

ENERGY STRATEGY of the Republic of Moldova until 2030

I. INTRODUCTION

1. The Energy Strategy of the Republic of Moldova until 2030 (hereinafter "the Strategy"), provides concrete guidelines for Moldova's energy sector development, with the main goal to provide the required basis for economic growth and improved social welfare. With this document, the Government of the Republic of Moldova has identified the country's vision and strategic opportunities within the energy context located in a rapidly changing geopolitical space that includes the Central, Eastern and Southern Europe, Russia and the Caucasus region. The Strategy represents an efficient prioritisation of the country's problems, calling for quick solutions and rescheduling/resizing of objectives in line with the need to achieve an optimal balance between: internal resources, the ones that are currently used and the ones provided, country's emergency needs, EU and Energy Community objectives, as well as the national targets, international obligations towards treaties, agreements and programmes (also including the neighbourhood policy) signed by the Republic of Moldova. The overall strategic goals for 2013 – 2030 are defined, as well as the specific goals for 2013-2020 and 2021-2030, having provided the goals implementation measures.

2. Given its geographical position, regional transmission network configuration, and power generation potential, Moldova has always held a strategic advantage, which was not fully exploited in the past decade. Thus, the Moldovan Government sets its Energy Strategy priorities as follows:

- a) strengthening the concrete status as a transit country for power and natural gas through the enhancement of the bidirectional transmission connections;
- b) building new generation capacities and refurbishing the existing ones aimed at full commercial strengthening and exploitation of the power generation internal capacity.

3. Within the natural gas sector, the transmission infrastructure in the region faces a process of diversification and reprioritization of transit routes. This development will be constantly evaluated and forecasted, for the purpose of maintaining and enhancing existing alliances and ensuring the required transmission infrastructure in order to develop them regardless of the future changes, and to influence within reasonable limits the mentioned reprioritizations. The new natural gas supply alternatives will be also analysed and developed, as

concrete results will be achieved by the international on-going or only planned projects. The status as a power transition country will be overall maintained and strengthened, through an open international policy towards understanding and exploiting the future regional configurations in the energy sector. The reversible connection of the natural gas transmission system with the EU grids will be completed in 2013, offering supply options in extraordinary situations, and contribute to the achievement of the long-term strategic objective, i.e. to benefit from the existing Romanian connections (with Hungary), under construction (with Bulgaria) and envisaged (with Serbia¹). Subsequently, by 2020, with the development of natural gas grids of the Southern Corridor and South Stream, this pipeline will offer additional connections not only with the Balkan countries.

4. The same year, 2020, is the deadline set by the Strategy for the completion of connecting the power and energy system of the Republic of Moldova to ENTSO-E, through the use of the most efficient technical solutions, in compliance with the Feasibility Study outcomes concerning the project implementation.

5. In order to reach the ambitious yet achievable objective of connecting the national power grid and the gas transmission network with the EU systems, the funding of related projects, according to the findings of the feasibility study, will be provided in the fastest and less expensive way, by using, depending on the opportunities: grants, long-term loans, participation of private investors. All options will be considered, including the European Neighbourhood and Partnership Instrument (ENPI, 2007-2013) and the ways of its continuation under the European Neighbourhood Policy, support provided by the International Finance Institutions, other grant sources, incentive regulations and private investments. On the other hand, the Republic of Moldova will eliminate the accumulated arrears that represent a burden for state-owned enterprises in the energy sector and undermine the credibility of the country for investors.

6. The Republic of Moldova already has a substantial internal generation capacity, related to the real and predicted consumption, which is superior from the point of view of this relation to the contracting parties in the Energy Community. The three directions of strengthening this capacity are as follows:

a) production in cogeneration mode, involving decommissioning of the current technology and reconstruction on a completely new technology basis with a substantial extension of the capacity;

b) integration into the transmission and distribution networks of new capacities based on renewable power sources;

¹ Energy Strategy of the Energy Community.

c) consolidation of the installed capacity of the Moldova State District Power Plant (CERMS), by increasing the technological efficiency and superior capitalization of its generation on the regional market.

In the cogeneration and renewable sectors, the Community Acquis permits (for cogeneration) and demands (for renewable energy) to ensure the priority access (support and dispatching schemes), which provides the best guarantee that can be granted to investors, and the Moldovan Government, and, in particular, the National Energy Regulatory Agency, will establish an incentive, transparent, non-discriminatory and predictable regulatory framework. Short-term actions towards enhancing the connection to ENTSO-E will be implemented and the technical conditions needed for the optimal functioning of the connection to the ENTSO-E will be provided (operating and maintenance convention regarding the 400kV overhead lines Vulcanesti-Isaccea), furthermore, the extension of the connection and the connection to the European Network of Transmission System Operators for Electricity (ENTSO-E) will be ensured, as well as for the long term, price guarantee² financial instruments compatible with the Acquis of the Energy Community Treaty will be implemented. These measures are intended to encourage investments into the existing power generation facilities. Only where those mechanisms will not attract private investments, based on quality improvement and reliability of supply, the government guarantees to investors will be applied, provided that their conditions are compatible with the applicable acquis.

7. As a foundation for its Strategy, the Republic of Moldova has established the clear option for integration into the European Union and its internal energy market. The request for accession to the Energy Community and the successful fulfilment of the accession stages represents a clear evidence of this option. Within the Energy Community, the Western Balkans region has a limited and outdated generating capacity, which is less attractive for the Republic of Moldova as a close source for electricity supply, in comparison with the Central and Eastern Europe. Nevertheless, the power generation mix in the Western Balkans³, which is nearly completely based on hydro resources, creates possible additional flows with Moldova's block, where the electricity generation, at the moment, is based on natural gas, and Ukraine, where coal and nuclear energy hold a large share in the generation mix.

8. The process of integration of Moldova's electricity and natural gas markets into the EU internal energy market will be a long one. The country's energy system, its economy and population in general, will have to live in a transitional period, under the current conditions. The Energy Strategy of the Republic of Moldova targets the year 2020 as the year of full integration into the internal energy market

² Establish a "contract for differentiation" and, respectively, identify the contractual partner.

³ Generation from hydro resources in Albania accounts for 96%, while in Bosnia and Herzegovina and Croatia - about 60%.

of the European Union (IEM). In line with this objective, the country's legislation will be timely harmonized with the Energy Community acquis and in convergence with the EU acquis, thus ensuring the legal and regulatory compatibility with these markets.

9. Up to 2020, the period imposed by the time required to achieve transmission interconnections in the natural gas sector and electricity sector, the Republic of Moldova will develop from the legislative, institutional and logistical points of view, a liberalised and functional energy market, at the same time, being aware of the fact that the access only to the EU natural gas and energy markets will not bring easy solutions to the country's existing energy problems. Over this period, the Moldovan Government will coordinate the implementation of political actions, legislative and technical measures that are required, on the one hand, for identifying and enhancing the most secure electricity supply routes through the existing routes, and, on the other hand, for reducing the period necessary to strength the interconnections and create competitive markets.

10. The period of 2013-2020 is also the stage when the first results are expected regarding the implementation of less expensive measures of energy efficiency aimed at reducing the energy use by 20% by 2020 and the use of renewable energy sources that are the most closed to the cost of the conventional energy to ensure their contribution of 20% in the energy mix of 2020. These measures will coexist with the acquisition in still a vulnerable approach of gas and electricity, due to the limited number of alternative sources of supply. Along with the exploitation of wind and solar resources, which would be added to the traditional employment of biomass for heating purposes, the active prospecting of hydrocarbon natural resources, including non-conventional natural gas, could contribute to the energy dependence reduction of the Republic of Moldova.

11. Moldova's energy sector development in the decade 2021-2030 will be based on the successful implementation of measures and actions planned for the previous period, 2013-2020. The start of this new phase will benefit from the planned achieved improvements of the energy mix, also from the reduction of the consumption and from the increased efficiency in generation, transmission, distribution and consumption, stronger connections, more diversified supply sources, effective competition in energy supply and lower market concentration, the setting of a transparent price by the help of the market's competition mechanisms, responsible, honest and highly professional management, as well as increased social accessibility. All of these achievements will create a sustainable platform, which will contribute to making a new step in the development of the Republic of Moldova, characterised by an efficient control of energy consumption and by an efficient integration into the network of small-scale sources of generation, distributed. These are the essential characteristics of the intelligent network

concept; both are based on the introduction of new, more sophisticated technologies that will reach by that date a competitive level of implementation costs. By 2020, the existing power generation technologies based on renewable energy sources, which are currently less developed, will become more competitive, while the new energy production and storage technologies, as well as eventually the carbon capture technology, that are currently only at an experimental stage, will develop to an economy of scale size.

12. The Strategy addresses the period 2021-2030 in a different way than the period of 2013-2020. The EU has a global plan with concrete indicators to be reached by 2020, while for the period 2021-2030 only forecasts, like roadmaps, can be produced at the moment, which will ensure a smooth continuation after the rigid threshold, in 2020.

During 2013-2020, the Republic of Moldova will have the full picture of the targeted models and will continue their implementation, considering year 2020 as a checkpoint for the full integration with the EU market. After 2020, Moldova can only follow the same directions, which will be followed by the EU, sharing with its Member States the uncertainties, risks and benefits of a large commercial space.

II. CURRENT SITUATION AND IDENTIFIED PROBLEMS

13. The current Strategy is based on both data derived from external sources, mainly on the latest data published by EUROSTAT and the Directorate General for Energy of the European Commission (the market observatory) and the internal data coming from the National Bureau of Statistics, National Energy Regulatory Agency, Moldovagaz JS and Moldelectrica SOE, as well as from the official policy documents of the country. In case of differences between internal data sources caused by the use of different processing methodologies, data from the National Bureau of Statistics prevailed. The harmonization of methodologies for collecting, recording, processing and forecasting national statistics on energy represents the main direction of action during the implementation of the Strategy's objectives.

Energy sources and distribution of consumption

14. The Republic of Moldova is a net importer of energy, the natural gas purchased from a single source representing the major source of fuel (Annex 1, Tables 1.1, 1.2, Figure 1.1).

There are several countries in the EU, smaller or larger than the Republic of Moldova, with a close degree of energy dependency, while, year by year, the EU itself becomes more dependent on energy imports (Annex 1, Figures 1.2 and 1.3). However, the EU-27 energy mix structure (Annex 1, Figure 1.4) is very different from the one in the Republic of Moldova, in terms of natural gas participation (23.9% versus 40.5% in the Republic of Moldova, meaning about almost half), so that the impact of this dependence is different. The liquid fossil fuel contribution to the energy mix appears to be more balanced. Moldova's oil

reserves are very low and are located in the south of the country, being previously extracted in the Cahul district, while the reserves identified in the Cantemir district have not yet been exploited. The coal has a lower participation in the energy mix of the Republic of Moldova. In the light of the EU's policy to promote the generation of electricity through low-carbon technologies, this fact should be seen as a favourable precondition for the implementation in the Republic of Moldova of a coherent EU policy on the future energy mix.

15. A comparison of the consumption structure by activities (Annex 1, Table 1.3, Figures 1.5 and 1.6) shows that 46.8% of the energy consumption is represented in Moldova by the household consumption (Annex 1, Figure 1.5), compared with only 26.5% in the EU (Annex 1, Figure 1.6), and only 6.9% by the industrial consumption, compared with 24.2% in the EU. Same proportions are characteristic for the electricity consumption structure by activities in Moldova, as shown in Annex 1, Figure 1.7 **Error! Reference source not found..**

16. Electricity consumption in Moldova has grown rapidly in the last decade, as reflected in Annex 1, Table 1.4. The same figure presents the distribution of electricity consumption by sectors for the right bank of the Dniester River in the period between 2003 and 2010, a trend that has contributed to differences from the EU structure mentioned above. Thus, the industrial sector consumption dropped down from over one third to almost one quarter, while residential consumption increased by 10%.

Power and heat generation

17. The main problems of the generation, transmission and distribution of electricity and heat assets are the lack of connection to the ENTSO-E, the insufficient capacity, so far, of the interconnection lines with the EU internal market and the advanced wear degree of some assets.

The electricity generation capacity includes:

- 1) CERMS (2520 MW, natural gas, fuel oil, built in 1964-1982);
- 2) Chisinau CHPCHP-2 (240 MW power capacity, 1200 GCal/h thermal capacity, built in 1976-1980);
- 3) Chisinau CHPCHP-1 (66 MW power capacity, 254 GCal/h thermal capacity, built in 1951-1961);
- 4) CHP Nord, Balti (20.4 MW power capacity, 200 GCal/h thermal capacity, build in 1956-1970);
- 5) Dubasari CHE (Hydropower Plant) (48 MW, built in 1954-1966);
- 6) Costesti CHE (Hydroelectric Plant) (16 MW, built in 1978);
- 7) Other power stations, including nine CHPCHPs of the sugar factories (97.5 MW gas, oil, built in 1956-1981).

Out of the relatively high nominal total capacity (MW 2,996.5), only about 346 MW in cogeneration in Chisinau and Balti and in the hydro base can be used, and only about half of the capacity of the CERMS are used (due to the difficult

trading conditions). The highest country's consumption (stabilized at approximately 76-79% during 2007-2010) is covered by the power generated by the CERMS and imports from Ukraine. However, the price for electricity generated from these sources is not stable; currently it is at the level of about 54 euro/MWh for both sources, or by 13% more compared to the previous contract price and tends to exceed the EU market prices.

18. Simultaneous generation of power and heat is provided by the Chisinau-based CHPCHP-1 and CHPCHP-2 and by the CHPCHP-Nord in Balti. Heat is also produced by thermal plants and other several thermal power plants in the smaller towns. Thermal power generation declined over the recent years (Annex 1, Figure 1.8), along with the decrease in the industry participation in the thermal energy structure (Annex 1, Figure 1.9).

The following are the identified problems:

1) the low level of tariffs over the previous period which resulted in debts. The debt accumulation has been stopped, but to eliminate the historical ones it is required to strictly observe the provisions defined in the Concept on the "Corporate, institutional and financial restructuring of the district heat supply in Chisinau Municipality";

2) the high price (to cover the cost of inefficient generation) for heat often determines people to find alternative heating solutions that are not optimal and efficient, either for consumer or for the plants' cogeneration efficiency;

3) the cost of electricity produced in cogeneration depends on the amount of heat and is much higher than import prices for electricity. By including it into a tariff that reflects the costs, the perpetuation of this inefficiency distorts the market and increases, year by year, the price paid by the final consumer. The thermal energy cost paid by the final consumer in Chisinau, the main heat market, is distorted by two factors: the wear of boilers in the city, which increases the overall cost of the heat supply and the thermal energy sales system, which creates competition between the marketing by the CHPCHPs of the produced thermal energy to the municipal supply enterprise Termocom JSC and the marketing of the amounts produced by this.

Quality/efficiency of generation, transmission and distribution

19. The evolution of the delivered power quality indices points out to a continuous improvement since 2007, but also, to a stagnation or even negative evolution of the customer average interruption duration index (CAIDI) in 2010 at one of the operators of distribution and the system average interruption duration index (SAIDI), the system average interruption frequency index (SAIFI) in 2010 for all distribution operators. However, the SAIDI value was significantly improved in 2011 by all three distribution operators. Also, despite the attention paid in the reports by the National Energy Regulatory Agency (ANRE) to the quality indicators of the distribution/supply service, final consumers rarely claim

compensation for the remaining time for connections / reconnections, therefore, more information campaigns are needed.

20. Approximately 70-75% of the energy sector equipment is worn out. Over 2001-2008, gas pipeline losses were estimated at an average of 7%. Today, these losses are estimated at 5.5% in the distribution system and 2.3% in transmission. During 2005-2010, losses in the electricity distribution networks dropped down from a level of over 20% (the RED Nord JSC recording only 14.39%), to a level of about 13%, after the distribution network operators were obliged to improve their performance under the regulations approved by ANRE. In 2011, losses reported by the distribution network operators accounted for 9.89% - by RED Nord JSC, 12.39% - RED Nord-Vest JSC, and 19.2% - RED Union Fenosa JSC.

Meanwhile, the district-heating sector in Moldova has experienced a high level of heat losses, accounting for 21% in 2009, with a growing trend by about 6% over the last 10 years. In 2011, technological consumption and heat losses amounted to a total of 19.8%⁴.

21. Technologies used to generate electricity in the Republic of Moldova are not as efficient as modern technologies by the specific level of fuel consumption. Because of the reduced heat consumption over the last years, the current operating modes of the CHPCHPs are far from the nominal ones, producing an efficiency that is much more below the nominal value. The heat generation efficiency in cogeneration mode cannot compensate the high price for electricity, produced in the same mode. This way, the tariff by CHPCHPs is high, reflecting the current poor state of assets and their unreliability in the future. As many as 80% of consumers in Chisinau have difficulties in paying the bills. Over the period 2007-2008, the volume of heat supply in Chisinau decreased considerably, determining consumers to look for alternative sources of gas, coal and wood, which caused a negative impact on the heat supply system, CHPCHPs' productivity and electricity generation.

Status of market reforms in the sector

22. The early steps made by the Republic of Moldova towards the liberalization of the energy market do not differ from the first steps by the European Union and took place under the partnership support of the EU-RM. In 1997, the state company Moldenergo was divided into three main directions: generation (CHP-1 Chisinau JSC, CHP-2 Chisinau JSC, CHP-Nord Balti JSC), distribution (RE Chisinau JSC, RED Nord JSC, RED Nord-Vest JSC, Red Centru JSC, RED Sud JSC), transport and dispatching centre (SOE Moldtranselectro).

⁴ Annual report by the National Energy Regulatory Agency, 2011.

23. The power transmission system operator Moldelectrica SOE manages the internal transport network on the right bank of the Dniester River, including 5977.5 km transmission lines of 400, 330, 110kV, and 25877.4 km radial lines of 35 and 6-10 kV. Interconnections include 7 lines of 330kV and 11 lines of 110kV with Ukraine, 3 lines of 110kV and just one line of 400kV with Romania. Moldova's electricity system operates synchronously with the IPS / UPS system and in island mode only with Romania, in Moldova or in Romania. While currently, the connection with Ukraine is entirely used, a large volume of the use is the maximum security transit, operation of the connection with Romania offers a reduced transborder exchange, as well as a low supply security.

24. In 2000, the Republic of Moldova privatized a large part of the distribution sector (approximately 70%), that including three of the five power distribution units, which, subsequently, merged in the RED Union Fenosa JSC, while the other two remained state-owned enterprises: RED Nord JSC and RED Nord-Vest JSC. On the left bank of the Dniester River the service is provided by the RED EPՇC JSC.

25. In the natural gas sector the Moldovagaz JSC was established, a stock company which owns the natural gas system in Moldova, including the upstream transit pipelines, and encloses two transport companies, LLC Moldovatrangaz (which is on the right bank of the river) and LLC Tiraspoltrangaz, 12 operators of the distribution networks on the right bank with branches in each district centre, 6 distribution companies in the Transnistrian region and a company specialized in importing and marketing of liquefied petroleum gas. The natural gas transmission system includes 4 transit pipelines and 5 compressor stations. During 2008-2010, the Republic of Moldova reported an increase in investments in the gas infrastructure from the amount of about 15 million euro (2008) to about 28 million euro, in 2010. The Balti-Ungheni pipeline network, put into operation in 2009, supported the connection of a big part from the Falesti, Singerei, Ungheni districts, at the same time the investment plans for 2013-2014 provide for the construction of over 500 km of pipelines with the connection of potential customers.

26. According to the Rules of natural gas market, the status of operator of the national gas system was assigned to Moldovagaz JSC. On the gas market there are 24 authorized suppliers operating with regulated tariffs, one with unregulated tariffs, a transmission system operator (LLC Moldovatrangaz) and 25 licensees for natural gas distribution. According to the ANRE Decision no. 408 of 6 April 2011, the natural gas market in the Republic of Moldova is determined as being uncompetitive because of a single import source, with imports being carried out by the supplier at regulated tariffs – Moldovagaz JSC.

27. The Republic of Moldova signed the Energy Community Accession Protocol on 17 March 2010, in Vienna. In an effort to join the largest regional market in the world, the Republic of Moldova has initiated the second set of reforms, starting with a new law package: Law No. 107 of 17 December 2009 on amending and supplementing certain laws (which amends Law No. 1525-XIII of 19 February 1998 on Energy, with the subsequent amendments), Law No. 124 of 23 December 2009 on the electricity bill (which repealed Law no. 137-XIV of 17 September 1998 on electricity, with the subsequent amendments), Law No. 123 of 23 December 2009 on natural gas (which repealed Law no. 136-XIV of 17 September 1998 on gas, with the subsequent amendments). Amendments, addenda and editing of the new legislation, which repeals previous laws, were made in accordance with the Law No. 117-XVIII of 23 December 2009 on Accession to the Energy Community Treaty of the Republic of Moldova. Also, the ANRE updated the Rules of the electricity market by Decision No. 320 of 16 January 2009.

28. On the electricity market there are 6 authorized generators, 3 suppliers at regulated tariffs, 9 suppliers at unregulated tariffs, 3 distribution network operators and one transmission network operator (Moldelectrica SE). The three distribution networks operators act as default suppliers and play the role of the "supplier of the last resort." The most active player on the wholesale market is Energocom - a joint stock company managing contracts for the electricity supply from Ukraine.

29. The current opening degree of the electricity market is only of up to 10% for customers connected to 110 and 35kV, which was established by the ANRE's Decision no. 62 of 30 May 2002. According to the Treaty Establishing the Energy Community, the liberalization of the energy market in the Republic of Moldova is set for 1 January 2015⁵, with an interim date set for 1 January 2013 for non-household consumers.

Critical problems requiring adequate and swift measures

30. An evaluation of the energy sector from the viewpoint of existent assets and their efficiency pointed out the following problems that need to be settled:

1) as there is no connection with the EU's internal electricity market, the CERMS has been using only half of its capacity, which means that the main risk for the Republic of Moldova does not reside in the physical lack of generation capacities as in the Western Balkans, but in keeping the leading position of the CERMS on the electricity market, which, together with a similar position of imports from Ukraine, leads to a negative evolution of energy prices. So, the cessation of supplies may be caused by a failure in the negotiations on the acquisition price, and not by insufficient generation capacities;

⁵ D/2009/03/MC-C-En,

2) despite the fact that activities in the electricity sector were separated quite a while ago and due to the lack of a very strong message regarding the intentions to continue to liberalize the market, these intentions did not materialize over the past 15 years. Besides the fact that the separation of activities in the electricity sector was not followed by the separation of activities in the natural gas sector, even the separation of activities in the electricity sector did not give either sufficient support or an incentive for the improvement of efficiency and investments. The main cause is the maintenance of the official degree of openness of 10%, which impeded the creation of a stable and predictable market and the setting of a transparent price;

3) presently, there is a strong unbalance in the attraction of financial means. Investments/financing are more often attracted from donors than from the private sector. Nonetheless, even the donors' support was not fully used in the implementation of the necessary measures;

4) the incomplete implementation of the *acquis* and the lack of specific actions to connect to the ENTSO-E system and to the EU system of main natural gas pipelines question the importance of political measures of liberalizing the energy markets.

31. An analysis of the existent framework of the energy market pointed out the fact that presently there is no real competition in the Republic of Moldova, which is a major problem that must be solved.

Only the separation of activities and the inclusion of costs in the tariffs cannot provide sufficient support for supplying energy at accessible prices. When the price is permanently on the rise due to the lack of competition, a regulatory system based on tariffs only can take measures to reduce the consumers' bills only by offering a low compensation to the transporter and distributor through the transport and distribution tariff, which will not back the much-awaited investments and infrastructure projects. This can merely maintain the existent assets in a relatively good and functional state and will not improve the operators' investing capacity.

A genuine competition market can be created only when new actors enter the market, and when at least the foreign participants demand that energy transaction products and cross-border capacities similar to the one they benefit from on the EU's internal energy market should exist on the emerging market too.

Accession to the Energy Community requests that the Republic of Moldova undertake extremely difficult measures in a very short time, which requires building institutional and operational capacities.

32. The Republic of Moldova will take the following measures to implement the *acquis* of the Energy Community Treaty:

1) to implement the *acquis* by the date of accession and not later than 2013, responding to comments of the annual report of the Energy Community, including in the field of laws on competition and state aid;

2) to implement the acquis of the Energy Community updated after the accession of the Republic of Moldova; the step should be completed in January 2015 at the latest, date which the European Union declared as deadline at the 9th meeting of the Ministerial Council of the Energy Community;

3) to prepare for the implementation of the guiding lines of the Agency for the Cooperation of Energy Regulators (ACER) and of the ENTSO-E network codes, which was announced as subsequent part of the Energy Community; the Community will demand that after they are completed by ENTSO-E and the European Network of Transmission System Operators for Gas (ENTSO-G) and are approved by the European Commission.

