

NATIONAL ENERGY STRATEGY 2030



MINISTRY OF
NATIONAL DEVELOPMENT

CONTENT

FOREWORD	6
BASIC CONDITONS	10
PILLARS	14
VISION	24



DEAR READERS,



While the final version of the National Energy Strategy has been the result of mutual efforts of one and a half year, its impacts will last for several decades. During its preparation, extensive professional and social consultations were therefore conducted in order to secure the support of as many of the stakeholders as possible when we set about to putting the concept into practice. An economic feasibility study and a strategic environmental assessment were drawn up prior to the public debate, shedding light on the background of the strategy and marking out the framework, both in terms of sustainability and financing, into which the action plans, currently in progress, can be integrated.

The National Energy Strategy, based on new foundations, will ensure the long-term sustainability, security and economic competitiveness of energy supply in Hungary. Serving primary national interests, guaranteeing the security of supply, taking into account the least cost principle and asserting environmental considerations, it enables Hungary to contribute to resolving global issues to an extent proportionate to its international weight and as far as its resources allow.

In order to achieve our goals, the document lays down five crucial efforts: increas-

ing energy savings and energy efficiency, increasing the share of renewable energies, integrating the Central European grid network and constructing the required cross-border capacities, maintaining the existing nuclear capacities and utilising the domestic coal and lignite resources in an eco-friendly manner for power generation.

Thinking responsibly, the Government considers it to be of critical importance in terms of energy policy to rebuild those Government positions that were given up in previous years due to short-term fiscal considerations or even less transparent or meaningful reasons. The only way to achieve the objectives of the strategy, including in particular the ensuring of affordable energy supply to consumers, is by increasing the involvement of the government.

Finally, let us thank our colleagues who have made every effort in order to enable the completion of the National Energy Strategy and who are now working in order to achieve that the action plans are completed, the legal framework is adjusted to the aims and the new support schemes are created along the path determined by the strategy, that being the only way of developing a uniform set of strategic objectives.

János Bencsik

Pál Kovács

FOREWORD



Because of the rapid shrinkage of arable agricultural land, potable fresh-water supplies and fossil fuel resources, ensuring the supply of healthy food, clear water and sustainable energy is one of the most important strategic challenges of the 21st century. As the age of cheap fossil energy sources, available in an infinite quantity, has also come to an end, in the future, the current consumption habits will no longer be sustainable. It can be forecasted that the forthcoming period will be that of a shift of structures and paradigms also in energy policy. Therefore, in order to preserve a healthy environment and ensure the requirements of future generations, an urgent change of approach is called for. By the development of the National Energy Strategy, the Government has aimed to:

- align energy and climate policies while taking into account the criteria of economic development and environmental sustainability,
- determine the future directions of energy projects, and
- prepare the required economic policy decisions

The development of the strategy, started in August 2010, was based on the opinions of nearly 110 significant economic, academic, trade and social stakeholders. The recommendations of the consultative trade committees attached to the Ministry of National Development and of the International Energy Agency and the energy policy concepts of the European Union were also taken into consideration. The reason we have opted for this path, which is both more time-consuming and involves more consultations, is because we are convinced that no energy strategy can be suitable to increase the confidence of the society and of investors and thus ultimately to succeed, unless it is based on the cooperation of all industry stakeholders and ensures long-term planning.

As part of the social dialogue, a strategic environmental assessment was also drawn up as the Energy Strategy was being finalised, in order to call attention to environmental and sustainability risks whose subsequent removal would involve considerably higher costs than prevention. On the basis of conclusions drawn from the recommendations of the strategic environmental assessment and the over 60 proposals received as a result of a 30-day public debate, we were able to identify those points of the Energy Strategy whose modification could increase the professional and social acceptance of the document.

In addition to our efforts for a social consensus within Hungary, global, European and regional energy policy developments were also followed with attention, as our energy policy must be implemented embedded in a system of dynamically evolving external conditions. The impacts on the energy market of the political goings-on in North Africa, the Fukushima reactor accident and the German and Swiss decisions on the phase-out of nuclear capacities made it clear that, rather than being a merely economic problem, energy security is increasingly becoming a strategic geopolitical issue. It is the responsibility of the Government to give adequate responses to the challenges represented by the competition for the diminishing fossil fuel reserves and the simultaneously emerging negative impacts of climate change, while protecting national interests. Six electric power, three gas market and three heat market scenarios are examined in the Energy Strategy and

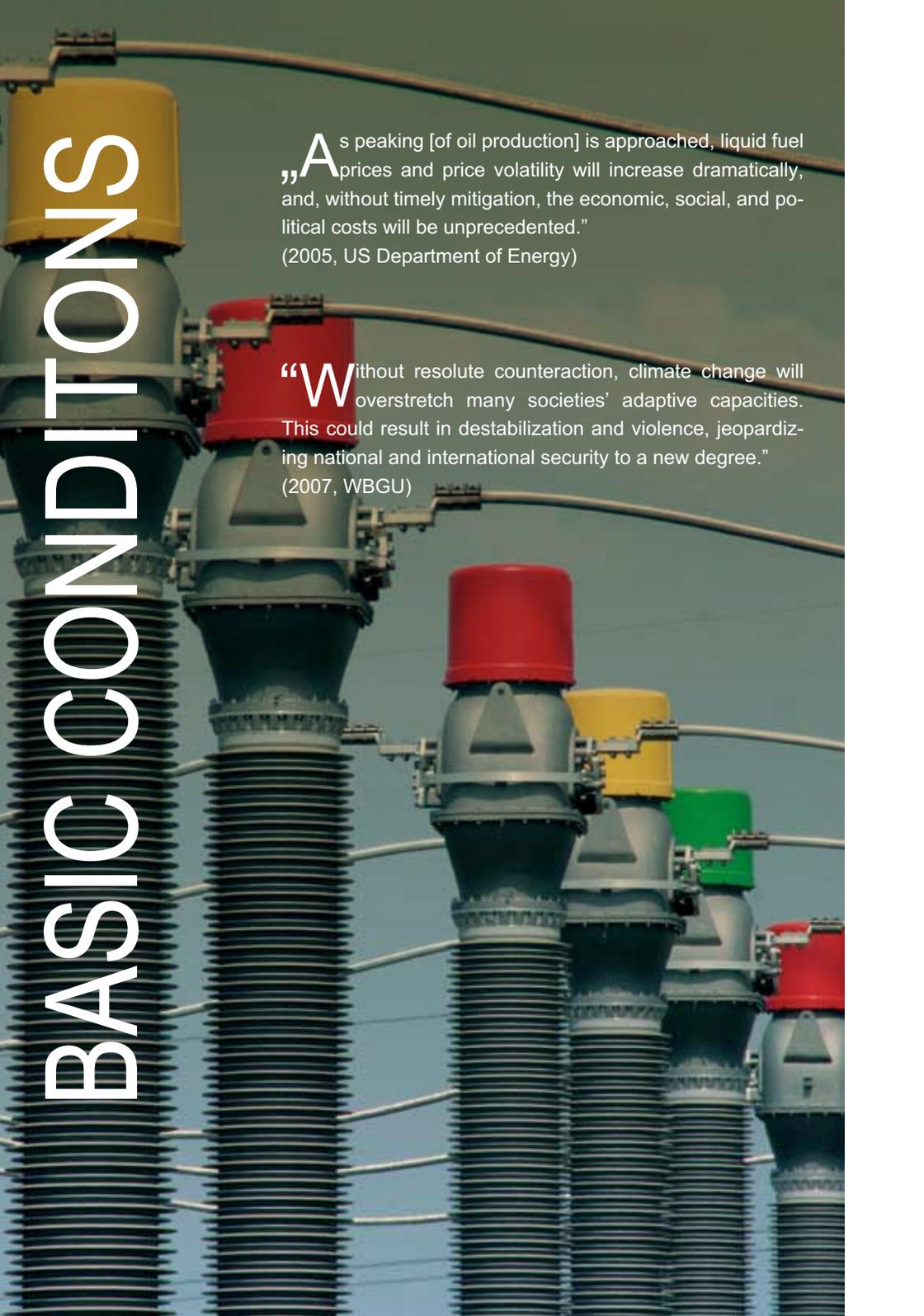
its economic feasibility annex. The Energy Strategy also contains analyses of several capacity-dependent scenarios of Hungary's integration to the European gas infrastructure, their effect on pricing on the gas market and the regional effects of the phase-out of German nuclear capacities. The National Energy Strategy provides solution proposals and ranks scenarios. We consider it a significant recognition that there has been a powerful interest in Hungarian energy policy plans both within our immediate region and from other member states of the European Union.

