International Institute for Applied Systems Analysis
IIASA www.iiasa.ac.at

science for global insight

Energy: Challenges & Drivers

Keywan Riahi
International Institute for Applied Systems Analysis
Graz University of Technology
riahi@iiasa.ac.at

TWI2050, IIASA, 10 March 2015

Sustainable development means overcoming several energy challenges

Energy Poverty

Water

Land Use & Forests

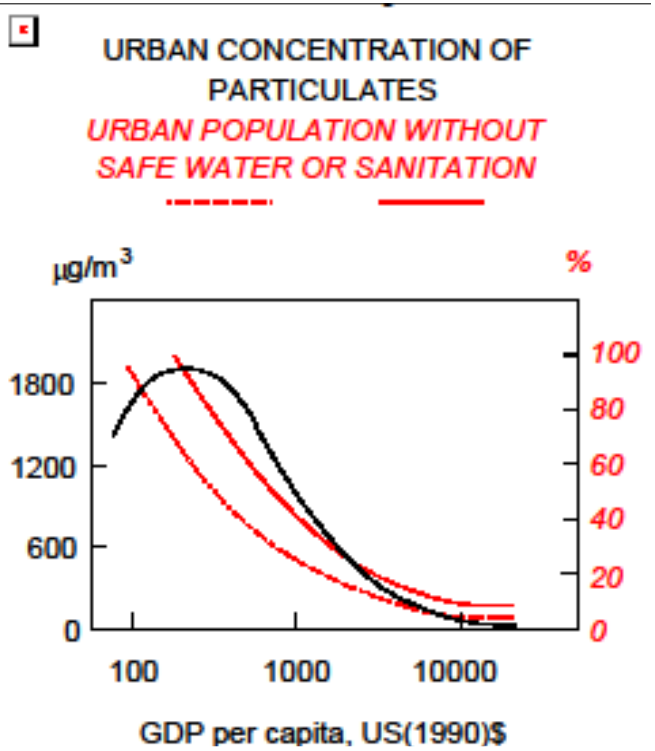
Climate Change

Energy Security

Air Pollution

Image sources: NASA, http://www.powernewsnetwork.com/white-house-releases-plan-to-cut-oil-imports-by-13-by-2025/1798/, http://wheresmyamerica.wordpress.com/2007/08/26/i-cant-see-my-america/, http://www.americanprogress.org/issues/green/report/2009/05/14/6142/energy-poverty-101/, http://today.uconn.edu/blog/2010/12/reclaiming-water-a-green-leap-forward/, http://te.wikipedia.org/wiki/%E0%B0%A6%E0%B0%B8%E0%B1%8D%E0%B0%A4%E0%B1%8D%E0%B0%B0%E0%B0%82:Forest_Osaka_Japan.jpg

