Session 3
Energy: Interoperable Smart Homes and Grids

Keith Dickerson (Climate Associates Ltd)

OASC Connected Smart Cities Conference (CSCC 2018)

ITU and climate change

ITU ACADEMY

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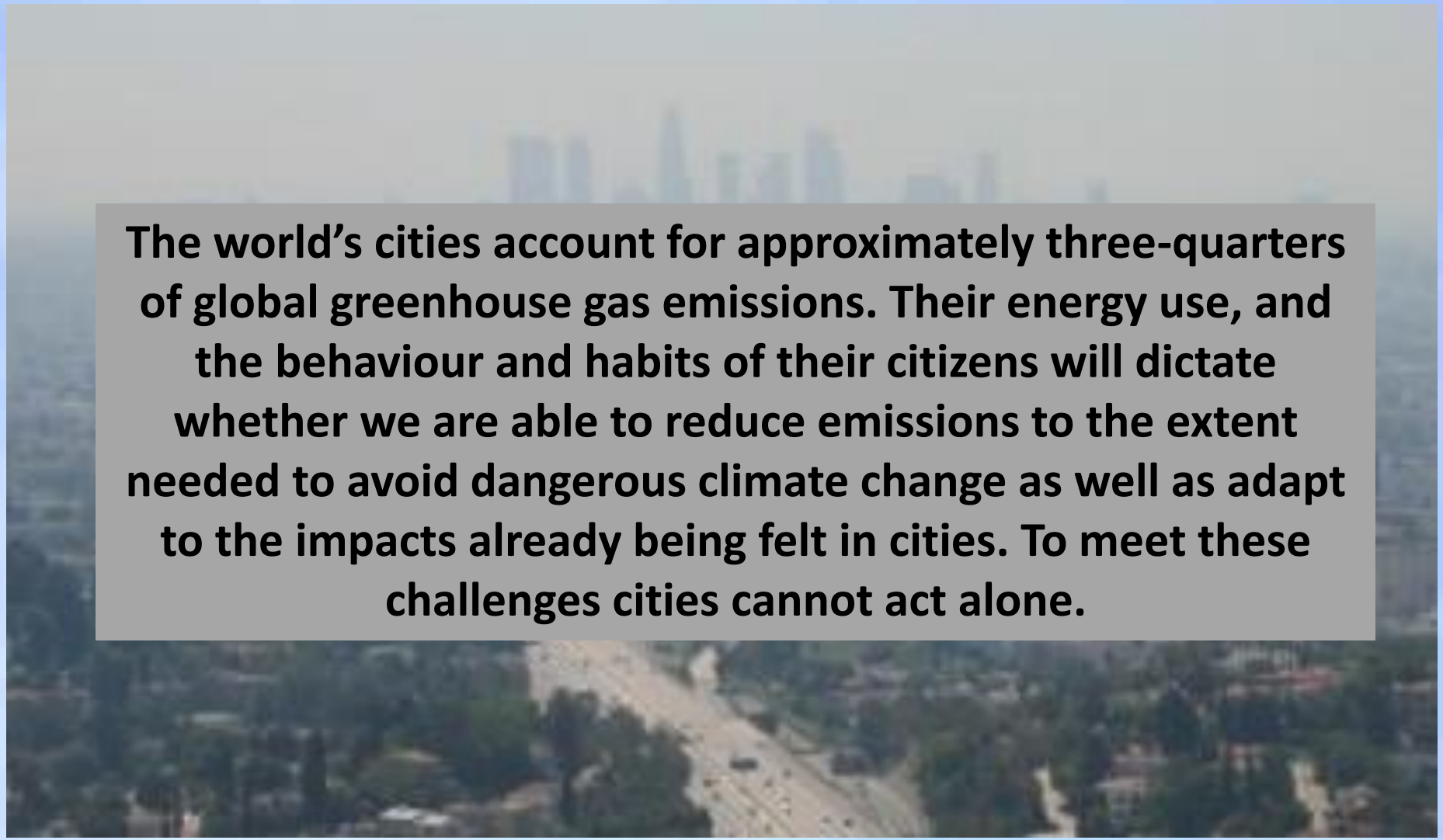
- **Rolf Riemenschneider** (DG CONNECT IoT Unit) who will speak on the EU Vision for Smart Energy and the interoperability requirements.
- **Natalie Samovich** (ENERCOUTIM and a member of the H2020 VICINITY IoT project) who will speak on IoT as an enabler for the Energy Market.
- **Nikolaos Kontinakis** (EUROCITIES and a member of the H2020 ESPRESSO project) who will speak on the EUROCITIES partners/projects developing this area.
- Panel.