Hungarian Parliamentary Decision 77/2011 (X. 14) will grant a mandate for the implementation of the National Energy Strategy, including the development of the action plans fitting into its framework, setting out the detailed measures required in order to achieve the objectives, their schedule as well as the financing requirements of the development projects. It will be followed by adjusting the legal environment to the strategy and, finally, the development of the appropriate support and financial systems. Together with matching other concepts, action plans and industrial strategies, the Energy Strategy will constitute a uniform strategic system of objectives.



THE MAJOR ACTIONS LISTED IN THE PARLIAMENTARY DECISION WITH REGARD TO THE OBJECTIVES OF THE ENERGY STRATEGY ARE AS FOLLOWS:

- 1. Framing the Act on sustainable energy management**
- 2. Improving energy efficiency**
 - a. National Energy Efficiency Action Plan**
 - b. Energy Strategy for the Building Sector**
 - c. Power Plant Development Action Plan**
- 3. Increasing the utilisation of renewable energies:**
 - a. Hungary's Renewable Energy Action Plan**
 - b. Regional mapping of the renewable energy potential**
- 4. Transport development:**
 - a. Zero Carbon Transport Concept**
- 5. Utilisation of domestic fuel resources:**
 - a. Reserve management and utilisation action plan**
- 6. Environment awareness-raising:**
 - a. Awareness-Raising Action Plan**
 - b. Establishment of a network of energy engineers**
- 7. Achieving industry development objectives:**
 - a. Energy industry development and R&D&I Action Plan**
- 8. Ensuring the competitiveness of the district heating service:**
 - a. District Heating Development Action Plan**



BASIC CONDITIONS

„As peaking [of oil production] is approached, liquid fuel prices and price volatility will increase dramatically, and, without timely mitigation, the economic, social, and political costs will be unprecedented.”
(2005, US Department of Energy)

“Without resolute counteraction, climate change will overstretch many societies’ adaptive capacities. This could result in destabilization and violence, jeopardizing national and international security to a new degree.”
(2007, WBGU)

The events on the global energy market – of which effects Hungary cannot avoid – predict the following trends:

- While competition for energy sources will increase, its adverse effect can be mitigated by increasing integration, co-operation and solidarity within the EU.
- In the long term, the risks of the availability of energy sources will increase, and the emergence of an imbalance of the demand and supply of liquid hydrocarbons is expected during the time-frame of the Energy Strategy
- The environmental requirements concerning the production and use of energy will continue to tighten.
- As a result of the above, the costs of the extraction of energy sources and of the production of utilisable energies will continue to increase.
- As the result of the continued growth of the share of electric technologies, the share of electricity within the total energy consumption will increase steadily and new areas of application will emerge (transport, heating/cooling).
- One of the already noticeable consequences of climate change, the frequency of extreme climatic conditions will increase, while the accuracy of the prediction of such conditions will decrease. This will present difficulties for economic planning and threaten the safety of agricultural production. The prevention and remedying of damages will involve significant costs for the population and the budget.

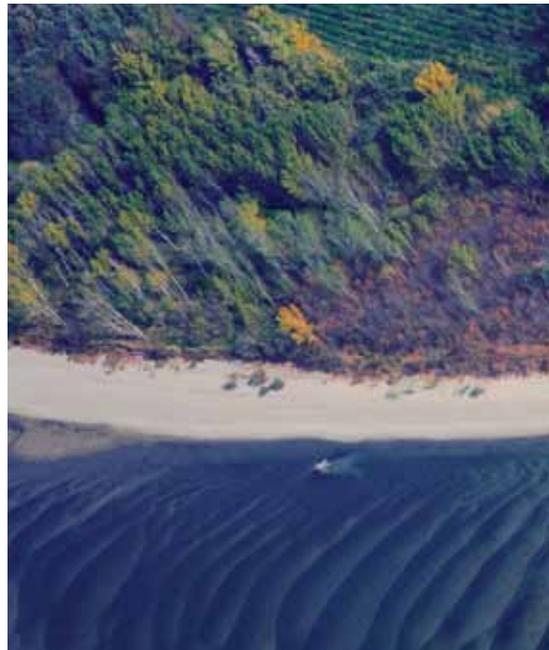
- The extreme climatic conditions due to the climate change will have a significant effect on the secure operation of the critical infrastructure, including the energy supply systems.



