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Pathways to World-Class Energy Efficiency in Belgium

Preface

Belgium faces a combination of challenges: a global economic crisis with serious implications for its economic fabric, highly volatile prices for natural resources, growing competition in international markets and an urgent need to cut greenhouse gas (GHG) emissions to comply with current and future international regulations.

Leaders in many nations have decided to set ambitious targets for higher energy efficiency. These represent the most cost-efficient lever for reducing GHG emissions in most developed economies. Moreover, implementing energy efficiency measures can create jobs relatively quickly, improve competitiveness and reduce dependence on energy imports. Belgium has the potential to save a great deal of energy across all economic sectors: the country's energy efficiency is currently among the lowest in Europe and those initiatives already planned or implemented to improve its energy efficiency will not do enough to keep the country in step with the rest of Europe.

To provide a basis for discussions on this topic, McKinsey & Company collaborated with the Federation of Enterprises in Belgium (FEB-VBO), representing 33,000 businesses in Belgium from 33 sector federations. As a result of these efforts, McKinsey has developed a perspective on pathways leading to world-class energy efficiency in Belgium. This document summarizes the main findings from this work on the potential for higher energy efficiency, the related costs, and improvement measures available to the highest energy-consuming sectors. The full report, including a comprehensive review of all potential levers and illustrations of international best practices, is available at www.mckinsey.be/energyefficiency.

This study builds on McKinsey's Global Greenhouse Gas Abatement Cost Curve and more than 10 national GHG abatement cost curves developed over the past 3 years. The purpose of this report is to provide an objective, uniform set of data, amplified by examples from other countries, that can serve as a starting point for debate between corporate leaders, policy makers and other decision makers on how best to improve energy efficiency in Belgium. It does not prescribe any specific policy choices.

We would like to thank the FEB-VBO and the members of the Advisory Council for their invaluable contributions to the methodology and content of this study: Flanders' Chamber of Commerce and Industry (VOKA), the Walloon Union of Enterprises (UWE), the Federal Planning Bureau, the Federal Public Service Health, Food Chain and Environment, Bond Beter Leefmilieu and Ghent University. Finally, we would like to thank FEB-VBO's different sector federations for their collaboration during this study.

Ruben Verhoeven
Director

Summary of findings

WHERE BELGIUM STANDS AND WHERE IT IS HEADING

Primary energy consumption – or gross inland energy consumption – in Belgium amounted to 368 million boe[1] in 2005. Ninety percent of this consumption derived from three sectors, Buildings, Road Transportation, and Industry, which consumed 128 million boe, 61 million boe and 144 million boe respectively.

All three sectors are currently less energy efficient than their counterparts in neighboring countries. Belgian energy consumption per square meter in residential buildings is more than 70 percent higher than the EU average. Fuel consumption per passenger-kilometer in Road Transportation is one of the highest in Europe, and not declining. Energy consumption in Industry is harder to compare with other countries because of differences in the industrial activity mix. However, the annual energy efficiency improvement targeted by Industry in Belgium is 20 to 40 percent below the target in other European countries.

With currently planned energy-saving measures, or what we term the "business-as-usual" (BAU) scenario, the country's primary energy consumption is expected to reach 366 million boe in 2030, slightly lower than the 2005 level. Belgium's final energy demand[2], unlike primary consumption, would increase from 281 million boe in 2005 to 307 million boe in 2030 according to the BAU scenario. On this basis and at a crude oil price of $62 per barrel (bbl)[3], the country's total energy consumption would represent €26 billion in 2030, or 5 percent of projected real GDP in 2030. Based on the expected evolution of the primary energy mix, GHG emissions in 2030 would amount to 185 megatonnes (Mt) CO_2e[4], of which 47 $MtCO_2e$ would come from Buildings, 26 $MtCO_2e$ from Road Transportation and 77 $MtCO_2e$ from Industry.

WHERE BELGIUM COULD BE IN 2030

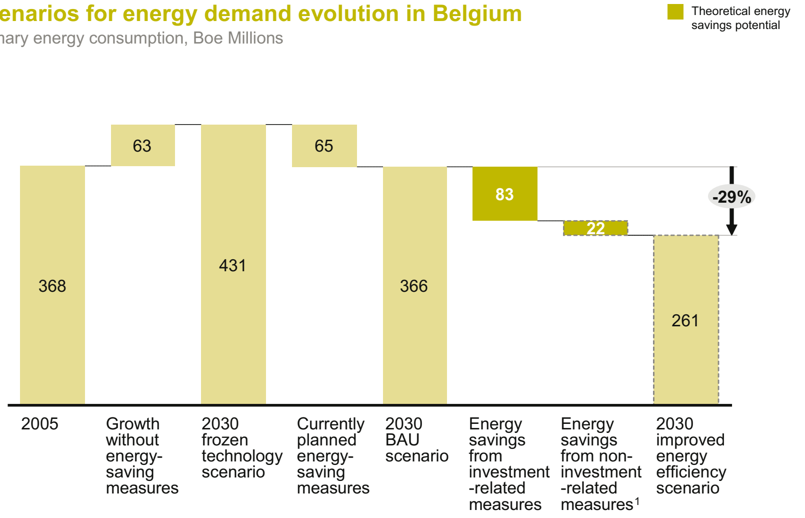
Our analysis has identified a theoretical energy savings potential representing 29 percent of the business-as-usual (BAU) scenario or 105 million boe in 2030 (Exhibit 1). These savings are measured as savings in primary energy consumption, taking into account inefficiencies in the transformation of raw energy feedstock into usable energy. From the end-user perspective, our analysis shows theoretical potential energy savings representing 28 percent of final energy demand in the BAU scenario, or 75 million boe. The largest improvement potential in terms of primary energy can be found in Buildings, with 61 million boe or 48 percent, 29 million boe comes from Industry (22 percent) and 15 million boe from Road Transportation (21 percent) (Exhibit 2).

