

A visionary Danish energy policy 2025

January 2007



A visionary Danish energy policy

The Government's proposals for a visionary energy policy extend until 2025. However, our time horizon stretches even further into the future. The Government wishes to entirely free Denmark of dependence on fossil fuels. This is an ambitious vision, which will require focused and long-term efforts.

Consequently, it is important that we start now to establish the foundation of a secure energy supply, which is independent of oil, gas and coal alike. In the run-up to 2025 we will double the use of renewable energy and considerably intensify our energy saving efforts.

We in Denmark are well equipped to deal with future challenges in the energy area. Since the 1970s we have shown that we can maintain energy consumption unchanged without this impairing our stable economic growth and competitiveness. We wish this state of affairs to continue.

Our goals require substantial technological initiatives. We will double public expenditure on research, development and demonstration of new energy technologies.

Danish companies are second-to-none when it comes to new and efficient energy technologies. The Government's proposals will underpin continued growth in our exports of energy technology to the benefit of Danish society as a whole.

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Flemming Hansen Minister of Transport and Energy



Photo: Helle Moos

It is the vision of the Danish Government that Denmark should in the long term become entirely independent of fossil fuels – coal, oil and natural gas - which will be replaced by the use of renewable energy.

Today 85% of Danish energy needs are covered by fossil fuels. In the long term this will result in major problems, which the Government will take the initiative in solving:

- Increasingly less reliable energy supplies, as the major deposits of oil and natural gas are concentrated in few and often unstable regions of the world.
- An increasing greenhouse effect, which has major human and economic consequences and which is threatening opportunities for development in large parts of the world.

Denmark has a sound basis from which to handle these problems, as we have long experience in developing new and efficient energy technologies and applying them in practice. It is crucial that energy policy should be as cost effective as possible and sustain continued growth, high employment and competitive advantage. One important aspect of energy policy is to ensure close international cooperation, in particular under EU auspices.

Therefore, the Government wishes to have a long-term energy plan which will provide Denmark with robust and environmentally correct energy supplies. Definite targets must be established and the means of attaining them must be provided. Up until 2025, the Government will:

- Reduce the use of *fossil fuels* by at least 15% compared with today.
- Effectively counteract rises in *overall energy consumption*, which must remain static.

This long-term vision and the specific targets must be achieved through strengthening efforts in the following crucial areas:

- *Efficient energy generation and consumption.* Denmark must continue to enjoy considerable economic growth without this involving an increase in energy consumption, an aim which must be realised through strengthening market-based initiatives.
 - o Energy saving initiatives must grow 1.25% annually.
- *Renewable energy.* The Government will provide set of effective market-based initiatives which in time with the development of new technology will increase the share of renewable energy consumed while ousting fossil fuels.
 - The share of renewable energy must be increased to at least 30% of energy consumption by 2025.
 - The proportion of biofuels used in transport will increase to 10% by 2020. The Government is ready to set up partial targets earlier than 2020 provided that adequately economically competitive and environmentally sustainable technologies have been developed.
- *New and more efficient energy technologies.* We must provide optimum conditions for further research into energy technology by our world class researchers. Up until 2010, the Government wishes to double financial support for research, development and demonstration of energy technology to DKK 1 billion per year. DKK 50 million has already been allocated for an actual fuel cell demo project.

Principles and follow-up

The Government's energy policy proposals are intended to ensure the cost effective fulfilment of its overall supply reliability, environmental and competitive objectives. The initiatives taken will combine

political regulation and market mechanisms to ensure that investment is targeted to obtain the best possible energy supplies and leat possible environmental impact for the money.

The optimum combination of measures needed to promote energy efficiency and renewable energy largely depends on market trends and technological development, both in Denmark, the EU and the rest of the world.

The Government will seek to constantly ensure that energy policy measures are as cost efficient as possible both in the long and the short term. Thus every four years the Ministry of Transport and Energy will establish a decision-making basis for future-oriented energy policy initiatives. This decision-making basis will be founded on renewed research, development and demonstration efforts. Both part targets for the energy saving and renewable energy initiative and specific means will be adjusted with a view to sustaining ambitious and effective energy policies.

In addition, in 2015 an overall halfway assessment of the extent to which targets have been met will be made and initiatives and measures taken will be assessed with a view to, if possible, setting even more ambitious targets.

Trials are at present being made on storing CO2. If technological development indicates that this can be done cost effectively and without harm to the environment, the consequences for energy policy must be examined in greater detail. Naturally, this still lies some years in the future.

Energy policy challenges

The consumption of oil and natural gas is undesirable in that Denmark is dependent on producer countries and insecure maritime and overland transport routes. In addition, the burning of fossil fuels is one of the main causes behind the increasing greenhouse effect, which is increasingly threatening opportunities for economic growth in large parts of the world.

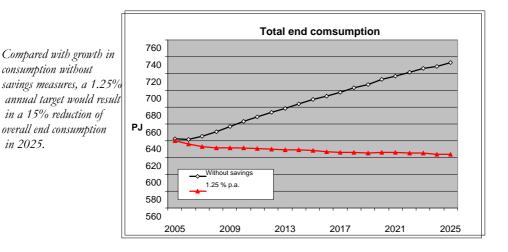
We must ensure that in the future too Denmark is among the richest countries in the world. The Government's energy policy is of major importance in this context. The competitiveness of Danish industry and thus employment and exports depend on competitively priced energy supplies.

The Government is the guarantee of long-term and focused efforts to develop and increase the application of efficient technologies and technologies based on renewable energy. The aim of entirely freeing Denmark from the burning of fossil fuels is ambitious and will involve us being able to supply the whole of our energy consumption from renewable energy sources in the long term. This goal will be easier to achieve if we also keep energy consumption statie. Every single extra unit of energy we use will require the production of more renewable energy, and therefore acting against increasing energy consumption is a central element in the achievement of this goal.

Energy savings

Our overall energy consumption must not rise. And it has not done so since the first oil crisis in 1972 in spite of the fact that we have doubled our economy. This is, in itself, an achievement, which at global level has only been matched by Switzerland and Japan and which has resulted in our economy today being far less sensitive to unstable energy prices than most countries are. We will continue the good work and ensure that our energy consumption does not increase in future either, while as before our economy continues to grow unhindered.

The current energy saving initiative was established in the energy saving agreement of June 2005 and is already ambitious. However, the initiative can be strengthened and made even more efficient to the benefit of energy consumers and society. The Government is eager for this to be the case.



The Government proposes:

in 2025.

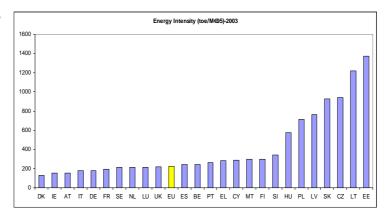
- An energy saving market. From 2010 onwards, households and businesses must have subsidies available for performing energy saving measures in buildings, production processes etc through the sale of energy saving certificates to utility companies. The utility companies can use the certificates to meet their energy saving obligations. The system ensures that energy savings are implemented where they are most cost effective.
- Increased energy saving requirements on utility companies. Opportunities for trading in energy saving • certificates make for more cost effective efforts, providing the potential for increasing the obligations imposed on utility companies to implement profitable energy savings without having to impose new obligations on households and companies.
- Energy savings in sectors not subject to CO_2 quotas. Energy consumption savings must be achieved in • those sectors which are not subject to the CO₂ quota scheme.
- Campaigns to promote energy savings in buildings. The Government proposes allocating funds for information campaigns etc aimed at ensuring greater energy savings over and above the minimum requirements of the building regulations and the energy marking of buildings.



