Moldova Energy Policy Analysis:

The Role and Impact of Energy Efficiency and Renewable Energy Going Forward

USAID Regional Strategic Energy Planning Project

Gary Goldstein
International Resources Group

LeoGrand Hotel
Chisinau, Moldova

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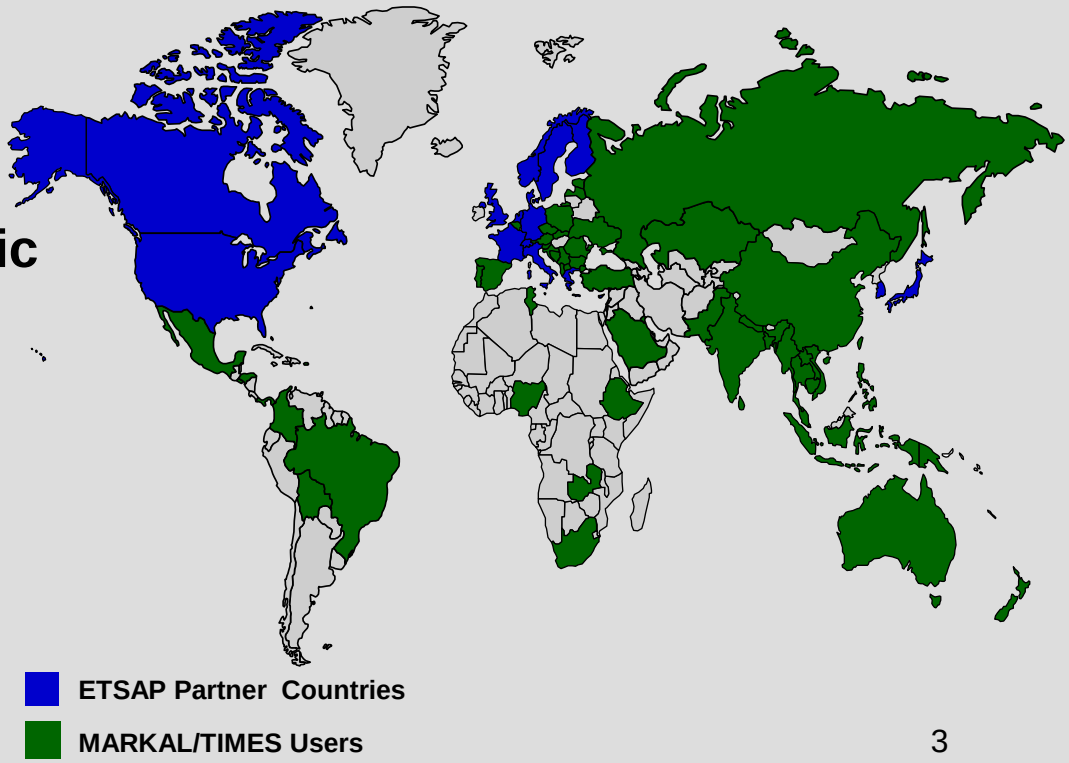
USAID Strategic Energy Planning Project

- 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

- 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



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MARKAL/TIMES Key Characteristics

- 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)

