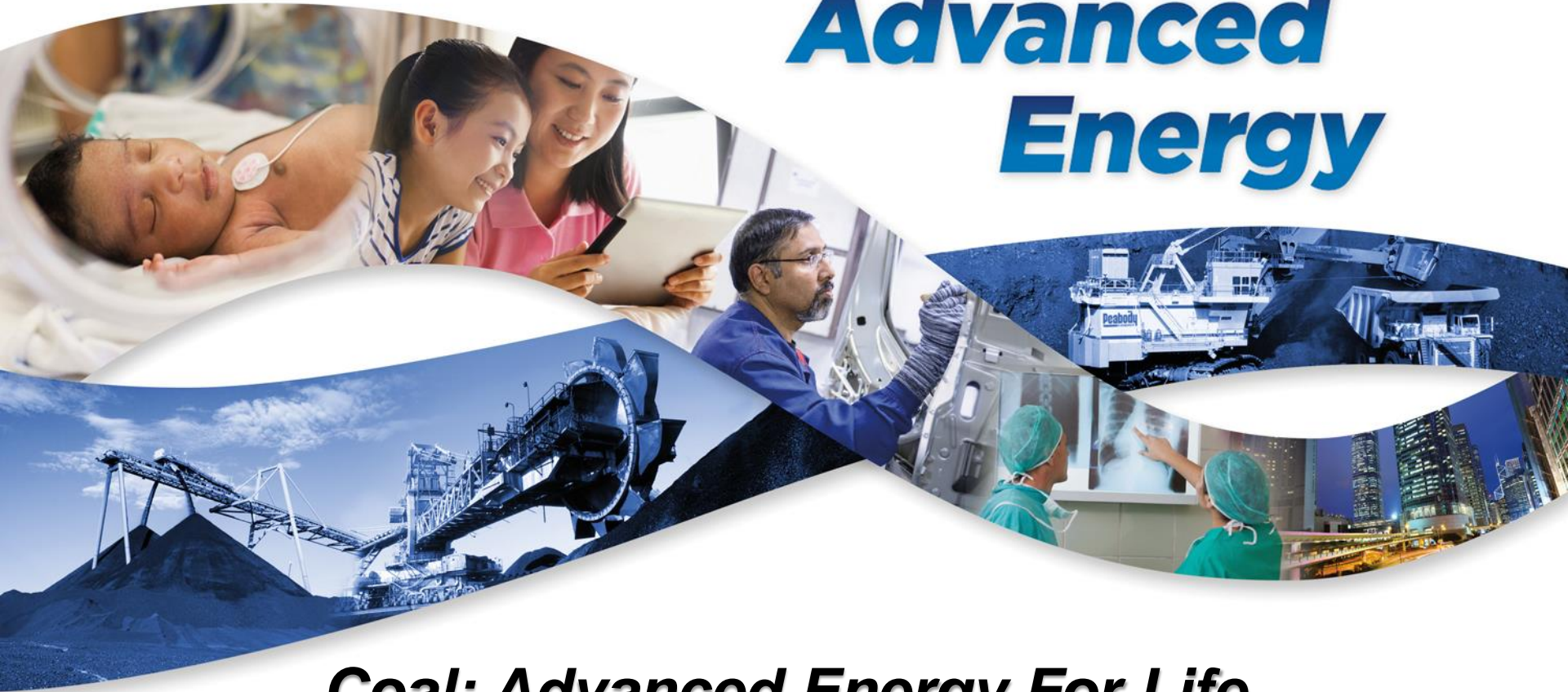


Advanced Energy



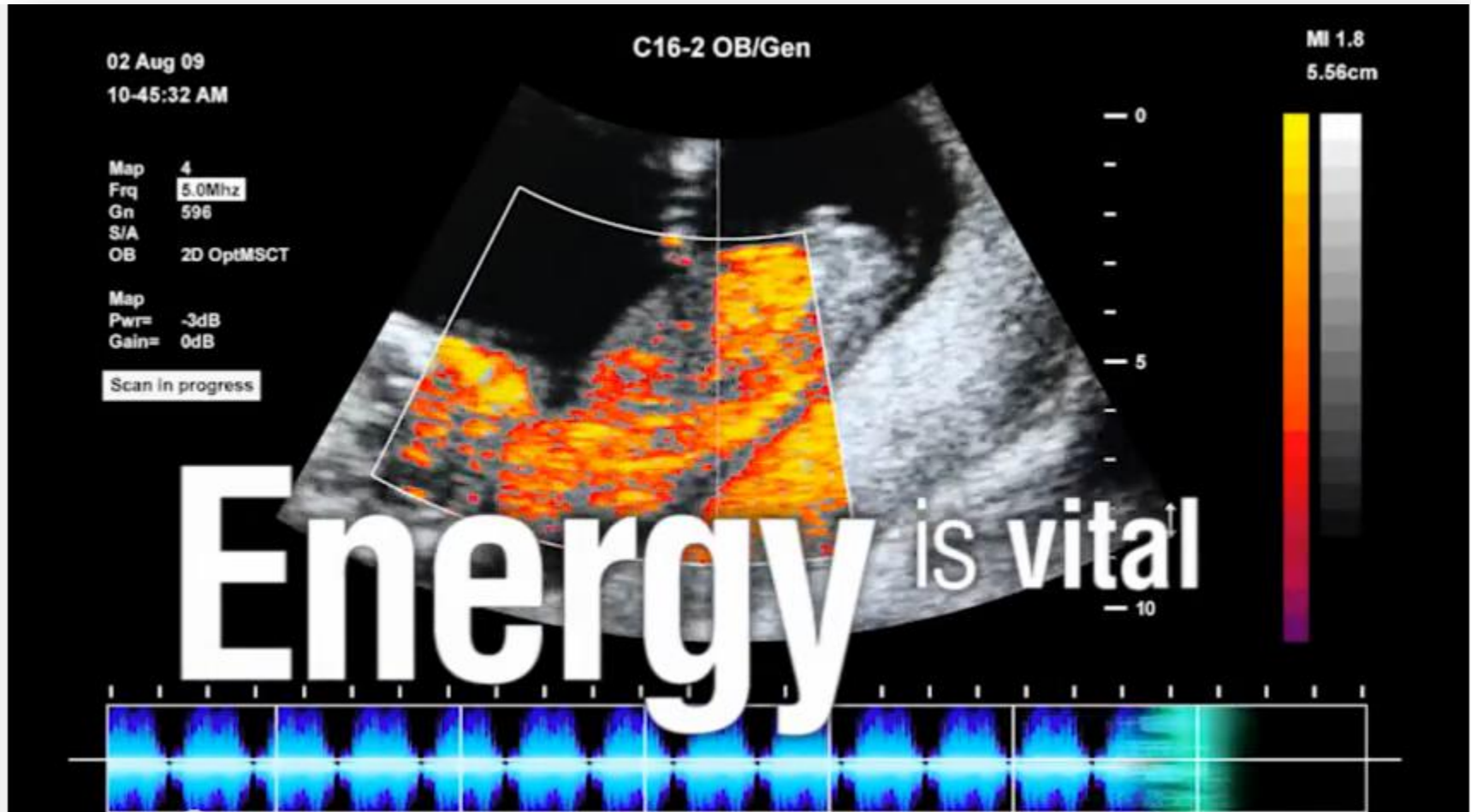
Coal: Advanced Energy For Life G20 Energy Access Workshop

