



Georgia Energy Policy Analysis:

Overview of the MARKAL/TIMES Methodology and Use

USAID Regional Strategic Energy Planning Project

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USAID Strategic Energy Planning Project



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- Why use the MARKAL/TIMES Energy System Model?
- MARKAL/TIMES Building Blocks: What goes into the System?
- What are the key components for the Reference Energy System?
- Where are we now in the program and Next Steps?

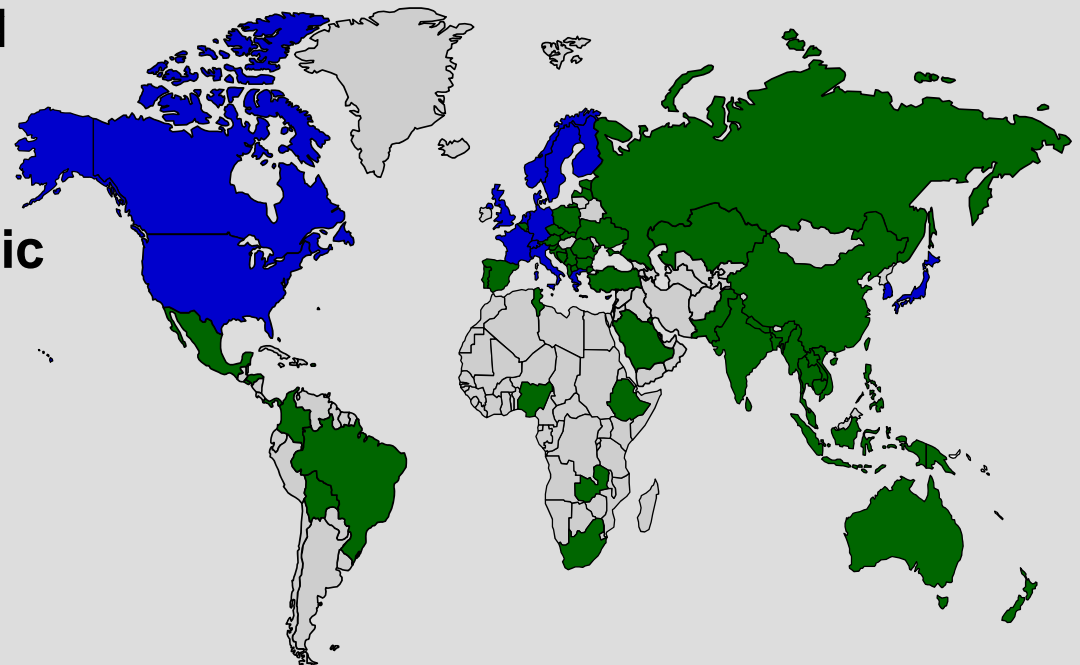




MARKAL/TIMES Global Reach



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- Provides an **integrated energy systems modeling framework** to guide policy formulation and investment priorities
- **Widely used, proven and continually evolving**
- Used to assess a wide range of **energy, economic and environmental planning and policy issues**
- **Flexible, verifiable and adaptable methodology**



