



International Institute for  
Applied Systems Analysis  
[www.iiasa.ac.at](http://www.iiasa.ac.at)

science for global insight



# Integrated Research: Energy and The World in 2050 Collaborative Initiative

Nebojsa Nakicenovic

Deputy Director General

International Institute for Applied Systems Analysis

Professor Emeritus of Energy Economics

Vienna University of Technology

*“Europe Current Evolution”, 4<sup>th</sup> Prague Castle – 24 June 2015*



IIASA, International Institute for Applied Systems Analysis

# The Key Energy Challenges



Energy Access



Climate Change

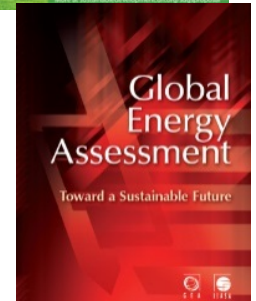


Energy Security



Air Pollution  
Health Impacts

# SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all



- 7.1 by 2030 ensure universal access to affordable, reliable, and modern energy services
- 7.2 increase substantially the share of renewable energy in the global energy mix by 2030
- 7.3 double the global rate of improvement in energy efficiency by 2030
- 7.a by 2030 enhance international cooperation to facilitate access to clean energy **research and technologies**, including renewable energy, energy efficiency, and advanced and cleaner fossil fuel technologies, and promote **investment** in energy infrastructure and clean energy technologies
- 7.b by 2030 expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in **developing countries**, particularly LDCs and SIDS



**SUSTAINABLE DEVELOPMENT  
SOLUTIONS NETWORK**  
A GLOBAL INITIATIVE FOR THE UNITED NATIONS



**Stockholm Resilience Centre**  
Sustainability Science for Biosphere Stewardship

**THE EARTH INSTITUTE**  
COLUMBIA UNIVERSITY

# The World in 2050

Integrating knowledge on SDSN pathways to global sustainable development

Inaugural Meeting – 10-12 March 2015

# The World in 2050

- ➡ Global development within a safe and just operating space and planetary boundaries
- ➡ “Safe Space” of interaction among SDGs: integrated models to sustainability narratives
- ➡ Transformational pathways based on existing literature e.g. SSPs, GEA, SDSN’s DDPP
- ➡ Co-benefits of transformation toward the “safe space” and how to achieve sustainable futures



# The World in 2050 “Consortium”

- AIMES
- Future Earth
- Centre for Integrated Studies on
- Earth League, whole Earth system modelling initiative
- Earth Institute, Columbia University
- Global Ocean Ecosystem Dynamics (GLOBEC)
- Indian Institute International Futures
- Indian Institute of Technology (IIT)
- International Energy Agency (IEA)
- International Food Policy Research Institute (IFPRI)
- International Monetary Fund (IMF)
- International Institute for Applied System Analysis (IIASA)
- Joint Global Change Research Institute at Pacific Northwest National Laboratory (JGCR)
- National Center for Atmospheric Research (NCAR)
- National Institute for Environmental Studies (NIES)
- UN Population Division
- UNEP- World Conservation Monitoring Centre (UNEP-WCMC)
- World Bank
- Organisation for Economic Co-operation and Development (OECD)
- Potsdam Institute for Climate Impact Change (PIK)
- PBL - Netherlands Environmental Assessment Agency
- Stanford University
- Stockholm Resilience Centre
- The City University of New York (CUNY)
- Tsinghua University



THE EARTH INSTITUTE  
COLUMBIA UNIVERSITY



EARTH LEAGUE



INTERNATIONAL FOOD POLICY  
RESEARCH INSTITUTE  
*sustainable solutions for ending hunger and poverty*  
Supported by the CGIAR