THE CURRENT PRACTICE

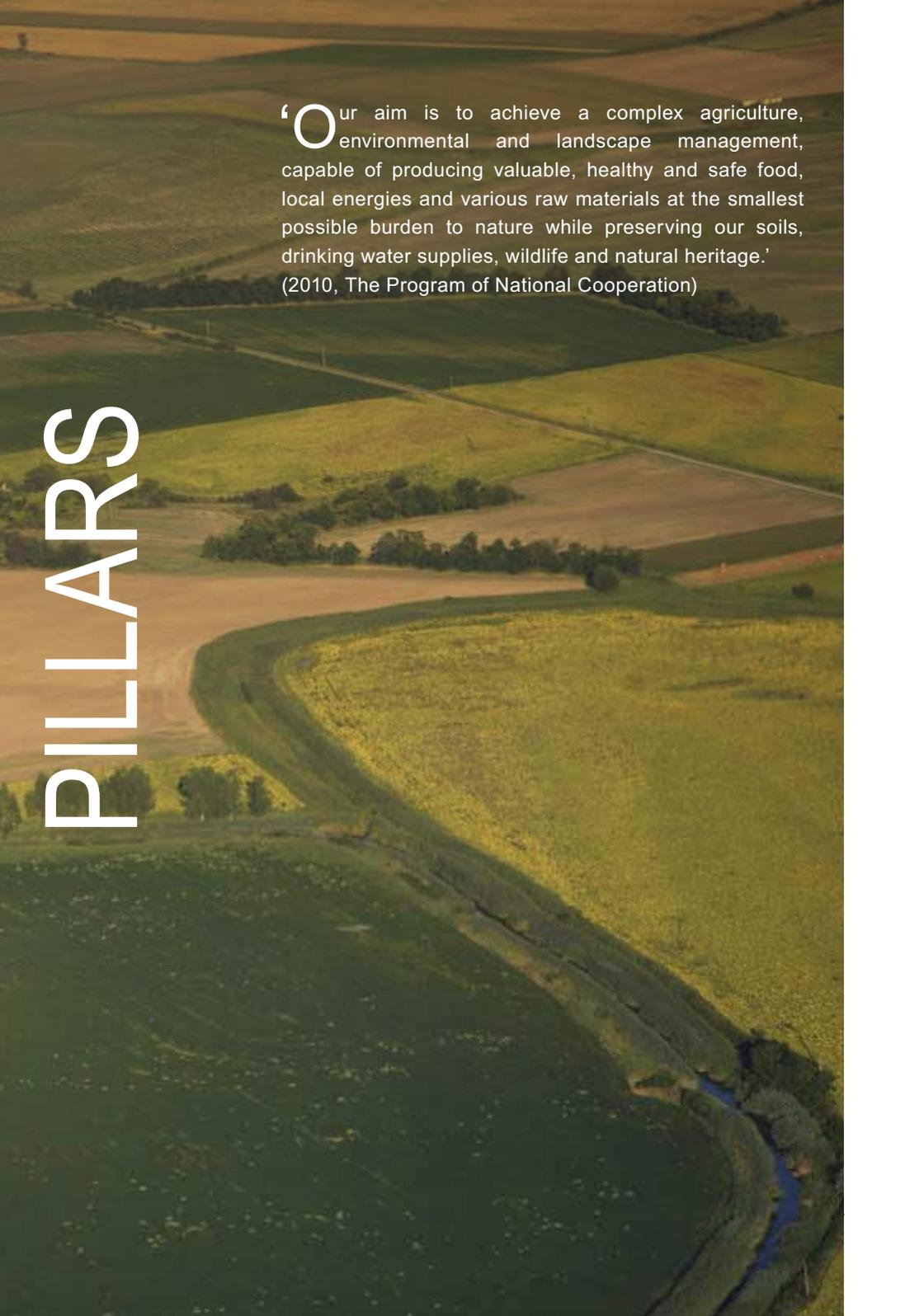
is NOT competitive because	<ul style="list-style-type: none">• the price and the availability of today's key fuels will become uncertain in the future, leading to the emergence of a seller's market.• the infinite economic growth model is no longer viable.• the desired locality is not fulfilled.
is NOT sustainable because	<ul style="list-style-type: none">• supplies are being consumed at a higher rate than they are being replaced.
is NOT secure because	<ul style="list-style-type: none">• the rate of extraction of the remaining supplies is unable to meet the increase of demand.• conditions are set by the countries disposing over the supplies, putting importers into a vulnerable situation.
The solution	<ul style="list-style-type: none">• changing the attitudes of the society and introducing new and more efficient technologies.

The energy policy of the future should be developed on the basis of the answers to the most important domestic and global challenges and the energy policy efforts of the EU, also taking into consideration our specific geopolitical features. It should focus on achieving both a rationalised energy demand and an energy supply (infrastructure and service) encouraging the growth of the Hungarian economy, ensuring the accessibility of the services and prices affordable to a large group of consumers. The challenges related to the imminent change of the energy structure may be turned to the advantage of our country. In order to do so, however, we should be able to make the most of the opportunities, conducive to employment and economic growth, offered by energy improvements.





PILLARS

An aerial photograph of a rural landscape. The scene is dominated by rolling green hills and a network of agricultural fields. A prominent feature is a winding river or stream that flows through the lower right portion of the image. The fields are in various stages of growth, with some appearing as vibrant green and others as a more muted, yellowish-green. The overall atmosphere is peaceful and scenic, showcasing a well-maintained agricultural environment.

‘Our aim is to achieve a complex agriculture, environmental and landscape management, capable of producing valuable, healthy and safe food, local energies and various raw materials at the smallest possible burden to nature while preserving our soils, drinking water supplies, wildlife and natural heritage.’
(2010, The Program of National Cooperation)

The Energy Strategy should provide guidance in resolving the actual energy challenges. If treated appropriately, today's problems will become tomorrow's potentials, not only for the energy sector but for the whole national economy and society. In the light of the global climate protection challenges, the steadily shrinking global fossil fuel reserves and the competition for these reserves, the basic objectives of the long-term Hungarian Energy Strategy are, in accordance with the national interest and the principles of the European Union, as follows:

- increasing of competitiveness
- transition to sustainability
- guaranteeing the security of supply

The sustainable and secure energy sector should be achieved while underpinning the competitiveness of the economy. This must be asserted in the framework of the Hungarian economy and society, making the most of the country's natural, social and geopolitical conditions, at an optimal cost-benefit ratio. Energy policy is an organic part of industrial and development policies. The achievement of its objectives is therefore closely linked to other areas of the economy and should inevitably take into consideration the development strategies of the latter and the impact of energy policy on their development.

Due to their nature, however, the above three aims cannot be met simultaneously. To resolve the conflict between them the National Energy Strategy proposes a system of five tools. The Parliamentary Deci-

sion also starts with the interconnection between the three aims since at the decision in the energy policy the joint analysis of these aims is necessary.

„COMPETITIVENESS is how a nation manages the totality of its resources and competencies to increase the prosperity of its people.”

(2008, Professor Stéphane Garelli, IMD World Competitiveness Yearbook)

The Hungarian energy sector can promote the long-term competitiveness of the Hungarian economy by the following:

- active participation in the single internal energy market of the European Union;
- the new industries gaining importance, with particular regard to the utilisation of renewable energy sources, the improvement of energy efficiency and the related research and development activities;
- the appropriate management of domestic supplies and resources. Since mineral resources and the geothermal and biomass potential are a national treasure, they should be employed and developed nationally and treated partly as strategic supplies.



The business conditions of the energy sector and energy consumers will be determined by competition on the national, regional and, within a few years' time, the single EU markets, which essentially requires a Hungarian regulatory environment stimulating competition. To this end the aims of the energy policy are to establish transparent and non-discriminatory conditions for market stakeholders and consumers;

to ensure an attractive investor environment: through long-term, stable and efficient regulation, the simplification and acceleration of administration.

Competition within the energy sector must result in a cost level acceptable to the economy. In addition, competition leads to increased consumer awareness and forces

stakeholders to increase the efficiency of operation.

„SUSTAINABLE DEVELOPMENT

is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

(1987, Brundtland Commission of the United Nations)

The combination of the issues of the environment and development can ensure continuous social wellbeing, the satisfaction of the needs of future generations and the preservation of our natural, social and cultural heritage. To achieve the sustainable energy future:

- energy management must seek the

balance between environmental (resource-efficient, climate-neutral), social (secure, accessible, non-harmful to health) and economic (cost-effective) dimensions of sustainability;

- all efforts must be made to reduce the energy consumption;
- the required energy must be produced and transmitted in the most efficient manner possible, preferably from renewable sources, under strict sustainability criteria;
- a critical review of consumption patterns is required and their changing through a wide range of awareness-

raising programs to create the future and environmental conscious society;

- low CO₂-emission technologies must be supported, the spreading of smart grids and meters must be encouraged, the application, as soon as possible, of viable green innovations must be fostered;
- the externalities related to the modes of energy production, particularly the use of fossil fuels must be quantified.

These efforts may enable the achievement of sustainable development and a living standard ensuring long-term prosperity.