[1] Barrel of oil equivalent; 1 boe = 0.136 tonne of oil equivalent (toe) = 6.12 gigajoule (GJ) = 1699.81 kilowatt-hour (kWh).
[2] Final energy demand measures energy consumed by end-users in for example industry and households. It is lower than primary consumption because of losses occurring in transformation and distribution.
[3] At $62/bbl and 1.5 $/€, and adjusted for the added value contained in different energy carriers.
[4] CO_2e is "carbon dioxide equivalent", a standardized measure of GHGs such as methane. Emissions are measured in metric tonnes of CO_2e per year, i.e. millions of tonnes (megatonnes) or billions of tonnes (gigatonnes). This analysis' greenhouse gas forecast differs from the forecasts made by the European Commission's DG for Energy and Transport, because of differences in terms of the CO_2 intensity of energy carriers and the different treatment of "non-marketed steam".

Exhibit 1

Scenarios for energy demand evolution in Belgium

Primary energy consumption, Boe Millions

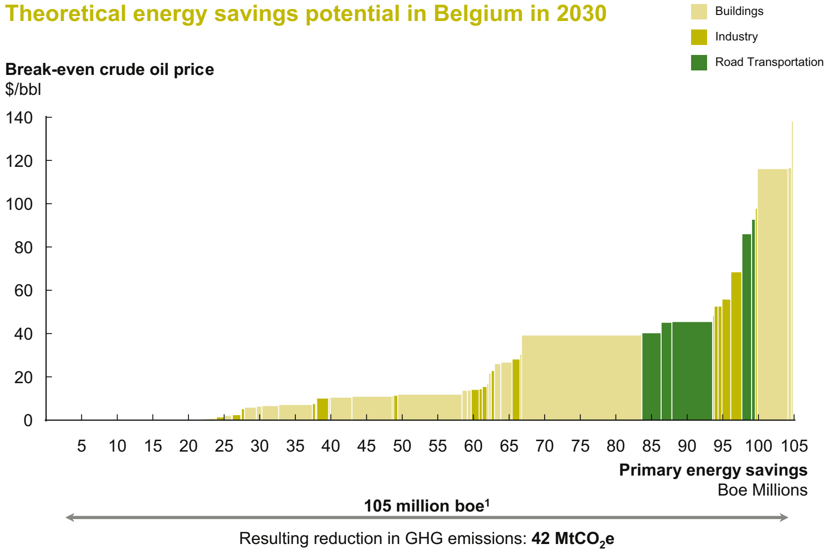


1 Includes behavioral changes

SOURCE: NTUA (PRIMES forecast 2007); McKinsey analysis

Exhibit 2

Theoretical energy savings potential in Belgium in 2030



1 Includes behavioral changes (22 million boe)

SOURCE: McKinsey Global Greenhouse Gas Abatement Cost Curve v2.0; UNFCCC; McKinsey analysis

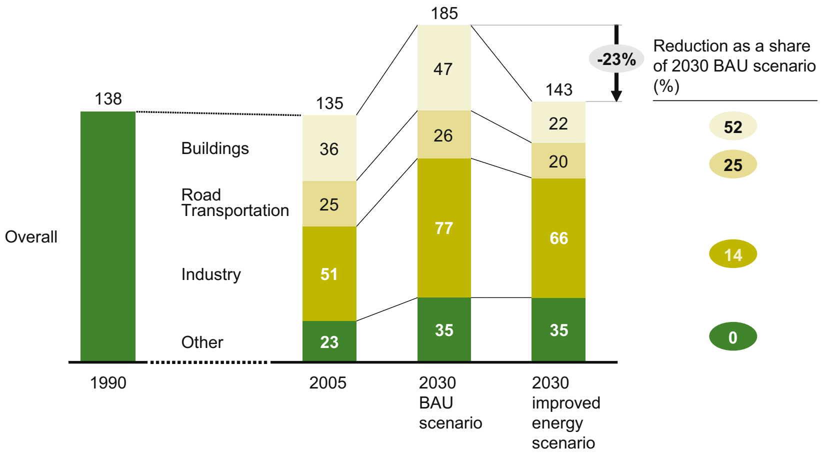
The value at stake is significant. Achieving the identified energy efficiency improvements would stabilize Belgium's GHG emissions at around 2005 levels, making them 23 percent lower than in the BAU scenario by 2030 (Exhibit 3). This in itself would not be enough to achieve Belgium's "20-20-20" target[5] in the agreed time, but is a necessary component of any action plan to reach that target. It would also save €5.2 billion[6] a year in energy costs by 2030, reduce exposure to commodity price fluctuation and geopolitical risks, and stimulate job creation.

