Bulgaria

Submitted on 27 October 2022

Summary of main findings

<table>
<tr><th>Metric</th><th>Value</th><th>Further information</th></tr>
<tr><td>Overall goal of the LTS</td><td>‘To set out the paths for the development of the energy system beyond 2030 in order to meet the significant emission reduction targets’</td><td>• The LTS’s analysis includes all the main greenhouse gases.
• The LTS’s analysis covers all domestic sectors, including LULUCF. It is not specified whether it includes international maritime and aviation.
• Decarbonisation scenarios consider the capture and storage of CO_2 for electricity generation, including BECCS.
• Oil and coal are expected to be fully phased out by 2050, while nuclear continues to support export of electricity in one scenario.</td></tr>
<tr><td>Scenarios presented in the LTS</td><td colspan="2">In addition to the baseline scenario (NECP2019), aligned with Bulgaria’s 2019 National Energy and Climate Plan, the LTS presents five long-term decarbonisation scenarios:
- Electricity and Energy Efficiency (EE) Improvement for 2 °C (EE2°C)
- Electricity and Energy Efficiency (EE) Improvement 1.5 °C (EE1.5°C)
- New energy carriers (NC) for 2 °C (NC2°C)
- New energy carriers (NC) for 1.5 °C (NC1.5°C)
- New energy carriers, nuclear and CCS (NC_var)</td></tr>
<tr><td>GHG reductions</td><td>Modelling results:
GHG emission reductions by 2050 compared to 1990 (excluding removals):
-78% to -84%[1]
(i.e. range reduction values under decarbonisation scenarios)
Target: No indicative milestones for 2040 and 2050</td><td>Emission projections by sectors:
<table><tr><th>Mio.tCO2 eq</th><th>2040</th><th>2050</th></tr><tr><td>Power</td><td>(-0.3, 2.8)</td><td>(-1.0, 0.6)</td></tr><tr><td>Industry</td><td>(0.6, 0.9)</td><td>(0.1, 0.2)</td></tr><tr><td>Transport</td><td>(5.7, 6.7)</td><td>(1.5, 3.2)</td></tr><tr><td>Buildings</td><td>(0.0, 0.1)</td><td>(0.0, 0.1)</td></tr><tr><td>Agriculture</td><td>8.3</td><td>9.3</td></tr><tr><td>Waste</td><td>1.9</td><td>1.2</td></tr><tr><td>LULUCF</td><td>(-8.4, -8.4)</td><td>(-8.3, -8.1)</td></tr></table>Notes: (1) Minimum and maximum GHG emissions under the 5 scenarios (excluding NECP2019). (2) Negative emission values in the Power sector can be explained by the use of carbon capture technology associated with biofuels, although the LTS does not provide sufficient explanation. (3) In buildings, energy efficiency and renewable energy (mainly solar, geothermal, heat pumps) will contribute significantly to reducing CO2 emissions by 2050. (4) In the case of agriculture and waste the modelling results shows the same projection of emissions for each scenario.</td></tr>
<tr><td>Renewable Energy Sources</td><td>Modelling results:
Share of renewables in gross final energy consumption in 2050:
61% to 70%[2]</td><td>Main drivers and features:
• In the power sector, onshore wind is expected to experience the largest increase, rising from a net installed capacity of 0.8 GW in 2030 to over 7 GW in 2050. Solar PV will increase by more than 160% in 2050 compared to 2030.</td></tr>
</table>

[1] The scenarios for the 1.5°C achieve between 83 % and 84 % reduction compared to 1990 levels. The electricity and energy efficiency improvement scenario shows the greatest emission reduction potential.

[2] The sectors’ contribution to the overall share of renewable energy in gross final consumption by 2050 is expected to be: 42% to 51 % in the electricity sector, 120% to 192% in the transport sector, and 73% to 81% in buildings.

Metric	Value	Further information
	(i.e. range reduction values under decarbonisation scenarios)	• In transport sector accelerated electrification will be coupled with use of advanced biofuels and the introduction of hydrogen in 2030. • Renewable energy in heating and cooling will be increased through deployment of heat pumps and development of additional solar.
Energy efficiency	**Modelling results:** FEC: 79 – 87 TWh[3] PEC: n.a.	**Main drivers and features:** • In buildings, the increase in insulation, high levels of renovation and use of more efficient appliances will reduce FEC by >10% in 2050 compared to 2030 levels. • In industry, policies will target reduction in heat loss; audits a key tool to for identifying actions. • In transport, new technologies in rail transport will generate additional efficiencies in long-distance inter-urban transport.
Estimated investment needs	€ 12.9 bn to € 14.4 bn (total investment needs over the period 2031-2050 under the 1.5°C scenarios)	• Investment costs in 1.5°C scenarios are close to 60% higher than in 2°C scenarios, on average. • The highest investment costs are estimated in the construction materials (EE scenarios) and in the chemical industry (NC scenarios).
Socio-economic impacts of transition	n.a	• The transition is expected to have a net positive effect on employment and human well-being, although fossil fuel industry will experience job losses and the risk of skill mismatch exists.
Adaptation Policies and Measures	Yes	• The National Strategy for Adaptation to Climate Change and Action Plan to 2030 is described at a high level.
Public consultation	Yes	• Draft of the LTS was published for public consultation. The LTS contains a summary of the feedback received.
Legal status of the LTS and targets	Unclear	• The legal status of the LTS is not mentioned.

Overall completeness of the LTS

- The LTS presents alternative scenarios, including a pathway to approach climate neutrality by 2050, without defining a specific goal.
- In general, the strategy is developed in detail and projections have been completed up to 2050. However, some modelling assumptions are not sufficiently detailed, raising questions on how the results could be achieved.
- The LTS includes most of the mandatory elements, although some partial gaps relate to GHG intensity (no data on future levels), CO2 intensity (unit is unclear) and socio-economic impact (only a qualitative description).

  The LTS includes most of the non-mandatory elements (e.g. the likely estimates on the share of renewable energy, adaptation policies and measures, general description of drivers at sector level). However, energy consumption data was not provided for all sectors, and further information could have been provided on emissions as sub-sector level.

[3] Based on the data in Table 15 (transport), Table 17 (industry) and Table 19 (residential) of the LTS