Pacific Northwest  
NATIONAL LABORATORY



NCAR  
JGCR

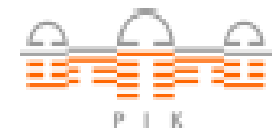


NATIONAL INSTITUTE FOR  
ENVIRONMENTAL STUDIES

United Nations Environment Programme  
World Conservation Monitoring Centre



PBL Netherlands Environmental  
Assessment Agency



STANFORD  
UNIVERSITY

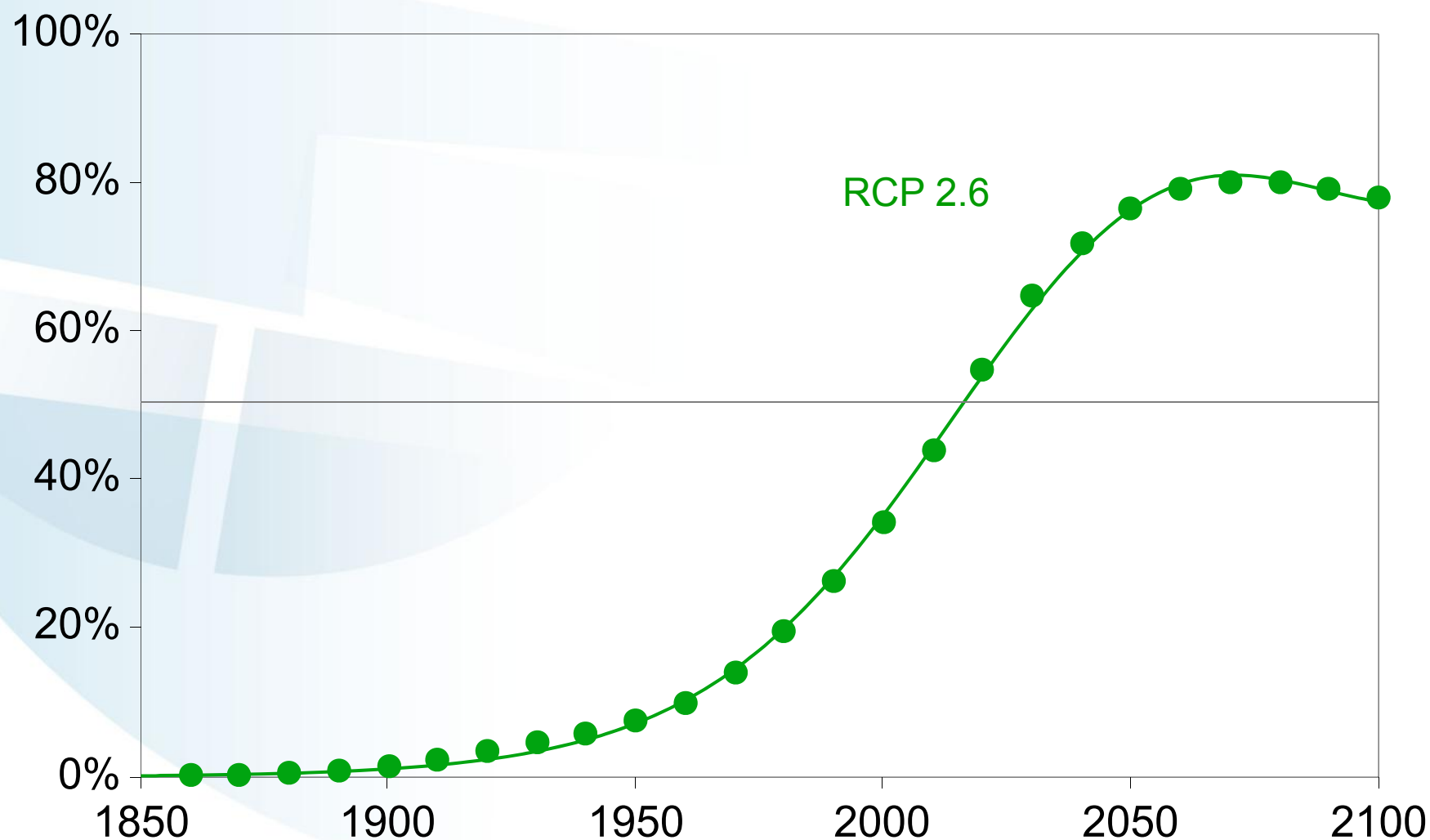


Stockholm Resilience Centre  
Sustainability Science for Biosphere Stewardship

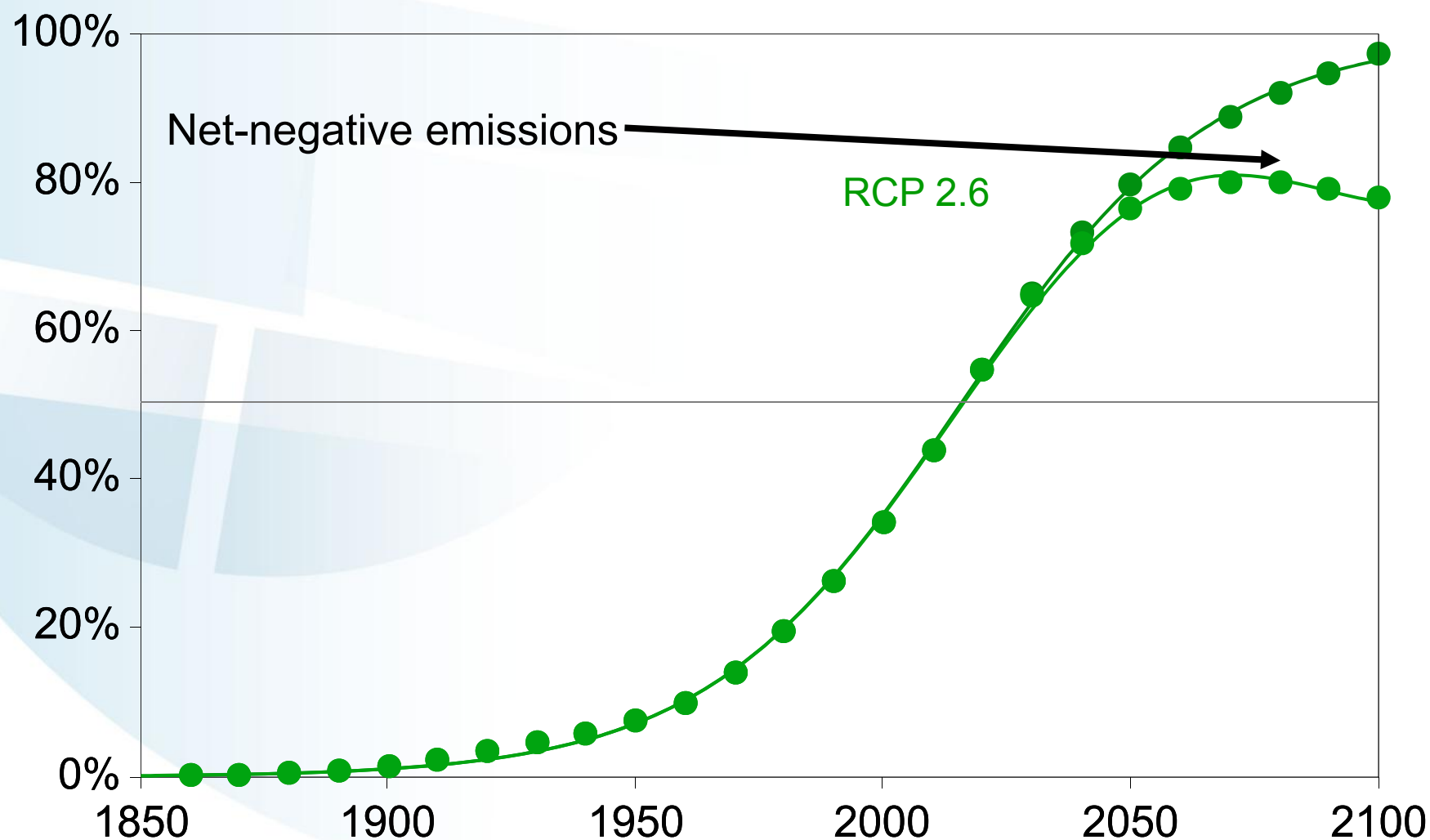


Nakicenovic