Implementing the identified energy efficiency improvements would entail a yearly incremental investment of €1.6 billion between 2010 and 2020, and of €2.2 billion from 2020 to 2030 spread across all sectors. At a crude oil price of $62/bbl, however, 93 percent of opportunities would be Net Present Value (NPV)-positive[7]. Moreover, such investments are likely to spawn multiple new business opportunities by creating new markets for efficiency-related products and services. This is especially the case in Buildings and Road Transportation but Industry, too, could require innovative products and services that can be developed and provided by Belgian companies.

Exhibit 3

Scenarios for greenhouse gas emissions evolution in Belgium

$MtCO_2e$



SOURCE: NTUA (PRIMES forecast 2007); UNFCC; Global Insight; McKinsey analysis

[5] Following the European Commission's proposals in January 2007, all heads of state and government of the European Union have committed in December 2008 to cut the EU's GHG emissions by 20 percent by 2020, or 30 percent as part of an international agreement. They have also committed to a 20 percent increase of renewable energy and a 20 percent increase in energy efficiency by 2020.

[6] At $62/bbl and 1.5 $/€, and adjusted for the added value contained in different energy carriers. These savings can be broken down into €2.9 billion for Buildings, €1.1 billion for Road Transportation, and €1.2 billion for Industry.

[7] Net Present Value is the value of the net profit of an investment taking into account all investment costs and future cash flows made during the lifetime of the project, discounted at year 0.

METHODOLOGY AND DEFINITIONS

The *business-as-usual scenario (BAU)* or forecast for 2030 is based on the 2005 primary energy demand as defined by Eurostat, and uses NTUA "PRIMES" projections to forecast primary energy consumption until 2030. This BAU scenario includes the expected energy efficiency improvements if current policy and incentive structures deliver their full impact. Additional measures improving energy efficiency, as considered in the improved energy efficiency scenario, would require additional actions initiated by the private and/or the public sector.

The *improved energy efficiency scenario* assumes that additional investment-related and non-investment-related energy efficiency improvement measures are implemented, as a result of more ambitious societal decisions and energy efficiency policies. The industrial activity and product mixes are assumed to remain unchanged from those in the BAU scenario.

The *theoretical energy savings potential* refers to the difference between the primary energy consumption in 2030 in the BAU scenario and in the improved energy efficiency scenario.

Energy consumption is expressed in *barrel of oil equivalent (boe)*, which corresponds to the amount of energy released by burning one barrel of crude oil.

The total theoretical energy savings potential from *investment-related energy efficiency measures* uses data on Germany from McKinsey's Global Greenhouse Gas Abatement Cost Curve 2.0 as a starting point. An energy efficiency "cost curve" for Belgium was developed by retaining only abatement levers that improve energy efficiency and, where appropriate, by adapting both input parameters and impact estimates to a Belgian context[8]. The energy efficiency cost curve displays the energy savings potential of individual levers relative to the BAU scenario, as well as the corresponding crude oil price at which each lever becomes NPV-positive. The width of each bar represents the theoretical energy savings potential (not a forecast) from that opportunity. The volume potential assumes concerted action starting in 2010 to capture each opportunity. The potential reflects the total active installed capacity of that savings lever in the year 2030, regardless of when that capacity has been built.

The analysis adopts a *societal perspective*, which means that taxes and subsidies have not been included, and that the capital cost for NPV calculations has been assumed similar to government bond rates, i.e. 4 percent. This perspective allows for comparisons of opportunities and costs across sectors and individual companies. It does, however, mean that the calculated costs and benefits may differ from those a company or consumer would see, as these decision makers would include taxes, subsidies, and higher discount rates in their calculations. The cost of each opportunity also excludes transaction and program costs such as costs for research, gathering information and meeting administrative requirements.

[8] In Buildings, for example, Belgian statistics were used for floor space, heating degree days, existing penetration levels of double glazing, etc.

PATHWAYS TOWARD AN ENERGY-EFFICIENT ECONOMY

It is one thing to have the potential to make significant energy efficiency improvements; it is quite another for individuals, companies and policy makers to realize that potential. Capturing all the opportunities would entail change on a large scale and require effort from all stakeholders in households, the public and private sectors.

Our analysis shows that the only viable path to significant and cost-effective energy efficiency improvements encompasses complementary measures in all sectors of the economy and involves all stakeholders, as well as the educational system. Based on ambitious initiatives in other countries, we have identified a set of measures for each of Belgium's highest energy-consuming sectors, which if taken would turn Belgium into one of the world's most energy-efficient economies.