Expected evolution at national and world levels

33. The long-term economic development in the country promises a constant increase in the gross domestic product (GDP). The middle-term development of the Republic of Moldova is represented in Annex 2, Table 2.2. The used scenarios produce rather similar results and practically merge in diagrams. The main results of the forecast are represented in Annex 2, Tables 2.1 and 2.2.

34. Energy consumption trends in 2003-2010 were little homogenous because of the swift reorganization of the national economy of the Republic of Moldova during this period, as well as because of the global crisis in 2008-2009, which also had an impact on energy consumption in Moldova (Annex 3, Figure 3.2). In 2030 energy consumption per sectors will increase in a more homogenous manner as represented in Annex 3, Figures 3.3 and 3.4.

35. According to the forecasts (Annex 2, Table 2.1), in the Republic of Moldova, the electricity consumption in the construction and farming sectors, foodstuffs production, transport and tourism is expected to exceed the average in the period until 2030. The main economic indexes until 2030 are covered by the same Table. Energy consumption per capita will increase, mainly in relation to the general depopulation that the Republic of Moldova will face in the long and short run.

36. Consumption proportions were calculated per sectors: industry, agriculture, construction and transport on the basis of sectoral development trends, which are built in a differentiated manner on the basis of GDP increase. The industry and agriculture will see no significant change in electricity consumption in the analyzed period – the forecast took into consideration the proportion of these sectors. The final results of this forecast are represented in Annex 3 of the Strategy.

37. The demographic situation in the Republic of Moldova in 2010-2020 had a strong impact on the general results of households' consumption. Trends for these 10 years are rather positive in terms of demography, but the next decades will witness the negative effect of the depopulation and ageing of the population. The forecasts (Annex 3, Table 3.1) confirm this negative depopulation trend.

38. All approximate results were unveiled without taking into consideration the migration flows, which will aggravate the real situation and are not observed to slow down. According to official statistics, migration accounts for about 10% of the population. Pursuant to the long-term forecast, the population of the Republic of Moldova may fall to about 2.596 millions until 2030 in line with the pessimistic scenario, or to 3.13 millions in line with the optimistic scenario (Annex 3, Figure 3.5). Had there been no depopulation forecast, then the electricity consumption would have been higher, despite the fact that consumption per capita will gradually decrease as compared with the estimated trend (Annex 3, Figure 3.6).

39. The general results of the consumption forecast point out a significant increase in electricity consumption in all sectors, including households. The forecast took into consideration both past consumption trends and structure, as well as prospects of increase for every sector. Construction, agriculture and transport will have the highest increase in electricity consumption. (Annex3, Tables 3.2 and 3.3).

40. International information sources regard the next decades as the epoch of natural gas, which will take over the role of coal until 2030. At the same time, electricity will account for over 40% of the energy consumption mix⁶. The figure is the result of a relatively low contribution of electricity generated by gas-burning power stations to the elements encouraging climate changes, of the support that the electricity generated by gas burning offers for balancing the energy system in order to ensure the increasing participation of the generation based on renewable energy sources in the mix of electricity systems, the existence of new reserves of conventional gas that are awaiting the most appropriate conditions on the market in order to drill for it. Non-conventional gas may reach a quota of 40 per cent of the overall natural gas supply based on the current development trend, which makes it possible for natural gas to reach a quota of 25 per cent of the overall primary energy sources by 2035.⁷ An important factor in the increase in the demand of natural gas is the 70% increase in the demand of electricity until 2035 due to the fact that electricity generated by gas-burning power stations will double in the electricity generation mix. (Annex 2, Figures 2.1, 2.2 and 2.3).

⁶ The Outlook Energy: 2040. EXXON Mobil, 2012.

⁷ Office of the Chief Economists (OCE) of the International Energy Agency (IEA). World Energy Outlook 2011. Special Report.

Presenting the degree of fulfilment of the objectives of the Energy Strategy of the Republic of Moldova until 2020: achievements reached until now and arguments for the development of a new Strategy

41. As regards the energy security objectives of the Energy Strategy until 2020, the following aspects need to be outlined:

1) accession of the Republic of Moldova to the Energy Community Treaty has been accomplished;

2) the internal electricity transport network was improved due to the support provided by the state-run enterprise Moldelectrica and the World Bank. Also the state and the stock company Moldovagaz invested in the extension of pipelines to connect cities and villages to the natural gas network. In the same context, the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) have recently approved loans for the strengthening of the internal power transmission network;

3) the quality indexes of the supply services were improved;

4) the construction of the power line Falciu-Gotesti, the feasibility survey for the 400kV power line Balti-Suceava and the approval by the joint operational programme Romania-Moldova-Ukraine on a grant for a feasibility survey on connection to the ENTSO-E system are among the completed actions taken to ensure real access of the national electricity and natural gas systems to the Energy Community Systems. The completion of all actions is a long-term process meant to materialize the benefits expected from the accession to the Energy Community Treaty;

5) the process of accumulating debts in the district heating sector was stopped and the Concept of corporate, institutional and financial reorganization of the district heating system in Chisinau Municipality was approved;

6) the electricity supply sources were diversified as compared with 2007, but the benefits did not extend to the consolidation of competition, which led to price increase;

7) no energy efficient technologies with limited impact on the environment have been implemented, and, overall, no investments were attracted either in new electricity generation capacities, including in renewable energy sources and co-generation capacities, or in the district heating system;

8) energy resources and fuel types were diversified through the extension of natural gas distribution networks, although the renewable energy sources were not diversified through their use for the electricity generation;

9) the failure to step up Moldova's role of transport corridor for electricity was caused by the non-completion of the process of extending interconnections with both Romania and Ukraine. In these circumstances, the CERMS generation capacities cannot be fully used and competition on the market cannot increase.

42. As regards energy efficiency and promotion of competition, it has been noted:

1) the increased efficiency in the production, transmission, distribution and supply chain was noticed through the reduction of losses in the transmission and distribution networks, but the efficiency of electricity and heat generation remained inappropriate;

2) investments have been launched and used by energy efficiency projects in the industrial and public sectors, including with the IFI support;

3) the existing potential of renewable energy sources in the energy mix is used insufficiently;

4) the setting of tariffs in the district heating sector was depoliticized, and tariffs fully reflecting the costs were introduced immediately after that. This made it possible to stop debt accumulation, with historical debts being the only ones that still need to be cleared;

5) given the inefficient co-generation of the outdated centralized heating system, the new tariffs failed to improve the enterprises' real ability to make investments as the only possibility of decreasing variable costs. They only made the tariffs less accessible for the consumers;

6) the market was not truly liberalized despite several amendments to the legislation/regulations in force, because the openness of the market is still at the level of 2002 and there is no true competition on the markets (electricity), or they are officially viewed as lacking competition (natural gas).

43. No specific objectives of the Energy Strategy of the Republic of Moldova until 2020 adopted in 2007 were set because of advanced demands stemming from the directive on the promotion of the use of energy from renewable sources and from the third legislative package adopted subsequently by the European Union, and after the Republic of Moldova joined it, by the Energy Community as well. The market reform in the Republic of Moldova introduced tariffs reflecting the fluctuation of costs, but did not contribute to creating a genuine competition framework, including new transaction and dispatch mechanisms and an adequate institutional framework. The previous strategy did not envisage the opening of the market, which is the representative pillar of competition. The official openness of the electricity market stood at 10%, whereas the natural gas market, despite its 100% openness, remains uncompetitive due to the single supply source. The main argument in favour of development and implementation of a new strategy is the limited rate of achievements over the past five years, the most significant moments being the network enhancement thanks to the IFI support, decrease in losses in the network, improvement of the quality of the supply service; stoppage of debts accumulation by depoliticizing the tariffs' regulation and by joining the Energy Community Treaty.

44. The recognition of the geopolitical realities as a new balance in the Black Sea and Caspian Sea regions, as well as the advance stage of projects pursuing the goal to construct a natural gas network in these regions and in Balkans, acknowledgment, as a undeniable reality, of the regionalization of East and South-East electricity markets and the advanced integration level of national electricity markets within the EU, and acceptance of the natural gas market development as a promising prospect in the EU offer sufficient reasons for demanding a new national strategic orientation leading to the adjustment and practical implementation of energy policies to attain tangible outcomes.

III. GENERAL STRATEGIC OBJECTIVES FOR 2013-2030

45. The Energy Strategy of the Republic of Moldova until 2030 is based on the international review outcomes, which set the following important development directions for the world energy sector during 2013-2030, differentiated in two stages:

1) up until 2020, the international development of the energy sector will comply with the top priority guidelines for this period:

a) development of transmission (networks and grids) in terms of investments in the infrastructure and improvement of system operation;

b) rethinking the generation mix from the perspective of avoiding climate changes;

c) setting and enhancing the institutional framework for the new energy markets.

Up until 2020, it is expected that most countries would agree on capping the emissions of CO₂ by their power plants. The EU, without any doubts, is on the top of this development, and the Republic of Moldova will take measures regarding these future caps on CO₂ emissions;

2) In the next decade, 2021-2030, the carbon capture and storage technology will have to prove its economic viability in order to be allowed to actively enter the market, substantially modifying the structure, values, prices and costs of fuel for the state-of-the-art technologies. Otherwise, it will not have the expected positive impact over the power generation technologies. This failure will have in its turn a negative impact over the coal's contribution to the construction of the future power generation mix.

Over 2020-2030, the smart network equipment and technologies will clearly prove their economic viability and will become a de facto standard for the power industry. This type of power system structuring will change very much the existing approaches of system topologies, balancing, measuring, monitoring and energy mix. All these modifications will act towards the assimilation of growing quotas of power from renewable sources

46. The Republic of Moldova is within a regional context, full of challenges, with a geopolitical balance in permanent development. The country's energy supply under the conditions of the existing framework is also part of this difficult jigsaw puzzle and needs to be appropriately considered.

47. Being a member of the Energy Community and a partner of the European Union as strategic alliances, including the energy sector, requires significant efforts from the country, while even more significant efforts will be required in short and medium term. Because of the existent technical barriers on the way to the real integration of its energy market into the EU's internal energy market, Moldova has for short term a higher growing rate of obligations than the growing rate of specific objectives that could be obtained following the accession.

48. Based on the "Energy Charter Treaty", the European Commission has launched its neighbourhood and cooperation policy with a programmatic document, the White Paper "Preparing the associated countries of Central and Eastern Europe for integration into the EU internal market," published in May 1995. The Republic of Moldova and the European Union established contractual relations for the first time on 28 November 1994, through a "Partnership and Cooperation Agreement" (PCA), which entered into effect on 1 July 1998. Also in 1998, a first energy legislative package was approved by Moldova, in an attempt to reform the energy sector according to the EU's trends at that date.

EU Objectives and the Context of their Settlement

49. Beyond the main objectives of the EU energy strategy, broadly shared by Moldova, but with attention paid to setting up its own priorities as concerning the country's context and own interests, Moldova's Energy Strategy envisages the most important concrete achievements of the EU policies. These are:

1. a functional and efficient pan-European electricity market model, including the allocation of transborder capacities and trading of power and natural gas as commodities.

2. provision of convergent and stable price signals on the existing power exchanges of the EU (Annex 4, Figures 4.1, 4.2 and 4.3). In particular, power exchanges in the Eastern Europe, hosting the power trading with a share of about 15-20% of the market, were capable to stabilise prices over the last period to app. 50 euro/MWh (Annex 4, Figure 4.3).

3. implementation of the new natural gas market model, bringing into effect the EU successive directives on natural gas (55/2003 and 73/2009), exclusion of destination clauses and of a better trading of pipelines' capacities with EU pressure in order to eliminate the concentration of rights to the transborder capacities, extension of the regasification capacities for absorbing an increase in the liquefied natural gas volume (LNG), merging of the balancing zones and of pipelines systems, which will allow the centralized trading, transparency improvement

measures, decoupling the long term traded natural gas price from the oil/coal price (Annex 4, Figure 4.4), convergent trends of the pipeline natural gas prices (Annex 4, Figure 4.6). However, a growing discrepancy among prices for different natural gas marketing centres is observed (Annex 4, Figure 4.5). Annex 4, Figure 4.7 shows a constant day-ahead and year-ahead natural gas prices at the National Balancing Point (NBP) trading centre in the United Kingdom.

Energy Community Objectives and the Context of their Settlement

50. The priority assigned to the objective of “sustainability” by EU Strategy represented by the energy saving under competition circumstances is due to the fact that the EU has focused much earlier on competition, as well as on integration. Today, in the EU, the exemplary results of this early emphasis are obvious. Power markets of the Energy Community’s contracting parties, both as concerning the competition and integration, show instead that they are just at the emergent market stage in terms of competition and integration.

51. Contracting parties to the Energy Community mainly are the countries with small energy markets, a situation that does not allow them to obtain the same results that a big market can obtain independently. However, their cooperation and solidarity is just a first step towards the region's integration into an even larger space, which is the EU internal energy market.

As for the energy from renewable sources, the Energy Community has set up national objectives for the contribution of renewable sources in 2020, by approving the directive on promoting the use of energy from renewable, adjusted to contracting parties.

In the natural gas sector, the Energy Community Strategy is focused on building “a natural gas ring” as a main project in this field, of which Moldova does not benefit directly, because neither the Southern branch, nor the North one is not directly connected to the pipeline system in Moldova. Nevertheless, Moldova and Romania are benefiting from a grant for additional and reversible connection, while two other projects from inside the Energy Community, Hungary-Romania and Hungary-Croatia interconnections, were finalized before the end of 2010. Also, the availability of co-funding, within the European Energy Programme for Recovery (EEPR), of the Romania-Bulgaria and Bulgaria-Greece interconnection projects, will lead to an improvement of connectivity alternatives for Romania, which, at the same time, also represents additional opportunities for Moldova.

52. The Energy Community shares, in general, the European Union's priorities. This has set up both energy efficiency and renewable energy objectives, as well as focusing on the general objective to draw in investments, considering the

realities of short generation assets. The main priorities of the Energy Community⁸ are:

- 1) creating an integrated (regional) competitive energy market;
- 2) attracting investments in the energy sector;
- 3) ensuring the security and sustainability of the energy supply to consumers.

53. At the local level, the Energy Strategy of the Energy Community highlights the climate changes and social dimension, as well as the investment attraction objective. At the local level, general premises⁹ for the efficient development and achievement of policies are taken into account:

- 1) raising public awareness on objectives and necessary measures,
- 2) internal political consensus and focus on policy priorities,
- 3) appropriate administrative capacities for implementation.

Setting up the main strategic objectives for 2013-2030

54. The Government of the Republic of Moldova has defined in the Strategy three main objectives:

- 1) to ensure the energy supply security
- 2) to develop competitive markets and ensure their regional and European integration
- 3) to ensure the energy sector's sustainability and combat climate changes

55. Compared to the other contracting parties to the Energy Community, the Republic of Moldova cannot perform the implementation of competitive energy markets before building the necessary infrastructure, which is a component part of the security of the supply. The very specific situation of the Republic of Moldova, that does not have any physical connections with large natural gas and power markets, represents the argument for providing the main priorities on the country's energy agenda, extending the interconnection with the EU, where connection to the ENTSO-E represents the priority axis. Although the inevitable time limits for conformity to the connection requirements of the electricity system to the ENTSO-E system can be considered as quite discouraging, these must just stimulate the identification of technically and financially efficient measures for managing this situation.

56. The Republic of Moldova cannot wait for the arrival to the national energy market of some new participants as a preliminary condition for creating a competitive energy market. The strategic approach will follow a clear paradigm: the new players will be interested to enter the Moldovan market only if the latter

⁸PHLG Meeting on 7 June 2012 "Energy Strategy of the Energy Community".

⁹PHLG Meeting from June 2011 "Aspects related to the en-gross market opening policy within the Energy Community".

will be fully competitive, with a transparent and predictable regulatory market, and for the investors to be able to identify short-term and long-term marginal costs (as a condition for projects to be viable), the market will provide the necessary price signals. For this, Moldova will build the ANRE's capacity, as well as the capacity of the transmission operators, as well as power and gas market operators, in order to supply the market instruments for the competitive trading of power and gas, as well as of the transborder capacities.

57. The two markets, natural gas and power, will undergo different development stages. These stages will not be the same as in the EU and will be different for Moldova as concerning the feasible calendar. Only after the meeting within the Madrid Forum, in April 2012, where a new natural gas market model was approved, the EU gas market was directed by the Council of European Energy Regulators (CEER) and the ACER to follow the existent model of internal power market. What is currently happening in the isolated centres of natural gas trading will be extended to similar centres, new or existing, and all the old and new centres will be interconnected. Over 2012-2020, Moldova will have an already prepared model for the power market and will share with all the EU member states the experiment of implementing the new gas market model. As for the transmission infrastructure, much more time will be required for the Republic of Moldova to meet the conditions required for joining the mature power market of the EU, than for joining the European emerging natural gas market.

58. As the participation of renewable sources to the energy mix is growing, many countries are directing their renewable-based generation sectors towards market-based support measures. The same is also valid for the other elements on the sustainable development agenda: limiting CO₂ emissions, providing them with an established market price, market-based energy efficiency measures, green, white and brown certificates for supporting various energy efficiency measures, etc. Specific systems, which support the sustainable energy development, are matching better and are much more accessible when introduced into a competitive market level, rather than into an emergent one. It would be very difficult to understand and implement market-based approaches of the support schemes for renewable and of the energy saving under the condition that the competitive energy market does not currently function in the country. Therefore, in the first period, 2013-2020, the Republic of Moldova will pay attention to growing the use of renewable energy sources to those mechanisms that do not require the availability of a functional competitive market: fixed tariffs combined with tenders. But along with the development of a competitive market, the Republic of Moldova will join the general trends.

Targets set by the Republic of Moldova relating to the commitments undertaken through the accession to the Energy Community Treaty and the Energy Acquis of the European Union

59. Taken into account Moldova's commitments undertaken upon accession to the Energy Community Treaty, the national energy targets of the Republic of Moldova for 2020, with an intermediary pillar set for 2015, are defined by the National Development Strategy „Moldova 2020” and by the National Energy Efficiency Programme 2011-2020:

- 1) in the energy security specific domain:
 - a) to perform energy interconnectors: 139 km of power lines and 40 km of natural gas pipelines in 2020;
 - b) to stimulate the use of energy produced from renewable sources, in relation to the total internal gross consumption: 20% in 2020, with an intermediate objective of 10% in 2015;
 - c) to ensure a 10% share of biofuels in the total fuels by 2020, with an intermediate objective of 4%;
 - d) to increase the internal power production capacities up to 800 MW by 2020;
 - e) to ensure a 10% annual share of power produced from renewable sources by 2020.
- 2) in the energy efficiency specific domain:
 - a) to reduce the energy intensity by 10% in 2020;
 - b) to reduce losses in the transmission and distribution networks by up to 11% in 2020 (up to 13% in 2015) for power, by 39% in 2020 (by 20% in 2015) for natural gas and by 5% in 2020 (by 2% in 2015) for thermal energy;
 - c) to reduce greenhouse gas emissions (compared with 1990) by 25% in 2020;
 - d) to reduce the energy consumption in buildings by 20% in 2020;
 - e) to achieve a 10% share of refurbished public buildings in 2020.

According to EU energy efficiency improvement objectives and taking into account Moldova's commitments, in line with the Community Acquis, the National Programme for Energy Efficiency 2011-2020 sets up long run energy savings of up to 20% by 2020. The intermediate objective for energy savings, to be achieved by 2016, is set up at 9%.

60. National objectives for the energy efficiency improvement and extension of the renewable sources use for 2020 are set up at ambitious levels, in line with the EU's targets and following decisions and recommendations of the Energy Community, the Republic of Moldova admitting the benefits and undertaking the efforts. Nevertheless, the most important in this decade will be the objective of ensuring the energy supply security, with the two priority directions:

1) strengthening the power and natural gas transit, by extending interconnectors (additional 139 km of power grid / 40 km of natural gas pipelines by 2020);

2) creating a modern power generation platform (additional 800 MW installed, with increasing the share of power production from renewable by over 10% of consumption.

As for the 2030 objectives, these have not been established yet as exact thresholds, given the multiple uncertainties, which are not applied to the context of Moldova only, but are also related to the new international commitments that have not been set up yet. It is however known that the main objective will be to reduce the greenhouse gas emissions, with the contribution of a new energy mix, and to improve the energy efficiency, regardless whether individual percentage targets will or will not be established for the latter.

IV. STRATEGIC OBJECTIVES FOR 2013-2020 AND ASSOCIATED MEASURES

61. Moldova's strategic objectives for 2013-2020 are as follows:

1) to ensure the natural gas supply safety, by diversifying the supply routes and sources, of carrier types (conventional, non-conventional gas, LNG) and by storage facilities, together with strengthening Moldova's role of natural gas transmission corridor;

2) to strengthen Moldova's role of power transmission corridor, by building new interconnectors, connected to the ENTSO-E system, and by consolidating the internal power transmission network;

3) to create a strong power and heat generation platform, through retrofitting, efficient district heating and advanced marketing;

4) to improve the energy efficiency and increase the use of renewable energy sources (RES);

5) to provide legal, institutional and operational framework for a real competition, to effectively open the market, set up energy prices in a transparent and fair way, integrate the Moldovan energy market into the EU internal market;

6) to provide a modern and competitive institutional framework for the energy industry development.

62. As priorities for achieving these objectives, the Strategy identifies four main principles for action during 2013-2020:

1) acting in a fast way in order to supply funds (including subventions and loans) and/or attracting private investments to strengthen Moldova's role as an energy transit corridor for performing the gas and power physical connections with Romania, and after their finalization, (including the synchronous/asynchronous functioning of the electro-energetic system with the ENTSO-E system) - for

integration into the EIM. Consolidation of the internal power network represents a priority.

2) ensuring conditions and promoting without delays a correct and efficient transposition of the EU legislation in line with provisions of the Treaty Establishing the Energy Community and negotiating the agreement with the EU, at the same time, really focusing on the way the *acquis*' components are jointly functioning, in order to benefit at the end from an economic growth and social welfare. Both the compatibility of market rules with the EU's and Energy Community's ones, and the consolidation of Moldova's role as a transit country will ensure the necessary conditions for the viability of the generation platform formed by the current and new/upgraded assets, based on the use of conventional fuel, and those based on the use of renewable energy sources.

3) rethinking the management principles of public institutions, including of the state-run institutions in the energy field, in a sustainable way, through a modern and efficient corporate governance, based on a strategic approach, competed and the last but not least, honest, where the interests of citizens are represented in a responsible way. Developing and approving a legal basis for this;

4) developing a network of strategic alliances, combining the policy and economic interests, which will include the neighbours and strong interested parties in the region and in the whole world (including international organizations and corporations), to contribute to a best positioning of the country, taking into account the possibly to participate in joint projects, to obtain subventions and loans and to negotiate energy prices.

Objective 1. Ensuring the natural gas supply security, by diversifying the supply routes and sources, of carrier types (conventional, non-conventional gas, LNG) and by storage facilities, together with strengthening Moldova's role of natural gas transmission corridor

63. The Directive on natural gas supply security will be transposed in the primary energy legislation, and the subsequent approval of specific regulations will guarantee the benefits from the full implementation of the *acquis*.

64. The flexibility elements contributing to the natural gas supply security, considered by the Moldovan Government, are as follows: diversification of supply sources, LNG and gas storage facilities.

65. The diversification of supply sources is based on three elements: improve transmission interconnectors in order to provide alternative supply routes, a higher number of alternative suppliers and a better assessment/exploitation of reserves existing in the Republic of Moldova.

From the point of view of the supply routes, Moldova has only two neighbour countries that can provide flows from one or several supply sources. However, the existing natural gas supply connection with Romania does not allow a reversible

flow, the only possible direction until now being the one towards Romania. Consolidation of Moldova's current role as a natural gas transit country is based on maintaining the current transit direction and creating a secure transit route in the alternative direction.

It is envisaged to construct interconnection of gas pipelines of the Republic of Moldova and Romania through the section Ungheni-Iasi, which would allow the reversible flow of natural gas with an annual capacity of 1.5 billion m³.

