

The **results** include the following parameters:

- Public transfer costs for promoting RES & RUE technologies (Mio Euro/year)
- CO₂-emissions (total and reductions due to promotion schemes) (kt/year)
- Heating and Cooling:
 - energy demand reductions due to insulation and window replacement for various building types (GWh/year)
 - mix of energy carriers for heating, domestic hot water and cooling systems (numbers of systems (1); numbers of buildings (1); final energy demand (GWh/year);...)
 - District heating related outputs
- Electricity:
 - output from RES-E plants (GWh)
 - installed capacity of RES-E plants (MW_{el})
- Bio fuels: total production of various types of bio fuels (t)

Invert guarantees maximum flexibility regarding the input of individual region specific data like costs, description of the building stock or climate data. Hence, with this specific data input the tool can be applied to every region in the world. The user may also modify model specific definitions in a highly flexible way.

The **Invert Simulation Tool** is available as a free download on www.invert.at.

The project **Invert** was undertaken with support of the European Commission, DG TREN under the Altener programme. The EEG (Energy Economics Group) coordinated the project and developed the computer tool.

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Investing in renewable and rational energy technologies:

Models for saving public money

The **Invert Simulation Tool** is a comprehensive computer model supporting the design of efficient promotion schemes for renewable and energy efficiency technologies.

Invert Simulation Tool is applicable for heating, domestic hot water, cooling, electricity and biofuels.

Invert Simulation Tool can be applied on a local, regional and national level.



Currently, huge amounts of money are spent throughout the European Union for promoting energy efficiency and renewable energy. Yet, using the same amount of money, a higher reduction in CO₂-emissions could be achieved if the strategies were properly targeted and more efficiently designed.

The Altener project **Invert** has investigated promotion strategies for RES (renewable energy sources) and RUE (rational use of energy) technologies throughout Europe. Recommendations for efficient promotion strategies have been developed on European, national and regional level.

Within this project, the **Invert Simulation Tool** has been developed. It is a comprehensive computer simulation tool supporting:

- the efficient design of promotion schemes for RES and RUE technologies in the fields of heating, district heating, domestic hot water, cooling, electricity from renewables as well as biofuels,
- the investigation of related public transfer costs,
- the analysis of energy demand and GHG emissions in the considered energy sectors.

Invert Simulation Tool is a disaggregated bottom-up model simulating the decision making processes of various consumers and investors in the energy fields considered.

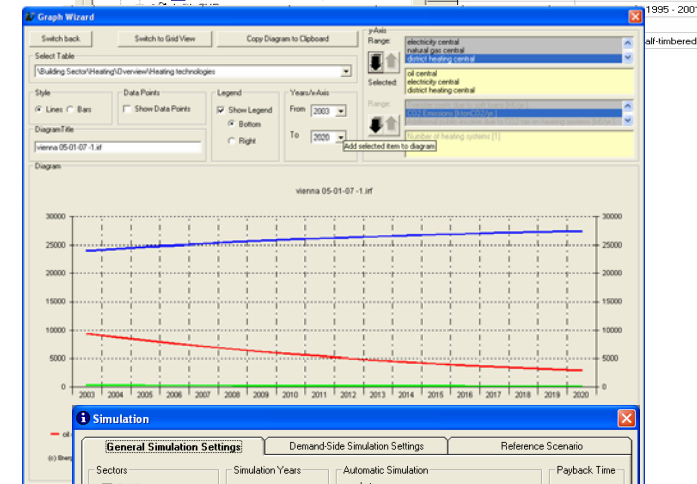
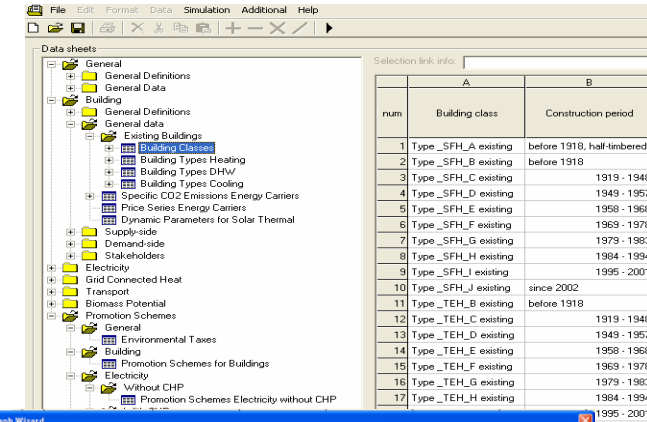
In the following regions comprehensive investigations have been carried out using **Invert Simulation Tool**.

- Baden-Württemberg (Germany)
- Crete (Greece)
- Cornwall (UK)
- Denmark (whole country)
- Jordanow (Poland)
- Vienna (Austria)

The following promotion schemes can be simulated:

Sector	Sub-sector	CO ₂ Tax	Investment Subsidy	Soft Loans	Feed in tariff
Building	Heating	✓	✓	✓	
	Domestic Hot Water (DHW)	✓	✓	✓	
	Air condition	✓	✓	✓	
	District Heating	✓	✓	✓	
Electricity	RES-E	✓	✓		✓
	RES-CHP	✓	✓		✓
Bio fuels	Bio fuel	✓			

Sector	Sub-sector	Tax incentive		Subsidy on fuel costs	Additional set aside premium
		Power	Energy		
Electricity	RES-E	✓	✓	✓	
	RES-CHP	✓	✓	✓	
Bio fuels	Bio fuel		✓		✓



The Simulation settings dialog box includes sections for General Simulation Settings, Demand-Side Simulation Settings, and Reference Scenario. It contains checkboxes for sectors like Building, Heating and DHW, Cooling, Electricity, RES-E, RES-CHP, Grid Connected Heat, and Transport. It also features fields for Simulation Years (Start year: 2004, End year: 2004), an Autonomous Simulation checkbox, and a Payback Time section with a Use stakeholder payback time checkbox. A 'Start Simulation' button is at the bottom.

