

# “Energy Forecasts and Scenarios until 2020”

## Summary

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August 2001

In this study, the energy model DAEDALUS III is used to calculate three new scenarios for Austria's energy industry until 2020.

In the “Baseline Scenario”, the development of crude oil prices, general economic development and the special factors of energy market liberalisation in Austria are of primary importance. With regard to electricity generation, liberalisation results in both an increase in the net import rate and, in the short term, a slight reduction of thermal power capacities. In the Baseline Scenario, final energy consumption rises, in particular in the fields of fuels, gas and electricity.

This results in an increase of CO<sub>2</sub> emissions caused by final consumption by around 2.7 million tonnes by 2010. Overall emissions of industry will remain constant, household emissions will decrease, while the emissions caused by the service and transport sectors will increase. The CO<sub>2</sub> emissions of transformation processes will rise accordingly (by around 3.2 million tonnes by 2010), which are distributed to energy suppliers (+ 1.5 million tonnes) and industrial electricity and heat production (+1.7 million tonnes). This also leads to an increase of total energy consumption and CO<sub>2</sub> emissions.

The preparation of the “Kyoto Scenario” was based on the existing Austrian climate strategy. The starting point of this strategy is the target of a 13% reduction of all greenhouse gases from 1990 levels by the period 2008-2012 defined in the Kyoto Protocol. This is to be achieved by numerous individual measures in the fields of building, electricity used by small consumers, transport, electricity and heat, industry, agriculture, waste management and other gases.

The simulations show a reduction of CO<sub>2</sub> emissions by 12.75 million tonnes as compared with the Baseline Scenario. In 2010, the CO<sub>2</sub> emissions will be around 53.5 million tonnes in the Kyoto Scenario, i.e. around 5.2 million tonnes above the target of 48.3 million tonnes<sup>1</sup> that would correspond to a 13% reduction (as compared with 1990). This reduction by 12.75 million tonnes is made up of around 9.5 million tonnes in final consumption and around 3.2 million tonnes in the field of transformation. Economic development is favourably influenced in the Kyoto Scenario. The investments and costs for the Kyoto Scenario are estimated to amount to ATS 16.7 billion per year (at today's prices). These trigger annual investments of ATS 26 billion (accumulating to ATS 363 billion) so that the difference of ATS 9.3 billion is the resulting impact on the overall economy.

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<sup>1</sup> Process-related CO<sub>2</sub> emissions are not included in the calculations. In 1990, energy-related CO<sub>2</sub> emissions amounted to around 55.55 million tonnes. Therefore, a 13% reduction results in a target of around 48.3 million tonnes.

Moreover, energy costs will be considerably lower than in the Baseline Scenario. These savings will total around ATS 19 billion in the year 2020. The Kyoto Scenario shows a drastic decrease of production and employment in the sectors supplying fossil energy (up to 30% lower than in the Baseline Scenario by 2020). In almost all the sectors not belonging to the energy industry, employment rises in comparison with the Baseline Scenario; in total employment is around 0.6% or 20,000-25,000 persons higher than in the Baseline Scenario. Due to the positive effects on GDP, the calculations also show higher public revenues amounting to up to ATS 19 billion in the Kyoto Scenario.

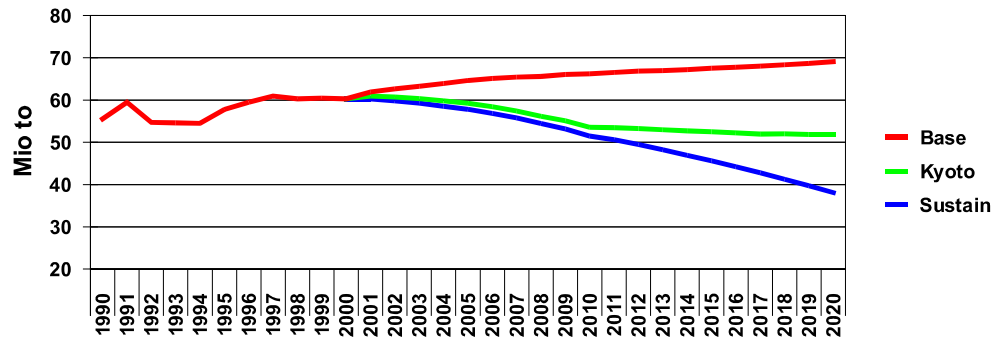
The "Sustainability Scenario" is mainly oriented to the emission scenarios developed by IIASA and the World Energy Council. In this scenario prepared for Austria, the implementation of sustainability means first of all that energy services are reduced in a socially acceptable way. This relates to the transport sector, household demand for electricity and process energy in industry. Another focal area of the Sustainability Scenario are accelerated technology take-up in order to speed up the wide-spread use of technologies that have almost reached market maturity (zero emission vehicles, green electricity generation by wind power and photovoltaic systems) as much as possible.