From the point of view of the natural gas suppliers, both neighbour countries are currently relying on the same sources in upstream, which is the Russian concern GSPC Gazprom, while Romania also has its own natural gas production, and Ukraine intends to rediscover its own potential in the natural gas area. Both countries have in the future alternative gas sources in the gas extracted in the sea and the schist gas. These neighbours aim at diversifying their supply sources with specific steps, both considering the gas from the Caspian Sea as a source, Romania through the Nabucco and Azerbaijan, Georgia, Romania Initiative (AGRI), and Ukraine by building a LNG terminal.

Also, during 2013-2014, exploration works will be carried out on the Moldovan territory to identify the capacities and reserves of oil and natural gas.

From the internal sources perspective, the zones in the South of Moldova (gas basins in the residential areas of Gotesti, Baurci, Aluat, Manta) will be reassessed, the process being combined with the implementation of clear leasing policies of deposits for the benefit of the state and citizens. Concurrently, exploration works will be carried out in other area, following the examples of neighbouring countries and in close cooperation with them. The Republic of Moldova will be open for cooperation with experience companies to investigate the potential of energy resources, and prudence in negotiating royalties, having highlighted the natural potential identified as a result of these investigations.

As concerning the diversification of natural gas supply sources, along the decades, at least, until 2015, there will not be any alternative sources to the Russian gas, and the transit through Ukraine remains relatively stable.

By the end of this decade, the transit to Europe through Ukraine could diminish¹⁰ given the gradual putting into operation of the North Stream pipeline and planning of the construction by Gazprom of the South Stream pipeline. By that time, Moldova will benefit from the membership to the Energy Community, participating actively in the community's life. By that date, the community is being programmed to be supplied with natural gas, both from the Southern Corridor¹¹, and the South Stream, with natural gas from Asia, Azerbaijan and Russia.

66. In case of a deficit, like the gas crisis in 2009, the liquefied natural gas could represent an important share of additional supplies; at that time, this share was of about 10%. The NLG is a chance for the natural gas market of the Southeast

¹⁰ 2019 is the deadline in the existing gas supply contract signed between Ukraine and Gazprom.

¹¹ TANAP and Nabucco West.

Europe to grow in volume, as well as to increase its liquidity, that could represent a basis for the short-term trading. However, specific conditions must be taken into consideration, when Moldova will decide, upon a thorough analysis, to become part of the initiative: investments in the LNG are very high, compared to pipelines, and Turkey eventually will not allow the transit of LNG tanks via Bosfor.

Once the AGRI project can become feasible, depending on the additional investments, the alternative for the Republic of Moldova to participate in the project will be analyzed in terms of viability, both from the financial and technical points of view.

67. The possibility to fulfil the supply security standards, by using the storage facilities located not only in Ukraine, but also in Romania, will be capitalized as part of the agreements associated to the construction of an additional interconnection with Romania through a specific bilateral agreement, as the applicable directive suggests. Meanwhile, possibilities for the construction of natural gas storage capacities in Moldova have been explored within two surveys, carried out in 2009 by the Berkeley Associates Company¹² and in 2011 by the Institute of Geology and Seismology of the Academy of Science of Moldova¹³. The possibility of implementing the surveys' findings will be considered with donors at a later stage. Benefits of the natural gas storage capacity will be represented by the improved capacity of the supply system to cover the peak consumption, as well as to ensure the supply under interrupted transit conditions.

Objective 2. Strengthening Moldova's role of a power transmission corridor, by building new interconnectors, connected to the ENTSO-E system, and by consolidating the internal power transmission network

68. Unlike the natural gas, the diversification of the power supply has no other alternatives but the development of the power transmission network. The interconnection projects of Moldova with the EU internal power market through new power lines and gas pipelines, as well as the strengthening measures of the internal networks/pipelines are essential, both for the supply security, and for the social welfare in the Republic of Moldova.

69. The final benefit of the development and intensification of competition can be ensured only through participation in a larger energy market, a participation which will not arise for Moldova without an asynchronous / synchronous interconnection of its network with the ENTSO-E system. Connection with EU offers, along with an enhanced security, better prices on the market, given the

¹² The pre-feasibility study on underground gas storage facilities.

¹³ The geology and geophysics survey of the southern region of Moldova for highlighting the possible local structures for creating natural gas collectors.

perspective to improve competition, which will result at the end into a final energy price less onerous for consumers.

70. At present, the interface between Moldova and Romania is made up by the 400kV OHL Vulcanesti-Isaccea, and three OHLs of 110kV each. There is a critical need for other high voltage lines to fulfil the safety criterion and to increase the interface capacity. Also, the 28-km line of 110kV with Romania: Falciu-Gotesti, for which works started in 2008, and was finalized on the Moldovan side.

By 2020, the further extension of the power network will include a minimum of two lines of 400kV of interconnection with the Romanian electricity system:

- 1) OHL Suceava - Balti;
- 2) OHL Straseni – Ungheni - Iasi (alternatively, Straseni-Ungheni 330 or 400kV and Ungheni-Iasi 400kV).

71. On 18 February 2011, Moldelectrica SE and Translectrica JS concluded the Memorandum of Understanding on the construction of the OHL-400kV Balti (Republic of Moldova) – Suceava (Romania), with the feasibility study funded by the EBRD. The study was finalized, the project implementation costs accounting for 66.448 million euro, of which, 36.886 million euro represent the project costs for the Moldovan side (52 km through the country, or the total of 115 km of the extension of the Balti Power Station to accommodate a 400kV OHL, 400kV distribution installation and 400/330kV autotransformers)¹⁴. It is envisaged that the EBRD and EIB would fund the project.

72. A similar feasibility study is also required for the Straseni – Ungheni - Iasi line, in order to establish the technical conditions and related costs; this project also requires the identification of funding sources. The cost of this line accounts for 64 million euro, of which, 28 million euro are for the Romanian side, and 36 million euro for the Moldova side¹⁵.

73. The alternative scenarios for providing the necessary funds are as follows:

- 1) transform the RM-EU interconnection into a top priority on the EU-ENTSO-E agenda, using all the cooperation ways¹⁶ that are provided by the contracting party quality to the Energy Community and the partnership with the EU.

- 2) continuity of the support from donors and the IFI that have until now significantly contributed to developing Moldova's internal power network, as well

¹⁴ ME Report for January-September 2011.

¹⁵ Source: Moldelectrica.

¹⁶ Conclusions of the second reunion of the Ministerial Council held in Chisinau mention the call by the Ministerial Council for all the Energy Community institutions to start working towards enhancing cooperation between public authorities and interested parts of the Contracting Parties to the ACER, ENTSO-E and directly with ENTSG.

as to improving its functioning through new facilities, with the final goal to transform the Moldovan power system into a viable component of the EU system. The effective implementation of the acquis is conditioned by this connection.

3) the opportunity for the potential investors to participate to the interconnection project in order to facilitate power export through a commercial line.

74. Congestion on the Republic of Moldova – Ukraine interconnector limits the import and transit of power. To increase the capacity of the Republic of Moldova – Ukraine interconnector, two power lines of 330kV Balti-CHE Dnestrovsk, of 123 km (87 km in Moldova) are needed. The feasibility study for the Moldovan side is done already. Costs are estimated at minimum 15 million euro: 6 million euro on the Ukrainian side, and 9 million euro - on the Moldovan side. Like in the case of the previous project, the undertaking of any further steps will depend on the interconnection project to the ENTSO-E EC system, as well as on the funding costs.

75. As for the rehabilitation and upgrade of the power network, the World Bank has already funded the Energy II Project, completed in April 2012, providing the upgrade of the energy equipment and a new measuring system, now finalised, as well as the installation of a new SCADA system. As a continuation of the rehabilitation and consolidation works of the power transmission network, Moldelectrica SE has the possibility to upgrade the transmission network through EBRD and EIB approved loans in the total amount of \$40 million, as well as the grant offered by the Neighbourhood Investment Facility (NIF) of the European Commission worth 8 million euro. The estimated cost of the project accounts for about 36.6 million euro. The rehabilitation will improve the energy efficiency of Moldelectrica SE, will consolidate the stability of power supply and will improve general functioning of the company, which is a precondition for Moldova's integration into the ENTSO-E.

76. During the February 2011 meeting, the EU Council of Ministers established that 2014 is the deadline for the integration of the European internal energy market. The recent events prove that this deadline is possible. At the same time, the Energy Community estimates that its integration will take place before 2015. For Moldova, integration has a vital importance on medium term. Year 2019 is the most optimistic deadline for the connection of networks, while a deadline after 2020 is unacceptable. For Moldova, the accession to the ENTSO-E means the accession to an extended EU regional market.

77. SOE Moldelectrica and Ukrenergo NPC have signed a Memorandum of Understanding on the joint accession to the ENTSO-E, where Transelectrica JSC (Romania) is a supporting party. A joint application was submitted before the

deadline on 31 March 2011, by Moldova, Ukraine and Romania, to the Joint Operational Programme for funding the feasibility study on the joint accession by Moldova and Ukraine to the ENTSO-E. The phase I of the application was approved, while Phase II with a detailed project proposal is being prepared. In early May 2012, the Joint Programme approved a 5-million-euro grant for the feasibility study. Total costs of the feasibility study are of circa 7 million euro¹⁷ with an execution period of 30 months.

78. The feasibility study has to analyse different scenarios: synchronous connection versus asynchronous connection. An anticipation of alternatives to be analysed by the study is presented in the SWOT analysis of these alternatives (Annex 5, 5.1). The asynchronous connection to ENTSO-E¹⁸ means the possibility to decide without constraints, at any time, between the alternative to buy energy from the East/West, independently of the Ukrainian market's evolution, but depending on the price level. Also, this solution provides Moldova with the commercial arbitration between the two blocks, as well as avoids the disconnection of the Ukrainian system from the IPS/UPS system, a disconnection that is considered as being very difficult from the technical point of view and very costly from the financial point of view.

79. The asynchronous connection (back-to-back) of Moldova with a complete Moldova-Romania segment synchronous with ENTSO-E requires the installation of back-to-back stations in Moldova for the following:

- 1) 400kV OHL Vulcanesti-Isaccea (a strictly needed project);
- 2) 400kV OHL Balti-Suceava (additional project, leading to the development of the synchronous section Moldova-Romania with asynchronous connection and increase in the possible export-import-transit flow);
- 3) 400kV OHL Straseni-Iasi (additional project, leading to the development of the full synchronous section Moldova-Romania, with asynchronous connection, increase in the possible export-import-transit flow and provision of the n-2 regime).

Thus, the back-to-back solution is based on the existent line 400kV Vulcanesti-Isaccea, as a minimal solution, with extensions through the other two OHLs. The estimated cost of each 500 MW convertor is 70 million euro. In case of an asynchronous connection scenario, the 330kV OHL Balti – CHE Dnestrovsk represents an additional project, to extend import possibilities from Ukraine.

80. Moldova's synchronous connection to the ENTSO-E, together with Ukraine, maintains the benefit of participating in the internal power market, as well as advantages of the arbitration between the east and west power sources, but the

¹⁷ ME Strategic Development Programme 2012 – 2014.

¹⁸ See the case of Baltic Countries.

moment when Moldova will have access to these benefits and advantages will be delays with the period necessary for the successful testing of the synchronous functioning.

Objective 3. Creating a strong power and thermal energy generation platform, through retrofitting, efficient district heating and advanced marketing

81. The installed capacity for power generation in Moldova represents the prerequisite for creating a generation platform that can significantly contribute, both to the economic growth and social welfare in the country, as well as to balancing the consumption within the Energy Community, conditioned by the real integration of Moldova's market into the regional market. This capacity is not limited to the generation assets, which, to a great extent, need energy rehabilitation, retrofitting measures, including decommissioning and replacement. Location, integration in the network, as well as in the environment and urban framework, operation and maintenance qualified staff, specific science and tradition of this industrial sector in Moldova, all these are important.

82. For creating and strengthening the generation platform, the SWOT analysis (Annex 5, 5.2) has allowed the definition of the main development directions, with the establishment on the basis of the target mix. The following are the generation capacities within the platform: cogeneration, renewables, CERMS. The CERMS and the Chisinau-based CHPs require a differentiated approach, towards the retrofitting, in order to increase the efficiency of the first one, and full replacement in the case of the cogeneration plants, given the extremely high costs of the power produced by these. Primary and secondary legislation, necessary for the integration into the system of new generation capacities, based on the use of renewable sources, will be adjusted, given the expected increase in demand for power in Moldova.

83. The basic hypothesis considered for the attraction of investors, is that investments in new generation capacities, both the use of renewables, as well as cogeneration, will be performed on long term exclusively under the risk conditions of Moldova's market. This means that these projects will be funded on the basis of the expectation to generate a reasonable rate of return through incomes obtained from the sale of power produced on the domestic market.

84. As a condition of principle for stimulating future investments in rehabilitations, retrofitting and construction of new capacities there are some major economic prerequisites, as concerning relations between the cost of investments and expected incomes. These correlations are important for every reasonable investor, not just in Moldova, but in any other country.

85. For the three directions of forming the capacity of the generation platform, approved by the Moldova Government, investors have, for long term, the expectation that prices established by the wholesale market will reflect the long-run marginal cost (LRMC), with the condition that the market is managed efficiently, hence the LRMC of the system will be equal to the LRMC of the infra-marginal unit, whose supply price sets up the balance price. In a functional market, with no shortage of generation units, the LRMC price determination, as a rule, takes place. Costs of investments will have to be recovered during the rush hours, through higher prices.

86. Without a capacity market (or payments for capacity), oriented towards the recovery of the generation units fixed costs – like in the case of the energy market of Moldova – all units, except for the infra-marginal unit(s), will profit on the competitive market by the difference between the balance price on the market and their supply price, which, theoretically, should reflect the LTMC of these. However, the energy only markets (without capacity of payments for capacity) are predisposed to the volatility of prices, hence, the condition to be fulfilled by all the future projects is to be able to obtain a price level reflecting the long-run marginal cost (LRMC) of the plant. This will allow reaching a market-based return of investments, as well as feasibility from the financial point of view.

87. As for the power generated from renewable energy sources (RES-E), a better investigation of the country's potential regarding renewable energy sources, within the context of defining the target quotas, is the preliminary condition needed before the introduction of appropriate incentives for the sector. The regulatory supporting measures, to be approved, include not only the fixed tariff calculation for the RES-E, but also the definition of the transfer mechanism of additional costs from a RES-E generator to consumer, dispatch with priority procedures, rules and connection procedures to the network, including the distribution between the investor and network operator of the connection related costs. The Feed-in Tariffs for diverse RES-E technologies will be defined and tenders for the RES-E projects will be organized, followed by the market associated contractual agreements for balancing the SRE-based intermittent generation and improvement of networks.

88. Apart from the real power generation capacity (CERMS) and the new capacities, based on renewables and in cogeneration, for covering the forecasted consumption, both as concerning energy and capacity, until its connection to the ENTSO-E, Moldova is obliged to consider only few alternatives (eventually, Romania) to the import from Ukraine, given the transmission constraints.

89. The energy efficiency for generation, as well as in distribution, must become an essential criterion for the authorization of generation capacities,

additional efforts being required for the substantial enhancement of the implementation of high efficiency cogeneration, district heating and cooling.

90. For several years, the power production by the CERMS and alternatively/together, by Ukraine had a lower price compared to EU. But, at this moment, it is obvious that power imports from EU became competitive. The only way to maintain a balance in the competitive establishment of prices on the Moldovan market will be to put face to face the existing capacities with other competitors in a market where until now these are dictating the price.

91. Once the priority directions for developing a strong generation platform will be established, an important role will be played by decisions on proportions of the generation mix:

1) the proposed objective for 2020 is to extend the existing capacity by 800MW. This will be done through decommissioning of the 250MW currently existent in cogeneration (Chisinau CHPCHP-1, CHPCHP-2) and building of new capacities, summing up to 1,050MW;

2) 650MW of the 1,050MW will be achieved through the construction of a cogeneration plant in Chisinau. Given the approximate installation costs of 950 euro/kW, a total investment of about 617.5 million euro is required for the 650MW capacity based on natural gas. Assuming a capacity factor of 0.5, the 650MW will generate 2.85 TWh. The feasibility study will analyse the optimal capitalization possibilities of the current location, infrastructure and constructions, as well as the level of training of the current staff to operate the new technology. One of the consequences of the capacity extension will be the creation of new jobs. The capacity extension opportunity of CHP Nord, to the extent of their thermal load, will be also analysed;

3) 400 MW out of the 1,050 MW produced by the new generation capacities, will be based on the power generation from renewable sources. Given the commitment to produce 10% of the total power consumed in 2020, and considering a capacity factor of 0.25, the minimum RES-E necessary capacity is of about 250 MW. An increased capacity in relation to this minimum target of 400 MW could cover about 16% of the consumption estimated for 2020. It is assumed that investments in the RES-E technologies will come from private initiatives. Part of the RES contribution to covering the 15% country's forecasted consumption of power for 2030 (8.419TWh) will be covered by the RES-based generation capacities of 600MW (by applying the same capacity factor of 0.25). The country's solar energy potential could contribute to the increase of 200 MW, with the condition of a decrease in costs over the next decade;

4) the amount of natural gas consumed annually by the new cogeneration capacity of 650MW, respectively CHP in Chisinau, will affect the total natural gas consumption in Moldova by about 496 million m³ per year. In 2011, the total

amount of natural gas consumed by the energy sector on the right bank of the Dniester River (circa 350MW) accounted for 430.8 million m³.

In case the above-described scenario is not possible to achieve because of the special status of the CERMS, the Government will consider an alternative scenario to cover the new generation capacities based on natural gas or other types of hydrocarbons on the basis of environmental friendly modern technologies.

The district heating and cogeneration in districts and towns, including based on the use of RES, will be promoted as one of the measures needed to reduce emissions and efficient use of fuel. The decentralized use of renewable sources will be considered as a priority.

92. A key problem of the analysis of new power generation capacities in Moldova is the possibility to attract private investments. In this regard, decisions on the district heating will be made, both concerning the debts in the thermal sector and the debts incurred by the natural gas supply and distribution, having applied measures outlined by the Conception on Corporate, Institutional and Financial Restructuring of district heating system from Chisinau Municipality, approved by the GD No. 983 of 22 December 2011.

93. This document defines the competences of the Ministry of Economy, Chisinau Municipal Council, Chisinau City Hall, ANRE along with the concept for heat supply in Chisinau through the district heating system. The merging process of Termocom JS and of the two CETs is also defined, while the settlement of current and frozen debts will follow together with the reorganization of the three enterprises, including administrative aspects too.

94. To ensure the functioning of the district heating system, as well as to further promote the power production in cogeneration mode, the entire district heating system needs to be technically reassessed, in order to reduce energy losses through rehabilitation, as well as to reduce the natural gas consumption by applying trigeneration technologies. The investment must be ensured by attracting foreign investors. The best benefit will be achieved if the investment, supported by contracts on the mandatory purchase of the power produced in cogeneration, will attract the interest of a company with experience in the natural gas supply business.

95. The following are the general objectives of the described system:

- 1) to restore the credibility of the market and ensure the viability of businesses by:
 - a) solving the debts issue;
 - b) deactivating (temporary closing) of worn out boilers in the Chisinau region, which affect the general heating supply costs;

c) avoid the sale of thermal energy volumes based on an disloyal competition (Termocom JS and CHPs) and develop a competition under fair conditions on the market and transparent breakdown of costs;

2) to reduce the thermal energy price and provide a regulatory framework to support a high consumption of heat, in order to transform cogeneration into a sustainable trigeneration technology, generating both heat and power;

3) to transform electricity produced through cogeneration into a competitive cost generation.

96. In order to implement the aforementioned Concept, some successive stages will be carries out related to the assessment of natural gas pipelines under the state ownership as per the approved methodology, legal agreement of debt settlement and transfer of gas pipeline assets to settle the debts.

97. A new and efficient technology will be implemented, allowing CHPs to supply real benefits expected from the combination of thermal energy and power generation. Also, regulatory measures are required for the protection and increase in the consumption of cogenerated heat. During the transition period, the fixed tariffs will support the cogeneration, while later on a regulatory framework for the participation of cogenerated power in the market will be ensured. A bonus scheme will allow it to enter the competitive market. The law on thermal energy and the associated normative framework on the supply, use and metering of hot water and heat at the population, public institutions and businesses, provision of support, as well as of other facilities to the population for the payment of heat and hot water consumption, connection to the public heat supply systems, heat supply public service, heat supply framework contract, will be approved.

Objective 4. Improving the energy efficiency and developing the use of renewable energy sources

98. Along with the low level of energy resources and the very high dependency on imports, the low energy efficiency and high-energy intensity are the reasons for which the energy efficiency is considered as one of the main aspects of the Strategy. Like the development of the RES use, the energy efficiency improvement has an exceptional status, compared with the other specific objectives contributing both to the energy supply security and environmental sustainability, as well as to tackling climate changes. The existing energy saving potential is proven by audits and projects. The evolution of the energy intensity shows a three-fold higher reduction in five years (1997-2002), while in 2007, the intension was reduced to half of the 2001 level. This means that these relatively positive modifications of the energy efficiency indicators were to a wide extent provided by the Moldovan economy development in 2002-2007.

99. Recent estimations by the European Commission¹⁹, targeting the national objectives for the energy efficiency for 2020, established by the member states within Europe 2020 Strategy, suggests that the EU will reach only half of the 20% objective by 2020. This confirms once again the complexity of the energy saving policies and their practical implementation, even for the countries with a more or less rich experience in the energy saving and energy efficiency measures. As for the Republic of Moldova, national approaches and experiences in the energy efficiency are much less extensive; hence its actions will be focussed on the most productive measures and policies, in this way avoiding the less efficient ones.

100. The Ministry of Economy, in cooperation with the National Energy Regulatory Agency and other central public administration bodies in the field, will develop the necessary regulatory framework to promote and stimulate the energy efficiency and use renewable energy sources. This is the reason why the first priority among the measures designed for the implementation of strategic objective to improve the energy efficiency and increase the use of renewable energy resources will be the establishment of a modern energy efficiency regulatory framework.

101. According to EU energy efficiency improvement objectives and taking into account the Republic of Moldova's commitments, in line with the Community Acquis, the National Programme for Energy Efficiency 2011-2020 sets up long-run energy savings of up to 20% by 2020. The intermediate objective for energy savings, to be achieved by 2016, is set up at 9%.

102. The targets set up in the National Programme for Energy Efficiency 2011-2020 are as follows:

1) 20% of energy from renewable sources in the final energy consumption in the country;

2) 10% of energy from renewable sources in all forms of transport.

Intermediate objectives for 2015:

1) 10% - the share of renewable energy in the final energy consumption;

2) 6% - the volume of ethanol and petrol mix in the sold petrol amount;

3) 5% - volume of biodiesel mix in the volume of sold diesel.

103. The set of main measures to be implemented for improving the energy efficiency include:

a) create district heat supply systems;

b) purchase and dispatch with priority electricity from the CHPs,

c) efficient measuring systems and devices for heat and energy,

¹⁹ Impact assessment accompanying the Energy Efficiency Plan 2011 [SEC(2011)277].

- d) label all electrical devices, depending on their energy efficiency, energy consumption and noise level rates,
- e) energy efficient buildings, etc.

Within all the possible energy efficiency measures, those that are relatively simply to organize and provide for a fast and visible effect will be implemented earlier. This approach will enhance the awareness level of these problems and will ensure the visibility of results after the implementation of measures.

104. A special attention in the energy efficiency promotion area will be paid to the staff education and training, of university students and school pupils, as well as of the wide population, as concerning the efficient energy use, energy saving and related actions. For this purpose, a series of educational programmes on the public awareness will be developed, along with the organization of contests and dissemination of achievements.

105. The main reason for this approach is the lack of practical experience in the EE field and of an institutional framework in the country. Given this, it should not be an issue when the first National Energy Efficiency Action Plan will be mainly dedicated to the establishment of an institutional framework as basis for the further evolution in energy savings, efficiency measures and results.

106. This new institutional and regulatory energy efficiency framework includes, as a key element, the Agency for Energy Efficiency. The National Energy Efficiency Action Plan, to be developed by the agency every three years, will become the backbone of the energy efficiency strategy implementation process.

107. The RES use development directions for the period 2013-2020 will, at the conceptual level, be similar with those used for the energy efficiency improvement. The general priority for the RES use development in Moldova will be the establishment of a national institutional framework, providing appropriate support to this development, harmonized integration into the existing energy infrastructure and expected return of investments made in the additional generation of clean energy, a reduced impact over the environment and fulfilment of the Energy Community and EU requirements in the area.

