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Future Regional Economic Scenarios for Netherlands

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Dutch regional economic and transport WLO (Welvaart en Leefomgeving) scenarios are developed every seven years and provide policymakers with scenario-based insights to guide decisions on mobility and urbanization. Given the inherent uncertainty of the future, WLO study employs multiple scenarios to analyze the impact of various developments and assess the effectiveness of policy measures. The WLO study combines different scenario elements including regional demography, regional economy and transportation.

For the development of Regional Economic and Sectoral scenarios we employ a methodological approach that combines qualitative scenario narratives, econometric data analysis, and dynamic regional general equilibrium model (EU-EMS model[1]). This approach aims to quantify sectoral and regional development trajectories within the four scenarios of the future along the dimensions of economic growth (High and Low) and the speed of international climate policy (Rapid and Delayed). Inputs for these analyses include demographic data at the provincial level, labor force participation, productivity, and GDP projections for the Netherlands. The international dimension is modeled using CEPII's MaGE model[2], which simulates labor productivity, GDP, and employment trends across EU and non-EU countries.

An essential aspect of the analysis is the integration of marginal abatement cost (MAC) curves derived from the IMAGE global Integrated Assessment Model and CO_2 price trajectories corresponding to emission reduction targets. These MAC curves outline the costs associated with emission reductions by sector and country group, ensuring consistency across the future scenarios.

Scenario analysis within the EU-EMS model proceeds in three phases. Initially, the "WLO High, Delayed" scenario is validated using national and international sectoral and consumption data. Subsequently, the "WLO Low, Delayed" scenario is developed, reflecting slower demographic and macroeconomic growth, lower investments in education and R&D, and increased domestic production reliance. Finally, ambitious climate policy is explored within "WLO High, Rapid" and "WLO Low, Rapid" scenarios, targeting a maximum global warming threshold of 1.8 degrees Celsius, with CO_2 price pathways adjusted accordingly.

The implementation of climate policies within WLO scenarios relies on CO_2 pricing mechanisms calculated via the IMAGE model. CO_2 prices are higher in "Rapid" scenarios than in "Delayed" scenarios, particularly in Europe compared to other regions. Emission reduction costs depend on technological assumptions, with significantly higher costs in "Low" scenarios than in "High" scenarios. Emission-intensive sectors such as industry, energy, agriculture, and transport bear the greatest burden, whereas service sectors face relatively lower costs.

[1] https://web.jrc.ec.europa.eu/policy-model-inventory/explore/models/model-eu-ems/
[2] https://www.cepii.fr/ANGLAISGRAPH/models/mage.asp

Climate policy significantly impacts production and employment. By 2060, climate policy costs account for over 1% of GDP in "WLO High, Rapid" and more than 5% in "WLO Low, Rapid." CO_2 taxation increases production costs directly through carbon levies and indirectly through necessary emission reduction investments. However, sectors such as biofuel production may benefit from subsidies that lower production costs and create new revenue streams.

Sectoral developments of the scenarios have varied employment and production dynamics. Employment variations are primarily driven by sectoral productivity growth, while overall labor supply remains fixed based on the regional demographic projections. Economic growth in "High" scenarios aligns with historical trends, emphasizing services, education, healthcare, and construction. Conversely, "Low" scenarios picture an industry-driven economy with higher reliance on domestic industrial production of basic consumer goods.

The distribution of production across sectors differs significantly between scenarios. In "High" scenarios, business services and construction expand, while industrial and agricultural output decline. In contrast, "Low" scenarios witness increased industrial growth due to reshoring but slower construction growth due to declining population trends. Climate policies drive investment in emission reduction, boosting sectors such as electrical appliances, machinery, and metal industries.

Simultaneously, higher costs reduce demand for emission-intensive products such as agriculture and transportation. Government revenues from CO_2 taxation are reinvested in energy infrastructure, facilitating the transition to a low-carbon economy. Public services such as healthcare and education also experience slight growth as a result.

In summary, WLO scenarios present a differentiated picture of sectoral and regional economic development. "High" scenarios align with historical service-sector expansion, whereas "Low" scenarios indicate a shift towards industry-driven growth with higher emission reduction costs. These complex interactions between regional employment and production provide crucial insights for strategic policymaking and long-term economic planning.