25 August 2014

*Charles Meintjes President, Australia
Peabody Energy*

Peabody
ENERGY

3.5 Billion Live Without Adequate Energy



The Crisis of Energy Poverty

“Delivering universal access to electricity and safe household fuels is a fundamental condition to end poverty.”

– World Bank President Jim Yong Kim

A group of people, including men, women, and children, are walking along a dirt road in Rajasthan, India. They are carrying large bundles of fuel wood on their heads and backs. In the foreground, a man in a red shirt and a woman in a blue dress are prominent. They are surrounded by a herd of goats. The background shows a dry, hilly landscape under a clear blue sky.

Rajasthan, India youth carry fuel wood

Energy Poverty: The World's Number One Human and Environmental Crisis



Global Energy Poverty Effects are Devastating

Half the world's population lacks proper energy access; Energy poverty is fourth leading cause of death globally killing >4 million per year

Energy Essential for Health and Longevity

One billion people receive substandard care in health facilities from lack of electricity; 2.5 billion people lack improved water sanitation facilities

Energy Access Linked to Economic Growth

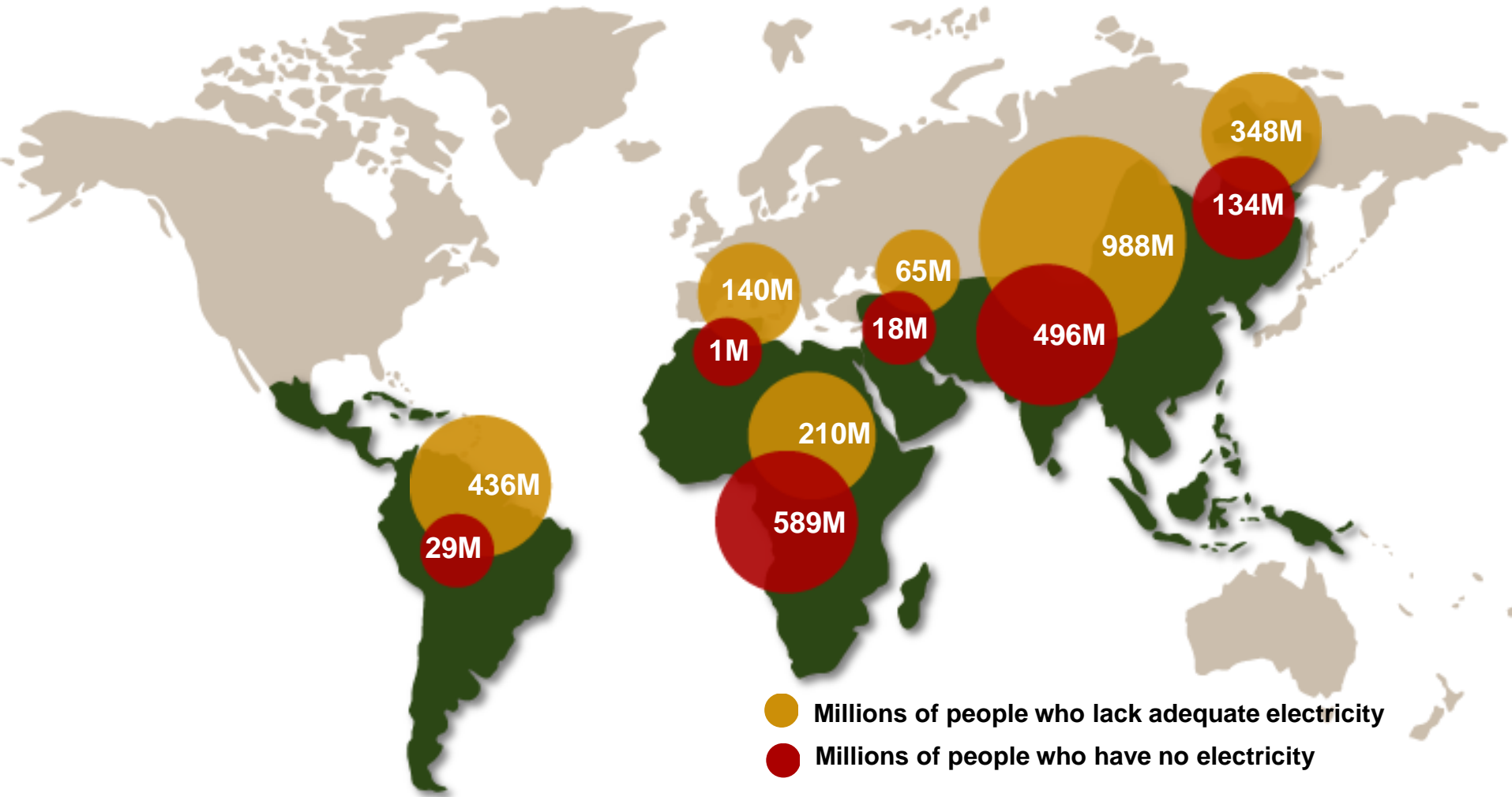
In developing world, half of children attend primary schools with no electricity; Lack of electricity stunts economic advancement

