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**Report of the technical assessment of the forest management
reference level submission of Croatia submitted in 2011**

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I. Introduction and summary

A. Overview

1. This report covers the technical assessment (TA) of the submission of Croatia on its forest management reference level (FMRL), submitted on 15 April 2011 in accordance with decision 2/CMP.6. The TA took place (as a centralized activity) from 23 to 27 May 2011 in Bonn, Germany, and was coordinated by the UNFCCC secretariat. The TA was conducted by the following team of nominated land use, land-use change and forestry experts from the UNFCCC roster of experts: Mr. N.H. Ravindranath (India), Mr. Robert Waterworth (Australia), Mr. Walter Oyhantcabal (Uruguay), Ms. Naoko Tsukada (Japan), Mr. Lucio Santos (Colombia) and Ms. Marina Vitullo (Italy). Mr. N.H. Ravindranath and Mr. Robert Waterworth were the lead reviewers. The TA was coordinated by Ms. María José Sanz-Sánchez (UNFCCC secretariat).

2. In accordance with the “Guidelines for review of submissions of information on forest management reference levels” (decision 2/CMP.6, appendix II, part II), a draft version of this report was communicated to the Government of Croatia, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Proposed reference level

3. Croatia’s proposed FMRL is a net removal of 6.289 million tonnes of carbon dioxide equivalent (Mt CO₂ eq) per year, which is the average of the projected removals for the period 2013–2020. This differs from the FMRL originally proposed by Croatia, which was based on the estimated emissions for 2020 only (–5.149 Mt CO₂ eq). During the review, the expert review team (ERT) recommended Croatia to use an average of 2013–2020 net removals instead of the value for 2020 only. Croatia agreed to accept the ERT recommendation in this regard, which resulted in the revised FMRL value of –6.289 Mt CO₂ eq per year.

II. General description of the reference level

A. Overview

4. Croatia’s FMRL is a projected reference level based on a ‘business as usual’ scenario. The ‘business as usual’ scenario is based on policies that were in place at the end of 2009. The reference level is an average of the emissions over the period 2013–2020.

B. How each element of footnote 1 to paragraph 4 of decision 2/CMP.6 was taken into account in the construction of the reference level

1. Historical data from greenhouse gas inventory submissions

5. Croatia has estimated the historical emission/removal values for the period 1990 to 2009. The area under forest management is a net sink for the whole period and the sink level has increased continually from 1996 to 2009. The average removal value is estimated

to be 7.388 Mt CO₂ eq. The historical trend is consistent with reporting under the Convention for 2011.

2. Age-class structure

6. Croatia's submission states that the provided age-class structure is used when calculating the FMRL. Figure 4.1-2 of its submission shows that the areas of forest land for all age classes, as well as the growing stock, have changed between 1996 and 2006. It is apparent that the area of forest land for classes I to V has decreased, while growing stock shows an increase in the same classes. The area for classes VI and VII shows an increase, while, in the same classes, the growing stock is reported as decreasing from 1996 to 2006 (19.3 m³ to 16 m³ for class VI and 9.6 m³ to 7.8 m³ for class VII). Also, for class V, the growing stock declined from 36.9 m³ in 1996 to 20.9 m³ in 2006. In response to queries raised by the ERT during the TA regarding age-class structure, Croatia supplied further information detailing how the different growing stock rates and changes in the area under different age classes of trees have been taken into account in the FMRL construction (see annex). Croatia provided a modified version of figure 4.1-2 (see annex). The ERT is satisfied with the explanation provided by Croatia regarding the revised age-class structure used in the FMRL.

3. The need to exclude removals from accounting in accordance with decision 16/CMP.1, paragraph 1

7. This is achieved by the provisions for factoring out, which are given below (see paragraph 23).

4. Other elements

Forest management activities already undertaken

8. The ERT requested further information as to how forest management activities already undertaken by Croatia were included in the FMRL, so that it can be compared with the projected forest management activities under the 'business as usual' scenario. The ERT notes Croatia's response that the difference between the activities undertaken and the planned activities under the 'business as usual' scenario is primarily related to private forests and demands for renewable energy sources. The policy actions for the future in the 'business as usual' scenario are described in chapter II.F below. In the projected 'business as usual' scenario, the harvest is assumed to make 75 per cent of the volume increment in 2020.

