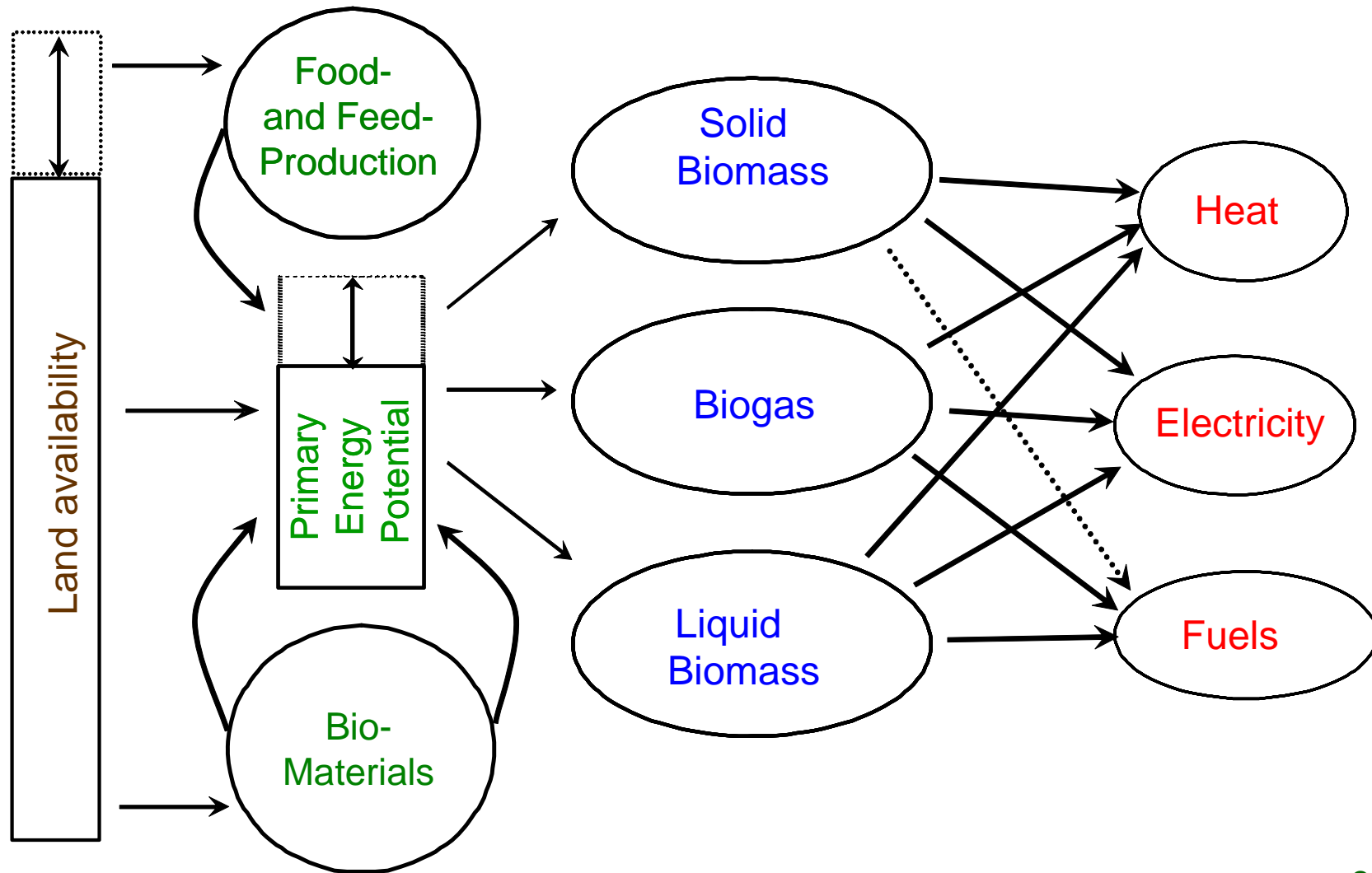


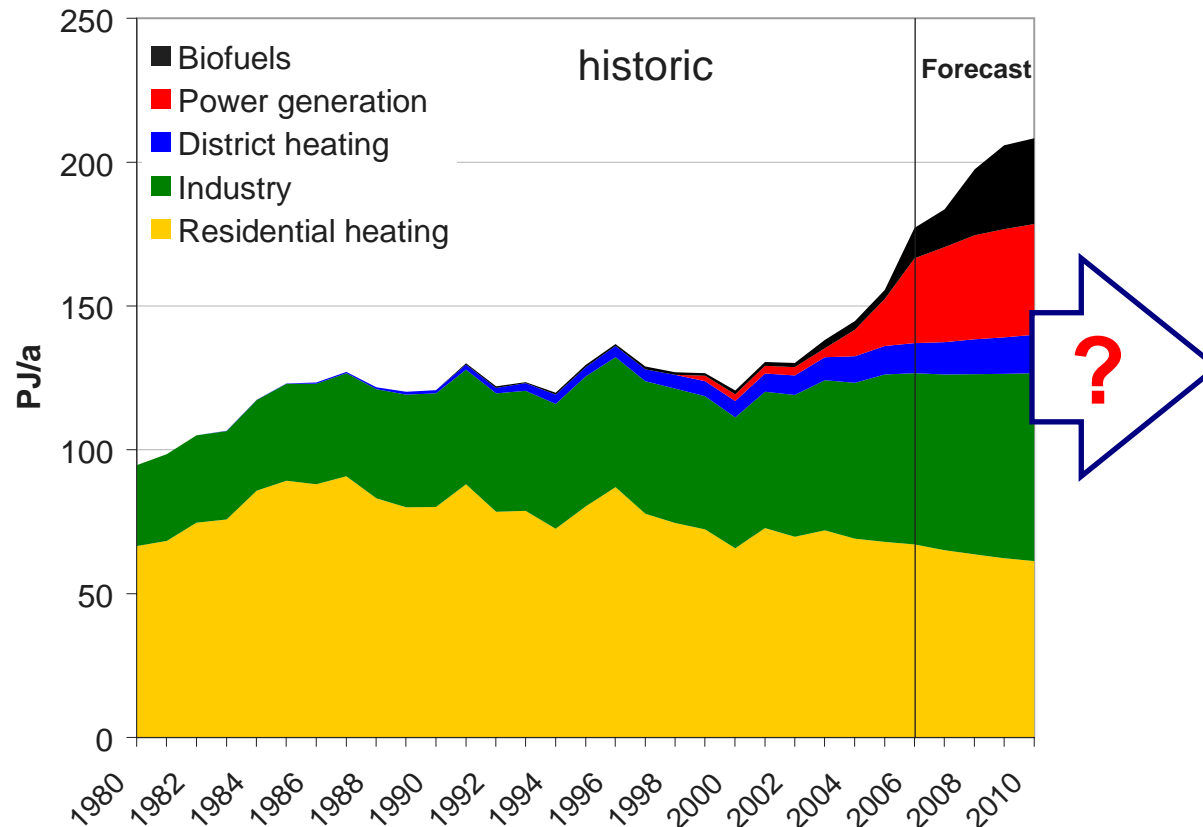
Long term bioenergy scenarios for Austria