The world's cities account for approximately three-quarters of global greenhouse gas emissions. Their energy use, and the behaviour and habits of their citizens will dictate whether we are able to reduce emissions to the extent needed to avoid dangerous climate change as well as adapt to the impacts already being felt in cities. To meet these challenges cities cannot act alone.

Role of cities, regions and local authorities

The Paris (COP-21) agreement recognised the role of **non-Party stakeholders** in addressing climate change, including cities, other subnational authorities, civil society, the private sector and others. They are invited to:

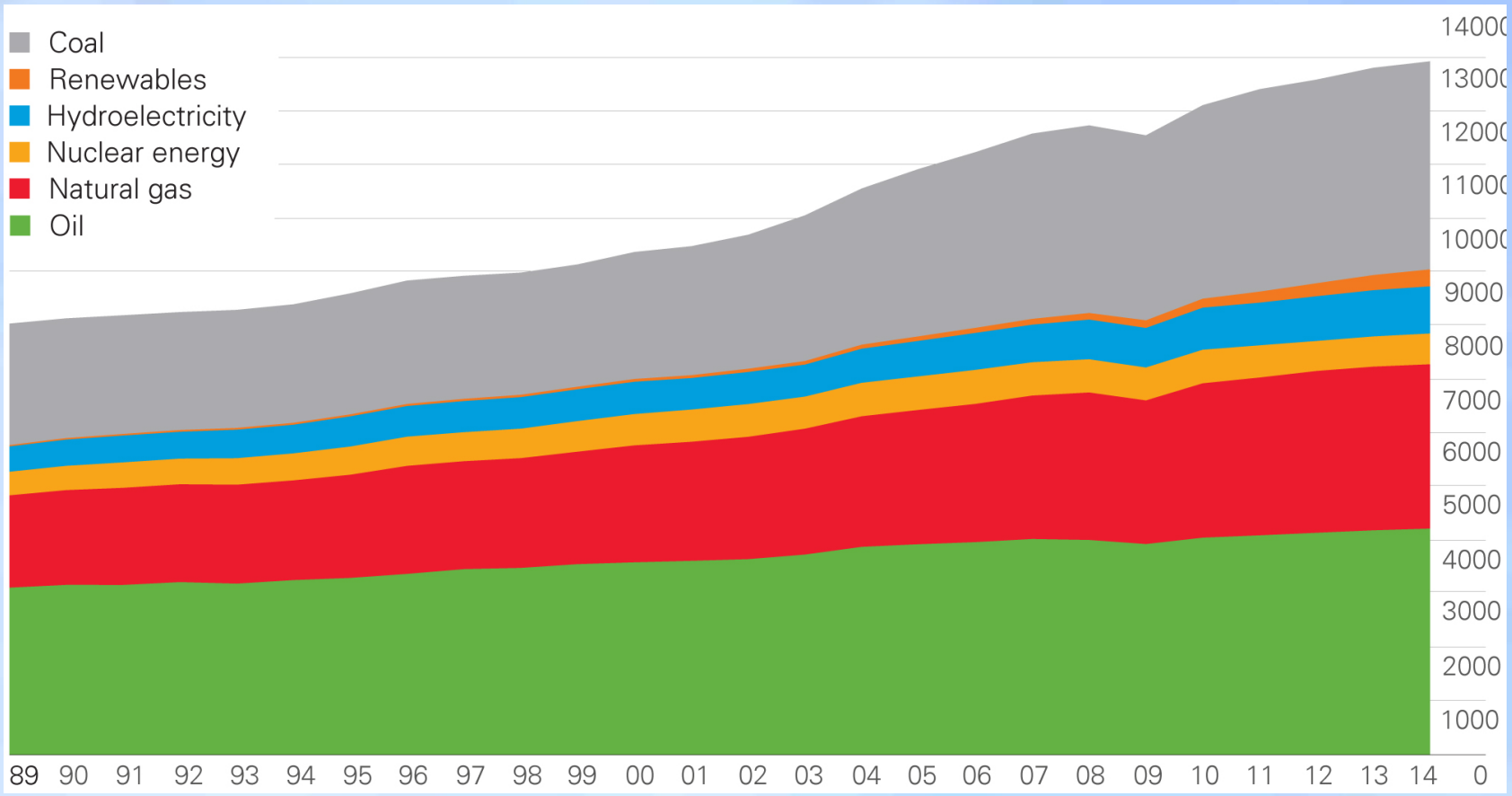
- scale up their efforts and support actions to **reduce emissions**;
- **build resilience** and decrease vulnerability to the adverse effects of climate change;
- uphold and promote regional and international **cooperation**.