Projected forest management activities under a 'business as usual' scenario

9. Croatia's projected forest management activities are described in the forest management area plan (FMAP). The forest management activities are prescribed for the period 2006–2015 and are not expected to change. The ERT noted that the submission did not include a description of proposed management practices from 2016–2020. In response, Croatia provided additional information on forest management activities under the 'business as usual' scenario for the period 2012–2020 (see annex).

Continuity with the treatment of forest management in the first commitment period

10. Croatia has elected forest management for the first commitment period. The carbon pools reported in the FMRL are the same as those currently reported in the first commitment period.

C. Pools and gases

1. Pools and gases included in the reference level

11. Only above- and below-ground biomass carbon pools are included in the FMRL. Croatia stated that the remaining carbon pools and non-CO₂ gases are not included due to lack of data. During the review, Croatia expressed its intention to include the remaining carbon pools and non-CO₂ gases in the emission/removal calculation when relevant data become available, and to make a technical correction to the FMRL to ensure consistency.

2. Consistency with inclusion of pools in the estimates

12. The pools included in the FMRL are consistent with those reported by Croatia under the Convention for 2011.

D. Approaches, methods and models used

13. The variables used to calculate the FMRL including area, growing stock, harvest, increment and natural disturbances are described in detail in Croatia's submission. The approaches and methods are consistent with its greenhouse gas inventory as reported under the Convention for 2011.

14. In its submission, Croatia states that the 'business as usual' method is used in constructing the FMRL. During the review, the ERT requested that Croatia provides more detailed information on the methods and assumptions used to calculate the emissions for the period 2013–2020, in particular how the 'business as usual' projections were derived from FMAP. Croatia noted that projections of relevant parameters were attained using a bottom-up approach using historical data at the sub-compartment and management class scale. The method takes into account the main species that were extrapolated to produce required projections. The FMRL is primarily derived from state forests, which are included in the highly comprehensive and long-term management and monitoring system, but does include privately owned forests (see annex).

15. Croatia's definition of forest land is consistent with that in its greenhouse gas inventory and is consistent with the forest land remaining forest land category, described in the 2010 national inventory report (NIR) and 2011 NIR.

E. Description of the construction of the reference levels

1. Area under forest management

16. According to the national forest definition, forest stands that fall within the thresholds of forest management are tall forests, plantations, cultures, coppice, maquia and scrub. However, the ERT noted that, maquia and scrub were not considered in the FMRL, due to a lack of data. During the review, Croatia expressed its intention to cover all lands in particular maquia and scrub in the emission and removal calculation when relevant data become available and to make a technical correction to the FMRL when doing so.

2. Relationship of the forest land remaining forest land category with the forest management activity reported previously under the Convention and the Kyoto Protocol

17. There is consistency with respect to the CO₂ emission/removal estimates given in the Convention and the Kyoto Protocol. In the FRML submission, Croatia states that all land included under the forest land remaining forest land category is considered to be under

forest management. However, as noted above, the area of maquia and scrub forests are not included in the FMRL. In response to the ERT, Croatia noted that when relevant data regarding these areas become available, they will be included in the forest management and forest land category, and the FMRL will be recalculated.

3. Forest characteristics

18. Croatia has even-aged (regular) forests, which are managed as forest stands, and uneven-aged forests, which are managed as single or groups of trees. Regular forests account for 83 per cent of Croatia's forest land. Its submission states that no significant changes in the increment of biomass are expected in the future. The ERT requested that Croatia further explain why the increment is not expected to change, since the increased harvesting rate, resulting from the projections, may change growing stock or increment. In response to this request, Croatia explained that in the latest historical data, a change is visible if it is compared with the period before 1996, however, this is due to specific national circumstances from 1991–1996 (war period) during which forest management was not conducted in a typical fashion. This influences the data in the following ten year period. Furthermore, as total fellings make only about 1–2 per cent of growing stock; thus, a harvest of 8 million m³ cannot significantly influence the growing stock. The ERT notes this response and accepts the explanation.