POVERTY

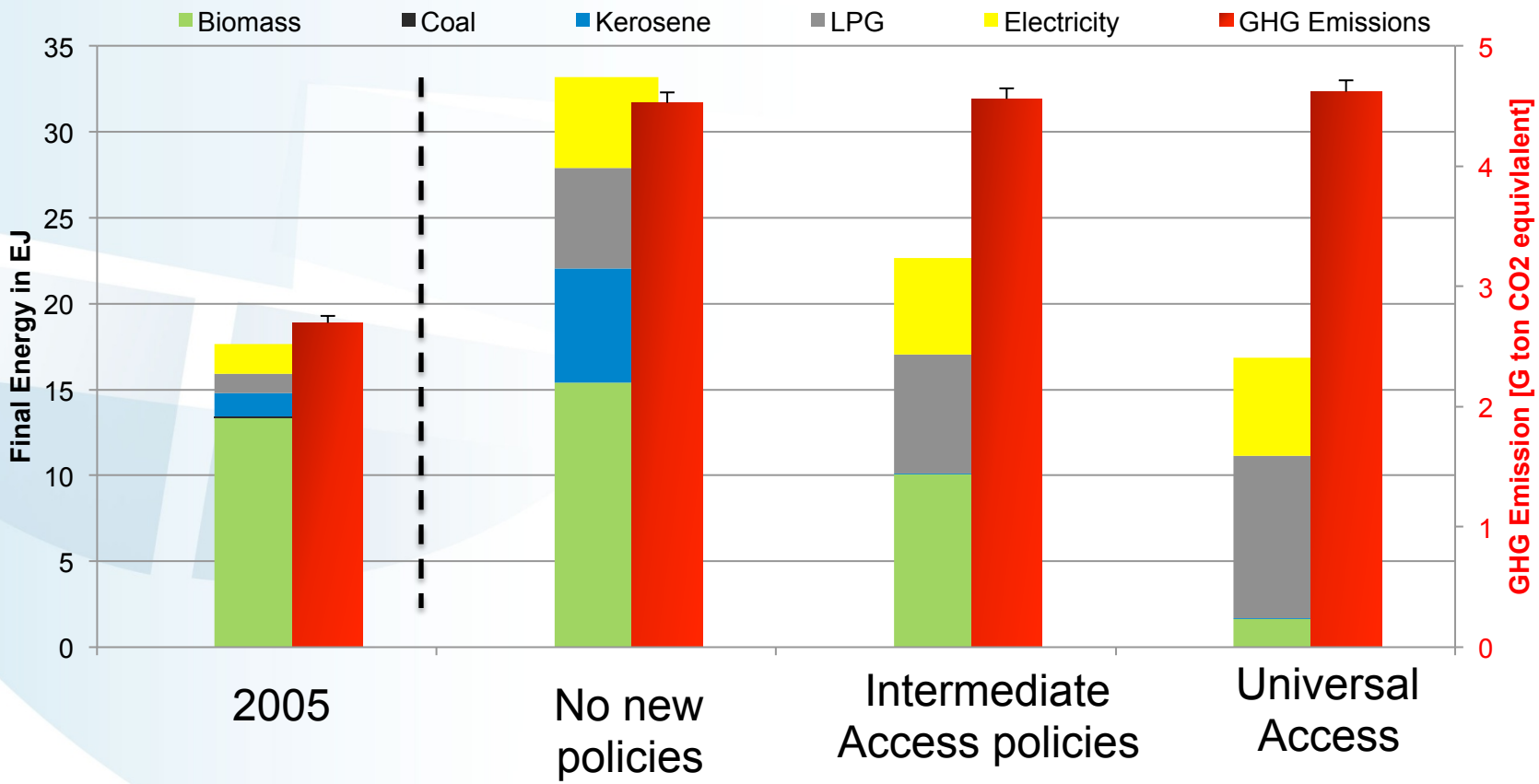


Based on WB, 1992

Energy Policy

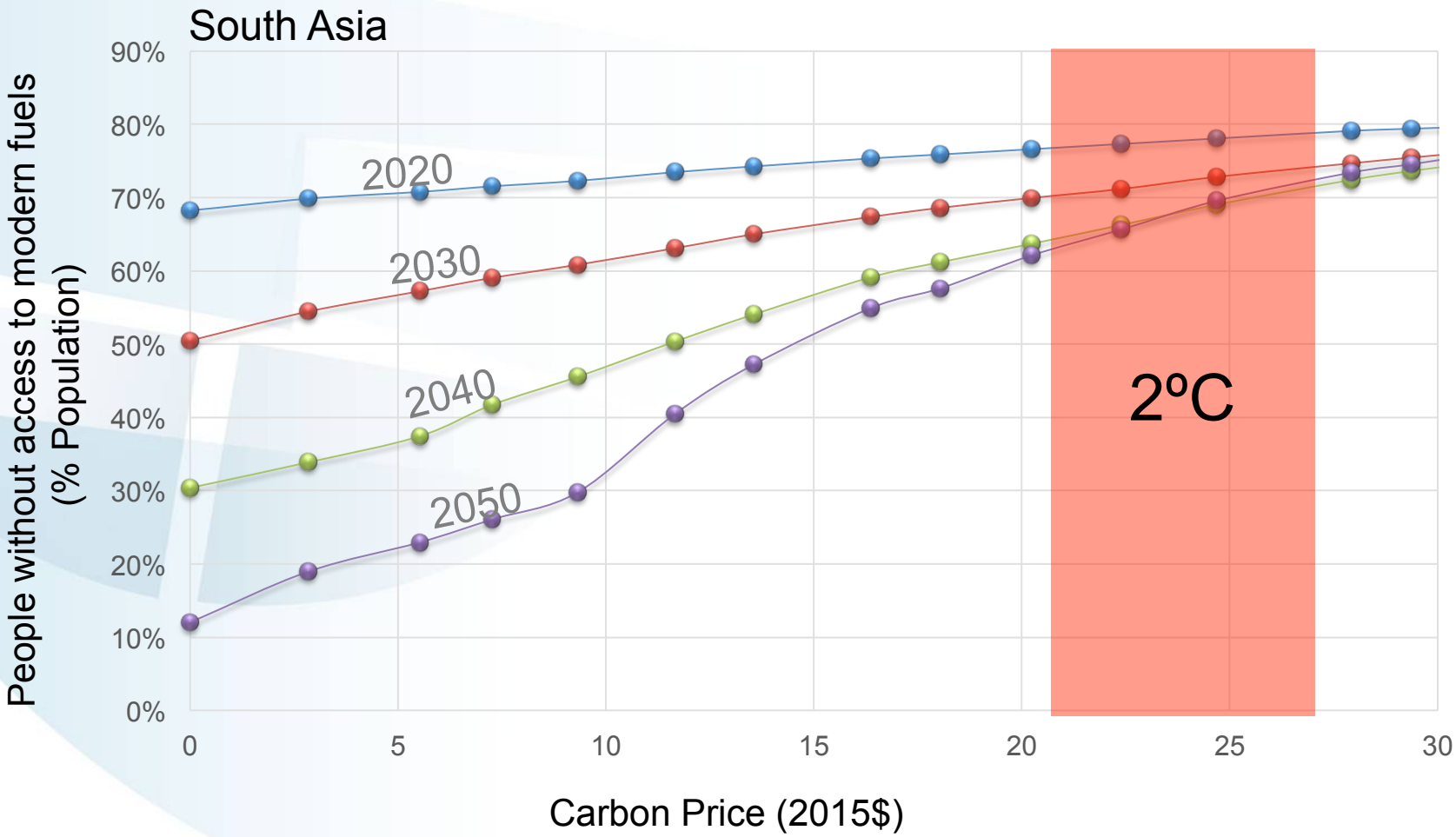
- Major driver of past transitions and future solutions
- Effects often “asymmetric” – solving one problem, but creating another one
- Integration across objectives, sectors, and scales needed
- Example: climate-energy poverty linkages

