

REVIEW OF THE WHITE PAPER -

ENERGY DEVELOPMENT STRATEGY OF MONTENEGRO BY 2025

INTRODUCTION

1. These notes summarise the findings of a review which has compared the content of the White Paper on the Energy Development Strategy of Montenegro by 2025 (November 2007) with the Draft Final version of the same document (the Green Paper, June 2007). Both reports have been produced for the Government of Montenegro by the Institute for Research in Energy, Ecology and Technology (IREET).
2. Text which is not highlighted is either a direct quote from published sources (shown in italics) or is an objective summary of the contents of the White Paper.
3. Comments on the content of the Energy White Paper Text are highlighted in grey.

SUMMARY OF FINDINGS

Introduction (Page 4)

2. The Energy White Paper states:

The Strategy, as one of the highest legal acts, also has the key development dimension within Montenegro, as in defining its spatial development, providing conditions for a sustainable development of the ecological state, in gaining the broadest consensus for its adoption and implementation, so as in energy and economy domains as important components of GDP growth

Comment 1: The status of the White Paper, as described, does not accord with the Government's own view that the role of defining Montenegro's spatial development falls to the National Spatial Plan as the 'second most significant state document after the Constitution'. (See official press release quotation below)

In consideration of its basic strategic goals, at today's Cabinet meeting chaired by Prime Minister Zeljko Sturanovic, the Government of Montenegro adopted the Bill on the Physical Plan of Montenegro by 2020. In view of the fact that this was the second most significant state document after the Constitution and the complex drafting process, the Government provided full support to the final version of the Bill achieving the best balance between objective needs for accelerated economic development and the protection of environment and cultural heritage. The adoption of the Physical Plan will enable a rational exploitation of Montenegro's natural resources, in line with the principles of balanced sustainable development...

Comment 2: The statement that the Energy Strategy is providing conditions for sustainable development of the ecological state is only partially accurate. It is also supporting proposals for large scale hydro development that potentially conflict with the Country's status as an ecological state and may perform poorly in terms of social welfare and economic cost.

Main Strategic Commitments (page 6)

3. Three new commitments are introduced. These are:
- (6) *Safe, secure, reliable and quality supply of customers with energy at realistic prices,*
 - (15) *Develop the system of natural gas (including construction of regional gas lines, terminals for reception of liquefied natural gas and plants for use of natural gas.*
 - (26) *Provide social protection in the process of energy sector changes that could affect social position of specific segments of society.*

Comment 3: Inclusion of commitments 6 and 26 simply confirm elements of the strategy that were included in the Final Draft Green Paper. However, the inclusion of a new commitment (15) on development of Natural Gas represents a major change of emphasis which is not indicated in the previous analysis in the Green Paper. It reflects recent decisions by the Government which have been taken since IREET produced the Green Paper. However, given the nature of the agreement that has been signed by Montenegro on international cooperation it is clear that the issues have been under discussion for some time and it is surprising that the Green Paper was so poorly informed .

4. The following strategic commitments which appeared in the Green Paper have been extended.
- (9) *... 'Additionally, there is a possibility to construct TP Berane if the investment is proven to be economically profitable'.*
 - (20) *Reach agreement with neighbouring countriesand plan new electrical energy interconnection lines for connection with these countries.*

Comment 4: Reference to construction of a thermal power plant at Berane –if investment is proven to be economic is surprising given that this condition should apply to all proposed energy generating facilities in the strategy. (Press statements on the tendering process for sale of the insolvent Berane company indicate that prospective purchasers were proposing to build a 100-500 MW TPP). The successful tenderer has proposed to build a 100MW plant.

Comment 5: The planned interconnection with neighbouring countries is in accord with the Energy Community treaty, but may have social, economic and environmental implications that should be assessed through strategic environmental assessment (SEA) in accordance with the ESPOO convention on transboundary impacts.

(4) Strategy Development Background (Page 8)

4.1 Institutional Environment

5. No changes have been made to this section

4.2 Regulatory Environment

6. Additional text has been added on the establishment of the Energy Regulatory Agency.

4.3 Domestic Legislation and Regulation

7. The bulk of this section has not been altered. However an important rider is added at the end which states:

'Since the Spatial Plan of the Republic of Montenegro by 2025 and the Energy Development Strategy of Montenegro by 2025 are being enacted almost simultaneously, these documents have to be harmonised'.

Comment 6: The principle of harmonisation is a fundamental requirement of Montenegrin Law. It is most surprising that the two documents have not been harmonised already in the course of production, especially since the Energy Development Strategy is required by law to respond to the strategic framework created by the Spatial Plan.

Comment 7: It is not clear how the necessary changes to the Energy Development Strategy will now be made in order to ensure that it conforms with the Spatial Plan (see also comments 1 and 2).

4.4 Relevant International Regulations

8. A new paragraph introduces this section as follows:

'Harmonization of regulations related to development of energy sector of Montenegro has been realised to a large extent during the process of defining of this strategy, therefore it can be confirmed that the Strategy is based on the EU regulations and continuity of harmonisation of Montenegro's regulations with the EU'.

Comment 8: The above statement needs to be read in the context of Comments 5, 6 and 7. A separate analysis of the treatment of key energy issues in the National Spatial Plan (Draft published December 2007) shows that there are a large number of government policies on energy conservation, site selection and environmental protection relating to hydro power production that have not been addressed in preparing the Energy White Paper. The relevant section of the Spatial Plan review is reproduced as Annex I to this document.