In the Sustainability Scenario, final energy consumption decreases to a similar extent as in the Kyoto Scenario by 2010. Total CO<sub>2</sub> emission levels are also similar to the Kyoto Scenario in 2010 (51.5 million tonnes compared to 53.5 million tonnes in the Kyoto Scenario), but will continue to significantly decrease to 38.2 million tonnes by 2020. This corresponds to a reduction to 63% of the emission level in the year 2000.

On the electricity supply side, thermal power generation is massively supplanted by electricity from wind power and photovoltaic systems. The Sustainability Scenario leads to annual costs of ATS 25.4 billion (ATS 450 billion accumulated) that result in annual investments of around ATS 37.9 billion (ATS 638 billion accumulated) so that the difference of ATS 12.5 billion is the impact on the overall economy, which is around ATS 3 billion higher than in the Kyoto Scenario.

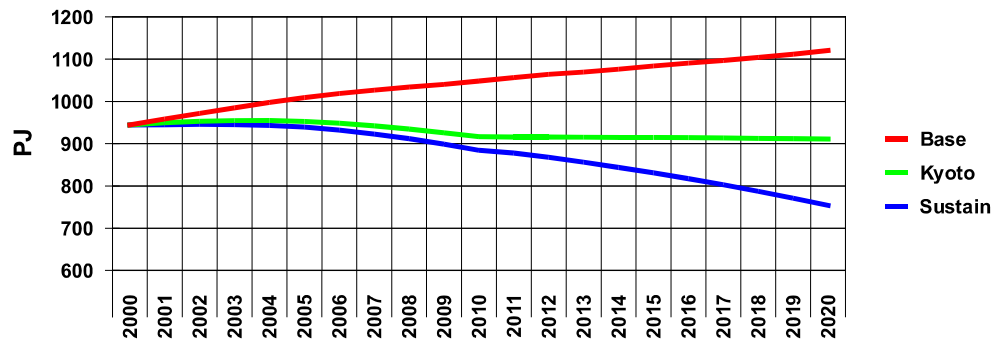
Energy costs are again considerably lower than in the Baseline Scenario. While in the Sustainability Scenario, production and employment of the energy industry is up to 47% lower than in the Baseline Scenario by 2020, total employment rises by 1% in comparison with the Baseline Scenario (30,000-40,000 persons in absolute terms). The GDP is around 1.4% higher than in the Baseline Scenario by 2010 and around 1% higher after that time. The calculations again show higher public revenues amounting to ATS 20 to 30 billion per year.

### CO2-Emissionen



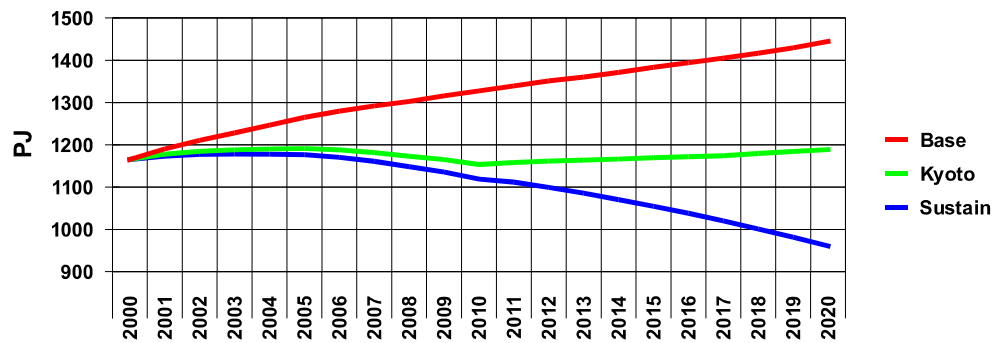
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### Energetischer Endverbrauch



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### Energetischer Bruttoverbrauch



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