusiness we focused on Monsanto and Syngenta. These selections were done in accordance with Bayer's sustainability department. For the research sources applied, please refer to section 8 at the end of this paper.

(4) CURRENT SUSTAINABLE DEVELOPMENT TRENDS IN THE PHARMACEUTICAL INDUSTRY

The issue of enabling a **better access to medicine** in developing countries and emerging markets is a critical issue. During the last few years, pharma business was able to gain ground in this area. In addition, **research on tropical diseases** has increased considerably. However, the patent challenge is going to pose a problem for those companies operating in the high end of the market. The latest debate on this issue is revolving around the revocation of patents on research intensive cancer drugs. On the other hand, most of the projected increase in pharmaceutical sales over the next decade in emerging and developing markets is expected to come from generics rather than patented products (PwC, 2012). Another issue related to developing markets is the increasing number of **clinical trials** that are conducted in countries lacking efficient regulation and control mechanisms (oekom research, 2012).

The **use of unethical or even illegal marketing tools** remains problematic within the industry. This is especially visible on the North American market, the most important market for pharmaceutical products. The competition for market shares leads to the use of illegal marketing methods such as the so called off-label marketing, intransparent potential side effects, price manipulations as well as bribery (Bank Sarasin, 2012).

Environmental issues

All pharma companies already operate under strict environmental controls, for obvious reasons. But these regulations are likely to become even tougher, given the international drive to curb carbon emissions. Tariffs on water consumption are also likely to rise, as population growth, increased farming, rapid urbanization and climate change exacerbate the shortage of fresh water. However, many of the assets pharma companies own are designed to support specific manufacturing processes – processes that typically consume considerable amounts of energy and water. If the industry aims to reducing its environmental footprint, it will have to adopt **new, more eco-friendly processes** and that will require a substantial investment in new equipment. Indeed, some companies may have to **relocate** some of their production facilities to completely different places. (PwC, 2011).

There is also a clear need for action to reduce the highly environmentally relevant effects of product transportation and the use of company vehicles and business travel. Since suppliers and contract manufacturers are such a feature of the industry, it is also important to support them to take responsibility for environmental protection. Most companies do have such procedures in place (source: Bank Sarasin, 2005). However, very few companies have announced **quantitative supply chain goals**. This represents an opportunity for companies to claim leadership as the pharmaceutical supply chain accounts for a significant share of the potential environmental impact of this industry. Up to date, approx. 90 % of the sustainability goals of the major pharmaceutical companies deal with their own internal operations. (GreenResearchhttp:// greenresearch.com).

Water is relevant to the pharmaceutical industry in two ways: Firstly, water is an important factor of production and secondly, it is critical to reduce the amount of drug residues in the water. With regards to the use of water in the production, companies have now started to deal with this issue in a systematic way, and several have introduced measures to save water at the production facilities. Many have also conducted first risk assessments, which may ultimately lead to relocations of production facilities (many of the traditional centers of pharmaceutical manufacturing, such as Singapore, lie in regions that will become more vulnerable to extreme weather events) (oekom Corporate Responsibility Review 2010; PwC, 2011). Please also see next section as well as APPENDIX 2 for achievements of Bayer's competitors. As for current trends in the public discussion on drug residues in the water please refer to section 7 of this paper.

Green pharmacy is an emerging topic - it is the design of pharmaceutical products and processes that eliminate or reduce the use and generation of hazardous substances. Following these principles, pharmaceuticals can be generated with reduced impact on the environment during production or after use. The introduction of such processes and pharmaceuticals is currently not a high priority for the pharmaceutical industry but future generations of pharmaceuticals will probably leave fewer residues in the environment. (EEA, 2010).

Personalized medicine is a relatively new paradigm in the practice of medicine. It will likely serve as the organizing framework around which a revolution in the usage of active pharmaceutical ingredients will occur. It may also lead to profound changes in the types and quantities of such ingredients introduced to the environment (Apoteket AB, 2009). 3D-printing of pharmaceuticals may play a role in this area, a technology which – although still at a fledgling stage – may enable modular drugs tweaked to individuals (The “chemputer” that can print out any drug, The Guardian, 2012) .

