





# Climate and Energy Strategy of the Ministry of Defence 2012-2015

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### Preface

The Ministry of Defence is one of Denmark's largest workplaces. We are active throughout Denmark and own buildings and land all over the country. We operate in many of the world's unstable areas. By spear-heading climate and energy solutions, we can reduce our energy consumption and impact on the climate. This will benefit the climate and the environment. Furthermore, there is money to save and operational benefits to gain by keeping our energy consumption in check and reducing our fossil fuel dependency. A specific example is the vulnerability and logistic challenge involved in transporting large amounts of fossil fuels to international mission areas.

Climatic change and scarce energy resources are among the most significant challenges of our time. As a large organisation with a correspondingly large energy consumption, we have an obligation to reduce our impact on the climate and contribute to the goal of making Denmark independent of fossil fuels by 2050. With this Climate and Energy Strategy, we will make a focused and ambitious effort to make for a greener organisation in a cost-effective manner.

I hope that we may find new, better and economically attractive solutions to the climate and energy challenges facing the Ministry of Defence through cooperation with private actors and research institutions. At the same time, I have a hope that the Strategy will contribute to our constant focus on climate and energy at the Ministry of Defence.

We will not find all the solutions to our climate and energy challenges in one go, but with our new Strategy, we are well on the way!

Nick Hækkerup

# A cross-organisational strategy for climate and energy

Energy was previously a minor part of the environmental strategy of the Ministry of Defence. With this Climate and Energy Strategy, however, we are focusing exclusively on climate and energy issues, including carbon emissions and energy consumption, within the entire field of responsibility of the Ministry of Defence.

The Ministry of Defence carries out numerous and different tasks. Most people know of the operative tasks; ranging from our involvement in the world's unstable areas to our search and rescue operations, aerial surveillance and sovereignty enforcement. What many people do not know is that we are also responsible for the operation of a large number of buildings, workshops and land areas. All parts of the area of the Ministry of Defence are included in the Climate and Energy Strategy.

With this Climate and Energy Strategy, the Ministry of Defence is adhering to the national policy for climate and energy, which is based on a long-term goal that Denmark is to be independent of fossil fuels by 2050. The Climate and Energy Strategy involves a costeffective reduction in carbon emissions from our activities – nationally as well as internationally. At the same time, the Strategy must contribute to reducing energy consumption and maintaining it at the lowest possible level. The reduction of energy consumption will be through combined technical and behavioural initiatives.

The Ministry of Defence participates actively in exchange of experience regarding climate and energy challenges with defence and emergency response agencies in other countries. We are also contributing to spotlighting the issue in international cooperation fora, for example in the Nordic countries and in NATO.

Through the Strategy, the Ministry of Defence wants to secure focused development in order to significantly reduce our climate impact. Our efforts in the climate and energy field must take into account the tasks and the financial situation of the Ministry of Defence, as well as legislative and authority demands.

**Our mission** with the Climate and Energy Strategy is that, in our work for peace and security at home and abroad, we reduce our energy consumption and avoid any unnecessary contribution to the climate change.

Our vision is that by the end of 2020, we will have

- reduced our energy consumption by a minimum of 20% in relation to 2006. Before the end of 2015, our energy consumption must be reduced by a minimum of 15%.
- increased the share of our electricity consumption from renewable energy to at least 60%. Before the end of 2015, the share must be at least 25%.
- reduced carbon emissions stemming from our activities (though not operative activities) by 40% in relation to 1990. Before the end of 2015, emissions must be reduced by 30%.

### Focus areas

In order to fulfil the vision of the Climate and Energy Strategy, we have identified six focus areas for the Strategy up to 2015:

- Energy optimisation of buildings
- Energy and the environment in operations
- Renewable energy and energy conversion
- Climate-appropriate and energy-appropriate behaviour
- Climate accounts
- Energy management

Each focus area comprises an objective and a series of tangible goals, realising the vision of the Climate and Energy Strategy.

Reading instructions, organisation and process

In the following sections, the focus areas of the Climate and Energy Strategy will be explained with a description of the background for each focus area, its objective, aims and specific goals.

