IRENA overview and the technology roadmap project
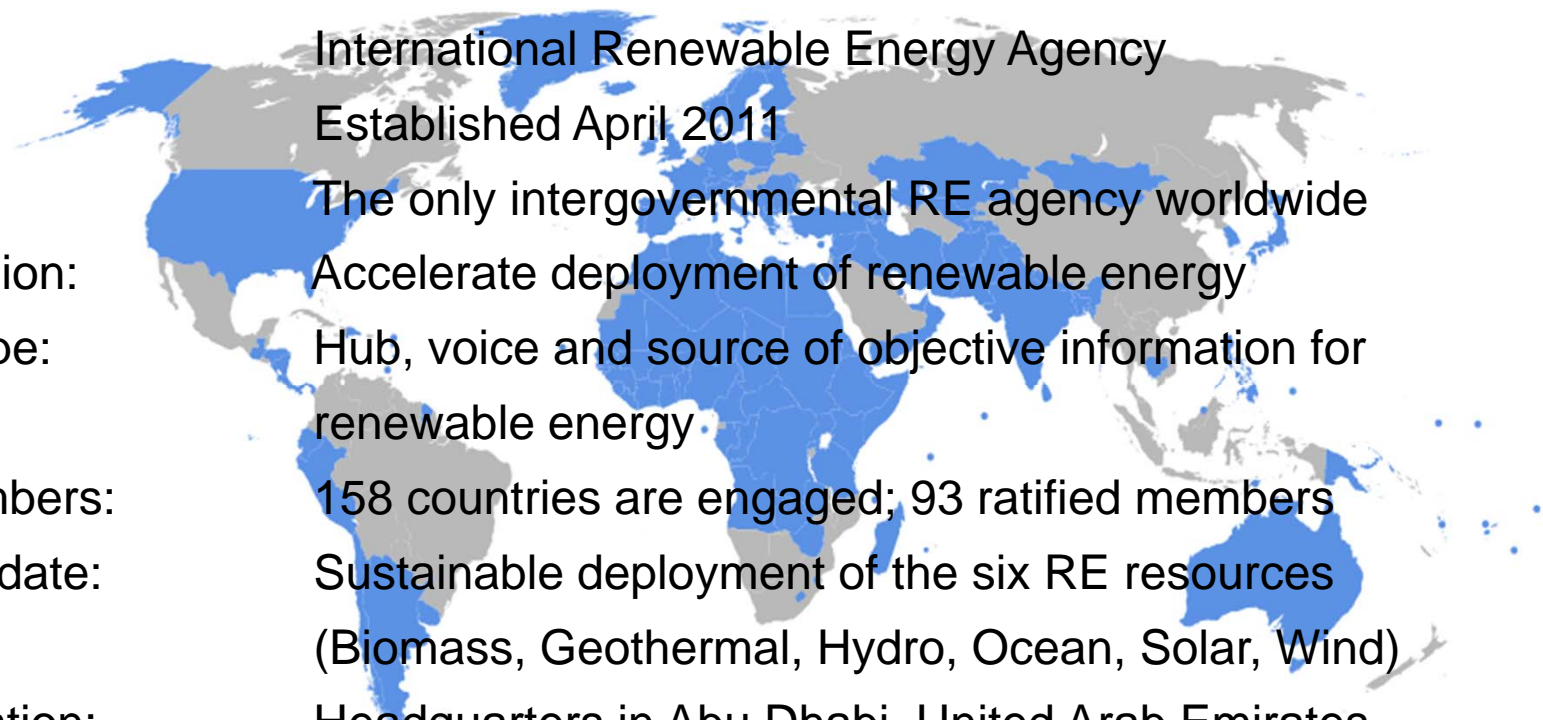
Dolf Gielen
Director Innovation and Technology

Bonn, 12 May 2012

WHO IS IRENA?