4. Historical and assumed harvesting rates

19. The key driver of the decrease in removals estimated in the projected reference level is the assumed 60 per cent increase in the harvest from 2010 to 2020. In its FMRL submission, Croatia notes that this projection is based on the FMAP 2006–2015. To date, the planned increase in harvesting is yet to be achieved. The ERT recommended that Croatia provides further information on how it plans to reach this policy goal by 2015 and how this increased harvesting rate has been extrapolated to 2020. The ERT notes the explanation provided by the Party that the total projected harvest for the year 2020 is 8.0 million m³, where 6.0 million m³ comes from extrapolation from the FMAP, an additional 1.5 million m³ comes from enhanced renewable energy needs from Croatia's Energy Strategy and 0.5 million m³ is accounting for uncertainty in reported figures, especially due to more uncertain data and forest management activities related to privately owned forests (for example, the current harvesting rate in privately owned forests may be underestimated, but Croatia expressed that it will provide more accurate figures in the future).

20. Croatia has used the proposed increase in harvesting rates for timber production from 2010–2015 as a baseline for the projections for 2016–2020. This projection does not match the average change noted in the FMAP. The ERT recommended that further information be given as to why the faster 'catch-up' rate for 2010–2015 was also applied to the period 2016–2020. The ERT notes the response of the Party that the harvest projection, based on the FMAP and the strategy. This faster 'catch-up' rate is expected to be attained by existing and future 'business as usual' scenario policies. The ERT suggests that further information on how this increase in rate will be achieved be included in any possible future submission.

5. Harvested wood products

21. Harvested wood products (HWP) have been included by Croatia in the FMRL assuming instantaneous oxidation. The ERT recommended that Croatia states if it is going to continue to assume instantaneous oxidation during 2013–2020 or if it will make a technical correction and include wood products in future FMRLs. During the review, Croatia noted its plans to put further efforts into attaining data on HWP and including the

latter in the emission/removal calculation and therefore to make a technical correction to the FMRL.

6. Disturbances in the context of force majeure

22. CO₂ emissions from natural disturbances are not quantified separately, but rather are included within the estimate as fellings. The ERT recommended that Croatia explains how these emissions are included in the FMRL and whether non-CO₂ emissions from forest fires are included in the FMRL. The ERT accepts the response of the Party that CO₂ emissions were allocated within fellings and through that are, to the greatest extent possible, included in the calculation of the FMRL. Non-CO₂ emissions from forest fires were not included in the FMRL construction since the projection of required data is not available.

Factoring out

23. Use of a projected reference level, which includes age-class structure, is considered to factor out dynamic age-class effects. Based on the present state of scientific knowledge, the effects of elevated CO₂ concentrations and indirect nitrogen deposition are considered to be approximately the same in the reference level and in the estimated period (i.e. the commitment period), and therefore they can be assumed to factor out.

F. Policies included

24. The ERT recommended Croatia to provide an explanation of FMAP and the Energy Strategy policy, especially those components that are relevant to future harvesting of forests, and a transparent explanation of the linkage between FMAP policies and the future extraction of wood from forests, which will impact the FMRL projections. The ERT also recommended that Croatia explain how 'business as usual' projections were linked to FMAP 2006–2015 policies. Croatia provided further information to the ERT on these issues (see annex). The ERT recommends that Croatia include further information on FMAP and Energy Strategy policy in any possible future submission.