In addition, the Government proposes a number of specific measures to encourage energy savings, including EU initiatives in the transport sector. These initiatives will be supplemented by additional initiatives in connection with the regular reassessment of the energy strategy every four years.

Energy consumption per unit of GDP (Source: The European Commission)

In Denmark, over the last 25 years we have implemented major efficiency enhancements, and this has contributed to Denmark today being the most energy efficient country in Europe.



Renewable energy

Reductions in consumption are not enough. In order to entirely free ourselves from the use of fossil fuels we must gradually replace our current consumption of coal, oil and natural gas with renewable energy. The Government is seeking to send clear political signals to the players we are eager to see make the right investment decisions. It must be possible to rely on stable and long-term framework conditions when making investments in renewable energy. We wish to reward renewable energy for its environmental benefits and for the supply reliability benefits. Moreover, we will remove today's undesirable barriers to increased use.

In Denmark, the primary sources of renewable energy are wind and biomass. We also produce a lot of electricity and heating from waste, which is a valuable resource which would otherwise be lost. Wind power technology is a crucial part of present-day supplies of renewable energy, and there is constant breakneck development in technology in the area. Looking forward to 2025 and the cost effective achievement of our goals, there is much that would indicate that wind power will continue to provide an extremely important contribution. We must already now allow for this in our current planning work.

Past developments:

In the last 20 years the proportion of total energy consumption generated from renewable sources has risen from approximately 5 % to approximately 15 % today.

- Biomass accounts for half of overall renewable energy use.
- Wind turbines generate almost 20 % of all electricity consumed.
- In addition, a considerable proportion of energy comes from the exploitation of waste.

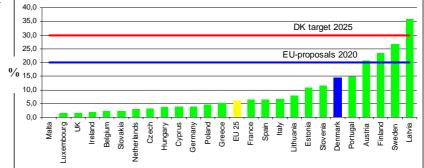
All the technologies we are familiar with and apply today can be improved even more, and entirely new ones may appear. Therefore, we must not rely on certain individual technologies or energy sources alone. On the contrary, we must set up a flexible model for how we can safeguard the transition to renewable energy while maintaining commercial competitiveness. It is crucial that this transition should support efficient and competitive energy markets. The most efficient application of sustainable energy will be underpinned by rules, subsidies and taxes.



The Government proposes:

- An improved and more efficient subsidy system for production the renewable energy. The present renewable energy subsidy scheme (PSO) must be reformed to reduce the unit cost of renewable energy below today's level. The Government's proposals involve the following main principles:
 - The most possible renewable energy for the subsidy spent.
 - o The increased use of tenders and as much competition as possible
 - 0 Increased transparency and predictability regarding subsidy levels
- *More biogas* The Government wishes to promote the use of biogas, which could both contribute to reducing consumption of fossil fuels and emissions of the greenhouse gas methane and solve a waste disposal problem for the farming industry.
- *More wind energy through strategic planning of wind turbine building.* The Government will work to establish a good framework for Danish wind capacity and, among other things, will promote onshore and offshore demonstration and trial sites and draw up an infrastructure plan for offshore wind turbines.
- Improved exploitation of energy from waste. The Government will work to promote the use of the increasing amounts of refuse in central power stations for the highly efficient combined generation of power and heating.
- Rationalisation of the taxation system. Energy levies must be reorganised to support the cost effective use of renewable energy. The Government wishes to promote the cost effective reduction of CO2 emissions by ensuring that the incentives for reducing the burning of fossil fuels are in principle uniform within and outside of the quota subject sectors. The Government will draw up specific proposals.
- *More heat pumps for householders.* The Government wishes to initiate a campaign aimed at promoting the use of energy efficient heat pumps as replacements for worn out oil fired boilers.
- Increased flexibility in the choice of fuels. The Government will continue to promote liberalisation of the current rules for the use of fuels for the generation of electricity and heating, so as to gradually increase the use of biofuels in combined power and heating generation in a manner which is justifiable from the economic and energy standpoints. The Government will draw up specific proposals.

These initiatives will be constantly assessed and supplemented or replaced by additional initiatives in connection with the regular reassessment of the energy strategy every four years.



Renewable energy share of gross energy consumption

NB! In the countries producing a greater share of energy frem renewable sources than DK, much of this comes from hydraelectric power.

New and more efficient energy technologies

Denmark is in the vanguard when it comes to development of the latest and most efficient energy technologies. In addition, we have much valuable experience in applying these technologies in practice.

To achieve the ambitious targets set for the future there is a considerable need for the continued devel-

opment of new energy technologies and for bringing already known but not fully developed technologies to the market. In other words, there is a major need for testing a large number of energy technologies in practice – and this is an extremely costly process. Investors and consumers must be able to perceive a long-term financial and economic benefit in investing in these technologies. Only in this way will we be able to ensure the sustainability of the strategy we are now laying down for the future.

Thus, research, development and demonstration are the cornerstones of a cost effective energy strategy capable of bridging the gap between the objectives and



means with which we are familiar today and the objectives we are seeking to achieve in the longer term. Consequently, the Government wishes to increase overall energy technology development efforts.

At the same time, the Government sees a potential in focusing a considerable part of the increased efforts on promoting technologies which are of particular interest when it comes to supporting Danish objectives and stronghold positions. Examples of the most promising technologies are 2G biofuels and other uses of biomass for energy purposes, hydrogen and fuel cells, wind power and energy efficiency, especially in buildings.

The Government will focus a considerable part of overall efforts on selected technology areas with a view to underpinning its energy policy goals as much as possible:

- Development of second generation biofuels for transport. To underpin the goal of increased use of biofuels in transport, the present already adopted initiative will be reinforced. Thus it will ensure that before 2010 full-scale trial facilities can be set up in Denmark.
- Development of wind power. Denmark must retain its present strong position in the wind energy sector. As an initial step, the Government proposes encouraging the erection of demo and prototype wind turbines and the Government will ensure there are suitable installation sites for new wind turbines.
- Development of hydrogen and fuel cells. There is great potential in the development of hydrogen and fuel cells for the efficient generation of energy and the increased use of renewable energy. Specifically, the Government will promote a demo project for micro combined heat and power systems based on fuel cells, an area in which Denmark could be a leader in the international arena. In the longer term, Danish fuel cells may also have great potential in the transport area.
- Development of low energy building. We need to develop improved components and solutions capable of considerably reducing the extra costs associated with low energy building and energy efficient renovations. Besides reducing energy consumption, the initiative must focus on indoor climate.