Fritz Diesenreiter, Reinhard Haas, Gerald Kalt, Lukas Kranzl,
www.eeg.tuwien.ac.at/biomassestrategie



- Strategies for reaching an optimal use of biomass potentials in Austria until 2050 with respect to GHG emission reduction
- Duration: June 2006 – May 2008
- Project in the frame of the programme “Energy systems of tomorrow”



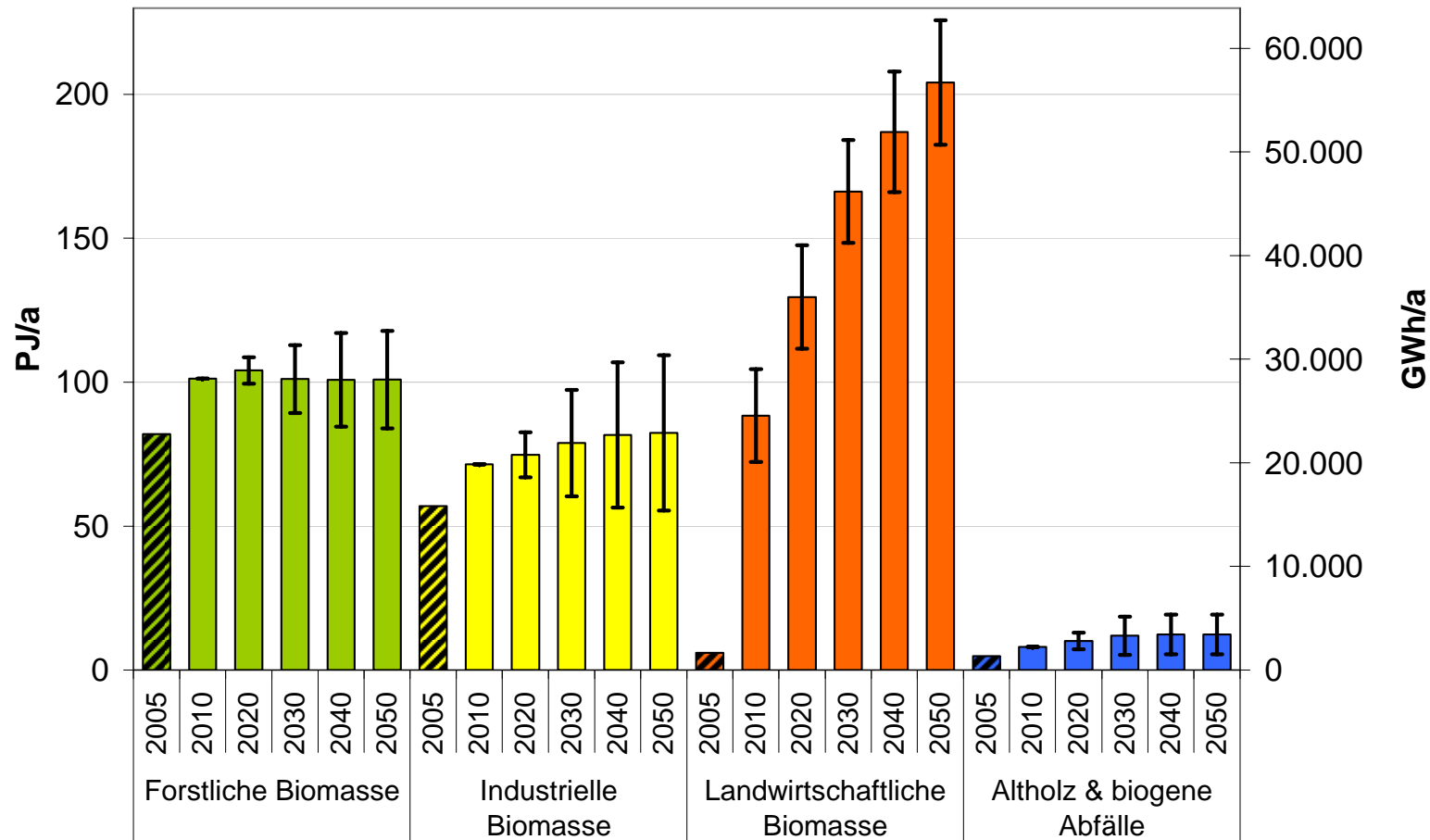


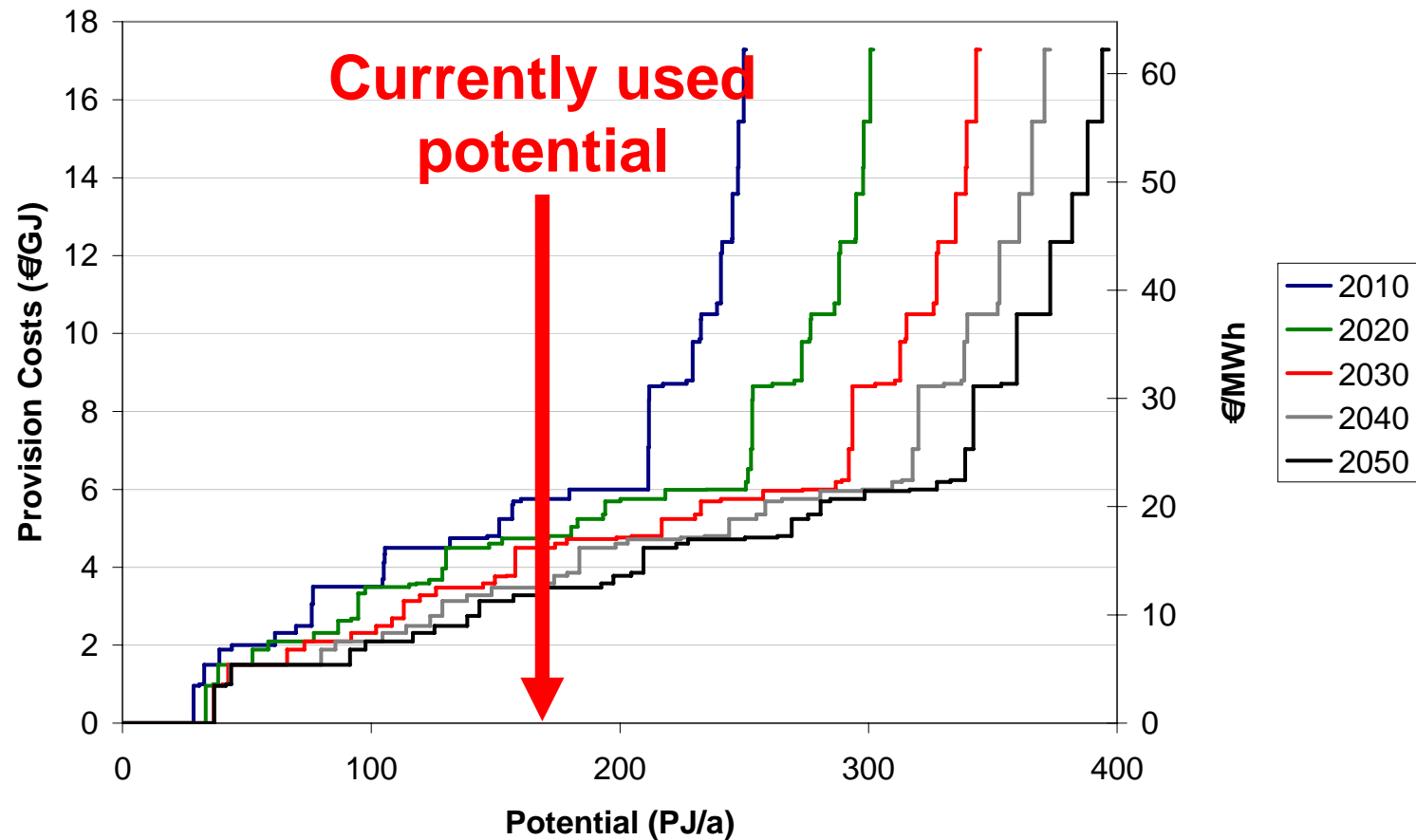
Influencing factors:

