



Ministerie van Defensie

Defence Energy
Transition Plan of Action

New energy in the organisation



Contents

1	Introduction	3
2	Approach and principles	4
3	Enabling conditions	5
3.1	Insight	5
3.2	Cooperation	5
3.3	Awareness and support	6
4	Implementation per domain	9
4.1	Military materiel	9
4.2	Camps	11
4.3	Non-operational materiel	12
4.4	Real estate	12

Cover photo: portable solar panels test.

1 Introduction

You have before you the *Defence Energy Transition Plan of Action*. As promised, the targets regarding energy as set out in the cover letter on the Defence Energy and Environment Strategy (*Defensie Energie en Omgevingsstrategie*, DEOS, Parliamentary Paper 33763, no. 152) have been developed into concrete measures in this plan. This plan sets out our approach, principles, enabling conditions and measures to make the Defence organisation more sustainable in a targeted manner with due regard for the financial resources available and the constitutional tasks of the Netherlands armed forces.

The term of this plan is 2020-2022. Besides the resources available in the context of regular activities, an additional 49 million euros have been released within the defence budget for the realisation of the measures listed in this plan. This makes it possible to accelerate the Defence organisation's energy transition by implementing the enabling conditions for the transition, carrying out studies and pilot projects, and embedding sustainability more explicitly in the conduct of regular activities. Furthermore, we are taking a first step in the implementation of sustainable mobility.

The Defence organisation's targets are specified in the DEOS (Parliamentary Paper 33763, no. 142). For the operational domain, the energy targets are as follows:

- By 2030, dependence on fossil fuels has been reduced by at least 20% relative to 2010.
By 2050, dependence on fossil fuels has been reduced by at least 70% relative to 2010.
- By 2030, 50% percent of the energy required at camps is sustainably generated and camps are entirely self-sufficient in energy terms by 2050.

This plan opens with a brief description of the approach and principles adopted. It then details the enabling conditions required to perpetuate the measures in the organisation in the long term. The final part provides an overview of the concrete measures for each domain. The domains are as follows: military materiel, camps, non-operational materiel and real estate.

2 Approach and principles

To ensure that the performance of our constitutional tasks is not adversely affected, a careful approach must be taken to achieve the aforementioned energy targets. The purpose of the approach is to achieve the greatest possible effect with the financial resources and capacity available.

To that end, a number of principles were formulated to guide the selection of measures. These principles are based on a baseline measurement, the outcomes of which were included in the Defence organisation's 2019 annual report (Parliamentary Paper 35470-X, no. 1). This measurement showed that approximately 40% of energy consumption is linked to real estate (this includes the systems in buildings, such as compressed air systems in workshops and printers and computers in offices) and approximately 60% is linked to the use of fuels. Most of that 60% fuel consumption is attributable to flying.

The principles set out below apply to the approach.

1. 'Biggest bang for the buck'.

To prioritise, we weigh the initiatives and measures on the basis of the following objectives. We select the initiatives and measures that have the greatest impact on:

- dependence on fossil fuels: relative to 2010, the goal is to be at least 70% less dependent by 2050;
- camps: these must be entirely self-sufficient in energy terms by 2050;
- CO2 reduction.

2. Operational added value.

We select measures that contribute the most to improving the Defence organisation's operational capabilities. The operational added value is determined on the basis of energy security, increasing operational sustainability and the contribution to striking power.

3. Viable business case.

We make the costs and benefits transparent and relate the costs and benefits of the investment to the service life of the type of investment. This makes it possible for us to make a weighted decision.

4. Innovation as driver of the energy transition.

Knowledge development and innovation for the energy transition mainly occur outside the Defence organisation. When setting priorities, the degree of innovation of the various solutions is taken into account to ensure that measures that make a greater contribution to innovation, and are therefore more broadly useful to society, achieve a higher score.

3 Enabling conditions

In addition to a targeted approach, the energy transition must be secured in the policy, activities and working methods of the Defence organisation for it to be possible to reduce fossil fuel consumption and CO2 emissions and generate energy sustainably. To this end, further implementation of the enabling conditions set out below is necessary.

3.1 Insight

Effective control aimed at achieving desired effects and the energy measures depends entirely on insight into our actual energy consumption and associated CO2 emissions. This insight contributes to:

- an overview of energy management and projects;
- the exchange of energy data with partners such as the European Defence Agency;
- the Defence organisation's contribution to the state operations annual report.