more than 7,000 cities have made commitments through the Global Covenant of Mayors for Climate & Energy – and are reporting on their progress.

Source: ://unfccc.int/paris_agreement/items/9485.php

World Primary Energy Consumption

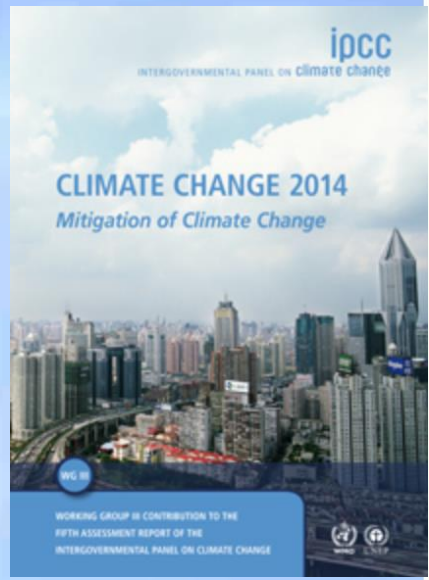
Million tonnes oil equivalent



BP Statistical Review of World Energy 2015

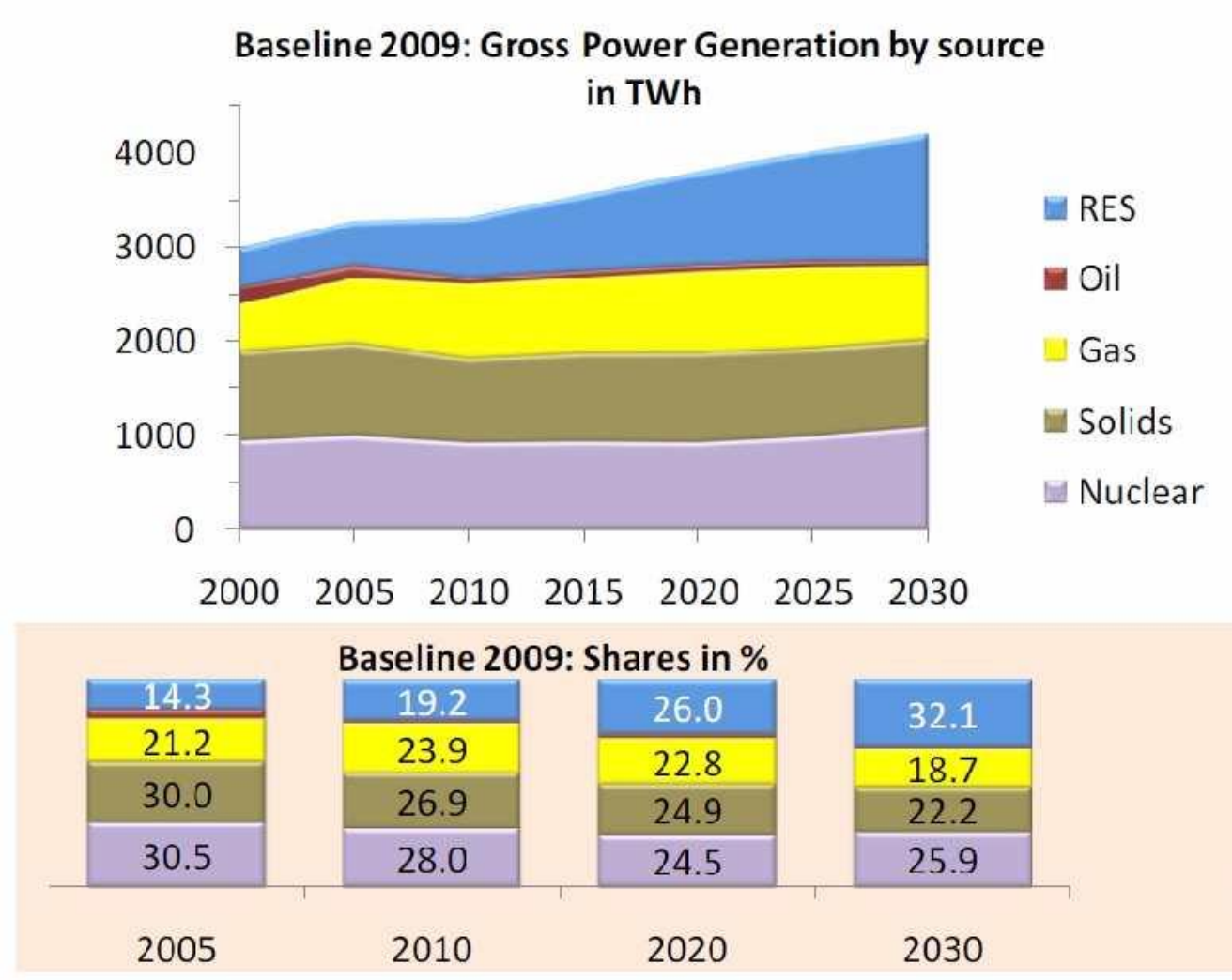
Mitigation actions necessary

- Decarbonizing electricity generation is a key component of cost effective mitigation strategies in achieving low stabilization levels (430–530 ppm CO_2e). Decarbonization will happen more rapidly in electricity generation than in other sectors.
- Mitigation scenarios reaching around 450 ppm CO_2e concentrations by 2100 require large-scale global changes in the energy supply sector.
- GHG emissions from energy supply projected to decline by 90% or more below 2010 levels between 2040 and 2070.



www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf

Energy trends in EU to 2030



http://ec.europa.eu/energy/observatory/trends_2030/doc/trends_to_2030_update_2009.pdf