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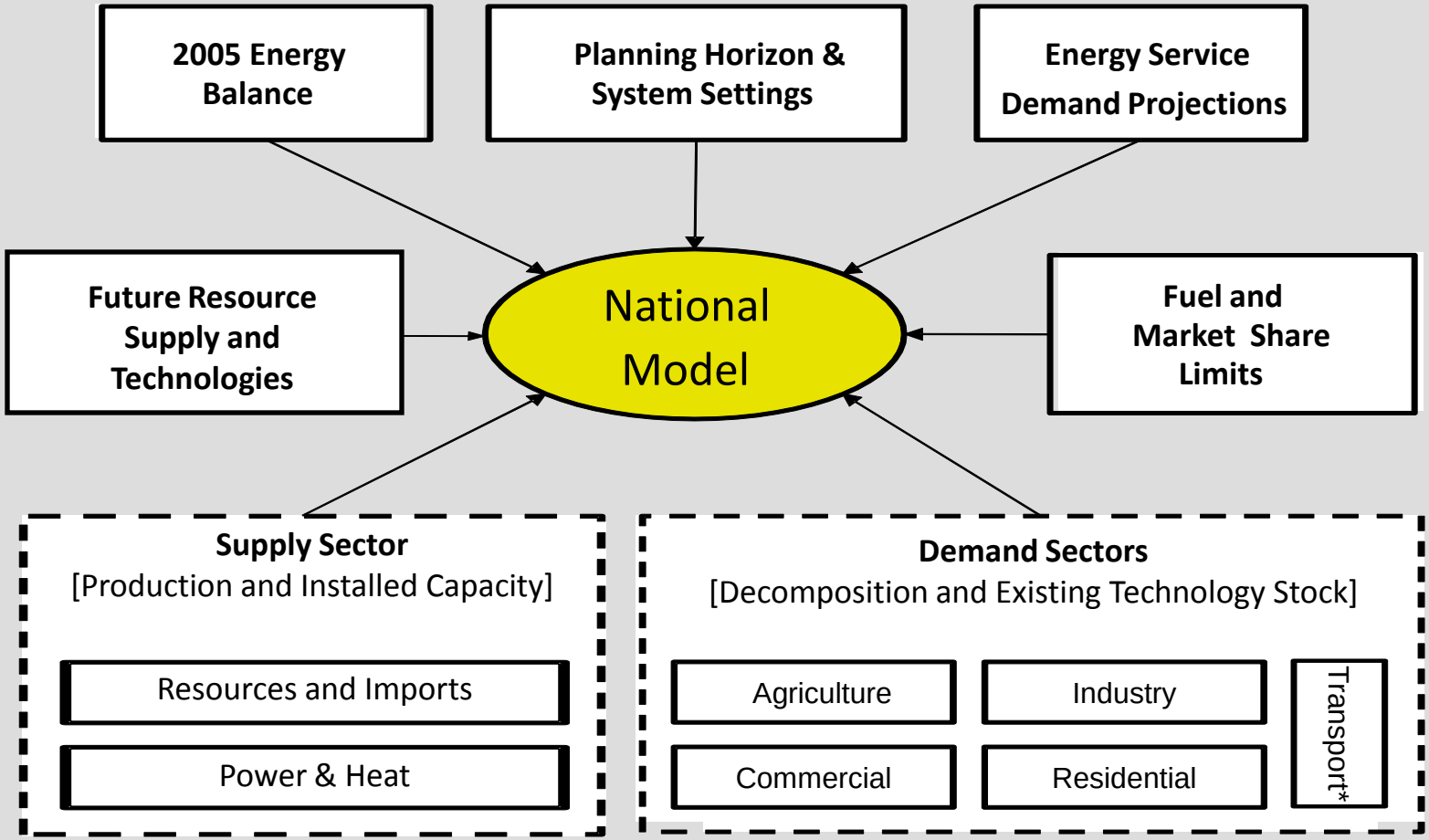