The Strategy is divided into several phases. Firstly, a better data basis must be established for energy consumption and carbon emissions. Secondly, various analytical processes must be initiated to identify and define goals for the activities we must carry out in order to achieve the best and most cost-effective climate and energy benefits. Finally, we are implementing a series of climate and energy optimisation initiatives in areas where we have enough knowledge to act immediately.

This Climate and Energy Strategy replaces earlier sections on energy in other strategies, such as the Environmental Strategy of the Ministry of Defence of 2003. A revision of the present Strategy will be initiated in 2013, in order for a new strategy can be ready by 2015.

In addition to this, we will make environmentappropriate and energy-appropriate procurements. This has been incorporated as a focus area in the Environment and Nature Strategy 2012-2015 of the Ministry of Defence.

The Ministry of Defence has appointed the Defence Facility Management as the cross-organisational climate and energy authority for the entire Ministry of Defence. The person responsible for energy in the Ministry's field of competence is also at the Defence Facility Management (see the circular regarding energy optimization in government institutions). The Defence Facility Management is also coordinating the preparation of action plans for the present Strategy.

A steering group will be appointed for the environment and energy area. The group will consist of representatives from the Ministry of Defence and its adherent authorities. An annual report regarding the status of the Climate and Energy Strategy will be given to the steering group and published (in Danish) on forsvaret.dk/fbe/energiiforsvaret.

### Focus area 1 – Energy optimisation of buildings

The Ministry of Defence is the owner of a large building stock. A large part of our total energy consumption takes place in these buildings. Our buildings date from the 17th century and up to today. The majority were built in the 1950s, 1960s and 1970s as standard constructions typical of their time. Over time, all buildings have been subject to varied levels of maintenance, and many of the buildings are in the least energy-efficient end of the energy labelling system.

About 50% of the buildings are heated by district heating, and the remaining part is heated by natural gas and oil. There are a modest number of renewable energy installations, such as solar collectors for heating utility water. There is thus a need for energy optimisation of the building stock by, for instance, demolishing very energy-consuming buildings, constructing of new buildings, making energy renovations, improving control of energy consumption (for instance by automatic on/off functions), and by reviewing and improving technical installations.

There is a huge potential for energy and cost savings through energy optimisation of the Ministry's buildings. We expect to invest DKK 225 million on energy optimisation of buildings in the period 2011-2014. The annual saving is expected to be DKK 38 million when all projects have been completed.

#### **Overall** objective

We want to improve the energy efficiency of our buildings.

#### **Optimisation of the building stock**

**Aim:** the Ministry of Defence will optimise the use of its building stock, based on overall consideration of energy consumption, age, function and future use.

**Goal 1:** Before the end of 2012, on the basis of data collected and analyses, the Ministry of Defence will have prioritized which buildings are to be renovated, demolished or sold off, after considering relevant factors.

**Goal 2:** DKK 225 mill. have been earmarked for energy optimisation (2011-2014). In addition to this, an annual minimum of 3% (corresponding to app. 50,000 sq meters) of the building stock must undergo energy renovation from 2013.

**Goal 3:** From 2012, analyses of possible energy savings must be prepared in connection with any renovation of a building exterior, and any renewal of building-technical installations.

#### **Building standards**

**Aim:** the Ministry of Defence will intensify focus on the use of low-energy building standards.

**Goal 1:** From 2013, the Ministry of Defence will carry out a minimum of 50% of all new constructions as low energy class 2020.

#### Certification

**Aim:** the Ministry of Defence will increase the share of sustainable buildings (buildings with low energy consumption, low environmental impact and good indoor climate).

**Goal 1:** From 2013, 50% of all new construction must be sustainability certified (the standards for sustainability certification are currently undergoing a major development, but at the moment we do not have a Danish standard).

#### Automation

**Aim:** the Ministry of Defence will increase the use of intelligent automated control of energy consumption in buildings.

