

Sector update
1 April 2011

Average GHG's intensity/sales

ton per €m in	2007	2008	2009	Priority sales
Consumer	63.5	47.5	48.1	Middle
Retail	107.3	104.8	97.6	Middle
Oils	270.2	200.8	305.9	Top
Chemicals	712.6	739.6	805.6	Top
Telecom	32.7	30.7	31.6	Low
Financials	7.1	7.9	10.6	Low

Source: Bloomberg, ING estimates

Average energy intensity/sales

MWH per €m in sales	2007	2008	2009	Priority sales
Consumer	273	302	248	Middle
Retail	142	142	137	Middle
Oils	975	755	1,164	Top
Chemicals	1,869	1,363	1,453	Top
Telecom	92	111	112	Middle
Financials	17.3	16.5	20.1	Low

Source: Bloomberg, ING estimates

Average water intensity /sales

cubicmetre / €m sales	2007	2008	2009	Priority sales
Consumer	1,874	1,502	1,492	Top
Retail	198	198	187	Middle
Oils	832	624	915	Middle
Chemicals	34,981	35,114	34,425	Top
Telecom	57	55	49	Low
Financials	74	37	41	Low

Source: Bloomberg, ING estimates

Average waste intensity/sales

m3 per €m in sales	2007	2008	2009	Priority sales
Consumer	14.8	13.2	13	Top
Retail	20.1	23.7	22.6	Top
Oils	5.8	2.5	5.4	Middle
Chemicals	19.4	40	26.2	Top
Telecom	1.6	1.5	1.3	Low
Financials	0.2	0.3	0.4	Low

Source: Bloomberg, ING estimates

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Third Industrial Revolution

Quantifying the wake-up call

We believe that the era of cheap access to resources is coming to an end. The sustainable revolution is more than shrewd marketing though, and opportunities in energy, water, waste and GHG reduction could amount to 5% of global GDP by 2020, based on our estimates. Benelux corporates are taking a lead in sustainability, which could become a competitive advantage.

Business-as-usual will disappear, beyond the halo effect. Unlike today, when the availability of energy, water and soft commodities and the production of waste and GHG emissions is taken for granted, in a decade's time we believe that a potential cost explosion from the scarcity of resources could seriously harm business-as-usual for those that do not adjust. Adjusting one's business model now could create cost advantages, and innovations might create opportunities. We expect first-mover advantage and limited initial investment to capture this "low hanging fruit". However, no action could potentially lead to major disruptions. The era of cheap access to resources is coming to an end, in our view, and we believe the sustainable revolution is more than shrewd marketing to give companies a short-term halo effect. Investments are needed now to capture these huge opportunities.

Tough wake-up call: opportunities up to 5% of global GDP. In this report we have analysed the potential cost savings based on a 10% reduction in energy, water, GHG emissions and waste reduction. We estimate that closing the global energy gap by 2020 alone could save up to €1,568bn, closing the water gap could potentially save up to €167bn and furthermore limiting waste worldwide by 10% could create €140.8bn in potential savings, while reducing GHG emissions could save up to €475bn. We expect the transition to happen in shocks, but the overall opportunity could be up to 5% of global GDP. Furthermore, we have benchmarked the companies to best-in-class, and a similar opportunity is emerging reflecting the opportunity to be best-in-class in each sector.

Benelux in the lead. From the extensive reporting on sustainability items and the relative high scores, we derive that Benelux corporates are in the lead in capturing a share of this sustainability opportunity. We see a total €56.9bn in cost savings for the Benelux based on reductions in energy, water, waste and GHG by 2020. The biggest opportunity will come from energy reduction of €46.7bn, followed by GHG €5.9bn, water reduction €2.9bn and waste reduction €1.4bn (based on our assumption of a 10% reduction from 2009 levels). We could see savings of up to 6% of GDP by 2020. Benelux-listed companies could actually obtain a larger slice of the global pie if they extend their current leadership role.

Corporates presenting at 7 April Industrial Revolution seminar. The presenting corporates are leaders in their respective sectors. Based on a 10% reduction in energy, water consumption, GHG emissions and waste, we could see substantial value.

Relevance of opportunity differs per sector

(€m)	Based on Savings 10%	Value	Mkt cap (%)	Best-in-class based	Value	Mkt cap (%)
Unilever	107.1	951.3	1.4	163.2	1,958	3
Ahold	57.0	399.3	3.7	270.2	2,702	25
KPN	15.4	118.9	0.7	43.9	439	2
ING	7.1	53.0	0.1	7.1	71	0
Akzo	296.3	2,667.1	23.9	833.8	8,338	75
RD Shell	4,066.4	30,497.8	19.1	4,072.7	40,727	25

Source: Bloomberg, ING Estimates

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With thanks to Dieuwertje Groot

Introduction

Third industrial revolution describing the seven simultaneous crises

Last year's Third Industrial Revolutions seminar focused on the world's changing landscape and the accompanying challenges and opportunities for Food, Beverages and HPC companies. Due to an increasing world population and emerging economies, there is a growing middle class consumer group. Energy, water and consequently raw materials are scarce, which pressures sourcing. Industries need to find opportunities to deal with: (1) reduced availability of production inputs; (2) the large numbers of consumers that do not want to pay extra for these extra costs; and (3) increased awareness and a changing political landscape. A solution to this problem proposed during the previous seminar was multi-committed companies (MCCs), companies that are locally involved, reduce water use, reduce the energy used in products and transportation, create products with a lower energy footprint and spread exposure over the world. Growth is possible, there is enough land and when used more efficiently fuels and water is still usable. So, growth should be associated with sustainability. And only companies who see that can gain 'hard business benefits'.

Expanding coverage

In this report we focus on a broader range of industries: Consumer Staples (Food & Retail), Chemicals, Oils, Construction, Financials and Telecommunications. The aim is to verify how companies can increase shareholder value through the saving of opportunity costs derived from reduction in Greenhouse-Gases (GHGs), Waste, Water and Energy. Resources become scarcer and reduction in GHGs, Water, Waste and Energy is a necessity for the survival of the next generations and businesses.

The question we raise here is: What do these numbers mean for your industry? And how can we benefit? How much investment is needed to reap the opportunities seen?

To answer these questions we start this report with a top-down analysis from a macroeconomic perspective. We aim to use this information concretely to forecast opportunities for each industry later on. On the other hand, bottom-up or micro-analysis helps to gain an insight into the companies' progress and to compare peers. Incorporating both macroeconomic and microeconomic outlooks gives the shareholder optimal insight into potential investments.

In this analysis we dig deeper into the risks we see from a widening gap between supply and demand in energy, water, soft commodities GHG emissions and waste.

- 1) Energy dilemma: how growing wealth creates scarcity?
- 2) Water dilemma: sourcing still taken for granted, but could this change quickly?
- 3) GHG emissions: Risk versus opportunity, will regulation make it a visible cost?
- 4) Waste reduction opportunity: Different mindset?

After the general discussion described above we will delve deeper into some of the sectors, such as Food, Retail, Chemicals, Financials, Telecom and Oils, as they represent companies that will be presenting at the 7 April 'Third Industrial Revolution' event. We estimate what the individual cost opportunities are for the companies presenting and what value this represents to the current market cap based on 2020 assumptions.

Day programme: 7 April

09.00 - 09.10	Introduction
09.10 - 09.30	Third Industrial Revolution report – ING Research
09.30 - 10.15	Unilever – Mr Paul Polman
10.15 - 11.00	AkzoNobel – Andre Veneman
11.00 - 11.15	Coffee break
11.15 - 12.00	KPN – Mr Baptiest Coopmans
12.00 - 13.15	Lunch Break
13.15 - 14.00	Ahold – Mr Lodewijk Hijmans van den Bergh
14.00 - 14.45	ING – Mr Jan Hommen
14.45 - 15.00	Coffee Break
15.00 - 15.45	RD Shell – Mr Allard Castelein
15.45 - 16.30	Arcadis – Mr Renier Vree
16.30	Closing with drinks

Top-down analysis

Quantifying the “wake-up call”

The scope of the report is to analyse the opportunity for cost savings from a sector or company perspective and on the other hand to “quantify the wake-up call” for the global opportunity energy gap, water gap, waste reduction gap and GHG emission impact. Many of the resources that are being used, whether it is soft commodities, energy or water, are taken more or less for granted. However, in this report we highlight that in the coming decade a large gap could open up between supply and demand for energy, water and other soft commodities. Potential large cost implications based on capping CO₂ emissions or Waste are still largely unaddressed at the moment, or at least not seen as costs in normal business.

Consumers are unwilling to bear the cost via price increases, hence cost reduction is needed

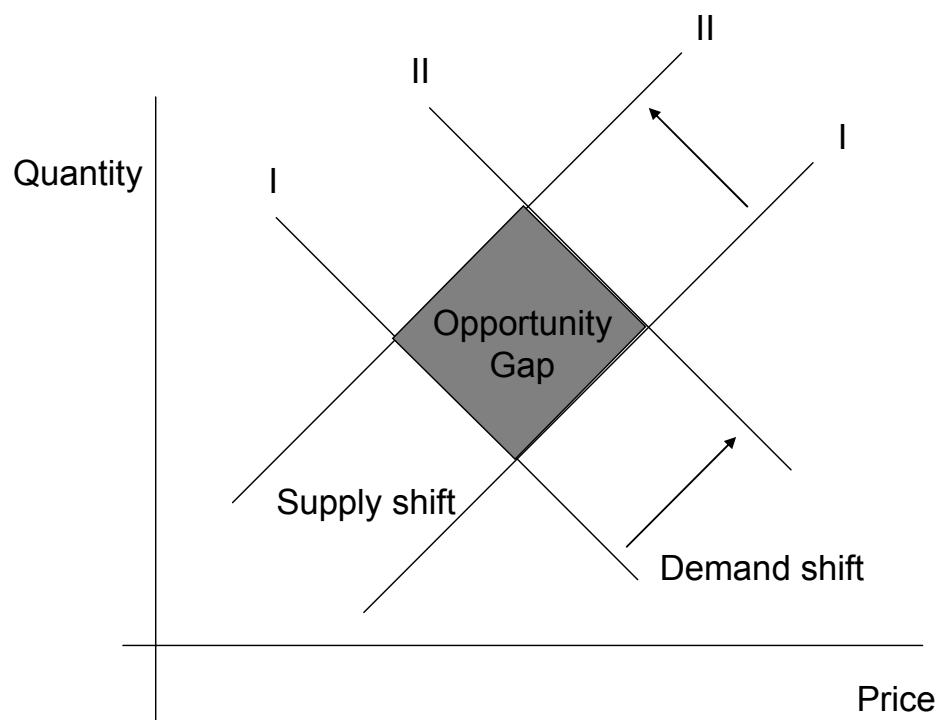
Demographic trends show that within 40 years there will be 50% more people on the planet, while the expansion of emerging economies results in a growing middle class of consumers. At the same time, the potential for growth is limited due to scarcity of water and energy, which causes food, energy and raw material prices to rise, with the risk of legislation on curbing CO₂ emissions and waste becoming a reality. In an open economy demand will respond, and scarcity of supply will cause prices to rise.

Since customers and companies are not able or not willing to pay for these increased prices, there is a need for cost reduction. Moreover, increased regulatory pressure for Green-House-Gases and waste reduction and an overall sustainable strategy also forces companies to change their policies on water, energy, waste and GHG emissions.

In this report we analyse the opportunity driven by a shift in supply from (I) to (II) due to better use of resources (recycling/reduction of waste) and hence the ability to accommodate the expected demand shift (due to wealth and population growth) from (I) to (II) without prices going up dramatically. This opens up a value opportunity for those that are able to innovate

In this analysis we use existing data to estimate what the opportunities are for energy reduction, water reduction, waste reduction and GHG emission reduction. First we look on a global scale, then on a Benelux scale and lastly, try to estimate the impact on a corporate level for the companies that are presenting at the seminar.

Fig 1 Gap analysis



Source: ING estimates

Efficient and sustainable production evidently reduces costs and helps supply to keep up with demand and vice versa. In a perfect economy price returns to equilibrium. If sustainability is aligned with companies' strategy and structure, the individual company will gain higher yields and competitive advantages.

Attention spreading to areas beyond GHG and energy to water and waste

The implications of climate change have gained considerable recognition among businesses and investors alike. So far much of the focus has been on energy and greenhouse gas emissions, while ignoring changes to precipitation patterns and water sources or Waste. In this analysis, which is a follow-up of the Third Industrial Revolution report we published in March 2010, we quantify the potential opportunities ahead. We believe if nothing is done these opportunities might quickly turn into business risks.

Reducing carbon, water, energy and waste

In the past decade there has been increasing awareness regarding reduction of GHGs and scarcity of natural resources such as water and energy. Experts estimate that reductions in GHGs are necessary and that there is a risk of shortages in water and energy if the world continues to evolve at the same pace.

Supply constraints on energy, water and other soft commodities have a dampening effect on supply and the current levels of waste pose a serious threat to prices going forward.

On the other hand, we see demand continuing to grow as population growth continues and wealth worldwide increases, with a subsequent rise in demand as a result. We now try to analyse part of this opportunity by focusing on four areas.

- 1) Opportunity for overall GHG reduction.
- 2) Opportunity for water use reduction.
- 3) Opportunity for energy use reduction.
- 4) Opportunity for waste reduction.

Mindset change needed to capture the huge opportunities from what initially are relatively limited investments

Below we highlight our findings from our study on potential savings in energy, water use, waste reduction and GHG emission reduction on a global, European and even Benelux level. We expect these initial cost savings opportunities to be realised with limited up front investments compared with the savings realised. However, we also recognise a mindset change needs to take place in order to capture the opportunities.

Interlink between GHG, energy, water and waste

The amount of energy responsible for Carbon emissions varies for every industry. For example, 60% of ING's CO₂ comes from energy, and CO₂ (Scope 1, 2) is c.50% of total GHGs (sometimes referred to as the total CO₂ footprint).

- Note: 1 MWh of energy equals 0.691 tonnes of CO₂ equivalents. CO₂ equivalents is an important part of total GHGs.
- For every industry, the contribution of carbon emissions to the total amount of GHGs varies. In general they account for c.50% of total GHGs.
- The CO₂ footprint differs by country. For instance Coal produces far more emissions compared to Nuclear (hence French companies compare relatively well, all other factors being equal), ie, the Scope 1 (direct energy use) can be sometimes misrepresented.
- A reduction of 4.153 MWh saves 2.9 tonnes of CO₂, which is similar to the recycling of 1 tonne of waste instead of sending it to landfill.