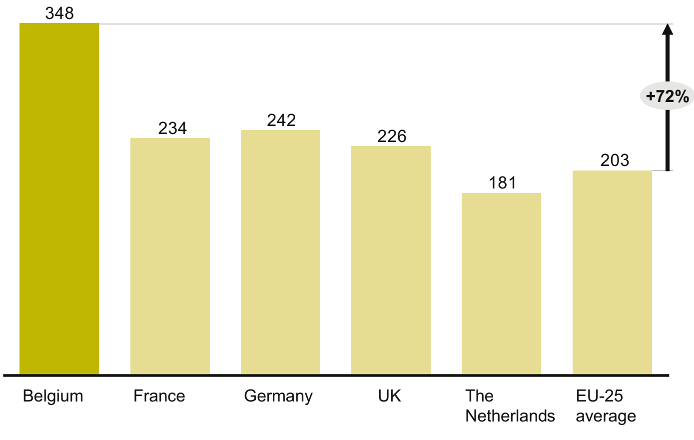
IMPROVING ENERGY EFFICIENCY IN BUILDINGS

In 2005, Belgium's residential and commercial buildings were responsible for 35 percent of primary energy demand (128 million boe). Residential buildings accounted for 73 percent of the sector's primary energy demand, with the commercial sector accounting for the remainder. Within the commercial sector, the demand mainly comes from schools (30 percent), hospitals (30 percent) and public administration offices (30 percent). The energy consumption chiefly emerges from heating, cooling and lighting requirements. With an average energy usage of 348 kilowatt hours (kWh) /m2 per year, Belgium's energy efficiency in residential buildings lags that in other Western European countries (Exhibit 4).

Exhibit 4

Average residential energy consumption in selected European countries

kWh/m², 2005



SOURCE: McKinsey Greenhouse Gas Abatement Cost Curve V2.0; NTUA (PRIMES forecast 2007)

In the BAU scenario, energy consumption in Buildings is expected to remain stable at around 127 million boe in 2030, despite an expected 1 percent yearly increase in floor space (Exhibit 5). This scenario assumes energy efficiency improvements from higher construction standards and the use of more energy-efficient appliances and lighting. However, the BAU scenario does not take into account the likely impact of full implementation of legislation such as the Energy Performance of Buildings Directive (EPBD) of the European Union and other, regional initiatives.

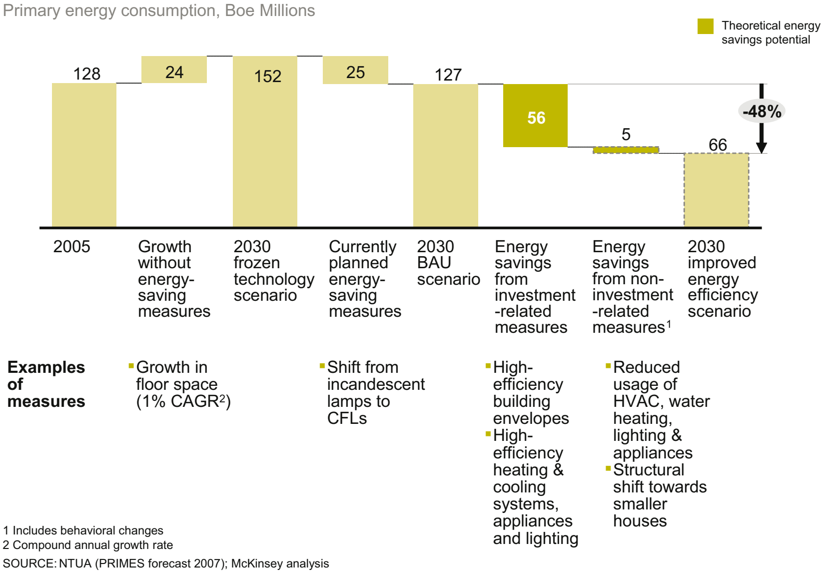
Our analysis has identified a theoretical energy savings potential of 61 million boe from Buildings by 2030. Of the total savings identified, 56 million boe comes from investment-related measures (Exhibit 6), while the remainder is the result of behavioral changes. Some 92 percent of spending on all these measures is NPV-positive at a crude oil price of $62/bbl or less.

To capture the full potential, Belgium would have to reach passive housing standards for its entire building stock, set ambitious energy efficiency targets for lighting, appliances and heating, ventilation and air conditioning systems, and individuals would need to change behaviors, for example, reducing their use of appliances or the size of their new homes. Pursuing such a set of ambitious measures would require a total investment of €24 billion over the 2010-2030 period, and provide an average payback time of 8 years. At the same time, it could create up to 20,000 jobs[9] and would reduce Belgium's GHG emissions by about 25 $MtCO_2e$ compared to the BAU scenario.