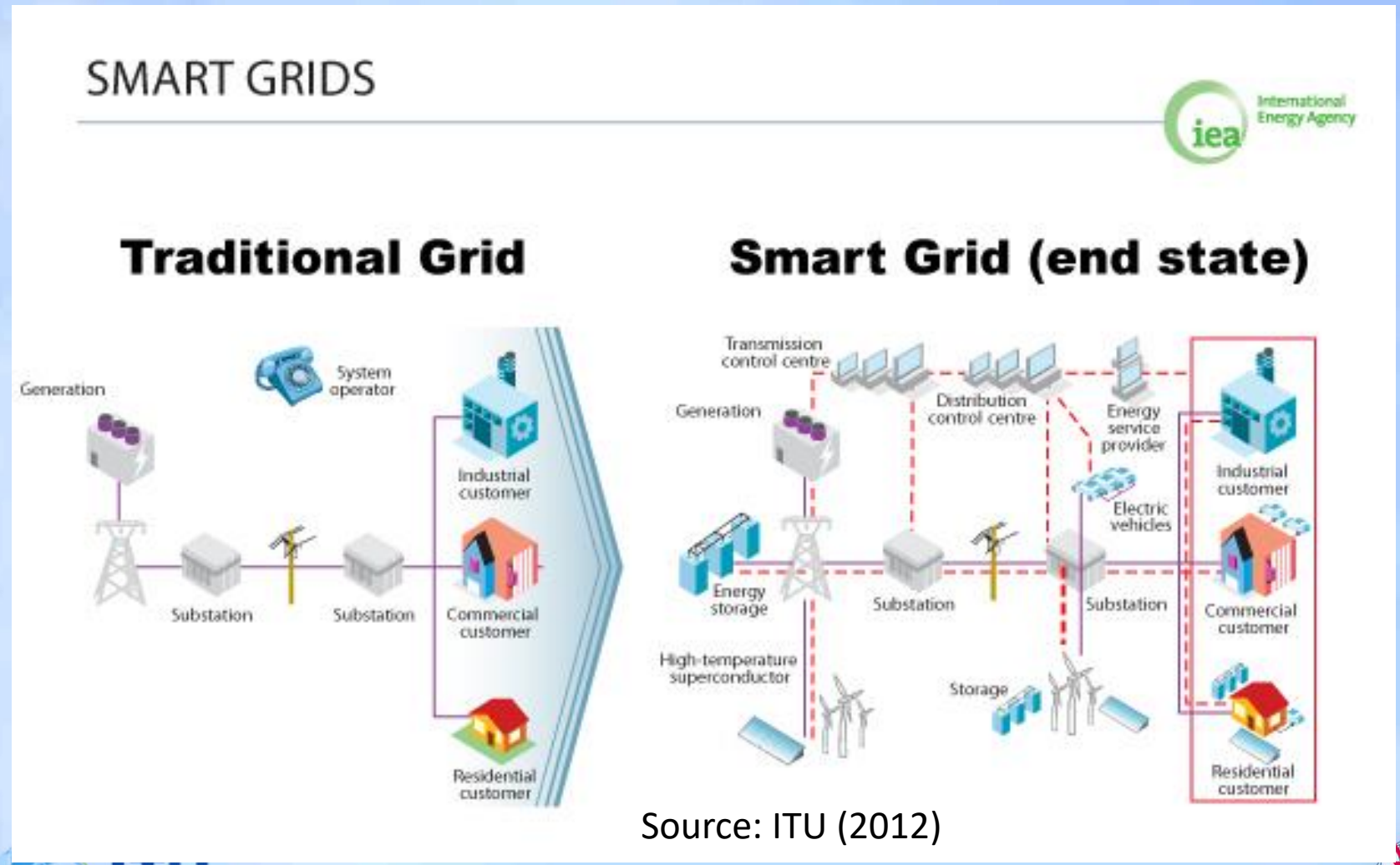
Smart Grids

The smart grid is not characterized by a single technology or a device, but instead is a vision for a distributed, internet-like system that will:

- provide better control of existing grid infrastructure assets.
- provide additional functionality and benefits from existing assets.
- integrate new (often small, widely distributed) assets into the existing operational paradigm.
- engage these new assets to provide entirely new benefits to the grid.

Source: US Dept of Energy (2010)