Moreover, the structured collection and analysis of data on energy consumption and CO2 emissions and reporting on this subject provide insight into the Defence organisation's energy transition and show which measures contribute the most to achieving the reduction targets.

Methodology

To gain insight into our energy consumption and associated CO2 emissions, we are developing a methodology for the structured collection and analysis of data on energy consumption from different sources. The methodology consists of the following steps: observing and recording, explaining the use, influencing the use and controlling the energy needs. For this control, we will create a dashboard and integrate it into our regular work processes. Full implementation of the methodology will take approximately three years.

We have started taking stock of the historical energy data and recording and monitoring current energy consumption. We use the Defence organisation's purchasing data concerning fuels and electricity to do so. The Defence organisation's CO2 emissions are then calculated on the basis of key indicators. Where possible, we remain in line with government-wide insights in this area. The first annual energy report was included in the Defence organisation's 2019 annual report.

3.2 Cooperation

A second key enabling condition for the Defence organisation's energy transition is the strengthening of existing and development of new partnerships. We are focusing in this regard on the 'golden triangle' of government, the business community and knowledge institutes, and on interministerial cooperation.

Golden triangle

In line with the Sienot motion (Parliamentary Paper 34-895, no. 5), to the greatest extent possible, we develop innovative solutions in cooperation with civil parties and research and knowledge institutes. The research into the propulsion of the naval support vessels about which I recently informed you in the A Letter (functional description of the capability in question) of the project concerning the replacement of naval support vessels (Parliamentary Paper 27-830, no. 305) is an example of this cooperation.

The Defence organisation is also making efforts to develop new ecosystems and strengthen existing partnerships. Where possible, we commit ourselves to (broader) societal initiatives at the national, regional and local level. A specific example in this regard is the case study that we carried out with the Central Government Real Estate Agency and De Bouwcampus. The study considered the application possibilities of innovative technologies for energy-efficient barracks. De Bouwcampus is a network that brings knowledge institutes, private companies and government authorities together to encourage innovation in the construction sector. Our innovation cells initiate and strengthen cooperation with knowledge institutes and the market through innovation projects in the field of, among others, energy. Military Innovation By Doing (MIND) strengthened cooperation with the Netherlands Organisation for Applied Scientific Research (TNO) by jointly establishing a system that makes it possible for military units to borrow innovative products and test them in practice. The Marine Corps is currently testing portable solar panels, for example. Within the golden triangle, experiments in energy generation are also in full swing in the Defence organisation's Smart Base Field Lab. Experiments are being conducted in relation to solar panels, energy storage and geothermal heating.

Interministerial

The Defence organisation is using the resources available in its own budget for the energy transition. Where possible, the Defence organisation seeks to use resources made available on a government-wide basis for achieving climate targets in accordance with the Van Helvert motion (Parliamentary Paper 35300-X, no. 26) and joins the initiatives of other ministries. So far, however, this has not resulted in additional financial resources for the Defence organisation.

The Defence organisation is an active stakeholder in the central government's climate and energy policy. Because Defence is a large organisation, the implementation of government policy usually has major financial consequences for the organisation and the defence budget. Choices must therefore be made when implementing government policy, and we assess the climate and energy policy in terms of practicability and on the basis of the following principles: biggest bang for the buck, operational added value, viable business case and innovation as the driver of the energy transition.

3.3 Awareness and support

The third and last enabling condition for the Defence organisation's energy transition is raising awareness and support. This is because many actors play a role in the implementation of this plan of action. A study¹ carried out by Clingendael, the Netherlands Institute of International Relations, in the spring of 2019 on the instructions of the Defence organisation underlines this reality. The study shows the importance of greater awareness within the Defence organisation about the impact of the organisation's own ecological footprint. The study also describes the energy measures at 11 other defence organisations, including those of France, Germany and Norway, and is used to contact partner countries when we wish to explore energy measures.

¹ Ready for take-off? Military responses to climate change', Clingendael Report (digital), March 2020.

We are increasing internal awareness and support for the energy transition through energy-related networking, by organising thematic sessions and webinars and by sharing lessons learned. The Defence organisation's Energy Knowledge Network, which has already been active for 10 years, is a network in which members of the Defence organisation, the business community and knowledge institutes share experience and knowledge and remain in contact with each other. The network regularly organises events to foster the exchange of knowledge. This year, we will launch an internal (digital) campaign to inform and encourage personnel regarding the acceleration of the energy transition. The campaign will consist of media productions such as short films about energy initiatives and lessons learned linked to operational activities, and (online) sessions about the energy transition will be organised.