Exhibit 5

Scenarios for energy demand evolution in Buildings in Belgium

Primary energy consumption, Boe Millions

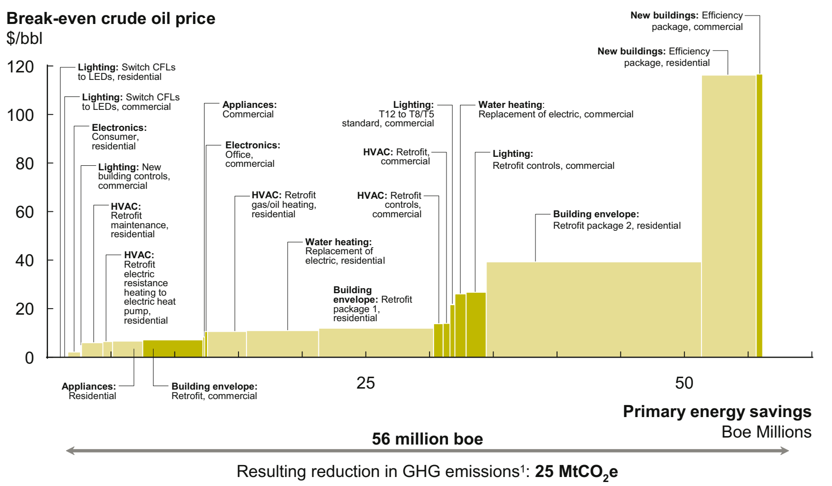


1 Includes behavioral changes
2 Compound annual growth rate
SOURCE: NTUA (PRIMES forecast 2007); McKinsey analysis

[9] Estimate based on an extrapolation of EU-wide and German employment creation data for the construction industry: *Green Jobs: Towards decent work in a sustainable, low-carbon world,* ILO, 2008; *Climate Change and Employment: Impact on employment in the European Union-25 of climate change and CO2 emission reduction measures by 2030*, ETUC, ISTAS, SDA, Syndex, Wuppertal Institute, 2007; *Impact of the EU Energy and Climate Package on the Belgian energy system and economy: Study commissioned by the Belgian federal and three regional authorities*, Federal Planning Bureau, 2008.

Exhibit 6

Theoretical energy savings potential in Buildings in Belgium
Investment-related measures, 2030



1 Includes non-investment-related measures
SOURCE: McKinsey analysis

Realizing this potential would require an integrated set of measures. These could include setting an ambitious target for maximum energy consumption in new and existing buildings as quickly as possible, and enforcing it in the medium term. Important elements would be a timeline for implementation, a clear set of incentives for adopting measures, penalties for avoiding them, and effective auditing and monitoring systems. Governments in other countries are providing incentives such as cheap loans to help invest in energy-saving measures and tax deductions or premiums for measures with a long payback.

IMPROVING ENERGY EFFICIENCY IN ROAD TRANSPORTATION

In 2005, primary energy consumption of Road Transportation amounted to 61 million boe. Road Transportation made up 83 percent of total energy consumption in transportation[10], while aviation, railway and waterway transport accounted for the remaining 17 percent[11]. Within Road Transportation, 75 percent of energy consumption came from personal cars and other light vehicles. Belgium's vehicle fleet is relatively energy efficient: in 2005 its consumption was 5 to 10 percent lower than the EU-15 average. However, Belgium ranks top of the list of European countries in terms of passenger-kilometers travelled.

[10] This is based on energy consumption of Belgian vehicles within Belgium – usage by foreign vehicles within Belgian borders and by Belgian vehicles abroad are considered to cancel each other out.

[11] Out of the 74 million boe used for the Transport sector, 61 million boe were used by Road Transportation. Aviation accounted for another 9 million boe, while Rail and Inland Navigation used about 2 million boe each. By convention, international marine bunkers are not seen as being part of domestic Transport energy usage.

All in all, fuel consumption per passenger-kilometer in Road Transportation is one of the highest in Europe and not declining (Exhibit 7).

In the BAU scenario, primary energy consumption in Road Transportation is expected to increase from 61 million boe in 2005 to 69 million boe in 2030 (Exhibit 8). This increase would derive mainly from an expansion of the vehicle fleet and longer average distances driven by each vehicle. Ongoing energy efficiency improvements would only partially offset the effects of these developments.

Our analysis identified a theoretical energy savings potential of 15 million boe from Road Transportation by 2030. Investment-related measures in this scenario amount to 12 million boe (Exhibit 9), while non-investment-related measures amount to 3 million boe[12]. At a crude oil price of $62/bbl, 87 percent of all measures would have a positive NPV from a societal perspective.

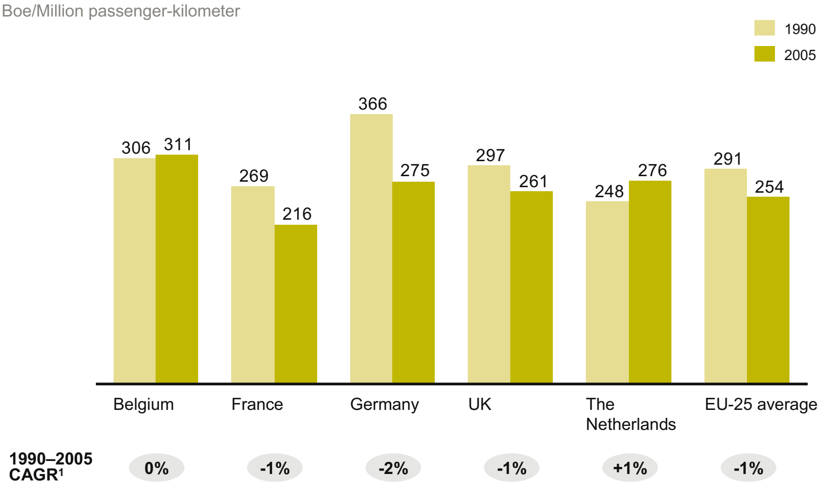
Our analysis assumes a sharp increase in the penetration of highly efficient internal combustion engines (ICEs)[13] and electric and hybrid vehicles (xEVs)[14], which would need to represent 60 percent and 14 percent of the fleet respectively by 2020.