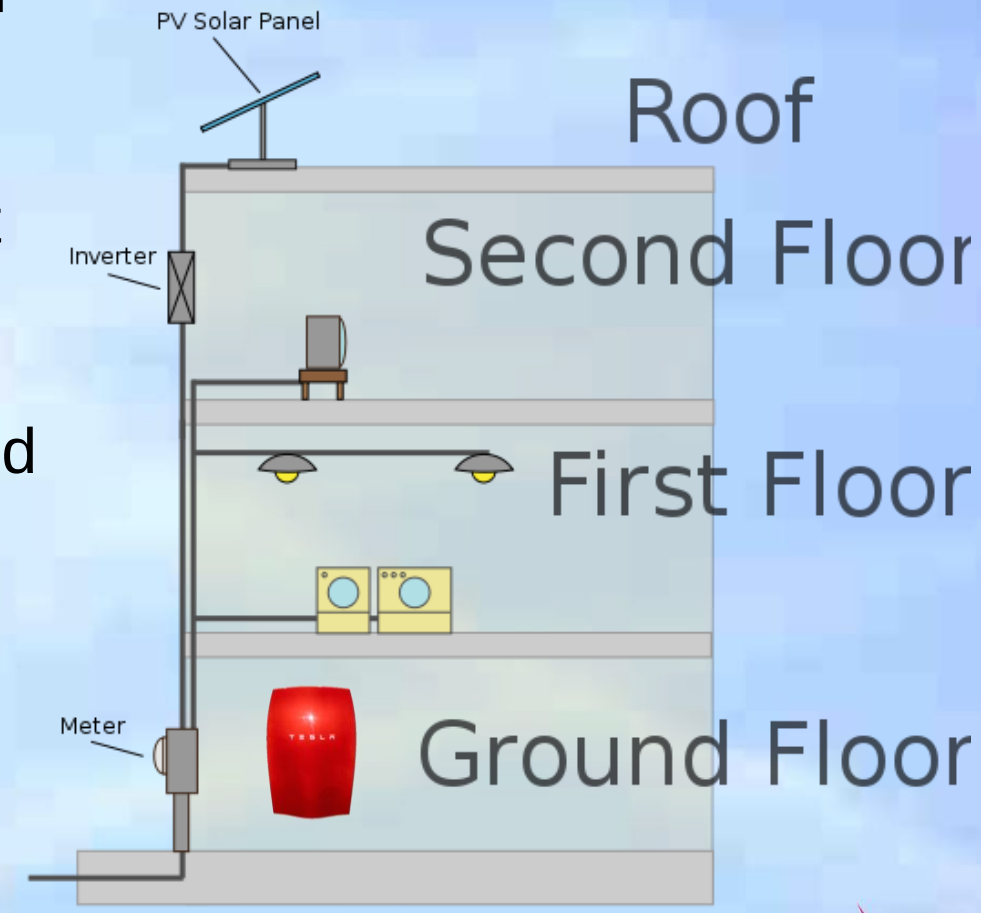
Smart Grid overview



Source: ITU (2012)

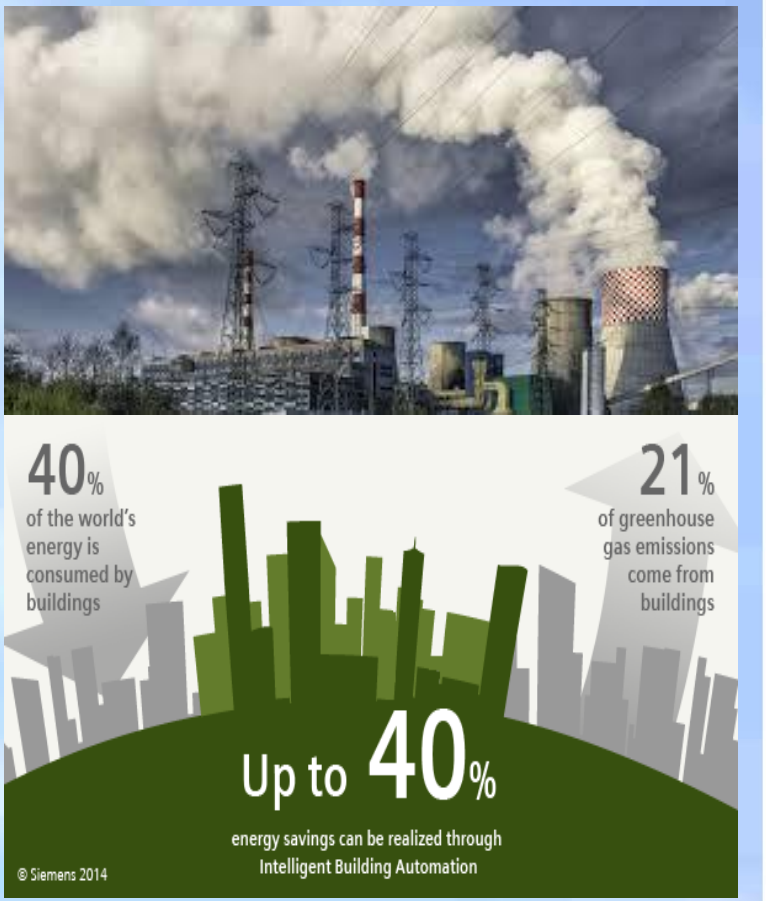
Microgeneration in buildings is a key component of an energy strategy

- Small-scale generation of heat and power by homes, small businesses and communities to meet their own needs, as alternatives to traditional centralized grid-connected power.
- Wind, solar PV, heat pumps.
- Role of home storage.



Need for Smart Buildings

- In most countries buildings are the largest driver for both energy use and CO_2 emissions.
- "Buildings account for around 40% of global energy consumption" (ITU 2015)
  - "In Europe buildings account for around 40% of the continent's energy consumption and 40% of its carbon emissions.
  - In the US, buildings account for 48% of total US GHG emissions." (ITU 2012)
- Up to 30% of all global energy-related greenhouse gas (GHG) emissions comes from buildings (ITU 2015)