108. Given the country's relatively low power consumption, traditional destination of biomass for heat, current and immediate future costs of the solar energy-based technology, and in order to integrate into the system the scheduled volume of RES-E generation, centralized tenders for wind energy-based limited capacity will be organised in 2013-2020, while the solar energy potential, although larger than the wind one, will be exploited in 2021-2030, to the extent in which expectations related to costs reduction will be confirmed.

109. A volume of circa 400MW of generation capacity based on the wind and solar sources will be integrated into the system. The tenders will enable the Moldovan Government to keep under control the volume of installed capacities and to anticipate the placement in the territories, and these actions are in close relation with the investments necessary to expand the transmission and distribution networks to cope with the changes in the power flow formats. Concurrently, the method would ensure optimization of costs for the end user and viable economic remuneration for investors. Being supported by the obligation to buy at the final tender price, it will attract the interest of potential investors into the use of these capacities.

Objective 5. Ensuring the legislative, institutional and operational framework for a genuine competition, efficient opening of the market, transparent and equitable establishment of the energy price, and for the integration of the Moldovan energy market in the EU internal market

110. For a long time, regulated tariffs and bilateral contracts had been the only mechanism for setting prices on the electricity and natural gas market. The non-inclusion of costs in the approved tariffs in the past was another historical burden on the economic operators remunerated according to those tariffs, just like non-payments encouraged by some unclear contract provisions and the lack of a clear fiscal discipline. At the same time, the inclusion of the electricity generation cost together with the existence of some inefficient assets in the centralized heating/cogeneration area leads to the loss of clients because of inaccessible prices, and thus trigger even lower efficiency. The lack of competition had a similar effect on the increase in the electricity import prices year on year.

111. The new phenomena that are presently characteristic of the EU²⁰ gas market have changed and in the next several years will continue to change the whole framework of natural gas transactions. As there is a difference in price of up to 10 euro between spot transactions²¹ and long-term contracts (Annex 4, Figures 4.2 and 4.3), it is getting increasingly difficult to preserve the existing natural gas sale/purchase contracts (GSPC)²², and the difficulty becomes more obvious in conditions of a shrinking market as it happened in 2009. Presently, one cannot forecast whether the prices of long-term contracts will decrease or the prices on the spot market will increase or whether both will change, but a future convergence

²⁰ Together with the NLG supplies to the EU market by reason of the success in the use of the schist gas in the US and decrease in the demand for natural gas due to the crisis that has resulted in the overflow of natural gas in 2009, the development of the natural gas market in 2011, and decision of the Madrid Forum in the favour of the short-term trading, evolution from fragmentation to integration.

²¹ About 5-15% spot in Germany. According to a decision by the Federal Cartel Authority that entered into force in September 2010, 20% of acquisitions should be made on the basis of contracts of up to two years, 30 per cent on the basis of contracts up to four years and 50% on the basis of unlimited contracts.

²² For instance, Russian-German contracts: long-term contracts (20, 25, 30 years) entered into force in 1973 and include a provision obliging the contractor to accept or pay penalties, as well as other provisions concerning the adjustment of prices at precise periods in line with a mathematical formula that unites the natural gas price with the prices of crude oil and oil products, and possibly coal.

may be expected. The convergence will be more obvious where the market is better developed and the results of the market's efficiency are more tangible. It is a transition period at the level of the entire Europe and there should be alternative solutions in order to go through transition. The decision to either renegotiate these accords²³, or to vertically integrate producers downstream and buyers upstream in this business in order to temper these differences by dividing risks and benefits²⁴ depends on whether this market already exists or not. If it does not, the period needed to develop this market shall be established. In case an efficient market exists or can be developed in a short time, the integration process may be avoided and the risk of negotiating a new GSPC may be assumed. But if a longer period is needed, then integration may be the right solution, taking into account the acceptable limits in line with the EU acquis.

112. An efficient natural gas market in the Republic of Moldova is a long-term perspective. Its existence depends on the construction of a new connection with Romania and on the coordination of actions among the countries from the region (Romania, Bulgaria, Hungary), under the aegis of the Energy Community, in order to jointly ensure critical thresholds for a liquid market as regards the consumption and trade of natural gas, as well as the creation of a bridge with the EU. Depending on the development of interconnections, the natural gas market will develop in line with the European model and by taking into account the specifications of ENTSOG codes. Accordingly, the process may become operational until 2020 depending on the synergy of these actions. Future negotiations of long-term contracts represent the opportunity for new (innovative) conditions of setting the price, , which would combine an indexed part depending on oil and an indexed part depending on the market in a well proportionate manner and an appropriate concept of indexation depending on the market.

113. The downstream integration of new or traditional natural gas providers through investing into the power generation facilities based on natural gas will be beneficent in terms of security of electricity supplies. This will also strengthen the interest of suppliers in supplying natural gas to the Republic of Moldova regardless of the configuration of the gas transportation ways in 2020.

114. A positive evolution of losses in the electricity network as a component of the power price used to partly compensate the constant increase in upstream costs in the electricity bill, but it can be foreseen that soon the decrease in these losses in the transport and distribution network will slow down and even stop. Thus, an eventual increase in the fuel cost reflected fully and proportionately in the final electricity price will be compensated not even partly by the decrease in losses.

²³ Renegotiations started back in 2010, but legal problems appeared, including because of rulings by arbitration courts.

²⁴ Please see the downstream integration of the Gazprom company and the upstream integration of the company Wintershall starting with the 1990s, as well as of the company E-On after 2000, including its close cooperation with Nord Stream

Meanwhile, the inefficiency of heating assets was fully reflected in the prices of heating and electricity and this situation will not change unless effective measures are taken to replace them in due time.

115. The legislation and regulation will define the price mechanisms in compliance with the free market framework. Despite the liberalization of the market, a rather significant share of the market will belong to regulated prices due to the introduction of some mechanisms for supporting renewable energy sources and for cogeneration in the form of fixed tariffs. This has a clear disadvantage as regards the price level, as well as the shrinking free market, but it also has a potential advantage for investors related to a better predictability of prices and for the ANRE which will be able to better control them. The ANRE will analyze the existing alternatives and will decide in favour of the most accessible alternatives on the market and of solutions based on/oriented to the market. Setting fixed tariffs for priority production may be replaced with the organization of tenders to guarantee favourable conditions for generating electricity based on the use of renewable energy, but that will limit the impact on the electricity price. As for co-generation, it may be backed by fixed tariffs set only for a transition period, whereas full competition for energy produced by co-generation and the bonus scheme will be introduced after that.

116. Presently, there is no genuine competition in the Republic of Moldova either in the natural gas sector or in the electricity sector. Genuine competition may appear provided that the market is officially and truly opened, which will allow the entrance of new participants. As new companies will enter the market, the foreign participants will request that products similar to the one they benefit from on the EU's internal energy market should exist on the emerging market too. This will mean the introduction of appropriate transaction products for consecutive time horizons: public tenders for bilateral contracts (starting with 2013), day-ahead market (starting with 2015), intraday trade (starting with 2020), system services, balancing market, etc. Annex 5 (5.3) presents a SWOT analysis of mechanisms for short-term (spot) and long-term (bilateral contracts) trade on the electricity and natural gas markets.

117. Directives on electricity and natural gas will be strongly transposed in the national legislation: the Law on energy, the Law on electricity, the Law on natural gas, the Law on renewable energy and the Law on energy efficiency will be amended in order to transpose and implement the third legislative package, as well as other directives in line with the decisions of the Energy Community, pursuant to the commitments undertaken by the Republic of Moldova.

118. Pursuant to the Energy Community Treaty, the liberalization of Moldova's energy market is scheduled for 1 January 2015 (D/2009/03/MC-EnC).

The updated primary and secondary legislation of the Republic of Moldova will ensure that all non-household consumers are eligible consumers starting on 01 January 2013 and all energy consumers are eligible consumers starting on 01 January 2015 in line with Directives 2003/54/EC and 2003/55/EC. Eligible consumers have the right to directly contract electricity from any supplier, including from abroad.

119. The legislation will provide for accurate definitions of the notions of vulnerable consumer, public services, last resort supplier, as well as scenarios for the selection and appointment of last resort suppliers and contractual mechanisms for backing them to purchase energy.

120. Mechanisms for purchasing energy for household customers, either directly by suppliers, or by a single entity operating as last resort supplier, shall meet the conditions set in the EU directives²⁵. The main mechanisms are purchase through public tenders, on a wholesale market based on competition combined with the purchase of electricity produced from renewable energy sources.

121. The primary legislation will be updated in order to cover the specific roles and responsibilities of the ANRE and of the transmission system operators (TSO) in compliance with the legislation of the Energy Community and the best practices available in the EU.

122. The skills of both TSOs (gas and electricity) to manage the balancing market and to organize tenders for the cross-border transport capacity will be built. The access of a third party will be fully ensured in line with the commitments entered by the Republic of Moldova upon the adherence to the Energy Community Treaty.

123. The security of energy supplies requires planning of the development of the electricity network and of the natural gas transport system by transmission system operators, and obliges the regulator to set a transport tariff to ensure the availability of the investment sources that both transmission system operators need, and to recognize the made investments while approving the tariff. Thus, the operators' planning and investment role will be stepped up in order to develop the electricity network and the main natural gas pipelines to adequately respond to challenges to the market's integrity and access to renewable energy sources. The national development plans will fit into the regional plans to ensure optimal regional development.

²⁵ According to the EU directive, the regulator is not obliged to ensure lower tariffs for the residential sector, but *"the right to receive electricity of specified quality, at reasonable prices that can be easily and clearly comparable, transparent and non-discriminatory prices"*.

124. For the Republic of Moldova to be ready to meet the requirements of a liberalized market in 2015, it is necessary to create an institutional framework, and once it is completed, the real system and the auxiliary staff shall go through a process of adaptation and practical training, respectively. The operators of the electricity and natural gas market will be nominated after 2013 to provide services of transaction, settlement, and on a case-by-case basis, counterpart station, as well as services of connecting the markets after 2020. Jointly with the TSOs, the market operators will provide market mechanisms and efficient products to facilitate the transparent and liquid sale of energy in compliance with various conditions and periods (public/online tender of bilateral contracts, next-day market, intraday market, balancing market, etc.).

125. Transaction products offered by market operators for both gas and electricity markets should be based on adequate mechanisms and a calendar of clear-cut, rational and efficient actions for passing the offers. Transaction results should represent the needed information and levers for programming the system. The available interconnection capacity should be allocated systematically and for standard periods of time through tender mechanisms agreed upon and managed jointly with the neighbouring TSO. The calendar of this allocation should be synchronized with the calendar of energy transaction.

Objective 6. Ensuring a modern and competitive institutional framework for the development of energy industry

126. The debts for thermal energy supplies in Chisinau Municipality and for gas consumed in Transnistria are not only a burden for energy operators, but also barriers to rescheduling them, to building investments capacities, as well as a barrier to the reliability of the market and to private investments. The debt issue should be solved, because privatization will be on hold as long as this issue is on hold. Its settlement will also be a positive signal for private investments. As long as the role of the market in the development of the system and in the settlement of this specific issue is not understood and accepted, this market will not become functional and the risk of perpetuating fiscal instability will exist.

127. The state owned enterprises will establish their corporate objectives and monitoring indexes and will make them public, and the management of these enterprises will respect strict ethic rules and will avoid possible conflicts of interest. Managers will be appointed in line with high-level criteria and their work will be assessed on the basis of clear-cut performance criteria.

128. In 2012-2015, the electricity market will be progressively opened, including by removing, on a case-by-case basis, regulated electricity tariffs in line with the public roadmap, which will stipulate the general terms envisaged in the

Energy Community's decisions. After the liberalization of the market, the management of the state-run enterprises will be responsible for the use of market mechanisms for the purchase and sale of electricity. The shares of power enterprises will be listed at stock exchanges in order to back investments and to put out performances. The energy sector needs capitalization. The regulation policies will provide support for the capitalization of savings in the daily activities of operators and suppliers, making them able to invest subsequently in networks and in business development. An incentive regulation system will be put in practice.

V. SPECIFIC OBJECTIVES OF THE 2021-2030 STRATEGY AND RELATED MEASURES

129. As for objectives for 2021-2030, the Strategy points out the existence of alternatives that are less expensive than the use of renewable sources and may ensure the security of supplies and reduce climate changes. It proposes that the contribution of renewable sources should be supplemented (with a 200 MW installed capacity), but it does not provide for a percentage increase in this contribution (only 15% in 2030). With the diversification of the energy supply sources (East-West) due to accession to the ENTSO-E system, which encourages real competition on the market, a judicious import policy, combining middle-term contracts with short-term transactions, may produce the same results as regards the security of energy supplies and cut in CO₂ emissions, but a smaller burden caused by the final price of electricity. This also comes from the fact that the provisions on the EU's policies for this period point out the promotion of cut in CO₂ emissions as the main line and not the renewable sources.

130. In line with the general view on the long-term EU policies and the expectations of global evolutions in 2021-2030, as well as with the country's social accessibility, the Energy Strategy of the Republic of Moldova after 2020 pays more attention and gives priority to those factors that presently involve too expensive technologies and approaches, in particular, in the field of renewable sources and energy efficiency. In 2021-2030, these may become accessible and accepted by the market. Special attention will also be paid to the development of the distribution network by using the concept of intelligent power networks in order to integrate in the best way possible the control over the renewable sources and energy efficiency. The following are the specific objectives of the Republic of Moldova for 2021-2030:

- 1) to ensure an enhanced use of renewable sources. Scenarios on long-term availability of carbon capture and storage;
- 2) to improve energy efficiency;
- 3) to introduce intelligent power networks.

Objective 1. Ensuring an enhanced use of renewable sources. Scenarios for long-term availability of carbon capture and storage technologies

131. In 2021-2030, the carbon capture and storage (CCS) technology may become an important driving force for establishing the contribution of the use of renewable sources to the technological mix of electric energy, and an eventual success of the CCS at industrial scale will transform coal into a potential counter candidate of renewable sources. The CCS is a promising technology, albeit not sufficiently mature, of eliminating CO₂ from the emissions of power stations operating on the basis of fossil fuel. Presently, the CCS technology is at the initial stage of development, with the number of projects implemented all over the world being very low.

132. Uncertainty surrounding this technology, as well as the lack of studies on practical experience in Europe and all over the world as regards possible venues of stocking CO₂ and/or privileges for the transportation may arouse reluctance towards the strategic options of energy scenarios. The CCS may be a strong challenge to the whole technological mix of producing energy at the global level, if a fully commercial technology is implemented on the market. The international policy on climate changes and greenhouse gas emissions is more or less clear when it comes to long-term approaches. This problem may become important for the Republic of Moldova, provided that the electricity generation based on coal is implemented in the country in 2021-2030.

133. Two scenarios are considered for Moldova's case:

1) without the CCS development: either because the technology will never reach large-scale economies and the promising results or because of the lack of storage facilities; so this scenario will proceed from the fact that there is no available CCS development.

2) limited CCS development: this scenario implies a limited capacity of storing CO₂ in Moldova, thus reducing the possible development of capacity generation projects that might use this technology.

134. The development of the use of renewable sources in the Republic of Moldova cannot take place before the implementation of the needed institutional reforms, which include not only the tariffs due to be set, but also the framework of competition market. The approach of the Republic of Moldova towards the development of the use of renewable energy sources should differ from the approach of other countries. Other countries view this opportunity as an instrument for changing the generation structure in order to protect the environment in the country, to enhance the efficiency of production by using the existent emerging renewable energy sources (ERES). For the Republic of Moldova, the use of local renewable energy sources has first of all the goal to ensure the security of supplies. Due to this criterion, the ERES-based generation technologies used in the Republic

of Moldova will pass through the filter of economic efficiency and of the availability of resources.

135. Since the Republic of Moldova, like other European countries, is dependent on imported energy sources, the security of energy supplies is a very strong incentive for the adoption and implementation of new and updated RES strategies, which benefit from enhanced attention in the Republic of Moldova. Other public social and economic benefits of the RES development, such as a lower impact on the environment, the creation of new industries and enterprises, positive structural consequences on regional economies and the creation of jobs, are good reasons to support RES in the country.

136. The attempt to implement renewable energy sources goes a long way back in Moldova's history. Its goal is to reduce dependency on fossil fuel and to make it possible to cut greenhouse gas and CO₂ emissions. Presently, renewable energy has a relatively low penetration rate in the Republic of Moldova, but the Government and the ANRE are about to work out a legislative and regulatory framework to promote RES.

137. There are three important documents on the policy on renewable energy in the Republic of Moldova: the Law on renewable energy No. 160 of 12 July 2007, the Methodology of determining, approving and applying the tariffs on electricity produced from renewable energy sources and bio fuel, approved by ANRE Decision No. 321 of 22.01.2009 and the Regulation on guarantees of origin for the electricity produced from renewable energy sources approved by ANRE Decision No. 330 of 03.04.2009.

138. The policy of the Republic of Moldova on renewable energy is managed by the following authorities: the Ministry of Economy (MoE), the Ministry of Environment (MoEn), the National Energy Regulatory Agency (ANRE) and the Agency for Energy Efficiency (AEE under the aegis of the Ministry of Economy). In general terms, the ME is responsible for the national energy strategy and development policies, including RES. The ME oversees the thermal energy sector as part of the policies of construction, administration and maintenance. The MM is responsible for the promotion of national and international mechanisms for fulfilling the objectives of reduction of greenhouse gas emissions, whereas the AEE is in charge of developing and putting into practice national plans of energy efficiency, actions and programmes, including RES policies and programmes as part of these efforts. The ANRE is in charge of the systematic integration of the national policies supporting RES and measures in the national energy regulation and the energy market by setting the tariffs and regulating the market.

139. As a member of the Energy Community, the Republic of Moldova will have to observe and implement certain obligations imposed on the Contracting Parties. These obligations include a provision on the elaboration of an implementation plan for the development of energy generation from renewable sources at the national level, which is regulated by the Directives (2001/77/EC and 2003/30/EC) and subsequently, the amended Directive 2009/28/EC, which established a mandatory target of 20% of renewable sources until 2020, with pre-established and individually adapted targets for every member state.²⁶

140. The National Action Plan implementation in the area of renewable energy sources will contribute to the accomplishment of the long-term objective: the 20% quota of renewable sources until 2020 and will formulate the most efficient way of fulfilling it.

Objective 2. Improving energy efficiency

141. The second stage of improving the energy efficiency in the country after 2020 will be based on a developed institutional framework, capacity and methodological infrastructure, practical experience in various industries, technological cores and property. This context, will allow the Republic of Moldova to create a much more sophisticated policy and elements of action than before 2020.

142. It is presumed that the Republic of Moldova will join the EU in the future, which means that the country will mandatorily join the EU emissions trading system (EU ETS). In this case the CO₂ emissions policy will become an important element in the energy efficiency policy of the Republic of Moldova. There is no final international solution to the framework of policies regulating CO₂ emissions, but there is one thing that is more or less clear, particularly the fact that policies will be based on market instruments and price cap. This approach is confirmed by a decision on the limits of CO₂ emissions and the setting of their prices, as the EU already does.

143. The aviation sector, which contributes 2% of the global greenhouse gas emissions, will be mandatorily included in the EU ETS. It means that all airlines flying from and to the EU must compensate flight emissions by buying emission allowances (EU EUA)²⁷ or certified emission reductions (CER)²⁸. The emissions

²⁶ The Official Journal of the European Union, Directive 2009/28/EC of the European Parliament and the European Council on the promotion of energy from renewable sources and on the amendment and subsequent abrogation of Directives 2001/77/EC and 2003/30/EC, Belgium, 2009.

²⁷ EU emission allowances (EUA) are negotiable instruments of EU ETS. One EUA equals 1 t CO₂e.

²⁸ The CDM certificates and, accordingly, the standardized negotiable units, are called certified emission reductions (CER). One CER is a unit of selling certificates of 1 t CO₂e.

cap is 3% for 2012, and 5% for 2013-2020, compared with emissions in the basic year in the period 2004-2006 (EU Directive 2008/101/EC, 2008). Accordingly, the EU regulations for the flights from the Republic of Moldova to the EU and vice versa are valid for the Republic of Moldova too, thus, aviation is Moldova's first sector which is going to be officially included in the EU ETS with an official emission cap. There are talks on the inclusion of other sectors in the next several years, and this may impact the economy and energy development in 2021-2030.

144. The initiative on CO₂ emissions in the aviation sector has already prompted many European airlines (Airbus, Lufthansa, British Airways, Safran, MTU, Virgin Atlantic) to actively react, as they expect opposite measures from the affected non-European companies, and from countries outside Europe (the USA, China, Russia).

145. The most likely answer may be the initiation of a greenhouse gas emissions trading system in the near future at least by the USA, and probably, Russia. This means that Moldova should start preparing an institutional amendment and change the paradigm of operation of all entities emitting greenhouse gas, including power stations, because once such a system is implemented, it will swiftly cover not only the aircraft pollution, but all the rest too.

146. As for the implementation of the carbon scenario, the general framework tallies with the fact that the cost of thermal energy generation, as well as the formation of the electricity price will take into account the impact of the carbon price forecast presented in Annex 4, Table 4.1 and Figure 4.8.

147. These prices imply a gradual increase in the long-term CO₂ price to reach 60 euro per tonne. The short and medium-term prices are adjusted to the current/future markets as Annex 4, Table 4.1 shows. The other scenarios may imply a long-term price of 100 euro per tonne and 40 euro per tonne for the pessimistic and optimistic versions.

148. Another key element of this stage of future development in the Republic of Moldova will be the concept of a new intellectual, distributed system largely based on renewable sources, in which energy consumers will also play their role in balancing the system in line with the generation basis and transmission system.

Objective 3. Introducing intelligent electricity networks

149. The structure of electricity consumption in the Republic of Moldova points out the fact that household customers are the main energy consumers. The future economic development in the country should allow the opening and swift development of small and medium-sized enterprises. This category of customers,

jointly with household customers, is small, dispersed and tends to have a better control over energy consumption. The intelligent network makes it possible to ensure this control, thus helping to save energy and benefiting the final efficiency of operations.

150. From the viewpoint of integration of RES-E in the network, the distribution of renewable sources is dispersed all over the country, which is a strong argument in favour of the implementation of the intelligent network in order to integrate these relatively small generation sources and not to waste them when wind and solar energy fluctuate. The integration of irregular energy sources at industrial level poses a range of challenges to the operation and management of the energy system. The safe and efficient integration of projects of Aeolian parks at industrial scale is a key benefit for the intelligent networks. The intelligent network is also a development opportunity for the network's telemetry and communication system. In most cases, it is the communication system that becomes the basis of the installation and at the same time it may hinder the development.

151. To ensure the development of the project, it will be necessary to create a specific regulatory framework in order to enforce the legislative provisions updated in line with the world best practices. Subsequently, the distributed renewable sources will be identified and the potential groups of target consumers will be investigated in order to create a demand response platform accompanied by an intensive promotion of investment opportunities, which shall be alternatively organized through tender. It will also be necessary to draw in funds in line with a comprehensive analysis of short-term investment costs and long-term systemic benefits, as well as to develop an equitable cost distribution pattern. Intelligent networks will certainly lead to a shift of jobs from the networks' centralized management to a distributed business model. This will have a positive impact on employment and creation of jobs through the integration of renewable sources in the network backed by the intelligent networks.

VI. SYNTHESIS OF MEASURES REQUIRED FOR ACHIEVING THE SPECIFIC OBJECTIVES DURING 2013 – 2020

152. The overall strategic priorities of the Strategy, like energy supply security, setting up of competitive markets, environmental stability and climate changes control will be transposed into the following strategic measures.

153. The Moldovan Government will develop a programme for the specific objective providing the achievement of an additional energy transmission capacity, by including the implementation of new power interconnectors and connection of Moldova's and Ukraine's power systems to the ENTSO-E system, through a close monitoring of the feasibility study production by the ENTSO-E consortium. The programme's single objective is to assure this integration depending on the result of

the feasibility study by 2019 and no later than 2020, being responsible for ensuring the project's funding and implementation. The technical solution, which could be an asynchronous or synchronous connection, will represent the result of the feasibility study and will decide upon an additional investment in order to cover the cost of AC/DC convertors in the case of an asynchronous connection, or of the internal network lines consolidation, if the study points out to this need, in order to support a new model of power flows in the power network of the Republic of Moldova.

154. The expected result following the connection to the ENTSO-E system is the technical support for the diversification of power supply sources and integration of Moldova's power market into the internal power market of the EU.