Opportunity could be 5% of global GDP in 2020

Although we are aware that there is interaction between the different factors highlighted, we believe there is scope for huge cost savings ahead. Sometimes if there is scarcity in one area this creates shortages in another and hence one plus one could become three. If we were to simply add the different areas of opportunities by 2020 and compare the opportunity with current global GDP, we could get up to 5% of global GDP.

Investments in clean energy take shape

From the G-20 clean energy factbook we learnt that the investment in clean energy in 2009 was US\$162bn and is expected to reach US\$200bn in 2010. Relative to its size the US is lagging behind investment in clean energy and China has already taken the lead in investment. China now already has 52.5 gigawatt of renewable energy capacity, catching up to the US with 53.4GW in 2009. If we take a look at capacity installed over the past five years, China with a 79% increase, Australia 40%, France 31% and India 31% take the lead, compared with the US with only 24% growth in the same period of time. Clean energy means coming from solar, wind, biofuels and other renewables.

For the US the 53.4GW represents c.4% of total power capacity, China has 4% of power capacity with clean energy installed. By comparison, Germany has 29% of power capacity installed coming from green energy (Spain has 30%), Brazil has c.10%, India 9% and France 8%.

Global stimulus plans target US\$184bn for clean energy led by the US with US\$67bn and China with US\$47bn. By the end of 2009 only 9% had reached the sector though. Two thirds of the stimulus funding is expected to be spent in 2010-11.

Investments in (new) water infrastructure take place

According to the World Bank c.0.6% of GDP on a global basis is needed for the development of clean water and sanitation. For developing countries it would average around 2% of GDP and far less for the developed world nations. This would include maintenance of water systems and sanitation systems, but would also take into account new infrastructure to be developed. By reversing water pollution the number could actually decline as a percentage of GDP.

For instance, in the US, investment in waste water reached 1.8% of GDP in 2005 and subsequently declined. Preventing water scarcity from happening could limit future costs. However, the consequences of not taking action could result in investment needs that are far higher.

**Clean energy investment
US\$200bn expected for 2010**

**Germany already has 29% of
power capacity coming from
clean energy.**

**Global stimulus funding
US\$184bn by 2009**

**0.6% of GDP needed for
water and sanitation on a
global basis, according to the
World Bank**

Fig 2 Global opportunity for cost savings to 2020

	World	Europe	Benelux
Energy consumption (MWH bn)	146.6	26.0	2.6
Energy efficiency opportunity (€bn)	2,638.8	467.4	46.7
GHG reduction in emissions (bn tonne)	20	2.8	0.234
GHG efficiency opportunity (€bn)	500	70	5.9
Water consumption m ³ m	4,600	736	110
Water efficiency opportunity (€bn)	122.8	19.7	2.9
Waste (m tonnes)	1,4082	2394	143
Waste efficiency opportunity (€bn)	140.8	23.9	1.4
Grand total (€bn)	3,402.4	581.0	56.9

Source: Company data, ING estimates

We now describe the different areas of opportunity one by one, before digging a bit deeper into the sectors we cover in this report and the Benelux corporates involved.

Energy reduction opportunity

Energy demand is expected to increase by 40% by 2030, and the estimated capital required to meet projected energy demand through to 2030 is c.US\$26 trillion or 1.8% of global GDP, according to the World Economic Forum. Of all the options, energy efficiency is able to provide the largest potential for reductions in demand of GHG emissions in the medium term. This potential can be measured in direct energy savings, indirect cost savings and reduction in emissions.

Energy reduction could capture 57% of savings by 2030

As part of the total drive to reduce GHG emissions, energy will have a major role to play. The IEA reckons that by 2030, 57% of those savings will be the result of energy efficiency measures.

Benchmarking could help save US\$80bn in annual savings alone

The World Energy Council (WEC) estimates that by developing benchmarking tools for governments and businesses around the globe, it will allow companies to see their level of efficiency compared with the industry average. According to the WEC, this benchmarking alone could help save 1GT of CO₂ and bring US\$80bn in savings annually.

Renewables alone are not enough

Energy efficiency >50% of GHG emission savings

The world is running out of energy resources such as crude oil, liquid fuels, natural gas and coal. Renewables (biomass, hydropower, wind, solar) are introduced as a sustainable alternative for fossil energy, but will be unable to close the gap entirely, hence a reduction in overall energy consumption is needed. Unfortunately opportunities for renewables cannot fill the energy gap and fossil fuels are still not infinite and too expensive.

Fig 3 Energy consumption as % of total operating costs

	Low user	heavy user
Cost from energy (%)	c.1.0-1.5	c.35-55

Source: WEF, ING estimates

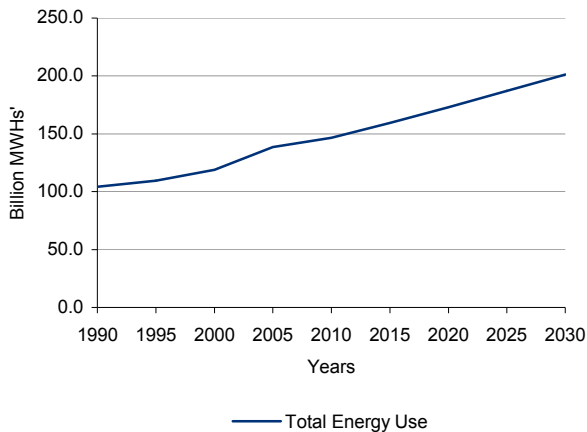
We believe that leading by example is the right strategy. We see potential in four main areas and believe that the industry in general has a leading role to play:

- 1) The potential for carbon legislation that will force action and/or existing targets and mandates.
- 2) Potential for energy efficiency measures to support cost reduction, particularly during times of austerity.
- 3) Competitive positioning that the implementation of energy efficiency measures supports.
- 4) Increased brand equity from being an industry leader in energy reduction.

How to get back into equilibrium?

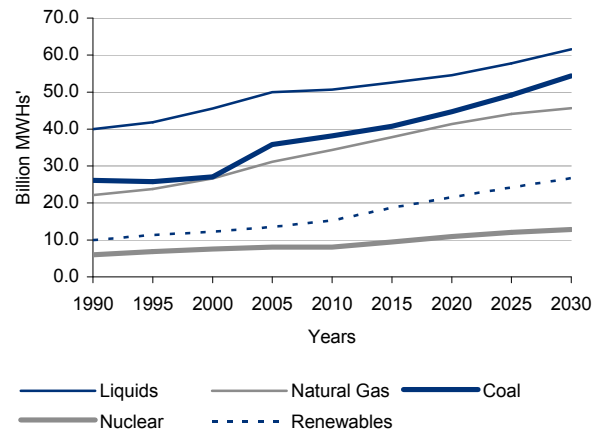
To get back in 'equilibrium' and reduce the gap, energy savings are necessary.

Fig 4 Total global energy use



Source: EIA

Fig 5 Total global energy use, split by source



Source: EIA

To get back in ‘equilibrium’ and reduce the gap, energy savings are necessary. As Figure 4 reveals, global energy is forecast to increase by 40% between now and 2030. Data shows that supply cannot keep up with demand and in the coming years the energy gap could become a reality.

Back to equilibrium: opportunity costs

To get back in ‘equilibrium’ and reduce the gap, energy savings are necessary. From Figure 5 we can see that the greatest demand is for liquids, coal and natural gas. Although renewable and nuclear are often seen as the solution for energy scarcity, the likelihood that they will actually decrease the ‘gap’ is low, especially as the recent earthquake in Japan and subsequent problems at Fukushima nuclear power station has put nuclear energy under the spotlight once again.

Fig 6 Total global energy gap

	Base point 2010	2015F	2020F
Demand MWH bn	146.6	159.3	173.1
Supply MWH bn	146.6	153.5	161.4
Gap supply/demand MWH bn	0.0	5.8	11.6
Gap value €bn (based on assumption of €90 per Mwh)		523.4	1,046.7

Source: EIA, ING Estimates

As Figures 4 and 5 reveal, global energy use has increased sharply. In 2010 demand equalled supply. In 2015 we expect an increase in demand of 12.7bn MWH’s, or 9%. Supply increases only by half, or the equivalent of 6.9bn MWH. In 2020 the trend is still similar, but when we look further into the future, demand and supply are increasingly diverging.

The energy gap alone will amount to over €1,500bn by 2020

Implementing an estimated EU energy price of €90 per MWH has a shocking effect. The energy gap is €523bn in 2015 and €1,046bn in 2020. Note: if we take into account rising inflation levels, increased energy prices due to scarcity and recent problems with oils and nuclear in North-Africa and Japan, opportunity prices are even higher. So action is necessary and pioneers can gain from associated opportunity costs.

Energy efficiency opportunity of a 10% reduction

In Figure 7 we explain how large the slice of the pie could be, based on a 10% reduction in energy consumption on a global basis, based on current demand. The numbers reported below include the “energy gap” listed in Figure 6.

We arrive at this opportunity cost reduction from the starting base at 2010. If we were to rebase this number in five years' time the opportunity gap would actually be higher than the number we calculate below (as the base would even be higher in 2015).

Fig 7 Global energy opportunity cost

	Base 2010	2015F	2020F
MWHs 10% reduction (bn MWH)	146.6	131.9	118.7
Value (€bn)		1,323	1,188

Source: EIA, ING estimates

Our assumption is that global energy reduction will be 10% in 2015 and 2020, with opportunity costs can amount to €1,323bn and €1,188bn.

Pioneers will be rewarded

Pioneers will be rewarded

Companies can pioneer in changing the world through innovative solutions and energy reduction. They can sell these improved products to governments, suppliers and other consumers. The combination of energy reduction, innovative solutions and creating awareness among consumers is necessary.

We expect that the initial "low hanging fruit" can be realised through relatively limited investment needs. Reports from the WEF (World Economic Forum) estimated that 'moving to a low-carbon energy infrastructure and restricting warming to below 2°C will require global investment in clean energy of roughly US\$500bn per year by 2020'.

PepsiCo saved US\$60m as a result from carbon-reduction policies (Source: CDP). Within the financial sector, ING Bank Mexico reduced energy use in the surroundings of Mexico City by 40% through the introduction of a luz verde – or the greenlight project. This shows that a relatively small gesture, such as changing light bulbs, can make a huge difference.

Consumer Staples are subject to raw material input from agriculture. Agriculture and the necessary desalination of fresh water is very energy intensive. In reality early adopters, such as Unilever, made some steps in the right direction on the input side. Nonetheless, a more significant impact could be achieved when reduction is forced on the end-products side. In other industries such as oils and chemicals, efforts to reduce energy is quite challenging and could potentially require the reinvention of their entire operations.

Energy intensity per sales opportunity: per sector

Energy intensity

The energy intensity is calculated as megawatt hours of energy consumed per million of sales revenue converted to euros. The data below is calculated on data items disclosed in company filings. Calculated as total energy consumption per sales in million (converted to €).

Fig 8 Average energy intensity/sales

MWH per €m sales	2007	2008	2009	Priority
Consumer	273	302	248	Middle
Retail	142	142	137	Middle
Oils	975	755	1,164	Top
Chemicals	1,869	1,363	1,453	Top
Telecom	92	111	112	Middle
Financials	17.3	16.5	20.1	Low

Source: Bloomberg, Company reports

Conclusion

- Global energy consumption growth continues, driven by industrialisation in the developing world – but efficiency improvements are likely to accelerate. World primary energy use is projected to grow by an annual average of 1.7% (or a total of 40%) in 2010-30, not much lower than during the previous two decades (1.9% pa or 45%).
- 93% of global growth is accounted for by non-OECD economies; their share of global consumption is likely to reach two-thirds by 2030, from about half today and 43% in 1990.
- Energy efficiency, broadly defined as the ratio of energy to GDP, is set to accelerate, facilitating faster income growth over the next 20 years. Efficiency improves faster in the non-OECD economies.
- Energy consumption growth is driven by power generation and industry in the developing world. Transport growth slows because of a decline in the OECD.

Investments in clean energy take shape

Clean energy investment of US\$200bn expected for 2010

From the G20 clean energy factbook we learned that the investment in clean energy in 2009 was US\$162bn and is expected to reach US\$200bn in 2010. Relative to its size the US is lagging behind investment in clean energy and China has already taken the lead in investments. China now has 52.5 gigawatt of renewable energy capacity, catching up to the US with 53.4GW in 2009. If we take a look at capacity installed over the past five years, China with a 79% increase, Australia 40%, France 31% and India 31% take the lead, compared with the US with only 24% growth in the same period. Clean energy means from solar, wind, biofuels and other renewables.

Germany already has 29% of power capacity coming from clean energy

For the US, the 53.4GW represents c.4% of total power capacity. China now has 4% of power capacity from clean energy. If we compare this with Germany, which has 29% of its installed power capacity from green energy, Spain with 30%, Brazil with c.10%, India with 9%, and France which has 8%.

Global stimulus funding of US\$184bn by 2009

Global stimulus plans target US\$184bn for clean energy, led by the US with US\$67bn and China with \$47bn. By the end of 2009 only 9% had reached the sector though. Two thirds of the stimulus funding is expected to be spent in 2010-11.

Water reduction opportunity

Cheap water coming to an end

The era of cheap and easy access to water for companies is coming to an end, in our view. This poses a greater threat. Most businesses rely very much on water to compete and stay financially sound. Entire supply chains can be heavily reliant on water as a raw material, which means the risks from water scarcity can be spread across the entire value chain.

Water scarcity to go beyond agriculture, energy to be impacted

Companies that face disruptions in their water supply may see their operations being undermined. Under a predicted 40% supply-demand gap there will not be enough water to grow the food needed to sustain population growth or to provide raw materials such as grain. The world could face annual losses of grain production equivalent to the entire grain crops of India and the US combined by 2025, according to Eiris.

Water is also key to energy production. In 2003, France was forced to shut down 58 nuclear power stations – responsible for supplying 75 per cent of the nation's electricity – because of severe water shortages. In the US many power plants are being denied planning permission because of a lack of available water supplies.

According to the World Economic Forum, 1.1bn people live without clean drinking water and 1.8m people die every year from inadequate sanitation. Companies that use water irresponsibly or pollute water sources will increasingly come under attack from public and civil society. Water scarcity will also increase water prices.

Water scarcity costs (direct and indirect) are hugely under estimated

Water scarcity will not only threaten businesses. It might threaten the world economy. Under a business-as-usual scenario there will not be enough water to grow the food or agricultural raw materials that will be required, and there will not be enough water to secure the energy supplies of some countries. In addition, as countries use more water than they have and damage the environment, the economic value of ecosystems will be lost.