„A nation-state is ENERGY SECURE to the degree that fuel and energy services are available to ensure: a) survival of the nation, b) protection of national welfare, and c) minimization of risks associated with supply and use of fuel and energy services. The five dimensions of energy security include energy supply, economic, technological, environmental, social and cultural, and military/security dimensions.”
(2004, David von Hippel, *Energy Security Analysis, A New Framework in reCOM-MEND*)
(2006, Department of Economic and Social Affairs of the United Nations)

Recent international developments and their impact on the energy markets have made it clear that energy security is increasingly becoming a strategic geopolitical rather than a merely economic issue. The high proportion of import fuels makes Hungary vulnerable in terms of energy supply. 62 percent of our total energy requirement is supplied by the import of fossil fuels. In particular, 82 percent of our natural gas supply is imported from Russia. That would not represent a high risk if properly diversified supply routes and supply sources existed, which makes increasing the security of supply a priority target.



As an open, export-oriented economy, in want of economically exploitable fossil fuels, Hungary obviously cannot be entirely independent in terms of energy supply. Nevertheless, thinking responsibly, Hungary should strive for energy independence in an effort to stay out of the looming international conflicts arising due to conflict of diminishing worldwide stocks of fossil fuels and an ever-increasing consumption demand. It is therefore with good reason that the motto of the National Energy Strategy runs: 'independence from energy dependence'. To that end

- the diversification of natural gas sources and transit routes must be continued (by implementing appropriate infrastructure alternatives);
- energy saving and energy efficiency must be treated as priorities (reducing consumption being the most efficient way, also viable in the short term, to increase supply security);
- our renewable energy potential, based on substantial local resources, must be exploited;
- the electric power generated by the Paks Nuclear Power Plant, accounting for 42 percent of the total domestic production, and our natural gas storage capacity, outstanding by international standards, are matters of priority;
- the future utilisation, in an eco-friendly way, of our still significant fossil fuel resources must be striven for.



TOOLS

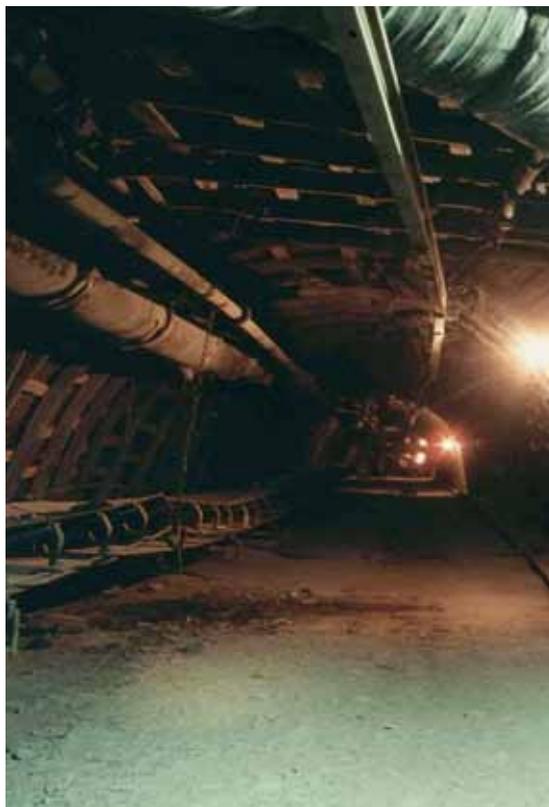
The energy independence of Hungary should be achieved by:

- energy saving, as the cheapest and most environmentally friendly energy is energy that has not been consumed,
- the highest possible share of renewable energy of decentralised domestic generation, which requires the establishment of bipolar agriculture (the utilisation of biomass can be switched between energy and food purposes, depending on market needs)
- safe nuclear energy, which serves as the basis for the electrification of road and rail transport,
- regional infrastructure platform (integration to the European energy infrastructures and markets) in order to achieve price stability, the diversification of resources, the security of supply and to increase regulatory capacities on the grid,
- government involvement and increasing the representation of the public good, social solidarity and the national interest, while respecting competitive neutrality and the rules demanded by a democratic society.

In addition to the above, we cannot, for the time being, afford to renounce fossil fuels. Natural gas, purchased at a reasonable price, will continue to play an important role, whereas the Hungarian coal and lignite resources represent the strategic reserves of Hungarian energy policy. This

means that the Hungarian coal and lignite resources also serve as emergency reserves for a crisis situation, i.e. an unexpected price explosion of natural gas or systemic operating troubles.

Rather than to achieve a desirable electric power mix, the objective of the National Energy Strategy is to guarantee the safe energy supply of Hungary at all times, taking into account the country's economic competitiveness, environmental sustainability and the endurance of consumers. Meanwhile, we should also be able to move



toward a shift of the energy structure, while the scope of action is limited by the actual fiscal conditions. The outlines of a number of alternative energy-generation methods are currently taking shape, which may give rise to high expectations. Most of these, however, are not yet ripe for the market, even considering the continuous increase of the prices of traditional fuels, and will not be viable unless substantial state subsidies are available. At the moment, it is difficult to predict the exact point in time the market-price inversion between traditional and alternative energy sources will take place. The impossibility of

predicting the future changes of the price of natural gas only adds to the complexity of the situation, as the energy supply of any country should essentially be based on an energy source or energy source mix available in a safe and predictable manner, at an affordable price. Therefore, for supply security reasons, the eco-friendly utilisation of domestic coal and lignite deposits should play an increasing role in the long term.

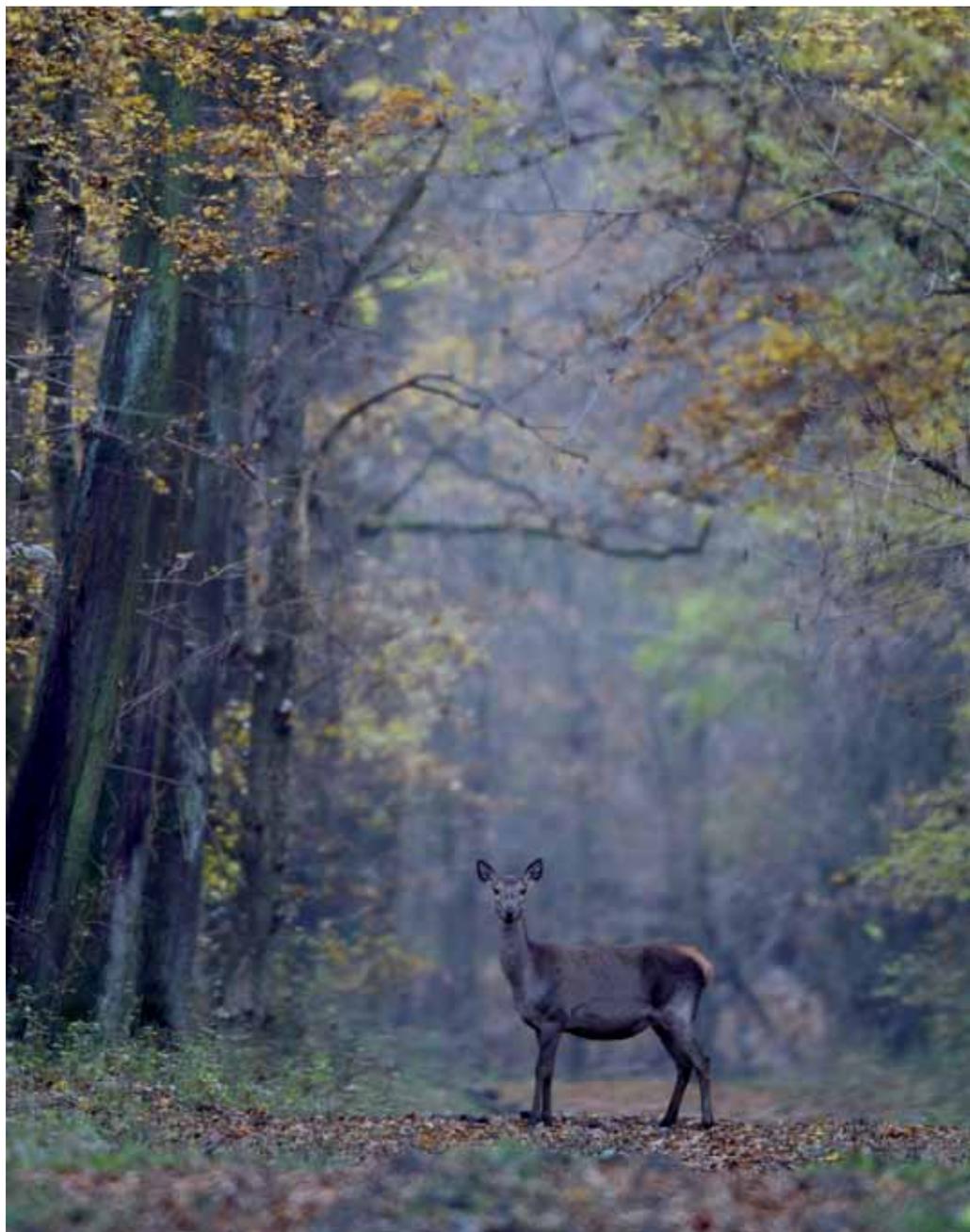
On the basis of the above, the 'Joint Effort' vision, considered to be the most realistic objective and therefore an objective to be