# Cumulative Carbon Emissions

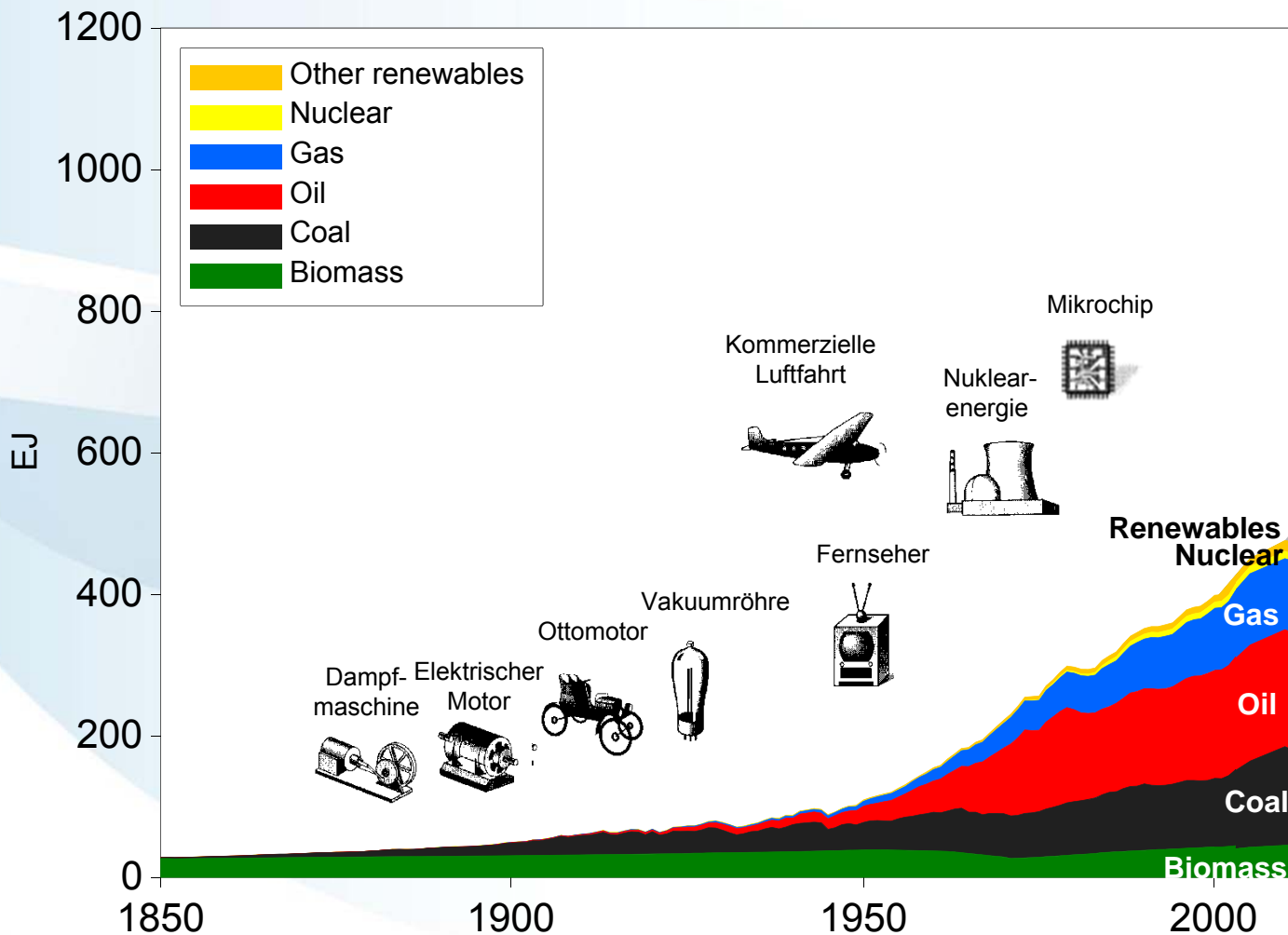
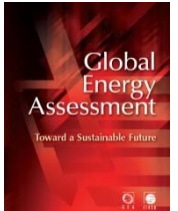


# Cumulative Carbon Emissions



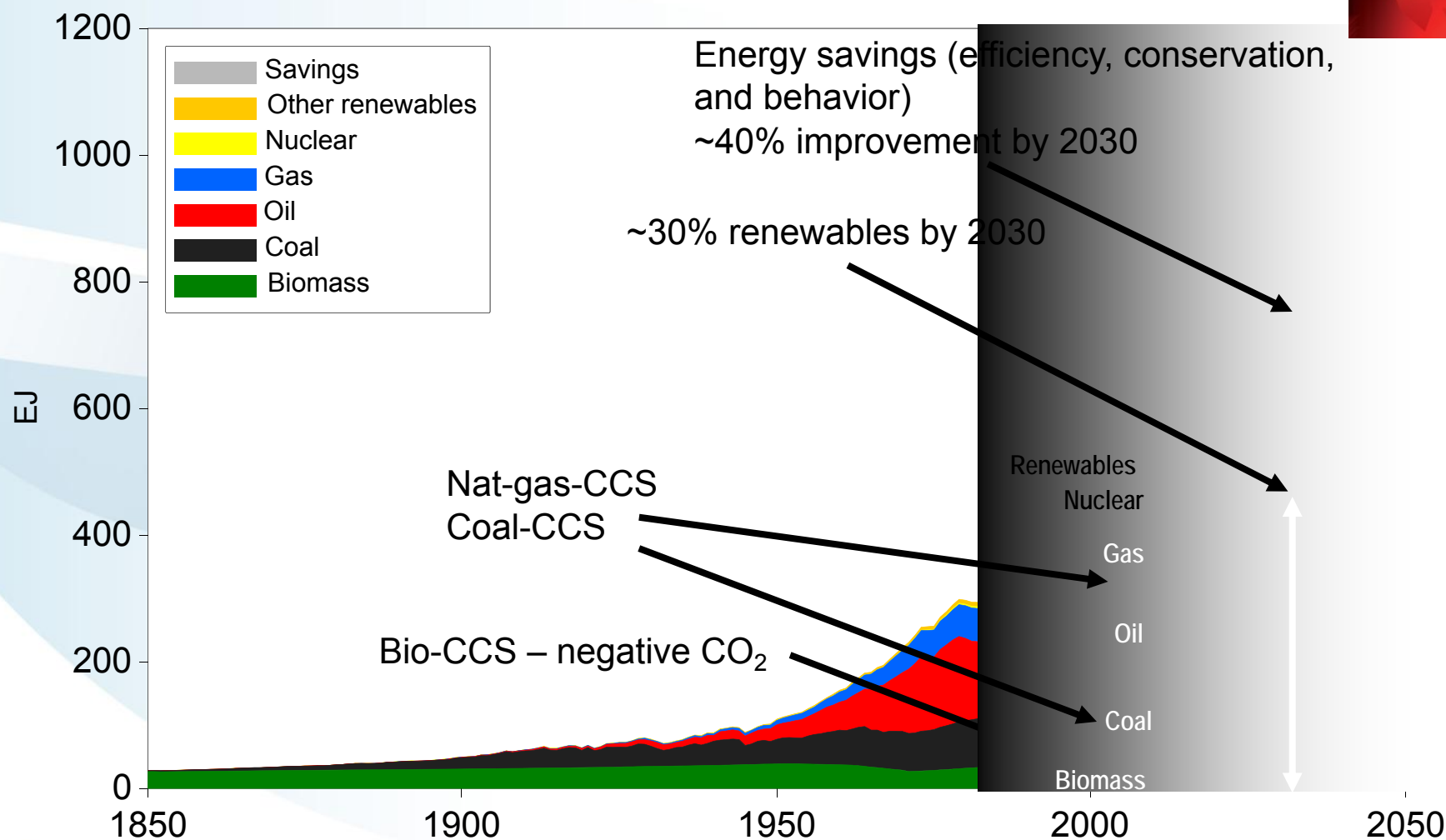
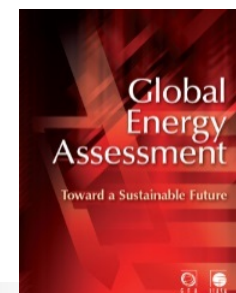