Comment 9: There is no evidence in the strategy that the requirements of the Water Framework Directive have been considered.

9. New references are made to a Decree on deadlines for qualified customers, commitments to implementing renewable energy sources and biofuels, and

attaining supply security in accordance with the June 2007 Council of Ministers of the Energy Community. Reference is also made to the Natural Gas Directive and regulations.

Comment 10: These changes are in the main procedural, except for the reference to Natural Gas (see Comment 3).

European Dimension of Montenegrin Energy Sector

10. No changes have been made to this section.

5 Energy Sector of Montenegro in the period 1990-2006 (Page 12)

5.1 Energy Sector Characteristics

11. This additional paragraph quotes the Bureau of Statistics of Montenegro in saying that data on the energy sector in Montenegro is limited. The share of electrical energy production amounted to 23% of the total industry production and accounted for 4.6% of GDP in 2005.

5.2 Energy Sector Position in the Economy

12. Data is added on the economic performance of Montenegro in 2006 and the first half of 2007. It is stated that the progress made is in line with earlier projections using the base year 2003. Consequently *'possible data discrepancies do not affect recommendations provided in the Strategy'*.

Comment 11: Although the changes are relatively minor, there appear to be inconsistencies between the data in the Green and White Papers which weakens confidence in the analysis.

Comment 12: There is no discussion in the White Paper of the potential significance of upward adjustments of energy recovery from existing plant (95.5 MW), increased contributions from small hydro (up from 30 to 80 MW, or additions to the <new wind/solar/biomass/energy from waste> renewable sources (up from 30 to 75MW). In total, these additional energy sources amount to 190.5MW, and this excludes the strong probability of a 100MW thermal plant at Berane. The total of 290.5 MW of new capacity relates only to the additional sources which are acknowledged as either firm elements (190.5MW) or probable (100 MW TPP Berane) within the Strategy. These additions to the strategy exceed the power capacity of the 4 Moraca HPPs (rated at 208.4MW) by 80MW.

Comment 13: Based on the evidence presented in the Strategy, total energy consumption relating to medium growth in GDP (on which the energy development strategy is based) could be met using Montenegro resources and without developing the water resources of the Moraca River system which has environmental implications of international importance or jeopardising any of the other principles and assumptions stated in the Strategy. This position would be achieved even without considering the option of a 1200 MW liquefied natural gas combined cycle power plant near Bar – or other conventional gas-fired thermal plant options that are dismissed in the Strategy (because when the Green Paper was drafted it was assumed that there would be no connections to international energy pipelines before 2020).

5.3 Primary Energy Production

13. Figures have been recast in this section, and the text has been edited. A reference to the variability of hydro-electric energy generation between 35-65% has been deleted. Whereas the Final Draft uses figures based on average performance between 1997-2004, the White Paper uses 2006 to indicate domestic primary energy production of 54% of total primary energy consumption ('energy independence') compared with 69% when the previous 8 year average was used. Total production of primary energy is now quoted (employing Eurostat methodology) as 24.59 PJ compared with 43.34 PJ for total production in 2003 as shown in the Green Paper.

Comment 14: Exclusion of the figures relating to variability in supply from hydro-electric sources gives a misleading view of the reliability of energy from this source. This position is reinforced by the latest report of the International Panel on Climate Change which refers specifically to risks to hydro power generation in Southern Europe.

5.4 Energy Imports and Exports

14. Figures have been recast to show lower rates of increase in the demand for oil imports and higher rates for electricity imports in the period 2005 to 2006.

Comment 15: The way in which the figures have been recast makes it impossible to compare performance since 1997. The statement that exports of 0.73 PJ in 2006 are insignificant (0.47PJ of coal and 0.26 PJ of electricity), should be compared with the same information given in the Green Paper where exports of 5.48 PJ in 2004 were made up of 0.61 PJ (lignite and brown coal) and 4.87 PJ electricity.

5.5 Primary and Final Energy Consumption

15. References in the Green paper to final energy consumption have been changed.

The Green Paper stated:

*'Total **primary energy consumption** in 2004 amounted to 62.72 PJ (100%)'*

The White Paper now states in the same section:

*'Total **primary energy consumption** in 2006 amounted to 46.11 PJ(100%)'*

Comment 16: The changes are assumed to bring the Energy Strategy into line with Eurostat (although this is not stated explicitly). A significant consequence is that references made previously to electricity transfers between Montenegro and Serbia which appeared under exports and imports are no longer included in these early discussion on sources of energy.

5.6 Total energy balance

16. The White Paper states:

'The contributors in total energy balances of Montenegro are hydro-energy, oil derivatives, coal, wood and wood wastes, and the imported electricity. A solid diversity of supply has been achieved since the three main forms of energy account for in equal shares.'

Comment 17: This is potentially misleading statement for two reasons. First it includes wood and wood waste (which accounts for only 5.3% in terms of total consumption of primary energy). Second, 'solid diversity of supply' implies reliability which is not the case since the proportion of energy drawn from lignite and coal and hydro-electric power fluctuates greatly from year to year due to climatic variations, and these two sources provide the bulk of all electrical energy. Oil derivatives are used largely for transport and heating.

17. Figure I has been redrawn to illustrate the Total Primary Energy Consumption and include 2005 /2006 figures, but is still entitled Total Energy Balance of RoM. Based on the information shown in Figure I the average annual rates of growth in consumption are quoted as: overall, 3.7%; coal, 3.0%; and hydro 5.4%. These averages mask annual fluctuations which are clearly exposed in the figure itself.