Coal Key to Solutions for Energy Access

Coal is abundant, reliable and low cost; Fuels over 30% of global energy use and is world's fastest growing major fuel

Energy is a Human Right and a Rapidly Rising Need

3.5 Billion People Lack Proper Access to Electricity

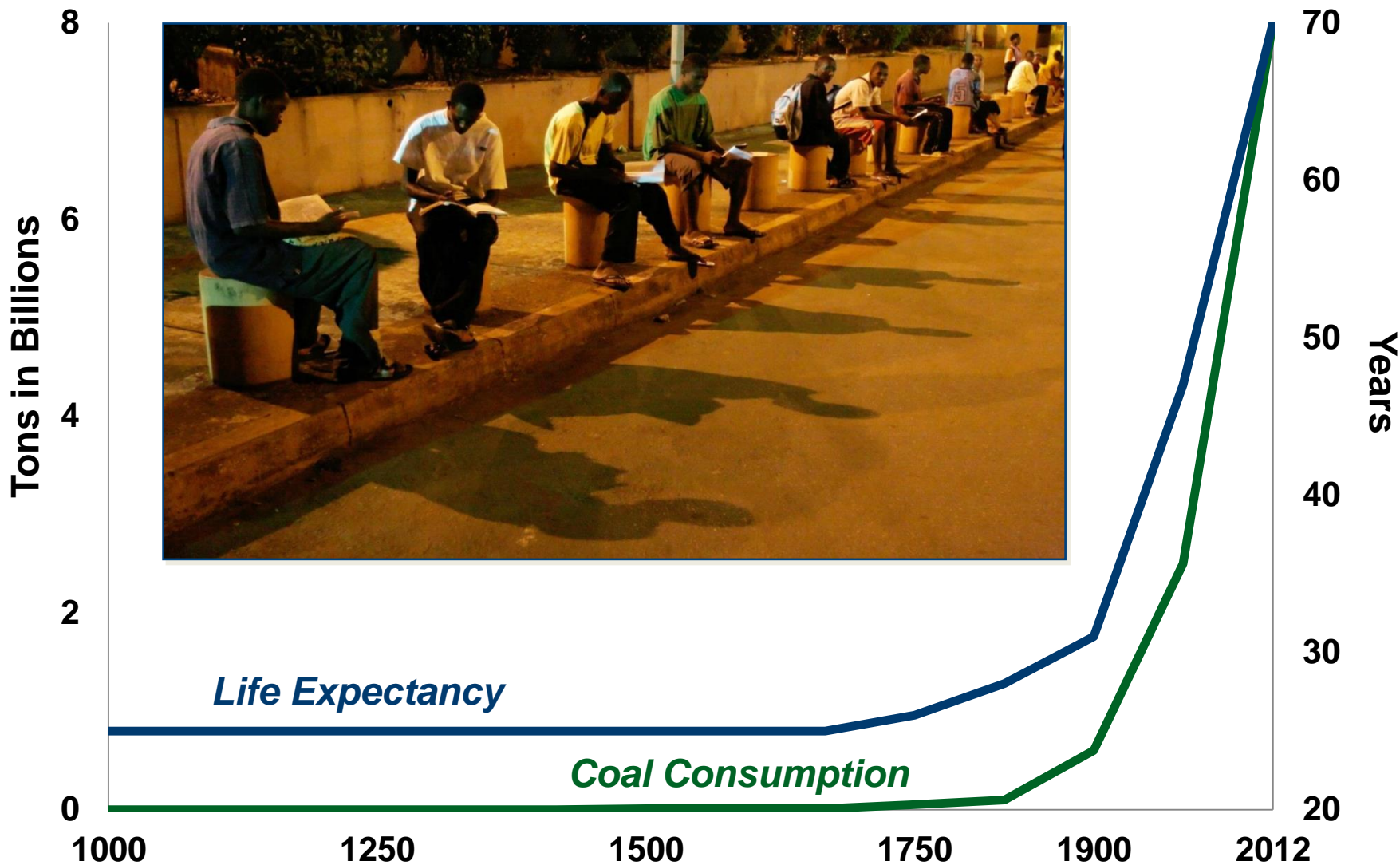


The Effects of Global Energy Poverty are Devastating



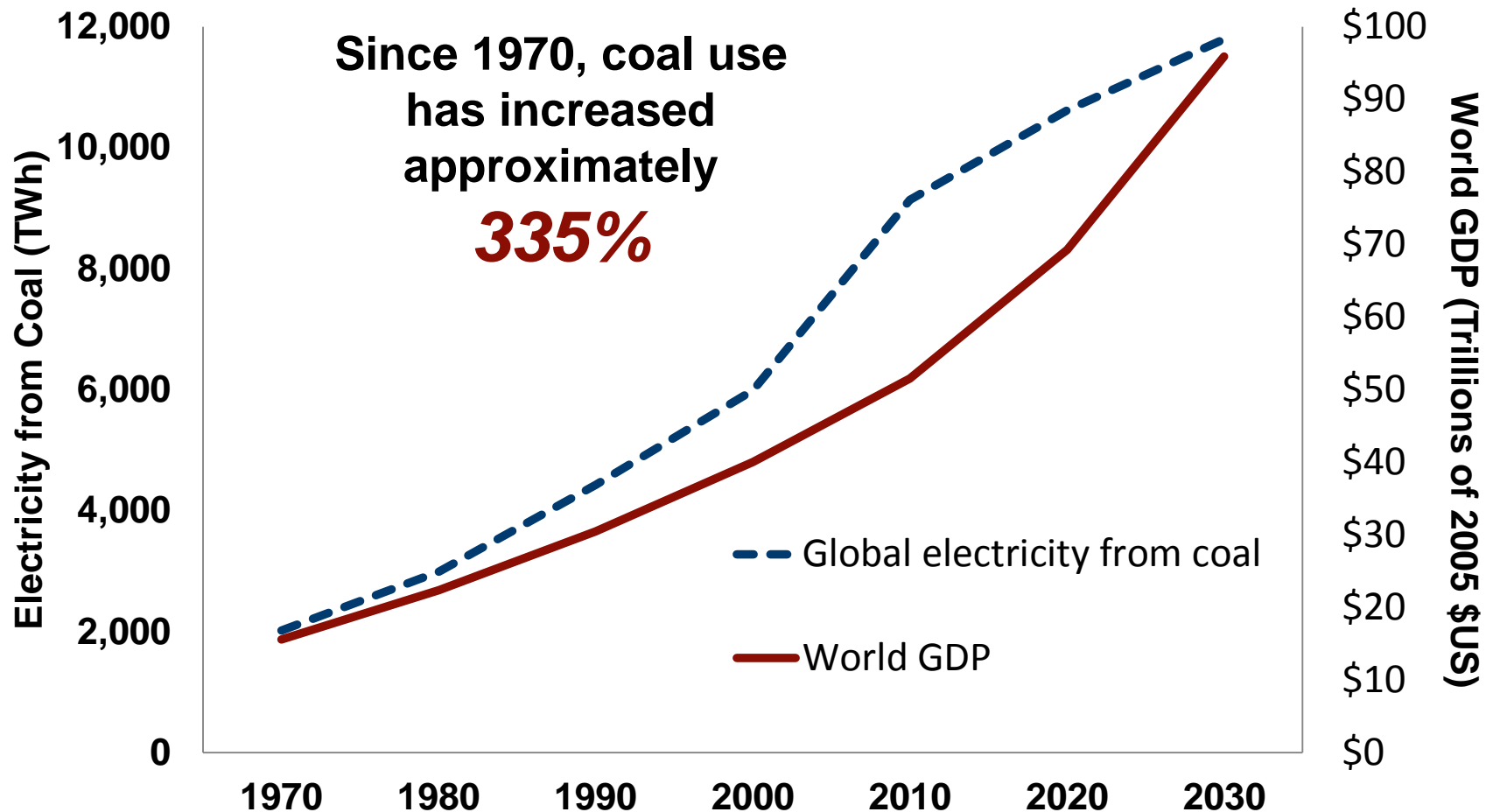
- Nearly 3 billion people use primitive stoves to burn wood or biomass to cook and heat homes
