"Gradual emission reduction in the energy sector - the National Emission Reduction plan"

REPUBLIC OF MACEDONIA
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Background

Party to the old NO$_x$ protocol-2010

<table>
<thead>
<tr>
<th>Emission level base year (1987)</th>
<th>Emissions in 2012</th>
<th>Compliance with the NO$_x$ Protocol</th>
<th>Emission reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40,7 Gg</td>
<td>35,1 Gg</td>
<td>YES</td>
<td>-14%</td>
</tr>
</tbody>
</table>

Party to the Gothenburg protocol

- Ratified by the parliament in 2010
- Annex II party in December 2013

<table>
<thead>
<tr>
<th>National emission ceiling (2010)</th>
<th>Emissions in 2012</th>
<th>Compliance with the Gothenburg protocol</th>
<th>Emission reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>39 Gg</td>
<td>35,1 Gg</td>
<td>YES</td>
<td>-10%</td>
</tr>
</tbody>
</table>
NOx emissions in 2012

NOx emissions in 2012 per SNAP sector

1-Combustion in energy and transformation industries (stationary sources) 54.97%
2-Non-industrial combustion plants (stationary sources) 2.44%
3-Combustion in manufacturing industry (stationary sources) 8.49%
4-Production processes (stationary sources) 0.09%
8-Other mobile sources and machinery 4.48%
9-Waste treatment and disposal 0.05%
10- Agriculture 1.06%
7-Road transport 28.41%
NOx concentrations in 2013

Annual average NOx concentrations in 2013

Number of days with exceedance of the hourly limit value for protection of human health in 2013
Legislation and national strategies on NOx emission reduction

- Law on environment- IPPC licenses system
- Rulebook on ELV - Limit values on NOx emissions
- Degree on limit value - Limit values on NOx concentrations
- LCP plans - emission reduction measures per plant
- National plan for air quality protection and NERP- Measures for NOx emission reduction
  - Strategy for Energy Development in the Republic of Macedonia by 2030
  - Strategy for Energy Efficiency Promotion in the Republic of Macedonia by 2020
- National Strategy for Transport and others
- Energy community agreement - LCP
LCP plans

LCP Plans - preparation **financed** by Norwegian Government in **2012**

**Time period** - **2012-2017**

**How many?**
13 identified - 7 of them prepared plans

**Why?**
- Negotiations for IPPC licenses
- Needed for preparation of the projections

**Update** of the LCP plans in **2015** (2017-2022)
(Decision of the ministerial council of the energy community deadline for LCP end of 2017)
National emission reduction plan

- Project Implementation and ratification of protocol on heavy metals, protocol on persistent organic pollutants and Gothenburg protocol;
- Financed by Netherlands and coordinated by UNECE;
- Time period 2012-2020;
- Adopted July 2012, Update 2015-2016;

Pollutants:
- NOx
- NMVOC
- SO₂
- NH₃

Measures:
- Transport
- Energy
- Agriculture
- Industry
- Waste
Implemented measures - Energy sector

**Project Sv.Petka**

Increase of designed capacity of electricity production plants in the Republic of Macedonia by around 36.4MW.

Increase of electricity production from domestic sources and reduction of electricity import by around 66GWh per year. Reduction of environmental pollution by 114t/ per year less Nox. Finalized in 2012.

**Construction of wind power plants park - Bogdanci**

Increase of designed capacity of electricity production plants by around 50MW;

Reduction of electricity import by around 100GWh per year;

Reduction of environmental pollution by 173t/per year less Nox. Finalized in 2014.
### Implemented measures - Energy sector

<table>
<thead>
<tr>
<th>Implemented Measures</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasification of Heating plant East Replacement of heavy fuel oil with gas</td>
<td>2006</td>
</tr>
<tr>
<td>BAT in new power plant Installed 72 low NOx burners, Stable combustion regime</td>
<td>2012</td>
</tr>
<tr>
<td>Gasification of Heating plant West Replacement of heavy fuel oil with gas</td>
<td>2013</td>
</tr>
</tbody>
</table>
# Ongoing measures—Energy sector

## Modernization of Power plant REK Bitola

**First phase** – Revitalization and modernizations of turbines and generators has been finalized

**Second phase** – NOx emission reduction due to modernization of block II is ongoing and should be finalized in October 2014

## Project small hidroplants

Increase of designed capacity of electricity production plants in the Republic of Macedonia by around 250MW.

- Less NOx 4296t/per year.
- Direct so called “Greenfield” investment.