 ETSAP Partner Countries
 MARKAL/TIMES Users



MARKAL/TIMES

Key Characteristics



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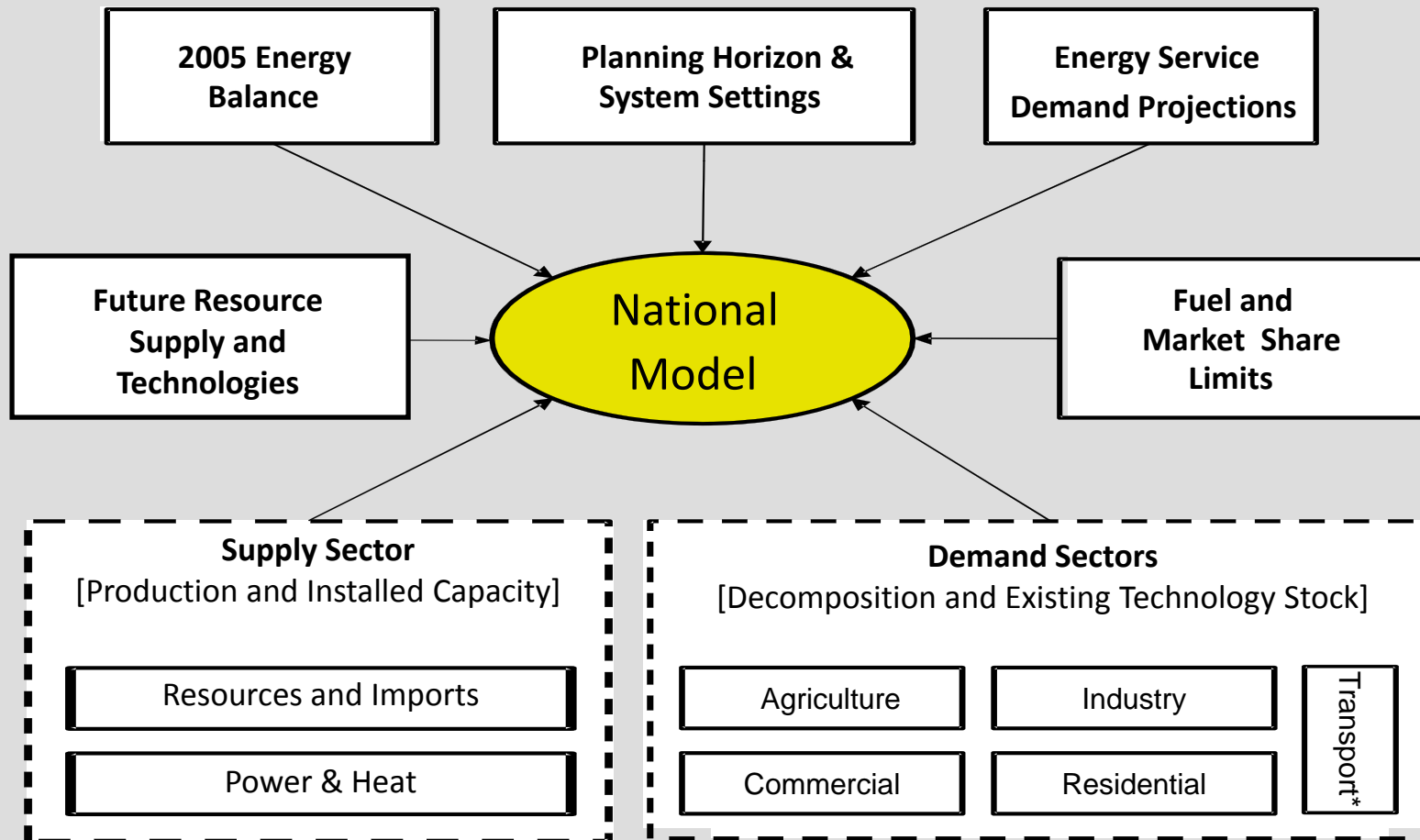
- Developed and maintained under by the International Energy Agency – Energy Technology Systems Analysis Programme ([IEA-ETSAP](#))
- Encompasses an [entire energy system](#) from resource extraction through to end-use demands as represented by a Reference Energy System (RES) network
- Employs least-cost [optimization](#)
- Identifies the most [cost-effective](#) pattern of resource use and technology deployment over time
- Provides a framework for the evaluation of mid-to-long-term [policies and programs](#) that can impact the evolution of the energy system
- Quantifies the [costs and technology choices](#) that result from imposition of the policies and programs
- Identifies the [benefits](#) arising for various policies and programs (e.g., increase energy security and economic competitiveness, reduced emissions)