The Government proposes:

• An energy Technology Development and Demonstration Programme. A new government financed programme for the development and demonstration of energy technology will be set up. We must seek to establish internationally competitive project consortia made up of the best Danish research expertise from companies and research institutes. • *More funding for energy research.* Overall investment in the development of new technology for efficient energy production and the use of renewable energy must be increased. The Government is already leading the way and is awarding increased funding from the globalisation pool. This increase must continue, and total public research funding must be doubled by 2010 to a total of DKK 1 billion annually.

Transport

A modern society cannot function without mobility. As individuals we must be able to move from place to place and products must be transported between suppliers and producers and out to the consumer. This requires energy. Today, the transport sector is almost entirely reliant on oil, and there are as yet no competitive alternatives. Thus the sector consumes 60% of the oil used in Denmark, and this is a particular challenge with regard to supply reliability and the greenhouse effect.

The absence of sustainable energy sources and quota regulation in the transport area also means that the energy consumed by the sector results in considerable CO2 emissions and is a considerable burden on Danish climate accounts under the Kyoto Protocol. Consequently, the Government will work to achieve efficiency enhancements and, in the long term, reform energy consumption by the transport sector.

For the time being, the most cost effective initiatives in the transport area can only be undertaken under EU auspices. The EU's single market rules restrict Denmark's opportunities for going its own way in establishing norms and standards in the transport area. Moreover, the automobile industry is global and a purely Danish initiative in this area would have very little effect.



The EU already has a voluntary agreement with the automobile industry on vehicle energy efficiency. Denmark has proposed working towards a tightening up of these agreements or a review of the regulations.

The Government will also support the process of transforming energy consumption in the transport sector through national initiatives:

- *Biofuels for transport.* The proportion of biofuels used in transport will increase to 10% by 2020. The Government is ready to set up partial targets earlier than 2020 provided that adequately socio-economically competitive and environmentally sustainable technologies have been developed. Denmark already makes extensive use of biomass in the production of electricity and heating this provides the greatest possible environmental benefits for the money. 11% of Danish energy consumption comes from biomass compared with 4% for the EU as a whole. Denmark leads the way in Europe.
- *Tax exemption for hydrogen powered cars.* With a view to promoting the conversion of energy consumption in the transport sector from fossil fuels to alternative fuels, the Government will exempt cars which are powered by hydrogen from tax.

Development of EU initiatives

Collaboration with the EU opens up a number of opportunities for efficiently promoting the realisation of a visionary energy policy towards decreased dependence on fossil fuels. Moreover, the negative impact on competitiveness can be limited by implementing initiatives together with the EU. The Government will actively work towards developing and exploiting these opportunities in areas wherever possible and appropriate.

We need long-term goals and thoroughly well prepared initiatives here in Denmark and in the EU context. With its draft strategic energy plan for Europe the Commission has created a sound and futureoriented foundation for further discussion of a stronger European energy policy within the EU. In general, the Government supports these efforts and is actively working to promote Danish points of view in this context.

Infrastructure

High supply reliability also depends on efficient markets and efficient electricity and natural gas supply networks. It is the aim of the Government that the overall energy infrastructure should conform to principles which in general support efficient and competitive energy markets.

The commissioning of increasing amounts of wind power and other renewable energy requires the well organised expansion of the *electric power grid*. The Government has taken the relevant steps in this regard to update the 1997 offshore wind turbine action plan.

The Government proposes:

- Localisation of offshore wind farms. The location of future offshore wind farms must be determined so as to allow for the long-term development of the electric power grid.
- *Expansion of the electric power infrastructure.* The electricity infrastructure must be expanded in time with an increased wind turbine construction rate, where in general this is socio-economically beneficial.

Given the known natural gas reserves in the North Sea, it has been predicted that Denmark will need to import natural gas from around 2015, and therefore we must continue to focus on the efficient extraction of oil and natural gas. In addition, within the not-too-distant future the need to establish a new *natural gas infrastructure* in order to obtain access to either Norwegian or Russian natural gas reserves will probably arise.

The Government proposes:

• *Expansion of the natural gas infrastructure.* We must ensure the necessary expansion of the natural gas infrastructure to open access to natural gas reserves. The need is expected to arise within the not-too-distant future when Danish natural gas production starts to drop off.

Review of specific energy policy measures

Cost effective action

The Government's energy policy proposals are intended to ensure the cost effective fulfilment of its overall supply reliability, environmental and competitive objectives. The instruments used will combine political regulation and market mechanisms to ensure that investment is targeted to obtain the best possible energy supplies and least possible environmental impact for the money.

Renewable energy

The highly efficient application of renewable energy will be underpinned by rules, subsidies and levies. The Government has already made reforms to the subsidy schemes and has involved the market more closely in the development of renewable energy. However, there is still major potential for doing things better and more efficiently than is the case today.

Specific measures for promoting renewable energy

The Government proposes:

- A new, efficient market-oriented subsidy system for the promotion of renewable energy. The present renewable energy subsidy scheme (PSO) must be reformed to reduce the unit cost of renewable energy below today's level. The Government's reform proposals involve the following main principles:
 - o The most possible renewable energy for the money
 - o The increased use of tenders and the maximum possible competition
 - 0 Increased transparency and predictability regarding subsidy levels
- **Increased flexibility in the choice of fuels:** The Government will continue to promote liberalisation of the current rules for the use of fuels for the generation of electricity and heating, so as to gradually increase the use of biofuels in combined power and heat generation in a manner which is justifiable from the economic and energy standpoints. The Government will draw up specific proposals.
- *Improved exploitation of energy from waste:* The Government will work to promote the use of the increasing amounts of refuse in central power stations for the highly efficient combined generation of power and heating.
- **Rationalisation of the levy system:** Energy levies must be reorganised to support the cost effective use of renewable energy. The Government wishes to promote the cost effective reduction of CO2 emissions such that the incentives for reducing the burning of fossil fuels are in principle uniform within and outside of the quota subject sectors. The Government will draw up specific proposals.
- *Strategic planning of wind turbine construction:* Denmark has a leading position in the international wind turbine market, and this must be retained and developed further. The Government will act on the recommendations of the wind turbine committee to ensure improved onshore wind turbine planning. In addition, the Government will work to promote demo and trial sites for onshore and offshore wind turbines, and finally, based on the wind turbine committee's report, the Government will elaborate a follow-up infrastructure plan for offshore turbines.

- *Creating the framework for maintaining and expanding wind power capacity:* The present wind power capacity must be constantly renewed in order to maintain the current major contribution of wind power to electricity supplies. The Government will create the necessary framework for maintaining the present capacity and the expected expansion with additional capacity.
- *More biogas:* Biogas is a renewable form of energy with low environmental impact. The use of biogas for the generation of heat and power will contribute to reducing dependence on fossil fuels. Moreover, its use will solve a waste disposal problem for agriculture and reduce emissions of methane (which is a greenhouse gas). For this reason, the Government is seeking to promote the use of biogas.
- *More heat pumps for householders:* Outside of collective supply areas, heat pumps are often the most environmentally friendly and energy efficient forms of heating. Heat pumps are also more profitable from the point of view of personal finances, and as a result the Government wishes to initiate a campaign aimed at promoting the use of energy efficient heat pumps as replacements for worn out oil-fired boilers. DKK 15 million annually will be earmarked for this purpose in 2007 and 2008.