Comment 18: Information on annual growth rates might be correct if described as 'moving', 'best fit' or 'logarithmic' averages but reference to Figure I shows that the contribution made by hydro power in 2002 compared with 2001 and 2005 compared with 2004 are, in fact, reversals of the trend reflecting differences in performance which are probably due to fluctuations in rainfall and available water.

5.7 Analysis of the Electricity Balance

18. This is a new section which shows what is described as the relatively fast increase of electricity consumption in Montenegro between 2003 and 2007 of 2.07% per annum.
19. Table I: Electrical Energy Balance of RoM in 2005 and 2006 is new information.

5.8 Energy Efficiency and Electricity Losses

20. This section remains unchanged but a short additional paragraph is added which states:

“Data on electricity losses in transmission and distribution in 2007 are encouraging and have been decreased below 20% due to activities and measures undertaken by EPCG”.

Comment 19: The position on energy losses through transmission and distribution reported in the Green Paper was described as ‘around 850 GWh’, which represents 14.9% of gross EE consumption of transmission network, which is an extremely high level of EE losses’. These figures are repeated in the White Paper. It is therefore difficult to interpret what the 20% decrease relates to.

5.9 Production, Transmission and Distribution of Electricity

21. Government ownership in Elektroprivreda Crne Gore (EPCG) is cited in the White Paper as 70.6%. This appears as an increase on the level of ‘around 68%’ quoted in the Green Paper.

5.10 Liquid Fuel Supply

22. This section remains unchanged

5.11 Heat Production

23. This section remains unchanged

5.12 Major Consumers of Electricity

24. This is a new section which emphasises the importance of Aluminium and bauxite mining to the national economy (over 21% of GDP) compared with the tourism sector at 14% of GDP. 47.3% of the total gross production of electricity (including losses) is consumed by industries with direct connection to the 110 volt distribution network the proportions are:
 - KAP aluminium 42.5%
 - Zeljezara Niksic / Steel plant Niksic 4.2%, and
 - Zeljeznice CG/Railroads 0.5%

Comment 20: There is no discussion in the White Paper (or in the National Spatial Plan) on the impact of possible changes in the level of demand for electricity from heavy industry over the next 18 years. Conflicting statements exist: the forecast of final energy consumption (7.4.3 White Paper) states that *'significant change in the shares of industrial sectors in total GDP of industry are foreseen. It is assumed that ferrous and non-ferrous metal production will decrease significantly'*. This is at variance with a comment made during a presentation to the National Council for Sustainable Development (Dec 2007) that KAP is increasing its annual production from 100,000 to 125,000 tonnes.

At present, KAP dominates the electricity energy requirements of Montenegro and what is seen as the national need to protect security of supply (see 10.8 below). It is also significant that attention is drawn in section 10.7 to the aim of: *'By not later than end 2011, eliminating any state interference in the determination of price for large consumers, because since that time onward these consumers will be totally left to the market'*.

5.13 Environmental Aspects

25. This section has not been altered.

The fourth paragraph notes:

'Montenegrin territory already feels the effects of global warming, reflected in increased drought period and drying of water streams of smaller and larger rivers, which has serious consequences for biotic of river and stream flows. There is a need for specially constructed accumulations that would adequately prevent unwanted effects of global warming. Positive effects of construction of accumulation hydroelectric power plants should be considered in this respect'.

Comment 21: It is questionable whether the long term solutions to the global problems of climate change should rely on reservoir construction as a means of responding to ecological change in watercourses. This would not appear to be in line with the objectives of the European Union Water Framework Directive.

5.14 Social Aspects and Prices of Energy Products

26. A new paragraph has been added which notes that industry is effectively cross-subsidising domestic users through paying higher tariffs. It is stated: *'Prices of electricity are determined on the cost based principle; however, highest prices are paid by small-scale industry and KAP, as a direct consumer, as opposed to households, which are paying significantly lower electricity prices'*.

Comment 22: The White Paper does not cross reference the fact that the electrical energy sector of Montenegro has always been heavily skewed towards providing for industrial needs (47% of total electricity consumption). With the privatisation of major industries these companies should be making their own provision to secure power in the open market. This would allow

the energy strategy to give more consideration to the opportunities of supplying the domestic sector with energy from decentralised small scale renewable sources.

27. Two additional paragraphs are added. The first deals with the scope for reducing unemployment during the period of construction for new energy structures. The second proposes that funds generated from a decrease in energy deficit should be placed into appropriate social programmes for retraining.

Comment 23: The White Paper focuses exclusively on employment opportunities generated in the electric power sector (and by implication hydro power generation) without recognising the very important contributions that will result from development of the gas market and could follow the introduction of <new> renewables. The Strategic Assessment of the Montenegro Draft Energy Development Strategy (LUC/UNDP 2006) sets out an analysis of the relative benefits.

6. Key assumptions for the Strategy

28. 15 assumptions are listed in the White Paper compared with 14 in the Green Paper. Twelve of the original assumptions have not been changed. One has been revised, one is new and one assumption has been substituted. The alterations are as follows:

Revision: Energy development is now referred to as '*a realistic and potential driving agent for ecological-sustainable overall development of the state of Montenegro*'. Whereas it was previously referred to as '*the driving agent*'.

Addition: A new assumption states:

'Efficient use of energy is of the key importance and should be given priority in implementation of the strategy.'

Substitution: The final assumption states:

'Participation of the general public in decision making related to energy development.'