**Goal 1:** Before the end of 2013, remote reading of all meters must be established and implemented.

**Goal 2:** Before 2020, remote reading to be installed, established and implemented at building level in all buildings where it has been deemed profitable. By 2015, this will have been carried out in 25% of buildings.

**Goal 3:** From 2012, the Ministry of Defence will expand and upgrade existing energy management systems (central and electronic on/off, and water, heating and electricity management), and establish energy management systems in establishments where these are currently not available.

#### Energy optimisation of buildings in practice

In 2011-2014, the Ministry of Defence will carry out energy optimisation of buildings totalling DKK 225 million. Projects with short pay-back times will be completed first, and subsequently focus will be on larger projects with an expected correspondingly larger potential for energy savings. The annual saving is expected to be around DKK 38 million, when all projects have been completed.



Installation of voltage stabilisation equipment to save electricity

#### Energy optimisation of buildings in practice:

In 2012, the Ministry of Defence will initiate the 'Green Establishments' project. The purpose of the project is for the Ministry of Defence, in collaboration with relevant Danish partners (private enterprises and foundations, as well as stakeholder and educational bodies), to create two establishments, optimised in terms of energy, resources and the environment. The two establishments must also be compatible with the core activities of Ministry. The project is expected to run for two to five years, and it is expected to inspire environment and energy initiatives in the Ministry's other establishments.

### Focus area 2 – Energy and the environment in operations

The operative tasks of the Ministry of Defence entail a large number of activities which affect nature, the environment and the climate. This applies to energydemanding transportation on land, at sea and in the air, as well as the use of high-tech equipment.

A reduction in our dependency on fossil fuels and application of new and better environment and energytechnology solutions in operative tasks not only gives us environmental and energy benefits, it may also provides us with many advantages in relation to operations and the logistical structure. A specific example is the vulnerability and logistic challenge involved in transporting large amounts of fossil fuels to international mission areas.

The Ministry of Defence must be able to perform its tasks in the most efficient and safe manner possible. This means that we are primarily seeking out new options that can offer us operative as well as environmental and energy-related benefits and, where possible, cost savings.

We want to put an independent focus on 'green thinking' in the operational part of our work, as this is an area with great potential for development. The area naturally links to other parts of environmental and climate efforts, for instance in relation to environmental and energy-correct procurement as well as waste management.

In international operational areas, it can be difficult to live up to Danish standards in relation to the environment and climate, typically due to the infrastructure in the area. Among other things, this complicates management of waste, oil and fuels. Denmark often cooperates with other nations on international missions, and therefore it is not always possible for us to set the standards for environment and climate, but we do seek active influence. Nevertheless, Denmark has positive experience from clearing camps after military operations in the Balkans.

In addition to this, the Danish Defence has focussed on environmental impacts in a number of individual areas. Among these are minimizing waste and utilising NOx filters on ships, environmentally correct waste and sewage management in mission areas, and use of simulators for training.



Refuelling a Fennec helicopter

#### Overall objective

We want to further include consideration of the environment and energy in operative tasks.

#### Analyses

**Aim:** the Ministry of Defence will carry out analyses which may lead to environment and energy goals for the operative part of the work of the Ministry of Defence.

**Goal 1:** During the period, and before the end of 2015, we will regularly enter and participate in co-financed partnership projects for initiatives to improve energy efficiency and the environment.

**Goal 2:** Before the end of 2012, we will examine the possibilities for – and initiate – cooperation in research and development projects, with focus on developing technological environmentally correct and energy-appropriate defence and emergency-response solutions.

**Goal 3:** Before the end of 2013, we will have carried out an analysis process, dealing with energy consumption and logistics, energy and environment conditions in camps, as well as fuel consumption by mobile units.

**Goal 4:** In 2012, we will initiate an analysis process dealing with the options to utilise bio fuels with a view to establishing specific goals for this area before the end of 2013.

**Goal 5:** Before the end of 2014, all options for utilising renewable energy as the local supply of energy on missions abroad will be analysed and described.

**Goal 6:** From 2013, we will allocate funds to research and development projects regarding technological environmentally correct and energy-appropriate defence solutions.