- Rudimentary cook stove smoke exposure is equivalent to inhaling 400 cigarettes per hour
- Some 4 million people die each year from household air pollution

World Turns to Coal to Improve Quality of Life for Millions of People



Coal-Fueled Electricity Increases Correspond to Rise in Economic Growth

Near-Perfect Correlation Between Coal Use and Global GDP

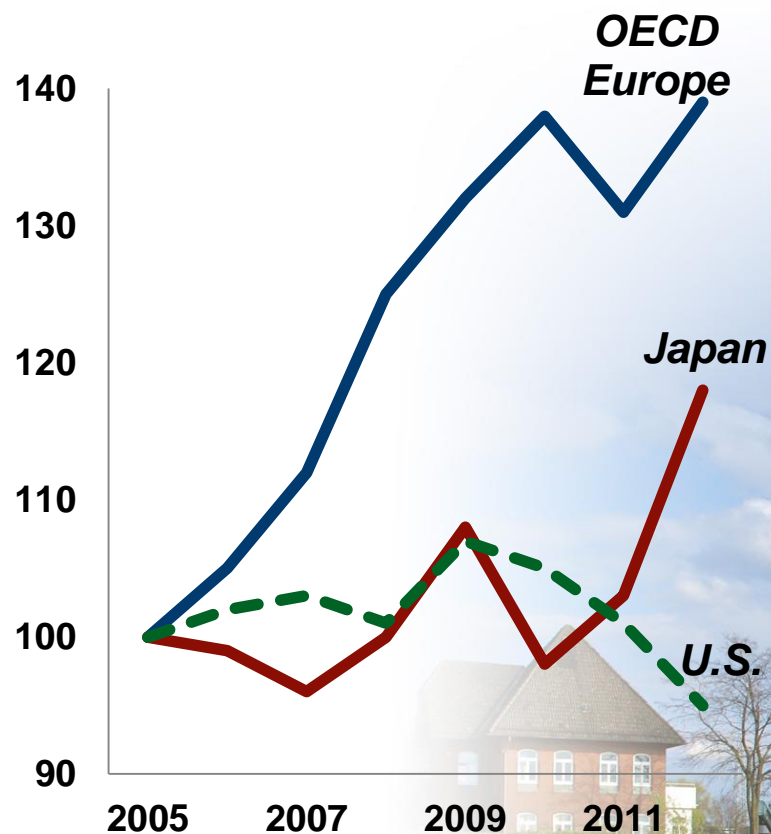


Source: International Energy Agency World Energy Outlook 1995-2013; U.S. Department of Agriculture, 2011.