>For details on activities of two of Bayer's most interesting competitors please see APPENDIX 1 and 2.

(5) WATER: COMPETITORS GLOBAL TARGETS AND RELATED PROJECTS

The degree and nature of water-related risks for companies differ widely depending on how much water they use, how their water footprint is distributed across the value chain, the degree to which they contribute to pollution, and if they tend to be located in areas prone to water stress, among other things. Businesses' traditional water use estimates often fail to address water risks embedded in the supply chain. Water supply risks are often hidden in companies' raw material inputs or intermediate suppliers. Indeed, it can take more than 1,000 times as much water to produce some inputs than is used in all onsite activities (Ceres-Pacific Institute, 2009).

Bayer's business is divided into three major segments: (1) Healthcare (pharmaceutical industry), (2) Material Science (chemical industry), and (3) Crop Science (agroindustry). WEC evaluated water and related approaches at two of Bayer's peers in each segment to reveal best practices.

- In HealthCare, we focused on *GlaxoSmithKline's* and *Novartis's* strategies on water issues (please see Appendix 2 for details). Our research shows that both companies are taking water related risks seriously. Both companies clearly associate water risks with their operations/supply chains in water stressed regions while water discharges do not seem to be of an equivalent challenge. Interestingly, both companies are using the WBCSD Global Water Tool as a starting point to identify regional water risks and prepare on-site action. Noteworthy further steps are (a) Novartis' estimate of total volumes of water used at suppliers in the manufacturing of product and raw materials sold to Novartis and (b) GSK's collaboration with some suppliers on reducing specific water related risks associated with these suppliers. Overall, GSK's ambition to reduce water demand seems to be higher, given the fact that the company is targeting at reducing its entire value chain's absolute water consumption (including GSK's suppliers and customers) by 20% as of 2020 (vs. 2010) and in addition works with several NGO's to understand water related impacts and to improve its strategy.

- In Material Science, we focused on BASF and The Dow Chemical Company. Both companies are taking global water scarcity very serious and can already offer a wide range of products to meet current and future water needs on issues such as water production, water use, and water purification. At the same time reducing wastewater emissions is still a priority at both companies where BASF has set up a goal to reduce waste-water emissions from organic substances and nitrogen by 80 percent, and emissions of heavy metals by 60 percent (each by 2020 vs. 2002). Both companies have achieved results from collaborating with NGO's to either (a) assess water use impact across the value chain (BASF) or (b) understand water/ecosystem services and their impact to support decision-making when it comes to designing, constructing and operating manufacturing sites (Dow). Especially interesting is the fact that 40% of the water Dow uses is seawater/ brackish water and that Dow is further developing low cost process water solutions through "mild desalination". Noteworthy is BASF's goal to reduce drinking water withdrawal from supply sources for production by 50% (by 2020 vs. 2010), which, at least in part might lead to similar action. (please see Appendix 2 for more details).
- In Crop Science, our research concentrated on Monsanto's and Syngenta's approach to water challenges. While both companies state that their main solution to the topic is to help growers conserve water through product innovation and maintain or even increase production in water scarce regions, only Syngenta seems to be actively pursuing the reduction of its own water consumption. Interestingly, Syngenta, too, is using WBCSD's Global Water Tool. (please see Appendix 2 for more details).

(6) ENERGY EFFICIENCY AND GHG-EMISSION REDUCTIONS: COMPETITORS GLOBAL TARGETS AND RELATED PROJECTS

During the UN Climate Conference COP 17 in Durban governments officially declared to follow scientific advice that global temperature rise must be kept below 2°C. Even though governments are hesitant to increase regulation to reach that goal, a general acknowledgement to stay within these limits is also accepted by business and civil society. However, a PwC analysis of current emissions trends and pledges shows that absolute emissions reductions of around 4% per year from 2020 to 2050 will be required if the objective agreed at COP17 is to be achieved. Corporate targets do not nearly match this level of ambition (CDP, 2012). This means that both stricter regulation as well as more ambitious goals by companies can be expected in the future.

In the following section, WEC has evaluated energy efficiency and Greenhouse Gas Emissions (GHG) strategies at two of Bayer's most important competitors in each of the three business segments.