Implementation stages:

- 1) conducting the feasibility study by the ENTSO-E consortium, to be finalized in 2015, with a main funding source from a 5-million-euro grant, approved by the Joint Programme Romania-Republic of Moldova-Ukraine;
- 2) approval of the decision on selecting a technical alternative,
- 3) the design will be finalised in 2016, and the project implementation – in 2019, with a subsequent testing period of the synchronous functioning beyond 2020, in case if a synchronous technical alternative is selected.

155. As for interconnectors, anticipating the finalisation of the feasibility study, two 400kV lines are scheduled to be built, as part of the interconnector with Romania (i.e. Balti-Suceava and Straseni-Ungheni-Iasi). The feasibility study for the first line has been finalised, as for the second one it needs to be performed, and the scheduled deadline, including the execution of the technical design and construction of the line, is set up for 2019. The consolidation of the interconnector with Romania is also supported by the finalized 110kV line Falcu-Gotesti.

156. A 330kV line is required for consolidating the interconnector with Ukraine (namely, Balti-Novodnestrovsk); the feasibility study for the Moldovan side has been already performed, which ensures the finalisation of the whole project by 2018. Implementation stages: the feasibility study and technical design execution, as well as the construction of lines and carrying out of related works, will be the progress indicators.

157. The impact of these two actions, consolidation of interconnectors and accession to the ENTSO-E network depends on the results of the feasibility study. The following estimations are taken into account:

- 1) if this connection is synchronous, the total cost of the three lines will be of 85.8 million euro.
- 2) in case of an asynchronous connection, flows will not change substantially, but additional costs of around 210 million euro will be required, due

to the acquisition and installation of the AC/DC converters. Also, the cost of the new line with Ukraine accounts for 9 million euro for Moldova. This brings up the total amount to 219 million euro.

3) from the commercial point of view, the impact of the synchronous connection will be the change of the power trading model through its reorientation from the East to West, while the asynchronous connection will represent the bases for the existence of a combination between the current model and the trading with the EU, the proportion being dependent on the prices for the two sources and the asynchronous interconnector's capacity.

The total amount of investments will be assessed more precisely through individual feasibility studies, and funding will be provided by the IFI (particularly, EBRD and EIB).

158. Diversification of the power supply and energy carriers will support the key objective of the energy supply objective. The following are the measures for achieving the specific objective of the natural gas supply flexibility:

1) diversification of conventional gas sources as concerning both suppliers and alternative supply ways. Diversification will be supported through the physical connection to the most reliable sources (regional/European pipelines and the EU power network) by the firm execution of concrete steps towards these directions. The key project is the main line Ungheni-Iasi, the expected result being the provision of an emergency supply alternative, as well as contribution to the alternative diversification of both directions and sources. Feasibility studies have been finalized by the two sides, and the following are the implementation stages:

a) technical execution design, and project implementation by the end of 2014;

b) construction of Ungheni-Iasi gas pipeline;

2) of the project's total cost of 20 million euro, 7 million euro represent a grant from the Joint Programme Romania-Moldova-Ukraine. The share of project's costs to be covered by Moldova accounts for 6 million euro;

3) the availability in the South of Moldova of some internal natural gas resources was assumed for long time. However, the lack of capacity by the concession holders has blocked the undertaken of significant steps towards the capitalization of these resources. The Moldovan Government will combine the funding of professional researches of the supposed resources with the concession granting policy;

4) the immediate result for Moldova of the success of some negotiations for becoming a beneficiary from the development projects in the **natural liquid gas** sector, either AGRI or the Ukrainian, would be a new alternative source, which is also necessary in view of the connection to a short term trading framework with the neighbour countries;.

5) observing and following some benefits from the **non-conventional gas** (schist gas) exploitation by neighbours: Poland, Romania, Ukraine, depending on

the capacity and the demand of the countries concerned to act further in this direction.

Currently, there are no gas storage facilities in Moldova. The Ministry of Economy together with the JSC Moldovagaz will create a programme to ensure the access to gas storage facilities through agreements with the neighbour countries and development of internal capacities, by using the surveys performed to identify such places in the country. The IFI will provide with the necessary funds. The conclusion of such agreements for external storages and technical execution design for storages in Moldova, as well as the project implementation, will represent the progress indicators.

159. The natural gas and power markets shall be opened according to the deadlines requested in the accession protocol to the Energy Community dated from 17 March 2010 and the Law No. 117-XVIII of 23 December 2009 on RM Accession to the Energy Community Treaty. Liberalization of Moldova's power market is set up for 1 January 2015, with an intermediate target for 1 January 2013 for the non-domestic consumers. Directive 2009/73/CE for the natural gas market will be transposed as per the terms established in the Decision of the Ministerial Council of the Energy Community of 6 October 2011, and for Article 9 of the Directive – as per the Decisions of the Council adopted on 18 October 2012 and 5 December 2012.

160. The Republic of Moldova will initiate the implementation of an efficient institutional and operational market framework, both for the power sector and the natural gas sector, with licensed market actors, registered as participants in the market and fully responsible for their actions in the daily market framework, this meaning supply and consumption in line with commercial arrangements (bilateral and/or participation in the spot market) as a specific objective for the period 2013-2020.

161. The expected result is the compatibility of the national market with the regional market/EU market for supporting the market's integration and defining by applying the competitive mechanisms of a transparent price, thus supporting the attraction of investments.

162. The following are the necessary measures:

- 1) create a market operator/operators for natural gas and power;
- 2) cooperation of the National Energy Regulator and of transmission system and system operators, as well as of the market operators with the full support of the working groups made up of representatives of parties interested in setting up:
 - a) the most appropriate balancing mechanisms; these mechanisms will help system operators to ensure in a timely manner corrections of unbalances between

production and consumption and will also define the obligation of parties responsible for balancing to cover the caused unbalances;

b) the most appropriate trading products to be administrated by the market operators for diverse time horizons: long, short and very short term.

3) cooperation of the National Energy Regulatory Agency, transmission and system operators and market operators with their counterparts in the Energy Community towards setting up an institutional and operational framework for the assignment of transborder capacities and congestion management.

163. Implementation stages:

1) creation of market operators, including within the TSO and develop their administrative capacities and framework for trading and registering bilateral contracts by 2015;

2) registration, if necessary, of a unified market operator as a separate entity, or in the ownership of the two TSOs by 2015 and develop a short and very short term trading framework by 2018;

3) Integration of the power market into the regional market by 2018 / 2020 and of the natural gas market by 2016 / 2018.

164. The following will be the progress indicators:

1) transposing the third package components into the domestic legislation;

2) approval of the market model according to the third package, with the guidelines and network codes when approved by the ACER and ENTSO-E, respectively, in line with the existing and expected decisions of the Ministerial Council of the Energy Community;

3) approval of national level network codes;

4) approval of roadmaps for natural gas and power and of commercial codes;

5) approval of firm and market oriented regulations for power and natural gas.

165. The impact's components of a new market framework will be:

1) existence of a higher number of participants on markets, thus, reducing the market concentration, and limitation of the dominant position currently held by the power originating from Ukraine, as import de jure, and by the electricity from the CERMS, as import de facto, as well as

2) a volatile price that will require the development of risk coverage and transfer management within the internal institutional framework of market's participants.

More determination of the market rules, on one side, and more attractive business opportunities arising along with the country's integration into the EU market, on the other side, will oblige and stimulate the CERMS to participate more actively and with more responsibility in the Moldovan market, particularly the

market's component related to the balancing mechanisms, offering them the chance to become an internal market. Also, a growth of competition brought by some new market participants will determine a new price policy by the CERMS.

166. As for the institutional framework, the Republic of Moldova must build its own institutions. While, from one side, it is not reasonable to set up own platforms for assigning the transborder capacities and for power trading, on the other side, Moldova needs strong institutions to manage transborder capacities and trading processes, as well as to register participants and monitor markets' performances. Utilisation of opportunities brought by the regional markets/IEM will not diminish the responsibility of Moldovan institutions. From this point of view, the SOE Moldelectrica will integrate itself into the regional coordination mechanisms for the assignment of transborder capacities and power trading.

The proposed programme will need support from the donors in order to develop the capacity of market operators and to increase the capacity of the National Energy Regulatory Agency, as well as of the TSOs. To limit this amount, operators will outsource services to commercial platforms. Provision of knowledge only for the development of capacities and rules will require an amount of about 5 million euro.

167. Over the last decade, the UE gas and power markets were capable of providing average prices, which are now lower or at least at the same level with the current offer by suppliers in Moldova. The proportion between the short-term centralized commerce and long-term bilateral contracts on the EU markets is inclined towards the first.

To obtain the availability of an accessible energy, Moldova's energy trading policy for 2013-2020 will carefully combine these two methods, by:

1) creating the best alliances to increase the negotiating power of bilateral contracts; while the upstream integration of the interested parties from Moldova is not feasible, given their financial conditions, the downstream integration of the traditional or new energy suppliers will be stimulated. The expected results are both better conditions for price negotiation and an improved energy supply security through the participation of their capital in the shareholding of the existing and new utilities. The offered conditions and obtained benefits will be thoroughly negotiated;

2) developing competences and the experience for the anonymous marketing by accessing large commercial platforms belonging to the EU markets, which offer liquidity and diminish the price shock. Moldova's participation in the centralised commerce can be independently organized, by hiring these platform services or by participating in their administration, as well as by registering market participants to these platforms through participation conventions. When interconnectors will allow, the Moldovan trading zone can access to a regional market.

168. The main objective for the power supply security can be reached only through the diversification of supply sources, as well as by building a national generation capacity as part of this diversification. Construction of an additional power generation capacity, partially in cogeneration, partially as production of power only on the basis of conventional fuel, and partially on the basis of renewable sources, and which, at the same time, would minimise the financial participation of the state, requires a substantiation of alternatives and accomplishment of the best choices. To attract private participants in the construction of power generation capacities, the following is needed:

- 1) improve the investment climate;
- 2) develop a predictable regulatory framework;
- 3) open and develop an energy market;
- 4) prove real actions for the achievement of new interconnectors with the EU markets;
- 5) stimulate the public-private partnership.

169. The Republic of Moldova intends to increase the energy generation conventional capacity by 400 MW and replace the 250 MW capacities, currently available in Chisinau, as cogeneration production. This means a new capacity of 650 MW of power produced in cogeneration, to which another 400 MW generated from RES will be added. The main impact of the new generation capacities will be over the market behaviour of existing sources, while another impact will consist in the consumption of a lower natural gas volume with a substantial efficiency improvement. To be able to cope with the increase in the power consumption until 2030, contribution of renewable sources will grow up to 600 MW.

170. Progress indicators will be represented by:

- 1) authorization of the power plant to cogenerate and project implementation, with connection and supply to the network;
- 2) successful tendering of capacities for the use of the wind source, project implementation, connection to and power generation to the network.

The achievement of the two objectives will ensure the fulfilment of the progress indicator mentioned in the National Development Strategy Moldova 2020: additional 800 MW installed in the system.

171. Cogeneration, as well as district heating related issues, including the problem of accumulated debts, will be solved through a global approach via a programme administrated by the Government, which includes the following measures:

- 1) transfer of assets for the existing debts settlement;
- 2) setting up of a new facility in Chisinau, based on efficient cogeneration technologies, including the type of "combined cycle gas turbines", with a power

capacity of 650 MW, thus, having increased the available capacity with circa 450 MW;

3) reassessment, reconstruction and rehabilitation, where feasible, of the existing district heating system;

4) implementation of a regulatory framework, meant to avoid the efficiency diminution due to the unwanted competition among the heating sources;

5) implementation of a regulatory framework to support the cogeneration, initially via fixed tariffs, and later through a bonus scheme.

172. The following are the main expected results:

1) keep the credibility of the market and viability of businesses;

2) reduce bills for heat;

3) transform the production of electricity through cogeneration into a competitive one.

173. Facilitate the sustainable development as a basic objective, meaning the energy efficiency improvement, which brings welfare and comfort to citizens, as well as the energy saving, which contributes to the reduction of CO₂ through the following measures:

1) developing a public awareness campaign;

2) ensuring the necessary funds for improving the energy performance of public buildings;

3) developing a market of performance-based contracts for energy services.

174. Further building on the sustainable development approach through the use of RES will advance via:

1) ensuring some accessible schemes to encourage the investors;

2) ensure the integration into the grid, meaning connection, reserve capacity and priority dispatching.

175. The needed actions and related financial sources²⁹ are as follows:

1) The MOSEFF Project, supporting investments in the energy efficiency field by enterprises in Moldova, is funded by the EBRD with a budget of 20 million euro;

2) budget support programme in the area of energy sector reforms with a 40 million euro budget, representing the direct financial budget support in exchange of implementing the Policy Matrix in the energy sector;

3) an EU grant worth 2.6 million euro to support the technical assistance for the implementation of reforms in the energy field;

²⁹ Sector Expenditure Strategy in the energy field, 2013-2015.

4) Moldova Energy and Biomass Project with a total budget of 14 million euro (EU) and 0.56 million euro (UNDP), which objective is to heat more than 130 kindergartens, schools, healthcare centres and other rural public institutions as well as more than 500 households with biomass-based energy generated locally;

5) regional programme „SYNERGY” with a total budget of 8 million euro, funded by the Greek Government and USAID intended to support an environment favourable for investments and enhance energy safety; strength the planning process in the energy sector at the level of local governments; improve energy efficiency of building in the residential and public sectors;

6) Project „Strengthening the capacities for energy sustainable management “with a 1.6 million euro budget provided by SIDA as technical assistance to support the Ministry of Economy and the Agency for Energy Efficiency to review and revise the Energy Strategy; to develop the legal framework in the energy efficiency and RES areas; to develop and implement the plan for institutional capacity building of beneficiaries;

7) Project “Upgrading the local public services in the Republic of Moldova” funded by the German Agency for International Cooperation GIZ and Swedish International Development Cooperation Agency SIDA with a 2.1 million euro budget, intended to provide assistance to the Component "Public Building Energy Efficiency", etc.

176. The table bellow shows the general indicators for 2013-2020 on the energy security, opening and connection of markets to the EU, as well as on the energy efficiency.

List of performance indicators

ENERGY SUPPLY SECURITY			
Indicators	MU	2015	2020
Energy interconnections:			
Power lines	km		139
Natural gas pipelines			40
Alternative natural gas supply sources: long-term supplier, relevant use of internal resources, short-term market		2	3
Stimulating the use of energy produced from RES in the gross internal consumption	%	10	20
Ensuring the biofuel share in the total used fuel	%	4	10
Use of energy from renewable sources in all forms of transport:			
volume of ethanol and petrol mix in the sold petrol amount	%	6	10
volume of biodiesel mix in the volume of sold diesel		5	
Increasing the internal power generation capacity	MW		By 800
Ensuring the share of annual generation of power from RES	%		10
OPENING OF MARKETS AND CONNECTION TO EUROPEAN MARKETS			
Transposing the third energy package		√ (in part)	√ (in full)
Approving the new roadmap and commercial codes for power and gas			√
Approving the regulatory framework on liberalization and competition			

		✓	
Appointing a market operator Accession of the SE Moldelectrica to the transborder capacities tendering coordination mechanisms Integration of markets managed by the Market Operator in Moldova to the EIM		✓ ✓	✓
Official opening of markets	%	100	
Interconnection with EU systems Electricity Gas			✓ ✓
ENERGY EFFICIENCY			
Reducing the energy intensity	%		By 10
Reducing power losses in transmission and distribution networks	%	13	11
Reducing natural gas losses in transmission and distribution networks	%	20	39
Reducing natural gas losses in transmission and distribution networks	%	2	5
Reducing greenhouse gas emissions (in comparison with 1990)	%		25
Reducing power consumption in buildings	%		10
Share of renovated public buildings	%		10

VII. STRATEGY IMPLEMENTATION, REPORTING AND MONITORING

177. To ensure the achievement of progress indicators in time and in full conformity with the legislation in effect, the management and monitoring responsibilities, as well as reporting duties must be distributed in a legal and efficient way.

178. General progress indicators for projects, representing the simplest elements of the strategy's implementation, are the feasibility studies, technical design development and execution process of the project itself. Project development represents a serial process, and the conformity of achievements with the deadlines of the progress indicators represents a condition for the start of the work in due time for the following progress indicator. Every fulfilment of a progress indicator in the planned time increases project's chances to be finalized in a timely and appropriate manner. The appointment of a project manager for each project apart represents an attribute of the administration of every institution mandated with the project development, the project's administration being in charge with reporting on a regular basis to the institution's Board. Project's technical documents shall be subject to approval by the technical-economic committee of each institution mandated with project's development.

179. However, every project will be part of a plan, with the following main areas resulting from the strategy:

- 1) provide support to the power transmission, including development of interconnections;
- 2) ensure the natural gas supply security;
- 3) develop new energy generation capacities, including energy production based on renewables;
- 4) cogeneration, district heating sector and solution of the accumulated debts issue;
- 5) market liberalization, incentives-based regulation, competitive market framework;
- 6) corporate governance improvement, including technical and management skills, code of conduct.

180. Not all of these areas will be approached through policy documents in terms of planning; therefore not all of them will belong to the Government (Ministry of Economy). This approach takes into account not only and not necessarily the fact that the Ministry cannot undertake all responsibilities, but also the fact that a different approach might not be compliant with the roles and activities defined by the primary legislation. In the specific case of the National Energy Regulatory Agency it is clear that it will not be coordinated and monitored

by the Ministry, but by the Parliament. These plans will be well defined at the individual level and will be comprehensive, coherent and consistent with other plans.

181. Along with an internal coordination of projects' development within these plans and taking into consideration the different vertical structure of the hierarchic coordination, a horizontal coordination of plans is also necessary, by including the monitoring, reporting and assessment aspects. Diverse plans will contribute to the achievement of the same major or specific objective and will imply interaction with institutions that are or not in a hierarchic relation.

182. General policy documents will allow the coordination of several plans for achieving the main objective and specific objectives. These policy documents will be the "Power sector roadmap for the Republic of Moldova until 2030," covering the domains 1), 3), 4) and 5), "Natural gas sector roadmap for the Republic of Moldova until 2030," covering the domain 2) and a specific action plan for domain 6) under the integral coordination of the Ministry of Economy and monitored by the State Chancellery. Two different committees will be appointed by the Government, with Parliament's approval, to coordinate the implementation of the two roadmaps. The administration of the two committees will be shared between representatives of the Ministry of Economy and National Energy Regulatory Agency, thus reflecting the two parallel authorities that have to participate in the coordination process. Membership will be assigned to all important actors in the power/thermal energy, natural gas and environmental protection fields. The two committees will meet monthly as part of the strategy's implementation and will report on a semestrial basis to the Government upon the Strategy implementation.

183. The other two main national plans, which are the NEEAP and NREAP are rather standard documents, implying a double reporting/monitoring process: to the Government and to the Energy Community Secretariat. Provisions of these two documents will be in line with provisions with the Energy Strategy and of other legal and normative acts in force, and with the reporting/planning standards arising from the commitments of joining the Energy Community Treaty.

184. Once approved by the Government, the Strategy and the two roadmaps resulting from the Strategy as action plans, the administration, representativeness and responsibility for their implementation shall be distributed to some different entities, as will be the tasks for reporting and monitoring. When the implementation levers and deadlines are connected to the energy policies, the monitoring task will be assigned to the Government. This is the case of domains 3) and 4). Because the administration and monitoring tasks of these plans will be in direct conflict and the project development requires special management

capacities, there where public property is involved it is necessary to establish a legal entity to fulfil an objective defined on a limited time period (Special Purpose Entity (SPE)), and there, where only private property is involved (for certain this is the case of the renewable energy-based generation), the organization of tenders and monitoring of plans will be under the responsibility of different departments from the Ministry of Economy.

185. For the cases where the implementation aspects are related to the compliance with regulation, administrative tasks will be assigned to the National Energy Regulatory Agency. An Institutional Strategy Plan of the ANRE shall be developed based on the definition of the domain and implementation schedule, with the approval and monitoring tasks being with the Parliament.

186. In the case of the power transmission, the planning role and implementation administration tasks are with the SOE Moldelectrica. There are instruments defined by law, such as the investment plan (and perspective plans. The planning responsibilities of the SOE Moldelectrica also include the generation capacity, which means the setting up of a connection with domains 3) and 4). From the point of view of energy policies, the monitoring responsibility is assigned to the Government (Ministry of Economy) through its representatives to the Board, and from the regulation point of view (including of financial aspects like investments, use of congestion rate and transmission tariff) responsibilities are assigned to the National Energy Regulatory Agency.

187. In the natural gas supply security domain, all responsibilities related to planning and implementation are with the JSC Moldovagaz. Following the implementation of the separation of activities, roles will be divided according to the institutional separation of the transport, distribution and supply. From the policy perspective, the monitoring responsibility is performed by the Government (Ministry of Economy) through its representatives in the Board, as from the regulation perspective (including financial aspects line investments, use of the congestion rate and transport tariff) responsibilities are assigned to the National Energy Regulatory Agency.

188. Assessment of progress indicators is a both qualitative and quantitative process. The quantitative assessment activity will be assigned to the independent authorised entities, while collection of primary and process data will be performed by specialised public entities, like the National Energy Regulatory Agency. Assessment of qualitative progress indicators will represent the result of the activity of entities carrying out the monitoring on the basis of the reporting by the implementation entities.

VIII. CONCLUSIONS

189. The present Strategy considers realities in the country's energy sector, admitting the inevitable geopolitical situation and the indisputable legacy that are on the ground of this reality. The current and future decision making factors will formulate and firmly implement the countermeasures necessary to these realities, if these are negative or are a threat, and must find new solutions to the new challenges. Once solutions are identified, the most accessible alternatives will be selected.

190. The challenge of implementing the *acquis* based on the obligations resulting from accession to the Energy Community and from the partnership with the EU is accepted as an additional condition in developing the Strategy. However, it should be admitted that the so-called "community *acquis*" was not developed on the basis of very abstract models, but in line with a medium approach of the EU member states as concerning the needs, the reached development level and experience from the past, which, in general, has to make the steps more accessible. The *acquis* itself is meant to ensure a stable economic growth in the EU and the welfare of citizens from the candidate countries. Belonging to the international community, treaties and associations, the Republic of Moldova must and can use the experience of the energy *acquis* provisions in the competition domain as well, as part of the EU's general *acquis*, in order to find solutions for its own problems in the energy field. The *acquis* implementation must be used as an efficient and certain vehicle for the integration of Moldova's energy market into the EU's internal energy market.

191. The integration in the EU's internal energy market will place Moldova in a position of sharing with the Contracting Parties to the Energy Community and the EU member states, both the benefits and specific risks of a large community. But the most important is the fact that Moldova will not face the existing energy challenges alone, but will certainly benefit from the membership to a large regional energy community. By applying the cooperation mechanisms in a wise way and in due time, Moldova will be allowed to maximize the benefits of complementing its power generation platform with the generation capacities from the Western Balkans and to reduce the risks arising from this reason and those due to Moldova's³⁰ peculiarities.

192. Affiliation to a large community brings the benefits of evolving in a large commercial space, with a much more stable and predictable evolution of the energy resources supply and acquisition related costs. The fundamental principle of the free movement of goods, regulations' provisions for ensuring equal activity

³⁰ The main particularities are the Balkans' dependence on the energy from the hydro resources and Moldova's dependence on the gas resources.

conditions, as well as oil and gas interconnected pipes, and the power networks, will offer Moldova a competitive access to the main economic resource for the economic growth and a compulsory component for people's welfare: the energy.

193. The access to the internal energy market of the EU, when Moldova will be effectively integrated through the infrastructure, regulation and practices, will lead to a security of the supply based on a loyal competition and sustainability. Moldova will be allowed both to capitalize the potential of its power generation platform, and to consolidate its role of a transit corridor for electricity and natural gas.

194. The assimilation of the best EU practices is the smoothest way for an effective and efficient integration of the market. However, before assimilation these have to be assessed as concerning their applicability must be assessed along with the fact whether they bring any real value. For the practical side, apart from understanding the technical and commercial regulations and the infrastructure development, it is also necessary to understand the excellence of the corporate governance, careful responsibility and administration of assets, as well as the intelligent strategic positioning of players and of interested parties on the internal market.

195. It is true that the individual markets of the EU member states have met several deficiencies, when in the last decade they implemented diverse strategies, but these were rather due to some individual errors, like an uncompleted transposition of directives, improper development of regulations, deficient implementation of the institutional framework, lack of a technical, mathematical and legal foundation, lack of awareness, political interference, but, as a result, this is not a proof of the *acquis*' failure, it's rather an indication to deviations from it.

