Global Energy Assessment (GEA) and its Impact

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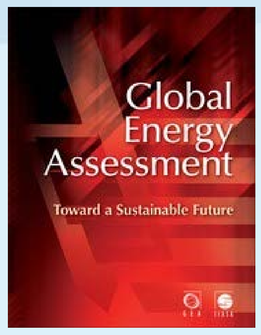

1 About the Book

- The Global Energy Assessment (GEA) was a multi-stakeholder initiative involving over 300 authors and 200 reviewers.
- It assesses the major energy challenges of our rapidly changing world from multiple perspectives.
- It identifies strategies and pathways for resolving the issues facing the urgently needed transformation of the global energy systems.
- Hosted and coordinated at IIASA, GEA involved energy experts from around the world and is the first ever fully integrated assessment analyzing energy challenges and opportunities for developing, industrialized and emerging economies.
- Its Council and group of funders and supporters included governments, non-governmental organization, academia, the United Nations system, and private sector.

3 Selected Key Messages

By assessing a broad range of resources, technologies, and policy options, GEA identified forty-one alternative options or 'pathways' that could support the required energy system transformation:

- **Radical improvements in energy efficiency**, especially in end-use is required and provides an immediate and effective option: efficiency improvements are proving to be the most cost-effective, near-term option for getting onto a pathway of energy system transformation.

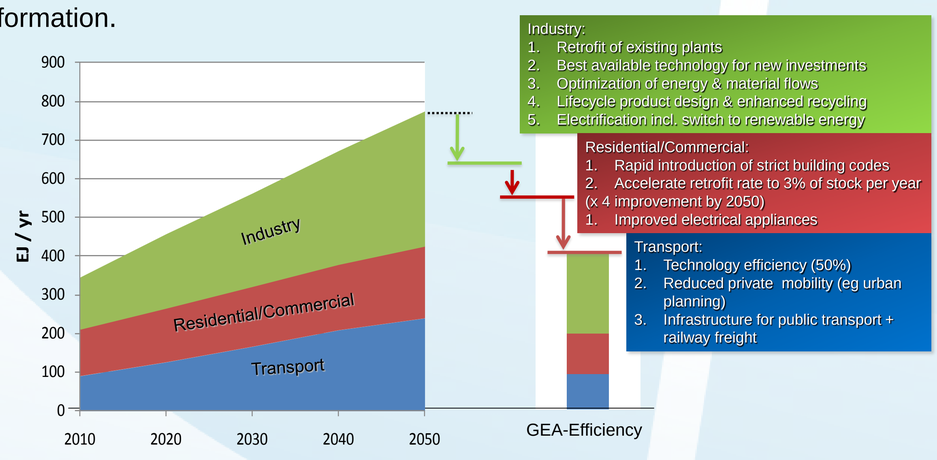

Figure 2: Global Primary Energy. Source: Riahi et al. 2012 in GEA 2012.

- **Decarbonization** through the rapid escalation of investment through greater shares of renewable energy and smart grid enabling more effective utilization of renewable energy technologies is possible and feasible: renewable energies are abundant, widely available and increasingly cost-effective making it possible for the share of RE in global primary energy to increase from its current 30% to 75% and in some regions exceed 90%

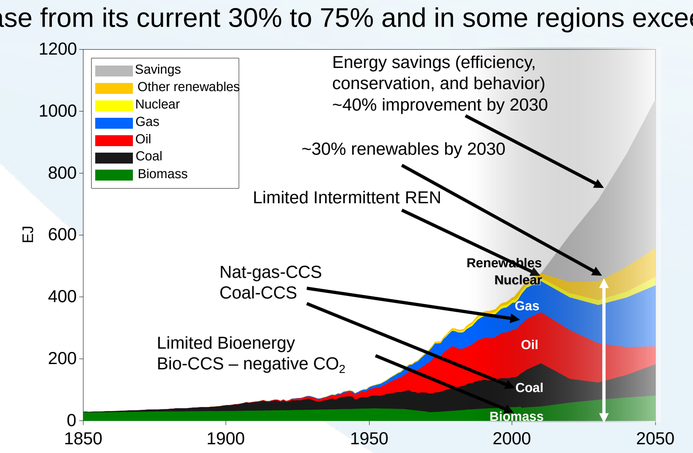

Figure 3: Global Primary Energy. Source: Riahi et al 2010 in GEA 2012.