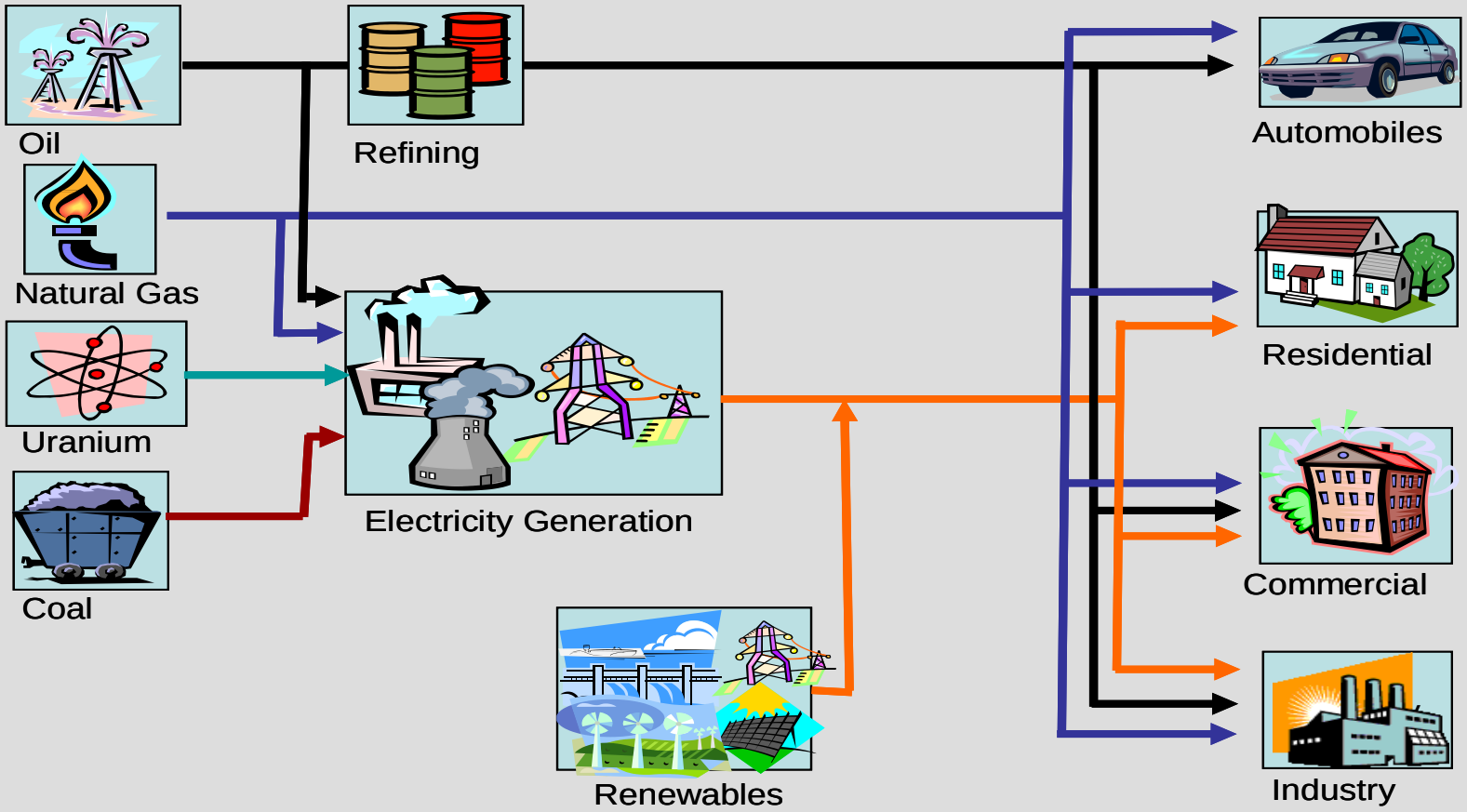
MARKAL/TIMES Building Blocks