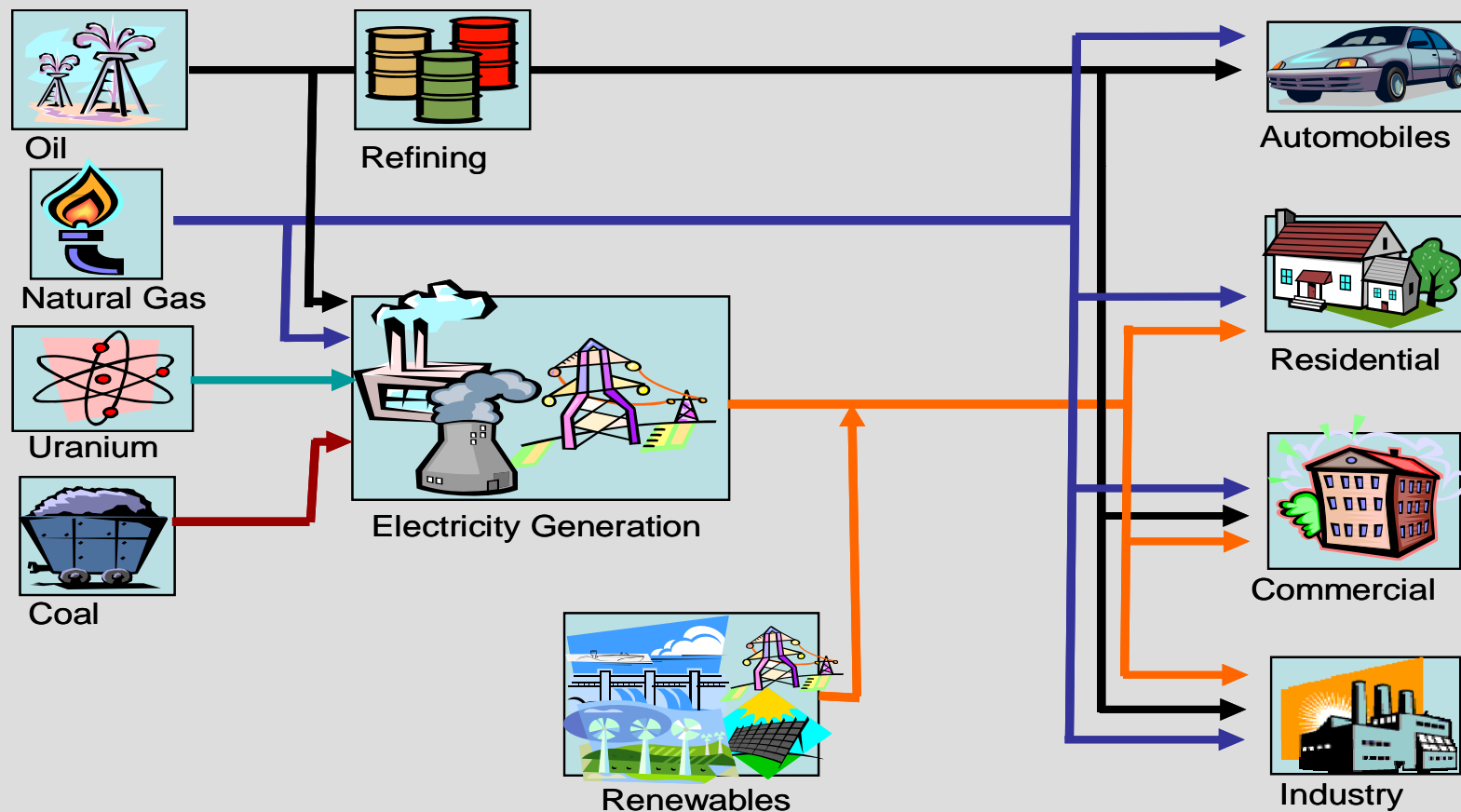
MARKAL/TIMES Building Blocks



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Simplified Reference Energy System