As we get richer we get thirstier

There is a structural problem in how water is being managed across the globe. The increasing volatility in food prices in 2008, 2009 and again in 2010 should be treated as early warning signs of what is to come. Arguably it is water that lies behind these agricultural challenges. As we get richer, we get thirstier. Between 1990 and 2000 world population grew by a factor of four but freshwater withdrawals grew by a factor of nine and is c.40x that in 1900.

Water supply-demand gap to widen substantially

Global demand for fresh water should increase due to rising population and increasing per capita consumption and urbanisation. We forecast a bigger supply-demand gap in the coming 20 years, which means the water price could treble over this period. Around 75% of fresh water is used somewhere along the food chain (from agriculture to consumer) and companies will have to adapt.

In the US a 40% increase in energy demand will lead to a 165% increase in need for freshwater

China alone will see industrial water demand in 2030 rise to 265bn m³ (Industrial water demand will represent 22% in 2030, up from 16% today). Furthermore, energy is the largest industrial user of water and expanding energy production requires more access to freshwater. For instance, in the US the forecast increase in energy of 40% by 2030 would lead to an increase in the need for freshwater of 165%.

Current water management practices may not be robust enough to cope with the impacts of climate change on water supply reliability, flood risk, health, agriculture, energy and aquatic ecosystems. In many locations, water management cannot satisfactorily cope even with current climate variability, with the consequence of large flood and drought damage. Water resources management clearly impacts on many other policy areas, eg,

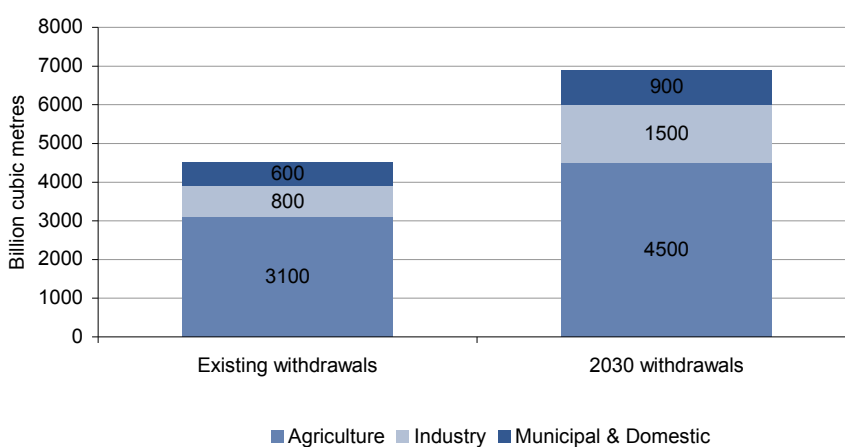
energy, health, food security and nature conservation. Thus, the appraisal of adaptation and mitigation options needs to be conducted across multiple water-dependent sectors (IPCC).

The problem: shortage of fresh water

Fresh water data: is there a problem?

Of global water supplies, 97.5% is salt and 2.5% is fresh. Agriculture uses 70% of global fresh water, industry 20% and households 10%. The problem is that the trend in fresh water availability per capita is down in most areas (Asia, parts of Africa and Central America). Fresh water supply is not evenly spread across the world. UNEP (Global International Waters) says that 1.8bn people could have acute water scarcity in 2025. On water stress, different scenarios indicate that by 2085, between 875m and 4.5bn people might have more water stress. This is mirrored by a range of 1.7-6bn people who will have less water stress. Of course, the pain from having no water weighs heavily.

Fig 9 Water gap analysis



Source: Mc Kinsey, ING estimates

The gap that is developing over the coming decade will cause serious issues for global industries.

Fig 10 Water gap increasing to 18% in 2020 and even 40% in 2030

Years from 2009		1	2	3	4	5	6	7	8	9	10	11
	2009	2010	2011F	2012F	2013F	2014F	2015F	2016F	2017F	2018F	2019F	2020F
Supply existing	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200	4,200
Supply incl efficiency	4,200	4,226	4,251	4,277	4,303	4,329	4,354	4,380	4,406	4,431	4,457	4,483
Gap	300	414	529	643	757	871	986	1,100	1,214	1,329	1,443	1,557
Gap with efficiency	300	363	426	489	551	614	677	740	803	866	929	991
Demand	4,500	4,614	4,729	4,843	4,957	5,071	5,186	5,300	5,414	5,529	5,643	5,757
Demand with efficiency gains	4,500	4,589	4,677	4,766	4,854	4,943	5,031	5,120	5,209	5,297	5,386	5,474
Gap (%)	6.7	7.9	9.1	10.3	11.4	12.4	13.5	14.5	15.4	16.3	17.2	18.1

Source: Mc Kinsey, ING estimates

Water scarcity can cause significant operational, regulatory and reputational risks to companies. Answers to the challenges of clean water scarcity for agriculture will therefore have to take account of the logistical (eg, shifting production), technological (eg, improving pre-treatment or irrigation technologies) and operational aspects, and aspects related to involvement and engagement (new cooperation within watersheds).

Further, regulatory risks can arise from current or expected laws, and relate to different areas such as pricing, withdrawal rights, or production standards. These can result in additional costs to the business. In addition, reputational risks are also part of the game.

Fig 11 Water need (m m³)

	Domestic	Agriculture	Industry	Total
Now	585,000	3,105,000	810,000	4,500,000
2015F	655,200	3,477,600	907,200	5,040,000
2020F	733,824	3,894,912	1,016,064	5,644,800
2030F	897,000	4,485,000	1,518,000	6,900,000

Source: McKinsey, ING estimates

If we single out Industry, we arrive at a huge opportunity in the coming ten-year period of a “normal” efficiency improvement of 10% over the coming five-year period, and after 2015 another 10% reduction in the industrial use of water up to 2020.

Water gap opportunity costs

We use a weighted average price to calculate the Water Gap opportunity. The price is build up using a weight of 82.5% times the current price of industrial water of €0.125 per m³ and a 17.5% needed reduction in the coming ten-years multiplied by the €0.93 replacement cost of water as shown in Figure 12 below. This leaves a Water Gap opportunity for the industry of between c.€106bn and €167bn based on the current assumptions.

Fig 12 Water need (m m³)

Yearly decrease necessary	10.0%	20.0%	Industry (shortage)	Industry (incl 10%)	Industry (20%)
within 5 years	17.5	27.5	68,040	158,760	249,480
within 10 years	27.5	37.5	177,811	249,480	381,024
within 20 years	50.0	60.0	607,200	759,000	910,800.0

Industry	Value (€bn)	Value (€bn)	Value (€bn)
within 5 years	18	42	66
within 10 years	47	66	101
within 20 years	161	202	242

Source: McKinsey, ING estimates

The opportunity costs could potentially run to €100bn in the coming ten years on a global basis, and this is just for the industry part of the equation which covers up to 20% of the global water usage. The biggest savings are of course possible in the agricultural field. If we were to extrapolate this opportunity to the agriculture side it would mean a further cost saving opportunity of €350bn.

Overall opportunity and risks

In Figure 13 we highlight what opportunities might be introduced in the coming decade.

Fig 13 Risks & Opportunities

Risks	Opportunities
Containment, falling water levels.	Drought-tolerant crops, increased demand for wastewater treatment chemicals, innovative water delivery solutions and water efficiency solutions.
Allocation, regulation, transport.	Climate change adaption systems flood defence and storm water systems.
Water scarcity; necessary ingredient/production.	Pioneer in water footprint methodologies.
Disrupted operations/reputational risk.	Preserve image, develop attention for water.
Price volatility, extreme weather.	Customer engagement, water efficient products, product differentiation.

Source: Carbon Disclosure Project

Water intensity per sales opportunity: per sector

Water intensity

Water intensity to sales is calculated as cubic metres of water consumed per million of sales revenue converted to euro. This ratio is calculated based on data items disclosed in company filings. Calculated as water consumption per sales.

Fig 14 Average water intensity/sales

(m ³ per €m in sales)	2007	2008	2009	Priority
Consumer	1,874	1,502	1,492	Top
Retail	198	198	187	Middle
Oils	832	624	915	Middle
Chemicals	34,981	35,114	34,425	Top
Telecom	57	55	49	Low
Financials	74	37	41	Low

Source: Bloomberg, company reports

Conclusion

Water shortage is becoming a particular risk in agriculture and energy production. After the recent Tsunami in Japan the world once again is confronted with the side effects of earthquakes, climate change and energy dependency. Could it mean that Nuclear energy is on the way back after the problems in Japan and that the demand for alternative energy is accelerating? Or are the high soft commodity prices leading to more attention being paid to a natural resource that is taken for granted at the moment? We could see a substantial shortage in the coming decades, which would make water scarcity a real business hurdle going forward. The expected increase in energy by 40% could lead to 165% growth in water demand. This would certainly push up the price of water sharply.

The opportunity we see ahead until 2020 is based on a weighted average cost price for water of only €0.27 in 2020, while the replacement cost of water is estimated already to be approaching €1 per cubic metre. If this were to become a reality the opportunity costs would triple to almost €500bn.

Investments in (new) water infrastructure take place

According to the World Bank c.0.6% of GDP on a global basis is needed for the development of clean water and sanitation. For developing countries it would average around 2% of GDP and far less for the developed world nations. This would include maintenance of water systems and sanitation systems, but would also take into account new infrastructure to be developed. By reversing water pollution the number could actually decline as a percentage of GDP.

For instance, in the US the GDP investment on waste water reached 1.8% of GDP in 2005, and preventing water scarcity from happening could limit future costs. However, the consequences of not taking action could result in investment needs that are far higher.

0.6% of GDP needed for water and sanitation on a global basis according to the World Bank

GHG reduction opportunity

Towards low carbon economy is irreversible

The shift to a low carbon economy is irreversible, in our view. The transition and development of sustainable low carbon technologies are reshaping core industry sectors and infrastructures across our society.

Many factors have emerged in the past decade that highlight the urgent need to develop low carbon and renewable technology, which enables energy efficiency or alternative energy production and use leading to a reduction in carbon emissions directly or indirectly.

The Carbon Disclosure Project (CDP) has a worldwide network for carbon reporting and emission reductions. They select carbon, water and climate change information from the 'largest companies globally, as measured by market capitalisation, as well as suppliers of major purchasing organisations'. We use their data as a starting point in our discussion. The data in Figure 15 comes from Bloomberg and highlights the split based on 2009 data.

Fig 15 Global carbon dioxide emissions based on 2009 data

	Total	Petroleum	Natural gas	Coal
North America	6,411	2,867	1,523	2,020
Latin America	1,273	850	329	94
Europe	4,310	2,059	1,060	1,192
East Asia	2,358	562	1,140	656
Middle East	1,714	947	733	34
Africa	1,122	454	272	395
Asia & Oceania	13,264	3,245	1,018	9,002
World	30,452	10,983	6,075	13,394

Source: Bloomberg 2009 data

From Figure 15 it is clear that the main improvement can be realised in the Asia & Oceania region and especially from reducing the dependency on coal for energy demand.

GHG emissions split by source

Will rising water and energy demand lead to higher GHG costs?

Industry needs to satisfy rapidly growing energy needs despite rising carbon constraints. Can companies' business models adapt to carbon at €25, €75 or even €100 per tonne?

A large percentage of R&D spending in the oil industry is focused on energy efficiency and carbon capture and storage. We expect the rise of a low carbon economy to create growth opportunities.

According to the intergovernmental Panel on Climate Change (IPCC), carbon capture and storage (CCS) could reduce energy-related carbon emissions by a third between now and 2050 (three main methods of carbon capture are mentioned, which are Post combustion, Pre-combustion' and Oxy-fuel combustion.)

Fig 16 Emission reduction opportunities in 2030 (Gt CO₂ equivalent)

	Opportunity
Power	10.0
Industry & waste	8.8
Transport	3.2
Buildings	3.5
Forestry & agriculture	12.5
Reduction opportunity	38.0

Source: McKinsey, IEA, ING estimates

According to McKinsey, the opportunity for GHG reductions range up to 38bn metric tonnes of CO₂ equivalent by 2030, or c.19bn tonnes by 2020. If we calculate the

opportunity of a reduction in GHG emissions based on the current carbon price of €25 per metric tonne, we arrive at an opportunity for the industry of up to €475bn.

Fig 17 GHG emission opportunity

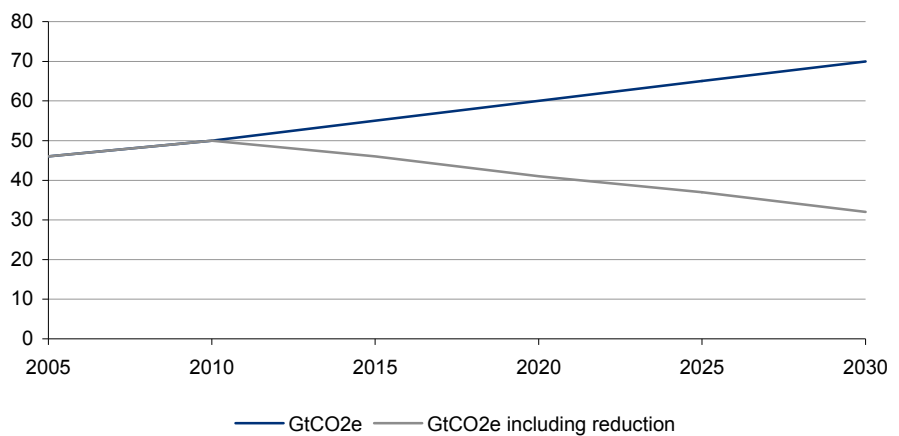
	2005	2010	2015F	2020F	2025F	2030F
GHG gap calculation (bn tonne)	0	0	9	19	28	38
Value (€bn)			225	475	700	950

Source: McKinsey, IEA, ING estimates

Would your business model still be profitable at €100 per tonne for CO₂?

What would happen if government regulation were to become stricter in the coming decade to limit CO₂ trading and/or emissions? For instance, the Total group is working with carbon prices in its business model that could amount to €100 per tonne. Would your business model still be profitable in such a scenario?

Fig 18 GHG emission GtCO₂ equivalent

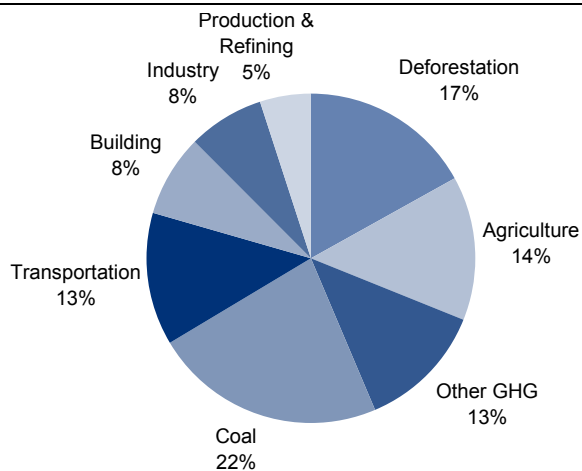


Source: McKinsey, IEA

GHG reduction not only from energy though...