Energy savings

The energy saving agreement of 10 June 2005 between the Government and a broad range of parties has resulted in the implementation of a number of specific initiatives to increase and enhance the efficiency of energy saving efforts to the benefit of energy consumers and society as a whole. These initiatives include the creation of a new framework for utility companies' energy saving efforts, and a number of specific initiatives have been taken to reduce energy consumption.

However, the strength and efficiency of Danish energy saving efforts can be further enhanced, and among the keys to such enhancement is the offering of incentives to actively participate in energy saving initiatives to more groups of players than was previously the case. At the same time, it is important to increase the transparency surrounding energy saving options.

Therefore, with these moves the Government is seeking to continue efforts aimed at a more market oriented and cost effective approach to energy saving. The aim is to realise a larger part of the economically profitable energy savings.

Specific initiatives aimed at promoting energy savings

The Government proposes:

- An energy saving market: Based on the assessment of the energy saving agreement, in 2008 energy saving efforts will be expanded into a fully developed system with energy saving certificates aimed at establishing the savings on a more market-oriented foundation and in a more cost effective manner.
- *A high energy saving requirement:* Moreover, based on the assessment in 2008 increased demands will be made on company efforts in connection with the certificate scheme. For example, this might involve an increase in annual obligations from the current approximately 3 PJ/year to approximately 5 PJ/year.

- *Energy savings in the sector not subject to quotas:* Improved incentives to reduce energy consumption must be offered to the sectors not subject to quotas with particular focus on the reduction of oil and gas consumption. The initiative should have a considerable CO2 impact in the quota allocation plans for 2008-2012. The initiative should be implemented either through 1) a pool of focused company subsidies of DKK 150-200 million per year from 2007 to 2009 or 2) a reorganisation of energy levies.
- *Campaigns for energy savings in buildings:* It has been proposed to allocate DKK 20 million annually from 2007 to 2010 and then DKK 5-10 million annually for focused campaigns etc aimed at ensuring the realisation of energy savings in existing buildings. The campaigns should primarily support the minimum requirements established in the building regulations and the energy marking of buildings, which identify a number of specific savings opportunities in each building. Thus the campaigns should increase awareness of the various requirements and savings options and thus contribute to ensuring that these are complied with or realised. Specifically, the initiative might, for instance, consist of focused campaign and information efforts aimed at craftsmen, consultants, developers and building owners.
- *The charting of barriers:* The barriers to energy savings in legislation will be charted with proposals for dealing with them via, for instance, changes to legislation, information, access to loans etc. Charting in this manner should include conditions relating to rented housing, including in the private sector and relative to the public sector. A more detailed analysis of the financing options for possible increased energy savings efforts will be carried out.
- *Flexible electricity consumption:* Promotion of flexible price electricity consumption, including evaluation of whether increased flexibility in consumption by rendering visible day-to-day consumption and relevant prices might also contribute to reducing consumption. Among other things, studies will be made of whether there is a need for public bodies to issue common standards and functional specifications with regard to the replacement of meters, and if so, clarification of the standards needed. The aim would be to ensure that utility companies which set up remote reading of meters etc on their own accord invest in metering equipment which will open up and support competition in the market.
- **District cooling:** An analysis of the technological and economic implications of the use of district cooling and the regulatory conditions applying to the use of district cooling as a possible alternative to other individual types of cooling.

New and more efficient energy technologies

The key to achieving the long-term vision of independence from fossil fuels is that we develop new technologies which will enable us to reduce the price of energy savings and the use of renewable energy. Such development would both underpin the cost effective achievement of energy policy goals and create the basis for future Danish exports and employment. At present, development is proceeding in a number of countries each with its own strengths.

Denmark is already making major investments in the development and use of more efficient energy technologies, but we must be even better at transforming and applying new knowledge, both that which we already have and that which we can achieve in close collaboration with international partners.

Therefore, the Government will work to optimise research efforts in order to enable the development of the best energy technologies and bring these to the market in close collaboration between the public and private sectors.

Specific initiatives aimed at promoting more efficient energy technologies

The Government proposes:

- An energy Technology Development and Demonstration Programme. The establishment of a new government-financed research programme with principal emphasis on the demonstration of energy technology and the building up internationally competitive project consortia made up of the best research expertise from companies and research institutes.
- *More funding for energy research:* Overall investment in the development of new energy technology must be increased. The Government is leading the way and is awarding increased funding from the globalisation pool. The increase will continue and, from 2010 onwards, overall public research funding will have doubled and will amount to DKK 1 billion p.a. The new funding must be aimed specifically at development and demonstration particular in the areas of:
 - 2G bio-ethanol, possibly in conjunction with other biomass applications for energy purposes
 - Hydrogen and fuel cells for the production of electricity and heat, and later in transport
 - Wind power, primarily relative to the commissioning of more offshore wind farms, including the reduction of costs
 - *Low energy buildings.* Improved components and solutions capable of considerably reducing the extra costs associated with low energy building and energy efficient renovations must be developed.
- **Development of second generation biofuels for transport:** Growth in oil consumption in transport is particularly problematical with regard to supply reliability and the greenhouse effect. Funds have already been allocated for 2G bioethanol. This initiative must be strengthened with a view to ensuring the setting up of full-scale testing facilities in Denmark. The object is to support the goal of increasing the use of biofuels for transport.
- **Promotion of fuel cells:** In 2007, DKK 50 million is being allocated to promote a specific fuel cell demo project.

An aggressive energy research initiative

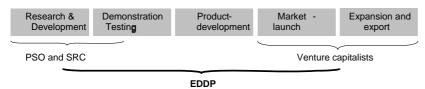
Considerable funds already go to research and development in the energy sector today, and many Danish technology companies, energy companies and research institutions are in the vanguard of development within a large number of new technologies.

To strengthen efforts towards the development of new energy technologies the Government has allocated funds from the Globalisation Pool to set up a new Energy Technology Development and Demonstration (EDDP) Program. The commercial focus of the program must be greater than has hitherto been the case. In addition, we also have the present Energy Research Program and support programs under Energinet.dk and the Ministry of Science (PSO and the Strategic Research Council respectively), and the Hi-Tech Fund, which will be granted increased funds in the run-up to 2010, and which supports new energy technology projects.

EDDP aims to optimise overall research efforts, besides it being possible to use the extra funds to satisfy many more qualified applications than hitherto, where experience shows that only about half of the fully subsidy entitled projects have received grants.

Furthermore, this facilitates increased focus on the demonstration phase and thus projects with tangible commercial prospects. Large-scale demonstration projects with possible integration with the existing electricity and heating system are considerably more expensive than the research and development projects typically supported up to now. Today, the lack of opportunities for prioritising demonstrations is one of the greatest barriers to the development of new energy technology prior to actual market maturing and commercialisation.

The focus of the Energy Technology Development and Demonstration Program



It is the Government's ambition for the EDDP to contribute to creating new sustainable driving forces in the energy sector by supporting promising projects which have passed the research stage but which are as yet not mature enough to attract commercial investors. Therefore the Government is committed to applying competition-promoting allocation principles to developing the best energy technologies through international competitive project consortia.