196. In particular, energy resources and internal (national) markets of the neighbour countries: Ukraine and Romania, are important. Energy strategies in both countries originate from the period before the putting into application of the third energy package³¹, as well as of the package of measures in the climate changes and energy field. Both countries are now in the process of reviewing their strategies. The more relevant elements regarding these markets for the Moldovan Strategy are:

1) Approval of the new law on electricity and natural gas in Romania (2012), accompanied by a roadmap for the full liberalisation of the electricity and natural gas markets to last until 2017 (with an eventual extension until 2018) with an intermediary term for the non-domestic consumers. Development of legal and normative provisions tackling the export of natural gas and progressive elimination

³¹ Ukraine's Energy Strategy from 2006, Romania's Energy Strategy from 2007.

of regulated prices for electricity and natural gas is important for the Republic of Moldova in terms of planning the adherence to the mechanisms of Romania's markets and negotiating the import of natural gas from the West;

2) The current development process of the electricity transmission infrastructure³² and retrofitting of the power generation system based on coal and nuclear resources in Ukraine is supported by the EBRD and EIB, as well as by half of the funding provided by the NIF in Ukraine.

197. Political and economic strategic partnership with the countries that are not EU members remains to be critical for Moldova. The permanent change and re-grouping of alliances in the Black Sea and Central Asia region and its obvious impact in the energy field in Moldova requires a more active presence at the negotiation tables as concerning the launch of infrastructure and transit corridors projects. Russia, Ukraine, Azerbaijan, Turkey, Romania, Bulgaria, as well as Greece, Hungary and Slovakia will represent the centre of Moldova's attention for the following years. At the same time, in many cases, the transnational interests and omnipresence of multinational companies are important coordinates of relations in the energy field, and the Black Sea and Central Asia zone are not an exception. Moldova will carefully consider the political, technical and commercial level cooperation opportunities with governments, multinational companies, operators and organizations in this geopolitical zone, based on the understanding of their interests and in the interest of achieving mutual benefit.

³² High voltage transmission projects are developed by Ukrenergo and the very high voltage corridor planned to be as a "secondary foundation" for connecting the pump storage plants and nuclear plants.

**Energy mix and distribution of energy resources
consumption in the Republic of Moldova**

**Table 1.1. Structure of main energy resources
(Republic of Moldova, 2003-2010)**

	(%)							
	2003	2004	2005	2006	2007	2008	2009	2010
Total resources	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Coal	9,3	7,7	6,8	6,7	6,6	8,3	7,1	6,8
Diesel	15,0	15,3	15,1	15,1	16,6	17,3	17,4	19,5
Oil fuel	1,7	1,4	1,1	1,1	0,9	1,1	2,6	1,9
Gasoline	11,0	10,8	10,6	9,7	10,2	10,5	11,2	9,8
Natural gas	46,2	43,5	47,1	47,7	45,3	41,7	40,0	40,5
Liquefied gas	3,1	2,9	2,8	2,6	2,7	2,9	3,2	3,3
Fire wood	3,0	2,5	2,5	2,9	2,7	2,9	2,9	2,6
Power	7,1	12,2	10,6	10,5	10,8	10,9	11,1	11,1
Other	3,6	3,7	3,4	3,7	4,3	4,4	4,4	4,5

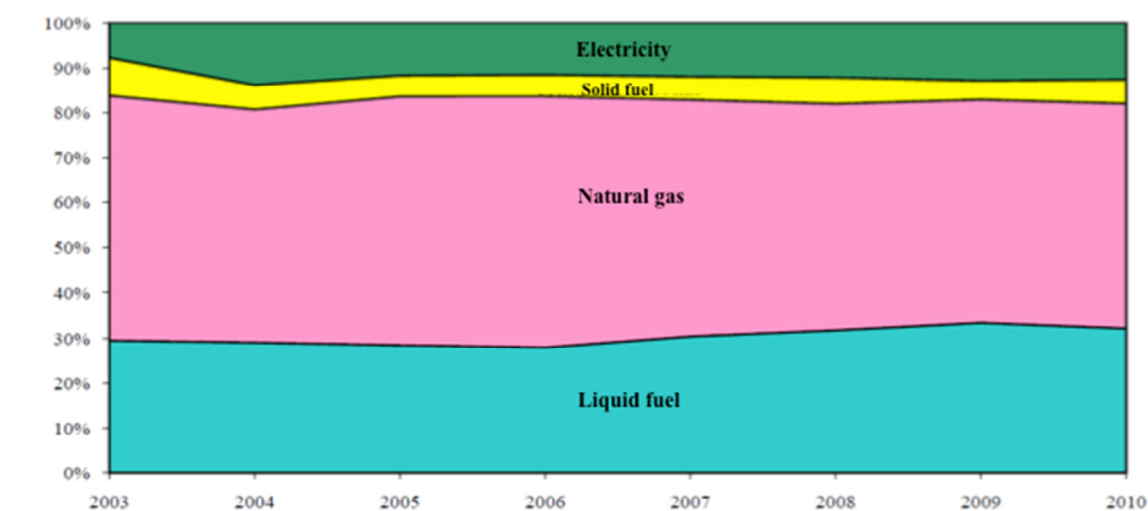
Source: National Bureau of Statistics of the Republic of Moldova: National energy balance 2010, fig. 3.2.

**Table 1.2. Energy balance
(Republic of Moldova, 2003-2010)**

	2003	2004	2005	2006	2007	2008	2009	2010
Total resources	2189	2377	2463	2430	2358	2410	2312	2401
Internal sources	87	84	87	92	88	110	124	104
Liquefied fuel	2	8	10	7	16	26	38	31
Solid fuel	79	71	70	78	69	77	81	66
Hydropower	6	5	7	7	3	7	5	7
Import	1956	2096	2185	2157	2115	2104	1973	2071
Liquefied fuel	577	609	622	603	643	668	659	666
Natural gas	1062	1083	1205	1201	1110	1057	977	1033
Solid fuel	166	115	103	105	110	124	84	112
Power	151	289	255	248	252	255	253	260
Fuel stocks at the beginning of the year	146	197	191	181	155	196	215	226
Total distributed	2189	2377	2463	2430	2358	2410	2312	2401
Domestic consumption	1978	2144	2278	2271	2160	2191	2071	2209
Transformed in other energy types	681	783	842	817	767	764	716	737
Production needs:	1297	1361	1436	1454	1393	1427	1355	1472
Industry and construction	124	130	161	163	156	142	85	107
Agriculture	80	71	61	59	52	51	46	48
Transportation	279	254	267	285	325	336	291	358
Trade and utilities	137	126	120	123	119	120	172	157
Sold to population	575	656	704	691	598	632	660	689
Other	102	124	123	133	143	146	101	113
Export	12	42	3	4	7	5	15	18
Fuel stocks at the end of the year	199	191	182	155	191	214	226	174

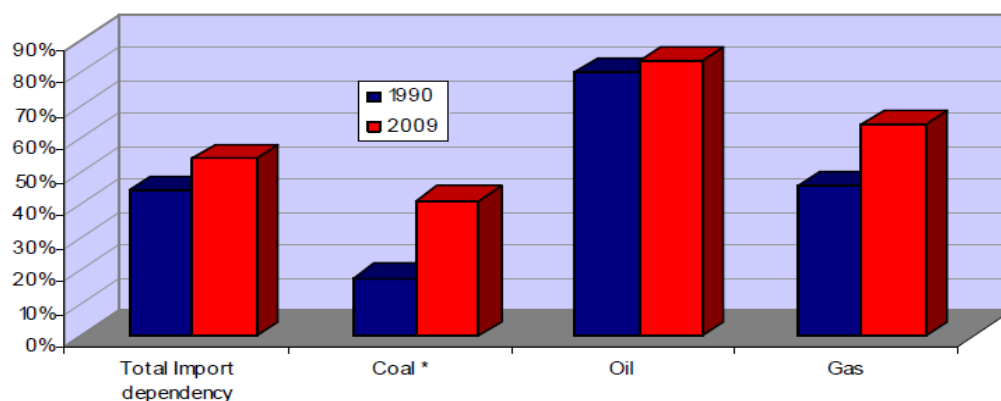
Source: National Bureau of Statistics of the Republic of Moldova: National energy balance 2010, fig. 1.5.

**Figure 1.2 Structure of fuel and energy imports
(Republic of Moldova, 2003-2010)**



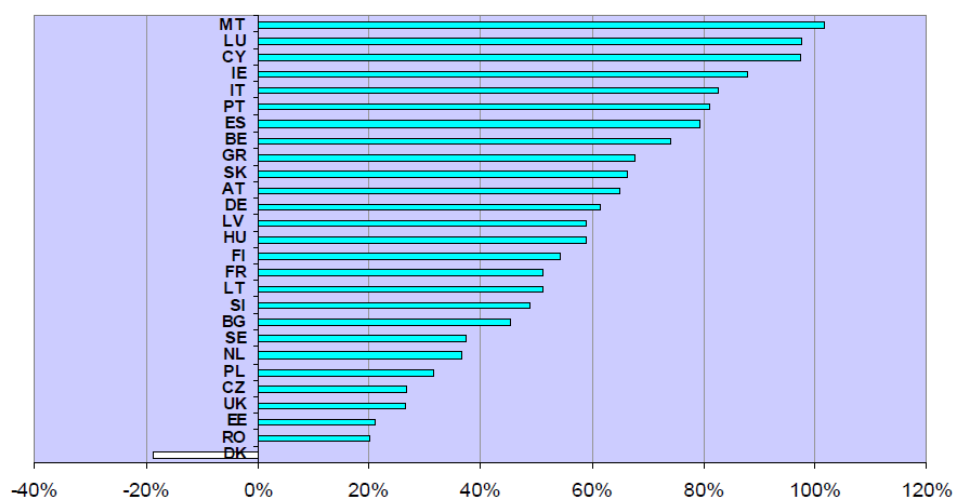
Source: National Bureau of Statistics of the Republic of Moldova: National energy balance, 2010, Fig.1.6.

Figure 1.3 Energy import dependency of the EU-27 countries



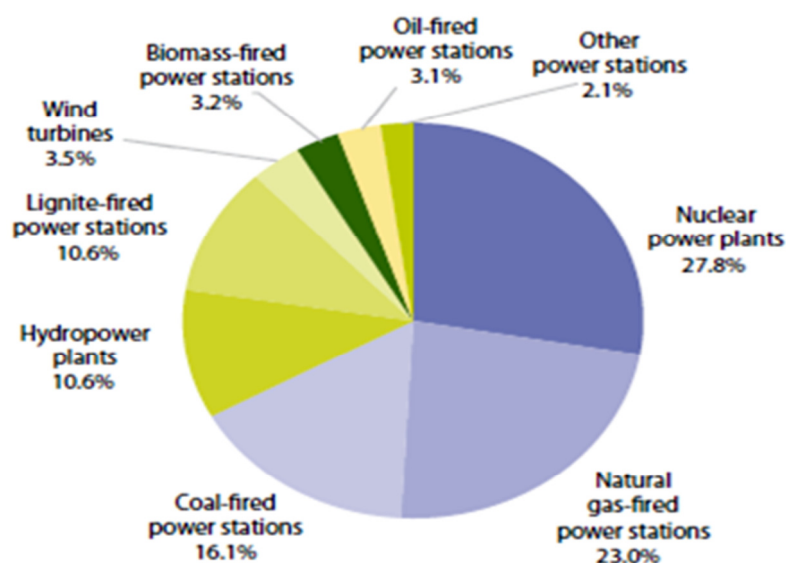
Source: EUROSTAT, May 2011 – Coal and other solid fuels, DG EN, Energy Market Observer, Main data, June 2011, 2. EU's energy dependence.

Figure 1.3. Energy import dependency in the member states in 2009



Source: EUROSTAT, May 2011, Energy Market Observer, Main data, June 2011, 2. EU's Energy Dependence, Dependence on the energy import of member states in 2009.

Figure 1.4. Electricity production by fuel used in power stations, EU-27, 2008



Source: EUROSTAT Europe in dates — Eurostat Yearbook 2011, Energy, Electricity Generation by Fuel used in Power stations, EU-27, 2008.

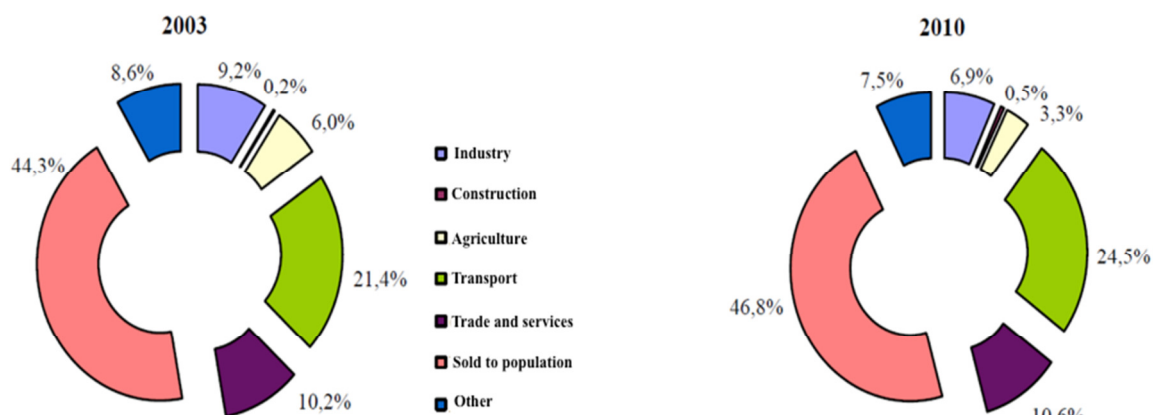
Table 1.3. Electricity consumption per main activities of the national economy (Republic of Moldova, 2003-2010)

in million kWh

	2003	2004	2005	2006	2007	2008	2009	2010
Total power resources	4629	4383	4196	4074	4031	4058	3974	4097
Power used	2527	2634	2921	3215	3364	4328	3378	3486
Industry	865	871	974	1026	1049	948	872	975
Construction	8	10	10	14	15	14	13	13
Transportation	51	47	50	58	65	62	50	46
Agriculture	52	48	51	55	50	54	59	54
Trade and utilities	581	539	671	753	745	841	866	783
Sold to population	836	964	1041	1154	1295	1371	1450	1514
Other needs and works	134	155	124	155	145	138	68	101

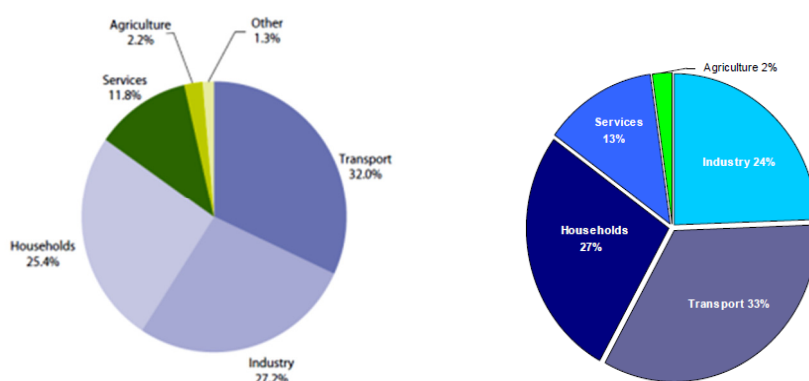
Source: National Bureau of Statistics of the Republic of Moldova: National energy balance 2010, fig. 4.3.

Figure 1.5. Distribution of final consumption of energy resources and fuel per main activities of the national economy (Republic of Moldova, 2003 – 2010)



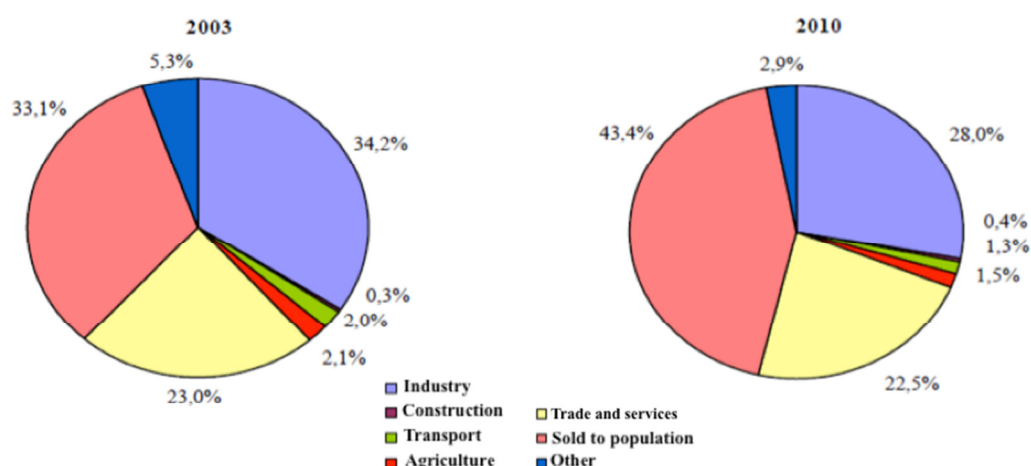
Source: National Bureau of Statistics of the Republic of Moldova: National energy balance 2010, fig. 2.2.

Figure 1.6. Distribution of energy resources per consumers (Republic of Moldova, 2008, 2009)



Source: EUROSTAT, Europe in figures, Eurostat Yearbook 2011, Energy, 12.6: Final energy consumption, EU-27, 2008, EUROSTAT May 2011, DG EN Energy Market Observer, Main data, 4. Energy Consumption EU (2009).

Figure 1.5. Electricity consumption structure per main activities of the national economy (Republic of Moldova, 2003-2010)



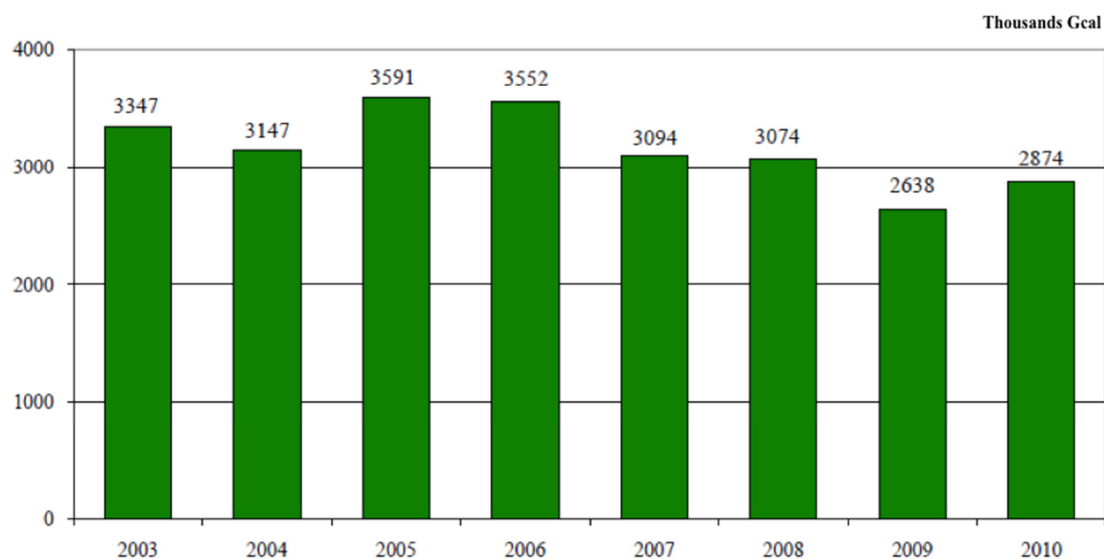
Source: National Bureau of Statistics of the Republic of Moldova: National energy balance 2010, fig.4.5.

Table 1.6. Electricity generation structure per producers and electricity consumption distribution per suppliers

Indexes	2001	2005	2009	2010	2011
Power generation (supplied from the power output lines), total, in mil. kWh	1042,9	999,8	865,8	888,1	854,3
including: CHP 1	115,4	128,9	116,7	82,0	59,8
CHP 2	812,6	724,7	639,2	665,4	655,9
CHP Nord	31,5	55,5	53,5	57,1	57,8
GTCP Costesti	72,2	83,8	54,0	78,3	75,5
Other domestic producers	11,2	6,9	2,4	5,3	5,3
Purchase of power, total, in million kWh	3194,8	3465,1	3799,6	3915,6	3993,7
including: RED NORD	569,7	588,1	638,6	651,0	662,9
RED Nord Vest	314,9	287,1	330,6	342,4	344,1
RED Union Fenosa	2310,2	2484,3	2749,2	2842,2	2902,5
Eligible consumers		105,6	81,1	80,0	84,2

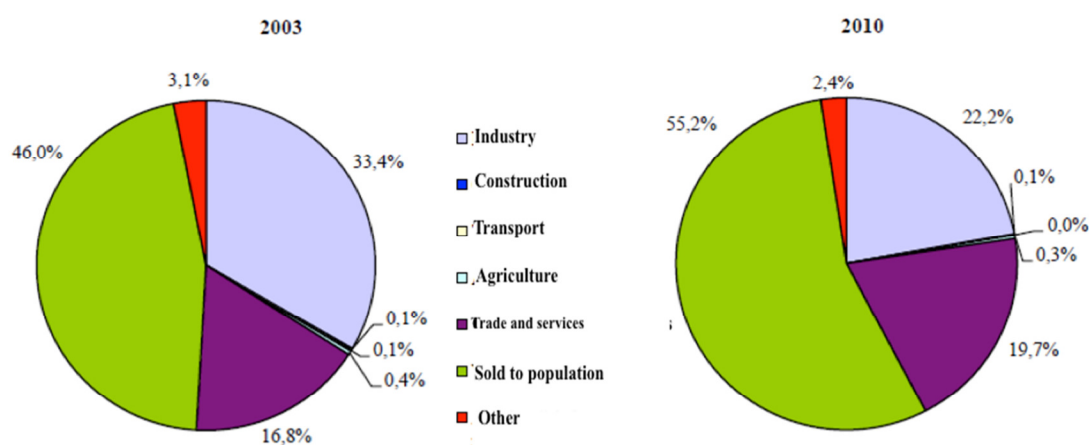
Source: ANRE Annual Activity Report, 2011.

Figure 1.7 Heat production (the Republic of Moldova 2003-2010)



Source: National Bureau of Statistics of the Republic of Moldova: National energy balance 2010, fig. 5.2.

Figure 1.8. Heat consumption structure per main activities of the national economy



Source: National Bureau of Statistics of the Republic of Moldova: National energy balance 2010, fig. 5.5.

Table 1.5. Evolution of relevant indicators of the natural gas sector

Indicators	2005	2007	2009	2010	2011
Volume of imported gas, million m ³	1418,5	1305,4	1126,3	1187,8	1152,1
Volume of transited gas, million m ³	25313,0	23692,8	17891,0	16670,0	19989,5
Length of gas networks, km	12259,2	15456,5	18472,4	21025,6	21884,9
<i>Including pipeline networks, km</i>	1307,6	1379,1	1474,5	1527,3	1559,6

Source: JS Moldovagaz.