#### **Material and equipment**

**Aim:** the Ministry of Defence, as a minimum, must meet civilian standards and carry out logistical optimisation in comparable areas, without compromising operational conditions.

**Goal 1:** Before the end of 2014, as a minimum, Danish Defence must adhere to the environmental and climate goals of the Danish Shipowners' Association - as long as operative conditions are not compromised.

**Goal 2:** Before the end of 2014, we will have initiated optimisation of transportation in relation to internal distribution, transportation on land, as well as national and multinational utilisation rates for transport vehicles, and we will have incorporated these with civilian options.

**Goal 3:** Before 2015, consideration for the environment and energy must be included in activities regarding camp-support for units, the activities of national support units, local disposal of material, and recycling of packaging and transport containers.

#### **Change of behaviour**

**Aim:** the Ministry of Defence will change individual and collective behaviours during operations, in order to incorporate regard for the environment and energy into all contexts where it does not compromise operations.

**Goal 1:** Before the end of 2013, we will have identified the most important areas (within our area of operation) where there is a need to alter individual and collective behaviours, in order to focus on the environment and energy.

**Goal 2:** Before the end of 2015, we will have revised our operative procedures, manuals and instructions with a view to incorporating environment and energy considerations.

# Energy and the environment in operations in practice:

Denmark's international engagement involves establishing, operating and decommissioning camps.

When the last soldier left the Danish camp in Kosovo, the Danish Defence sent in a team of environmental experts to close the camp with the greatest possible consideration for the environment. Contaminated soil and waste from the shut-down operations was managed in an environmentally correct manner, so as not to expose the local population and environment to harmful impacts. Excavation and transportation of contaminated soil was carried out by local firms under supervision of the environmental experts from Danish Defence.

# Energy and the environment in operations in practice:

The Ministry of Defence uses new technology, which limits impacts on the environment and the climate.

During 2011, Denmark installed NOx reduction systems on Danish Defence DIANA class vessels. This means that we are reducing emissions harmful NOx gasses by up to 80%. The NOx system was developed by Dansk Teknologi (Danish Technology), and it is based on similar systems developed for large trucks.

# Energy and the environment in operations in practice:

Modern armoured fighting vehicles demand ever more electrical power for a series of systems (communications, surveillance, targeting/ securing targets, cooling, and power supply for other electronic equipment). Much of the equipment must also function when the vehicle is standing still. Traditionally this has been done by letting the engine of the vehicle run idle with diesel generators or batteries. Fuel cells make up an operationally and economically attractive alternative, due to less wear, higher effect, almost no exhaust gasses, and limited noise.

Since January 2012, Danish Defence has been part of a project, with Falck-Schmidt and General Dynamics UK as partners, and Topsøe Fuel Cells as sub-contractors. The project will run for three years, and its purpose is to further develop and integrate fuel cells into armoured fighting vehicles, in this way testing and demonstrating the possibilities of this technology.

### Focus area 3 – Renewable energy and energy conversion

So far, the Ministry of Defence has only used renewable energy to a limited degree.

Positive climate effects may be achieved by reducing energy consumption and thus carbon emissions. A further immediate carbon-reducing effect can be attained by converting from fossil fuels to renewable energy, such as solar, wind and/or bio energy.

With the initiatives in this Strategy, the Ministry of Defence is contributing to climate efforts, both by reducing energy consumption, and by converting to renewable energy. In addition to conversion to renewable energy, we see a great potential for carbon savings by converting from individual supply (oil/gas installations) to common energy supply (district heating).

A substantial technological development is taking place in this field, and the various facilities for production of renewable energy are becoming ever more cost-efficient. We have already installed solar panels and heat pumps at several locations, and we intend to expand the number of energy-producing facilities.

#### Overall objective

We want to increase the use of alternative and renewable energy sources.

#### Analyses and determination of goals

**Aim:** the Ministry of Defence will examine and catalogue the options for integrating renewable energy, in order to determine quantitative, measurable goals for the use of renewable energy sources.

**Goal 1:** Before the end of 2013, we will analyse and describe the options for increased use of electric cars (at establishments locally and in general).