It is expected that the project for 80 small hydro plants will be finalized by 2017
## Future measures - Energy sector

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Emissions Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Lukovo Pole 2013-2018</td>
<td>Increase of electricity production from domestic sources and reduction of electricity import by around 159GWh per year.</td>
<td>275 t/per year less NOx</td>
</tr>
<tr>
<td>Project Boshkov Most 2014-2018</td>
<td>Increase of designed capacity of electricity production plants by around 68MW.</td>
<td>207 t/per year less NOx</td>
</tr>
<tr>
<td>Project solar power plant in the mine Suvodol near Bitola 2020</td>
<td>Increase of designed capacity of electricity production plants by around 50MW. Increase of electricity production from domestic sources and reduction of electricity import by around 104GWh per year.</td>
<td>179 t/per year less NOx</td>
</tr>
<tr>
<td>Project Chebren and Galishte 2020</td>
<td>Increase of designed capacity of electricity production plants in the Republic of Macedonia by around 530MW. Increase of electricity production from domestic sources and reduction of electricity import by around 1100GWh per year.</td>
<td>3938 t/per year less NOx</td>
</tr>
<tr>
<td>Project Modernization of TEC Oslovej power plant 2014-2017</td>
<td>Automatization of the technological process, new boiler with the system to store and preparation of the fuel. Improvement of the controlling system. Emission reduction of CO2, SOx, NOx and dust</td>
<td></td>
</tr>
</tbody>
</table>
National emission projections

Basic scenario- policies and measures planned by the year selected as baseline year. Official documents, applicable legislation and year of fulfillment of individual emission reduction measures are used.


Scenario with additional measurements- Not done

Scenario with models- CIAM report
## National emission projections

<table>
<thead>
<tr>
<th>NOx [kt]</th>
<th>Year</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>National emission ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx [kt] - BS</td>
<td></td>
<td>33.27</td>
<td>37.64</td>
<td>28.67</td>
<td>39</td>
</tr>
<tr>
<td>NOx [kt] - SM</td>
<td></td>
<td>33.16</td>
<td>33.7</td>
<td>23.8</td>
<td>39</td>
</tr>
<tr>
<td>NOx [kt] - Model</td>
<td></td>
<td>33.85</td>
<td>28.39</td>
<td>20.84</td>
<td>39</td>
</tr>
</tbody>
</table>
Effects on emission reduction

- Project Boshkov Most
- Project Lukovo Pole
  - Project solar power plant in the mine Suvodol near Bitola
- Project Chebren and Galishte
- Project Sveta Petka
- Project small hydroplants

Reduction:
- 207t/year less NOx
- 275t/year less NOx
- 179t/year less NOx
- 3938t/year less NOx
- 114t/year less NOx
- 4296t/year less NOx

Total: 9 Gg
Supporting factors in implementation of the measures

✓ International agreements and National legislation as binding instruments;

✓ Communication and participation of stakeholder during planning and implementation of the measures - (Inter-sectorial group consist of relevant governmental bodies established in 2011);

✓ Strong political commitment (Committee on health and environment);

✓ Public awareness raising (transparency and available information);
Веб портал за квалитет на воздух

Добро дојдете на Националниот портал за квалитет на воздух на Република Македонија. Овој портал содржи информации за моменталната состојба на амбиенталниот воздух во вкупно, како и информации за загадувањаот на супстанции, здравствените ефекти и законодавството.

Според Извештајот за оценка на квалитетот на воздухот, Македонија е поделена на две зони, Источна и Западна зона, и агломерацијата Скопски регион.

Измерените концентрации на шест загадуващи супстанции од 17 мониторинг места се приближат на секој час. Моменталната состојба на квалитетот на амбиенталниот воздух се класифицира и визуелизира со едноставни кодови на бои и дополнително овие информации подетално се представени како јавен експонат за публичност од извршени мерки. Воодушетворува информација за јавноста во реално време за најгиуштениот на границите вредности за квалитет на воздух.
Main Challenges

Potential risk of fully implementation of the measures according to the planned time table

WHY?

• High financial cost for their implementation
• Involvement of long tendering procedures
• Long time for shipment of equipment
• In some of the measures, serious constraints are also posed by the different interests of the stakeholders
CONCLUSIONS

• Legislation demands emissions reduction from energy industries; Measures in the energy sector are defined and partially implemented;
• There is political will to continue with the implementation of measures defined in the energy sector;
• Better communication across relevant groups is needed;
• Macedonian’s NOx projections have been compared against GAINS results and results showed similar trend;
• The projected value for NOx emission reduction according scenario with measures in 2020 can be accomplish if all defined measures in energy sector are finalized on time;
• In order to reach the projected value for NOx emission reduction in 2020, according scenario with models, measures defined in the transport sector should be also implemented.
THANK YOU FOR YOUR ATTENTION

Monument of nature - OHRID LAKE