implemented, is represented by the 'Nuclear-Coal-Green' scenario of the Energy Strategy in terms of electricity generation. Its most important elements are as follows:

- the long-term preservation of nuclear energy in the energy mix;
- the maintenance of the current level of coal-based energy generation, for two reasons: (i) in energy crisis situations (e.g. the price explosion of natural gas, a systemic breakdown) it is the single readily available internal reserve, (ii) preventing the final loss of a valuable trade culture due to the above and with a view to maintaining the possibility of an increased share in future utilisation. The latter depends on full compliance with the committed sustainability and GHG emission criteria (full use of carbon capture and clean coal technologies);
- in terms of renewable energy sources, the linear extension of Hungary's National Renewable Energy Action Plan after 2020, provided that efforts should be made in order to increase the set objective, depending on the capacity of the economy, system controllability and technological development.

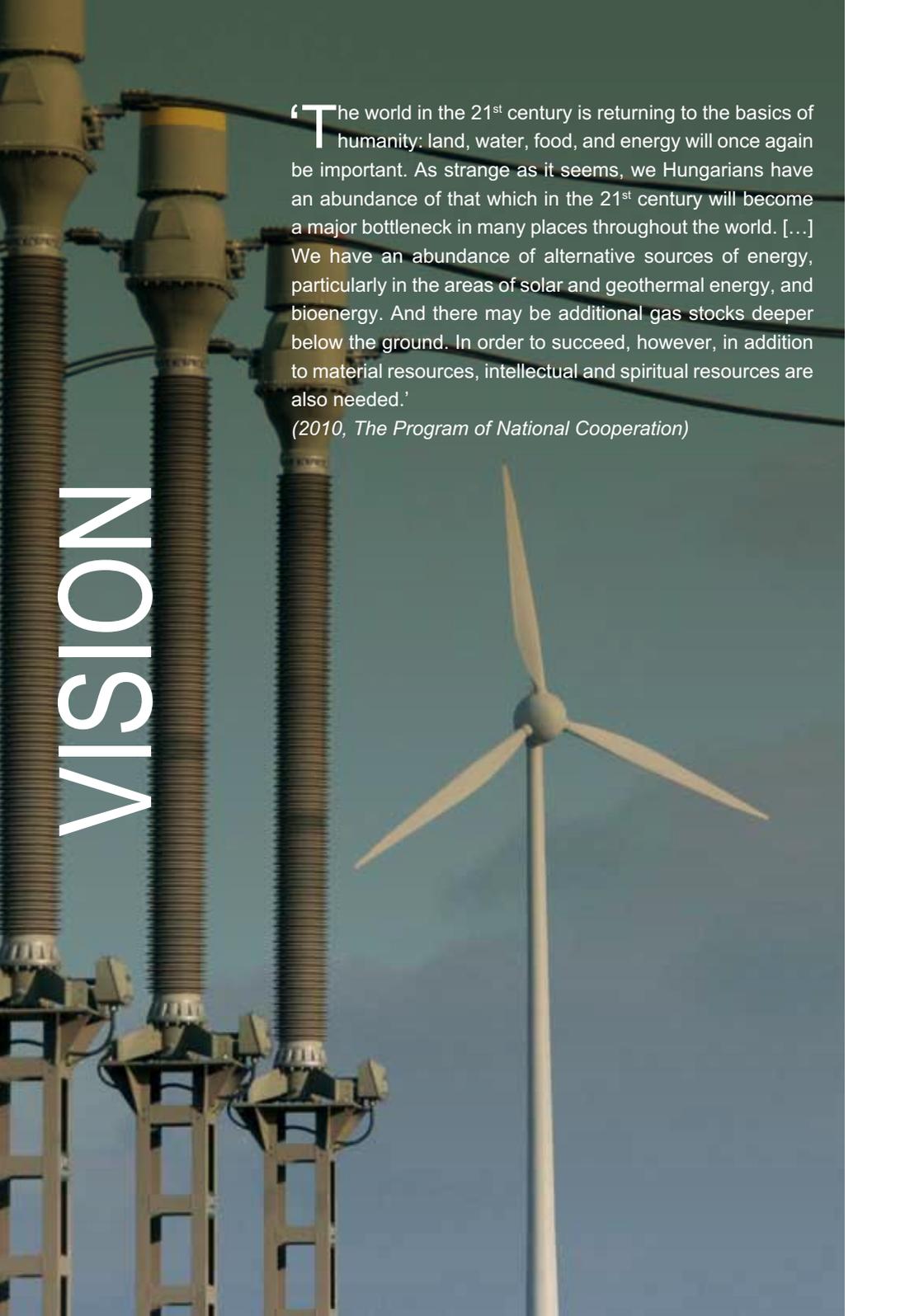
The preference of the Nuclear-Coal-Green scenario does not mean that the elements of the other scenarios are unrealistic. Under certain external and internal economic policy conditions, the government may even change its preference, as a different scenario may offer a more reliable guarantee for the security of supply in a changed situation. The biennial review of the National Energy Strategy therefore remains an important element.



VISION

‘The world in the 21st century is returning to the basics of humanity: land, water, food, and energy will once again be important. As strange as it seems, we Hungarians have an abundance of that which in the 21st century will become a major bottleneck in many places throughout the world. [...] We have an abundance of alternative sources of energy, particularly in the areas of solar and geothermal energy, and bioenergy. And there may be additional gas stocks deeper below the ground. In order to succeed, however, in addition to material resources, intellectual and spiritual resources are also needed.’

(2010, The Program of National Cooperation)



ENERGY EFFICIENCY

The path to the future is to ensure the reduction of energy consumption as a result of energy efficiency measures and the application of innovative technologies and to increase the carbon consciousness of consumers through targeted awareness-raising campaigns. It is the responsibility of the Government to treat this question as a priority, to select and support the alternatives best suiting local conditions and to mitigate adverse external effects on the security of energy supply and market prices in Hungary. Hungary has an advantageous potential in terms of both knowledge capital and resources (drinking water, food, alternative and certain mineral energy sources). These supplies represent strategic reserves and a potential at the same time, the future-conscious exploitation of which is the common interest and responsibility of all of us. The Energy Strategy should therefore aim at a synthesis of social and economic policy objectives and Hungary's national interests.