This replaces:

Significant participation of the non-governmental sector in adoption of strategic decisions related to the energy development

Comment 24: The inclusion of a new assumption on Efficient Use of Energy is to be welcomed, as is the recognition that energy is not the only driving agent of development.

Comment 25: The deletion of a specific role for the non-governmental sector is a serious withdrawal of commitments previously made by the Government to its NGOs who are partners in the National Council of Sustainable Development and have complained that their voice has not been listened to in the public consultation phase and subsequent debate of the NCSD.

7. Development of Energy of Montenegro (Page 21)

Existing scenarios, plans and strategies of the overall development of Montenegro

29. This section is new. It highlights Montenegro's commitments within its own national and international law to sustainable development and underlines the value of the state's environmental advantages and 'accession to Euro-Atlantic integration process(es)'.
It is stated:

It is stated:

'In all plans and development strategies Montenegro is regarded as a modern and regulated democratic state, fully integrated in Europe, ensuring its progress within sustainable development framework'.

30. The section concludes:

The 'supply of sufficient energy on the one hand represents a precondition of economic development and satisfactory living standard, while on the other hand it require(s) to minimise impacts of production and consumption of energy on the environment'.

Comment 26: Taken at face value these statements are welcome additions to the Energy Development Strategy. Unfortunately much of the detail, particularly on the development of large hydro-power schemes, indicates that these principles are not being followed by the strategy itself. Specifically there is no reference to the European water framework directive 2000/60/EC, or to the SEA Directive.

7.1.2. Water Industry aspects

31. This is a new section which stresses the importance of Montenegro's water resources.

The White Paper notes:

'However, the impression is gained that the positive effect noticeable in construction and exploitation of hydro energy structures and accumulations has not been sufficiently considered, yet it is prominent and reflected in improvement of micro-climate conditions, through stimulation of development of specific types, avoiding or mitigating natural environmental disasters, enabling development of specific economic activities and contributes to quality of living of population affected by prospective changes'.

Comment 27: The emphasis on the importance of Montenegro's water resources is positive.

Comment 28: The quoted paragraph does not indicate who has failed to consider the positive effects of hydro energy structures, but at the same time it presents a very one-sided set of observations on the merits of hydro-electric schemes. These issues are exhaustively covered in scientific literature, including the seminal findings of the World Commission on Dams. Most professional commentators recognise that hydro-energy schemes are capable of bring major benefits, but they also acknowledge the many disbenefits which have arisen in the past, particularly from large hydro installations. Some of these disbenefits are clearly stated in the National Spatial Plan for Montenegro adopted by Government on 27 December 2007 from which the following quotations are taken:

- Energy – Protection of natural environment - Construction of new hydropower plants also brings serious negative consequences on the environment, thus decisions on their realization should be made with detailed and comprehensive environmental impact assessment. Part A p92/219
- The construction of adequate accumulations, which can level annual unevenness of water flows, is the joint interest both of electrical and water supply companies within the framework of the integral water supply system of the Republic of Montenegro. But, the accumulations create both positive and negative environmental effects. Before any construction may start, detailed studies of geomorphologic and hydro-technical adequacy of the foreseen location should be submitted to relevant authorities, for the purposes of assessment of environmental impacts on the location, but also on the wider area for the assessment of seismic risks and potential impacts and the assessment of social impacts. Principle 02.6.2-4 p.152/219

7.2 Reserves in the Existing Energy System – Revitalisation and Reconstruction of Existing Facilities

32. This section brings together many of the recommendations made through the period of public consultation in terms of upgrading existing facilities before developing new resources. The text and table 2 are new, and confirm that 95.5 MW of electrical power can be added to the existing baseload for an investment cost of €166 million.

7.3 Strategy for the Efficient Use of Energy

33. The main content of this section is unchanged but several new paragraphs have been added.
34. The role of the existing Strategy for Energy Efficiency and related Action Plans for 2006 and 2007 is emphasised as a precursor to the Energy development Strategy.
35. Areas where energy efficiencies will be targeted first include EPCG as a supplier and KAP and Niksic steel plant, the buildings sector, transportation and other industries.

7.4 Final Energy Consumption until 2025

7.4.1 Scenarios of Gross Domestic Product (GDP) development

36. The figures on which the MEDEE energy model operate, in terms of estimates of growth in GDP have been changed as follows

| Scenario | Green Paper | White Paper |
|---------------|-------------|-------------|
| Low Growth | 4.6% | 4.3% |
| Medium Growth | 6.0% | 6.3% |
| High Growth | 8.0% | 7.7% |

37. The reason for the changes is not clear since most of the detailed breakdown of GDP structure by economic sector between 2003 and 2025 remains unchanged in the two documents (7.1.2b GP) and (7.4.2b WP), although the figures for projected final outturns in GDP have changed. The differences between the Green Paper and White Paper are presented below.

| Scenario | Green Paper | White Paper |
|---------------|-------------|-------------|
| Low Growth | 5700 € | 5539 € |
| Medium Growth | 8400 € | 8377€ |
| High Growth | 11,000€ | 11,216€ |

Comment 29: No explanation is given for the change of figures on which the energy development strategy was originally modelled. However, application of the various average growth rates to the base figure of 2260 Euros per capita in 2003, suggests that there may be inconsistencies in the energy model. This cannot be verified without access to the model.