III. Conclusions and recommendations

25. Croatia has adopted a 'business as usual' method for constructing its FMRL for the period 2010 to 2020. Its FMRL projection shows a net removal for the period 2010 to 2020. The emission and removal trends reported in the FMRL submission is different from the historical trend, as the historical trend shows an increase in the quantity of net removals for the period 1996–2009, while the FMRL projections show the forest management sink rate declining from 2010 to 2020. Croatia explained that this is due to the effect of the war period (1991–1996) on the country's forest land and its management.

26. The ERT recommended Croatia to explain transparently how the 'business as usual' method was applied and how the projected FMRL trend is linked to policies in FMAP 2006–2015, and to explain the difference between historical trends and 'business as usual' projections. The ERT accepts the explanation provided by the Party.

27. The ERT recommended Croatia to provide a rationale for selecting the removal level of 5.149 Mt CO₂ eq per year projected for 2020 as the FMRL, instead of the average of 2013 to 2020. The ERT expressed its thanks to the Party for agreeing to modify the FMRL by taking the average of the period 2013 to 2020, and the new value of the FMRL is 6.289 Mt CO₂ eq per year.

28. The ERT recommends Croatia to state if it wants to consider a possible technical correction and to include all forest land, including maquia and scrub, better data for privately owned forest land under forest management, as well as all the relevant carbon pools and non-CO₂ gases, whenever activity data and emission factors become available. The ERT agrees to the response of the Party to make technical corrections as the availability of activity data and information on emission factors improves.

Annex

Documents and information used during the technical assessment

A. Reference documents

Information submitted by Croatia on the forest management reference level. Available at <http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/awgkp_croatia_2011.pdf>.

National greenhouse gas inventory of Croatia submitted in 2010. Available at <<http://unfccc.int/5270.php>>.

National greenhouse gas inventory of Croatia submitted in 2011. Available at <<http://unfccc.int/5888.ph>>.

B. Additional information provided by the Party¹

1. SUMMARY OF THE NATIONAL FORESTRY POLICY AND STRATEGY (OG 120/03)

(a) In 2003, Croatian Government adopted the National Forestry Policy and Strategy. The National Policy and Strategy consists of the following: A. Management of forest ecological systems; B. Forest governance and legislation; C. Non-wood products – tourism, hunting and other products of forest and forest land; D. Wood industry; E. Environment and physical planning; F. Education, research and international cooperation; G. Public relations and promotion.

(b) For each of these topics, policy, policy goal and specific strategic activities necessary for the goal to be achieved are determined. Organizations or institutions responsible for implementation are also determined. All activities are divided in one of three priority classes: I class – Direct priority and obligatory implementation in the period from 2003-2006; II class – Mid-term priority and obligatory implementation in the period from 2006-2008; III class - Long-term priority and obligatory implementation in the period after 2008.

(c) The general Strategy goal is to increase the contribution to the national economy with sustainable management, usage and overall protection of forest resources and biological diversity and by applying research results, complying with international standards and resolutions and by acknowledging the rights of the local community.

(d) Main specific goals and tasks are as follows:

- To develop forestry to the extent and in a way that will, based on the sustainable management principles, maximise its contribution to the national economy and overall welfare and in a way which is pursuant to the protection and preservation of nature and the environment
- To produce high quality wood and to effectively use available wood mass
- To increase the share in non-wood forest products' income
- To improve the level of management in private forests

¹ Reproduced as received from the Party.

- To fulfil obligations of ministerial conferences declarations and to establish partner relationships with the relevant EU bodies
- To connect scientific institutions with similar institutions in Europe and the world and to apply new research technologies
- To continuously perfect staffing and to include high education into the European high education system (ECTS)
- To certify forests – the goal is to develop national standards which will be the base for the forest certification in Croatia

2. FMAP

(a) FMAP ten-year goal was set based on the legal provisions of the Forest Act and the Forest Management Regulation, depending on the forest management type and the age of forest stands (FM types and age classes are described in the Reference Level Submission). In line with the latter and considering the differences between, for example management types, different methods were used to derive planned cuts (e.g. for uneven-aged forests, planned cut was determined based on the management system for uneven-aged forests, for even-aged forests based on the age class proportion method, scientific information on thinnings etc). Also, forest stands' health status was taken into account.