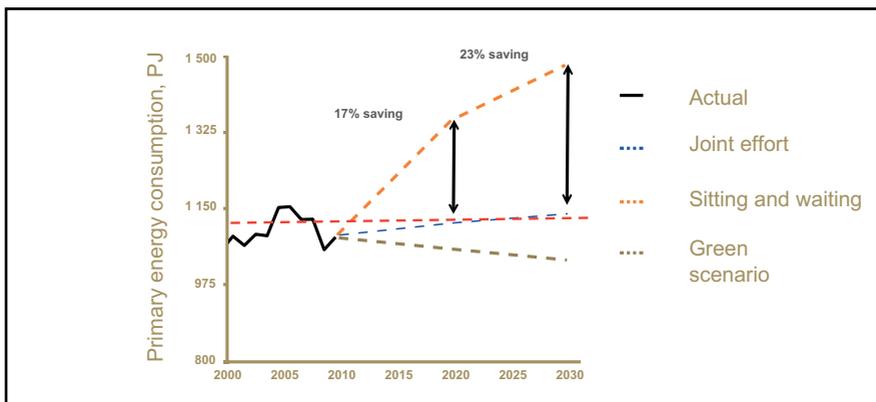
The change of the energy structure should include:

- (i)** energy efficiency measures spanning the entire supply and consumption chain;
- (ii)** increasing the share of low CO₂-intensive electricity generation based primarily on renewable sources of energy;
- (iii)** promoting renewable and alternative methods of heat generation;
- (iv)** increasing the share of low CO₂-emission modes of transport.

It is an axiom that non-consumed energy is the safest, cheapest and most environmentally friendly form of energy. Based on that, the reduction of consumption through energy saving and improving energy efficiency is the most efficient and effective means of increasing the safety of supply. Under the green scenario of the Energy Strategy, the objective is that primary energy consumption should preferably be reduced or, on the basis of the joint effort scenario, it should increase at a level not exceeding 5 percent up to 2030, i.e. it should not be higher than before the crisis. It must be achieved by reducing fossil fuel consumption and carbon dioxide emissions at the same time.

Energy efficiency measures must take into consideration the entire supply chain, from production to consumption, in order that the level of primary energy consumption can be maintained through the improvement of energy efficiency, as the collective result of technological solutions, economic incentives and social awareness-raising. The key elements of the supply chain as a whole are as follows

- Building energy programs: under 'Joint effort', heating energy demand could be reduced by 111 PJ, i.e. more than 10 percent of the country's primary energy requirement, compared to 'Sitting and waiting' through a powerful building renovation program. According to



Expected change of primary energy use in Hungary

the 'Green' scenario, industrial energy rationalisation programs, including energy innovations, will offset the increase of demand due to the growth of production and increasing electricity consumption.

- Modernisation of electric power plants and the grid: through the modernisation of the current low-efficiency power stations, 6 to 9 percent of primary energy could be saved compared to the present.

In addition to the above, the reduction of the energy needs of industrial technologies, agriculture and transport constitutes another important factor of the energy conservation program.

Energy efficiency projects in the building sector are a key component of the improvement of energy efficiency. Today, 40 percent of all energy consumed in Hungary is consumed in our buildings, two-thirds of which goes to heating and cooling. 70 percent of the approximately 4.3 million

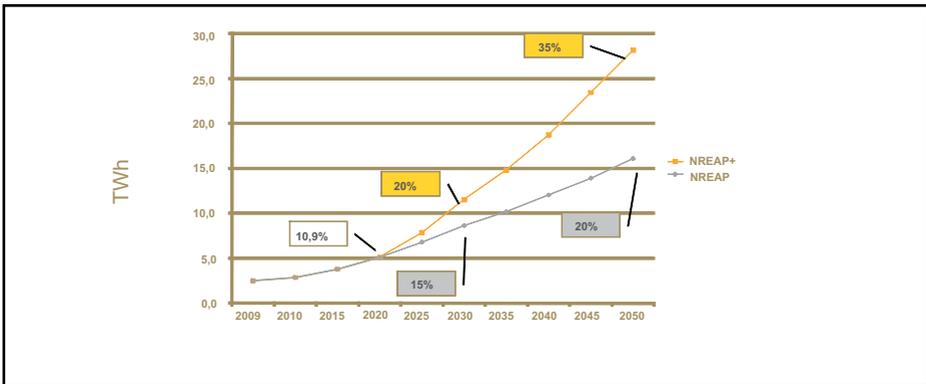
Hungarian homes fail to meet modern functional technical and thermal engineering requirements, with a similar ratio for public buildings. Despite an improving trend as the result of the communal energy efficiency programs implemented in recent years, the heating energy consumption of a flat in Budapest is still twice that of a similar sized flat in Vienna. It is the purpose of the Energy Strategy to reduce, by 2030, the heating energy requirements of buildings by 30 percent through energy-efficiency programs in the building sector in accordance with European Union targets.

Awareness-raising also plays an important role in the propagation of energy conservation and the reduction of the environmental load of ecosystems: the widest possible groups of society must be converted into environmentally conscious consumers, from schools to adult education.

RENEWABLE ENERGY SOURCES

Considering Hungary's economic and environmental conditions, the share of renewable energy will increase to approximately 20 percent by 2030 in terms of primary en-

be achieved in a strictly regulated manner, in accordance with sustainability criteria, preventing any interference with food and fodder agriculture. The main roles will be played by biogas and biomass power plants making the most of local conditions and retaining profits locally, generating both decentralised heat and electric power,



The share of renewable energy in electricity generation

ergy demand. On a twenty-year perspective, that rate is but an indicative target, obviously. Subject to factors such as technological progress, the level of the flexibility of the grid and the actual efficiency of the economy, we will need to strive for achieving the highest possible share of renewable energies. One of its prerequisites is bipolar agriculture. That model is essentially based on the establishment of a system of economic incentives and support enabling a flexible switch between food and energy farming according to the actual requirements of the market. The cultivation of biomass for energy purposes, however, must

geothermal and solar power-generated heat and wind power. In order to increase the share of solar and wind energy, the flexibility of the electric power system must be improved, by means of a hydro-pumped plant, among other things.

As far as the utilisation of bioenergy is concerned, decentralised energy-producing units (e.g. biogas plants) processing base materials originating from energy plantations and agricultural and industrial (e.g. food industry) by-products will be given priority. Another important question is the energy utilisation of communal and industrial wastes non-utilisable in their materials and of waste waters.

Since municipal organic waste qualifies as biomass, its energy utilisation is added to the share of renewable energy sources. Similarly to many other countries, where it accounts for up to 15 to 20 percent of biomass-to-energy utilisation, it could increase the share of renewables also in Hungary. In highly industrialised countries worldwide, the energy utilisation, in incineration plants, of burnable municipal wastes, non-utilisable in their materials, in strict adherence to technological discipline and the strict environmental standards, is considered a resolved issue. The safe utilisation of up to 60 percent of such wastes would be feasible at the current technical/technological level. Hungary must also move into this direction, as deposition without recovery is not sustainable, occupies an increasing area of valuable arable land and endangers drinking water supplies and natural biodiversity.

The transition of public transport to locally generated fuels, meeting the sustainability criteria (second-generation technologies, biogas, hydrogen and electricity) will also

contribute to the achievement of the Energy Strategy objectives.