Some other countries have tried to stimulate adoption of efficient ICEs and xEVs by raising taxes on the most energy-consuming vehicles, supporting investments in EV infrastructure or giving tax rebates on ICEs with very low consumption. Their experience could prove instructive.

Exhibit 7

Fuel consumption in Road Transportation in selected European countries

Boe/Million passenger-kilometer



1 Compound annual growth rate

SOURCE: NTUA (PRIMES forecast 2007)

[12] Road infrastructure measures have not been included.

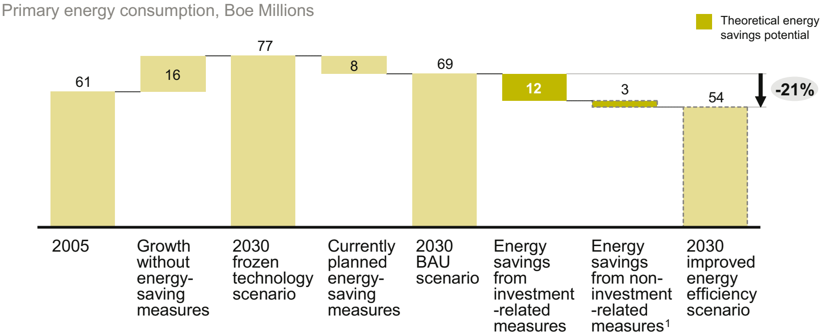
[13] Highly efficienct ICEs consume 5.4l/ 100 km or less.

[14] The acronym xEV includes electrified vehicles (EVs), full hybrid electric (HEVs) and plug-in hybrids (PHEVs).

Exhibit 8

Scenarios for energy demand evolution in Road Transportation in Belgium

Primary energy consumption, Boe Millions



Examples of measures

- Growth without energy-saving measures:
  - Growing vehicle fleet (0.5% CAGR[2])
  - Longer distances travelled (0.4% CAGR)
- Currently planned energy-saving measures:
  - Conventional optimization of ICE providing fuel economy
- Energy savings from investment-related measures:
  - Additional measures on ICE (e.g., medium and heavy truck ICE improvements)
  - EVs, plug-in hybrids
- Energy savings from non-investment-related measures:
  - Behavioral changes including modal shift to public transportation and structural shift to smaller cars

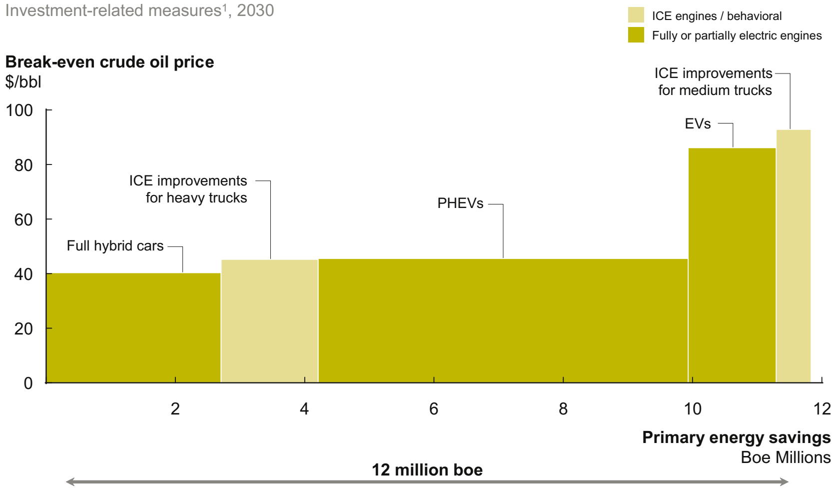
1 Includes behavioral changes
2 Compound annual growth rate

SOURCE: NTUA (PRIMES forecast 2007); McKinsey analysis

Exhibit 9

Theoretical energy savings potential in Road Transportation in Belgium

Investment-related measures[1], 2030



Resulting reduction in GHG emissions[2]: **6 $MtCO_2e$**

1 The 2030 perspective takes into account learning curve effects on cost for xEVs
2 Includes non-investment-related measures

SOURCE: McKinsey analysis

Public transport is the most energy-efficient means of city commuting. Its use could be stimulated by congestion charges limiting traffic in major cities and a ban on ICEs in city centers. Experience from other countries like the UK and The Netherlands shows that developing an energy-efficient road environment with ICT solutions, such as traffic management, and other measures such as spreading vehicle use during the day could also help reduce energy consumption. Finally, changing individual behaviors, by encouraging eco-driving, for instance, has proven effective in many locations. Pursuing the full range of these measures would represent an investment cost of €10 billion over the 2010-2030 period, at an average payback time of 9 years. It could also create 10,000 to 20,000 jobs[15] and reduce Belgium's GHG emissions by about 6 $MtCO_2e$ compared to the BAU scenario.