- Resource potentials
- Economic performance of bioenergy systems
- Fossil fuel price development
- Bioenergy policies
 - Subsidies
 - Quotas
 - Taxes etc.
-

Biomass primary energy use in Austria form 1970 to 2010

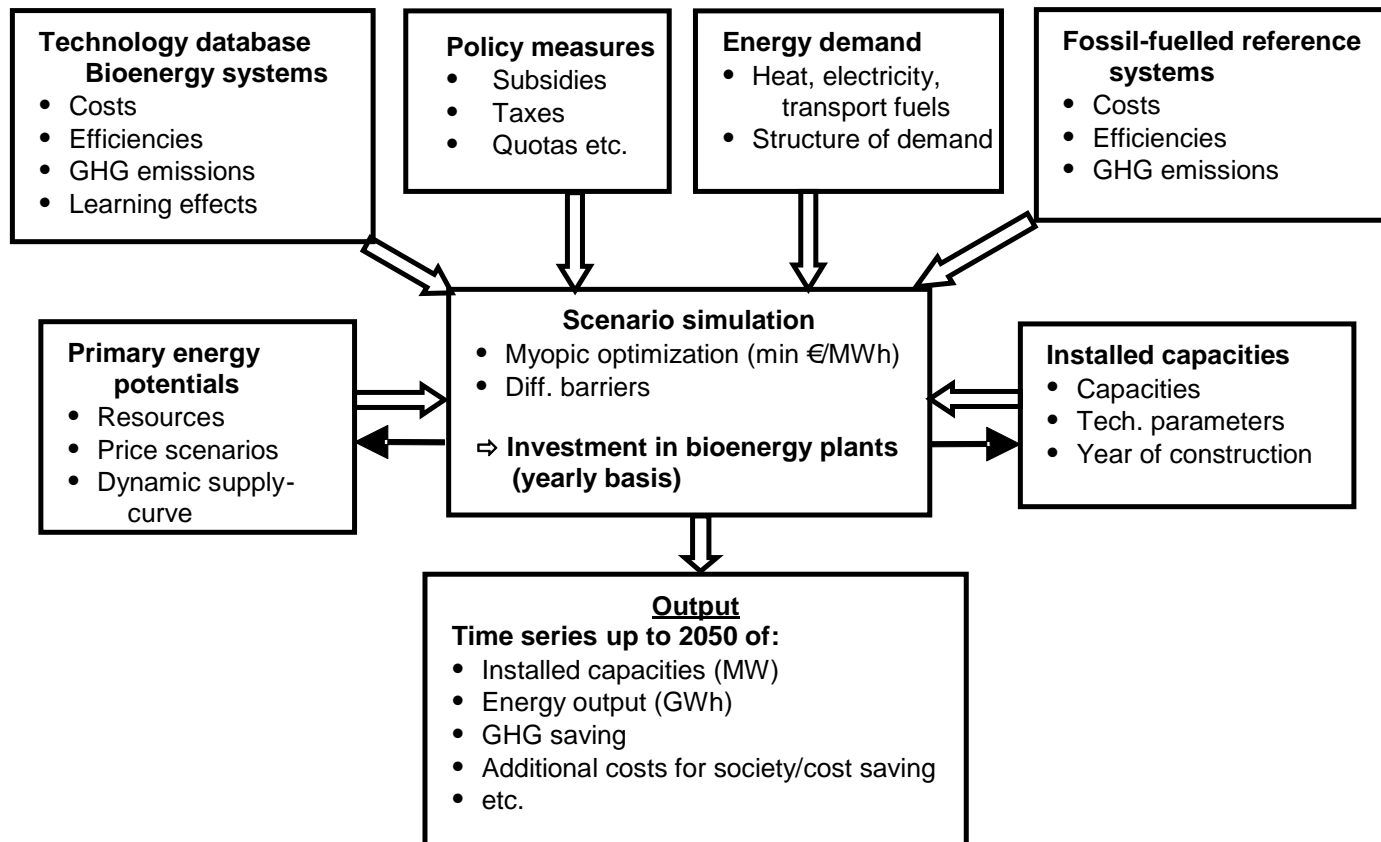
Sources: E-control, Statistik Austria, Austropapier, NÖLWK, Biotreibstoff-Institut, EEG.





Dynamic cost-resource curve of the total primary energy potential of biomass in AT (baseline scenario)