Although the majority of GHG emission savings will potentially be made in energy, there are plenty of reduction opportunities in agriculture and deforestation as well (see Figure 19).

Fig 19 Global GHG emissions split by source



Source: IEA, IPCC 2007

The definition: Scope 1 and 2

Scope 1 emissions are emissions from the companies' own activities. Scope 2 emissions are created on behalf of the company in generation of electricity or the delivery of energy

via hot water or steam. The reason for accepting responsibility for these emissions is because the company has ultimate control over the decision to reduce or not to reduce.

The oil & gas industry accounts for around one third of emissions of GHG on a global scale. Of which 85% is attributable to product use and “only” 15% can be attributed to production and refining.

Fig 20 Oil & Gas worldwide accounts for 33.5% of GHG emissions globally

The oil & gas split	Split (%)
Product use	85
Production & refining	15

Source: Total, ING estimates

Global GHG emission a 10% reduction opportunity

From the companies we cover in the analysis, we derive that a 10% reduction of GHG emissions over a period of five years is targeted. If we were to try and put a value on the global opportunity using a simple reduction of 10% GHG emissions, we arrive at a value of c.€75bn for the industry up to 2015, and a further c.€80bn by 2020.

Fig 21 Global Carbon emission reduction opportunity

	2015F	2020F	Total
GHG based on 10% reduction (tonne)	27,406	24,666	5,786
Value (€bn)	76	82	158

Source: McKinsey, IEA, ING estimates

Overall opportunities and risks

To realise this potential, investments are needed in supply chain, manufacturing facilities, clean water installations and waste treatment just to name a few. We expect the opportunities for the sectors we cover in the report to be in the targeted areas without being exclusive.

Fig 22 Opportunities and risks

	Opportunities	Risks
Consumer Staples (Food/Retail)	Green products, sustainable packaging	Brand image, extreme weather effects on supply chain/raw material
Energy (Oils)	Local sourcing, low carbon, new products	Strict compliance
Financials	Responsible investing, new technologies	Higher exposure clients
Materials (Chemicals)	Increased demand, pioneering processes	Climate change/regulations/disruptions
Telecommunications	Reduce paper/travel/hardware use	Service availability, fuel costs
Industrials (construction)	Growing demand energy efficiency, early movers advantages	Market risks, extreme weather
All industries	Sustainable reputation, regulatory/compliance costs	Regulatory/Compliance costs

Source: ING estimates

If we take a look at the industries we cover in this report, then it becomes clear that the major opportunity is in the chemicals and oils industry.

GHG intensity per sales opportunity: per sector

Greenhouse gas (GHG) intensity calculated as metric tonnes of greenhouse gases per million of sales revenue converted to euro. The data below is calculated on data items disclosed in company filings. Calculated as GHG emissions per million of sales (converted to €).

Fig 23 Average GHG emission intensity/sales (*)

	2007	2008	2009	Priority
Consumer	63.5	47.5	48.1	Middle
Retail	107.3	104.8	97.6	Middle
Oils	270.2	204.3	311.6	Top
Chemicals	712.6	739.6	805.6	Top
Telecom	32.7	30.7	31.6	Low
Financials	7.1	7.9	10.6	Low

(See appendix for the companies per sector)

Source: Company data, ING estimates

Conclusion

The side effects of global economic growth are the production of GHG emissions. The current price of CO₂ for Dec20 contracts from the European CO₂ market at the EUA exchange is €25. We have based our calculations on this price for CO₂ emissions. In many reports this price is expected to rise sharply and prices of €100 are mentioned. We expect it is just a matter of time before stricter regulation by governments is enforced upon agriculture and industry. Hence, it is better to be prepared and start acting now. As calculated from the example above, the opportunity for the pioneers is large.

Waste reduction opportunity

The word Waste can be associated with uselessness. To underline that waste is not useless, world sustainability activists came up with terms such as Cradle to Cradle, Product Take Back and Design for Environment. In management accounting terms, raw materials produce main products, by-products and waste. By-products are usually deducted from costs and waste products are added. Hence, if we assume waste products are no longer waste but conveyed to a by-product such as energy or fuel, this will decrease costs and yield higher profits. Instead of transferring this waste opportunity to waste management companies, we think companies can benefit from initiating their own recycling projects.

Reducing waste from packaging opportunity just scratching the surface

Reducing packaging waste

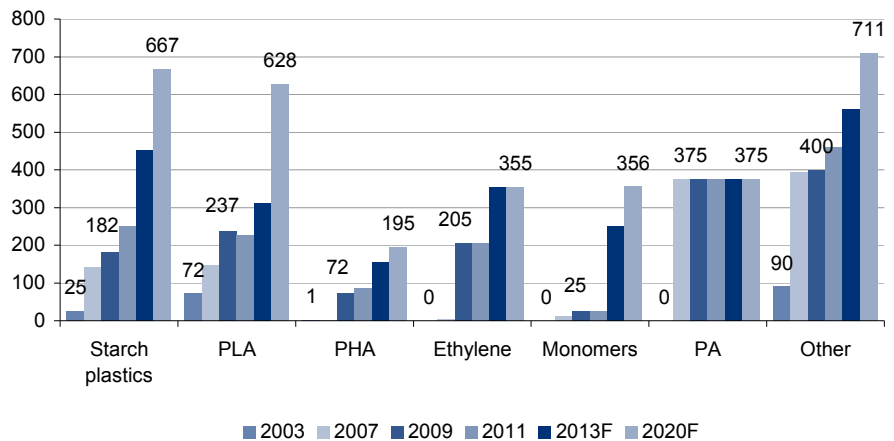
A good example of reducing waste is provided for by the GMA (Grocery Manufacturing association). On 17 March 2011 they announced they expected to eliminate 4bn pounds of packaging waste nationwide over the period 2005-20. Already 1.5bn pounds have been avoided over the period to 2010 and another 2.5bn pound is expected to be cut by 2020. The 4bn pound represents a 19% reduction in reporting companies' total average US packaging weight. This not only reduces waste in landfills but also allows for more units per truckload, reduces GHG emissions and conserves resources such as energy and water. The savings amount to the equivalent of 815.000 cars or 4.2m tonnes of CO₂ per year, which equals c.US\$106m for the food & beverage industry in the US alone.

Bio-based plastics will play an increasing role

Another innovative solution that is gaining ground is bioplastics. This market is developing as organic recycling is a cost-efficient new recycling option. Some of these bioplastics are even biodegradable. Using bioplastics helps to reduce CO₂ and in the long term there is significant potential for cost reductions through economies of scale. With oil prices being increasingly volatile and in a multi-year upward price trend, there are many incentives for chemicals companies to diversify from oil as a feedstock to using multiple feedstocks as an alternative for crude oil. Bio-based plastics may offer a viable alternative to petrochemical-based plastics by reducing the world's dependence on oil while reducing the related environmental impact.

Most bio-based plastics are currently produced by modifying natural polymers, while an increasing number of bio-based plastics are derived from monomers, produced by fermentation or conventional chemistry. Bio-based plastics are an interesting investment case for chemical companies.

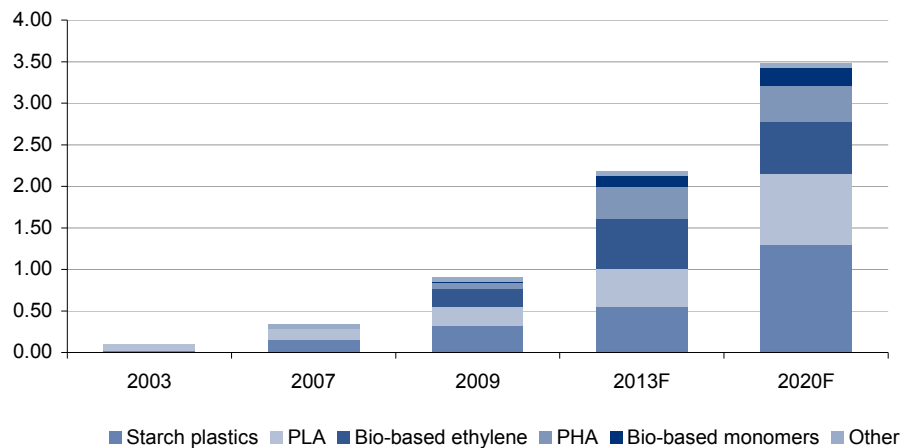
Fig 24 Bio-plastics capacity growth (tonnes)



Other included PTT, Propylene, PUR and various other plastics
 Source: ING estimates, Company data

Our analysis shows that starch plastics, PLA, PHA, polyethylene and monomers (mainly epichlorohydrin) seem to be in the sweet spot, where solid financial returns can be combined with a potentially large market. Meanwhile, we believe the future of bio-based polyamides, PTT and PUR, will be confined largely to niche market applications due to the limited size of their respective markets and their relatively high production cost versus traditional oil-based polymers. In Figure 25 we show a table with all production capacity currently announced for bio-based plastics in 2013 and 2020.

Fig 25 Bio-based plastics growth (m tonnes)



Source: Company data, ING

On average, bio-based plastics are able to extract a premium of 33% versus their oil-based competitors. Currently bio-plastics occupy a niche in which they can extract a significant premium versus oil-derived plastics due to their limited use in volumes. Our discussions with industry experts show that prices of oil-based and bio-based plastics will converge in the future, as consumers are unwilling to pay high premiums when bio-plastics are used in products destined for mass consumption. For bio-plastics to reach significant volumes, prices are likely to have to decline. This could be achieved by a combination of factors such as switching to cellulose-based bio-plastics, reaching economies of scale and by further R&D breakthroughs that increase efficiency.

Treatment of waste to energy is estimated to be a US\$100bn opportunity in developing markets alone

Waste to energy opportunity

One of the newest technologies highlights that there are many ways to treat sewage or municipal waste to make renewable energy. Converting waste into energy is done in many ways. This presents an opportunity to kill two birds with one stone; by building the infrastructure in the developing world that uses municipal solid waste to make renewable energy. This would cut the greatest source of the rise expected in greenhouse gas emissions from fossil fuel use in the next decades: from fast-developing nations such as India and China. Clean energy in December 2009 quantified the waste-to-energy reduction opportunity to be c.US\$100bn in developing markets alone.

Incineration makes it possible to recover energy from waste. At the same time the waste reduces. This energy can be re-used for heating, electricity and other industry needs. Other possibilities for non-hazardous waste are recycling, composting and land filling. (Source: Microphilox).

Overall opportunities and risks

The opportunity to create a valuable product from waste has only become a topic in the past couple of decades. With lack of resources becoming more topical, recycling is gaining in importance but also smart use of resources is creating innovative solutions in packaging, for instance by light weighting or by using bio-plastic materials. Furthermore, treating waste as a source of energy is relatively new but could play an increasing role in battling the energy gap that is emerging.

Fig 26 Industrial waste reduction

Method	Action	Application
Reduction	Create sustainable products, change products, change inputs, re-use	Extend products life-cycle
Recycle	Renovate, stabilize, neutralise, incinerate	Reuse metals/plastics
Treat	Dispose directly	Don't dump

Source: USACH Chile

Waste intensity per sales opportunity: per sector

Waste generated per sales calculated as metric tonnes of waste, both hazardous and non-hazardous per million of sales revenue converted to euro. The ratio is calculated based on data items disclosed in company filings. This is calculated as total waste per million of sales generated converted to euro. In our calculation we use a price for waste of €100, which is generally taken as the price for one metric tonne of hazardous waste.

Fig 27 Average waste intensity/sales

(tonnes)	2007	2008	2009	Priority
Consumer	14.8	13.2	13.0	Top
Retail	20.1	23.7	22.6	Top
Oils	5.8	2.5	5.4	Middle
Chemicals	19.4	40.0	26.2	Top
Telecom	1.6	1.5	1.3	Low
Financials	0.2	0.3	0.4	Low

Source: Bloomberg, company filings

Conclusions

Corporates are going back to the drawing boards for their products to see whether recycling is possible or whether a reduction in packaging can be achieved. Furthermore, waste to energy is accelerating with energy prices now reaching critical levels. In addition, with the R&D investment in bio-plastics the big problem of packaging waste from plastics might be soon behind us, as new packaging will be recyclable and/or biodegradable. Those that act quickly on energy reduction, packaging and waste

detainment could not only save costs but could also generate an early halo effect (without the “green washing” dilemma).

China for instance is set to spend c.2% of GDP for cleaning up pollution in the country. If in future recycling becomes a standard already a 2% investment can be realized on a sustainable basis.

Benelux opportunity estimated

Benelux corporates score relatively well on sustainability themes. However, in addition to a reputational benefit we see hard business benefits for those companies that take the lead in capturing the opportunities and those that are in the lead in avoiding extra costs.

Fig 28 Benelux corporates

Intensity to sales	GHG sales	Energy sales	Water sales	Waste sales
Unilever	Mid quartile	Best in Class	Mid Quartile	Top quartile
Ahold	Mid quartile	Mid quartile	Best in class	Best in class
KPN	Best in class	Mid quartile	Mid quartile	Best in class
ING	Best in class	Best in class	Best in class	Best in class
AkzoNobel	Best in class	Mid quartile	Best in class	Best in class
RD Shell	Best in class	Mid quartile	Best in class	Best in class

Source: ING estimates (see p53 addendum for listed international peers used)

In Figures 29 to 32 we estimate the opportunities for the Benelux in the four areas discussed previously on a global scale: Energy reduction, Water reduction, GHG emission reduction and waste reduction.

Up to 5% of current GDP in Benelux can be saved if action is taken now

The opportunity is estimated to be up to c.€57bn until 2020. This is up to 6% of current GDP in the Benelux (which is estimated at c.€1 trillion, based on Bloomberg data).

Benelux: energy reduction opportunity

The potential savings from reductions in energy are plentiful. We see the opportunities in the Benelux mainly coming from implementing energy efficiency programmes that will catalyse renewable energy, create a low-carbon infrastructure and encourage local sourcing.

Biggest opportunity

Fig 29 Benelux energy efficiency opportunity 2020

	World	Europe	Benelux
Energy consumption MWH bn	146.6	26.0	2.6
Energy efficiency opportunity (€bn)	2,638.8	467.4	46.7

Source: EIA, ING estimates

The Benelux could take up c.1.7% of the global opportunity by 2020.