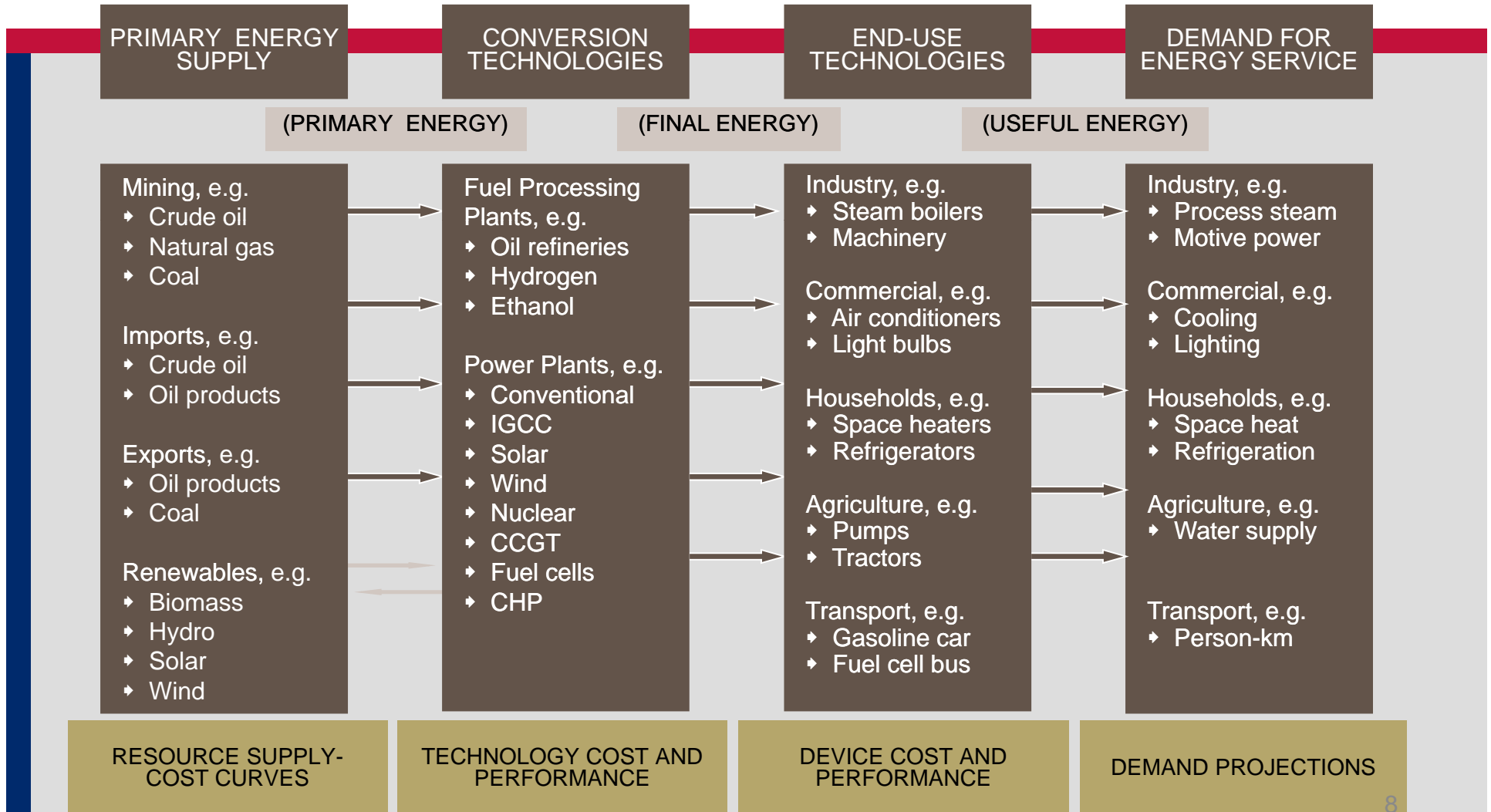


Depicting the National Energy System



- **Energy Balance (2006/9)**
- Analysis of the **annual electricity load curve** to establish sector consumption patterns
- End-use **fuel consumption decomposition** procedure
- **Calibration** throughout the energy system (resources, refining, power & heat, final energy by sector)
- Establishing drivers (e.g., GDP, population, saturation) and **demand projections** for each end-use
- Identify **future** resource supply, power sector and demand **options**
- Guiding the **evolution of Reference** scenario (BAU) energy system
 - Determine the “hurdle rates” for improved demand device (impediments to adoption of energy efficient options)
 - Decide upon fuel switching ranges in each sector
 - Reflect the cost of (electricity and gas) infrastructure expansion
 - Smoothing and taming model choices to reflect country situation

Reference Energy System Components



Level of technology detail is a function of available data and nature of the questions and policies to be explored