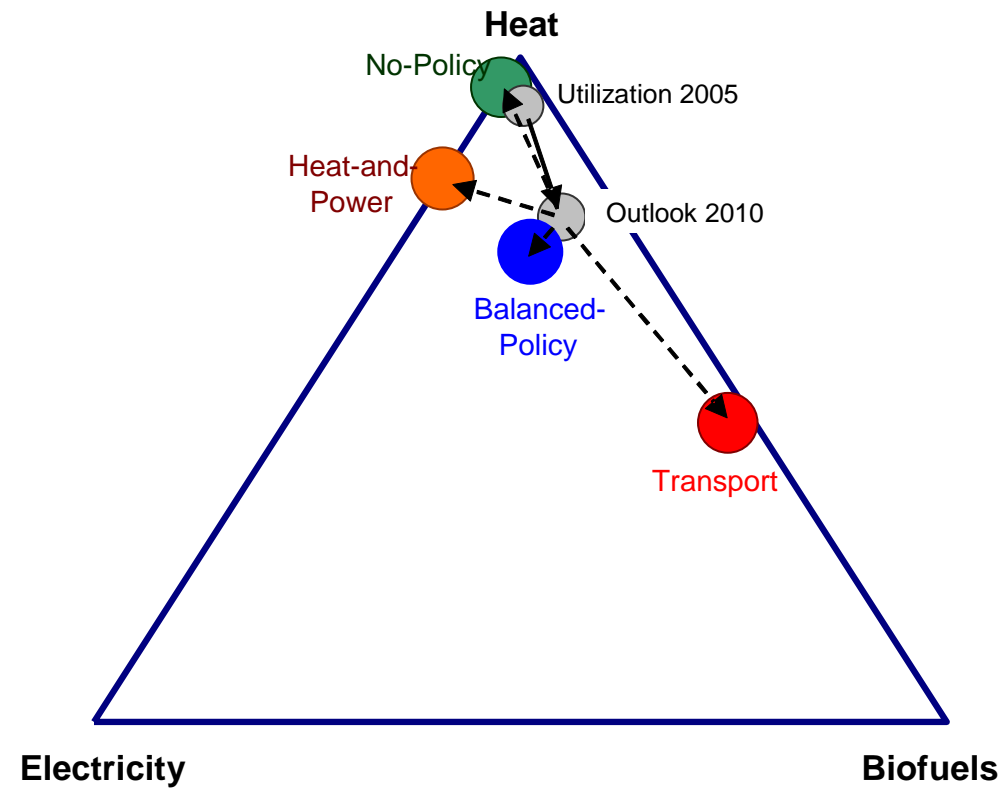
The Model Green-X_{Bio-Austria}



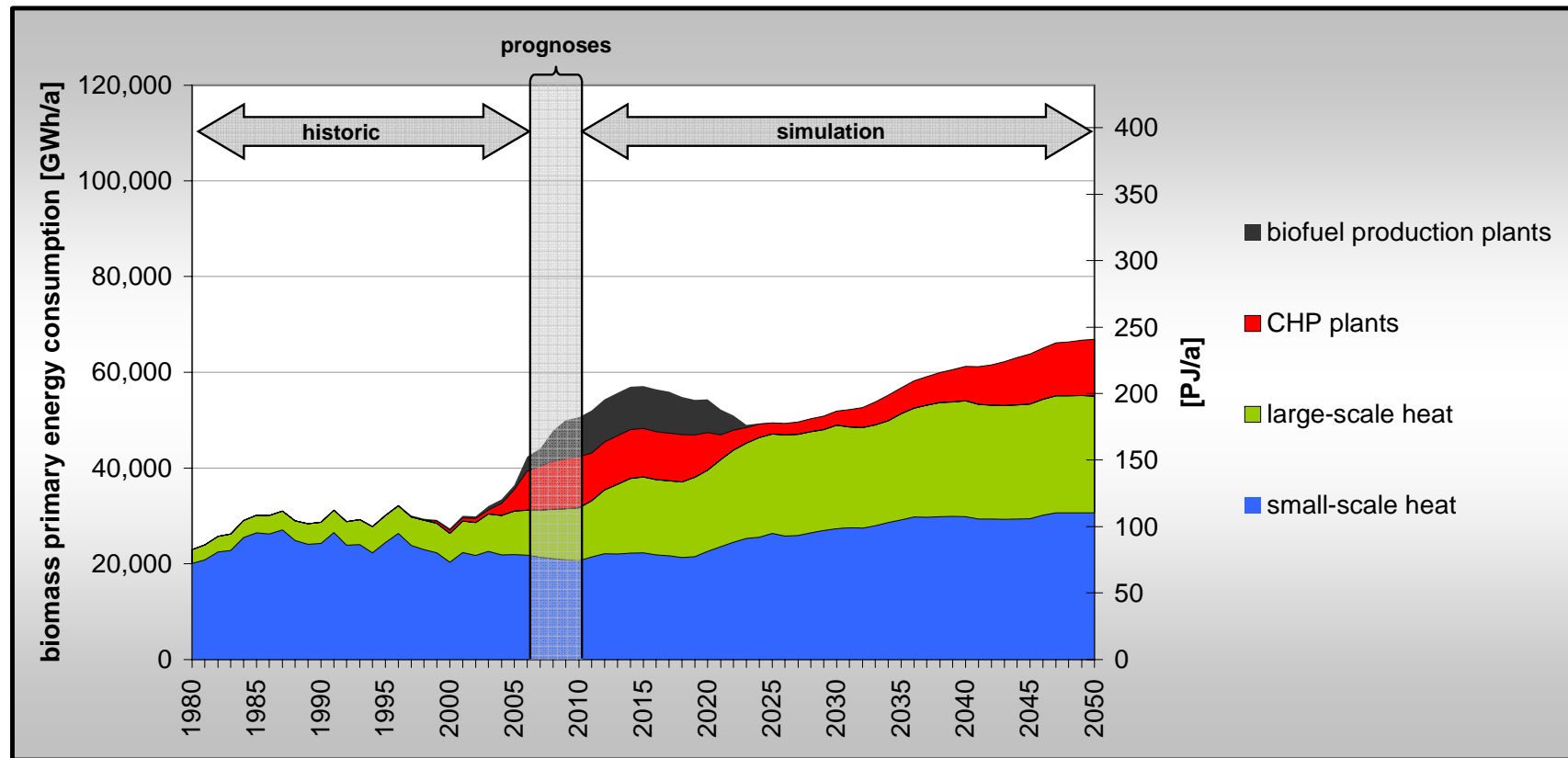
Structure, input and output parameters of the Model Green-X-BA

- Comparison of 4 scenarios (based on different bioenergy policies)
- Common assumptions:
 - Low-price scenario
 - Energy demand scenario: Baseline
- Promotion schemes:

Sector	Small-scale heat	Power generation	Biofuels
Promotion scheme	Investment subsidy	Feed-in tariffs	Quota
<i>No-Policy scenario</i>	No	No	No
<i>Heat-and-Power scenario</i>	20%	Yes	No
<i>Balanced-Policy scenario</i>	20%	Yes	10% (2020-2050)
<i>Biofuel scenario</i>	20%	Yes	10% (2010) 30% (2030-2050)