(b) The FMAP does not prescribe annual harvest but rather the harvest for the related 10-year period. FMAP 2006-2015 determines ten year harvest of 65.64 mil. m3 which could mean average yearly of 6.5 mil m3 if the planned cut is assumed the same each year. It is important to notice that the analysis of the fulfilment of mentioned goal can only be made at the end of the period. Although these values have not been met yet, but with new instruments in forestry sector and those coming from energy strategy goals will enable to reach goal in 2020.

(c) So far, the Croatian Forest Company Ltd. established daughter company Forest Biomass Ltd. aiming to improve the biomass management of state forest. Recently public bidding for 0.5 mil m3 was announced through Forest Biomass Ltd. company. Also, expectations are on private forest that are developing Management plans on the level of management units (currently they are under higher order management plans - FMAP), the process that is undergoing.

(d) The interest of investor is very high for use of biomass. There are several big projects for electricity and heat production under development.

(e) Below is given additional explanation related to Energy Sector Development Strategy (to be included in resubmission) Energy Sector Development Strategy.

3. THE ENERGY SECTOR DEVELOPMENT STRATEGY (OG 130/09)

(a) The Energy Sector Development Strategy (ESDS) is adopted for the period until 2020 in order to harmonize with goals and time framework of strategic documents of the European Union. The ESDS, as a policy document and within the framework of the document Strategic framework for development from 2006 to 2013, has a purpose to define the development of Croatian Energy sector by 2020 and a goal to build, under the conditions of uncertainty in the global energy market and scarce local energy resources, a sustainable energy system.

(b) Therefore, the goal of the Strategy is to build a sustainable energy system that makes a balanced contribution to security of energy supply, competitiveness and environmental protection and provides for security and availability of energy supply to the Croatian citizens and business sector. Such energy supply is a prerequisite for economy and social development.

(c) The energy Strategy has been adopted in the year 2009, at time of negotiations for full membership in the European Union. Currently, negotiations have been finished and Croatia has defined date for accession to EU in July 2013.

(d) Energy Strategy aims to integrate environmental goals and measures with national policies to mitigate climate change. Through the its Energy Strategy, Croatia supports the efforts of international community to mitigate climate change, and it shall be internationally active in creating policies and measures to mitigate climate change and shall fulfil the related commitments in an effective manner.

(e) Croatia is becoming ever more dependent on energy imports. Croatia is currently importing about 50% of its energy demand. In today's balance of primary energy supply in Croatia, oil and oil products are represented with 50% and natural gas with 25%. Consumption of these fuels shall grow in the future, while local oil and natural gas production is going to decrease due to exhaustion of deposits.

(f) Croatia is facing difficult tasks which will have major impact on building the energy system and economy. These challenges are at the same time development opportunities, with a special emphasis on the following:

- Meeting the Kyoto Protocol commitments;
- International environmental commitments beyond 2012;
- Integration into the European Union emission trading scheme and effort sharing agreement between EU member states;
- Competitiveness in the region;
- Pressure from fast-growing sectors;
- Development and application of renewable energy sources;
- Development and application of technology for carbon dioxide capture and storage;
- Nuclear power use;
- Resistance to construction at local level, so called NIMBY syndrome (Not-in-my-backyard).

(g) Additionally, the challenge that is not particularly mentioned in Energy Strategy is the fact that Croatia is at the border with non-Annex I countries which create high risk of carbon leakage and relocation of industry production capacities.

(h) Croatia has good conditions for significant increase in using the renewable energy sources due to its great experience in energy equipment production. Strategy stated that larger usage of renewable energy sources shall be stimulated by electricity consumers' funds and it is necessary to ensure that such sources are directly in a function of development of the Croatian economy.