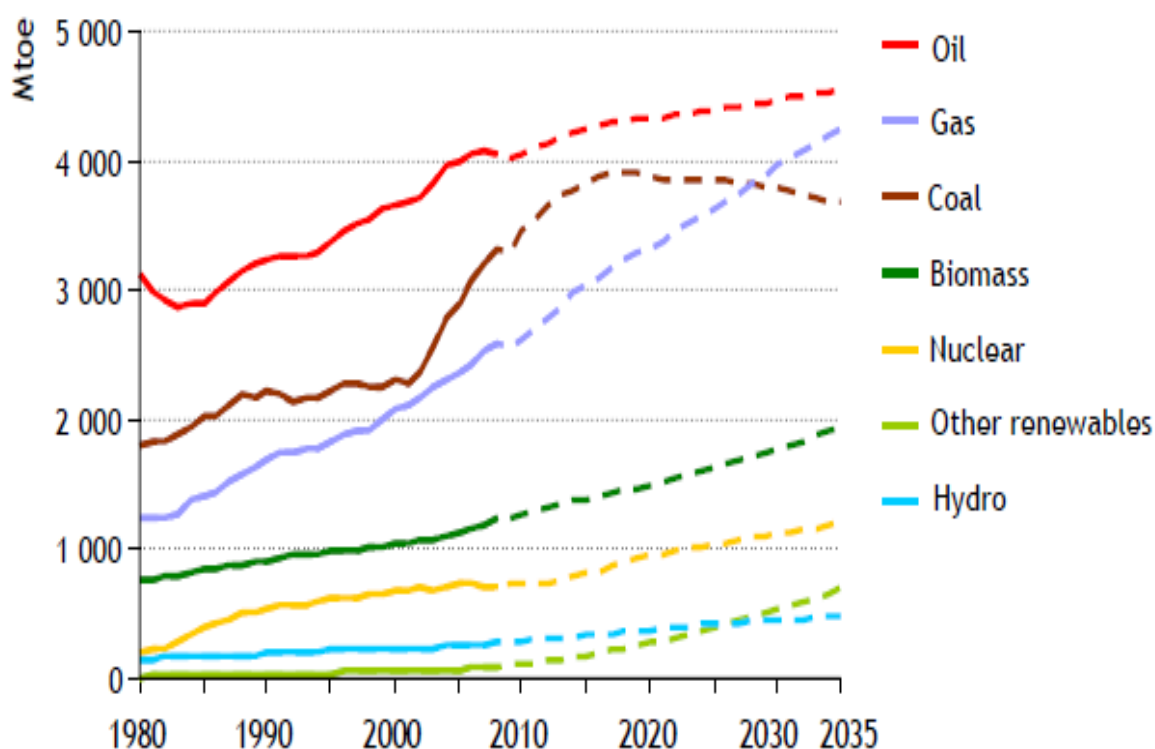
Evolution of the main economic indicators in the Republic of Moldova

**Table 2.1 Main economic indicators in the Republic of Moldova till 2030
(basic scenario)**

Indicators	2015	2020	2025	2030
GDP (in current prices), lei, billion	118,3	173,331	238,958	320,705
Industry (in current prices), lei, billion	49,5	67,9	92,5	121,3
Agriculture (in current prices), lei, billion	27,1	32,9	40,1	48,9
Population, million	3532	3,437	3,357	3,327
Total energy consumption, TWh	4,241	5,556	6,996	8,491

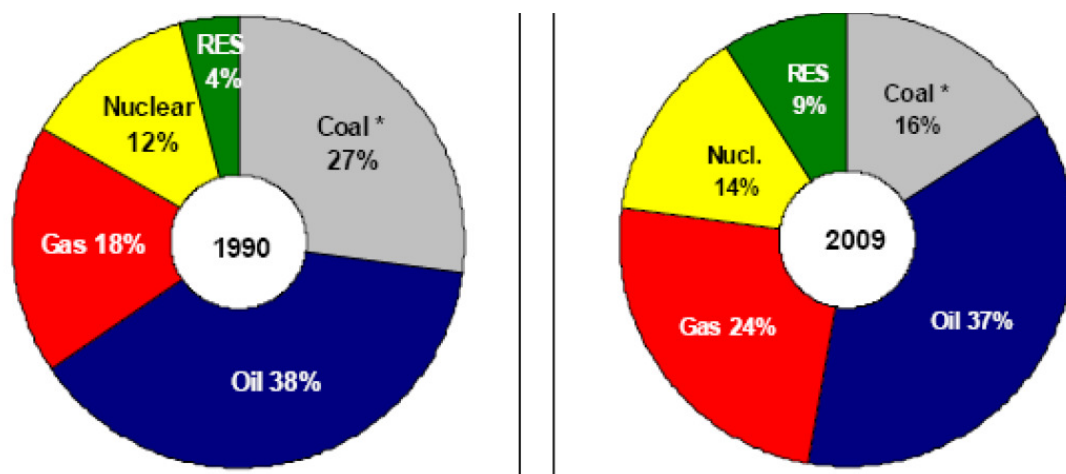
Source: International Monetary Fund (IMF), WEO, April 2012; Ministry of Economy updated forecast for 2015.

Figure 2.1. World primary energy demand by fuel in the natural gas scenario



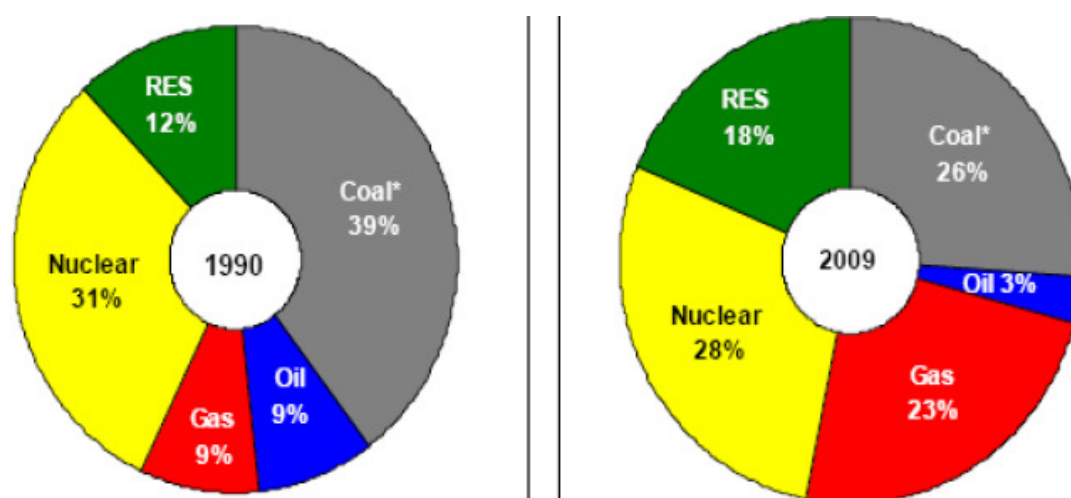
Source: IEA, World Energy Outlook 2011, Special Report.

Figure 2.2. EU-27: Energy mix structure in 1990-2009



Source: EUROSTAT, May 2011 – Coal and other solid fuels - RES: Renewable energy sources, DG EN Energy Market Observer Main data, 3. EU's energy consumption by fuels. Gross internal fuel consumption in 1990 and 2009.

Figure 2.3. Growing role of natural gas and renewable energy in electricity generation in EU



Source: EUROSTAT, May 2011 – Coal and other solid fuels: RES: Renewable energy sources, DG EN Energy Market Observer Main data, 6. Electricity production in the EU, Electricity production in the EU by type of fuel in 1990 and 2009.

Table 2.2 Main short-term economic indicators in the Republic of Moldova

Indices	Scale	Units	2010	2011	2012	2013	2014	2015	2016	2017
GDP, constant prices*	Lei	Billion	9,425	10,030	10,331	10,847	11,389	12,016	12,653	13,323
GDP, constant prices	% exchange		7,09	6,41	3,00	5,00	5,00	5,50	5,30	5,30
GDP, current prices	Lei	Billion	71,885	82,174	90,141	99,380	109,567	121,373	134,196	148,373
GDP, current prices**	Lei	Billion	71,9,	82,2,	88,3	97,4	107,3	118,3	129,007	138,841
GDP, current prices	US dollars	Billion	5,813	7,003	7,589	8,216	8,969	9,776	10,640	11,671
GDP, deflator	Index		762,70	819,31	872,57	916,20	962,01	1010,108	1060,61	1113,64
GDP per capita, constant prices*	Lei	Units	2649,00	2819,98	2907,68	3053,06	3025,72	3382,03	3561,28	3750,03
GDP per capita, current prices	Lei	Units	20211,67	23104,46	25371,50	27982,08	30839,22	34162,14	37771,37	41761,92
GDP per capita, current prices	US dollars	Units	1634,52	1968,95	2135,92	2312,64	2524,43	2751,73	2994,74	3284,85
GDP based on the PPP assessment of the country's GDP	\$ current international	Billion	11,039	11,997	12,558	13,362	14,231	15,261	16,370	17,599
GDP based on the PPP of the GDP per capita	\$ current international	Units	3103,75	3373,24	3534,74	3761,00	4005,62	4295,57	4607,60	4953,44
Implied PPP conversion rate	National currency per \$ current international		6,512	6,849	7,178	7,437	7,699	7,953	8,198	8,431
Total investments	% of GDP		23,524	24,491	25,210	25,936	25,943	26,057	26,180	26,469
Gross domestic savings	% of GDP		15,615	12,973	13,825	15,282	15,869	16,455	17,000	17,691
Inflation, average consumption prices	Index		33525,17	36089,71	37946,69	39834,70	41833,10	43924,68	46118,93	48424,55
Population	Persons	Million	3,557	3,557	3,553	3,553	3,553	3,553	3,553	3,553

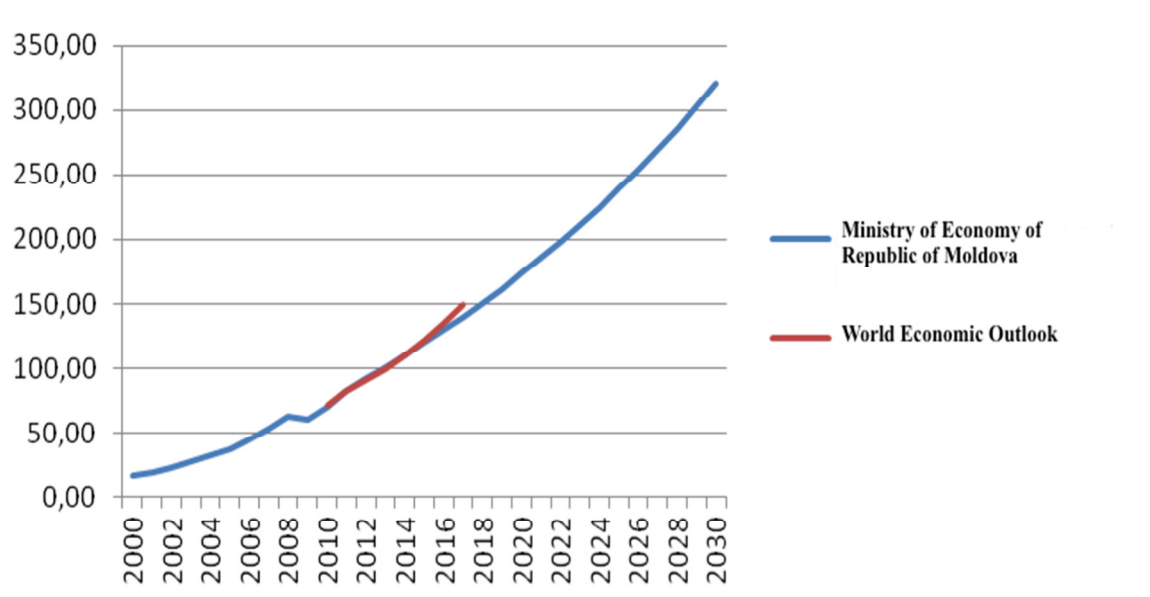
* WEO forecast, Reference year - 1995

** Forecast by the Ministry of Economy of the Republic of Moldova from October 15, 2012.

Source: IMF, World Economic Outlook, October 2012; Forecasts of the Ministry of Economy.

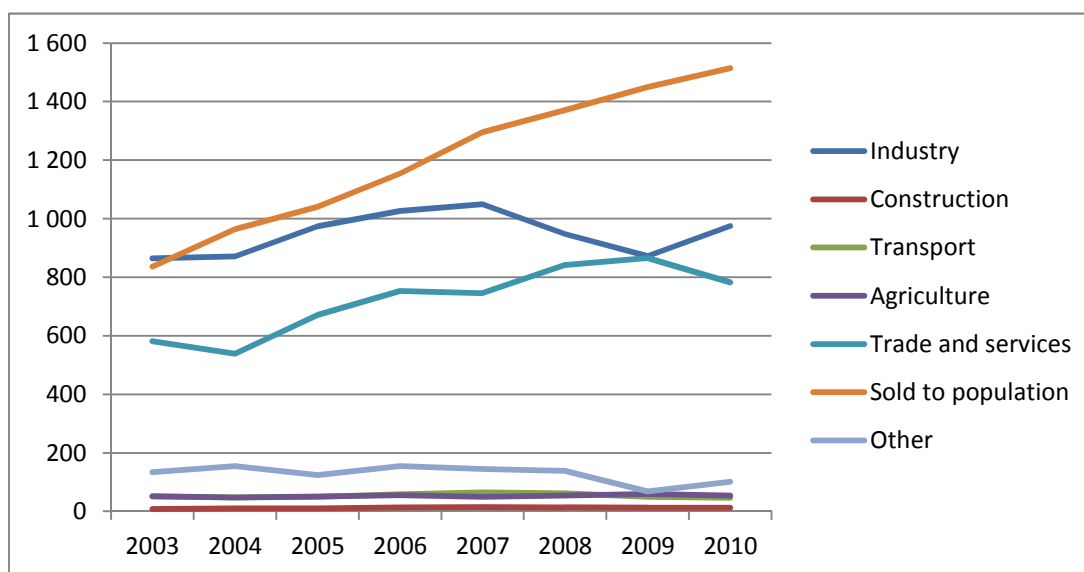
Electricity consumption forecast

Figure 3.1. GDP growing trends (Republic of Moldova, 2000-2030)



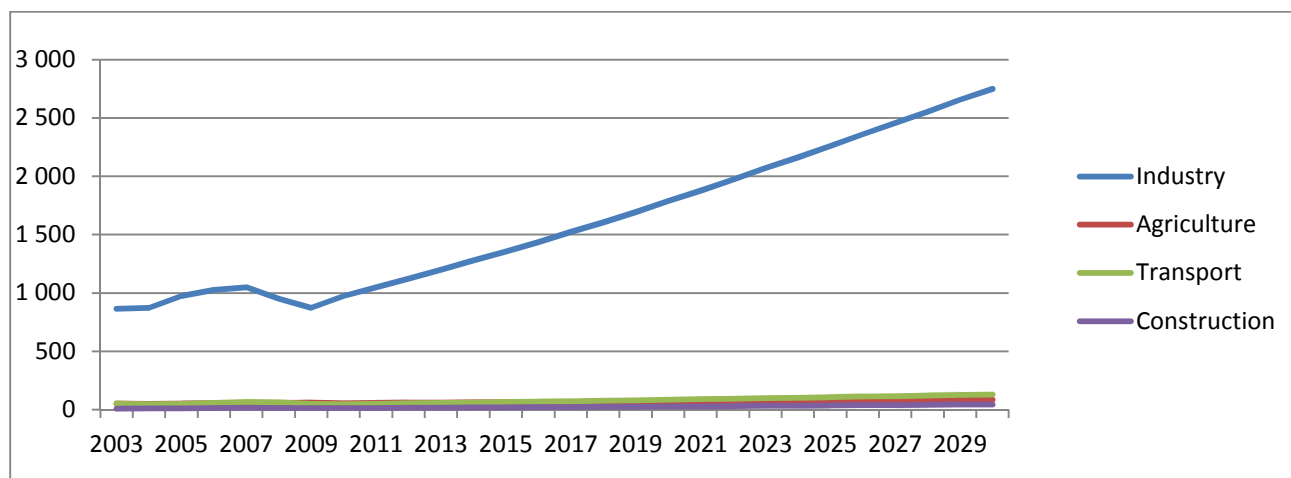
Source: IMF, WEO, April 2012; Ministry of Economy's updated forecast for 2015.

Figure 3.2. Energy consumption per sector (Republic of Moldova, 2003-2010), kWh



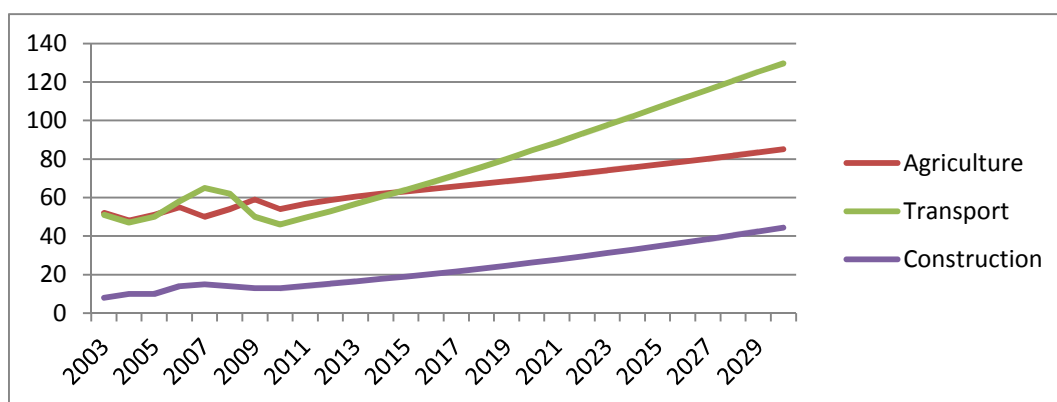
Source: National Bureau of Statistics of the Republic of Moldova, Energy Balance of the Republic of Moldova. Collection of statistical data, 2010.

Figure 3.3. Electricity consumption by basic sectors in the Republic of Moldova until 2030, million kWh



Source: National Bureau of Statistics of the Republic of Moldova, Energy Balance of the Republic of Moldova. Collection of statistical data, 2010.

Figure 3. 4 - Electricity consumption by basic sectors in the Republic of Moldova until 2030 (without industry), million kWh



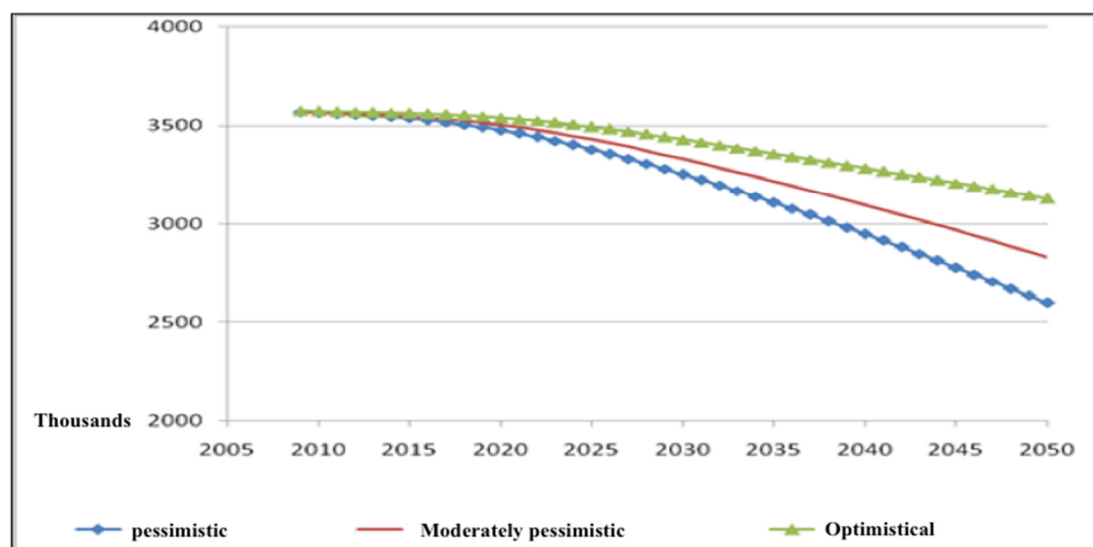
Source: National Bureau of Statistics of the Republic of Moldova, Energy Balance of the Republic of Moldova. Collection of statistical data, 2010.

Table 3.5 Demographic forecast for the Republic of Moldova until 2050

Responsible organizations	Scenarios	Population, thousand			Ageing coefficient		
		2010	2025	2050	2010	2025	2050
UN Department of Economic and Social Affairs	low	3576	3254	2558	15,9	23,7	36,7
	average	3576	3291	2734	15,9	22,7	31,2
	high	3576	3426	3202	15,9	21,8	26,7
Independent Actuarial and Information Centre, Moscow, Russia	pessimist	-	3354,7	2593,6	-	-	-
	Moderate-pessimist	-	3356,7	3004,0	-	-	-
Institute of European Integration and Political Sciences, Academy of Sciences of Moldova	pessimist	3563,6	3379,8	2596,2	14,3	20,3	30,3
	Moderate-pessimist	3563,8	3430,0	2830,8	14,3	20,4	30,8
	optimist	3572,6	3493,5	3129,8	14,4	20,8	31,9

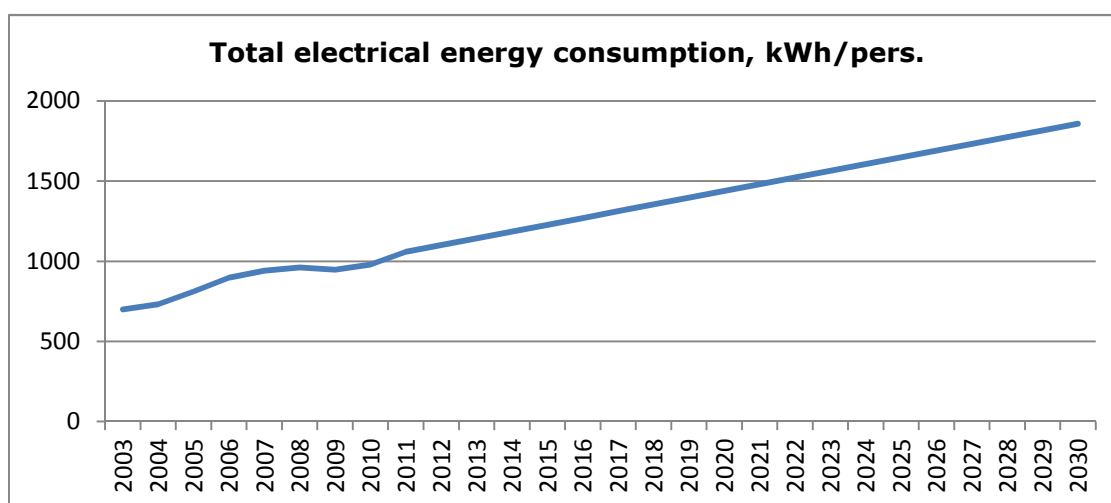
Source: World Population Prospects: The 2010 Revision. Pension system in the Republic of Moldova: Actuarial expertise. Edition. V.N.Baskakov, Moscow, 2007.

Figure 3.5. Long-term population trends in the Republic of Moldova until 2050



Source: Gagauz O., Penina O. Moldova's Demographic Perspectives. In "The Main Challenges of Demographic Security: Differences and Affinities - Chisinau, Stiinta, 2010).

Figure 3.6 Energy Consumption per capita in the Republic of Moldova until 2030



Source: National Bureau of Statistics of the Republic of Moldova, Energy Balance of the Republic of Moldova. Collection of statistical data, 2010.

Table 3.2. Growth of energy consumption indicators in 2011-2030 by sector, %

Topic description	Scale	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GDP, current prices, billion	Lei	82,1	91,6	101	110,8	120,238	129,701	139,963	150,977	161,864	173,331
GDP (increase in deflation conditions)	%	105	105	105	104,5	104,9	104,5	104,6	104,5	104,1	104
Industry (increase in deflation conditions)	%	107,5	107	107	106,5	106	106	106	105,5	105,5	105,5
Agriculture (increase in deflation conditions)	%	105	103,5	103	102,5	102	102	102	102	102	102
Constructions (increase in deflation conditions)	%	106	106	106	105,5	105,9	105,5	105,6	105,5	105,1	105
Transport (increase in deflation conditions)	%	105	103,5	103	102,5	102	102	102	102	102	102
Other sectors (increase in deflation conditions)	%	107,4	106,8	106,8	106,3	105,8	105,8	105,9	105,4	105,4	105,4
Population, thousands*	Persons	3557	3553	3553	3553	3553	3534	3515	3495	3476	3456

Topic description	Scale	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
GDP, current prices, billion	Lei	185,556	198,147	211,517	224,802	238,958	253,935	269,943	285,697	303,122	320,705
GDP (increase in deflation conditions)	%	104	104	104	103,5	103,5	103,5	103,5	103	103	103
Industry (increase in deflation conditions)	%	105	105	105	104,5	104,5	104,5	104	104	104	1035.
Agriculture (increase in deflation condition)	%	102	102	102	102	102	102	102	102	102	102
Constructions (increase in deflation conditions)	%	105	105	105	104,5	104,5	104,5	104,5	104	104	104
Transport (increase in deflation conditions)	%	102	102	102	102	102	102	102	102	102	102
Other sectors (increase in deflation conditions)	%	105	105	105	104,4	104,4	104,4	104	104	104	103.5
Population, thousands*	Persons	3437	3417	3397	3377	3357	3337	3317	3297	3277	3257

*Without taking into account migration flows

Source: World Economic Outlook.