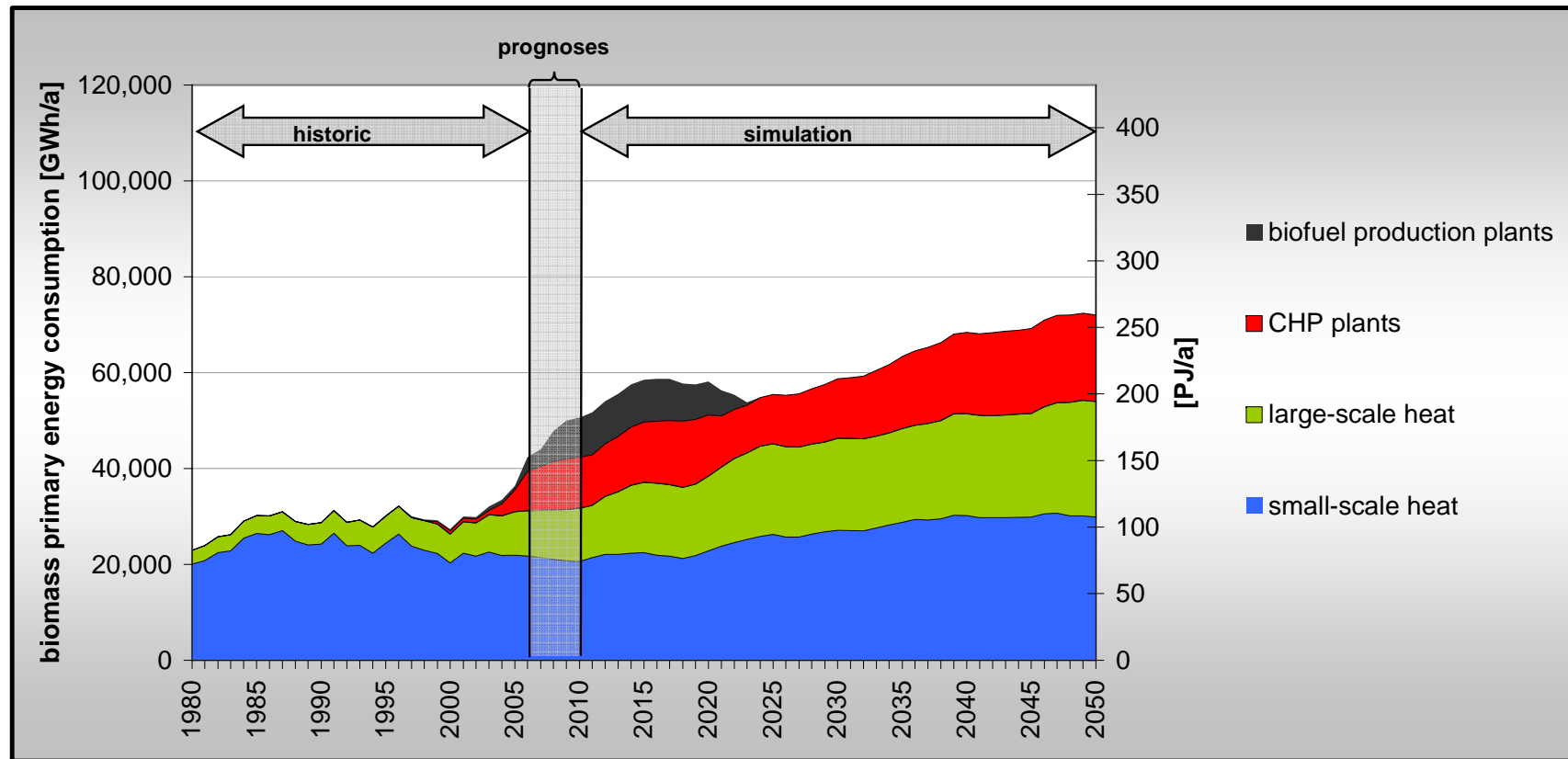


- No biofuel quota
- No investment subsidies, no feed-in tariffs



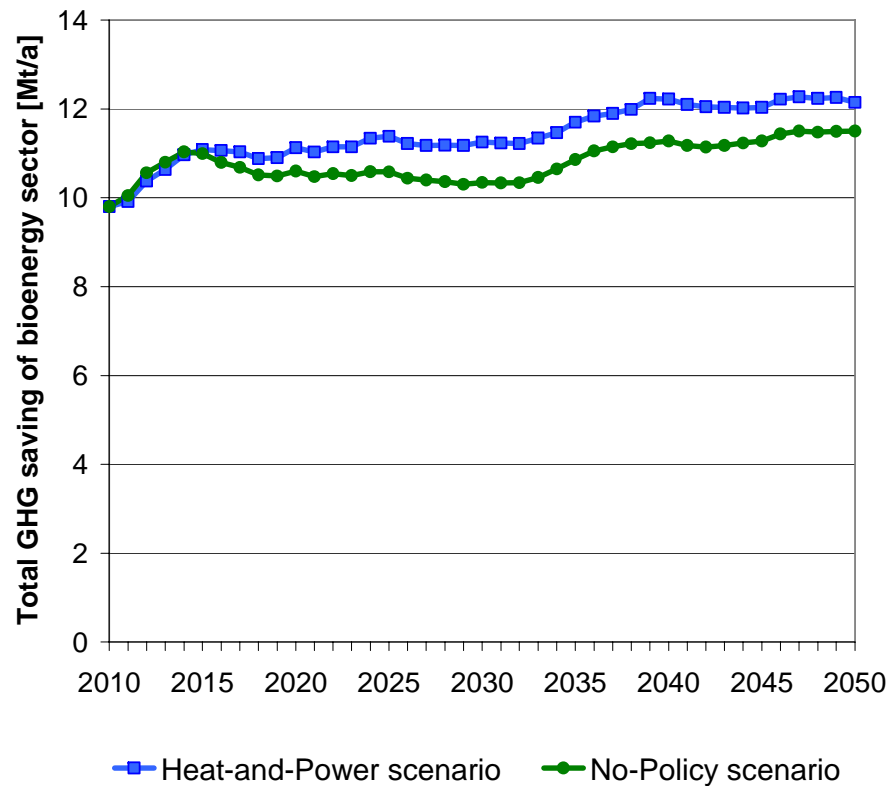
Biomass consumption in the No-Policy scenario, Austria

- No biofuel quota
- Investment subsidies for small-scale heat, feed-in tariffs for biomass CHP