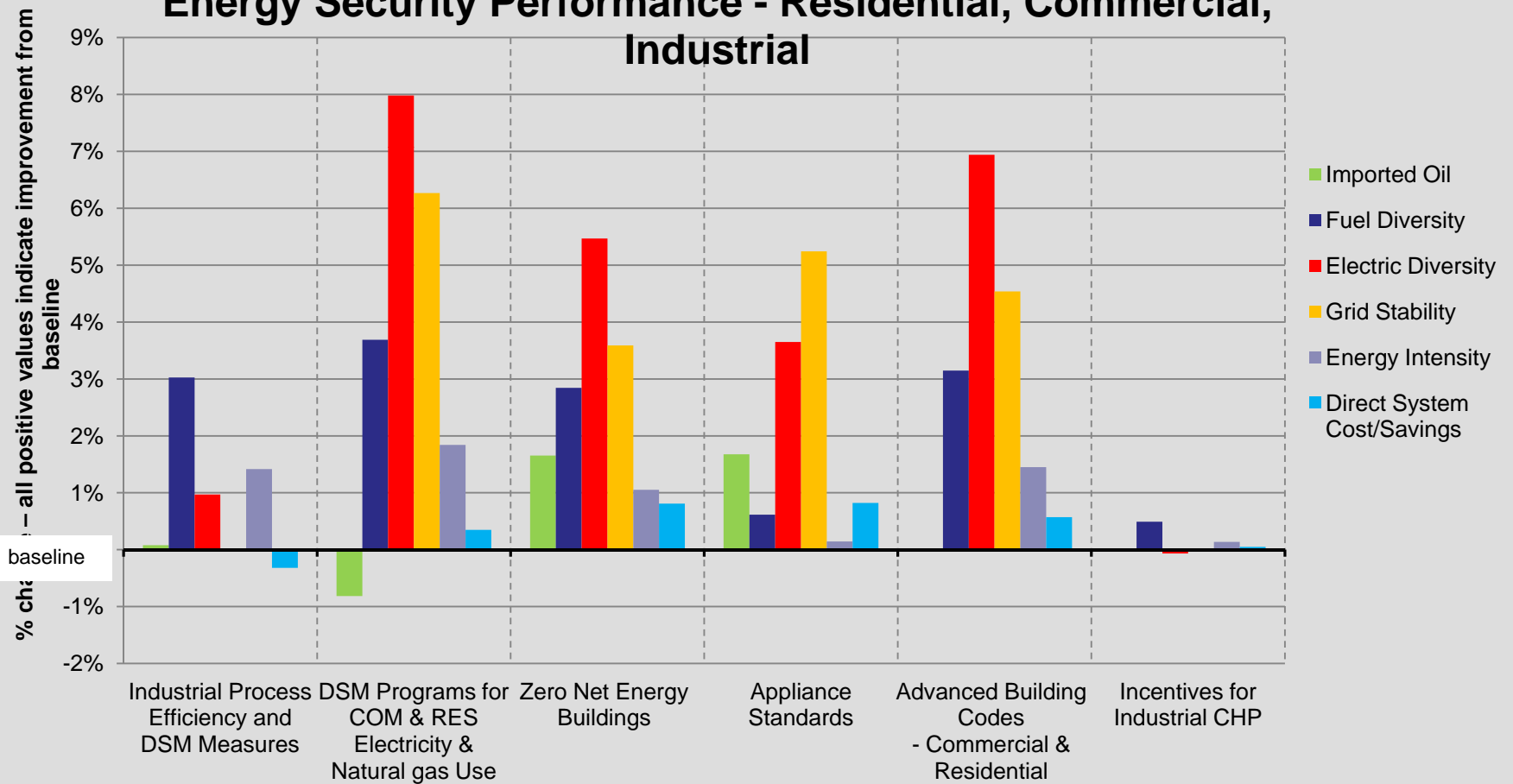


Assessing Implications on Energy Security



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Energy Security Performance - Residential, Commercial, Industrial