Escalating Energy Prices Create New Urban Poor in Europe

EU Energy Price Growth ~37% Greater Than U.S., ~20% Than Japan

**Industrial Electricity Price Index
Rebased (2005=100)**

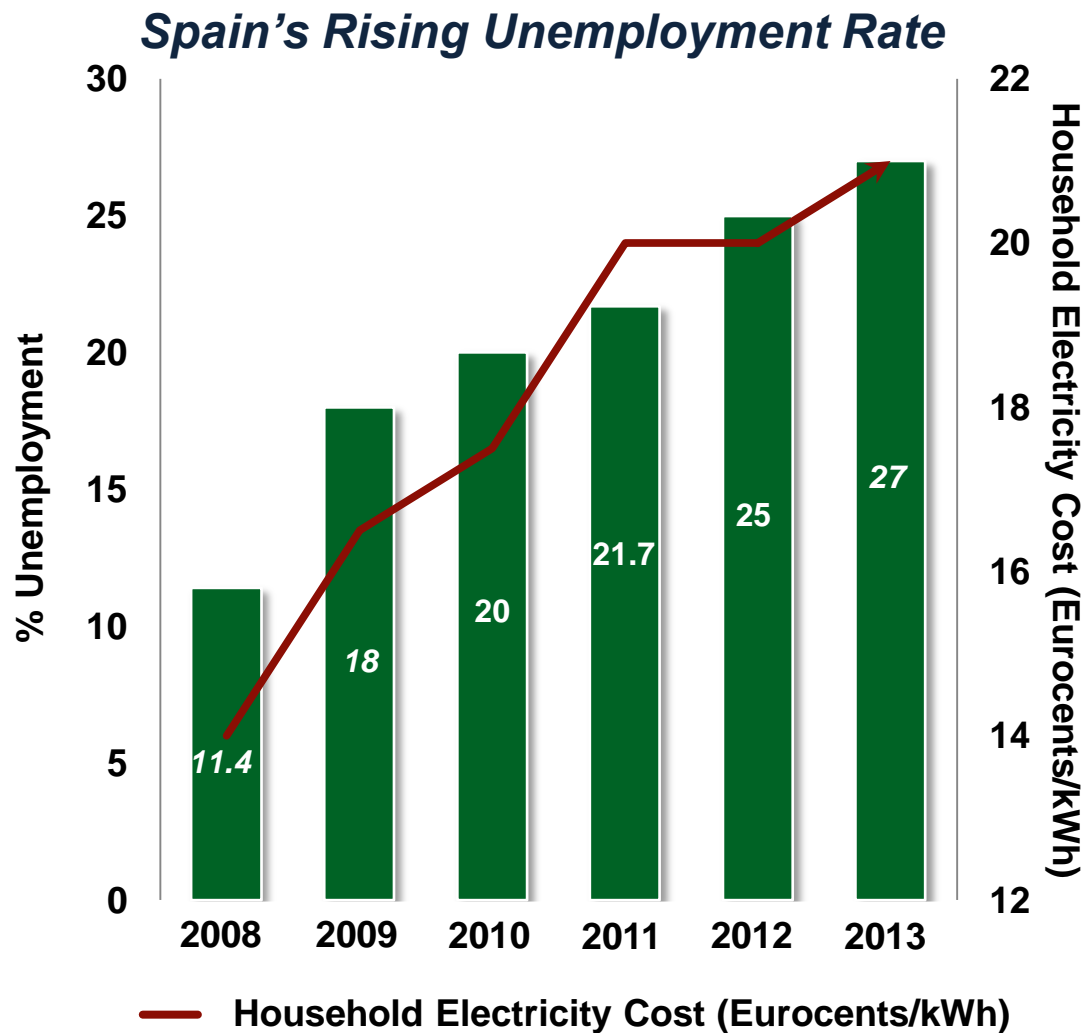


“We embarked on a big transition to a low-carbon economy without taking into account the cost and without factoring in the competitive impact...”

– Fabien Roques, Head of European Power and Carbon Division, HIS, Paris

The Lesson of Spain: Still Waiting for “Green” Jobs

Study: For Every Green Job, 2.2 Jobs Were Lost Elsewhere



“Spain has already attempted to lead the world in a clean energy transformation. But our research shows that Spain's policies were economically destructive... and a source of social harm and net job destruction.”

*—Professor Gabriel Calzada
King Juan Carlos University*

“Study of the effects on employment of public aid to renewable energy sources”

“We have made a clear commitment to battle climate change. But we are also serious about African access to energy. In certain places where the only option is coal, we have to look at that.”