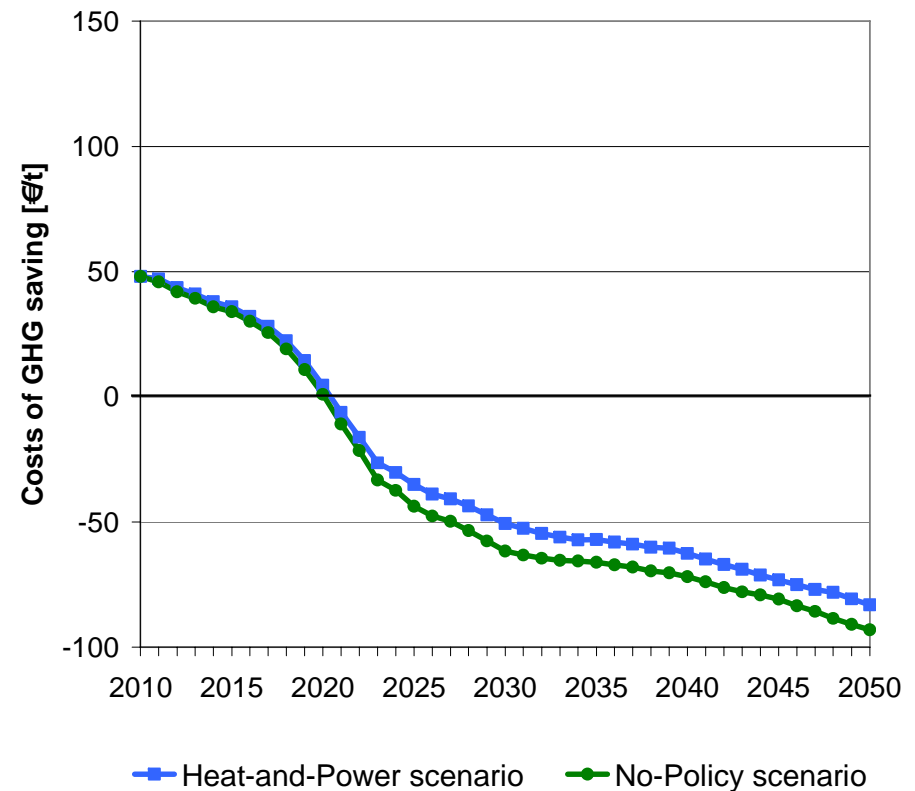


Biomass consumption in the Heat-and-Power scenario, Austria

...of the No-Policy and the Heat-and-Power scenario

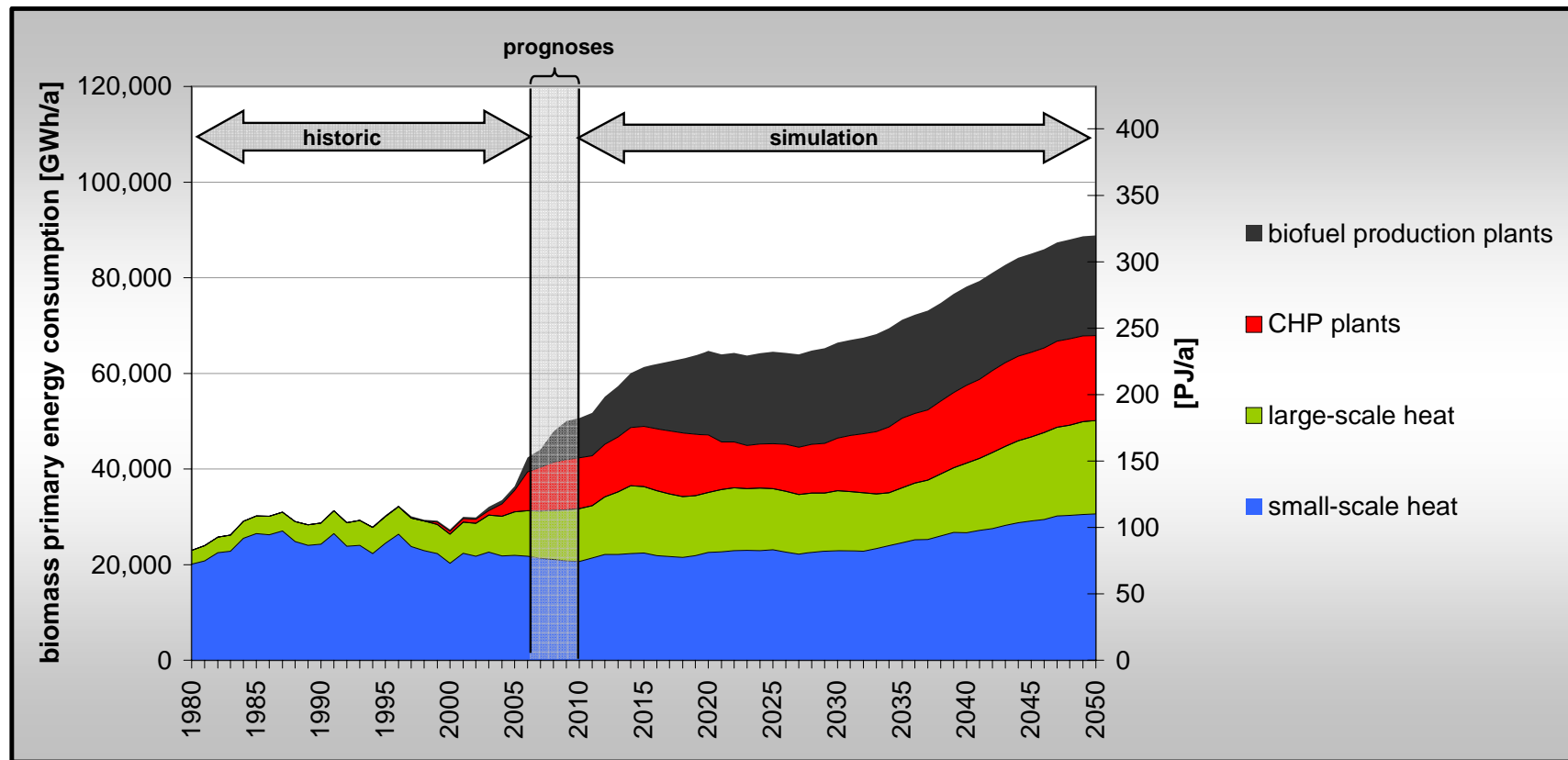


Annual GHG saving (of the whole bioenergy-sector)



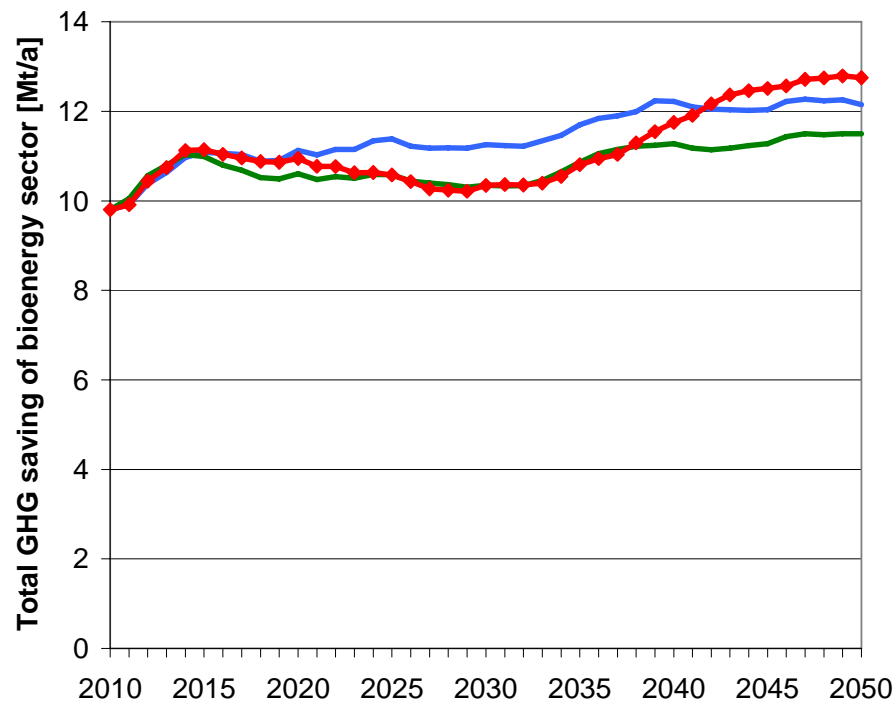
Average costs of GHG saving

- Biofuel quota: 10% from 2010 to 2050
- Investment subsidies for biomass heat, feed-in tariffs for biomass CHP