- In HealthCare, we focused on GlaxoSmithKline's and Novartis' strategies on energy and GHG-emissions issues. Both companies have set ambitious goals around scope 1 and scope 2 emissions, while GSK tops this comparison by targeting the entire value chain (scope1+2+3) with the aim of becoming carbon neutral by 2050. GSK's intermediate goals on this path are the reduction of its value chain carbon footprint by 10% as of 2015 (vs. 2010) and by 25% as of 2020. Furthermore, measures that GSK undertakes are clearly of a more mature nature. Instead of mainly concentrating on carbon offsetting projects, GSK focuses especially on reducing its product carbon footprint by working with its supply chain partners to identify opportunities for carbon savings in the design of products (GSK begun with the top 20 products as a starting point) and in the design of manufacturing processes. Advances with the product design of inhalers and with milking techniques in India for milk-based products have already substantially reduced GSK's scope 3 GHG emissions. (please see Appendix 2 for more details).
- In Material Science, we focused on BASF and The Dow Chemical Company. Their goals to reduce GHG-emissions seem moderate compared to other industries as both do not believe they can go beyond reductions in relative emissions (energy intensity per product). However, both companies point at the savings their customers are making when using their products designed for energy efficiency, thereby ultimately leading to a slower rise in GHG concentrations in the atmosphere than if products were used that are not state of the art. Dow is not publicly reporting on any specific energy related projects with real impact on its operations and supply chain. BASF is, however, investing in its own combined heat and power plants as well as in an integrated energy supply concept at all major sites, enabling the waste heat from one production plant to be used in the production at neighboring plants. (please see Appendix 2 for more details).
- In Crop Science, our research concentrated on Monsanto's and Syngenta's approach to energy efficiency and GHG emissions. While Monsanto in its 2012 response to the Carbon Disclosure

Project declared that the company does not have an emissions reduction/energy efficiency goal (which is backed by the fact that our research didn't identify any specific energy related projects), Syngenta is clearly more interesting to look at, without creating expectations. The company has set a goal until 2012 to reduce specific value chain emissions (scope 1+2+3) by 40 percent compared with 2006. Apart from regular awareness campaigns for employees to save energy, Syngenta's major energy-saving initiative is coolers that shut down when the outside temperature drops and sensors that automatically switch off lights in unoccupied offices. Also, Syngenta states that it has investigated significant opportunities for reductions through engaging with suppliers to identify low carbon options, as well as securing the benefits of supplier carbon management initiatives. These initiatives are under way. At the same time Syngenta engages with customers e.g. by advocating low tillage practices on the field, which keeps GHG inside the soil. (please see Appendix 2 for more details).

(7) CORE TOPICS AT PHARMACEUTICAL COMPANIES' FOUNDATIONS AND THEIR INTEGRATION INTO THE COMPANIES' SUSTAINABILITY STRATEGY

The Novartis Foundation for Sustainable Development operates in three overlapping areas (Annual Report 2012):

1. Healthcare projects

These projects focus on poor people in low-income settings by improving access to healthcare, strengthening human resources in healthcare (e.g. telemedicine projects) and empowering vulnerable groups such as children (e.g. psychosocial support of AIDS orphans) or leprosy patients. NFSD also facilitates the Novartis leprosy and tuberculosis drug donations, by targeting health system strengthening, provider compliance and patient adherence to the treatment.

2. Think-tank activities

Current areas of research include business and human rights, corporate responsibility for access to medicines, stakeholder dialogue and multi-sectoral partnership. In addition to scientific and analytical publications, concepts and presentations, the foundation develops practical programs and pilot projects in the areas of international health and corporate responsibility. During 2012, the foundation has been actively sparking debate over what should replace the UN Millennium Development Goals (MDGs) when the deadline for their achievement is reached in 2015. Think-tank activities also include scientific studies on the effectiveness of its own projects in cooperation with independent research institutions.