We expect that we will be able to carry out, both online and physically, the challenges that were postponed because of the COVID-19 crisis from 2021. In this regard, we will work with universities, knowledge institutes and the youth network of the Ministry of Defence to devise solutions to our energy issues.

Training

Embedding the energy transition in training courses, doctrines and processes is an important part of raising awareness. To do this, an agreement that provides for sustainability studies is currently being drawn up with the Faculty of Military Sciences. Our personnel are also participating in international training courses and symposia. An example in this regard is the Defence Energy Managers course. The purpose of this course is to reduce energy consumption associated with real estate by training Defence organisation personnel in the setting up and use of civil energy management systems.



4 Implementation per domain

To secure the energy transition in terms of implementation, we translate the energy targets into policy, plans and frameworks for the conduct of activities. The sustainability measures are therefore not in place in isolation. They result in the strong anchoring of our targets in regular activities and regular acquisition processes. We do this by:

- translating, where applicable and where possible, national and international sustainability policy into Defence organisation-specific policy;
- including sustainability-related possibilities and the associated costs and benefits in our requirements regarding materiel and real estate so that sustainability is a part of weighted decision making in the acquisition process;
- selecting concrete measures as drivers of the energy transition on the basis of four principles: biggest bang for the buck, operational added value, viable business case and innovation.

We periodically evaluate the objectives and measure the progress of the measures and the intended effects.

This helps us to direct efforts towards achieving the energy targets. We are therefore putting the Belhaj motion (Parliamentary Paper 31125 no. 98) into effect. To achieve the energy objectives, the Defence organisation is focusing on four domains in which energy transition is important: military materiel, camps, non-operational materiel and real estate.

The purpose of the concrete measures described below is to reduce our energy consumption, mitigate CO2 emissions and, where possible, generate sustainable energy. In terms of reducing our energy consumption, we are focusing on the main causes of that consumption, namely materiel-related fuel consumption and electricity and gas consumption associated with real estate. We always consider what is possible in operational terms. The options in this regard are limited by the state of technology, international agreements and regulations. The generation of sustainable energy is being studied in government-wide programmes and in the context of the strategic real estate plan. Furthermore, experiments concerning energy generation are being conducted in the context of energy-independent camps.

4.1 Military materiel

Flying, sailing and driving are inextricably linked to the deployment of the armed forces and account for approximately 60% of the Defence organisation's total energy consumption. The choices currently being made in relation to materiel will not only determine deployment options for the coming decades, they will also have a major impact on future energy consumption. In terms of trend, the energy consumption of (weapon) systems is increasing (heavier, larger and faster). At the same time, the cost of fuel fluctuates. A scarcity of fossil fuels as a result of the growing global demand for energy and declining reserves is therefore a potential risk. Reducing the consumption of fossil fuels is therefore of increasing importance to the effectiveness of units in terms of readiness and deployment.

Knowledge and innovation

The Defence organisation will determine the knowledge requirement regarding sustainability in cooperation with the Maritime Research Institute Netherlands (MARIN), the National Aerospace Laboratory (NLR) and TNO. We will do so in 2021 during the update of the Defence organisation's strategic knowledge and innovation agenda, which includes CO2 reduction and renewable energy as items. With partners, we are already developing innovation proposals in the field of climate-neutral technology for maritime shipping. We are looking in this regard at the extent to which funds can be used, such as the growth fund announced by the Ministry of Economic Affairs.

The incubators within the Defence organisation, such as FRONT, MIND and the innovation cells of the operational commands, are driving the transition by testing concrete solutions. An example in this regard is the experiment concerning the use of hydrogen in a long-range drone for maritime surveillance. In this initiative, we are working with the Netherlands Coastguard, the Royal Netherlands Sea Rescue Institution and the Ministry of Infrastructure and Water Management. The technical knowledge for this experiment is provided by Delft University of Technology, TNO and the Netherlands Defence Academy (NLDA). We are therefore learning about the use of hydrogen and can conduct long-range reconnaissance flights in an energy-efficient way.