**Goal 2:** Before the end of 2013, we will set goals for the implementation of environmental and energy-friendly administrative road vehicles.

**Goal 3:** Before the end of 2013, we will map the locations where it is practicable to convert to district heating (common supply).

# Test projects and establishment of renewable energy facilities

**Objective:** the Ministry of Defence will perform regular energy- optimisation tests and will establish renewable energy facilities in selected establishments.

**Goal 1:** From 2012, we will regularly test the profitability of new technology and carry out tests to optimise processes and methods for example fine-tuning ventilation plant and intelligent booking systems (see text box).

**Goal 2:** Before the end of 2015, one or more solar cell installations totalling at least 20,000 sq meters will be installed on land areas belonging to the Ministry of Defence. Before the end of 2013, one or more solar cell installations totalling at least 5,000 sq meters will be installed.

**Goal 3:** Before the end of 2012, potential sites will have been identified for the erection of wind turbines on Ministry of Defence land.

**Goal 4:** During 2012, the 'Grøn Christiansø' project (Green Christian's Island) will be defined and launched. The project will lead to optimisation of the island in terms of energy and the environment. Among other things, the project will examine whether the island can become self-sufficient with renewable energy.

#### Applied renewable energy:

The intelligent booking system used by Danish Defence is intended to ensure that consumption of electricity and heating in Danish Defence quarters is managed by a rental system. When rooms are booked, the system ensures that the electricity is switched on, and that heating is turned up to achieve an appropriate temperature before the room is to be used. The system prevents energy from being used unnecessarily.

#### Applied renewable energy:

The Ministry of Defence owns large areas of land with space for solar cell installations. Before 2015, solar cell installations totalling 20,000 sq meters will be established. Before the end of 2013, solar cell installations totalling 5,000 sq meters will be established, with a capacity to produce 500,000 kWh a year. This corresponds to about 0.5% of the energy consumption of the Ministry of Defence. The construction cost will be DKK 9-11 million, and it is anticipated that the investment will pay back within approx. 12 years. In principle, the installations will subsequently supply free electricity for approx. 18 years.



Trial with small solar cell installation at Raghammer ranges on Bornholm

### Focus area 4 – Climate-appropriate and energyappropriate behaviour

We expect to be able to reduce energy consumption by encouraging climate-appropriate and energy-appropriate behaviour in employees. The Ministry of Defence is one of Denmark's largest workplaces. It is therefore crucial that our employees are encouraged to act in ways that are appropriate in terms of energy and the climate. In other words, employees must learn to turn everything off. However, it is also about the employees and management finding better and more energy -appropriate everyday solutions. Until now, climate and energy campaigns have been organised on a local basis in the organisation. The many varied fields of activity in the Ministry of Defence (ranging from operative tasks over office work to workshop activities) have complicated the introduction of uniform and coordinated efforts.

There is a need to raise people's awareness about climate and energy, to establish general guidelines, and to arrange targeted climate and energy campaigns, cross-organisationally as well as for selected groups of employees.





#### **Overall objective**

We want to point the behaviour of our employees in a more climateappropriate and energy-appropriate direction.

#### Changed employee behaviour

**Aim:** in order to achieve positive climate effects and energy savings, the Ministry of Defence will involve employees in finding new climate and energy solutions, and the Ministry will measure and change employee behaviour in relation to climate and energy.

**Goal 1:** From 2013, the Minister of Defence will award an annual climate and energy prize to acknowledge the best efforts of the year in the climate and energy area.

**Goal 2:** Before the end of 2012, a website on climate and energy will be established as a subsite in the Defence Facility Management's intranet and its official website.

**Goal 3:** Before the end of 2013, we will integrate climate and energy information (adapted to the function of the individual employee) as a part of the introduction of new employees throughout the organisation.

**Goal 4:** From 2012, we will initiate annual targeted climate and energy campaigns in order to lower energy consumption.

**Goal 5:** From 2013, we will carry out annual evaluations of the effect of campaigns in the preceding year by comparing our energy consumption before and after the campaigns.