Benelux: water reduction opportunity

Although in Europe water scarcity is not always at the top of people's minds, the opportunity to save still represents c.€2.9bn for the industry at large, by cutting c.10% in water use by 2020. Although water is currently abundant and the price of m³ water is most likely below the price of water in China, at €0.26 per cubic metre of water the opportunity is still sizeable.

Fig 30 Benelux water opportunity 2020

	World	Europe	Benelux
Water consumption m ³ m	4,600	736	110
Water efficiency opportunity (€bn)	122.8	19.7	2.9

Source: McKinsey, ING estimates

Although there is plenty of water available in the Benelux, the opportunity in agriculture and industry could reach c.2% of the total global opportunity.

Benelux: GHG emission reduction opportunity

Until 2020 we would expect a c.€2bn cost savings opportunity based on current GHG emissions for the Benelux, simply from a reduction of 10% over the coming five-year period and a 10% reduction over the following five-year period.

Fig 31 Benelux GHG opportunity 2020

	World	Europe	Benelux
GHG reduction in emissions (bn tonne)	20	2.8	0.234
GHG efficiency opportunity (€bn)	500	70	5.9

Source: McKinsey, IEA, ING estimates

In terms of GHG emissions, solar energy, wind energy etc, could help reduce c.1% of the global GHG emission opportunity based on a 10% reduction in current emission levels.

Benelux opportunity: waste reduction

The opportunity for waste reduction is huge. The waste management industry is relatively young and is still very much in its infancy, in our view. Although the overall potential savings seem small at c.€1.5bn by 2020, this only takes into account the proportion of hazardous and non-hazardous waste issued by industry players.

Fig 32 Benelux waste opportunity 2020

	World	Europe	Benelux
Waste (m tonnes)	14,082	2,394	143
Waste efficiency opportunity (€bn)	140.8	23.9	1.4

Source: Eurostat, ING estimates

The Benelux could save 1% of the total global opportunity. We agree that it is difficult to quantify and we understand that the opportunity goes beyond the “hard” direct reduction of waste, in our view. Recycling is part of the solution and reduces the indirect levels of waste and lowers the direct cost of input materials.

In the first and second industrial revolution the Benelux was a ‘latecomer’, held back by continuous wars. Decades later, the Benelux has proved to be a region of entrepreneurship and innovation, building strong business relationships worldwide. In the areas of water management, engineering and architecture, Dutch professionals are hired worldwide for advice on infrastructure projects. To continue this success companies should aim to be pioneers in sustainability. The changing world landscape of the Third Industrial Revolution offers new ‘pioneering opportunities’ for industries.

In our evaluation we have seen some industries struggle while others flourish. For example in Foods, Unilever showed strong progress in all areas. Nonetheless, an absolute reduction in water use is possible, since this industry still uses large amounts of water. For Retail there is progression in GHG and energy reduction, but waste and water needs further improvement. (Note, Ahold uses lower amounts than Delhaize).

Telecommunication participates in the energy debate, since they consume substantial amounts of energy for their data-centres and telephone services. On the other hand, ICT companies are pioneers in GHG reduction; they can innovate through more sustainable data-storage and can move their hardware suppliers to deliver sustainable hardware. For KPN an increase in energy efficiency and 100% use of renewables will bring significant GHG savings. Since every industry relies on ICT, savings can be achieved on a large scale. Financials, our business, has a role both as screener and intermediary. Carbon trading and investing in renewable energy are key opportunities. Chemicals and Oils can gain foremost from innovative solutions such as bio-plastics and alternative energy, an increased demand for environmentally friendly products also strengthens relations

between the separate industries. Chemicals and Oils should reduce the absolute amounts of water used. The greatest opportunity comes from energy reduction. The construction industry can take advantage of sustainable demand in buildings, infrastructure and water management, working together with governments.

Some industries can gain greater advantages from reductions than others. One thing looks certain – while opportunities to innovate have few limits, companies that ignore these opportunities will suffer reputational damage, allowing others to ‘steal’ market-share. Green is the new gold!

How to reduce? Some examples

How to reduce CO₂

If countries and companies are strongly involved in limiting reductions, this can limit costs to 1% a year. If this effort is not made it will cost a country 5% of GDP a year. When extreme risks are taken into account, costs can increase up to 20% a year (Source: KPMG). Poor countries are likely to suffer the most.

- Overall, energy – both gas and electricity – is the greatest source of GHGs.
- Easy solutions are reduced business travelling (Scope 3), green electricity, creating remuneration targets based upon sustainability, clear capital allocations, standards and certification programmes.
- Aside from CO₂, HFCs, CFCs and PFCs are 20,000 times worse for the ozone layer. These arise in retailing for cooling, in pharmaceuticals for inhalers and in semiconductors for cleaners.

Emissions trading

Increased awareness regarding sustainability issues changes the landscape for investors. Apart from the usual financial health a company should possess, sustainability measurements are gaining ground. Organisations worldwide – both profit and non-profit – participate in the development of sustainability measurements and this pushes the criteria for businesses. Sustainability reports are no longer part of the annual report, and we forecast that soon investors will look at sustainability measurements in a similar way as they look at EBIT. Trading in emissions is a source of income for countries and companies worth US\$30bn. Usually countries participate in emission trading through Clean DM and JI.

Renewable investments

Problems in the Middle-East and troubles in Japan have further piqued interest in investments in wind, solar, and geothermal energy. Disasters (eg, BP) have also caused investors to be more cautious.

- ING recently injected €2.5.bn for the first phase of Nordstream with the aim of securing gas supply for Western Europe.
- Government spending on sustainability provides an excellent opportunity for 'green businesses'. It created millions of new jobs and a new low-carbon future. The UK, for example, was the first country to develop a 'carbon price floor' to strengthen investments in renewables for the power sector, according to the FT.
- Industries that lost during the economic crisis, have improved due to the latest attention on renewables. Examples include industries in composting, electric cars, solar panels and windfarms.

Other opportunities

- Logistics: Warehouse consolidation; Truck fleet efficiency upgrades, alternative transport, supplier pooling, minimisation of "empty miles" (co-deliveries, backhauling, etc); shipment consolidation, minimisation of employee and customer travel – store locations, local sourcing, inventory management.
- Materials/Packaging; Packaging reduction; material replacement, returnable/reusable packaging. product carbon labeling, product life cycle assessment.

- Supplier engagement; supplier trainings, supplier standards or scorecards, mandatory GHG emissions reporting.
- Supplier collaborative programmes.

Food sector

In the consumer sector we take Unilever as the main example for comparison. We compare Unilever to its European peers on the key subjects such as GHG, energy use, water and waste.

Progress is evolving, for instance in water reduction. In this industry water is very important for success. This industry was the first to initiate footprint methods in this area. Through the innovation in technology and promotion of this new uses among stakeholders, great reduction in water use can be accomplished. Additionally raw materials like palm oil, soy and other agricultural products are dominantly used. Also food companies have a pioneering rule in promoting a healthy lifestyle. Making effort to reduce waste is a great step but in order to succeed strategy and structure should be comprehensive.

Findings

Unilever is often recognised for its' progressing sustainability strategy. Unilever realises that sustainability is very important for the future of its business. Since consumers within this industry can switch fairly easily to other products, managing a sustainable reputation is essential for the company's future. Figure 33 shows GHG, energy and water intensity per million sales equivalents (converted to euro). Although not entirely comparable from a business perspective, there are lessons to be learned from the data below.

Fig 33 Consumer GHG, energy and Water intensity per sales (based on 2009)

Foods	GHG intensity/sales	Energy intensity/sales	Water intensity/sales	Result	Improvement
Unilever	65.3	223.2	1,308.3	Best energy	GHG, water
Nestle	46.0	274.9	941.6	Best water	Energy/GHG
Danone	33.3	246.3	2,224.9	Best GHG	Energy/Water
Kraft	47.9	No data	No data		
CSM	131.1	337.2	9,463.2		All

Source: Bloomberg, ING estimates

Opportunities

- Increased interest in 'green' products, sustainable packaging and foods that are sourced locally. In the end this reduces the carbon footprint. Reduction in raw material prices and longer growing seasons. In the long term this will increase the yield from crops. Water consumption is very important in this sector, and when managed effectively it can result in significant cost savings.
- Good relationships with stakeholders can be achieved through: a supply chain monitoring system, meeting the standards regarding employees, and making effort with sustainable projects.

An important incentive for sustainability is whether or not remuneration policies are tied to efforts on savings in GHG, water, energy and waste. Moreover, this will create a positive image among stakeholders and shareholders

Risks

- A high reliance on water supply and raw material prices that can be threatened by natural disasters and other macroeconomic factors. More costs due to regulatory requirements regarding compliance. Crop yields could decrease due to rising temperatures. Moreover, higher CO₂ levels cause damage to seawater and fish-stocks.

- Reputation might be at stake, in case the company does not comply with the sustainability regulations. When a company does not meet the standards regarding a proper treatment of stakeholders involved, accidents, labour strikes or related scandals can drive up the cost due to reputational loss and lawsuits.
- When compensation is not tied to sustainability performance, there is not the incentive to make a difference. In the end the investment in sustainability could be a waste of money.
- What about DSD delivery in emerging markets?

Unilever tear sheet

Continued progress

In Figure 34 we highlight the progress Unilever has made in the past few years. We believe this progress has resulted in a serious contribution to the cost savings announced by the company. For instance, in 2010 savings amounted to €1.4bn.

Fig 34 Unilever progress across the board

Intensity per €m in sales	2007	2008	2009	Progress (%)
GHG (tonnes)	74.3	68.8	65.3	14
Energy (MWH)	248.2	230.3	223.2	11
Water (m ³)	1,515.4	1,396.7	1,308.3	16
Waste (tonnes)	23.2	22.9	21.3	9

Source: Company data, ING estimates

If Unilever were to close the gap to Danone on GHG it could reduce the GHG emissions by 50%.

Opportunity quantified

Potential for >€100m in savings by 2020

What would a reduction of 10% by 2020 mean for Unilever for the four areas of potential cost savings – GHG reduction, energy reduction, water reduction and waste control – based on current 2009 data? We apply the same unit cost prices as we used in the global discussion, ie, €25 for GHG emissions, €90 per MWh, €0.27 per cubic metre of water and €100 for hazardous waste. The column on the right of Figure 35 highlights the opportunity based on a reduction of 10% over five years (hence 2x) and based on inflated unit prices per area.

Fig 35 Unilever: value opportunity

	Intensity per sales	Sales (€m)	Unit price	2020 10% in 10 yrs	Unit price 2020 10% in (pressure) 5 yrs (2x)	
GHG (tonne)	65.3	44,262	25	7.2	75	43.3
Energy (MWH)	223.2	44,262	90	88.9	150	296.4
Water (m ³)	1,308.3	44,262	0.27	1.5	0.93	10.8
Waste (tonne)	21	44,262	100	9.4	200	37.8
Total (€m)				107.1		388.3
Value before investment			12	951.3	12	3,448.1

Source: ING estimates

For Unilever this would mean potential savings of €107m by 2020, which has a value of €0.95bn based on an existing PE multiple of 12x.

Fig 36 Unilever: best-in-class opportunity quantified

Intensity per €m in sales	GHG/sales	Energy/sales	Water/sales	Waste/sales	Additional savings
Unilever	65.3	223.2	1,308.3	21.3	
Nestle	69.4	274.9	941.6	2.4	
Danone	33.3	246.3	2,224.9	15.9	
Kraft	47.9				
CSM	131.1	337.2	9,463.2	17.6	
Best in class	33.3	223.2	941.6	2.4	
Opportunity in units	32.0	0.0	366.7	19.0	
Opportunity in value (€m)	35.4	0.0	43.8	84.0	163.2

Source: ING estimates

Unilever's water consumption is moderate in absolute and relative measures compared with its peers. The strategy launched in 2009 aspires to reduce the direct and indirect water footprint through water conservation techniques for agriculture, eco-efficiency targets for manufacturing facilities and a programme of product innovations aimed at

helping consumers reduce the amount of water they require to use our products. Unilever clearly realises that their water availability is vulnerable to climate change.

There is a focus on competitive advantages regarding (sustainable) key products. Successful innovations for Unilever include Surf Excel Quick Wash in India, which saves buckets of water per wash for Indian consumers. The brand has seen a 20% increase in sales during 2008 (CDP, Unilever).

Conclusion: Unilever's sustainability

In 2009 Unilever launched a new vision to 'aggressively' grow the size of business while reducing the overall impact across the value chain: *'this new vision recognises that the world is changing. Populations are growing. Rising incomes around the world continue to fuel growth in demand for consumer products. Products like ours rely on an increasingly constrained set of natural resources, whether it is fuel or other raw materials. At the same time, climate change is not just a problem for the planet; it represents a huge threat to economic and social stability. We know that if we are to achieve our growth objectives we must reduce the total environmental impacts of the business. Our commitment covers not just our factories and offices but also the environmental impacts associated with sourcing our raw materials, through to how consumers use and dispose of our products.'*

Unilever gives monetary rewards for the management of climate change, including the attainment of GHG targets. Remuneration components are linked with sustainability at the board level, in management groups and for managers that are responsible for sustainability (CDP, Unilever).

Retail sector

Retail opportunity partly dependent on progress in Food

Some of the reduction risks and opportunities are similar to those of the Food industry discussed previously, since this is an important supplier. In addition, the retail faces its own risks.

- Carbon footprint is based upon Lighting, heating, plant & equipment, water, packaging and waste management. Location insights are very important for reducing the footprint.
- Tactical responses: Energy can be reduced due use of different machines/computers, use of LEDs and green energy. Use of green energy can help to push recognition for renewables.
- Better results through a change in the fundamentals of retail through reshaping consumer behavior; greater visibility of green products, green home delivery, travel plans. Greater percentage of sales online – some retailers already generate 10% of sales online.
- Increased regulation, awareness and sentiment forces stakeholder awareness and the growing sentiment that large retailers must address environmental and sustainability issues across the entire supply chain mean that Ahold's brand and reputation may suffer if it does not adequately address relevant corporate responsibility issues affecting the food retail industry

Findings

For the retail environment we use Ahold as a proxy within retail. On a product-level Retailers can gain market share with the promotion of new sustainable products. Ahold increasingly promotes ecological products and basic 'products from the farm'. Moreover, they can decrease waste and packaging material through precise ordering. Retailers might experience problems in this area because they want to meet demand from customers at all times.