Making military materiel more sustainable

The Defence organisation has studied the use of biofuel in the flying, sailing and driving domains and has carried out pilot projects. Flying accounts for most of the consumption and may therefore have the greatest impact. We are continuing the blending with biokerosene at Leeuwarden Air Base. It is not yet possible to use biokerosene at other air bases. This is because of internationally binding agreements regarding the use of NATO pipelines, which, with the exception of Leeuwarden Air Base, also supply our airfields. We are making efforts within NATO to have these agreements modified. This year, we will also start blending biofuel into marine diesel. We will do so to gain experience with biofuel in the maritime operational domain.

For driving, the Defence organisation has concluded a framework contract for the blending of biofuel into diesel such that the biofuel constitutes 20% of the blend. We are therefore also fulfilling the obligations ensuing from the Renewable Energy Directive.²

In terms of replacement and major maintenance with respect to our materiel, we study and implement viable energy measures. For example, we are studying the applicability and viability of the Hull Vane. This is an underwater spoiler that reduces the fuel consumption of patrol vessels. Another example is that major maintenance to ships includes, as standard, the replacement of traditional lighting systems with LED lighting systems. The cost of replacing an existing lighting system with an LED lighting system is usually recouped over the remaining service life of the lighting system.

Fuel consumption was taken into account in the conceptual design of the new frigates. The frigate can achieve the required maximum speed with propulsion provided by diesel and electric engines instead of the gas turbines in the current frigates, as recently

² European directive for renewable energy.

included in the B Letter (results of the study phase) of the project concerning the replacement of the multi-purpose frigates (Parliamentary Paper 27-830, no.307). The choice of a diesel and electric engine configuration for the new frigates is beneficial in terms of fuel consumption per ton. Nevertheless, the new frigate's fuel consumption will be higher in absolute terms than that of the current multi-purpose frigate because the tonnage of the new vessel considerably exceeds that of the current one (5,500 tons as opposed to the current 3,500 tons).

As stated in the A Letter of the project concerning the replacement of naval support vessels (Parliamentary Paper 27-830, no. 305), we are studying the technical feasibility and financial consequences with respect to making these vessels (partly) emissions-free. A viable business case is required for that purpose. We are working in this regard with knowledge institutes and the Governmental Shipping Company.

In 2020, the Royal Netherlands Marechaussee will launch a study into the possibilities regarding zero-emission vehicles for operations. For this purpose, pilot projects involving hydrogen and (battery) electric vehicles are being set up.

The Defence organisation is also giving further direction to the sustainability of military materiel by elaborating, in cooperation with knowledge institutes TNO, MARIN and NLR, routes for making military materiel more sustainable. These routes will ensure focus by providing insight into the challenges and necessary changes, and will likewise ensure focus regarding the innovation requirement.

4.2 Camps

The Defence organisation's current fuel requirement means major logistics efforts during transport to camps in deployment areas. Considerable planning, transport and maintenance capacity is required, which affects the speed of operations and the manoeuvrability of units.

A programme team that focuses specifically on energy-independent camps has been formed at the Concept Development and Experimentation (CD&E) unit of the Royal Netherlands Army. Among other activities, this team is testing possibilities at the Smart Base Field Lab³ with respect to generating, storing and distributing energy. This is being done in cooperation with the Engineer Corps Centre of Expertise, Engineering Works, knowledge institutes and the market. We are therefore ensuring that new technologies connect to existing systems and we are increasing the knowledge level of the military engineers.

An example in this regard is the recently completed test with the Green Energy Mill (GEM) tower. In addition to wind energy, this tower makes it possible to generate a lot of energy by means of solar panels on a relatively small surface area. This tower was co-developed by Eindhoven University of Technology. We also carried out a market consultation to study the generation of sustainable energy from residual waste for the purpose of saving on fuel and waste transport. A spin-off of this study is that we are better able to map out waste streams in mission areas.

³ <https://www.defensie.nl/onderwerpen/innovatie/fieldlab-smart-base>.

Solar energy at a compound in Afghanistan.



Furthermore, the Defence organisation, together with TNO, has prepared an application for the European Defence Fund for the development of concepts for renewable energy at camps. Our purpose in this regard is to contribute at a European level to interoperability and compatibility. This is necessary in the context of ever-increasing international cooperation and allied action.

4.3 Non-operational materiel

As part of this plan of action, the Defence organisation has made a budget available for approximately 400 electric cars, including the associated charging infrastructure and required IT alterations.

We are therefore acting in advance of future legislation and will be able to prepare our information and organisational processes for the use of zero-emission vehicles. Regarding the long term, we are working to identify further sustainability measures that are possible and viable, such as the use of hydrogen cars.