Impacts of Energy Access Policies on GHG Emissions are Negligible



Source: Pachauri et al. 2013, Environ. Research Letters

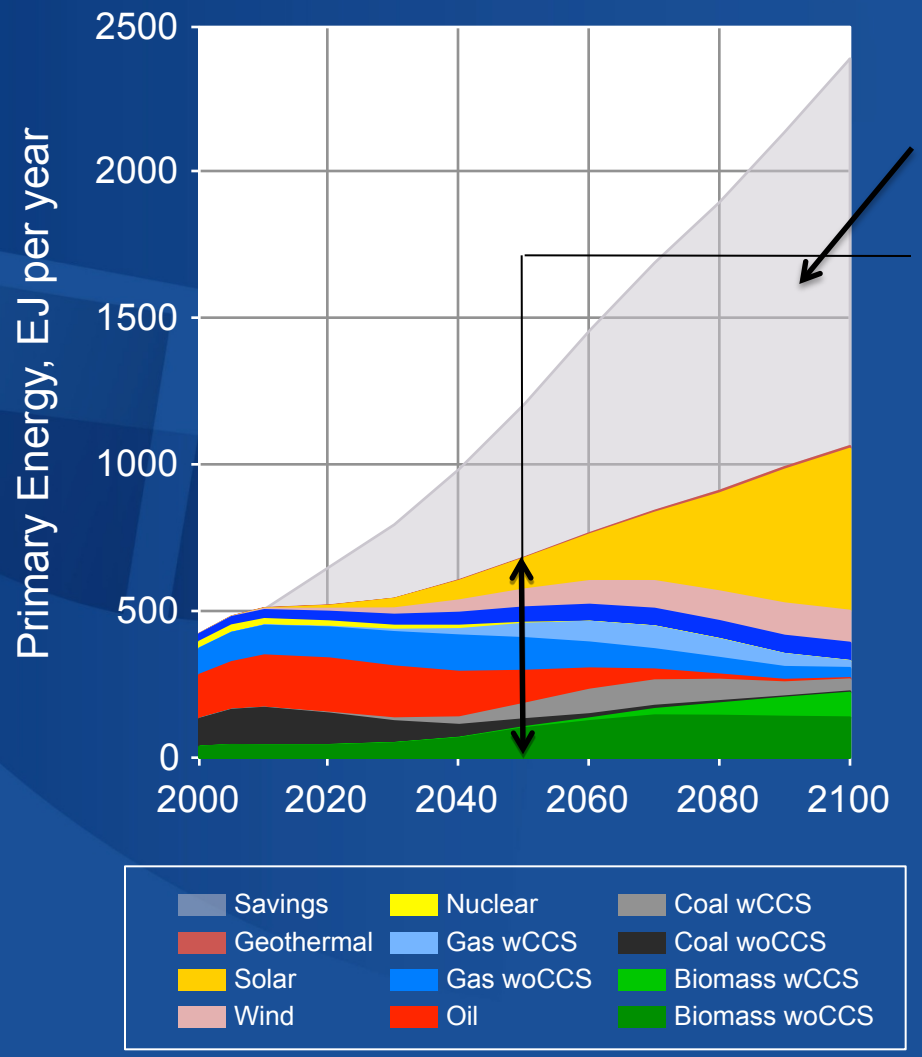
Impact of Climate Policy on Energy Access (without compensatory mechanisms)