(i) Croatian national target for using renewable energy sources (RES) by year 2020 is to reach 20% of total gross net final consumption from renewable sources. Croatia declares itself to use the renewable energy sources in accordance with the principles of sustainable development. The sectorial targets are: 35% of RES for production of electricity, 20% RES for heating and cooling, and 10% of RES for transport. Contribution to total 20% RES target of this sectors are 9,2%, 8,6% and 2,2%, respectively. Trajectory of RES targets till the year 2020 for each sector, with policy and measures actions needed, are defined by National Renewable Action Plan that is under adoption by the Government.

(j) Already, from the year 2007 in place is feed in tariff for electricity production from renewable sources, (OG 33/07, 133/07) similar instrument is planned to be adopted for heating energy. Streamlining process for simplification of administrative processes is under way.

(k) Energy strategy of Croatia is in the line with EU goal for 2020, to reduce 20% GHG emission, to reach 20% renewable energy in gross net consumption, and to save 20% of energy by energy efficiency.

(l) Biomass potential is referred to the wood biomass and biomass from agriculture, as well as the firewood cultivation. Additionally, wood biomass from wood harvesting during maintenance of waterways and power facilities has also been added as a biomass potential.

(m) In accordance with the goals of the Strategy of Waste Management, waste potential of biological origin for the energy production has been particularly valued. The Energy Strategy stated that Croatia belongs among the countries of large biomass potential.

(n) It is possible to use available biomass with various techniques to transform it into electricity and/or internal energy (heat) or to refine it for commercially acceptable forms of energy (pellets, briquettes and wood coal). Part of biomass could be used for production of biofuels of the second generation.

(o) Croatia defines a goal to, along with the existing incentive measures and removing the existing administrative barriers, use around 15 PJ of biomass in energy purposes in 2010, while in 2020 double, around 26 PJ. Part of this biomass shall be used in many biomass fired power plants of total power of 85 MW in 2020, preferably cogeneration plants.

(p) Synergy operation of development policies of several ministries is required for Croatia to achieve its goals considering the usage of biomass

(q) According to such synergy operation, Croatia shall convert the development prerequisites into incentive measures of government, industrial, agricultural and energy policies:

- Stimulate development of the Croatian wood processing industry;
- Develop forestry and facilitate all forest residues to be utilized;
- Stimulate forest cultivation and energy forest cultivation;
- Stimulate biomass fired cogeneration plants for heat and electricity generation;
- Stimulate usage of biomass for heat production.

(r) The harvest projection is based on both FMAP and Energy Strategy.

Tablica | Table 2.4.1. Ukupna potrošnja energije | Total Primary Energy Supply

| | 2004. | 2005. | 2006. | 2007. | 2008. | 2009. | 2009./08. | 2004.-09. |
|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|-------------|
| | PJ | | | | | | % | |
| Ugljen i koks Coal and Coke | 29,70 | 32,95 | 31,61 | 33,74 | 34,65 | 24,66 | -28,8 | -3,6 |
| Drvo i biomasa Biomass | 16,09 | 14,96 | 15,48 | 13,62 | 13,80 | 14,42 | 4,5 | -2,2 |
| Tekuća goriva Liquid Fuels | 179,62 | 181,88 | 185,15 | 189,70 | 180,15 | 178,04 | -1,2 | -0,2 |
| Prirodni plin Natural Gas | 104,66 | 101,06 | 99,86 | 114,22 | 110,22 | 102,15 | -7,3 | -0,5 |
| Vodne snage Hydro Power | 69,00 | 62,40 | 58,18 | 42,21 | 50,19 | 65,77 | 31,0 | -1,0 |
| Električna energija Electricity | 13,19 | 18,41 | 20,24 | 22,90 | 23,68 | 20,46 | -13,6 | 9,2 |
| Obnovljivi izvori Renewables | 0 | 0 | 0,24 | 0,82 | 0,97 | 1,43 | 47,4 | |
| UKUPNO TOTAL | 412,27 | 411,85 | 410,76 | 417,21 | 413,66 | 406,92 | -1,6 | -0,3 |

Izvor | Source: EIHP

Table 1: Energy in Croatia, Annual energy report 2009, Ministry of Economy, Labour and Entrepreneurship, 2011

4. ENGLISH TRANSLATION OF THE CHAPTER 9.2 FROM STRATEGY OF ENERGY SECTOR DEVELOPMENT (OG130/09)

BIOMASS

Biomass potential is referred to the wood biomass and biomass out of agriculture, as well as the firewood cultivation. Additionally, wood biomass from wood harvesting during maintenance of waterways and power facilities has also been added as a biomass potential.