NUCLEAR ENERGY

Nuclear energy is important means of both energy independence and climate protection in Hungary. The use of nuclear energy makes a substantial contribution to the maintenance of the security of energy supply and, through its low production cost, also to the competitiveness of the national economy. In addition to continuously monitoring safe operation, the Paks Nuclear Power Station is an indispensable element of the Hungarian electric power system. Strategic documents in the making are therefore based on the assumption that the share of nuclear energy will be at least maintained at the current level over the next few decades. There are two principal reasons underlying the need to maintain the Paks nuclear capacities in the long term:

- increasing domestic demand for electricity: The need for the replacement and the potential expansion of the existing capacity by new units is underpinned by the need to replace the existing obsolete power plants, the expected average 1.5-percent annual increase of demand for electricity, the meeting of the increasing electricity demand as a result of the desired electrification of transport and heating/

cooling and the shrinking of our import potentials.

- the need to move toward the decarbonisation of the Hungarian economy: As nuclear power plants are almost emission-free producers of electricity, they are economical and efficient tools of meeting the environmental and climate protection targets.

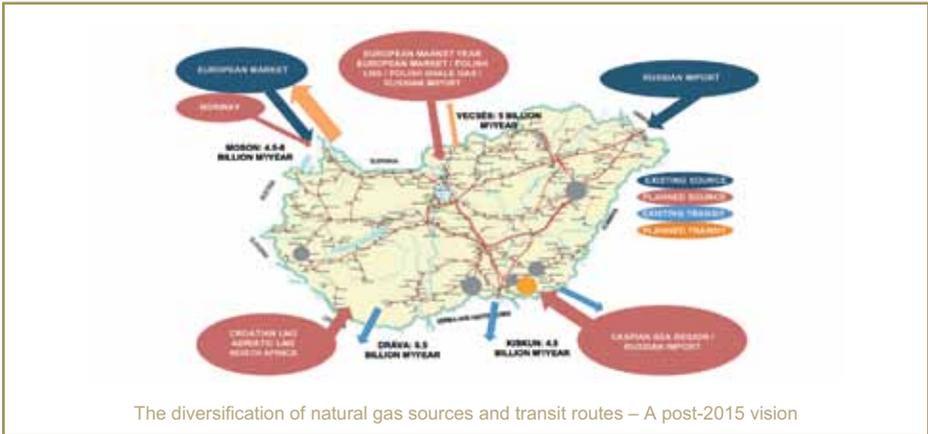
The European Union is envisaging the significant (up to 80-95 percent) reduction of GHG emissions up to 2050. According to our calculations, the potential phase-out of the Paks nuclear capacities would substantially increase both carbon dioxide emissions and natural gas consumption in Hungary.

As far as nuclear energy-related decisions are concerned, the basic and most essential criterion is the safety and security of the health, life and property of the Hungarian population, which means that nuclear safety must have a priority above all other considerations. The regular auditing of the operation and safety of the Paks Nuclear Power Plant and the conditions of its operation must be continued. New improvements (whether technologic development or the appearance of a new standard to be enforced) must be taken into consideration in order that safety requirements are maintained at the highest possible level.

REGIONAL INFRASTRUCTURE PLATFORM

Hungary's natural gas infrastructure, which constitutes a significant element of the country's national wealth and which is at a much more advanced level of development and in a much better condition than the gas infrastructures of other countries in the region, will continue to make a significant contribution to the country's weight in terms of energy policy. However, rather than being an external condition, the regional and later Europe-wide integration of the national electricity and natural gas markets is an existing trend to be adapted to and proactively reacted to by Hungarian energy policy. Legal and physical integration to the single European energy markets would enable the conditions of competition, including the selection of the most advantageous option of the purchasing of natural gas at all times. Since Hungary is currently party to the second most expensive gas supply contract within the EU, it is our intention to renew the contract, expiring at the end of 2015, at the most advantageous conditions possible in terms of both quantities and prices.

As far as the physical infrastructure is concerned, potential solutions include the construction of links of suitable capacity to the European market and the North-South gas corridor, whereas in terms of the diversification of sources, (Italian/Croatian/Polish)



LNG terminals, Polish shale gas, sources in the Caspian region and the ‘return transport’ of surplus Western European quantities constitute the possible alternatives. For Hungary, priorities include the initiatives potentially resulting in the diversification of sources as well as an alternative transportation route. At the same time, it must be kept in mind that the success of major international projects (including Nabucco and the South Stream) depends on various external factors.

THE GOVERNMENT’S SYSTEM OF INSTITUTIONS AND INSTRUMENTS

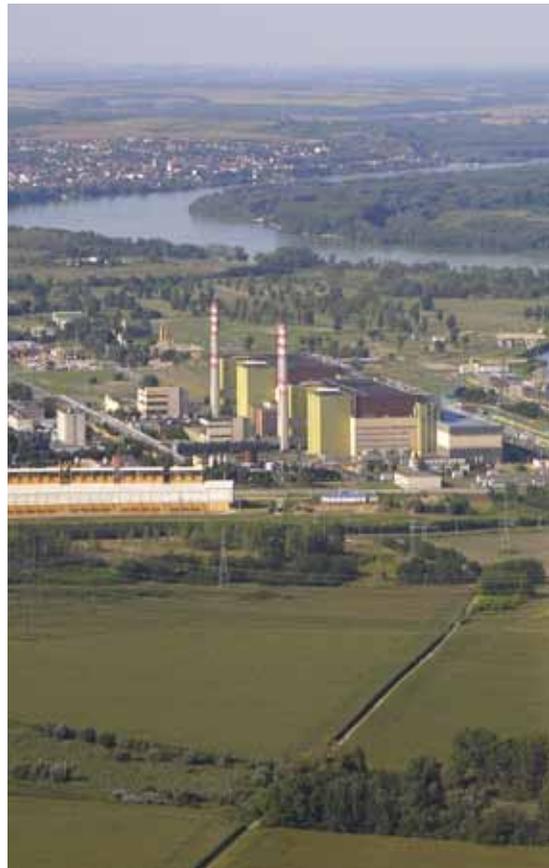
The representation of the public good, social solidarity and the national interest cannot be solely based on market principles. In itself, ensuring the coherence of legal and economic conditions is insufficient in order to efficiently vindicate public good and national interests. Consequent-

ly, in the future we will make an effort to increase the involvement of the public sector in the energy economy, while obviously respecting competitive neutrality and the rules demanded by a democratic society. While in the electric power sector, the government continues to have a substantial direct potential to influence the market through the state-owned MVM Zrt. (Hungarian Power Companies Ltd.) and the Paks Atomerőmű Zrt. (Paks Nuclear Power Plant Ltd.), a similar potential should be established in the natural gas and oil sectors, with particular regard to the expiry in 2015 of the long-term gas price agreement between Hungary and Russia. This may include the granting of new authorisations to the MVM Zrt., creating a new state-owned natural gas trading company or acquiring a controlling interest in a company with a high market share.

Since the renewal of the Hungarian energy infrastructure (power plants, grids, smart meters) is investment-intensive,

the predictability of the investor environment and a system of institutions ensuring rapid administration must be established. The failure of the above may prevent the projects indispensable for a long-term security of supply. It is of crucial importance that the stability and credibility of the system of the government's energy institutions should be ensured in the long term in order that it should be able to put the Energy Strategy into practice and to monitor its implementation on a regular (biannual) basis.