3. Dialogue and networking

For over a decade, the foundation has hosted an annual symposium covering topics such as health and development, business and human rights, and the right to health. The symposium is today considered a 'jour fixe' on the development policy agenda, with renowned international scholars, scientists, politicians and experts invited to debate a current social or development policy issue. Jeffrey Sachs, Mary Robinson, Desmond Tutu, Daniel Vasella and others have participated. In 2012, the symposium was dedicated to the topic of "A generation at risk: psychosocial support for Africa's children". In 2010, the Novartis Foundation started another event series, entitled the Geneva dialogues. The aim of the dialogues is to share and discuss new approaches to tackling global health challenges with a variety of stakeholders.

The total budget of the Foundation for 2013 amounts to CHF 10,610,000.

GlaxoSmithKline Foundation

- Contributions to charity in 2010 totaled £222 million, an increase of 36% compared to 2009. That figure was made up of £147 million of product donations, £53 million in cash, £18 million in management costs and £4 million of in-kind donations.
- In 2009, GSK made a commitment to re-invest 20% of profits from Least Developed Countries back into a variety of health infrastructure initiatives in those countries (approximately \$6 million in 2011). To that cause, the company has formed a partnership with three NGOs: AMREF in East and Southern Africa, CARE International UK in Asia Pacific, and Save the Children in West Africa. The objective of the partnerships is to improve health outcomes by supporting frontline health workers operating in these countries. GSK chose the charities for their expertise in accessing and supporting healthcare workers operating in challenging rural and marginalized communities. In addition, grants and resource donations are made from other areas in the business (source: <http://www.fundraising.co.uk/news/2011/05/26/glaxosmithkline-chooses-three-charities-support>). The company's ViiV Healthcare company (established and run in conjunction with Pfizer) has also committed to investments of £10 million (USD 15.8) in 117 projects across 21 countries, although this includes funding related to drug donations.

- In the United States, GlaxoSmithKline Corporate makes charitable grants through its US Contributions Committee. The principal areas of focus are health and human services (child health or access to healthcare, targeting the needs of underserved and diverse populations), science education and literacy, and the arts. Through its Matching Gifts Program, the Foundation also matches personal contributions of eligible U.S. employees to nonprofit organizations.
- In Germany, the GSK Foundation promotes biomedical research and its acceptance in Germany.
- In Canada, the GSK Foundation focuses on health and wellness and supports and works with registered Canadian charities, primarily in the areas of healthcare and health promotion, science education, hospice palliative care, and local community initiatives. For charitable organizations with a focus on a specific disease state, only those whose work is directly aligned to areas in which GSK has a medicine or product approved for market in Canada will be considered for funding.

Tres Cantos Open Lab Foundation

The foundation, overseen by a board of leading scientists, supports researchers in developing new medicines to treat diseases of the developing world. The foundation was set up with £ 5 million, with a further £ 5 million being added in 2012. Twenty-two visiting scientists from around the world have made use of the facilities at the open laboratory in Tres Cantos, Spain since its launch in 2010. There are 22 projects in the open lab portfolio, four complete, ten active and six approved to start in 2013. 19 of these projects are supported by the foundation. In September 2012, the Foundation launched a call for proposals for projects to explore potential treatments for malaria, TB, Chagas disease, leishmaniasis and sleeping sickness (source: GSK Corporate Responsibility Report 2012).

GSK Impact Award

The GSK IMPACT Awards have been running since 1997 and are designed to recognize and reward charities that are doing excellent work to improve people's health. The awards are funded by GlaxoSmithKline and managed in partnership with The King's Fund (source: <http://www.kingsfund.org.uk/projects/gsk-impact-awards>)

(8) CURRENT TRENDS IN THE PUBLIC DISCUSSION ABOUT ENDOCRINE DISRUPTERS

- When discussing a controversial topic and trying to understand the basic facts Wikipedia is many people's first source of information: In this case the online dictionary concentrates on informing on the complexity of the interrelationship between exposures to chemicals/pharmaceuticals and health effects. With 20 years of research completed the information provided today emphasizes especially the critical period of development for most organisms, which is between the transition from a fertilized egg, into a fully formed infant. As the cells begin to grow and differentiate, there are critical balances of hormones and protein changes that must occur. Therefore, a dose of disrupting chemicals may do substantial damage to a developing fetus (baby). The same dose may not significantly affect adult mothers.
- On the other hand, in the media, adult's exposure to plastic (especially food packaging but also car interior) and baby's exposure to pacifiers/dummies as well as plastic toys are continuously being highlighted, while pharmaceuticals in the environment and the use of chemicals in the agribusiness industry with its effects on health are also a continuously discussed issue. Each of Bayer's three business segments is therefore affected by this issue.