PRELIMINARY RESULTS: Cameron, Pachauri, Rao, Riahi (forthcoming)

SE4ALL Goals / Energy SDGs

Integration of Access, Efficiency and Renewables can provide an entry point for the Climate Objective



Energy savings (efficiency, conservation, and behavior)

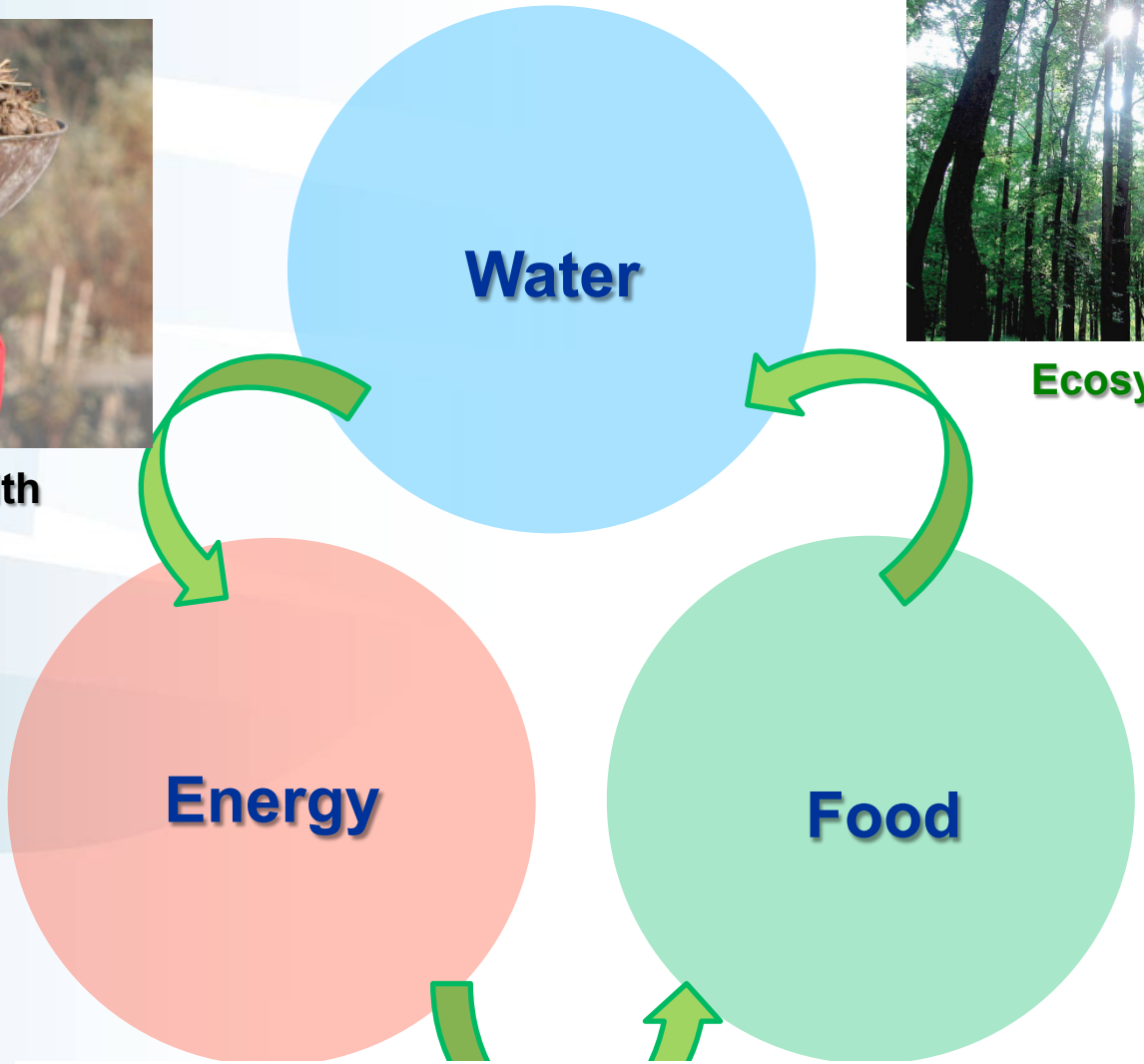
~50% renewables by 2050

GEA: Chapter 17 (Riahi et al, 2012)

The Energy-Food-Water Nexus

Human Health

Ecosystems



Climate Change

How do these linkages facilitate or constrain our ability to meet development and sustainability goals?

Air and Water Quality

Thank you!

nature climate change

D. McCollum, V. Krey, K. Riahi (2011)

Synergies of Meeting Multiple Energy Objectives

Integrated Climate-Pollution-Security Policies