Fig 37 Retail peer ranking

Retail	GHG intensity/sales	Energy intensity/sales	Water intensity/sales	Result	Improvement
Koninklijke Ahold	96.0	162.0	142	Best Water	GHG & Energy
Delhaize	137.5	186.5	175.2	Worst Energy	GHG & Energy
Tesco	103.8	No data	No data		
Carrefour (2008 figures)	52.8	87.1	244.4	Best GHG & Energy	Water
Casino	5.5	145.7	751.9	Best in GHG	Water

Source: Bloomberg

Opportunities

For operations: optimising efficiency and energy usage:

- For supply chain and consumers: working together with all involved in supply chain and consumer behaviour to stimulate more sustainable production and consumption. Concerning operations, (food) retail does not have a high GHG footprint in comparison to other industries. Concerning the total chain from supplier to consumer, the GHG contribution is significant. Furthermore, it is important to understand that (food) retail is about constantly optimising the offered assortment by selecting the best supply sources and constantly meeting changing consumer demands. Changes either in the supply chain, in consumer behaviour, or in regulations, therefore do not have to be considered as a risk for the business as long as there is a proven track record that

shows that you are able to deal with these changes just as good or better than the competition.

- New or stricter environmental legislation on recycling might have a major influence on business.
- Improving shrinkage (retail definition of waste) by using better technology and cut costs (limiting the number of products that expired by date).

Risks

- Retailers face limited risk from climate change, except for potential increased costs related to GHG emissions, energy use and transport.
- When (food) retailers fail to suit their new products to the increased demand for sustainable products, they lose reputation and accordingly market share.

Ahold tear sheet

Ahold's corporate responsibility strategy focuses on issues that are closely related to its business when it comes to consumer's well being, the impact that the sourcing of products has on the environment in the communities Ahold serves and the people they employ. For 2015 Ahold has set clear targets on healthy living, sustainable trade, climate action, community engagement and diversity.

Fig 38 Ahold progress

Ahold in €m sales revenue	2007	2008	2009	Progress (%)
GHG intensity per sales (tonnes)	106.0	96.5	96.0	10.4
Water intensity per sales (m ³)	128.6	157.8	142.2	-9.6
Waste generated per sales (tonnes)	22.2	24.6	23.4	-5.0

Source: Bloomberg

If Ahold were able to close the gap to Carrefour on energy consumption alone, a 47% improvement per million sales could be realised.

Stores provide an excellent opportunity to reduce energy. A good example is the Ahold store in Torrington, Connecticut, that has its own fuel cell. This 400kW cell generates 90% of the store's annual electricity requirements. Stop & Shop opened a store using CO₂ as a refrigerant; this saves 160 tonnes of CO₂ a year.

Ahold stacks up well compared with peers on GHG emissions, as Figure 39 shows.

Fig 39 Emissions: peer analysis

(tonnes)	Total	Scope1	Scope2
Carrefour	4,811,568	2,319,453	2,492,120
Koninklijke Ahold	2,681,665	1,259,093	1,422,572
Delhaize	2,710,064	966,923	1,743,141
Tesco	5,094,719	1,956,628	3,138,090

Source: Carbon Disclosure Project

In 2004 Ahold launched a new business model, a virtuous circle in where they plan to lower costs, build stronger consumer brands, drive identical sales growth and allocate capital to new (sustainable) growth.

Ahold explains that total waste increased by 6% and efficiency per sale worsened by 5.1%, caused by an increase in stores and sales volume in this period. Globally most waste comes from cardboard and 'other' waste. Organic waste is dominant in the Netherlands. Plastics, metals and woods are relatively small sources of waste. In addition water consumption rose due to expansion.

Opportunity quantified

Now what would a reduction of 10% by 2020 mean for Ahold for the four areas of potential cost savings – GHG reduction, energy reduction, water reduction and waste control – based on current 2009 data. We apply the same unit cost prices as we used in the global discussion, ie, €25 for GHG emissions, €90 per MWh, €0.27 per cubic metre of water and €100 for hazardous waste. The column on the right highlights the opportunity based on a reduction of 10% over five years (hence 2x) and based on inflated unit prices per area.

Ahold value opportunity
c.€115m by 2020

Fig 40 Ahold: value opportunity

	Intensity per sales	Sales (€m)	Unit price	2020 10% in 10 years	Unit price (pressure) 5 years (2x)	2020 10% in 5 years (2x)
GHG (tonne)	96	29,530	25	7.1	75	42.5
Energy MWH	162	29,530	90	43.1	150	143.5
Water m ³	142	29,530	0.27	0.1	0.93	0.8
Waste (tonne)	23	29,530	100	6.8	200	27.2
Total (€m)				57.0		214.0
Value before investment			10	399.3		1,498.0

Source: ING estimates

If we consider Ahold moving to best in class in each area the opportunity would be €270m.

Fig 41 Ahold best-in-class opportunity quantified

(Intensity per €m in sales)	GHG/sales	Energy /sales	Water/sales	Waste /sales	Additional savings
Ahold	96	162	142	23	
Delhaize	138	187	175	22	
Tesco	103.7				
Carrefour	53	87	244		
Casino (*)	5	146	752		
Best in class	5	87	142	22	
Opportunity in units Ahold	91	74.9	0.0	1.5	
Opportunity in value (€m)	66.9	198.9	0.0	4.4	270.2

(*) Casino has a target of reducing GHG's by 75% by 2050

Source: Bloomberg, ING estimates

Delhaize tear sheet

Delhaize sees sustainable growth and operating as 'a best-in-class corporate citizen' as their way of doing business. From the Retail Peer ranking figure we can see that Delhaize still has plenty of opportunities to gain from a reduction in GHGs, water-use and energy-use.

Additionally, the location of a store can influence use of transport. When a store has a good connection with buses or is located in a dense area, this might reduce fuel use from driving. Moreover, when suppliers and stores are located nearby they can reduce transport. Delhaize initiated a Backhauling project – when drivers return from their delivery they reload their trucks at suppliers in the same area.

Delhaize initiated a Hannafords 'lead' store that also uses a green refrigeration system and various other sustainable projects. Energy decreased by 59% and water use by 38% (Delhaize). So on a store level the savings pay off, on a greater level millions of euro of savings are feasible.

Fig 42 Delhaize

Delhaize in €m sales revenue	2007	2008	2009	Progress (%)
GHG intensity per sales		143.9	137.5	4.6
Energy intensity per sales	188.79	197.96	186.53	1.2
Water intensity per sales (m ³)	191.5	191.3	175.2	9.3
Waste (tonnes)	18.0	22.7	21.9	-18.0

Source: Bloomberg

- Delhaize's GHGs are c.60% higher than those of Ahold. In 2007-08 it slowly made progress. Energy and water reduction improved by 1.2% and 9.3% respectively. However, waste increased.
- 66% of Sales from Delhaize are from the US east coast. 24% of Sales come from Belgium, 8% from Greece and 2% from emerging markets. This means that the footprint is partly influenced by the regulations and influences in these areas. For example, in the US consumers might prefer food that is pre-packaged or pre-cooked. On the other hand, Delhaize's roots are in Belgium and therefore Delhaize might have to comply with the EU's tougher regulations on health.
- Ahold has a comparable exposure: 58% of sales come from the US, 36% from the Benelux (Netherlands) and 6% from Eastern Europe.

Telecoms

Information and communication technology (ICT) lies at the core of both the challenges and solutions for corporate strategies to reduce operational GHG emissions. On the one hand, as demand for data centres, computer networks, mobile communications systems and other ICT technology grows, the GHG emissions associated with these technologies are rapidly increasing, expanding the carbon footprint of companies across all industries.

On the other hand, ICT offers some of the most significant and promising solutions to achieving GHG emission reductions. Information and communication technologies currently account for roughly two percent of all GHGs emitted globally each year, and, due to increasing need for computation data this figure could increase if no action is taken.

- Telecoms are similar to financials in their use of water and energy. Nonetheless, GHGs are considerably higher in this industry. Communication and information technologies account for 2% of the GHGs emitted globally and they are expected to become 3% by 2020 (Ceres).
- Telecoms (even more so than financials) have a pioneering role in sustainability. According to Ceres' research, telecoms as part of ICT are an important facilitator of sustainability and GHGs reductions, since every industry depends upon communication and associated hardware. There is an increased demand for data centres, computer networks, mobile communication systems and so forth.
- IDC verified that Telecoms 'do not produce mobile phones, but are certainly important in driving sustainability topics to the companies they deliver to.
- An increase in the technologies necessary in ICT/telecoms evidently results in increased GHGs in every company that Telecoms lend their services to.
- But on the other hand, ICT and telecoms are pioneers in reducing GHGs. In theory, when Carlos Slim changes his standards to environmentally friendly hardware, America Movil (the company he owns) will replace hardware in every company they represent, which in the long term reduces GHGs along the supply chain, with a multiplier effect.

At IBM, for example, for every US\$ spent on hardware they need a similar US\$ for cooling. Telecoms also need cooling for their datacentres.

Findings

Fig 43 Telecoms peer ranking

Telecommunications	GHG intensity /sales	Energy intensity/sales	Water intensity/sales	Result	Improvement
KPN (mix of mobile & fixed)	30.8	119.5	No data	Best GHG	Energy
Vodafone (Mobile)	38.1	83.4	271		
Belgacom (mix mobile & fixed)	No data	114.0	38.1	Best in water	Energy
Telefonica (mix mobile & fixed)	30.9	92.1	78.8	Best Energy	
France Telecom (mix mobile & fixed)	No data	122.0	75.5		Water , Energy
Deutsche Telecom (mix mobile & fixed)	32.5	122.5	61.2	Worst Environmental	GHG/Energy

Source: Bloomberg

Opportunities for Telecoms

- IDC initiated a green ranking for worldwide mobile operators. Telecoms were ranked based upon the sustainability of packaging, materials, energy, and 'end-of life' mobile programmes. The criteria focused on mobile operators' overall sustainable handset strategy, packaging, materials, energy, and end-of-life programmes for mobile

devices. The companies that best met these criteria are AT&T, Deutsche Telekom, Sprint, Telefonica and Vodafone (Bloomberg).

- In the energy industry they have invented a new system 'smart grid' that constantly updates energy supply and demand, in order to get an insight into consumption patterns.
- Use of recycled paper in offices, improved air-conditioning, reduced travelling and sustainable employees' vehicles.
- Telecoms and ICT in general should focus on innovative energy-reducing solutions, so that reductions can be achieved through the consumers' use of sustainable services. For instance, KPN delivers a green ICT service.
- Support suppliers to deliver sustainable products, this creates reductions for the supplier, the Telecom company and eventually the customer.
- There are particular opportunities to reduce carbon emissions for wireless services. For example, Vodafone expects to reduce its emissions by 113 megaton's a year for the EU by 2020 (Vodafone). Other opportunities for Telecoms include reducing energy from datacentres, sustainable modems, and recycling of old mobile phones.
- And of course the use of renewable energy throughout the entire company is important. KPN stated in its most recent report that in 2011 100% of the energy throughout the entire Group will come from renewables.

Risks for Telecoms

- The highest risk for Telecoms is service availability due to increased weather disruptions.
- Moreover, increased energy/fuel costs could mean that datacentre costs amongst others go up to stay competitive.

KPN tear sheet

KPN wants its CSR activities to be simple, result-oriented and exciting for employees, customers and partners. Many of their commercial business operations help bring social issues closer to a solution. This applies for instance to technology provided for teleworking, which can help reduce traffic congestion and GHG emissions.

KPN's three pillars for sustainability are based on:

- Connecting people.
- New world of work.
- Responsible energy use.

Fig 44 KPN progress

Intensity per €m in sales	2007	2008	2009	Progress (%)
GHG (tonnes intensity per sales)	43.3	38.4	30.82	40
Energy (MWH intensity per sales)	103.4	105.3	119.47	-14
Waste (tonnes)	0.25	0.29	0.26	-4

Source: Bloomberg

One of the focus areas for KPN is its GHG emission reduction, which as Figure 44 shows, has been successful. If KPN is to become best-in-class in energy consumption like Vodafone there is an additional 44% improvement to be realised per million sales. Part of the explanation for why increasing energy consumption is not resulting in higher GHG is due to the use of more green energy.

Opportunity quantified

What would a reduction of 10% by 2020 mean for KPN for the four areas of potential cost savings – GHG reduction, energy reduction, water reduction and waste control – based on current 2009 data. We apply the same unit cost prices as we use in the global discussion, ie, €25 for GHG emissions, €90 per MWh, €0.27 per cubic metre of water and €100 for hazardous waste. The column on the right highlights the opportunity based on a reduction of 10% over five years (hence 2x) and based on inflated unit prices per area.

Fig 45 KPN

	Intensity per sales	Sales	Unit price	2020 10% in 10 years	Unit price 2020 10% in (pressure) 5 years (2x)	
GHG (Ton)	31	13,324	25	1.0	75	6.2
Energy MWH	119	13,324	90	14.3	150	47.8
Water m ³	65	13,324	0.27	0.0	0.93	0.2
Waste (ton)	0.5	13,324	100	0.1	200	0.3
Total (€m)				15.4		54.3
Value before investment			10	118.9		418.3

Source: ING estimates

The opportunity to achieve best in class can be reached mainly in energy intensity to sales improvement. This alone could be an opportunity of €43m for KPN.

Potential for >€200m in savings by 2020

Fig 46 KPN best-in-class opportunity quantified

(Intensity to sales)	GHG/sales	Energy/sales	Water/sales	Waste/sales	Additional savings
KPN	30.8	119.5		0.5	
Vodafone	38.1	83.4	271	0.1	
Belgacom		114	38.1	1.7	
Telefonica	30.9	92.1	78.8	1.0	
Deutsche Telecom	32.5	122.5	61.2		
France Telecom		122	75.5	1.0	
Best in class	30.8	83.4	38.1	0.1	
Opportunity in units KPN	0.0	36.1	38.1	0.3	
Opportunity in value	0.0	43.3	0.14	0.5	43.9

Source: Bloomberg, ING estimates

Conclusions: KPN's sustainability

KPN has clear targets related to environmental sustainability. Together with 'Greenlab' the company promotes the use of renewable energy throughout the company and value chain. Although clear efforts are being made to reduce GHGs, energy, and water, remuneration is not tied to sustainability.

In our view, compared with peers KPN still has ample opportunity to save energy. Its energy intensity to sales is still c.30% above its peers Vodafone and Telefonica.

Financials

ING is the first major Dutch financial institution to be 100% carbon neutral. This means that by lowering energy consumption, using green energy, investing in renewable energy projects and offsetting carbon consumption, ING has reduced its net CO₂ emissions to zero.