# Global Primary Energy Historical Evolution



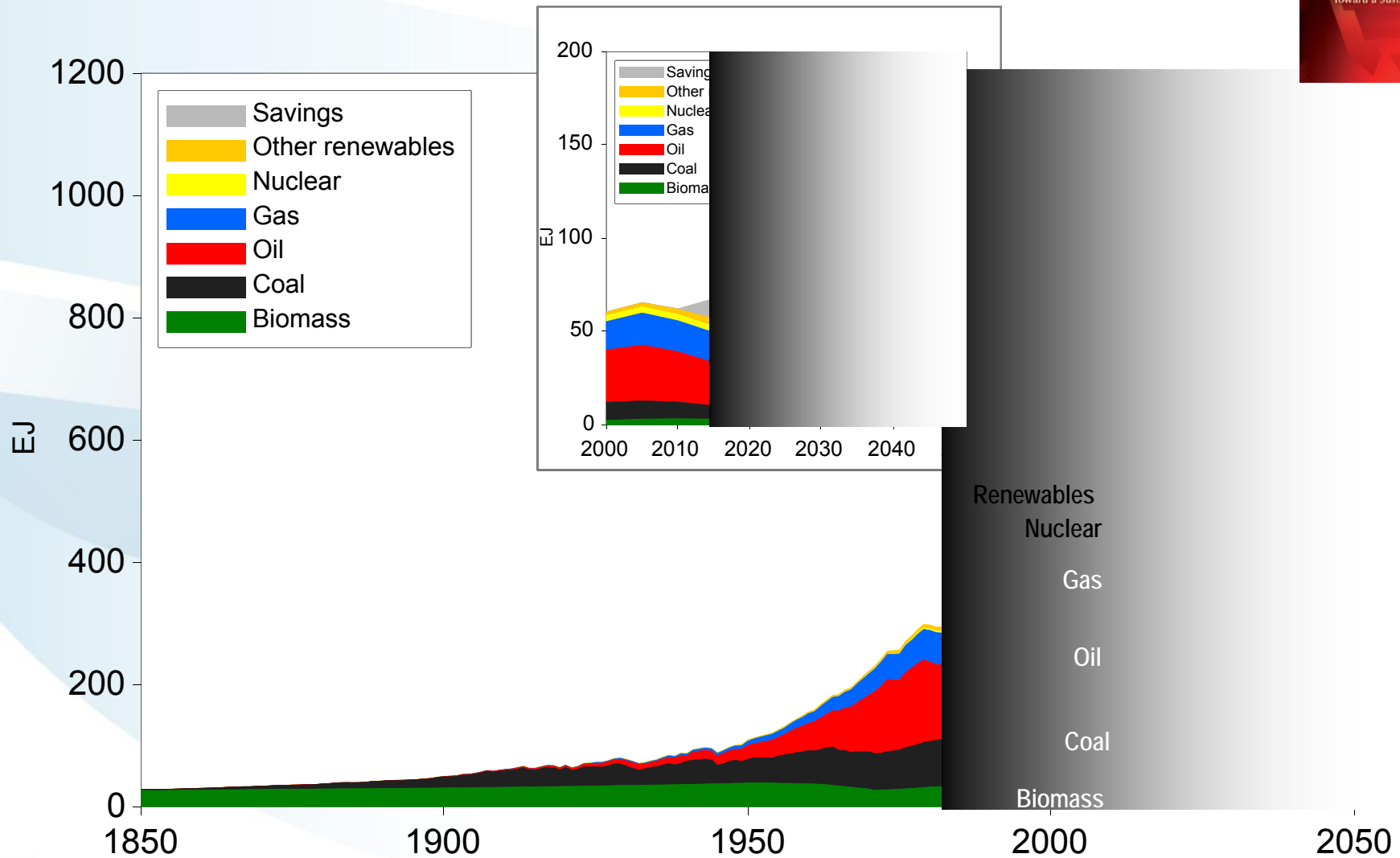
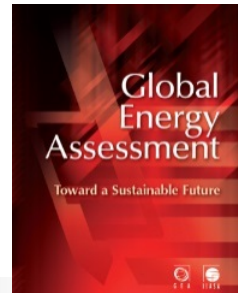
# Global Primary Energy