#### Climate-appropriate and energy-appropriate behaviour in practice:

The Ministry of Defence is one of the government's curve breakers. In cooperation with 'Go' Energi' ('Good Energy'), a curve breaker agreement has been signed for the five pilot energy establishments. The goal is to consume 5% less energy by the end of 2013 compared to consumption in 2009. consumption in 2009.

#### Climate-appropriate and energy-appropriate behaviour in practice:

In 2011-2012, the Ministry of Defence will be implementing the 'Energy as required' project in five strategic pilot energy establishments. All employees in the five establishments will be involved in defining areas in which technical initiatives may help obtain energy savings. The technology introduced should aim at ensuring that energy is only used where there is a real need, for instance by installing light sensors in toilets.



### Focus area 5 – Climate accounts

Climate accounts for the activities of the Ministry of Defence will give us a better data basis for identifying potential action areas to reduce the Ministry's climate and air impacts. The climate accounts comprise statements of  $CO_2$  emissions and air pollution from NOx, SOx and particles, together with an overview of the climate impact from the Ministry's travel activities.

#### **Overall objective**

We want to prepare climate accounts and statements of air pollution from our activities.

#### Annual balances and accounts

*Aim:* the Ministry of Defence will prepare annual climate accounts, in order to establish percentage reduction goals for CO<sub>2</sub>, NOx, SOx and particle emissions.

**Goal 1:** From 2012, climate accounts must be prepared.

**goal 2:** Before the end of 2012, based on quantitative references, we will establish goals for percentage CO<sub>2</sub> reductions and also identify areas that are potentially suitable for reductions of NOx, SOx and particle emissions.

#### Climate accounts in practice:

From 2012, the Ministry of Defence will prepare  $CO_2$  accounts based on the Guidelines for the preparation of climate accounts issued by the Danish Energy Authority.  $CO_2$ accounts are a calculation of the carbon emissions stemming from our activities (except operative activities). The accounts will also comprise a statement of NOx, SOx and particle emissions.

### Focus area 6 – Energy management

In order to meet the climate and energy goals of this Strategy, the Ministry of Defence needs an improved data basis of our energy consumption. Furthermore, there is a need to monitor consumption and work systematically with energy initiatives. Energy management is expected to help anchor the process at management level and ensure focus on the task. Energy management will also provide the necessary overview of consumption and management needs. We expect to be able to substantially reduce our energy consumption and energy costs through implementation of energy management according to the ISO 50001 standard.

Energy management means a targeted and systematic effort to reduce the energy consumption of an organisation. A central part of an energy management system is well-functioning energy mapping and energy registration. With this in place, the goal for reductions can be established, and plans for improvement can be drawn up.

#### **Overall objective**

We want to introduce energy management according to the ISO 50001 standard.

# Introduction of the energy management

*Aim:* the Ministry of Defence will systematically introduce energy management according to the ISO 50001 standard.

**Goal 1:** Before the end of 2020, energy management according to the ISO 50001 standard must be implemented.

**Goal 2:** Before the end of 2015, energy management will be implemented at Aalborg Air Base, Karup Air Base and Skrydstrup Air Base.

## Energy management in practice:

In 2012, the Ministry of Defence will initiate a comprehensive mapping of electricity and heating consumption. The mapped data are the first step in implementation of energy management according to the ISO 50001 standard. Implementation of energy management is expected to lead to reductions in greenhouse gas emissions and energy costs by systematic management of our energy consumption.



This Climate and Energy Strategy applies to all authorities within the field of responsibility of the Danish Ministry of Defence:

- The Ministry of Defence
- The Defence Command and subordinated authorities
- The Danish Emergency Management Agency
- The Homeguard Command and subordinated authorities
- The Defence Intelligence Service
- The Judges Advocate General's Corps
- The Defence Internal Audit

The Ministry of Defence 2012

#### The Ministry of Defence

 Holmens Kanal 42
 Phone: +45 3392 3320
 fmm@fmn.dk

 1060 København K
 Fax: +45 3332 0655
 fmn.dk