- Financials are aware of the vulnerability regarding the changing environment. Scarcity of energy, water and increased emissions continue to influence companies and their competitiveness. Financials can gain opportunity costs by reducing their carbon footprint. This can be achieved in large part through reduced energy (redesigning buildings, IT infrastructure). Also reduced business travelling, water use and paper use is relevant.
- In addition, financials play a key role, since they are the ones that connect businesses and companies. Accordingly, financial companies increasingly write reports and initiate projects on this topic.
- Investment groups set up sustainable investment funds and investment demand for renewables is increasing. Moreover, new businesses are created out of sustainability benchmarking. An example is Trucost, which aims to calculate portfolio emission exposure for investment funds. Indexes are created for sustainability benchmarking. Trucost states: "At a carbon cost of US\$60, as much as 10% of the total cash flow of listed companies could be transferred from companies with below-average carbon efficiency to those with above average efficiency."
- Recent problems in some of the key OPEC countries have increased demand for renewables. ING is currently involved in financing renewables to ensure that energy supply is secured for Western-Europe.

Renewables financing

Findings

Fig 47 Financials peer ranking (€)

Financials	GHG intensity/sales	Energy Intensity/sales	Water Intensity/sales	Result	Improvement
ING	1.25	6.20	No data	Zero CO ₂ emission	Best in Energy
RBS	16.09	31.99	64.43	NA	All
Barclays	28.28	38.82	21.07	Best in water	GHG, Energy
Deutsche Bank	6.94	10.79	16.65	Best Water	GHG, Energy
HSBC	6.82	14.28	35.26	NA	All
UBS	3.35	14.26	38.01	Best GHG	Energy/Water

Source: Bloomberg

Opportunities for financials

Opportunities for financials are in sustainable investments.

- Carbon trading (Clean Development Mechanisms, Joint implementation) and risk reduction. For example, Barclays (the bank with the highest GHGs) provides financial and risk management solutions across business lines. It supports renewable energy firms to access financing from capital markets and offers strategic advisory services in this sector. 'Financing low carbon technology represents a unique opportunity for banks to benefit from the growth of the low carbon technology sector while demonstrating their positive contribution in tackling climate change (Pierre Nanterme Accenture).

- Pioneering: A group of 259 banks, pension funds and other financial organisations signed the Global investor statement on climate change (UN Environmental Programme) for investing in reducing Carbon Footprints.
- Energy-related opportunities from energy reduction are reduced energy costs. And due to the fact that energy costs are a great part of total GHGs, banks can benefit from reducing their GHGs. Specific actions necessary include redesigning buildings, using green energy, LED bulbs, and reducing travelling and office waste.

Risks for Financials

- Increased exposure due to rising food prices, energy prices, water prices and raw materials. Moreover, increased extreme weather causes severe damage to companies' assets and outputs.
- Global clean energy investment will be c.US\$200bn in 2010, while institutions argue that US\$500bn a year is necessary (IIGCC).
- Investors are willing to invest US\$15 trillion in the coming decades (Global investor statement on climate change). They expect a 20% drop in GDP by 2050 if there is no investment in low-carbon technologies (IIGCC).

ING tear sheet

ING has been carbon neutral since 2007 due to lowering energy consumption, use of green energy and offsetting carbon emissions through sustainable investments. It has €992m of sustainable assets under management. Deutsche Bank plans to be carbon neutral in 2013.

Fig 48 ING progress

ING (in €m of sales revenue)	2007	2008	2009	Progress (%)
GHG tonnes intensity per sales	1.1	0.9	1.3	Zero emission
Energy	5.0	5.0	6.2	-20
Waste: paper		0.1	0.0	25

Source: Bloomberg

From the four areas that we researched in this analysis, we see that energy is the main opportunity going forward for ING. However, we are of course aware that further important opportunities lie elsewhere – in fund management, financing green projects and the like, which are harder to quantify.

Fig 49 ING energy components

(kwh)	2007	2008	2009	Progress (%)
Electricity (brown)	253.9	199.4	201.4	26
Electricity (green)	259.8	344.4	330.6	-21
Natural gas	134.3	150.5	157.9	-15
Fuel oil	21.4	14.2	15.0	43
District heating	47.2	40.2	40.0	18
Total	716.7	748.8	744.9	-4
Energy use in kWh per FTE	6,836.0	6,834.0	7,733.0	-12

Source: ING

Looking specifically at Energy, ING has the lowest energy use among its peer group, with an increase in green energy of 21% over 2007-09. Deutsche Bank, UBS and HSBC also posted an increase in energy use per €m in sales, which we reckon can be partly explained by lower revenues compared with higher energy use per se. Energy accounts for 60% of the carbon footprint for financials, hence a reduction in energy costs offers an opportunity to reduce their carbon footprints.

Considering ING's energy components in 2007-09, we see a strong reduction in brown electricity of 26%. To a large part this is offset by an increase in green electricity of 21%. Furthermore, there is a considerable reduction of 43% in fuel oils and a significant reduction of 18% in district heating. Natural gas reduction did not improve. Total energy use increased moderately by 4%.

Environmental footprint

In 2006, an independent consultant, DHV, investigated ING's environmental footprint and developed an 'ecopoint' system to identify the relative significance of the environmental impacts associated with the company's various operational activities. According to this system, 99% of ING's footprint is caused by the focus areas set out in our environmental statement: energy usage, business travel and paper usage.

Involvement in renewable energy projects

In 2010, ING's sustainable portfolios grew across all business activities. This reflects our consistent pursuit of financial targets based on sound business ethics and sustainable business priorities. This is particularly true of our involvement in renewable energy projects, which has grown exponentially from 2005 to 2010. At the end of 2010, the volume of power generation projects financed by ING's Structured Finance department was €3.3bn globally. Around 29% of this €3.3bn is in renewable power generation.

Sustainable assets up in 2010

In 2010, ING's Private Banking team in the Netherlands increased its sustainable assets under management by 43%, from €363m to €517m. This echoes a global trend of an increase in sustainable investments, but also shows how private clients are moving their mandate from mainstream investments to sustainable options.

ING's sustainable assets under management showed a 5% increase compared with 2009. Assets are considered sustainable when they are linked to products and services that incorporate social, environmental and ethical criteria, or when it is designed to deliver a specific social and/or environmental benefit.

Opportunity quantified

What would a reduction of 10% by 2020 mean for ING in the four areas of potential cost savings – GHG reduction, energy reduction, water reduction and waste control – based on 2009 data. We apply the same unit cost prices as we used in the global discussion, ie, €25 for GHG emissions, €90 per MWh, €0.27 per cubic metre of water and €100 for hazardous waste. For ING the main benefit relates to financing opportunities. The column on the right of Figure 50 highlights the opportunity based on a reduction of 10% over five years (hence 2x) and based on inflated unit prices per area.

Fig 50 ING

	Intensity per sales	Sales	Unit price	2020 10% in 10 years	Unit price 2020 10% in (pressure) 5 years (2x)	
GHG (tonne)	1.2	109,674	25	0.3	75	2.1
Energy MWH	6.2	109,674	90	6.1	150	20.4
Water (m ³)	41	109,674	0.27	0.1	0.93	0.8
Waste (tonne)	0.4	109,674	100	0.5	200	1.9
Total (€m)				7.1		25.2
Value before investment			10	53.0		189.3

Source: ING estimates

Chemicals

Chemicals form the EU's second largest manufacturing sector, just behind food, drink and tobacco in terms of production and behind electrical engineering in terms of added value. The EU is also the world's most important producer of chemicals, accounting for circa one third of output.

Legislative pressure

There is growing legislative pressure on the safety of chemical products and despite a 26% increase in production volume over the past few years CO₂ emissions have remained stable with an effective cut of 21% per unit of production since 1990. Furthermore, the industry has reduced energy consumption by 8% over the same period of time.

Reduction of waste opportunity

However, the OECD warns that a current lack of reliable information regarding the safety of chemicals on the market, as well as on the volume of hazardous substances being released into the environment during use and disposal, will pose major challenges to policy makers over the next decade. Especially worrying are chemicals detected in the environment that are persistent and toxic.

Fig 51 Chemicals peer ranking

Chemicals	GHG Intensity/sales	Energy Intensity/sales	Water Intensity/sales	Result	Improvement
AkzoNobel	354.6	2,068.2	20,724.6	Best in Water	Energy
BASF	613.5	950.8	38,999.5	Best in Energy	Water, GHG
Du Pont	358.0	530.7	No data	Best in GHG	Water?
DSM	867.0	2,263.0	No data		All
Solvay	2,314.3	30.39	75,523.5	Best in Energy	GHG, Water

Source: Bloomberg

Further key goals are a significant improvement in working conditions, a reduction of the environmental impact and enhancement of the quality of waste in general.

Opportunities

- Over the next 20 years or so the continued use of fossil fuels as the predominant source of chemical feedstock will gradually disappear. This will lead to a more manageable carbon emission, reduced energy consumption and more green thinking.
- It is better to prevent waste than to clean it up afterwards, hence the recyclability of end products and biodegradability is coming more and more into play.
- The development of renewable chemical feedstock, from bio waste as a feedstock to waste to energy for energy consumption to reduce costs and emissions.

Risks

- Regulation will provide the biggest potential challenge to the industry. In particular, caps on CO₂ emissions and potential trading restrictions could harm the industry in the short term. Hence the need to quickly adjust to the new opportunities ahead.

AkzoNobel tear sheet

AkzoNobel manufactures and supplies specialty chemicals, decorative paints, and performance coatings worldwide. AkzoNobel also produces personal care, specialty chemicals and pharmaceuticals.

Fig 52 AkzoNobel progress

(in €m of sales revenue)	2007	2008	2009	Progress (%)
GHG intensity per sales	323.0	298.4	332.5	-3
Energy intensity per sales MWH	3,153.8	2,072.3	2,068.2	50
Water m ³	24,860.5	19,267.0	20,724.59	20
Waste tonnes per sales	5.6	51.6	19.11	-71

Source: Bloomberg

AkzoNobel has implemented a sustainability strategy to invent, manage and improve: “We are committed to continuously improve the sustainability of our operations and the entire value chains in which we operate. Downstream, we seek to offer solutions that allow our customers, or their customers, to reduce their footprint.”

- AkzoNobel aims to reduce its total carbon footprint per tonne of product by 10% by 2015 (2009 baseline). Furthermore, they aim to reduce the cradle-to-gate carbon footprint per tonne of production. In addition, they want to increase eco-premium solutions to 30% of sales.
- A further aim is to reduce the emission of ‘volatile organic compounds’ to the air to 4,000 tonnes by 2010. Concerning renewable energy, AkzoNobel is using a new breed of solar cells. However, its share of total energy consumption remains unclear. A green procurement policy is implemented, encouraging vendors to comply with AkzoNobel’s standards. AkzoNobel states that it has sustainable products that account for 18% of the total turnover in 2009.
- Remuneration and bonuses are correlated to sustainability issues. There is a ‘Sustainability council’ that directly reports to the executive board; targets are strict and performance is measured “every member of the global Procurement Council has at least one sustainability target as an item in their personal target”.

Opportunity quantified

Opportunity could be almost €600m based on a 10% reduction.

What would a reduction of 10% by 2020 mean for AkzoNobel for the four areas of potential cost savings – GHG reduction, energy reduction, water reduction and waste control – based on 2009 data. We apply the same unit cost prices as we used in the global discussion, ie, €25 for GHG emissions, €90 per MWh, €0.27 per cubic metre of water and €100 for hazardous waste. The column on the right of Figure 53 highlights the opportunity based on a reduction of 10% over five years (hence 2x) and based on inflated unit prices per area.

Fig 53 AkzoNobel

	Intensity per sales	Sales	Unit price	2020 10% in 10 years	Unit price 2020 10% in (pressure) 5 years (2x)	
GHG (tonne)	355	14,640	25	13.0	75	77.9
Energy (MWH)	2,068	14,640	90	272.5	150	908.4
Water m ³	20,725	14,640	0.27	8.1	0.93	56.4
Waste (tonne)	19	14,640	100	2.8	200	11.2
Total (€m)				296.3		1,053.9
Value before investment			12	2,667.1		9,484.7

Source: ING estimates

AkzoNobel's main opportunity is in energy/sales improvement. If we consider Du Pont as the reference point, the opportunity could be €2.0bn by 2020 from savings on energy costs. However, we have chosen to use the average as a benchmark in chemicals, which provides an opportunity of €0.8bn.

Fig 54 AkzoNobel best-in-class opportunity quantified

Intensity per €m in sales	GHG sales Energy /sales	Water sales	Waste sales	Additional savings	
AkzoNobel	354.6	2,068.2	20,724.6	19	
BASF	613.5	950.8	38,999.5	33	
Du Pont	358	530.7			
DSM	867	2,263			
Solvay	2,314.3		75,523.5	3	
Best in class	354.6	1,453.2	20,724.6	3.1	
Opportunity in units AkzoNobel	0.0	615.0	0.0	16.0	
Opportunity in value	0.0	810	0.0	23.4	833.8

Source: Bloomberg, ING estimates

Solvay tear sheet

- Solvay's mission is "Building on scientific, technical and commercial expertise, and aware of our societal responsibilities, Solvay provides innovative products and services related to chemistry and human health to create sustainable and ever-increasing value to our customers, shareholders and employees."
- Its environmental management system is comprehensive and 49% of the company's sites are externally verified. There is evidence that Solvay implemented a number of programmes to reduce its impact, such as greenhouse gas and other toxic air emissions. In addition, Solvay has some activities regarding renewable energy use. The company takes into account environmental performance when assessing a new supplier.

Fig 55 Solvay progress

Intensity per €m in sales	2007	2008	2009	Progress (%)
GHG (tonnes)	1,556.9	2,298.3	2,314.3	-33
Energy (mwh)	3,433.4	4,730.7	30.29	-27
Water (m ³)	53,175.1	69,996.5	75,523.5	-30
Waste (tonnes)	35.0	79.3	3.13	-56

Source: Bloomberg

Most of today's synthetic polymers are produced from petrochemicals and are not biodegradable. These polymers are a significant source of environmental pollution and harm wildlife. For example, the effects of plastic bags have a negative affect on sea-life. In addition, plastics count for the largest part of waste. Since there is increasing awareness among governments and companies to reduce waste – and save money – compostable or biodegradable waste becomes popular. Also, it saves energy from burning waste under high temperatures.

- Solvay produced PVC from Bio ethanol.

Solvay entered the Brazilian market as it realised that Brazil's large production scales in feed stocks were a great advantage. Brazil is the leading producer of sugarcane in the world, and has the lowest production costs for this raw material. Feedstock here can be easily reproduced into low cost bio plastics such as sugarcane. Solvay used the ethanol from sugarcane for bio-based PVC. In 2015 Solvay is expected to cover 36% of the Brazilian PVC market with a production of 120,000 MT per year. Unfortunately, bio plastics prices are expected to decrease 20/25% in the coming five years due to the new capacity of bio-based PE flowing into the market. This pushed Solvay to cancel activities, the decreasing prices limited the possibilities.