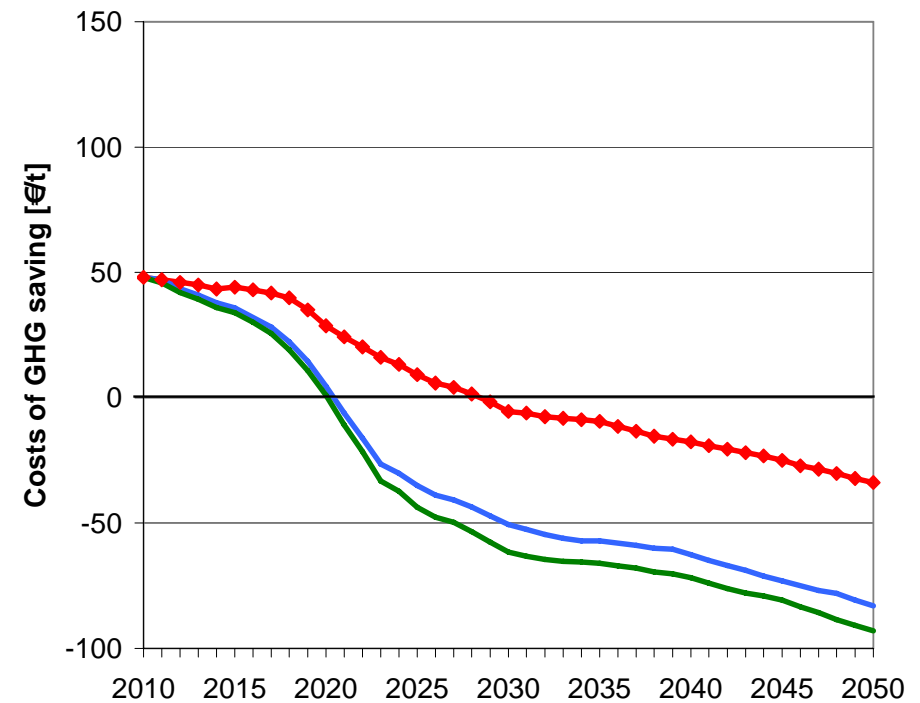
Biomass consumption in the Balanced Policy scenario, Austria

...of No-Policy, Heat-and-Power and Balanced scenario



— Heat-and-Power scenario — No-Policy scenario
— Balanced-Policy scenario

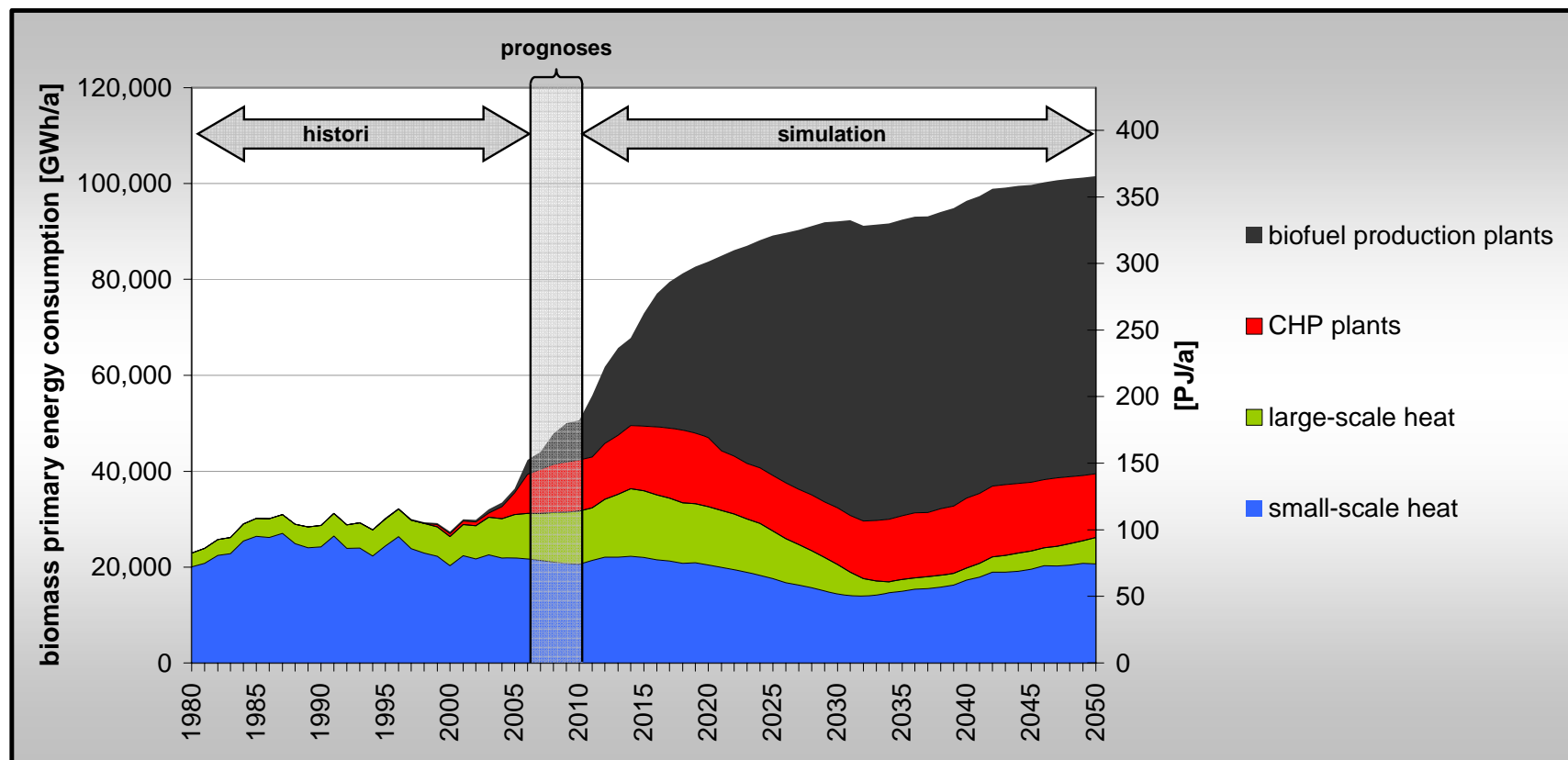
Annual GHG saving (of the whole bioenergy-sector)