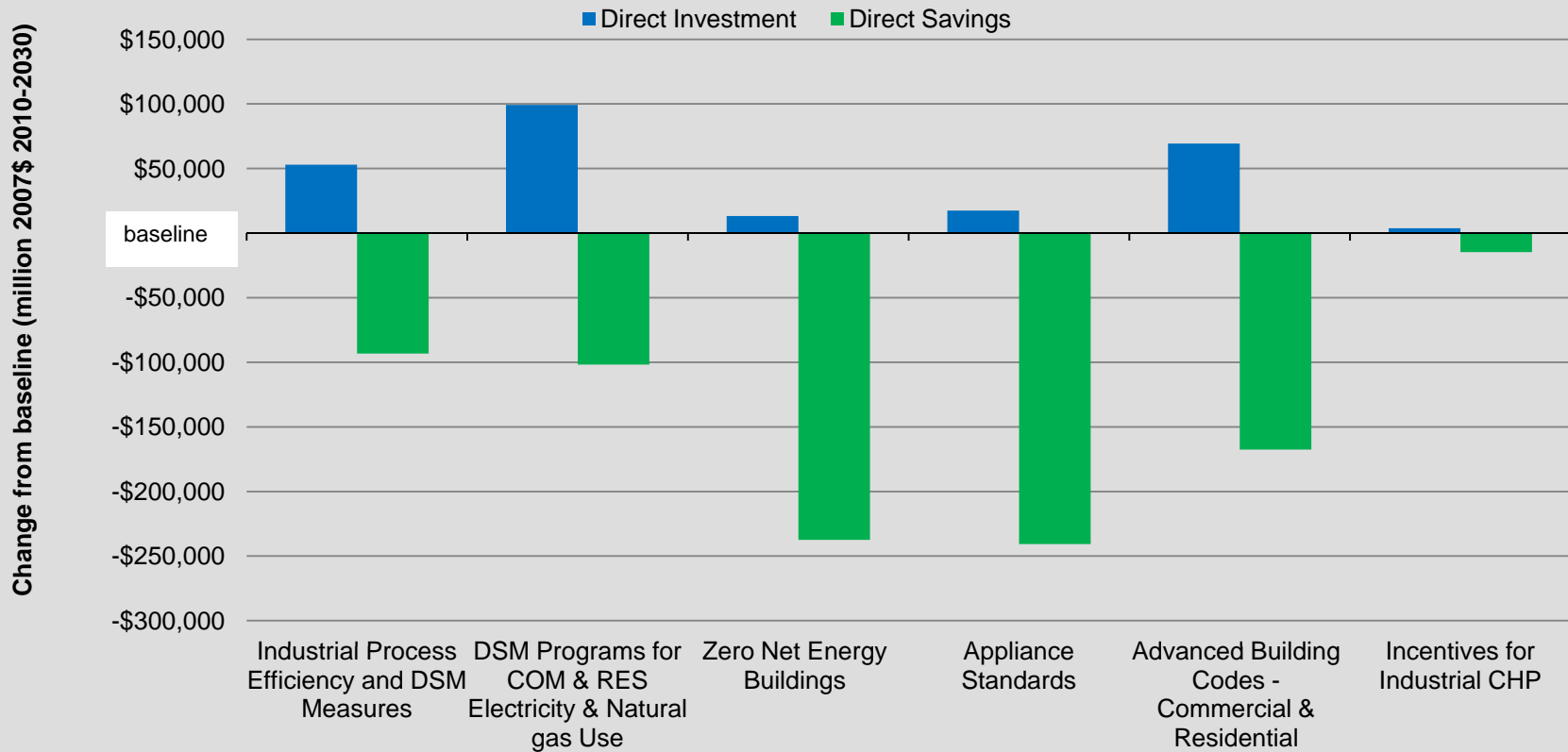


Assessing Implications on Competitiveness



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Direct Cost (Savings) & Investment Requirements - RCI Sector