38. Sections on Households consumption and measures of energy efficiency and the introduction of renewable energy sources are unchanged.
39. A new table has been introduced which explains some of the assumptions that have been included within MEDEE/MAED Table 3: Basic Scenario Elements for Forecasting Final Energy Consumption

Comment 30: The table is helpful in indicating some of the assumptions that have been built into the forecast of final energy consumption although there is no explanation of the reasons why specific levels of fuel substitution have been adopted for each scenario. The section on Technologies provides a definition of the improvements in efficiency that are envisaged but no figures are provided so this critical part of the model remains a 'black box'.

7.4 Consumer structure and forecast of final energy consumption by scenarios

40. This section has not been altered and continues to show growth of final energy consumption from 27.63 PJ in 2000 to 57.40 PJ (High), 51.62 PJ (Medium) and 44.82 PJ (Low) scenarios by 2025.
41. A final paragraph states that current growth rates are approaching the Medium Scenario forecast of 6.3%.

7.5 Development of Use of Hydro Potential

42. This section contains a new introduction of four paragraphs
43. The first paragraph highlights Montenegro's potential in terms of hydro-energy. Out of 9,846 GWh, only 1800 GWh is currently exploited (over 17%). The national and international status of the River Tara in terms of natural heritage is clearly stated.
44. The second paragraph states that the technically useable potential of the country's water resources ranges from 3.7 to 4.6 TWh assuming no water is drawn from the River Tara. If, however, water was transferred at the rate of 22.2 cubic metres a second from the upper reaches of the River Tara to the River Moraca, the technically useable potential would rise from 4.6 to 5.3 TWh.
45. The third paragraph refers to opportunities for additional small scale Hydro electric production, and the fourth paragraph states that even with substantial hydro power development, the water resources of Montenegro are of the highest strategic advantage to the country.

Comment 31: There is no explanation in the White Paper for the radical downwards revision of technically useable potential to 3.7 to 4.6 TWh from the figures of .4 to 6.3 TWh contained in the equivalent section of the Green Paper. The figures for useable potential from the Tara and Moraca systems have also been amended from 6.3 to 6.9 TWh in the Green Paper to 3.7 to 4.6 TWh as quoted above.

Comment 32: The statement in the White Paper (7.5.2) that "the Strategy recommends HPP on River Moraca and HPP on river Komarnica, as energy and economically most attractive and most researched" is not supported by any evidence in the White Paper that the necessary economic, social or environmental analysis has been undertaken.

Comment 33: The statement (quoted in comment 30 above) appears to contradict analysis in the Green Paper and earlier studies which show that unless water is transferred from the Upper Tara catchment the full potential of the Moraca hydro power plants will not be realised.

Comment 34: Any proposals for development of hydro-power plants on the Moraca River should be accompanied by clear evidence of the system's economic performance when relying solely on water storage from within the Moraca catchment, since transfer from the Tara Basin would be contrary to the Declaration of UNESCO and of the Parliament of the RoM on river Tara protection (as noted in 5.7.2 of the White Paper.

7.5.1 Theoretical Potential

46. Paragraphs have been added on the potential yield of hydro energy together with Table 4 which gives a breakdown of the potential for each of the main watercourses.
47. An additional paragraph describes the measure that will need to be taken in reaching agreement with interested neighbouring countries on more specific use of hydro potential in watersheds of these rivers.

7.5.2 Use of Hydro potential

48. There is no change in the description of the planned development of hydro power in the Moraca and Komarnica river catchments.
49. Two additional hydro schemes are identified for further consideration in the Action Plan. These are HPP Boka and HPP Krusevo.
50. The section concludes with a new statement on the review of the Strategy at least every five years (until 2012), including the possibilities and need for construction of additional hydro energy facilities on the territory of Montenegro.

7.5 Development of Use of Coal Resources

51. Additional data is provided on the coal resources of the Pljevlja sub-region and Berane area and further information is given on the ownership of TPP Pjevlja and the coal resources at Berane. The potential for development of a 100MW thermal power plant to use Berane coal is included (if the investment is proven to be economically profitable in market conditions).

Comment 35: It is good to see a reference to the planned development of a thermal power plant at Berane, but the qualification on economic viability is surprising since this applies with equal if not greater force to the uncertain conditions of the Pljevlja TPP and the high capital cost of investment in large hydro plants.

7.7 Development of Local Energy, Cogeneration and Heat Energy Supply

52. The text on introduction of co-generation , heat energy and local energy systems has been expanded slightly but the substantial points made in the Green Paper remain unchanged.

7.8 Supply of Liquid Fuels

7.8.1 Oil and Gas potential in the Republic of Montenegro

53. There is no change in the substance of the information given about oil and gas exploration prospects.

7.8.2 Supply of petroleum, petroleum derivatives and mandatory 90-day reserves.

54. There are no significant changes to this section.

7.9.1 Supply of liquefied petroleum gas

55. There are no significant changes to this section.

7.9.2 Supply of natural liquid gas NLG

56. This section of text has been substantially revised in referring to the interest of foreign investors in possible construction of a terminal for NLG in the vicinity of the port of Bar, with the potential to add a combined cycle thermal power station with 1200 MW output. This project would be synchronised with construction of a direct current 400kV submarine power cable between Montenegro and Italy. Such a development would have major ramifications not just for the development of the energy sector, but for the overall economic development of the country and region.

7.9.3. Natural gas supply

57. This section of the strategy has been radically amended. Whereas the Green Paper published in June 2007, referred to the prospect of Montenegro *realistically expecting delivery of natural gas from international pipelines only after 2020* the White Paper notes that Croatia, Albania and Montenegro signed an agreement in September 2007 to launch an initiative to build a 400 km section of the Ionian-Adriatic pipeline. It is estimated that construction of the Ionian-Adriatic pipeline will be completed in between 2011 and 2012. There is a strong probability that Bosnia and Herzegovina will also join the project.