An integrated approach to achieving this potential could include a combination of incentives, penalties and investments in infrastructure to encourage a shift among consumers towards energy-efficient vehicles (highly efficient ICEs and hybrid vehicles in the short term, electrified vehicles in the medium term), and investments in infrastructure and service quality improvements to stimulate the use of public transport. In addition, Belgium could develop an energy-efficient road infrastructure and encourage energy-saving behavioral changes.

IMPROVING ENERGY EFFICIENCY IN INDUSTRY

In 2005, Industry consumed about 144 million boe or 39 percent of total primary energy consumption in Belgium. The Belgian economy has a high share of energy-intensive industries (Exhibit 10). Three sectors – Chemicals, Iron and Steel, and Petroleum and Gas – account for the majority of Industry's energy consumption[16].

In the BAU scenario, primary energy consumption by industrial activities is expected to fall to 133 million boe by 2030 because of changes in the power generation portfolio, improvements in energy conversion processes, and efficiency gains in certain industrial processes (Exhibit 11).

Our analysis shows a theoretical potential to reduce Industry's primary energy consumption by 29 million boe, to a level 20 percent lower than consumption in 2005 and 22 percent lower than in the 2030 BAU scenario. Fifteen million boe comes from investment-related measures (Exhibit 12), and 14 million boe from behavioral and other non-investment-related measures. Expressed in terms of final energy, this would translate respectively into 11.1 and 10.1 million boe energy savings. At a crude oil price of $62/bbl, 99 percent of the improvement actions would have a positive NPV from a societal perspective. Additional energy savings opportunities – especially coming from major process changes – exist, but the required investments would not be justified by these energy savings alone. Hence the changes would only be implemented when an overhaul or "debottlenecking" would be planned.

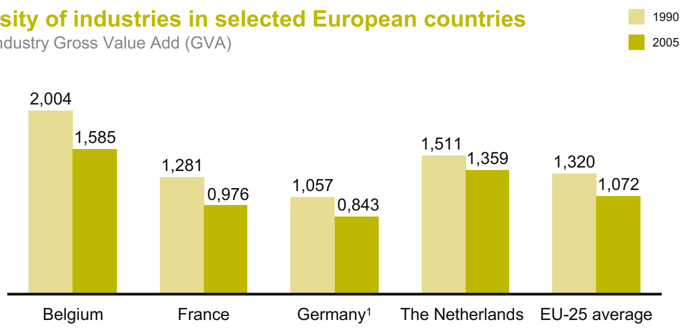
[15] Estimate based on an extrapolation of employment creation data in road transportation in Europe and in Flanders: *Climate Change and Employment: Impact on employment in the European Union-25 of climate change and CO2 emission reduction measures by 2030*, ETUC, ISTAS, SDA, Syndex, Wuppertal Institute, 2007; *EU Energy and Transport in Figures: Statistical Pocketbook 2005, European Commission, 2006; Voorstel van Resolutie tot opmaak van een Groene New Deal voor Vlaanderen*, Groen!, 2009.

[16] For the purpose of this study, all further analyses keep the activity share of energy-intensive industries unchanged over the BAU scenario.

Exhibit 10

Energy intensity of industries in selected European countries

Boe/€ Millions of Industry Gross Value Add (GVA)



	Belgium	France	Germany[1]	The Netherlands	EU-25 average
1990–2005 CAGR[2] Percent	-2	-2	-2	-1	-1
Energy-intensive sectors' share of industry GVA[3] Percent	9.0	5.4	8.6	9.7	8.0

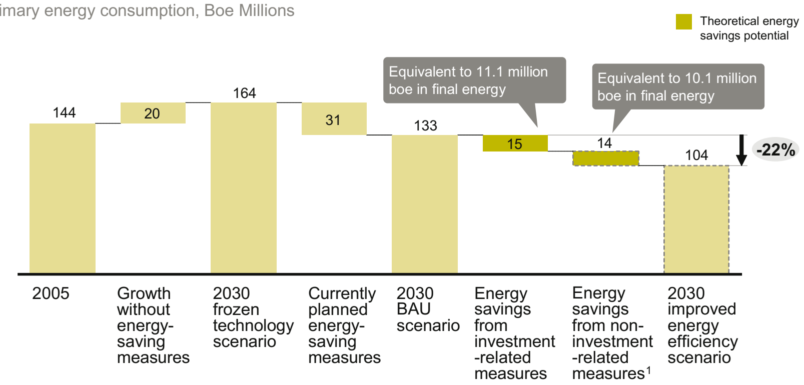
1 For Germany, 1995 has been used as the base because of the closing down of factories after reunification
2 Compound annual growth rate
3 The definition of energy-intensive industries by NTUA (PRIMES forecast 2007): Chemicals; Forest products; Glass; Metals & Metal products; Mining & quarrying; Petroleum Refining; Steel

SOURCE: EuroStat NTUA (PRIMES forecast 2007); Global Insight

Exhibit 11

Scenarios for energy demand evolution in Industry in Belgium

Primary energy consumption, Boe Millions



Examples of measures

- Growth without energy-saving measures:
  - Growth in production volumes
- Energy savings from investment-related measures:
  - Higher penetration of energy efficiency measures, incl. capital-intensive measures
- Energy savings from non-investment-related measures:
  - Higher throughput
  - Lean transformation
  - Energy efficiency optimization mindset and implementation of energy management system