In line with the Government's report on promoting environmentally efficient technology, overall it is committed to supporting longer-term projects whereby the interplay between private companies, public bodies and universities is strengthened and applied in the best possible way.

Today, Denmark possesses a number of technological strong points in the energy area. By intensifying research efforts, in the long term several of these will become obvious candidates for developing key technologies, thereby establishing a foundation for Danish energy technology to enjoy global commercial success in the long term.

Wind power

In 2006, a public-private wind power partnership was established with representatives from the industry, research institutions, authorities and users. The partnership would indicate that the long-term visions for the development of Danish wind energy will include:

- Denmark continuing to be the centre of global expertise on wind energy technology and wind energy research, and
- The fact that wind energy can be produced at competitive prices.

The goal for 2010 is to be able to construct even more reliable wind power stations, which are fully competitive with conventional power stations.

From the industry we are seeking means and opportunities for the installation of demonstration and prototype wind turbines so that Denmark can continue to act as

the display window for the wind turbine industry. The commissioning of Danish offshore wind farms is an important step in this direction, which may well be followed up by research funds and opportunities for demonstration onshore.

Hydrogen and fuel cells

A public-private partnership for hydrogen and fuel cells was set up in Denmark in 2006. Today, hydrogen and fuel cells are at the stage where complete plants can be built based on a number of different fuel cell types. However, none of these are so developed that they could fully compete with traditional electricity and heat generating plants on price, service life and energy efficiency.

In Denmark, we are firstly committed to the development of fuel cell technology primarily intended for use within niche areas (backup power plants, forklift trucks and handicap vehicles etc). In time, the experience gained here can be applied to expanding use to such areas as those of combined heating and power and transport.

A Danish initiative involving the development of micro combined heating and power stations based on hydrogen and fuel cells is also in progress with the development and demonstration of efficient and competitive technologies and systems. During a period of transition the initiative will be based on natural gas as fuel and later on renewable energy, and Denmark has an opportunity to situate itself among the best in the world.

At present, there are plans for a demonstration project for natural gas-based micro combined heating and power stations based on Danish fuel cells. The parties are seeking part financing by the public sector for the project, which over a number of years will introduce fuel cells into private homes for the production of heating and electricity.

Biofuels for transport

Today, it is technologically possible to produce small amounts of ethanol with the new technology, and in a number of countries the basic technology has been developed and tested on a laboratory scale and in large-scale experimental facilities. The challenge is to be the first in the world to come up with the competitive production of full scale 2G plants.

The ambition of the Danish partnership is to gather all the primary players with a view to implementing the necessary development process in close collaboration with the new development program for 2G bio ethanol (under the EDDP) and with a view to subsequent commercialisation.

The partnership's first milestone will be to work together towards and construct a large-scale demonstration facility in 2010 with plant and operating support from the new bio ethanol program. In this way the Government's bio ethanol program will also fulfil its mission. Subsequently, further work must be done on competitive production, which it is expected may be achieved within 5-10 years if circumstances are favourable.

Low energy buildings

In conjunction with the reduction of energy consumption in new and existing buildings there is considerable need for increased research and development efforts into energy efficient components and overall systems and not least the demonstration of these in practice. Besides reducing energy consumption, the initiative must focus on indoor climate. We need to develop improved components and solutions capable of considerably reducing the extra costs associated with low energy building and energy efficient renovations. Specifically efforts must help ensure:

- A drastic reduction in energy consumption in new buildings while providing a good indoor climate. The intention is to reduce energy consumption over 15-20 years to 25% of the current requirement. An initiative of this kind must be viewed in the light of the planned tightening up of energy requirements in the building code and help ensure that such a tightening of requirements does not make buildings considerably more expensive.
- That through the renovation of existing buildings over the next 30-50 years we can achieve a halving of heating consumption at a reasonable price. Renovations must allow for architectural considerations in the building and ensure good indoor climate.

Clean Coal (CO2 separation and storage)

The underground storage of CO2 is one option for reducing emissions, which requires that CO2 is separated from exhaust gases or fuels and that there are suitable geological formations where the released CO2 can be stored underground. In Denmark a considerable share of electricity is based on generation using coal, which is in general an extremely rich source of energy. However, because of the greenhouse effect there may be a need to develop cost-effective methods for the separation of CO2 and its storage underground.

Denmark leads internationally with regard to knowhow on the storage of CO2.

Since 1999, Denmark has been participating in GESTCO (Geological Storage of CO2 from Combustion of Fossil Fuels), which is supported by the EU. The GESTCO project has concluded that in Denmark there are attractive opportunities for the storage of CO2. Moreover, an EU project has investigated possibilities for storing CO2 underground at Kalundborg. Finally, a pilot plant has been installed at the DONG Energy power station in Esbjerg for the cleaning of coal-fired power station exhaust gases with subsequent storage.

Nevertheless, the International Energy Agency, the IEA, has concluded it can only be economically viable to separate and store CO2 underground in connection with the building of new large power stations. In fact, the IEA has calculated that the separation and storage of CO2 would add some 20-25 øre to the kilowatt price. Danish calculations indicate that the cost could be anything up to double that.

Efficient exploitation of Danish oil and gas deposits

For some years in the future the efficient exploitation of Danish oil and natural gas deposits will continue to contribute to Danish growth and welfare and provide a strong framework for a smooth transition towards the reduced use of fossil fuels in energy supplies. If oil reserves are to last longer than 15-20 years and natural gas reserves longer than 10-15 years, merging into a subsequent gradual increase in the share of imports, new technologies which increase extraction rates must be constantly developed and applied.

Danish oil companies are highly skilled in extraction from lime fields, and this experience is becoming increasingly attractive in other parts of the North Sea and in other regions of the world where Danish companies operate today. Moreover, efficient expansion and operating concepts have been a precondition of Danish North Sea oil extraction. Against this background, both the Danish oil companies and the many Danish subcontractors are already today attractive partners in other countries' oil extraction activities and for other branches of the Danish and international energy sector.

Solar cells

Denmark has a number of strengths within the solar cell area. Several Danish companies are global leaders within their niche areas (including silicon and so-called inverters for solar cells). These companies are typically subcontractors to large international companies which manufacture the actual cells and solar panels.

In addition, in recent years Denmark has developed architectural design concepts and integrated solar panels in buildings, which together with manufacturing companies are providing a promising foundation for development and exports, especially to the German market, which is in a stage of powerful growth at the moment.

Finally, the commitment of the power companies to the solar cell area is also a Danish strength, which has been underlined in international assessments of Danish solar cell efforts.

Other technologies

Work is being done on the development of a number of different technologies for the exploitation of wave power, and a number of test facilities have been set up in Denmark. The technologies concerned are still at the initial development stage, but in the long run may prove to have a certain potential.

District cooling is a ready-developed technology where the primary challenge is to assess exploitation options and suitability to the Danish market and export prospects in the light of the strong Danish position within the district heating area.

Fusion energy, which has extremely long-term prospects, is an area of special priority within the EU energy research program, in that more than half of the funds for this are being used to promote a joint European research project into fusion energy.