- Epicerol is currently undergoing a large capex programme.

Epicerol is the process by which epichlorohydrin is produced with a renewable feedstock glycerine rather than propylene. Glycerine's advantages are that it is a by-product of bio-diesel and has a lower price than propylene. Epicerol processes uses 10x less water, 8x less chlorinated by-products and 2x less CO₂ and Solvay aims to capture 25% of the market between 2007 and 2012.

Oil and Gas industry

Oil and gas – the most important sources of power for heat, light, mobility and communications – account for more than 63% of the world’s primary energy needs, but with what impact on the environment and society?

Diversification from traditional energy sources to low carbon alternatives is high on the agenda in energy. This includes solar energy, wind energy, bio-fuels and hydrogen fuel cells. Furthermore, new techniques such as carbon capture and storage might lead to new developments and investments in infrastructure. However, increased risks from compliance as a result of future carbon regulations are high on the agenda. This might lead to intensity targets or cap-and-trade systems in future. Any failure from non-compliance with regulations, environmental disasters or worker casualties leads to high corporate reputation risk.

Fig 56 Oil and Gas peer ranking (2009 data €m per sales)

Energy (oils)	GHG Intensity/sales	Energy Intensity/sales	Water Intensity/sales	Result	Improvement
RD Shell	201.7	989.8	512.0	Best GHG	Energy
Total	523.4	1,505.9	1,316.1		All
BP	195.4	868.6	1075.8	Best GHG	All
Exxon	334.2	1,066.0	757.8		Energy

Source: Bloomberg

Opportunities

- For the world’s poorest, access to sustainable, healthy sources of energy remains a basic critical need. About 2.4bn people lack access to clean, safe cooking fuel, while 1.6bn people have no access to electricity. Collecting fuel is time consuming, while unsustainable use of fuelwood depletes natural resources and inefficient burning exposes people to smoke-related respiratory illnesses.
- Vast renewable energy resources (wind, solar, hydropower) are available, but under-exploited in some of the poorest countries. Government energy policies need to recognise and support decentralised options for poor consumers.
- Technology transfer from developed to emerging countries could quickly resolve some of the “low hanging fruit” options for energy reduction.
- Energy, ecosystems and livelihoods are interdependent. There are close links between energy, agriculture and water provision. Energy issues need to be addressed holistically. More and more this is being done.

Risks

- Despite intensified searches for sustainable alternatives, oil and gas exploration and production continues – in increasingly sensitive environments. Many oil-producing countries suffer from the ‘resource curse’, where an abundance of natural resources undermines economic growth, for example through corruption or mismanagement of revenues.
- Some international energy companies are leaders in corporate social responsibility yet good environmental and social policies do not guarantee effective governance of supply chains.
- Eighty per cent of oil and gas development is undertaken by state companies, who may not subscribe to international good practice standards and are frequently not held to account by civil society.

- Energy companies are increasingly looking towards large-scale biofuel production as an alternative to oil and gas, raising further issues of land-use conflict and food security.

Shell tear sheet

Climate change is one of the greatest universal challenges society faces. A recession-driven shift towards less energy use among businesses and consumers has slowed the growth in global greenhouse gas emissions. As the downturn lifts and energy demand rises, the challenge will be to sustain a more efficient use of energy and manage CO₂ emissions.

Fig 57 RD Shell progress (based on 2009 data)

RD Shell in €m intensity per sales	2007	2008	2009	Progress (%)
GHG tonnes intensity per sales	195.0	126.8	201.7	-3
Water (m ³)	646.7	334.0	512.0	26
Waste (tonnes)	5.8	2.5	5.4	7

Source: Bloomberg

We see increasing opportunities over the next 10-15 years from installing new gas-powered generating capacity, as hundreds of old coal-fired plants are decommissioned in North America, Europe and China. Moreover, installing carbon capture and storage technology (CCS) in a gas-fired plant would almost eliminate CO₂ emissions from that plant.

RD Shell uses advanced technology to reduce its need for fresh water. For instance, once operational their Pearl GTL plant in Qatar, which will convert natural gas to liquid products, will take no fresh water from its arid surroundings. Instead, it will use and recycle water produced by the GTL manufacturing processes. Shell will be re-using water produced with the gas for hydraulic fracturing, a process that involves the high-pressure injection of water to unlock the tightly-trapped gas. This approach reduces the use of fresh water in the process by more than 50%.

Opportunity

Opportunity could be c.€4bn based on a 10% reduction.

What would a reduction of 10% by 2020 mean for Royal Dutch Shell for the four areas of potential cost savings – GHG reduction, energy reduction, water reduction and waste control – based on current 2009 data. We apply the same unit cost prices as we used in the global discussion, ie, €25 for GHG emissions, €90 per MWh, €0.27 per cubic metre of water and €100 for hazardous waste. The column on the far right of Figure 58 highlights the opportunity based on a reduction of 10% over a five-year period (hence 2x) and based on inflated unit prices per area.

Fig 58 Royal Dutch Shell

	Intensity per sales	Sales	Unit price	2020 10% in 10 years	Unit price 2020 10% in (pressure) 5 years (2x)	
GHG (Ton)	201.7	368,056	25	185.6	75	1,113.6
Energy MWH (*)	1164	368,056	90	3,855.8	150	12,852.5
Water m ³	512.0	368,056	0.27	5.0	0.93	35.1
Waste (ton)	5.4	368,056	100	20.0	200	80.0
Total				4,066.4		14,081.2
Value before investment			10	30,497.8		105,609.0

(*) as no data is available for RD Shell we have take the industry average

Source: ING estimates

If we were to benchmark the opportunity, RD Shell could improve compared with the best-in-class, especially on energy reduction. This opportunity alone is similar to our base case scenario of a 10% reduction over a period of ten years.

Fig 59 RD Shell best-in-class opportunity quantified

(Intensity per €m in sales)	GHG sales	Energy sales	Water sales	Waste sales	Additional savings
RD Shell	201.7	989.8	512	5.4	
Total	523.4	1,505.9	1,316.1		
BP	195.4	868.6	1,075.8		
Exxon	334.2	1066	757.8		
Best in Class	195.4	868.6	512	5.4	
Opportunity in units AkzoNobel	6.3	121.2	0	0	
Opportunity in value	58.0	4,014.8	0	0	4,072.7

Source: Bloomberg, ING estimates

Conclusion

World development relies heavily on oil & gas supplies. Bearing in mind that energy consumption will only increase further due to emerging economies, this will strongly influence prices. We forecast that these prices might put a “tax” on world economies, potentially depressing growth worldwide and pushing up inflation. Apart from the increased attention on the scarcity of the world’s resources, other threats to the energy industry are taking place. First, the economic turndown, second the political troubles in many of the major oil producing countries and third, nuclear problems, have put energy markets in a spin. We are certainly seeing a lot of attention from investors on the matter.

Arcadis tear sheet

Mission statement: “Arcadis recognises the principles of sustainable development and acknowledges the challenge of meeting human needs, while protecting the environment and natural resources for future generations. Sustainability is an integral part of business: through the business lines it is integrated in the solutions provided to clients, while sustainable practices are integrated in operations through a global team, led by the corporate director for Environment.”

Arcadis provides consultancy, design, engineering and management services. The fields in which they operate are water, infrastructure, buildings and environment. These areas are naturally tied to sustainability and Arcadis acknowledges that “pushing demand in infrastructure allied with renewable energy and public transport, are contributing to sustainability”. Another solution is to reduce and treat waste water.

Fig 60 Arcadis emissions

Tonnes CO ₂ (calculated for 15,000 employees)	2008	2009	Difference (%)
Auto transport	35,550	15,450	57
Air Transport	42,900	21,300	50
Office energy use	22,050	19,650	11
Total	100,500	56,400	44

Source: Bloomberg

Arcadis implemented a Global Sustainability Programme in 2008. Through their operations they tackled emission reductions in the areas of transportation, ground air, energy and usage in offices, paper usage and type, waste reduction and disposal or recycling, and the selection of purchased materials and products. The company stated that the results have been significant and total reductions were 44% for CO₂ in one year. The emissions are Scope 2 only.

Opportunities and risks

By 2020 the Dutch government wants 20% less CO₂ production and 14% of all energy needs to be renewable. The targets are implemented in the ‘Green Deal’. In order to meet these targets energy reduction has a high priority, while consistency is also very important, as companies and governments need to be able to plan on the basis of stable renewable energy prices. For example, in Germany prices for renewable energy have been fixed for the past 20 years.

Certification of ‘green buildings’

There is an opportunity for Arcadis is to tailor its services toward climate issues and sustainability. Climate change increases the demand for systems that help to reduce the impact from extreme weather events. Examples include climate change adaption systems and flood defense or storm water systems. In addition, there is increased demand for certified solutions or ‘green buildings’.

Addendum: intensity calculation

Waste intensity

Waste intensity opportunity: per sector

Waste generated per sales calculated as tonnes of waste both hazardous and non-hazardous per million of sales revenue converted to euro. The ratio is calculated based on data items disclosed in company filings. This is calculated as total waste per million of sales generated converted to euro.

Energy intensity

Energy intensity opportunity: per sector

The energy intensity is calculated as megawatt hours of energy consumed per million of sales revenue converted to euro. The data below is calculated on data items disclosed in company filings. Calculated as total energy consumption per sales in million (converted to euro).

Water intensity

Water intensity opportunity: per sector

Water intensity to sales is calculated as cubic metres of water consumed per million of sales revenue converted to euro. This ratio is calculated based on data items disclosed in company filings. Calculated as water consumption per sales (converted in million in euro).

GHG intensity

GHG intensity per sales opportunity: per sector

Greenhouse gas (GHG) intensity calculated as tonnes of greenhouse gases per million of sales revenue converted to euro. The data below is calculated on data items disclosed in company filings. Calculated as GHG emissions per million of sales (converted to euro).

Companies included in the average sector calculation are Henkel, Unilever, Danone, Nestle in Consumer. Ahold, Delhaize, Tesco, Carrefour are taken in retail. RD Shell, Total, BP Exxon and Chevron are used in oils. In Chemicals the companies we use are BASF, AkzoNobel, DSM, Du Pont, PPG Industries. In Telecom we use KPN, Deutsche Telecom, Vodafone, Belgacom, France Telecom, BT Group, Teliasonera and Tele2. In Financials we use ING, RBS, Barclays, Deutsche Bank, HSBC and UBS.

Lexicon

Third Industrial Revolution

Following the steam engine and ICT boom we are now entering the Third Industrial Revolution. Companies can reap benefits from consumers' social and environmental concerns and from the understanding that resource scarcity will result in a permanent change in business models. The third industrial revolution will on one hand aim to save the planet while on the other hand accommodate the consumer and wealth explosion we expect in the coming decade. We are at the crossroads of 'hard' business benefits while the perception is these are only 'soft' factors.

Cradle to cradle (C2C)

A design principle aligned with nature in that nothing is waste – every end product should be capable of being used as an input to another process. Materials used in manufacture are either “technical nutrients” – non-harmful synthetics that can be used over and over without losing value, or “biological nutrients” – able to be returned to the soil for use by healthy micro-critters. (There's no “grave” in this thinking – just an elegant ongoing loop of materials.) Read the book by this name by McDonough and Braungart for more.

Product take-back

Producers take responsibility for their products by accepting them back at end-of-life (by regulatory requirement in some cases). This encourages design that allows easy disassembly and recycling of components (including packaging), and discourages hard-to-dispose toxics.

Design for the Environment (DfE)

An umbrella term that encompasses a variety of design approaches aimed at considering the environmental impact of goods or services over their entire life cycle, including extraction, production, transport and disposal. The US EPA has a DfE standard that helps minimise waste and pollution and allows a DfE label on qualified goods. See their webpage (easy to Google) for more.

Smart Growth

Basically an anti-sprawl urban planning concept, aimed at concentrating growth in cities, retaining green space, providing high quality transit and walkable communities. Lots of case studies and examples at www.smartgrowth.org.

Five R's

Most of us grew up with just three “R's” – reduce, reuse, recycle. Now there are two more lower down in the hierarchy – “recovery,” which usually means some sort of energy from waste system, and “residuals,” which is what is left for landfill after every other attempt has been made to deal with our waste stream. (“Zero waste” means getting that last R down to nothing.) Despite increasingly glamorous and attention-grabbing technologies for recycling and recovery, the real answer in garbage still lies in the first two R's – reduce and reuse.

Life-cycle analysis

Used two ways – as a design question and a purchasing framework. For design, see DfE and C2C. In purchasing, this invites a robust consideration of all the impacts a product has while in your hands, such as energy use and end-of-life disposal. If a new piece of equipment comes with a low price, check that it is not an energy hog or a toxic waste

problem – and factor those costs into the equation. The higher-priced purchase may be less costly in the long run.

Eco-efficiency

Coined by the World Business Council for Sustainable Development, this basically means producing more with less – more durable goods produced more efficiently with fewer resources. Within companies or economies, it can provide a competitive advantage. As one sustainability speaker we heard said, “it’s never been a bad thing to reduce waste in a business”.

Carbon accounting

Basically, a method for measuring carbon dioxide equivalents emitted by a process or within an enterprise (also known as your “carbon footprint”). As cap-and-trade systems emerge and markets start to handle carbon trading, accounting for carbon will become necessary. Standards have evolved quickly – if you want to calculate your carbon footprint, use an online calculator for a rough estimate, or get someone immersed in this stuff to give you some guidance.

Carbon dioxide equivalents (CO₂e)

There are a variety of gases that contribute to the greenhouse effect, the increasing layer of insulating gases that are causing global warming by trapping heat at the earth’s surface. Some, such as methane, have a much higher heat-trapping effect than others (such as carbon dioxide). A “carbon dioxide equivalent” is a unit of measure that allows all gases to be compared on a standardised basis commensurate with their relative damaging impact. You can read the math and jargon at Wikipedia.

Sustainability innovation

Not so much a new term as an emerging discussion. Two authors at Harvard Business Review argue that sustainability is the key driver of innovation today (search hbr.org for those terms and you’ll find it). If crisis tends to beget either failure or innovation, it stands to reason that the hard-edged realities of our limited planetary resources and growing global population are positioning us for some major creative outbursts (and unfortunately, some failures). Getting your business in the game is the only way to see the opportunities, and, some would argue, to survive the shift. The good news: the Harvard authors say it is “simply not true” that sustainability represents a net cost – their study of 30 companies yields bottom- and top-line returns.

Disclosures Appendix

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