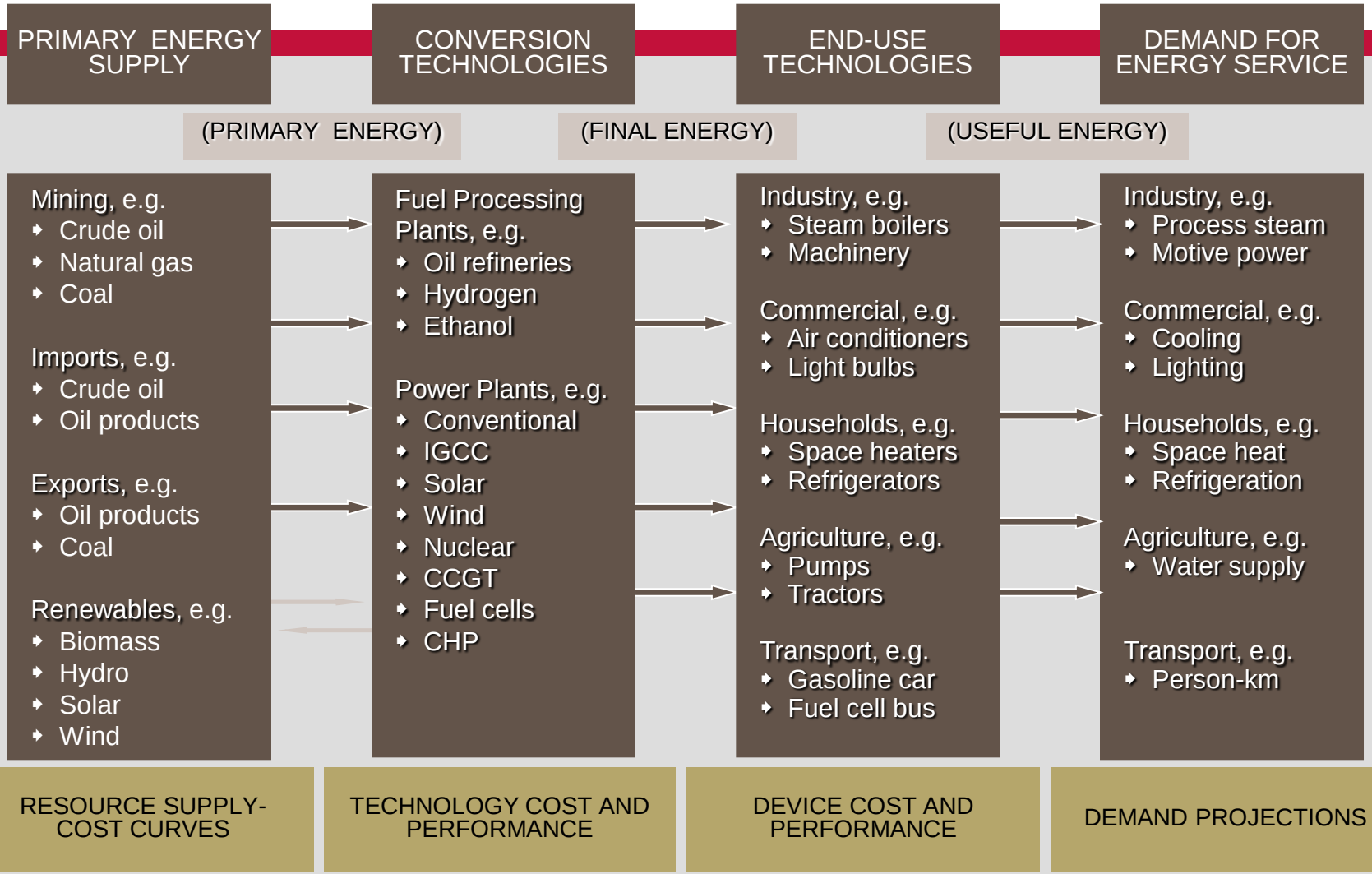
Depicting the National Energy System

- **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

Simplified Reference Energy System



Reference Energy System Components



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

Where we are now?

- **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 Academy of Sciences of Moldova / Institute of Power Engineering (ASM/IPE) 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 Moldova**

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 Moldova, besides the progress to date, **analyses are also planne**d to
  - Complete the Energy Community Regional Energy Strategy Data Call
  - Contribute to the preparation of the update to the Energy Strategy 2030
  - Provide support for the Moldova's Task Force Group on Gas-to-Power Initiative of the Energy Community
  - Provide support for Moldova's Renewables Action Plan (NREAP) for Energy Community
  - Perform updated Energy Efficiency analysis in support of Moldova's Energy Efficiency Action Plan (NEEAP)

Major Europe MARKAL/TIMES Analyses

- 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

Thank You!

Gary Goldstein

International Resource Group / DecisionWare, Inc.

E-mail: gary.a.goldstein@gmail.com