The transport sector

As far as energy policies are concerned, energy consumption by the transport sector is particularly challenging. The transport sector consumes 60% of the oil used in Denmark, and is today almost entirely dependent on oil. As a result, this sector is especially vulnerable.

Moreover, there are no simple re-alignment options. In a situation of uncertain supplies and possibly drastic fluctuations in oil and gas prices, heating and electricity can be produced from other fuels - but the same does not apply to the transport sector.

The absence of renewable energy sources and quota regulation in the transport area also means that the energy consumed by the sector results in considerable CO2 emissions, and therefore, embarking upon enhancing the efficiency and re-formation of energy consumption in the transport sector is only a matter of common sense.

The most cost effective initiatives in the transport area may only be undertaken under EU auspices. The EU's single market rules restrict Denmark's opportunities for going its own way in establishing norms and standards in the transport area. Moreover, the automobile industry is global and a purely Danish initiative in this area would have very little effect.

The EU already has a voluntary agreement with the automobile industry on vehicle energy efficiency. We must work towards tightening up these agreements or we must review the regulations. Against this background, in its EU energy initiative – A Joint European Energy Policy - Denmark has proposed:

- More energy efficient cars
- Requirements to limit tyre rolling resistance
- Increased energy efficiency in maritime and air transport

The Government will also support the process of transforming energy consumption in the transport sector through national initiatives.

Specific national initiatives in the transport sector

The Government proposes:

- **Promotion of biofuels:** The proportion of biofuels used in transport will increase to 10% by 2020. The Government is ready to set up partial targets earlier than 2020 provided that adequately socio-economically competitive and environmentally renewable technologies have been developed.
- *Tax exemption for hydrogen powered cars:* With a view to promoting the conversion of energy consumption in the transport sector from fossil fuels to alternative fuels, the Government will exempt cars which are powered by hydrogen from tax.

Optimum development of the electricity and gas infrastructure

It is the aim of the Government that the overall energy infrastructure should conform to principles which in general support efficient and competitive energy markets, and consequently the Government's ambition is that new infrastructure initiatives should be based on the following grounds:

- Extensive market flexibility and free competition both in Denmark and in relation with the other Nordic and European markets
- Maintaining the reliability of supply
- Efficient and environmentally correct utilisation of the production and transmission system

The electricity infrastructure

The electricity infrastructure should underpin supply reliability, competitive electricity prices and the environmentally correct utilisation of the production and transmission system through the application of efficient and free competition.

The commissioning of increasing quantities of wind power and other renewable energy resources significantly changes the demands on the electricity system. Both large scale wind power production and local technologies for the production of renewable energy, such as micro combined heat and power, fuel cells and solar cells, require the correct design and management both of local networks and the overall supply grid, and this requires well organised electricity grid expansion.

One important aspect of future planning will be the greatest possible clarification of which geographical areas are suitable for the construction of offshore wind turbines, how many wind farms there will be room for in each area and the possible prioritisation of the order in which each location should be developed. In this context, the Government has taken the initiative to update the 1997 offshore wind turbine action plan. The survey work will be submitted to the Danish Energy Authority at the beginning of 2007.

Specific initiatives relative to the electricity infrastructure

The Government will ensure:

- That the location of future offshore wind farms is determined so as to allow for the long-term development of the electric power grid.
- That the electricity infrastructure is expanded in time with an increased wind turbine construction rate, where in general this is socio-economically beneficial.

The natural gas infrastructure

Given that the natural gas market involves trading across national boundaries, the supply situation must be viewed from the broad perspective, including geographical availability and infrastructure rather than the domestic production perspective.

The present known North Sea natural gas reserves would indicate that Denmark may need to start importing natural gas from around 2015. Therefore, within the not-too-distant future the need will also arise for the construction of a new natural gas infrastructure aimed at obtaining access to either Norwegian or Russian natural gas reserves.

Specific initiatives relative to the natural gas infrastructure

The Government will ensure:

- That focus will remain on the efficient extraction of oil and gas.
- The necessary expansion of the natural gas infrastructure to open access to natural gas reserves. The need is expected to arise within the not-too-distant future when Danish natural gas production starts to drop off.

Follow-up

The Government will seek to constantly ensure that energy policy instruments are as cost efficient as possible both in the long and the short term. Therefore, the Government will constantly monitor and measure the application and effects of the instruments chosen. It is important that the latest knowledge and technology which the market and research can provide should be brought into the realisation of objectives. Based on the renewed efforts in research, development and demonstration, every four years the Danish Ministry of Transport and Energy will draw up the decision-making basis for future-oriented energy policy instruments.

APPENDIX

The Danish approach to the EU energy policy – "A Joint European Energy Policy" 12 October 2006

Denmark

A Comprehensive Energy Policy for Europe

The global demand for energy is increasing. Oil prices have tripled within a few years, with gas prices following. The EU's dependence on imported oil and gas is rising, and the supply situation is suffering from a lack of investments. In the future, the EU runs the risk of becoming dependent on imported energy from only a few regions in the world, notably the Middle East, North Africa and Russia.

EU energy policies and measures must contribute to reducing emissions of CO2 and other environmentally damaging substances and to fulfilling the EU's obligations, cf. the conclusions of the European Council regarding achievement of the two-degree target. The EU must take the lead in the fight against global climate change by means of a responsible energy policy, i.a. through energy efficiency improvements and renewable energy.

In March 2006, the Commission presented a Green Paper on sustainable, competitive and secure energy for Europe. The Green Paper and the Conclusions of the Spring Summit of the European Council provide a good basis for the creation of a coherent and coordinated European Energy Policy.

The overriding objectives of the EU Energy Policy should continue to be:

- Security of energy supply
- Environmental protection, including climate change mitigation
- Competitiveness

The EU Energy Policy must be based on markets and competition. Effective interaction between the contribution from energy efficiency and the choice of energy sources and technologies is necessary, bearing in mind Member States' free choice of energy mix.

Ensuring a well-functioning internal market for energy for Europe is essential in order to safeguard security of energy supply. In this context, there is a significant need for ensuring further investments in European energy infrastructure – especially in cross-border interconnections.

On this basis, Denmark proposes that a comprehensive energy policy for Europe aimed at reducing EU dependence on fossil fuels should be based on the following objectives and initiatives:

The EU should be the most energy efficient economy in the world. Setting an ambitious energy efficiency target must be seen as a contribution towards strengthening the development and utilisation of new technology. Hence, an increased focus on <u>energy efficiency</u>, also in the transport sector, is necessary:

• With a view to reducing dependence on the import of energy and at the same time achieving the environmental targets, a binding energy savings target amounting to 1.15 per cent annually, including transport, for the EU as a whole and for Member States individually up to 2017 must be adopted. The ambition will be to maintain this objective up to 2025. In

National Energy Action Plans, the Member States must give an account of the way in which the total energy savings target is expected to be distributed over the individual sectors.

• The EU should establish binding minimum standards for the energy efficiency of new passenger cars and light trucks (more kilometres per litre) through ambitious agreements with the automobile industry and direct regulation. etc.