1 Includes behavioral changes

SOURCE: NTUA (PRIMES forecast 2007); McKinsey analysis

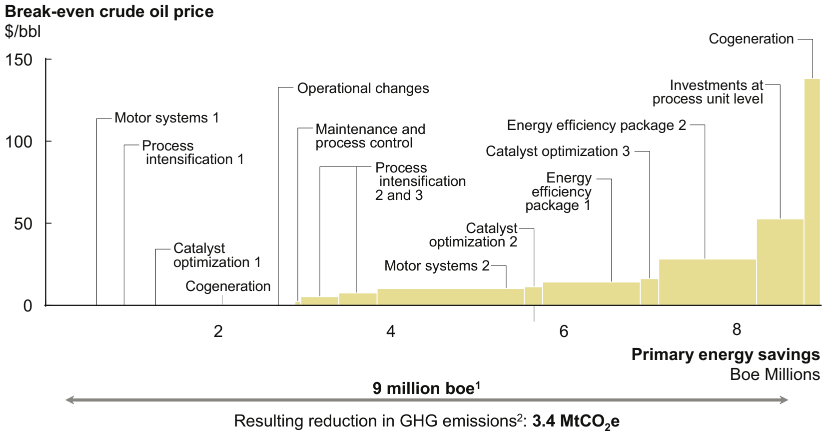
Capturing the full energy savings potential from Industry would require a broad range of general measures – including improving waste heat recovery, installing more energy-efficient equipment, enhancing maintenance to keep equipment in optimal condition, improving process control, balancing utilities production and consumption – and a series of sector-specific initiatives. It would also require a number of non-investment-related measures including improving throughput, applying lean practices, and changing mindsets and behaviors among management teams and the workforce. The total investment required would amount to €5 billion over the period 2010-2030, with an average payback time of 4 years. Increased energy efficiency in Industry would reduce Belgium's GHG emissions by about 11 $MtCO_2e$ compared to the BAU scenario.

An integrated approach to pursuing these measures could include creating a new action plan covering the entire industrial sector, and building on existing efforts setting world-class ambitions for energy efficiency over a longer time horizon. Public and private sector actors would need to coordinate their efforts, such as sponsored audits and consulting, in order to strengthen the support structure for small and medium-sized enterprises (SMEs). To this end, SMEs would also need appropriate incentives and penalties and easier access to capital. Generating an "energy efficiency mindset" throughout the industrial landscape will also depend on providing training for the workforce and management and on behavioral changes in society at large, which could be achieved through education and communication.

Exhibit 12

Theoretical energy savings potential in the 3 most energy-consuming industries in Belgium

Investment-related measures, 2030



1 These numbers only reflect the investment-related potential from the 3 most energy-consuming sectors; the total investment-related energy savings potential for Industry has been extrapolated from this basis

2 Includes non-investment-related measures

SOURCE: McKinsey analysis

BUILDING AWARENESS THROUGH EDUCATION

Observations from other countries show that successfully identifying and capturing energy efficiency opportunities depends on the ability to develop unprecedented awareness of energy efficiency among individuals, companies and authorities.

In the short term, a good deal of "instant" awareness could be generated with customized information campaigns geared towards individuals and companies. In Belgium, the regional and federal governments have already developed such campaigns, especially for the Buildings sector.

However, the best foundation for creating a "continuous improvement" mindset would be to integrate energy efficiency and other energy issues in each and every educational curriculum, whether vocational, technical, general or higher education. Companies and non-profit organizations could participate in developing and delivering some elements of the curriculum, which would help to develop energy saving capabilities among the next generation of employees. Students in vocational training programs, for example, could participate, real-time, in implementing a company's energy management system.

THE NEED FOR AN INTEGRATED LONG-TERM PROGRAM

The various measures that together provide significant potential energy efficiency savings come at different individual costs. Our analysis shows that a comprehensive, long-term program ensuring the measures are adopted as a package is likely to be preferable – and needed if Belgium wants to reach Europe's "20-20-20" goals – to a fragmented approach that cherry-picks the easiest or most profitable measures. A coordinated plan that is communicated early would create a stable investment climate, reduce the duplication of efforts due to fragmentation, and help avoid means being allocated disproportionally to one or more measures over time.

An energy policy roadmap for the next 10 to 20 years would start from a clear vision, have phased objectives and milestones, and include a set of mechanisms (a combination of information, incentives, monitoring and penalties) for implementing identified energy efficiency opportunities. While these mechanisms should be flexible enough to respond to particular economic, technological and environmental developments, they should be sufficiently clear and stable in principle to attract investors. From a societal perspective, the savings generated by the cheapest measures could be used – in part or in total – to pay for the more expensive levers; without such contribution the latter might be difficult to implement.

We hope that the analysis provided in this report will serve as a useful starting point for corporate leaders, policy makers, and other decision makers as they further engage in discussions on how to improve energy efficiency in Belgium.

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