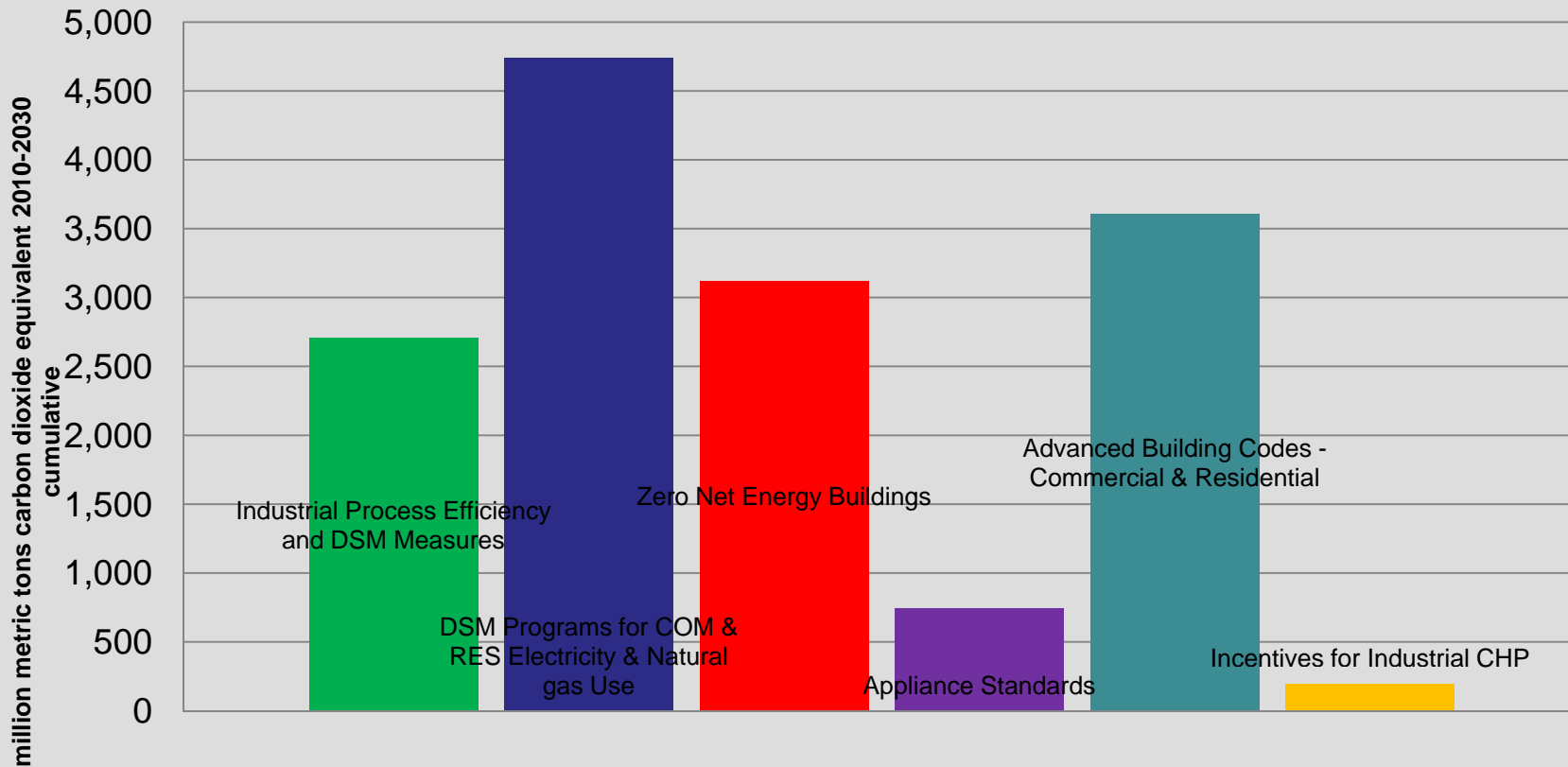


Impact of Climate Change



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GHG Reductions - Residential, Commercial, Industrial





Where we are now?



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- **Substantial progress** has been made by participating countries in developing a useful tool for national strategic energy planning and the skills to work with it
- National models are positioned to play a **significant role in policy formulation** and energy strategy deliberations
- Current analyses look to **quantify the benefits and costs** of different Energy Efficiency (EE) and Renewable Energy (RE) targets, and other national priorities
- Today's World Experience Georgia (WEG) presentation makes a strong case that Energy Efficiency and Renewable Energy investments can contribute to **improved energy security, promoting economic growth, and reduce greenhouse gas emissions for Georgia**



Next Steps



- Many assumptions have to be made and there is clearly room to refinement as part of a **consensus building process**, for which this workshop is meant to serve as a solid starting point in Ukraine
- Similar **National Energy Policy workshop briefings** have been held in two other Energy Community countries, and planned for 2012 in two others
- Here in Georgia, besides the progress to date, analyses are also planned to
 - Effect of electricity export prices on new power plant builds
 - Impact and implications of building the Gardabani coal-fired power plant
 - Accelerated economic development scenario



Major Europe MARKAL/TIMES Analyses



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- IEA Energy Technology Perspectives - Scenarios and Strategies to 2050 [16 region global model]

<http://www.iea.org/techno/etp/index.asp>

- UK Climate Change Policy “White Paper”

<http://www.ukerc.ac.uk/ResearchProgrammes/EnergySystemsandModelling/ESM.aspx>

- New Energy Externalities Developments for Sustainability (NEEDS)

<http://www.isis-it.net/needs/>

- The Pan-European TIMES model (PET)

http://www.res2020.eu/files/fs_inferior01_h_files/pdf/deliver/The_PET_model_For_RES2020-110209.pdf

- RES2020 examining the EU renewables directive

<http://www.cres.gr/res2020/>

- REALISEGRID optimal development of European transmission infrastructure

<http://realisegrid.rse-web.it/>

- Risk of Energy Availability: Common Corridors for Europe Supply Security (REACCESS)

<http://reaccess.epu.ntua.gr/TheProject/ProjectObjectives.aspx>



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Thank You!

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