- **Universal access to electricity and cleaner cooking fuels and stoves** can be achieved by 2030 but this requires innovative institutions, enabling mechanisms and targeted policies to enable this to happen and to enable a required rapid transformation of the energy system for this and other developments to take place' but this requires a stable investment regime and policies that provide incentives for large scale deployment of energy efficiency, renewable energy and advanced energy system technologies and global investments in the trillions.

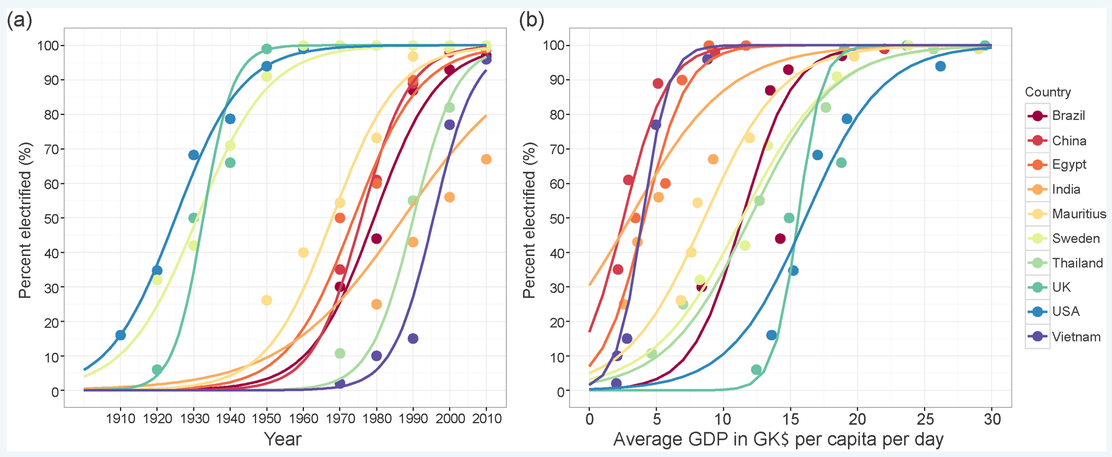

Figure 4: S-curve fits to historical electricity access data by year and average income level in international Geary–Khamis dollars (GK$). Source: Rao & Pachauri 2017.

2 Global Energy Challenges

- Current energy systems are not delivering across major global needs: poverty eradication, climate, sustainable production and consumption, infrastructure, health, to name just a few.
- Global energy systems require a major transformation that makes them affordable, safe, secure and environmentally sound so as to deliver on major global needs.
- Providing clean and affordable energy for all is a pre-requisite for most other of the human rights included in the UN Charter.
- Increasing energy security for all regions and nations is a pre-requisite for global development and world peace.
- Reducing GHG emissions to limit global warming to less than 2 degrees centigrade and even more ambitious levels above pre industrial levels is now agreed as a major strategy for avoiding catastrophic impacts of climate change across several area.
- Reducing in-door and out-door air pollution from fuel combustion and its adverse impacts on human health should be one of the top priorities for targeting the poor.
- Identifying and reduction the ancillary risks associated with energy systems is a prerequisite for developing all options for countries to choose.

