GWS SPECIALISTS IN EMPIRICAL ECONOMIC RESEARCH

Mandaté par :

Ministère fédéral de l'Environnement, de la Protection de la Nature et de la Sûreté nucléaire

de la République fédérale d'Allemagne

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

PRÉSENTATION DU MODÈLE E3.DZ

DÉVELOPPÉ DANS LE CADRE DU PROJET GIZ « DIALOGUE POLITIQUE SUR LES STRATÉGIES CLIMAT-ÉNERGIE ET GESTION DES CONNAISSANCES DANS LA RÉGION MENA » (DIAPOL-CE)

Frank Hohmann, GWS mbH, Germany

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Who we are:

- **Privately funded think tank/ research institute / consultancy**
- **Currently ~ 24 researchers**
- **Private and public customers**
  - International, national and regional Governments, Ministries
  - Energy companies, banks

Support private and public decision makers with sound empirical, data based, economic tools

Main areas of interest:

Environmental questions, energy policy, focus on renewable energy, materials, focus on resource efficiency

Economic modelling, individual country models, regional models, world

Labor market issues

Capacity building

Main goals of the project

- Develop a long-term dynamic simulation model for the Algerian economy
- Model must be suitable for quantitative analysis of different (energy) policies
- Model must be fully accessible (incl. all data and source code) by Algerian partners in order to apply, update and enhance it independently

Sources of information

- National (and international) data
  - Macroeconomic data
  - Input-Output tables describing inter-industry relations
  - Energy balances describing energy intake and expenditure
  - Times series from 1984 (or latest 2000)

- Close cooperation with local experts to better understand the Algerian economy and strategies

- Experiences from other (inter)national modelling exercises, i.e. to measure economic impacts of renewable energy and energy efficiency

Model implementation

- e3.dz: Integrated economy, energy and environment model for Algeria
  - ⇨ Covering the three E's and their interrelations allows for quantifying direct AND indirect or induced effects
- Econometric regressions project past behavior into the future
- Dynamic solution: Model solves the equation system year-by-year
- Model is fully implemented in Microsoft Excel
  - ⇨ User-friendly solution
  - ⇨ Easy distribution of model and scenario results

Applying the model: Scenario analysis

- Scenario: Consistent set of quantitative assumptions describing a certain policy
- Reference scenario (Business-as-usual): Projection of today's economic situation "as is"
- Scenario analysis: Comparing the outcome of one scenario with another (i.e. reference) scenario

- Two sample scenarios have been developed regarding renewable energy and energy efficiency targets
  - ⇨ Moderate assumptions
  - ⇨ Optimistic assumptions

Renewable energy (RE) assumptions

Reference:

- No increase of renewable energy beyond 2017
- Existing installations are operated and maintained

Moderate Scenario

- Reaches the 22 GW target by 2050
- Technology choice as planned
- Spending 0.1% of GDP on efficiency and RE

Optimistic Scenario

- Reaches the 22GW in 2035
- Continuation of the path thereafter (36 GW in 2050)

No assumptions regarding decommissioning in any scenario

Energy efficiency (EE) assumptions

Reference:

- No explicit modelling of additional EE

Moderate scenario:

- National targets reached in 2050.
- Decrease of energy demand to 73 million toe (tons of oil equivalents) in 2050 instead of 80 million toe

Optimistic scenario

- National targets reached in 2035
- Extrapolation until 2050
- Decreases of final energy consumption (industrial sector up to 12.1%, residential sector 8.4 % in 2050)

Scenario analysis conclusions

- Simulation results positive for both scenarios
  - ⇨ Moderate: 200k additional jobs induced by RE
  - ⇨ Optimistic: 300k additional jobs induced by RE
- Energy transition thus seems to be a win-win situation and should be pursued with vigor.
- Integrated modelling approach reveals “hidden” effects:
  - ⇨ Feedback loop from the energy system to the economy via additional hydrocarbon revenues.
  - ⇨ Additional economic activity tends to cannibalize on efficiency gains. Any production increase leads to – ceteris paribus – an additional demand for energy.

Limits by design

- Some implementation details could be improved, e.g. constant input-output table
- Long-term simulation models are not suitable for short-term forecasts
- Model can only quantify, not recommend policies
- Many important questions require additional modelling activities, e.g. how regions are affected
- Inconsistent assumptions produce misleading results

Thank you for your attention!

Frank Hohmann

T +49 (0) 541 40933 - 130
E hohmann@gws-os.com

Information Technology