In accordance with the goals of the Strategy of Waste Management, waste potential of biological origin for the energy production has been particularly valued.

Croatia belongs among the countries of large biomass potential

It is possible to use available biomass with various techniques to transform it into electricity and/or internal energy (heat) or to refine it for commercially acceptable forms of energy (pellets, briquettes and wood coal). Part of biomass could be used for production of biofuels of the second generation.

Croatia defines a goal to, along with the existing incentive measures and removing the existing administrative barriers, use around 15 PJ of biomass in energy purposes in 2010, while in 2020 double, around 26 PJ. Part of this biomass shall be used in many biomass fired power plants of total power of 85 MW in 2020, preferably cogeneration plants.

Synergy operation of development policies of few ministries is required for Croatia to achieve its goals considering the usage of biomass

According to such synergy operation, Croatia shall convert the development prerequisites into incentive measures of government, industrial, agricultural and energy policies:

Stimulate development of the Croatian wood processing industry;

Develop forestry and facilitate all forest residues to be utilized;

Stimulate forest cultivation and energy forest cultivation;

Stimulate biomass fired cogeneration plants for heat

5. RESPONSE OF THE PARTY ON FMAP 2006-2015:

FMAP2006-2015 determines ten year harvest of 65.64 mil. m³ which could mean average yearly of 6.5 mil m³. Recent projection made as extrapolation from current data gives 5.6 mil m³ in 2015 and 6.0 mil. m³ in 2020 (Draft Plan for implementation of article 3.4 of Kyoto protocol, Ministry of Environment, physical planning and construction, 2010). This extrapolation is practically only for state forest since private forest harvest was accounted on about 0.09-0.14 mil m³, as recorded officially.

The Energy Sector Development Strategy defines needs for biomass in 2020 on amount of 26 PJ for electricity production and heating and cooling (see explanation in chapter F Policies included). Current level of biomass use for energy purposes is 14 PJ (average 2007-2009), according to Energy in Croatia 2009, Annual Energy Report (Ministry of Economy, Labour and Entrepreneurship, 2011), It should be noted that in the year 1990 the 22.7 PJ of fuel wood energy has been used. (Fifth National Communication of Croatia to UNFCCC, January 2010, Table 2-2, www.unfccc.org). For reaching 26 PJ in biomass in 2020, additional 12 PJ is needed, which corresponds to around 1.5 mil m³ of round wood volume harvested.

Total projected harvest for the year 2020 is 8.0 mil m³, where 6.0 mil m³ comes from pure extrapolation, 1.5 mil. m³ additional comes from enhance renewable energy needs from Energy Strategy and 0.5 mil. m³ is accounting of uncertainty, especially related to data and forest management in privately owned forests (for example, current harvest rate in private forests is underestimated (only officially record) but in future it will be more accurate).

The following table shows the contribution of each data source (FMAP and Energy Strategy):

| | mil. m ³ overbark | | | | | | |
|---|------------------------------|------|------|------|-------|-------|-------|
| | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 |
| FMAP 2006-2015, 10-year average plan | | | | | 6.564 | 6.564 | |
| Recent projections, used for Submission paper | | | | | 5.150 | 5.600 | 6.000 |

| | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|
| Addition to reach Energy Strategy Goal | | | | | | 1.000 | 2.000 |
| Total Harvest | 4.674 | 3.395 | 4.281 | 4.773 | 5.150 | 6.600 | 8.000 |

6. REVISED FIGURE 4.1.-2 SHOWING AGE CLASS STRUCTURE OF THE FORESTS