– *Jim Yong Kim*

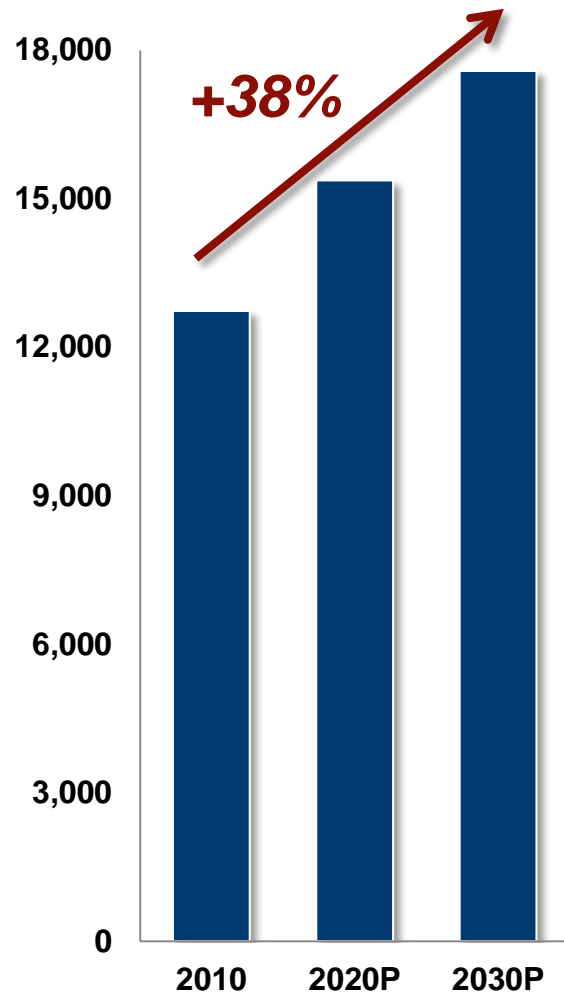
President of the World Bank

Coal's Global Role in Energy

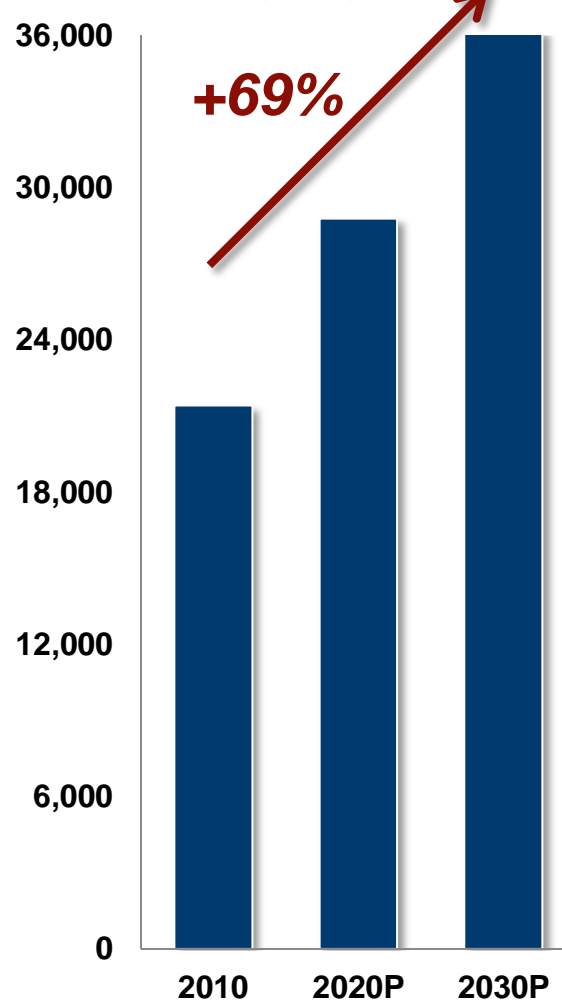


Expanding Global Energy Needs Lead to Rising Coal Demand

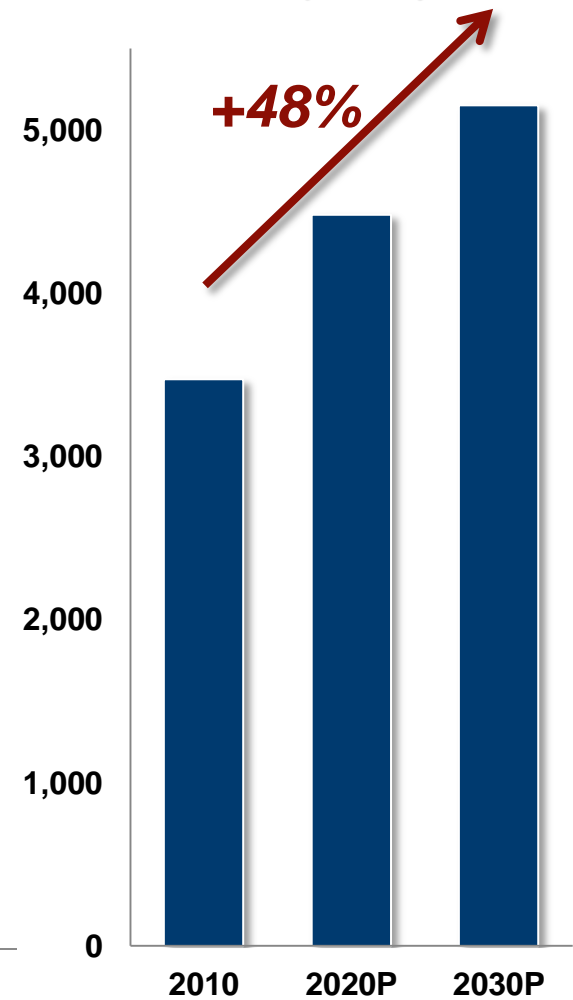
Global Energy Demand (MTOE)



Global Electricity Use (TWh)

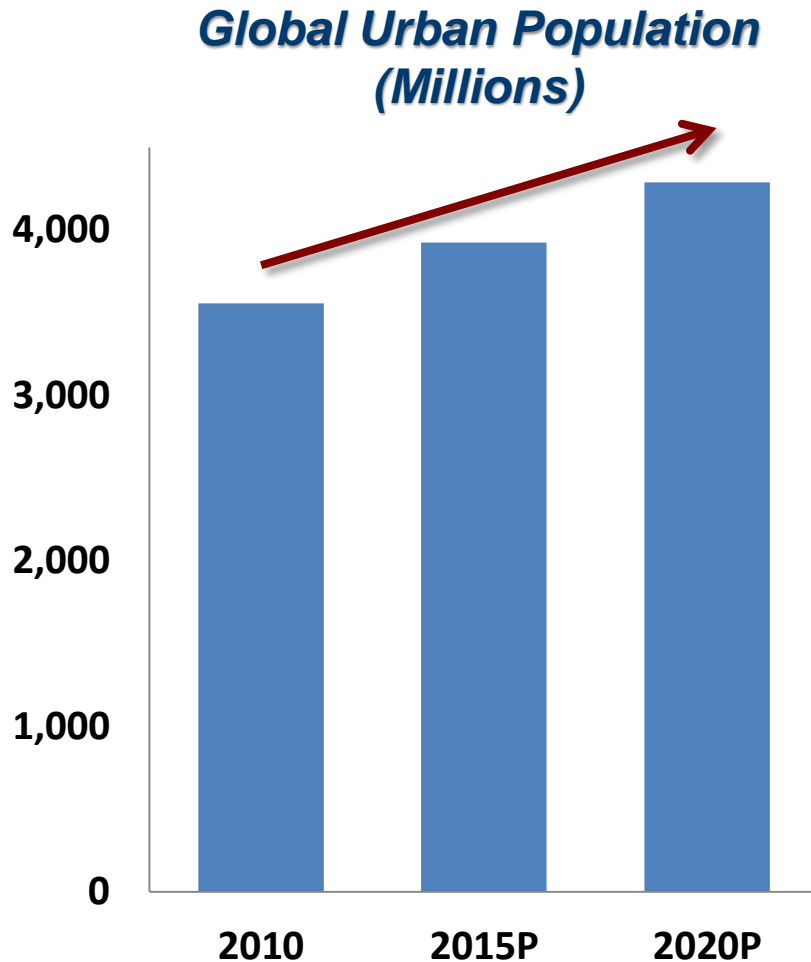


Global Coal Demand (MTOE)