Comment 36: Sources other than the Green Paper on Energy Development indicated that a number of the initiatives discussed in 7.9.2 and 7.9.3 were being considered as part of the regional energy initiatives during 2007. It is most surprising that no reference was made to either the potential for a liquefied natural gas terminal on the coast or the delivery of natural gas to Montenegro by 2012 in the earlier analysis of the energy balance.

The inclusion of this information in the White Paper, combined with similar observations about the potential for a 100MW TPP at Berane, must raise doubt about the credibility of the modelling which has so far been undertaken, taking investment cost, investment opportunities and social and environmental costs and benefits into account.

7.9 Strategy of Introduction of Renewable Energy Sources

58. A new introductory paragraph emphasises that Montenegro already produces around 59% of primary energy from renewable resources. This represents a reinterpretation of the status of large hydro which provides most of this resource from the statement contained in the Green Paper. The *‘overall strategy envisages use of renewable energy sources at the level of minimum of 20% of total primary energy consumption until 2020-2025’*.

59. In the light of consultations on the Green Paper, targets for development of non-hydro renewable resources have been raised as follows:

| Type of renewable resource | Green Paper | White Paper |
|----------------------------|---------------------|---------------------|
| Small Hydro (under 10 MW) | 30 MW | 80 MW |
| Wind farms | 20 MW | 60 MW |
| Solar Energy | No specific targets | No specific targets |
| Biomass | No proposals | 5 MW |
| Energy from Waste | 10 MW | 10 MW |
| Biogas | No proposals | No proposals |
| Bio-fuels | consumption 0.68 PJ | |

60. In 2008 programmes will be announced to encourage exploitation of (new) renewables.

7.11 Researches in Energy Sector

61. There are no significant changes to this section.

7.12 Development of the Power Generation System

7.12.1 Electricity consumption prognosis

62. This section has been substantially rewritten and includes new sections entitled Sensitivity Analysis (SA1 and SA2). The analysis sets out assumptions about growth in demand over the time period of the strategy which were requested in the strategic assessment commissioned by UNDP. The new data makes clear that allowance for a reduction in growth rates for consumption has been factored into the early years of the strategy to reflect the opportunities for substantially reducing losses in transmission and distribution combined with greater efficiencies amongst end users. The

sensitivity test explores a scenario through which delays in implementing energy efficiency measures and substitution of other energy sources for electricity could increase consumption in the early years.

Comment 37: The focus of the two sensitivity analysis tests is on the likely consequences of either a two year delay in commissioning the proposed Pljevlja TPP and Moraca HPPs, or accelerating the construction of the Moraca HPPs by two years. The analysis seeks to justify (conclusions c-f) adherence to strict timetables for delivery of the favoured construction programme.

Both sensitivity tests are partial in their coverage and completely ignore the more flexible elements for power production that have now been included in the White Paper. These include the additional 95.5 MW power increase from existing plants (see Table 2 White Paper), the significant programme of small Hydro Power Plant development already initiated by the Government or opportunities to build wind turbines, energy from waste and biomass plant within 5-8 years based on well tested international experience.

It is significant that wind energy plants are costed at €1million per MW capacity, and small hydro at €1.5m/MW. These plants require lower levels of investment than large hydro (an average of €1.8 m /MW for the four Moraca HPPs) (see Table 1 White Paper).

7.13 Development of Power Transmission System

63. There are some changes in details relating to the upgrading or development of electricity transmission lines but the proposals remain essentially the same. Provision of a 400 kV link to Tirane and links between Hydro Power Plants in neighbouring countries confirm the options for cross border energy transfer. The long term option of a 400 kV submarine cable to transmit direct current between Montenegro and Italy is described as feasible.

7.14 Development of Power Distribution System

64. A fuller description is provided of measures to reduce energy losses in transmission and distribution of electricity (which fell from 25-30% to approximately 20% in 2007. Conversion to European voltage standards will require further studies.

7.15 Total Energy Balance until 2025

65. The basis for arriving at the projected energy balance in 2025 has not altered. In terms of primary energy consumption a significant increase in lignite and hydro energy is planned. Biomass contribution will increase (but with a net overall reduction in proportional share of the total energy balance) while (new) renewables will expand. Diesel and gasoline will remain the most important component of oil derivatives.
66. Significant imports of electrical energy will be required until new energy generation facilities are introduced in 2011-2013. The contract for reciprocal

transfers of electricity between Montenegro and Serbia based on supplies from HPP Piva will remain in place until 2025.

67. The text of this significant part of the energy development strategy has been substantially rewritten to emphasise the importance of renewable energy sources. It includes discussion on the development of the natural gas distribution system and prospect for a liquefied natural gas terminal and thermal power station. All references to the lower growth strategy have been deleted.
68. A new table (11) has been added which provides a helpful display of indicators against which the progress of the strategy can be measured.

Comment 38: In the White Paper, the overall balance of the Energy Strategy has shifted from the stated aim of self-sufficiency in Montenegro, to becoming a net exporter of energy between 2013 and 2025 (maximum 670 GWh). This situation arises because available power sources are increased through upgrading existing plant and expanding the non-hydro renewable programme. (without factoring in other possibilities relating to natural / imported gas).