— Balanced-Policy scenario — Heat-and-Power scenario
— No-Policy scenario

Average costs of GHG saving

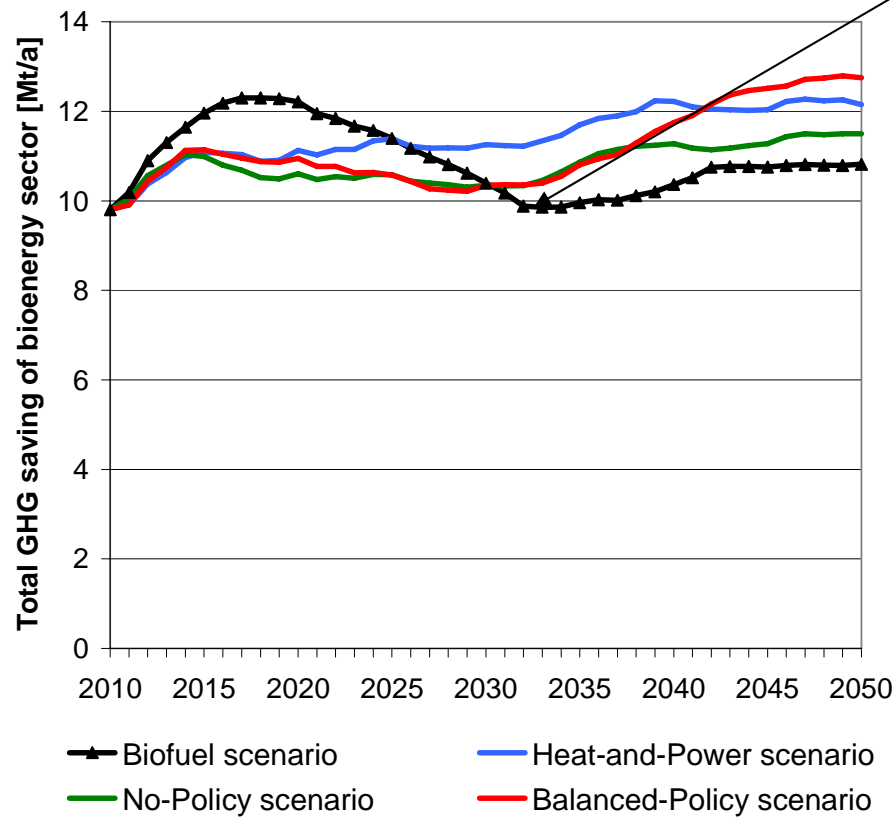
- Biofuel quota: 10% in 2010, 30% from 2030 to 2050
- Investment subsidies for biomass heat, feed-in tariffs for biomass CHP



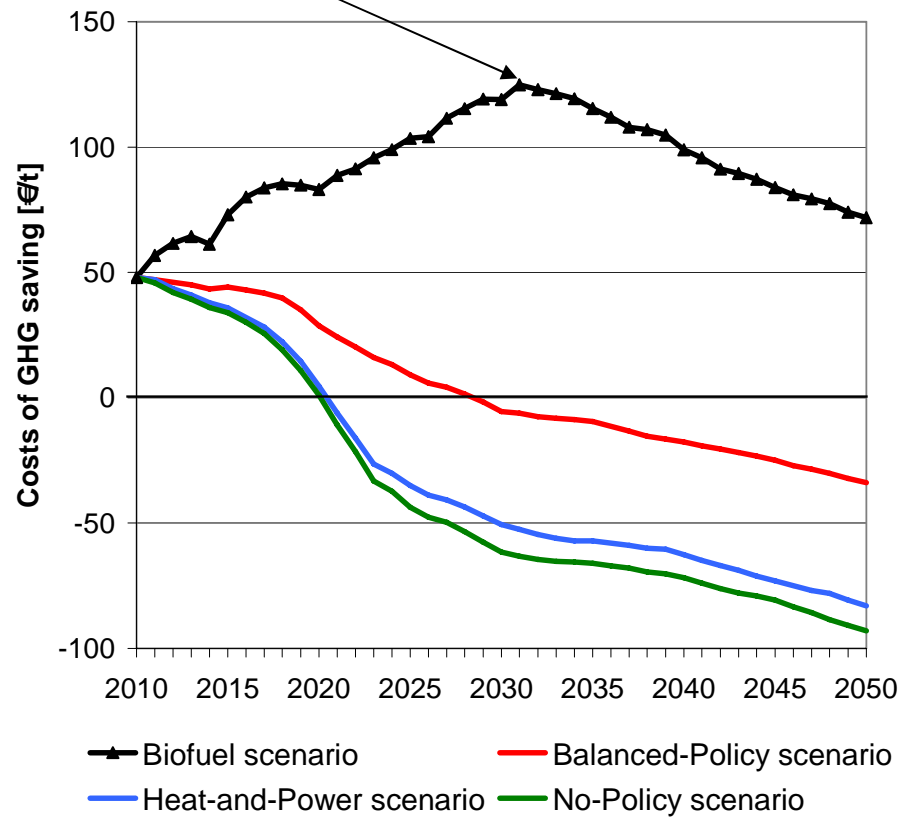
Biomass consumption in the Biofuel scenario, Austria

...of all 4 scenarios

second-generation biofuels



Annual GHG saving (of the whole bioenergy-sector)



Average costs of GHG saving

- Biomass potentials are limited and should be used in a most efficient way. Policy instruments in one sector can lead to a decrease of bioenergy in another sector.
- Heat generation with biomass:
 - Competitive to reference
 - Relatively highest efficiency, lowest costs of GHG saving
 - Share of biomass already high but further increase is possible
 - Decreasing heat load
- Biomass CHP:
 - Utilization of heat crucial for economic efficiency and GHG impact
 - Suitable applications/locations (high heat demand)
 - Incentives for high heat utilization rate?
 - Technology development => higher electrical efficiency

- Biofuels
 - High costs compared to fossil fuels and other bioenergy paths
 - GHG impact lower than other bioenergy paths (2nd generation better than 1st generation)
 - Costs of GHG reduction very high
 - Reducing dependency on fossil fuel imports in transport sector
- Strategy for optimal use of domestic biomass resources:
 - Promote technology improvement and innovation
 - Promote sustainable mobilization of resource potentials (especially biogenous wastes & residues)
 - Focus on heat generation (as long as necessary) and CHP
 - Transport sector:
 - Ambitious biofuel quotas not reasonable for Austria
 - Political discussion about the relevance of biofuels for diversification of energy supply in the transport sector.

- The share of bioenergy in the different scenarios varies between 13-16% (2020) and 17-30% (2050)
- Only by reducing the total energy demand dramatically we can achieve a substantial share ($\geq 30\%$) by domestic bioenergy potentials on total gross energy consumption.
- To reduce strong pressure on biomass markets and the competition between different biomass utilization paths:
 - Reduce energy and resource consumption dramatically.
 - Increase conversion efficiencies and technology development.
 - Use biomass resources in those sectors with the highest economic and ecological performance.

For further information:

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