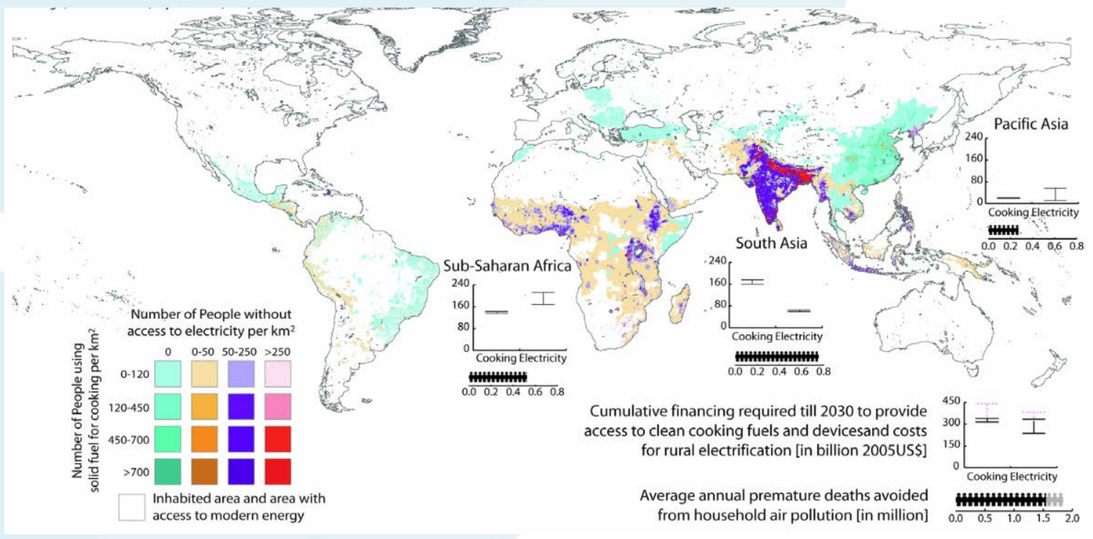

Figure 1: Source: Proportion of population without access to electricity and using solid fuels. Nagai et al 2011 in GEA 2012.

4 GEA Impacts

- **UN-Energy**: Contributed to shaping of the work of the UN system and its agencies in energy around the world through direct advice to group reviewing this work.
- **High Level Advisory Group on Energy and Climate Change**: Through direct high level advice to the Secretary General, helped shape the strategy and work of the UN Secretary General in the area of climate and which would later turn into his important legacy.
- **Intergovernmental Panel on Climate Change (IPCC)**: Through GEA's core team and several lead authors, contributed substantively to the production of the IPCC AR5; GEA also became one of the most cited works throughout.
- **Vienna Energy Forum (VEF)**: With GEA as a background pillar, IIASA has contributed to the founding and development of this major international forum for policy debate and scientific discussion.
- **Sustainable Energy for All (SE4ALL)**: Initiative of the UN Secretary General was created based on the analysis and contribution of GEA and led to the design of SE4All based on three targets on energy access, energy efficiency and renewable energy.
- **SDG 7**: The three targets based on GEA, later became the blueprint for SDG 7:

7.1 By 2030, ensure universal access to affordable, reliable and modern energy services

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix

7.3 By 2030, double the global rate of improvement in energy efficiency

Figure 5: Sustainable Development Goal 7.

- **Policy Tools and Pathways Databases**: Using GEA analysis, iterative policy tools for decision makers for easy use are now available to all on the website as well as one of the richest databases which documents the results and assumptions used in the GEA transformation pathways.
- **Paris Agreement**: With GEA substantive contribution to the IPCC AR5, one can say that GEA was a major contributor also to the Paris Agreement.
- **SDG Implementation**: Current work at IIASA and elsewhere on the SDGs that examines synergies between SDGs and particularly SDG 7 with others is heavily based on the analysis of GEA.
- **The Shared Socio-Economic Pathways (SSPs):** Through the IIASA team and its participation in the work on a new scenarios, GEA work is a strong contributor.

References

GEA, 2012: *Global Energy Assessment - Toward a Sustainable Future*, Cambridge University Press, Cambridge, UK and New York, NY, USA and the International Institute for Applied Systems Analysis, Laxenburg, Austria (www.globalenergyassessment.org)

Rao N. & Pachauri S. (2017). Energy access and living standards: some observations on recent trends. Environmental Research Letters DOI:10.1088/1748-9326/aa5b0d. (In Press)