Increasing Urbanisation in Asia Continues to Drive Record Global Coal Demand

200,000 People Added to Cities Each Day



- Urbanization trends lead to greater coal use to fuel growing electricity and steel demand
- More than 70 million people expected to be added to cities each year through 2020
- Coal is the only affordable fuel, at scale, to meet rising energy needs

Coal: Least Expensive and Most Reliable Form of Electricity Generation



	Coal	Oil	Natural Gas	Nuclear	Solar/Wind
Low Cost					
Baseload Capacity					
Safe to Transport					
Energy Dense					
Widely Available					
Technology Based					

Coal:

- Only a fraction of other fuels' costs
- Provides baseload power; easily transported
- Energy dense, abundant and increasingly uses advanced technologies

Coal and Advanced Technology

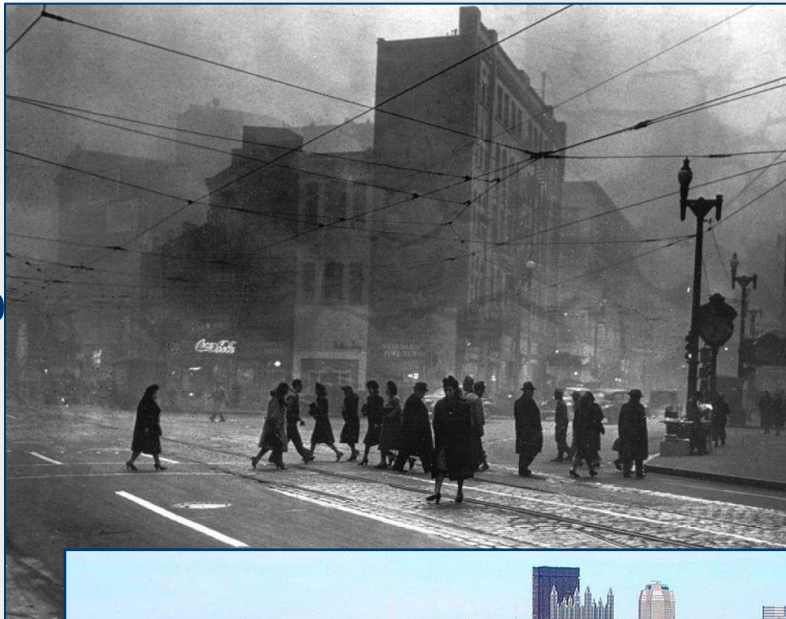
**GreenGen Power Plant and
Carbon Research Center; Tianjin, China**



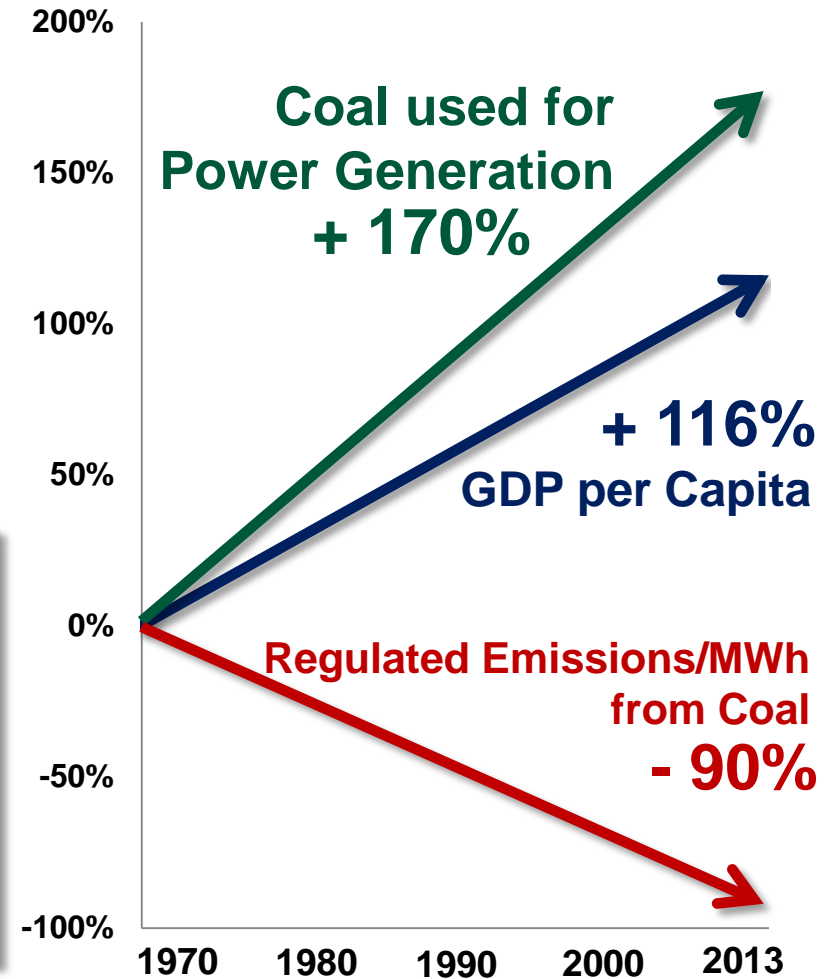
Advanced Coal Technologies: U.S. Environmental Success Story