Comment 39: The figures demonstrate that the requirement to build the Moraca system of Hydro Power plans is driven principally by assessments of short term need and potential threats to security of supply as discussed in the Sensitivity Analyses rather than overall demand because the output from Moraca (235 MW/ 693.7GWh) effectively balances the anticipated export of 670 GWh. It should also be noted that the probable construction of a 100MW TPP at Berane¹, and the possible development of combined cycle gas plant on the coast would increase energy supply and export potential still further.

7.16 Assessment of Macroeconomic effects of electrical energy generation in Montenegro

69. This is a new section in the Energy development strategy. It states that based on analysis of macroeconomic effects of electrical energy generation in Montenegro (by the Institute for Strategic Studies and Projections) investment in Montenegro's own generation capacities is a superior alternative to the import of electrical energy.

8. Environmental Protection

70. Some of the claims for environmental protection being enhanced through the energy development programme (that were made in the Green Paper) are presented less strongly. A new paragraph is added which states that *the strategy is not a permit for immediate construction and in that aspect the importance of detailed assessment of impact on environment is particularly important in the process of project approvals*. It is claimed that analysis of

¹ Whether a TPP is built at Berane or not – the output of coal from this area needs to be taken into account in the Energy Strategy because it will be used as an energy source either within the Country or as exported energy.

development scenarios considered the possible effects of global warming (climate change) which was estimated as one of critical aspects in this process. Having this in mind development of a separate strategy within the Action Plan is recommended.

Comment 41: This section of the White Paper ignores the National Spatial Plan and National Strategy for Sustainable Development. Specific requirements in the National Spatial Plan relating to the the energy sector are not referred to (See Annex I to this commentary).

Comment 40: A requirement for all major power plants to be subjected to full Environmental Impact Assessment should be stressed in the context of the Energy Strategy. This applies to both Thermal and Hydro Power Plants. Under Montenegrin Law, thresholds for EIAs of energy development are set above those of most countries in the European Union.

8.1 Analysis of energy development scenarios from the environmental protection aspect

71. A new section has been added on the nature of environmental studies and mitigation required in connection with new hydro power developments and accumulations.
72. A series of graphs (figures 5-8) have been added to show the effects of environmental improvements stemming from the energy development strategy.

9. Investment Promotion, Costs and Financing of the Energy Strategy

9.1 What differentiates the energy sector of Montenegro from the neighbourhood?

73. There are no changes to this section

9.2 Investments in the Energy Sector of Montenegro and Comparative Analysis

74. There are no changes to this section

9.3 Investment Promotion and Capital Market

75. A new paragraph has been added which states:

In consideration of recommendations and potential investment projects given in this Strategy, it is necessary to bear in mind that the time factor is of key importance, since in a specific way potential projects in Montenegro are in active competition with similar projects in the neighbourhood. Therefore, it will be necessary immediately after adoption of the Strategy to define action options and implement the commitments given in this Strategy.

9.4 Financial resources required for the development of the energy sector

76. Table 12 (Table 5 in Green Paper) showing the funds needed includes an additional €40 million for Pljevlja 2, and includes additional sums for small hydro and other non hydro renewables.

9.5 Role of State, Private Sector and Financing Sources of Anticipated Development of Energy Sector

77. The cost of the Energy development strategy is approximately €2 billion being the equivalent of annual GDP. It is stated that:

‘Since the State has no possibility to finance the whole range of envisaged investments, the Strategy envisages that the state undertakes the following roles: (1) energy policy, (2) regulation of the sector and (3) ownership over strategically significant energy infrastructure’. Also the state is to simplify all legal and administrative procedures for the purpose of efficient realization of envisaged projects.....The Strategy therefore assumes that the State will through its legislation and secondary regulations contribute to faster entering of capital into energy sector’.

10. Other Strategy Elements

78. This concluding chapter of the Energy Development Strategy contains a number of topics that were introduced in the Green Paper, but these have been substantially rewritten with additional information.
79. Section 10.1 dealing with privatisation of the energy sector outlines problems and potential solutions for dealing with current deficiencies in the energy entities of Montenegro.

10.2 Electrical Energy Prices and Poverty Reduction

80. This section gives further guidance on the measures that are planned for inter-ministry cooperation to protect the interests of the more vulnerable sectors of domestic purchasers of energy (electricity and heating).

10.3 Development of Energy Sector and Social Position of Citizens

81. This new section sets out what are seen as the advantages of a strong domestic energy sector, with a paragraph devoted to the benefits to local economies and social welfare of communities from construction of energy facilities. Opportunities arising from hydro power development are emphasised.

10.4 Indicators of benefits of the energy sector development for citizens of Montenegro

82. This new section notes the length of time that has passed since any hydro-power development took place in Montenegro but then cites the benefits that are expected to materialise.

10.5 Price Policy

83. This section reserves the right of Government to take a wide range of actions to respond to inadequate and untimely interest of investors in the construction of new energy sources / facilities. It states:

'The Government should provide, by special measures such as decisions to increase energy prices, to issue public tenders for new facilities and the like, conditions for energy entities to be able to perform obligations arising from their activities, particularly those related to security and regularity of supply of the consumers with required energy.'

10.6 Local and Regional Energy Market

84. This new section provides a detailed account of the areas of investigation being undertaken by the Energy Regulatory Agency for Montenegro.

It is stated that:

'the Energy Law prescribes that the largest portion of repurchase of electrical energy will be conducted on concluded bilateral agreements, while the remaining, smaller part of daily needs will be provided at spot market or at the market based on reconciliation of supply and demand'.

85. A subsequent paragraph states:

'According to the current review, Montenegro will use regional market for purchase of basic energy and for provision of balanced services'.