Increased focus on renewable energy:

- The EU must adopt a target of a 15 per cent renewable energy share of EU energy consumption by 2015. Denmark prefers binding targets, fully respecting the individual Member State's different possibilities.
- Before 2015, a decision should be taken regarding the adoption of a new target for 2025. This target should be at least 20 per cent and up to 25 per cent, depending on technological developments.

Member States must have full freedom to decide how to fulfil these targets, but at the same time they should be required to report on the initiatives taken in order to reach the targets in their National Energy Action Plans. Member States' individual contributions to the achievement of the overall EU target for renewable energy should be negotiated separately.

The most efficient way of ensuring the achievement of targets is by using market-based schemes, thereby ensuring a resource-efficient effort. Efficient and co-ordinated economic instruments must be established at EU level in order to ensure energy savings and the promotion of renewable energy. In order to fulfil this purpose, Denmark proposes:

• That the Commission explore the possibilities of promoting renewable energy and energy efficiency by establishing markets in Europe for certificates for energy savings and certificates for renewable energy in the electricity sector. Such markets presuppose binding targets for the promotion of renewable energy and energy efficiency.

The <u>internal market</u> for electricity and gas must be strengthened in order to contribute to economic efficiency, ensure security of energy supply and reduce price fluctuations. Specifically. Denmark proposes:

- That the rules of the internal market be strengthened and further developed with the aim of improving competition and infrastructure;
- That solidarity regarding gas supplies be strengthened;
- That the Commission be requested to submit a plan for the development of European electricity and gas networks, possibly based on regional development plans, with the aim of securing energy supplies and enhancing the scope for trade.
- That the Commission draw up an action plan proposal for the development of offshore wind farms in EU territorial waters as well as a plan for the associated electricity infrastructure;

In the long term, a <u>focused R&D</u> effort with the aim of developing new and cleaner means of energy supplies is crucial. Hence, Denmark will endeavour to achieve the following in the EU:

- That EU funds for research and development of renewable energy and energy efficiency be doubled in connection with the mid-term review of the 2007-13 budget and the next budget period;
- That R&D funds be offered in open competition in order to spur competing research environments. encouraging efficiency and adaptability and thereby enhancing the EU's opportunities for taking a global lead in the development of new energy technologies.

The attached annex provides further details concerning the proposals mentioned above and contains a number of specific proposals for policies and measures.



Copenhagen, 1 6 OCT 2006

President of the European Commission Mr. José Manuel Barroso European Commission Rue de la Loi 200 B-1049 Bruxelles Belgium

Dear José Manuel Barroso,

A Danish contribution to an Energy Policy for Europe and beyond

At the informal summit in Lahti on 20 October Heads of State and Government will have the opportunity to engage in the discussion of a common European Energy Policy with a particular view to the external dimension.

I welcome the fact that energy has been given a prominent place on the European agenda by the Commission Green Paper on "A European Strategy for Sustainable, Competitive, and Secure Energy".

Europe faces an immense challenge. The EU's dependence on imported energy, primarily oil and gas, is predicted to rise from 56 % today to almost 70 % in 2030 unless we act now. As a consequence, the EU faces the prospect of becoming increasingly dependent on energy supplies from unstable regions in the world.

In the light of this challenge, I am pleased to enclose a Danish contribution to the future EU Energy Policy, backed by a large majority in the Danish Parliament, aiming at reducing the EU's dependence on fossil fuels. A European Energy Policy based on this aim will also significantly enhance the EU's contribution to fighting global climate changes and reduce air pollution.

A key message is that the EU must put its own house in order as a precondition for a coherent external EU policy on energy. We strongly believe that markets and competition are keywords in this process. Denmark proposes a number of concrete actions in order to ensure the completion of the <u>internal EU market for energy</u> leading to enhanced competition and cross-border energy infrastructure.

Moreover, the EU should focus on <u>increasing energy efficiency</u>. The EU should be the most energy efficient economy in the world.

Our experience in Denmark shows that we can maintain economic growth and reduce the dependence on fossil fuels. During the last 25 years, Denmark's economy has grown by more than 50 % but there has been no increase in the consumption of energy. A key initiative has been a widespread introduction of combined heat and power. The Danish experience also underlines that a strategy in line with the Danish contribution can go hand in hand with increased employment, growth, and welfare.

Also, the EU has to set new ambitious goals for increasing the share of internally produced <u>renewable energy</u>.

Finally, the EU should strengthen its efforts within the area of <u>Research and</u> <u>Development</u> in renewable energy and energy efficiency.

Denmark would welcome a Commission analysis on the effects of adopting an EU Policy based on the elements in the Danish contribution on economic growth, the environment including CO2 emissions etc.

As regards the external dimension of the European Energy Policy, we should aim our common dialogue with the major external producer, transit, and consumer countries, at promoting the core values of EU's internal Energy Policy.

An external Energy Policy based on diversification of external EU energy sources should be combined with an effort to ensure effective open markets, increased energy efficiency, and focus on renewable energy in third countries. This will further contribute to the EU's ambition of fighting global climate changes.

Denmark looks forward to participating in the debate on the future European Energy Policy in the run up to the spring European Council.

Yours sincerely, Huden top 17

Anders Fogh Rasmussen

Denmark

Annex to: A Comprehensive Energy Policy for Europe

Detailed and supplementary Danish proposals.

Energy efficiency

With a view to reducing dependence on the import of energy and at the same time achieving the environmental targets. a binding energy savings target amounting to 1.15 per cent annually for the EU as a whole and for Member States individually up to 2017 must be adopted. In National Energy Action Plans, the Member States must give an account of the way in which the total energy savings target is expected to be distributed over the individual sectors. The ambition will be to maintain this objective up to 2025. The proposal should be implemented by making the existing indicative energy savings target in the EU binding, cf. Directive (2006)32. The potential for energy efficiency measures is in all likelihood considerably greater than the 20 per cent indicated by the Commission.

Products

There is a need for a strengthened effort in the EU to promote more energy efficient products. Denmark proposes:

- The swift and ambitious adoption of minimum standards for energy efficiency for a range of products (e.g. household appliances, electric motors, pumps, boilers, personal computers, televisions and battery chargers) within the framework of the Ecodesign Directive. The increasing standby consumption of electronic appliances is a special focus area where consumption should be limited by means of a standby consumption standard of maximum 1 Watt for most products. Today, standby consumption constitutes around 10 per cent of electricity consumption in households;
- An improved and expanded energy labelling scheme. The current framework directive concerning energy labelling should be expanded to cover further products, and the current labelling criteria should be strengthened in a manner that ensures the promotion of the most energy efficient products on the market to a higher degree than today.

Buildings

Significant cost-effective savings can be achieved in buildings by means of strengthening and fully implementing the EU Directive on energy consumption in buildings. Denmark proposes:

- That the requirements in connection with the renovation of existing buildings should be tightened (small buildings should also be covered by the requirements). Energy efficiency requirements should be introduced in connection with the replacement of different building parts, such as roof, windows and boilers;
- That the EU should adopt common targets for energy consumption in new buildings (adapted to the differentiated climate conditions in the EU Member States). These targets should be continuously tightened so as to ensure that new buildings over time become low-energy in design;
- That the significant energy savings potential in the new EU Member States in particular be realised by means of establishing better funding opportunities within the existing budgets. In this context, it should be explored whether it is possible to create better funding opportunities within the framework of the European Investment Bank (EIB).