U.S. Emissions Rate Declines 90% Since 1970; Coal Use Rises 170%

Pittsburgh 1950s



Today

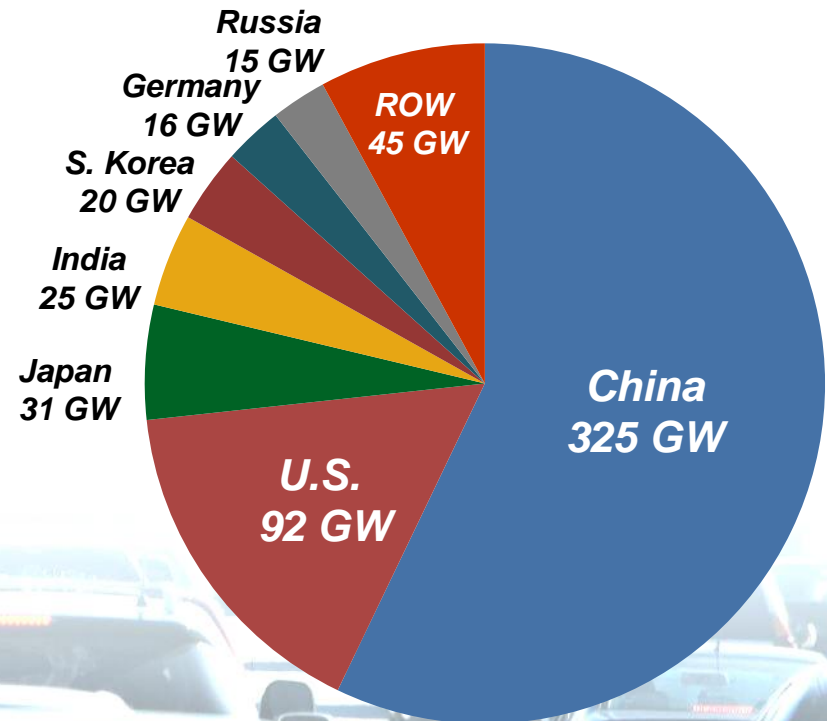


Every Advanced Coal Plant Equal to Taking 'A Million Cars Off the Road'

“A single, large coal plant, if built with the best-available technology, can reduce emissions by the annual equivalent of taking a million cars off the road...”

Maria van der Hoeven
Executive Director
International Energy Agency
December 2012

Advanced Coal Generation 569 GW On Line and Under Construction



Next Generation Technologies Offer Continuous Path Forward

Efficiency Improvements at Existing Plants

Building New Supercritical and Ultra-Supercritical Plants

Demonstrating and Deploying IGCC and Carbon Capture, Utilization and Storage

Advance Carbon Capture, Use and Storage and Btu Conversion Applications

Retrofitting Existing Coal-Based Generation with Carbon Capture/Storage Up to 90% Lower CO₂

CO₂-Enhanced Oil Recovery, Producing 4 Million b/d

**The Goal:
Near-Zero
Emissions**

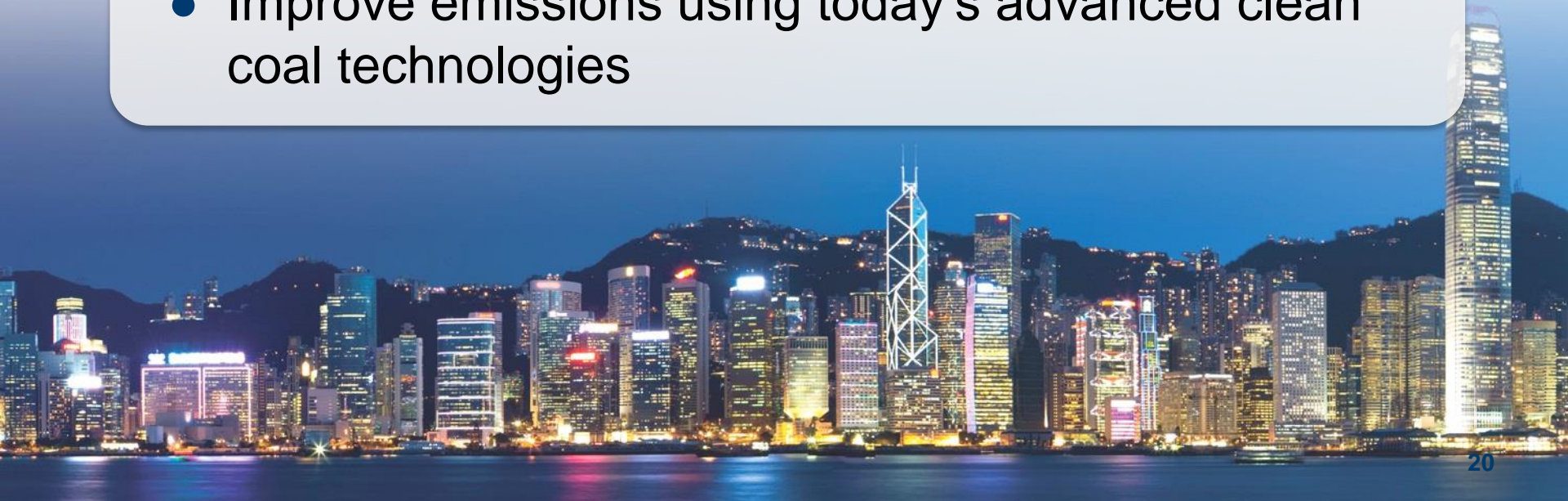
→ 20 years

Call to End World's No. 1 Human and Environmental Crisis: Energy Poverty

Systemically Changing the Way People Think About Coal

Raise awareness and support to:

- End crisis of global energy poverty, which leads to crippling impacts to human health, standards of living and the environment
- Increase access to low-cost electricity
- Improve emissions using today's advanced clean coal technologies





Advanced Energy



***PeabodyEnergy.com
AdvancedEnergyForLife.com***