With the introduction of zero-emission vehicles, we are also studying the option of making it possible for Defence personnel to use, at a rate in line with market conditions, charging stations installed on Defence organisation sites.

4.4 Real estate

The baseline measurement of energy consumption in 2019 shows that the real estate domain accounts for approximately 40% of the total. It is therefore clear that making the Defence organisation's real estate more sustainable will

substantially reduce the organisation's CO2 emissions. Proper insight into consumption is necessary to be able to take targeted energy-saving measures and check whether the energy targets are being achieved. The programme launched to make it possible to remotely read energy meters, which improves insight into consumption, is on the verge of completion.

As is the case regarding materiel, making real estate more sustainable will be made a more explicit part of regular activities.

Sustainability route

The Defence organisation's task regarding real estate is set out in the strategic real estate plan (Parliamentary Plan 33-763, no. 151). The Central Government Real Estate Agency was asked to provide advice on how substance can be given to the sustainability task as part of the real estate task. This request resulted in a road map with which the real estate can be made more sustainable in a cost-efficient way in the context of the CO2 reduction targets of the Climate Act. The expected costs of the road map were included in the estimates of the strategic real estate plan.

We use the approach described below to plan for a longer period in relation to making our real estate more sustainable. We are following the road map in this regard.

Buildings

The energy measures set out in the road map for making real estate more sustainable were included in the revitalisation programme of the strategic real estate plan. We will start with the implementation of a pilot project at the Bernhard Barracks in Amersfoort. This will be a knowledge project with which we gain experience in energy generation to make complexes (almost) energy neutral.

In addition to the revitalisation programme, the greatest possible increase in sustainability will be achieved during major maintenance to buildings. The real estate will be made more energy efficient by means of insulation, 'smart buildings' solutions, sustainable energy generation and efficient use (energy management). The step-by-step implementation of energy management will reduce real estate-related energy consumption. At trial locations, this approach has already saved 10 million kilowatt-hours (and 700,000 euros in energy costs) and it will be rolled out to other locations in the future.

Furthermore, the Royal Military Academy will be connected to the heating network in Breda in October 2020. An internal heating network will then be installed at the location. This network is expected to be operational before the summer of 2021.

Sites

Most of the energy on sites is required for lighting. Efforts undertaken to increase sustainability will therefore focus specifically on site and airfield lighting.

Innovation

In cooperation with the Central Government Real Estate Agency, the Defence organisation is giving substance to innovation in the context of national and European sustainability policy within the built environment. An example in this regard is the new learning and teaching building of the Royal Netherlands Marechaussee at the Koning Willem III Barracks in Apeldoorn. The learning and teaching building is the first central government building that is equipped with an innovative ice buffer system. In combination with the heat pumps, solar panels and solar air collectors, the building can be heated or cooled depending on demand.



Cooperation

To make the real estate more sustainable, we actively sought cooperation with other ministries in the past year. For example, we are exploring possibilities to participate in the programme concerning roof solar panels on central government buildings and energy generation at central government buildings. Together with the Central Government Real Estate Agency and other ministries, we are studying scenarios to achieve the targets of the aforementioned road map.

The Defence organisation actively participates in energy-related activities of the European Defence Agency. One of these is the Consultation Forum for Sustainable Energy in the Defence and Security Sector, in which discussions about energy conservation and sustainable energy in armed forces real estate take place at the European level and in which international cooperation projects in the field of energy are established. The participation of Defence organisation personnel in the Defence Energy Managers course resulted in a pilot project concerning an energy management system at the Nieuwe Haven site in Den Helder that has achieved considerable energy savings. Work is currently in progress to introduce the energy management system at five other locations at which energy consumption is high. The plan is to have an operational energy management system in place at the 20 locations that have the highest energy consumption levels by 2023 at the latest.

The energy transition is also being implemented in the context of the adaptive armed forces. For example, we are exploring whether and in which way Defence organisation sites can be used to generate sustainable energy, as well the role of the Defence organisation in this regard. In 2020, together with the Central Government Real Estate Agency and the De Bouwcampus foundation, the Defence organisation launched a study into regional energy systems and possibilities (area-based approach). From a barracks perspective, the way in which a barracks site can contribute to the realisation of the desired energy systems is being considered with a large, local group (energy and construction companies, knowledge institutes, municipal authorities and police and fire departments).