Transport

The transport sector constitutes a special challenge. A cost-effective effort requires common EU measures. Denmark proposes that:

- The EU should establish minimum standards for the energy efficiency of new passenger cars and light trucks (more kilometres per litre) through ambitious agreements with the automobile industry and direct regulation, etc. In relation to the current voluntary agreement with the automobile industry, which includes a target for bringing fuel consumption down to 140 g CO₂/km and an EU target of 120 g CO₂/km in 2010/12, a long-term target should be maximum 100 g CO₂ /km in 2020. This would result in very significant reductions of fuel consumption;
- In parallel with the establishment of fuel efficiency standards, the EU should adopt standards for the rolling resistance of tyres. This in itself is considered to be able to reduce energy consumption by up to 5 per cent;
- The EU should explore the possibilities for entering agreements on increased energy efficiency within sea and air transport.

Renewable energy

Denmark proposes:

- That a target of a 15 per cent renewable energy share of energy consumption in the EU as a whole by 2015 be adopted. Denmark prefers binding targets, fully respecting the individual Member State's different possibilities.
- Before 2015, a decision should be taken regarding the adoption of a new target for 2025. The target should be at least 20 per cent and up to 25 per cent, depending on technological developments.

Market-based schemes

Denmark proposes:

• That the Commission explore the most cost-effective means of promoting renewable energy and energy efficiency and draw up best practice guidelines for the Member States. This includes exploring the possibilities of promoting renewable energy and energy efficiency through the establishment of markets in Europe for certificates for energy savings and certificates for renewable energy. Such markets presuppose binding targets for the promotion of renewable energy and energy efficiency.

Internal market for electricity and gas

Denmark proposes that the existing rules be implemented more consistently:

• The rules of the internal market should be tightened and further developed with the aim of improving competition and infrastructure.

In order to strengthen competition and security of supply of electricity and natural gas. Denmark further proposes:

- That solidarity regarding gas supplies be strengthened;
- That the Commission be requested to submit a plan for the development of European electricity and gas networks, possibly based on regional development plans, with the aim of improving security of energy supply and enhancing scope for trade;

- That the Commission draw up an action plan proposal for the development of offshore wind farms in EU territorial waters as well as a plan for development of the associated electricity infrastructure;
- Continued financial support from the EU through the programme for Trans-European Networks and encouragement of the European Investment Bank (EIB) to investigate the options for expanding its loan facilities to energy infrastructures in the EU;
- The adoption of further measures for ensuring effective, free and non-discriminatory access to European electricity and gas networks. Denmark insists on ownership unbundling between system operators at transmission level, and activities exposed to competition. This will create incentives for expansion of the networks:
- The adoption of rules which more effectively ensure that national regulators are sufficiently politically independent and are competent to ensure optimal functioning of the market;
- That the rules for the handling of cross-border trade in electricity and gas be harmonised further. There is a need to draw up more detailed technical rules for regulating access to the use of cross-border infrastructure:
- A European regulator with powers that support effective cross-border trade in electricity and gas.

With the aim of ensuring increased solidarity and security of supply for gas. Denmark proposes:

- Common, harmonised standards for gas stocks, so that all Member States are obliged to have a certain minimum gas storage capacity;
- Harmonised requirements regarding the spread and use of contracts with consumers, enabling consumers to shift to other fuels at short notice. Supplies to these consumers can consequently be interrupted during a supply crisis, thus reducing the demand for gas;
- The possibility of greater flexibility in gas production, making it possible to increase production swiftly during a supply crisis.

Targeted research & development effort and technological development

Denmark proposes:

- That EU funds for research and development of renewable energy and energy efficiency be doubled in connection with the mid-term review of the 2007-13 budget and the next budget period:
- That R&D funds be offered in open competition in order to spur competing research environments, encouraging efficiency and adaptability and thereby enhancing the EU's opportunities for taking a global lead in the development of new energy technologies;
- That the European Technology Platforms in the energy field within the European Commission's 7th Framework Programme be established particularly in areas where Europe has a unique potential for promoting new technological solutions in the areas of energy efficiency and renewable energy;
- That a new European Institute of Technology (EIT) be based on networks between universities and research institutions with the highest competence within education, research and innovation, and be used to promote European co-operation in the energy field. In the first instance, cooperation efforts within the EIT should focus on very few areas, i.e. areas where new networks are deemed to add most European value;
- That investments in new energy supply technology and energy efficiency solutions in the 10 new EU Member States can be promoted by means of combining various support schemes, such as a combination of development and demonstration funds and structural funds;

• That research be performed on the possibility of phasing out dependency on oil, in the transport sector in particular.

With the aim of reducing the oil dependency of the transport sector and its CO2 emissions, Denmark proposes:

• That the EU establish a long-term strategy for the development and use of second-generation biofuels, based on a thorough analysis of their potential. The strategy must ensure increased emphasis on technology development as well as address environmental concerns and cost-efficiency in the production, distribution and use of biofuels.

Comprehensive energy action plans and a new mechanism for evaluation

A consistent and cost-effective approach in Member States' efforts to achieve EU energy policy targets is crucial to the success of an overall EU policy. Hence, Denmark proposes:

- That Member States be committed to drawing up comprehensive three-year National Energy Action Plans which state the full contribution of the respective countries to the fulfilment of the Common European Energy Policy, including efforts for the promotion of energy savings and renewable energy;
- That a mechanism be incorporated into the EU Energy Policy by which quantitative and qualitative EU targets, as well as instruments to achieve these targets, are only adopted and implemented after their usefulness has been confirmed by thorough impact analysis;
- That targets and instruments be thoroughly evaluated at regular intervals.

The EU's external energy relations

In the development of an external EU Energy Policy, Denmark will place particular emphasis on the following aspects:

- A coherent approach to the internal and external energy challenges, political as well as institutional. Key priorities such as well-functioning markets, diversification, energy efficiency, renewable energy, development of new and better energy technologies and efforts to address climate change must be a systematic part of the EU's dialogue with third countries, both producer and consumer countries. The spread of market principles will at the same time counter the geo-strategic politicisation of the energy field;
- The fight against global climate change, i.a. by focusing on reduction of CO2 emissions and other environmentally harmful substances, cf. conclusions of the European Council regarding achievement of the two-degree target;
- The strengthening of the EU's approach to and co-operation with a) Russia, with the Energy Charter as the reference point, b) the EU's neighbours within the framework of the European Neighbourhood Policy, with particular emphasis on energy efficiency, c) the Caucasus and Central Asia, and d) the Baltic Region;
- Strengthened co-operation with key producer and transit countries, especially in the Middle East. Africa and Latin America;
- Strengthened co-operation with key consumer countries, in particular China, India, Japan and the USA;
- Strengthened and systematic inclusion of relevant European economic/commercial actors in the dialogue with third countries, with the aim of promoting and deploying environmentally friendly and energy efficient solutions and technologies;
- Strengthening of the international energy organisations.