With a view to competitiveness, the security of supply and sustainability and taking into account the economic productivity of Hungary, the system of tools should be in accordance with economic considerations, international commitments, the principle of cost efficiency and the mitigation of environmental burdens. Environmental and natural resource management criteria must be borne in mind with a view to meeting the sustainability criteria.



PRIMARY ENERGY SUPPLY

<p>will become competitive if</p>	<ul style="list-style-type: none"> • new, long-term jobs are created in the energy sector, primarily in the fields of energy saving and renewable technologies, which may offset the energy price increase due to their increasing use. • a stable and transparent electricity and gas market situation is established as a result of the emerging internal market of the European Union. • local conditions (natural and social resources) are taken into consideration and made increasing use of – creating value locally. • consumer prices are not higher than the price level of the European Union.
<p>will be sustainable if</p>	<ul style="list-style-type: none"> • the primary energy requirement stabilises while demand continues to grow. • it is generated by low CO₂-intensity technologies, based primarily on renewable energy technologies, complying with the basic conditions of decarbonisation in the longer term (during their lifetime).
<p>will be secure if</p>	<ul style="list-style-type: none"> • it relies heavily on domestic energy sources. • sufficient reserves are available for contingencies. • import routes are diversified.
<p>Tools:</p>	<ul style="list-style-type: none"> • the implementation and continuous monitoring of the energy efficiency programs. • extension of the lifecycle of the Paks Nuclear Power Plant and the potential construction of new nuclear unit(s) • various fiscal incentives (including, for example, differentiated delivery prices, refundable and non-refundable investment subsidies, preferential tax and contribution schemes). • supporting renewable-based heat generation in addition to green electricity and the subsidised feed-in of biogas. • encouraging innovation technologies and manufacturing capacities based on the domestic knowledge base, an indispensable factor of the employment of highly skilled professionals. • a differentiated support scheme to promote the use of renewable energy sources (with particular regard to biomass and geothermal energy) and waste-to-energy. • The implementation of new developments in the form of pilot projects. • regional and European consultations and joint positions.

ELECTRICITY SUPPLY

will become competitive if

- we manage to turn the benefits of integration to the internal EU market to the advantage of domestic consumers.
- the grid is advanced and its control capacity is increased within the framework of the regional infrastructure platform.
- the price of electric power is lower than the regional wholesale prices even if subsidies is taken into account.

will be sustainable if

- the CO₂ intensity of power generation is reduced, primarily through the increase of renewable energy and nuclear energy capacities and, if appropriate conditions are available, the supplementary application of CCS.
- the efficiency of production improves.

will be secure if

- the number and types of new power plants meet the demand, taking decommissioning into account
- demand is supplied from domestic power plants based on domestic jobs.
- system controllability improves, with particular regard to storage

Tools:

- simplified, investor-friendly permitting, network access and regulation schemes and a feed-in tariff system of a period set out in the law, in order to promote the penetration of alternative technologies.
- the transparent allocation of the resources from emissions trading, in accordance with the targets of the Energy Strategy.
- a clear and long-term set of criteria concerning the construction of power plants.



HEAT ENERGY SUPPLY

will become competitive if

- the technical standard, efficiency and the coverage of the district heating service increase. This essentially requires quality improvement and the full satisfaction of the comfort requirements of consumers (e.g. controllable heating and cooling).
- the share of local energy sources increases.

will be sustainable if

- the share of renewable energy sources increases as far as both district heating and private heating systems are concerned.
- biomass is utilised in strict compliance with sustainability criteria.

will be safe if

- development projects are accompanied by building energy retrofit programs.

Tools:

- simplified permitting, regulation and feed-in tariff system in order to encourage the increasing use of alternative technologies (in addition to green electricity, the supported feed-in of heat generated by renewable energy and upgraded biogas fed directly into the natural gas system).
- multi-tier program package geared to target user groups in order to support the improvement of energy efficiency.
- introduction of efficiency incentive support system.



THE ENERGY SUPPLY OF TRANSPORT

will become competitive if

- transport evolves along a path that integrates transport, energy policy, rural and urban development, job-creation, foreign trade and training targets.
- high transport costs do not reduce the competitiveness of Hungarian export.

will be sustainable if

- both oil dependency and CO₂ intensity are reduced.
- the role of rail transport increases in freight and passenger transport.
- alternative fuels (electric and hydrogen power, biofuels) qualified according to the appropriate set of criteria become dominant.
- bioenergy production and utilisation do not endanger the agricultural environment and food supply and do not go against rural development efforts

will be safe if

- preparation for the post-oil peak, transition of the transport structure and the development of electric, hydrogen and biofuel infrastructure is started in time.

Tools:

- the joint support of alternative fuel production and vehicle development in terms of both research and development and manufacturing.
- encouraging the establishment of decentralised plants supplying local needs.
- quantifying the externalities caused by fossil fuels.



HORIZONTAL ISSUES

The whole system of relations of the energy sector has changed and become more complex as it now has links to other policies (transport, environmental protection, agriculture, water management, education and employment). The energy policy and the role of the government must therefore adopt a complex approach, also extending to other areas. Among other things, it includes the following:

- in addition to the classic fields of energy policy, the role of the government should have a proactive effect on awareness-raising, R&D and innovation activities,
 - in order that energy policy should be part of industrial development and make a substantial contribution to economic development and job creation, pilot projects and technologies based on domestic research, development and innovation must be promoted,
 - the establishment of bipolar agriculture, possessing the required market-oriented flexibility enabling it to shift between food production and energy-g geared biomass production, encouraging, by the cultivation of energy crops, the gradual conversion to arable land of areas unsuitable for food production at the required efficiency, which are therefore currently left uncultivated. This is also a prerequisite
- of job-creation in rural areas and the increase of green-collar employment, in other words, the rehabilitation of ‘agricultural rust belts’.
- In the future, renewable energy sources of agricultural and forestry origin may play a major role in the complex regional development of rural areas, in addressing the environmental problems of rural settlements and increasing their population-retaining capacity and in the creation of new jobs in rural areas,
 - promoting organic farms that rely on local demands and opportunities, as a prerequisite of sustainable development and in particular of a sustainable and competitive agriculture,
 - in industry policy development projects, potential investment-stimulating opportunities in the field of energy manufacturing should also be borne in mind and their achievement should be promoted through an investor-friendly regulatory environment,
 - with regard to the shortage of energy experts and with a view to achieving the objectives of the Energy Strategy, high-quality vocational education in energy needs to be revived as soon as possible, with particular regard to the launching of the multi-level training of experts skilled in the mapping of energy saving options and the utilisation of renewable energy sources. The human resource requirements of the creation of the new nuclear blocks also require the imple-

mentation of a substantial educational and training program.

- environmental consciousness and climate protection start at home, at the level of the individual. The shaping of environmental consciousness must be started, in a playful way, at the nursery school and integrated into the curricula of all primary, secondary and post-secondary schools.
- the campaigns affecting energy consumption patterns should be combined with programs concerning the transformation of waste and water management habits, as this provides a complex system for environmental education.
- in the future, social benefits targeting the elimination of energy poverty should be allocated on a needs basis. It is therefore recommended to move toward support schemes furthering savings through energy efficiency rather than consumption. Such solutions include, for example, third-party financing mechanisms (ESCO), the increased use of which may also alleviate social and welfare-related problems.
- in the long term, however, welfare considerations should be completely dissociated from energy objectives since, under the current regulatory framework, neither consumers nor energy market operators are interested in giving preference to consumer awareness.



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