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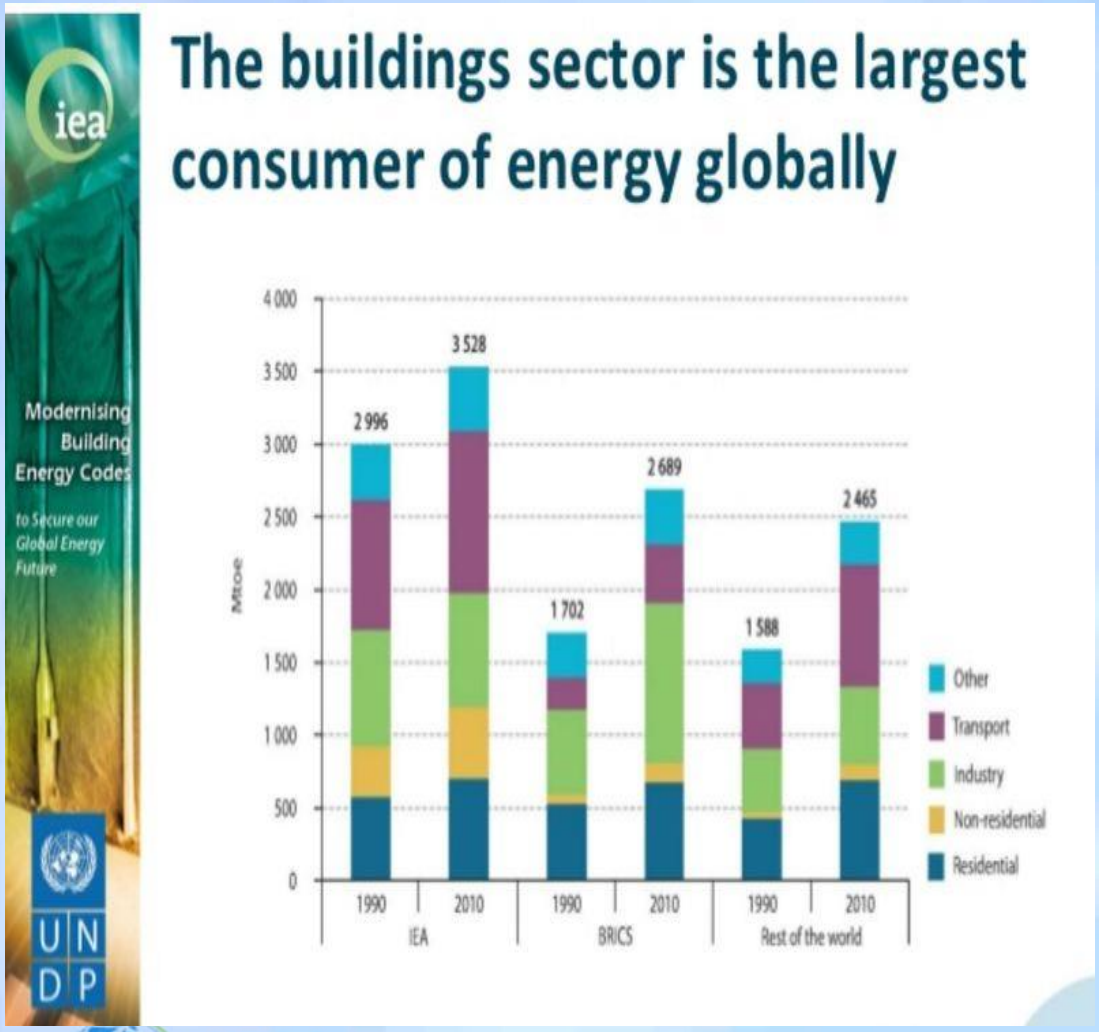

Energy is used in the building envelope and its insulation, in space heating and cooling systems, in water heating, in lighting, in appliances and consumer products, and in business equipment. (IEA 2013)

Need for Smart Buildings

With an expected population increase of 2.5 billion people by 2050, and given improvements in economic development and living standards, energy use in the buildings sector is set to rise sharply, placing additional pressure on the energy system (IEA 2013)

Smart Buildings

This growth could be limited to just over 10% without changing comfort levels or requiring households to reduce their purchases of appliances and other electronic equipment. (IEA 2013)

Is this a Smart Building?

https://www.cartoonstock.com/directory/h/home_automation.asp

A homeowner can use a smart phone to activate the home security system, control temperature gauges, switch appliances on or off, control lighting, or programme the entertainment system (IEA 2013)

“Alexa! What is interoperability?”

Key Issues

- But will Smart Grids and Smart Buildings be interoperable?
- Are smart building functions and control devices interoperable between suppliers?
- Will it be possible to implement effective demand-response mechanisms?
- Who will benefit from the savings?

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References for further reading:

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