About IRENA

International Renewable Energy Agency

Established April 2011

The only intergovernmental RE agency worldwide

Mission: Accelerate deployment of renewable energy

Scope: Hub, voice and source of objective information for renewable energy
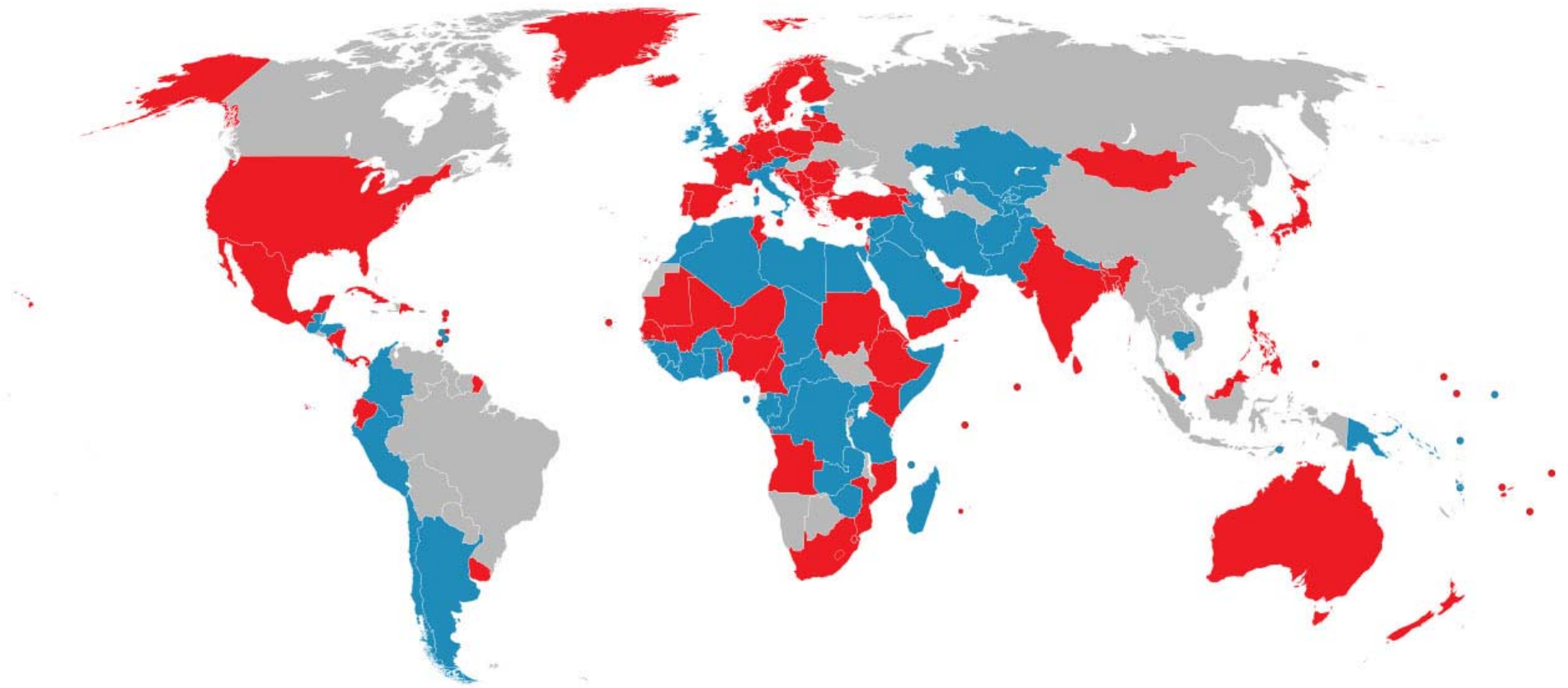
Members: 158 countries are engaged; 93 ratified members

Mandate: Sustainable deployment of the six RE resources (Biomass, Geothermal, Hydro, Ocean, Solar, Wind)

Location: Headquarters in Abu Dhabi, United Arab Emirates Innovation and Technology Centre IITC, Bonn, Germany