## A Transformational Pathway



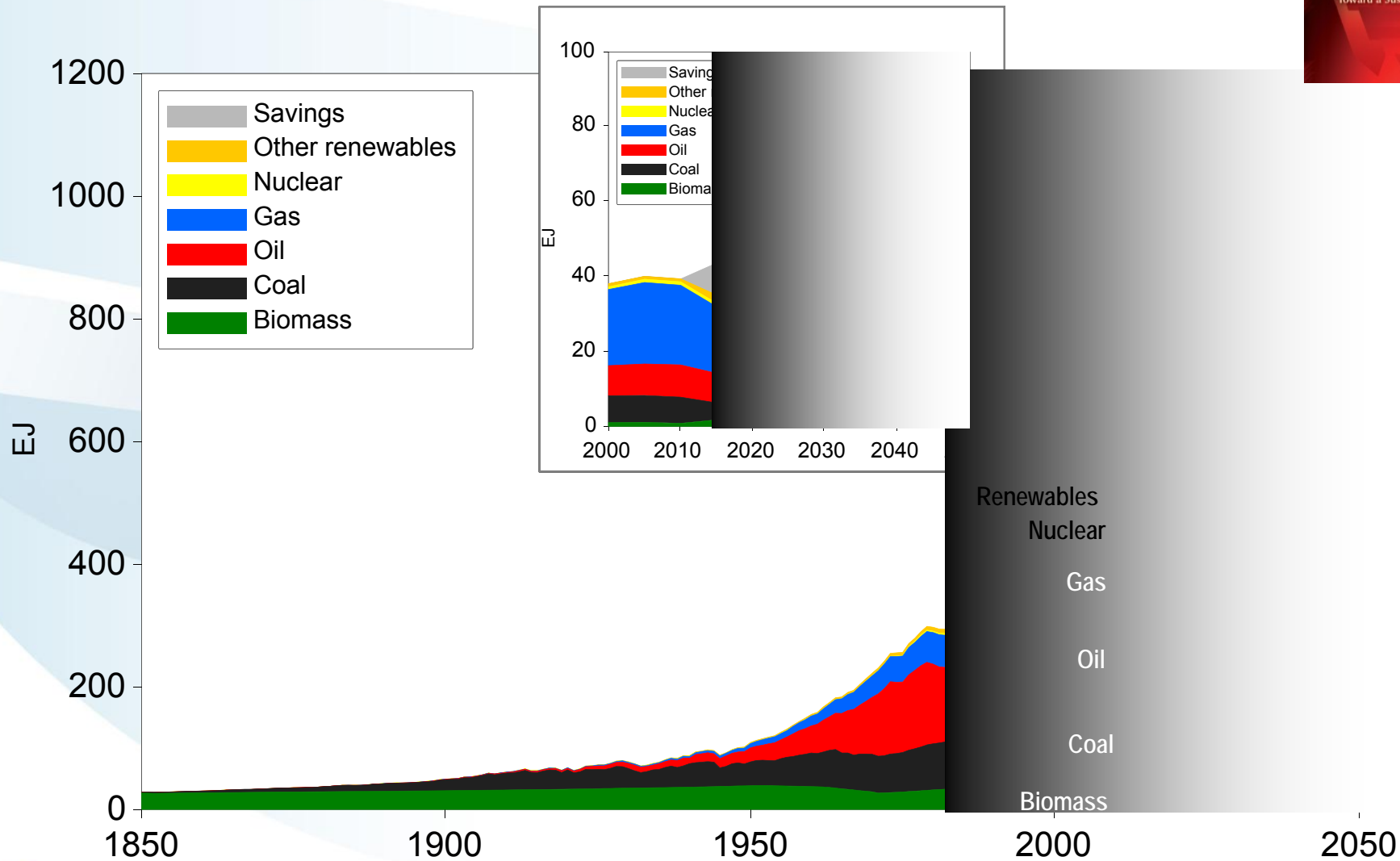
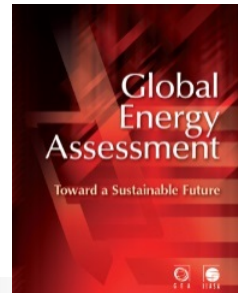
# European Primary Energy