10.7 Accession to EU, Regional and European Development Trends

86. This section sets out the Government's objectives in relation to desired accession to the European Union and compliance with relevant legislation and directives. The final statement notes:

- *'By not later than end 2011, eliminating any state interference in the determination of price for large consumers, because since that time onward these consumers will be totally left to the market'.*

10.8 National Security and Sovereignty

87. This new section states:

'Total deficits in the energy area, particularly in the area of energy sector (sic) are becoming higher and entering into an area when they jeopardise national security of Montenegro. The increase in electrical energy deficit may represent financial burden that is not simple for Montenegro so that it is necessary too consider it from this aspect when determining development priorities'.

10.9 Technological Development and Research

88. This section discusses the importance of encouraging technological innovation.

10.10 Education and International Cooperation

89. Proposals are advanced for including energy issues within all levels of education.

10.11 Bologna Convention

90. This section reiterates the aims for education on energy efficiency.

10.12 Alternative (Nuclear) Option

91. There is no change in this section.

10.9 Public Awareness and Strategic Communication

92. Previous text on engaging the public in parts of the energy decision-making process is repeated. An additional paragraph is added recommending the preparation of a Communications Strategy *'to provide favourable conditions for the overall development of energy sector in Montenegro, as one of the crucial pillars of economic development of the state of Montenegro'*.

Review and Commentary

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13 March 2008

2.6.2 Spatial concept of energy infrastructure development

93. The potential for constructing dams and accumulations on a number of rivers is set out in **Policy O2.6.2-4** where it is stated:

‘For optional use of water potential and the construction of the necessary facilities the following locations for potential hydro-power plants have to be secured from requirements and uses which contradict or disturb the foreseen use’. (a list of Hydro-power plant sites follows).

94. The explanation notes that construction of adequate accumulations ‘create both positive and negative environmental impacts. Before any construction may start, detailed studies of geomorphic and hydro-technical adequacy of the foreseen location should be submitted to the relevant authorities, for purposes of assessment of environmental impacts on the location, but also on the wider area for the assessment of seismic risks and potential impacts and the assessment of social impacts’.

95. Other policies in the Spatial Plan are directly relevant to the potential use of rivers for hydro-electric power generation. These are:

GP-1 The spatial development structures fosters and improves the status of “Montenegro– an ecological State” by ensuring a rational use of land and space and by the valorisation of landscapes.

GO-4 Rational Use of natural resources through:

6). Encouraging the use of renewable resources, before all hydro potential as well as the use of sun, wind and biomass energy, where this is spatially acceptable.

PI.3.2.1-4 Economic Development - Protection of bio-diversity and landscape

O1.3.2.3-3 Development of grid-bound infrastructure should be directed into joint corridors, respecting the limits which come out from the demands for conservation of biological diversity, natural values and protection of natural resources, cultural heritage and relief characteristics.

O1.3.2.3_9 Improving roads, such as “panoramic roads” which should be treated as the means for tourism development (Explanation: Special landscapes are one of the unique attractions of Montenegro)

O.13.2.3-18 All planned investments in energy production, as well as the selection of locations, should be seen as integrated projects and assessed from the aspect of regional and state economic effects, social impact, environmental impact and seismic risk.

- PI.3.3.2-4 Protection and improvement of authentic cultural landscape and ambient, provides integrated protection of spatial entities and of separate complexes and facilities having characteristics of cultural heritage.*
- PI.3.3.3-1 One of the preconditions for the realisation of sustainable development is efficient protection of natural heritage.*
- PI.3.3.3-2 The concept of natural heritage protection is based on applying a model of sustainable development that needs to be specific in certain areas of Montenegro, harmonised with local conditions and based on physical capacities.*
- PI.3.3.3-3 The development has to be compatible with ecological values and their improvement and implementation anticipated in spatial plans have to be worked on.*
- PI.3.3.3-4 In respect of the further integration into the European Union, the water resources should be managed in a way to correspond with legislation and the adopted Conventions and Directives.*

Comment 18:

The impact of any energy development proposal promoted under policy O2.6.2-4 should be tested against these policies (and other regionally-based policies in the Spatial Plan) but four in particular are especially relevant and create a set of preconditions for the eventual decision.

- GP-1 The spatial development structures fosters and improves the status of Montenegro – an ecological State”by ensuring a rational use of land and space and by the valorisation of landscapes.*
- GO-4 Rational Use of natural resources through:

6). Encouraging the use of renewable resources, before all hydro potential as well as the use of sun, wind and biomass energy, where this is spatially acceptable.*
- O.13.2.3-18 All planned investments in energy production, as well as the selection of locations, should be seen as integrated projects and assessed from the aspect of regional and state economic effects, social impact, environmental impact and seismic risk.*
- PI.3.3.3-4 In respect of the further integration into the European Union, the water resources should be managed in a way to correspond with legislation and the adopted Conventions and Directives.*

The reality of the present situation on energy is that the White Paper on the

Energy Development Strategy for Montenegro was adopted by Government two weeks before adoption of the Spatial Planning Bill.

The Energy Development Strategy (which acknowledges the need for its own further harmonisation with the National Spatial Plan) proposes the development of most of the hydro-power options set out in policy O2.6.2-4, with the next ten years. This will be accomplished without meeting any of the pre-conditions of the above policies, although it proposes that each dam site and accumulation should be subjected to Environmental Impact Assessment (EIA), rather than SEA which is appropriate for integrated and cumulative projects like those on the River Moraca (Policy O.13.2.3-18).

February 5th 2008