Online forums and the media are getting the insights to the next level of discussion: One especially sensitive topic has evolved around low fertility of humans in post-industrialized societies being backed up by a recent WHO report (2013), stating that up to 40% of young men in Germany and the Scandinavian countries have low semen quality, which reduces their ability to father children. Although research shows that more health problems such as increased cancer rates are being associated with endocrine disrupters in the environment, the infertility issue is being discussed so intensely as it is already affecting so many personal lives.

A short web-based screening of articles around this topic revealed that the dangers of endocrine disrupters to fertility are being discussed widely not only in scientific forums but also on media channels as diverse as the BBC News (2012), NBC News (2010), The Independent (2010), The Daily Mail (2013), The New York Times (2012), Die ZEIT (2013), Süddeutsche Zeitung (2010), etc., as well as on Social Media Platforms, online-blogs and in medical infertility centers around the world. It shows that the topic is highly relevant for Bayer.

(9) RESEARCH SOURCES USED

Overall, WEC consulted the following sources of information:

Scientific papers and other public documents:

- Apoteket AB/MistraPharma/Stockholm County Council (Ed.) (2009): A Healthy Future. Pharmaceuticals in a Sustainable Society, Stockholm
- Bank Sarasin (2012): Pharma: Marketingpraktiken bleiben nachhaltiges Risiko in: Sustainability Spotlight, Sustainability Research. Basel.
- Bank Sarasin (2005): Sarasin Sustainability Report 2005. Basel
- Carbon Disclosure Project (2012): CDP Global 500 Climate Change Report 2012. London
- Carbon Disclosure Project (2012): CDP Global Water Report 2012. London
- CERES/UBS/Bloomberg (2010): MURKY WATERS? Corporate Reporting on Water Risk. Boston
- CERES/Pacific Institute (2009): Water Scarcity & Climate Change: Growing Risks for Businesses and Investors. Boston and Oakland, CA
- European Environment Agency (Ed.) (EEA) (2010): Technical Report / No. 1/2010, Pharmaceuticals in the environment, Results of an EEA Workshop. Copenhagen
- Oekom research (2012): Oekom Corporate Responsibility Review 2012. Munich
- PriceWaterhouseCoopers (2011): Pharma 2020: Supplying the Future, Which path will you take? Munich
- PriceWaterhouseCoopers (2012): Pharma 2020: From Vision to Decision
- UNEP/WHO (Ed.) (2013): State of the Science of Endocrine Disrupting Chemicals – 2012. Geneva

Websites:

- [http:// greenresearch.com/2011/08/04/pharmaceutical-companies-missing-an-opportunity-to-show-sustainable-supply-chain-leadership/](http://greenresearch.com/2011/08/04/pharmaceutical-companies-missing-an-opportunity-to-show-sustainable-supply-chain-leadership/).
- <http://io9.com/5928050/3d-printing-technology-could-let-you-print-your-pharmaceuticals-at-home>
- www.accesstomedicineindex.org
- www.basf.com (including BASF Report 2012)
- www.bayer.com (including Bayer Sustainability report 2012)
- www.cdproject.net
- www.cdproject.net/water
- www.dow.com (including Dow Annual Sustainability Report 2011)
- www.gsk.com (including GSK Corporate Responsibility Report 2012)
- www.guardian.co.uk/science/2012/jul/21/chemputer-that-prints-out-drugs
- www.kingsfund.org.uk/projects/gsk-impact-awards
- www.monsanto.com (including Monsanto Corporate. Social Responsibility and Sustainability Report 2011)
- www.novartis.com (including Novartis Annual Report 2012)
- www.pharmatimes.com/article/11-03-29/GSK_pledges_to_cut_carbon_footprint_charity_donations_rise.aspx
- www.pwc.com/pharma2020
- www.syngenta.com (including Syngenta Annual Review 2012, with online section “environment”.)