## A Transformational Pathway



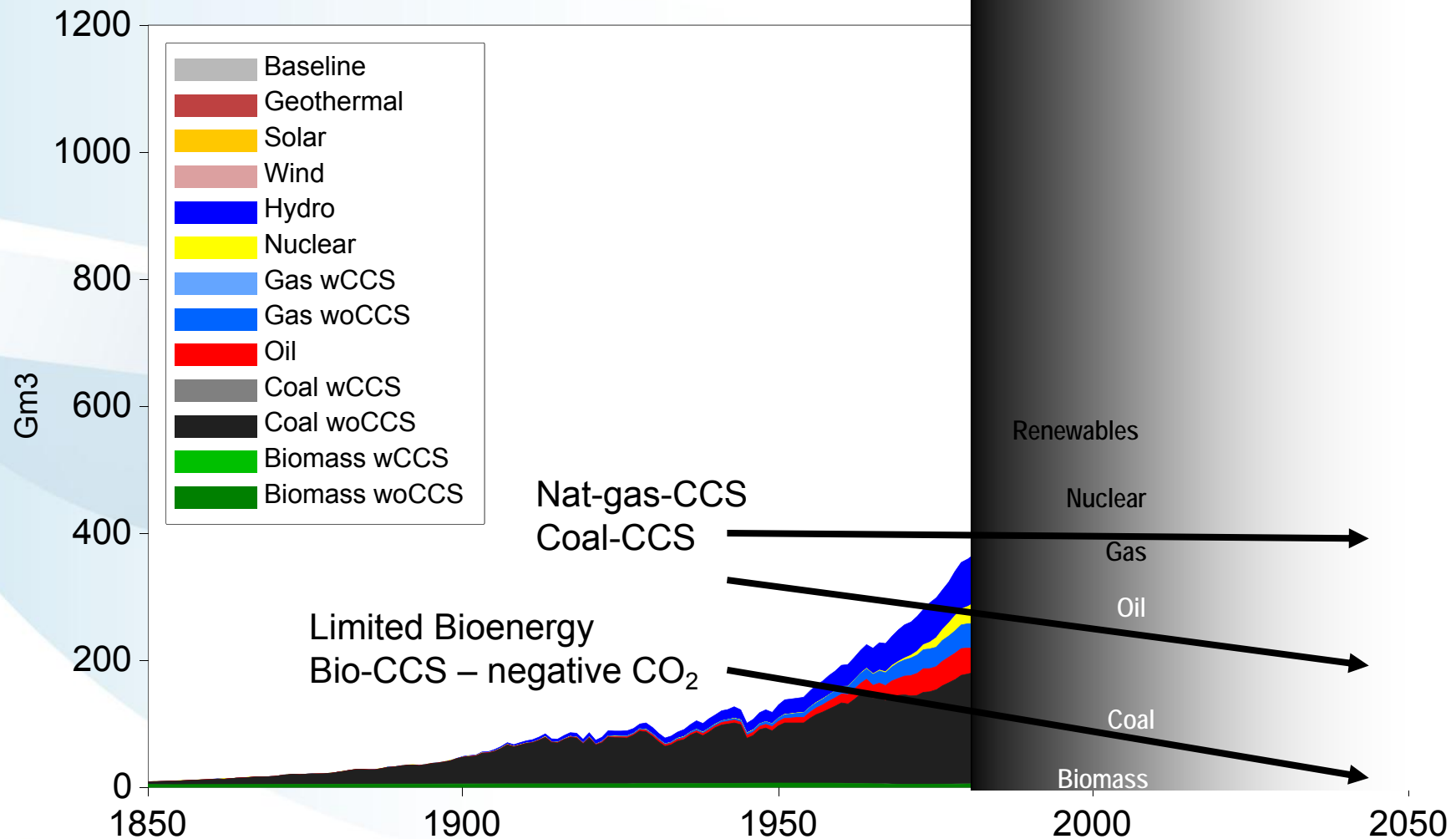
# Russian Primary Energy

## A Transformational Pathway



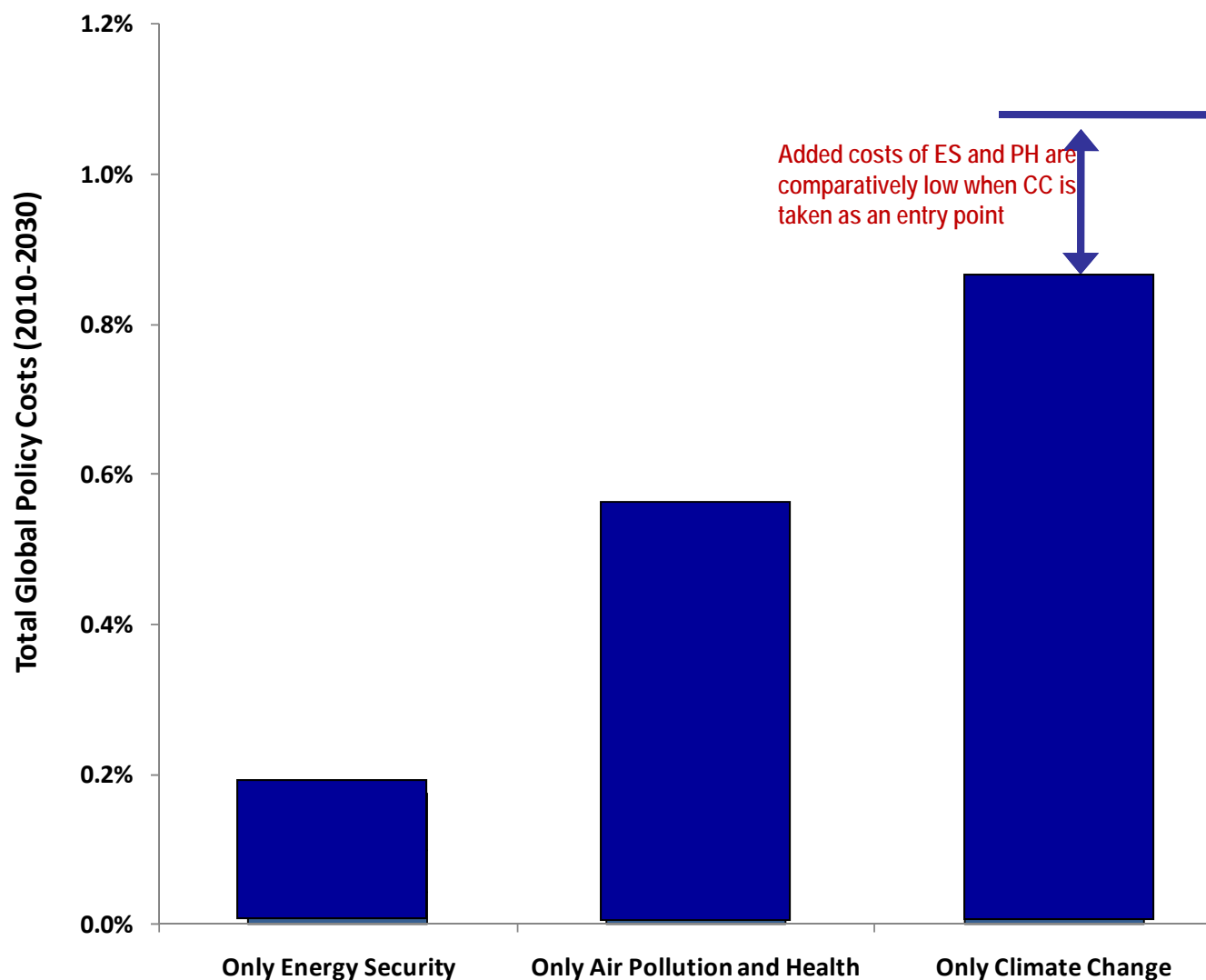
# Global Water Withdrawals

## A Transformational Pathway





# Multiple Benefits of Integrated Policies





International Institute for  
Applied Systems Analysis  
[www.iiasa.ac.at](http://www.iiasa.ac.at)

# THANK YOU

science for global insight



**[naki@iiasa.ac.at](mailto:naki@iiasa.ac.at)**



IIASA, International Institute for Applied Systems Analysis