Table 3.3. Growth of energy consumption indicators in 2011-2030, by sector

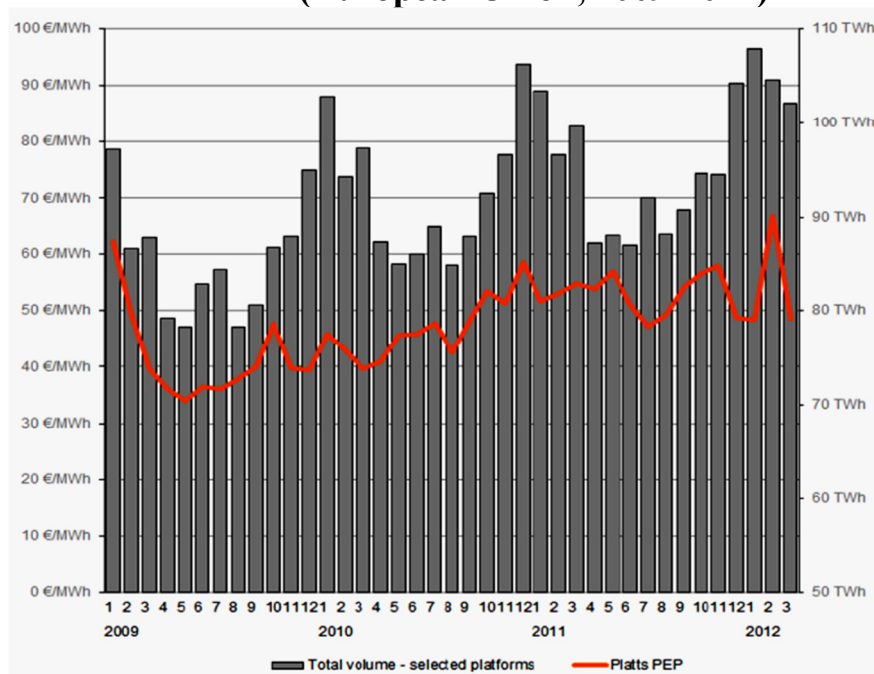
Topic description	Scale	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total consumed, incl.:	Million kWh	3303,5	3528,7	3749,1	4007,3	4241,4	4488,1	4750,5	5005	5274,3	5556
Industry	Million kWh	1003	1073,2	1148,4	1223	1296,4	1374,2	1456,6	1536,7	1621,2	1710,4
Agriculture	Million kWh	67	69	71	73	75	76	78	79	81	81
Constructions	Million kWh	14,1	15,2	16,5	17,7	19	20,2	21,7	23,1	24,6	26,2
Transport	Million kWh	49,5	53	56,6	60,3	63,9	67,7	71,8	75,8	80	84,3
Population	Million kWh	1518,9	1622,8	1733,6	1843,3	1951	2065	2185,7	2303,3	2427,3	2557,9
Other sectors	Million kWh	651	695,5	723	790	836,1	885	936,7	987,1	1040,2	1096,2
Total consumption, per capita	kWh/pers.	9385	1003,8	1072,3	1140,2	1206,8	1277,3	1352,1	1424,7	1501,4	1582,2

Topic description	Scale	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total consumed, incl.:	Million kWh	5829,6	6115,8	6415	6699,3	6996,1	7306,2	7594	7894,1	8206	8490,8
Industry	Million kWh	1796	1885,7	1980	2069,1	2162,2	2259,5	2350	2443,9	2541,6	2630,6
Agriculture	Million kWh	84	86	87	89	91	93	94	96	98	100
Constructions	Million kWh	27,7	29,4	31,1	32,9	34,7	36,6	38,4	40,4	42,4	44,3
Transport	Million kWh	88,5	93	97,6	102	106,6	111,4	115,9	120,5	125,3	129,7
Population	Million kWh	2683,4	2815,2	2953,5	3084,4	3221,1	3364	3497	3635,3	3779,1	3910,3
Other sectors	Million kWh	1150	1206,5	1265,8	1321,9	1380,5	1441,7	1498,7	1558	1619,6	1675,9
Total consumption, per capita	kWh/pers.	1716,0	1810,7	1910,8	2007,4	2108,9	2215,6	2317,1	2423,33	2534,6	2638,7

Source: World Economic Outlook.

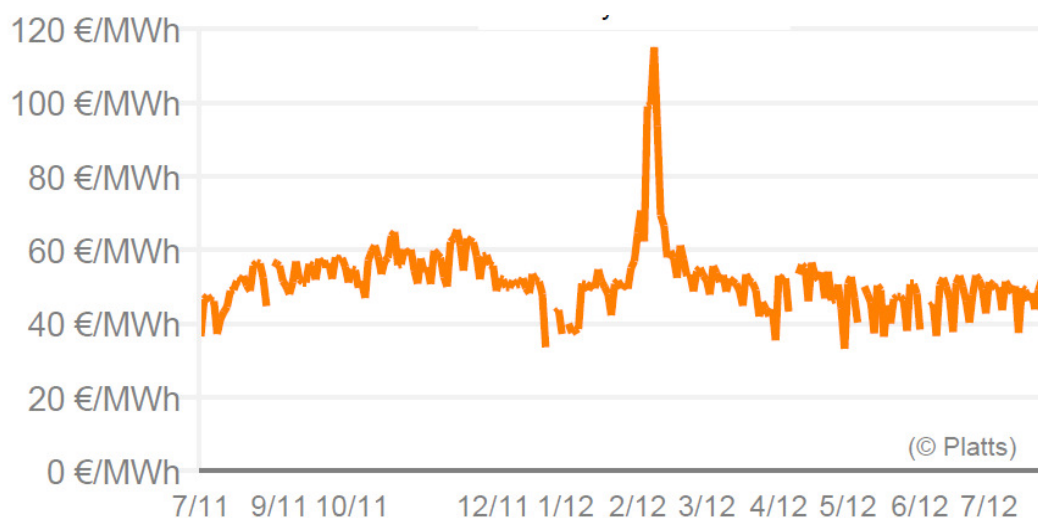
Price evolution for electricity, gas and CO₂ in EU

Figure 4.1. Monthly average prices for electricity on electricity exchanges (European Union, 2009-2011)



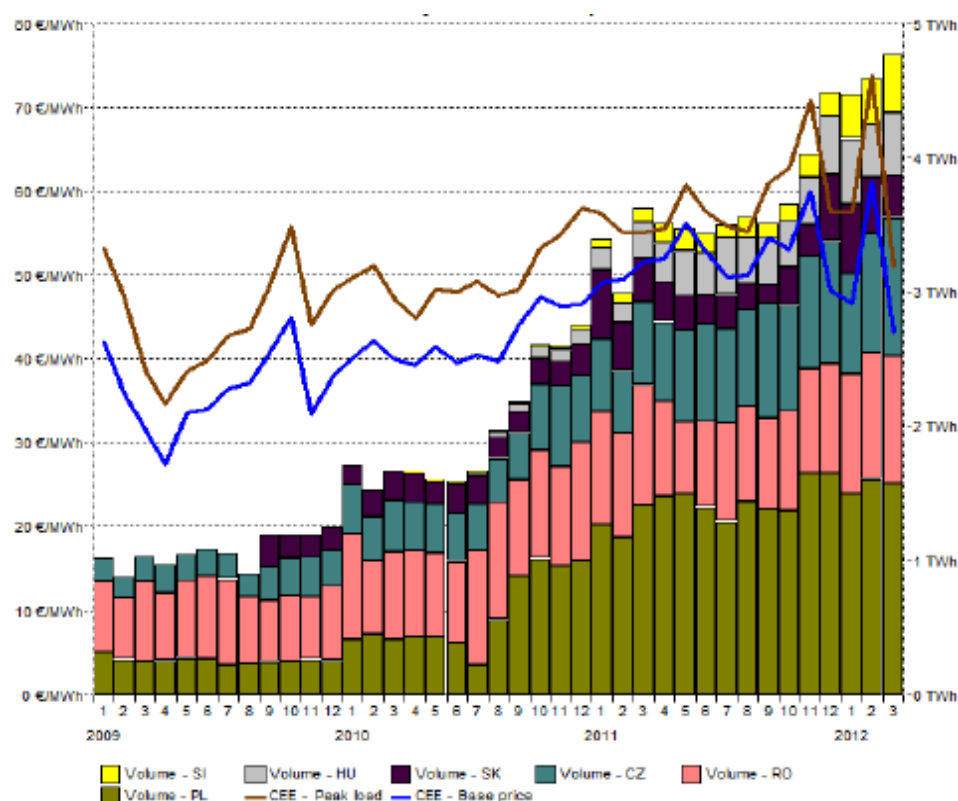
Source: European Commission, DG EN, Power Market Observer, trimester 1, 2012, Monthly Pan-European Power index and monthly aggregated volumes (selected power markets: Norway, Sweden, Finland, Denmark, Holland, France, Belgium, Austria, Italy, Spain, Czech Republic, Slovakia, Poland, Hungary, United Kingdom, Romania, Slovenia)

Figure 4.2. Platts Day-ahead Pan-European Power index evolution, reference July 2011 - July 2012



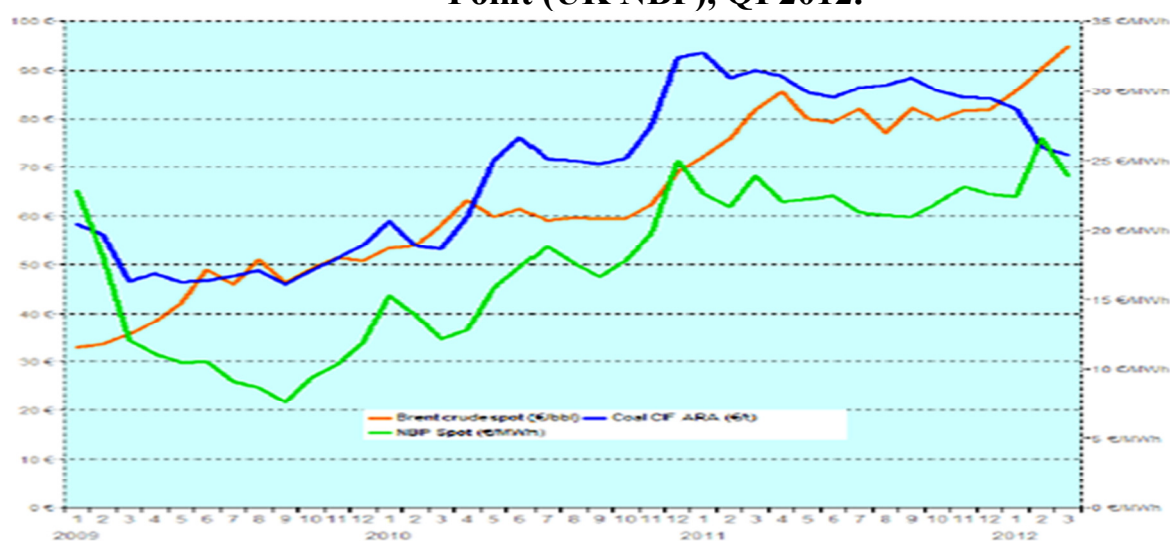
Source: DG EN, Market Observer, Daily report on power prices, July 2012.

Figure 4.3. Prices and volumes evolution on power exchanges (Eastern Europe, 2009-2011)



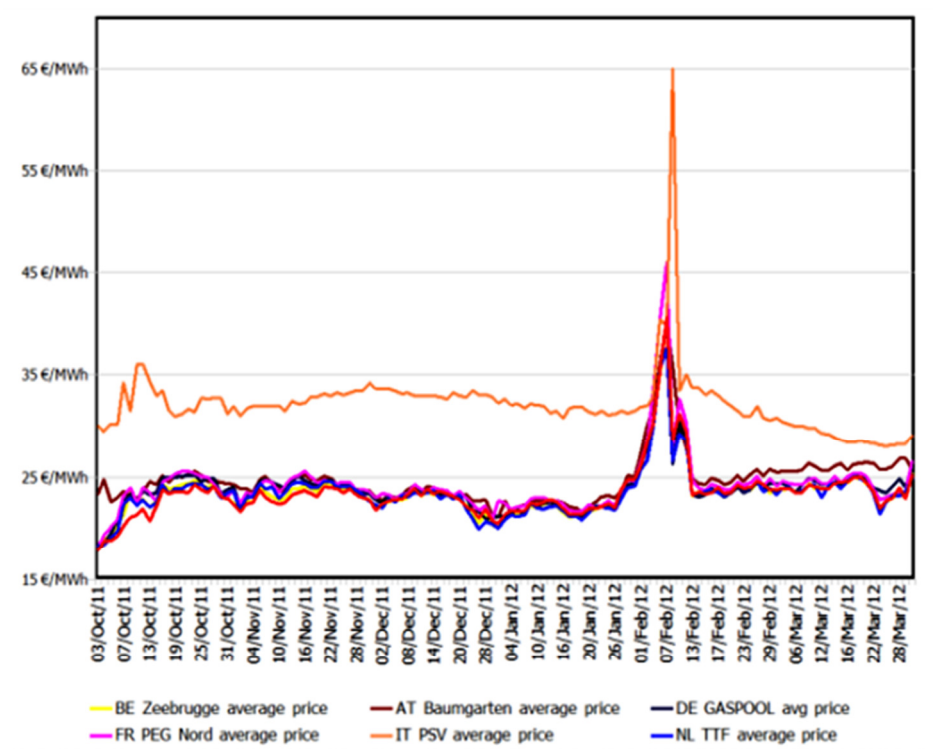
Source: European Commission, DG EN, Power Market Observer, trimester 1, 2012, Monthly volumes and prices in Eastern Central Europe: Poland, Czech Republic, Slovakia, Hungary, Romania, Slovenia.

**Figure 4.4.
Natural gas, oil and coal spot prices decoupling (UK National Balancing Point (UK NBP), Q1 2012.**



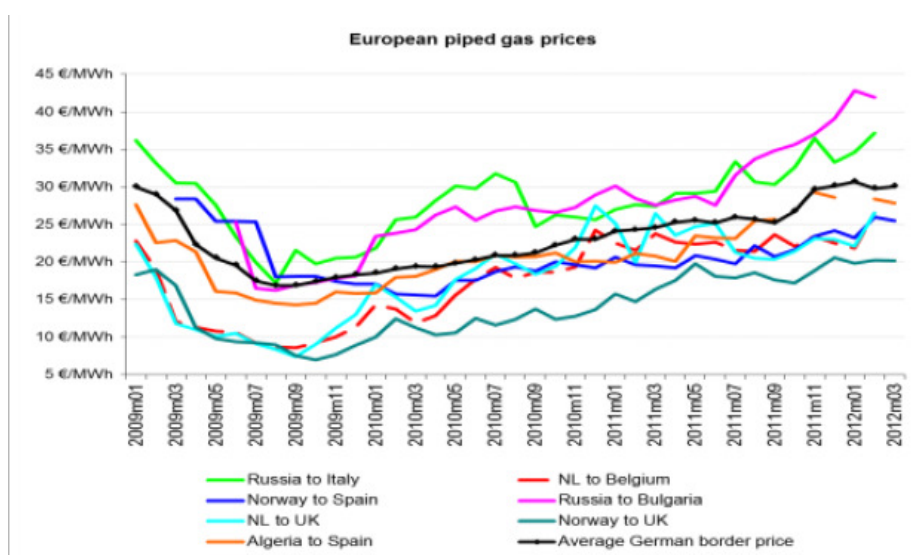
Source: European Commission, DG EN, Market Observer, Quarterly Report on Natural Gas Markets, QIV 2011, Q1 2012.

Figure 4.5. Natural gas spot prices in EU trading centres, QI 2012



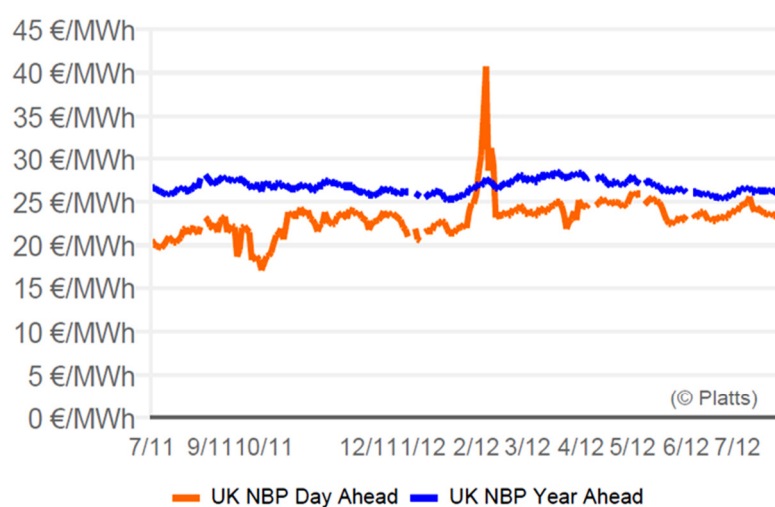
Source: European Commission, DG EN, Market Observer, Quarterly Reports on Natural Gas Markets, QIV 2011, QI 2012, Daily Day-ahead prices in the EU trading centres.

Figure 4.6. Evolution of pipeline natural gas prices in EU, 2008-2012



Source: European Commission, DG EN, Market Observer, Quarterly Report on Natural Gas Markets, QIV 2011, QI 2012.

Figure 4.7. Day-ahead and year-ahead price evolution in natural gas trading centres, UK NBP, July 2011 – July 2012



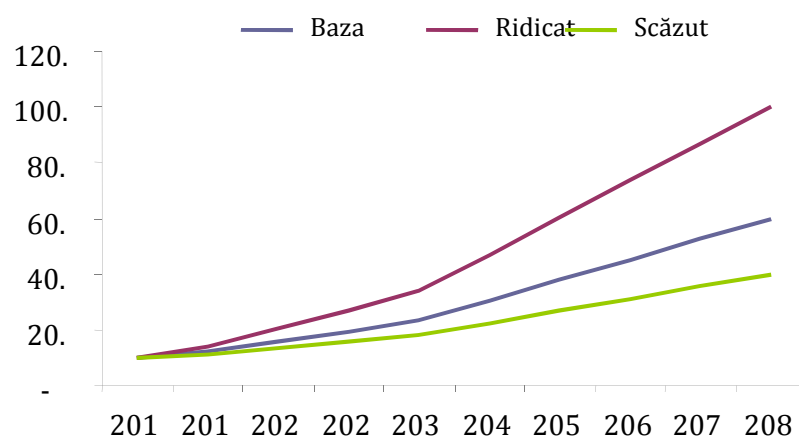
Source: DG EN, Market Observer, Daily report on energy prices, July 2012, Natural gas – wholesale.

Table 4.1 - CO₂ Prices, in EURO/tonne

YEAR	Scenario		
	Reference	Maximum	Minimum
2012	10,0	10,0	10,0
2015	12,2	14,0	11,3
2020	15,9	20,6	13,5
2025	19,6	27,2	15,7
2030	23,2	33,8	17,9
2040	30,6	47,1	22,4
2050	37,9	60,3	26,8
2060	45,3	73,5	31,2
2070	52,6	86,8	35,6
2080	60,0	100,0	40,0

Source: Information Centre for the Environment (ICE).

Figure 4.2 CO₂ Price comparison.



Source: ICE.

SWOT analysis of the reviewed strategic options

5.1. SWOT analysis for the integration of the Republic of Moldova's power system with the EU's ENTSO-E system

Integration together with Ukraine

Strengths and opportunities:

- (a) the lowest price, around 85.8 million euro;
- (b) keeping the system's existent stability;
- (c) the widest trading options, including the arbitration;
- (d) a lower pressure for increasing the internally generated energy volume;
- (e) better investment conditions for energy generation capacities;
- (f) possibility to join the Romanian balancing market.

Weaknesses and threats:

An alternative that requires more time, delaying the real progress.

Integration without Ukraine (possibly integration only together with the Burshtin Island in Ukraine)

Strengths and opportunities:

- (a) of all the alternatives, this is not the highest cost, 142.8 million euro;
- (b) wide trading options, through connection to the most secure market, including complementarities with Western Balkans;
- (c) a lower pressure for increasing the internally generated energy volume;
- (d) better investment conditions;
- (e) possibility to join the Romanian balancing market.

Weaknesses and threats:

- (a) Higher costs in comparison with the connection scenario together with Ukraine;
- (b) new stability conditions;
- (c) a longer period of time required for the project execution due to the need to consolidate the internal network compared to the asynchronous connection;
- (d) does not offer the widest trading options.

Asynchronous integration (back-to-back stations)

Strengths and opportunities:

- (a) the fastest solution;
- (b) wide trading options, through connection to the most secure market, including complementarities with Western Balkans;
- (c) the best East-West arbitration conditions;
- (d) reduced pressure for increasing the internal power generation;
- (e) better investment conditions;
- (f) possibility to join the Romanian balancing market.

Weaknesses and threats:

- (a) the highest cost of all the alternatives, 219 million euro;
- (b) does not offer the best competition conditions, arbitration might not be in the direct benefit of consumers.

5.2. SWOT analysis for extending the power generation capacities

Integration of CERMS into the Moldovan market

Strengths and opportunities:

- (a) already operational capacity;
- (b) can be stimulated to participate in the construction of a partnership-based commercial line for exports to the Balkans regions, which would increase its load and redesign its business profile;
- (c) low carbon emissions, on the gas side;
- (d) within an improved market framework, the CERMS could participate in building a local balancing mechanism.

Weaknesses and threats:

- (a) tensioned relationships context because of political and commercial precedents;
- (b) insecure information regarding the real condition of production capacities;
- (c) requires technology upgrades.

Efficiency and increased capacity for the (new) CHP in Chisinau

Strengths and opportunities:

- (a) the cogeneration efficiency must be improved;
- (b) this will be valid on the market, benefiting from the priority for cogeneration;
- (c) low carbon emissions.

Weaknesses and threats:

Price could be increased; in order to mitigate it, a fixed tariff can be applied for a period, depending on the connection date to the ENTSO-E transport system and eventually, a bonus scheme after that.

RES use (mainly, the wind energy) on the basis of auctions, with feed-in tariff as start price

Strengths and opportunities:

- (a) clean generation;
- (b) contributes to the fulfilment of future arrangements,
- (c) reduces dependency on imports.

Weaknesses and threats:

- (a) the needed incentives for attracting investors might be costly;
- (b) RES-based generation interferes with the gas burning-based solutions, as it requires more sophisticated balancing solutions;
- (c) a new hydro capacity has not been considered, because even if small hydro stations can be taken into consideration while investigating the technical and economic potential, the general perception is that there is no issue of relevant volumes.

New generation capacity (based on coal) working initially through the connection to ENTSO-E grid in the "island mode"

Strengths and opportunities:

- (a) contributes to reducing dependency from natural gas imports;
- (b) can bring solutions for strengthening the Western interconnection (commercial line), which is important, because it could support imports from the EU;
- (c) after connection to the ENTSO-E grid, exports from these capacities to the EU will increase the capacity to import from the EU.

Weaknesses and threats:

- (a) high carbon emissions,
- (b) partial availability for an initial period during which it could be operational in the "island mode."

Alternatively to the new coal-based capacities, a new Combined Cycle Gas Turbine (CCGT) type.

Strengths and opportunities:

- (a) much cleaner compared with the coal-based technologies;
- (b) supports integration into the network of the energy generated from renewable sources;
- (c) same beneficial aspects as in the case of the new capacity based on coal.

Weaknesses and threats:

- (a) Gas burning requires appropriate interfaces between the modes of power / gas markets in terms of prices/balancing;
- (b) the attraction of a traditional gas supplier for an upstream integration could be vital for the project's implementation.

5.3. SWOT analysis for power and natural gas trading in the Republic of Moldova

Natural gas trading on the basis of long-term contracts

Strengths and opportunities:

- (a) well known trading mode with a potential impact of the political context;
- (b) no need for a centralized market;
- (c) less dependence from the availability of gas storage conditions.

Weaknesses and threats:

- (a) higher costs;
- (b) few alternative suppliers.

Short-term natural gas trading

Strengths and opportunities:

- (a) lower prices;
- (b) optimization of acquisitions according to consumption.

Weaknesses and threats:

- (a) liquid market is required;
- (b) storage facilities are required.

Power trading on the basis of long-term contracts

Strengths and opportunities:

- (a) avoiding any volatility risks;
- (b) use of a well known model of negotiations and contractual clauses.

Weaknesses and threats:

Price results from the reference price, which could be irrelevant in general (market without liquidity) or special conditions (economic crisis).

Short term power trading through products

Strengths and opportunities:

- (a) avoiding the volume risk;
- (b) transparent payments, adjustable trading.

Weaknesses and threats:

Presence of the low liquidity and high volatility risk.