Director-General: Adnan Amin

IRENA Membership

Members of the Agency
Signatories to the treaty
Non Signatory

Status 1. May, 2012

4

Overview IITC activities

- Mission: Framework for technology policy support to governments for accelerated renewable energy development and deployment
- Component 1: Energy planning for RE technology and innovation strategies
    - 6 activities (incl. scenarios and strategies, roadmaps, intellectual property)
    - Incl. support for SE4ALL process
- Component 2: Cost competitiveness and markets
    - 5 activities (incl. cost status, business models, standards, niche markets)

- 16 staff

IRENA TECHNOLOGY ROADMAP PROJECT

IRENA Roadmap

- Many existing roadmaps
  - IEA technology roadmaps
  - Various US, Japan roadmaps
  - EU platforms
  - Roadmaps by industry associations
- Goal is to complement existing work and avoid duplications
  - IRENA has a sectoral approach (instead of technology approach)
  - Global reach including non-OECD countries
  - Focus on renewable energy technology solutions
  - Emphasis on end-use sectors, starting with cities and maufacturing industry

RENEWABLES IN CITIES ROADMAP
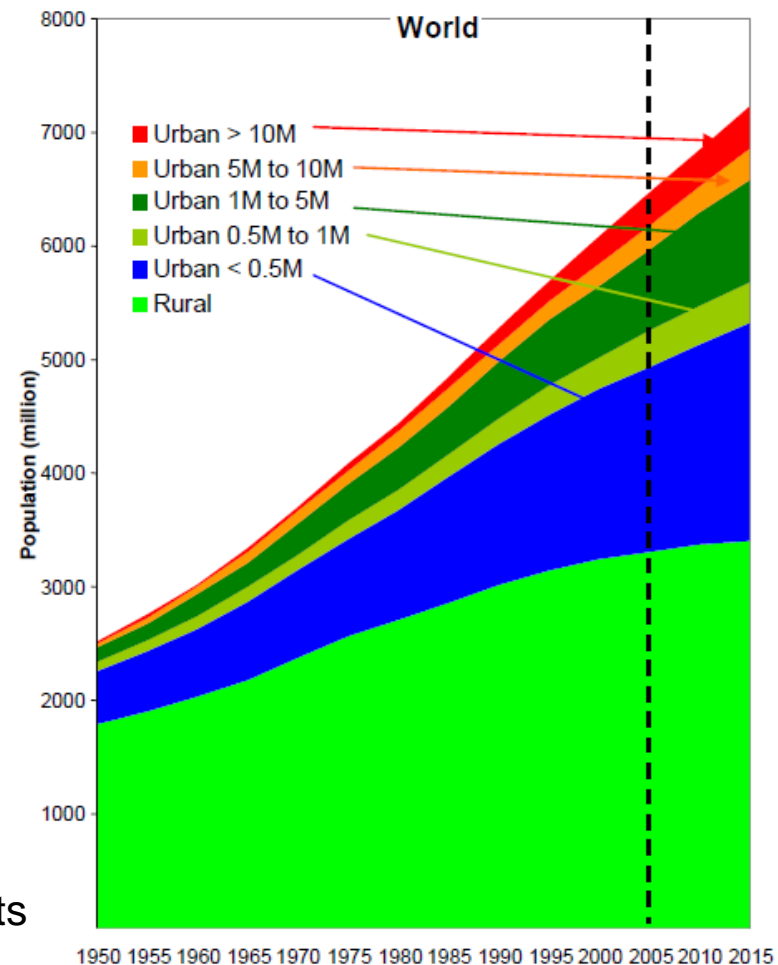
Why a roadmap on cities?

- Cities account for 75% of global final energy consumption

- Cities not only adapt to climate change, they can actively manage their energy use

- A unique level of policy and decision makers

- In certain applications and locations renewable energy is the most economic solution today

- Significant CO_2 reduction worldwide will also require reductions in cities

  - Energy efficiency is a priority

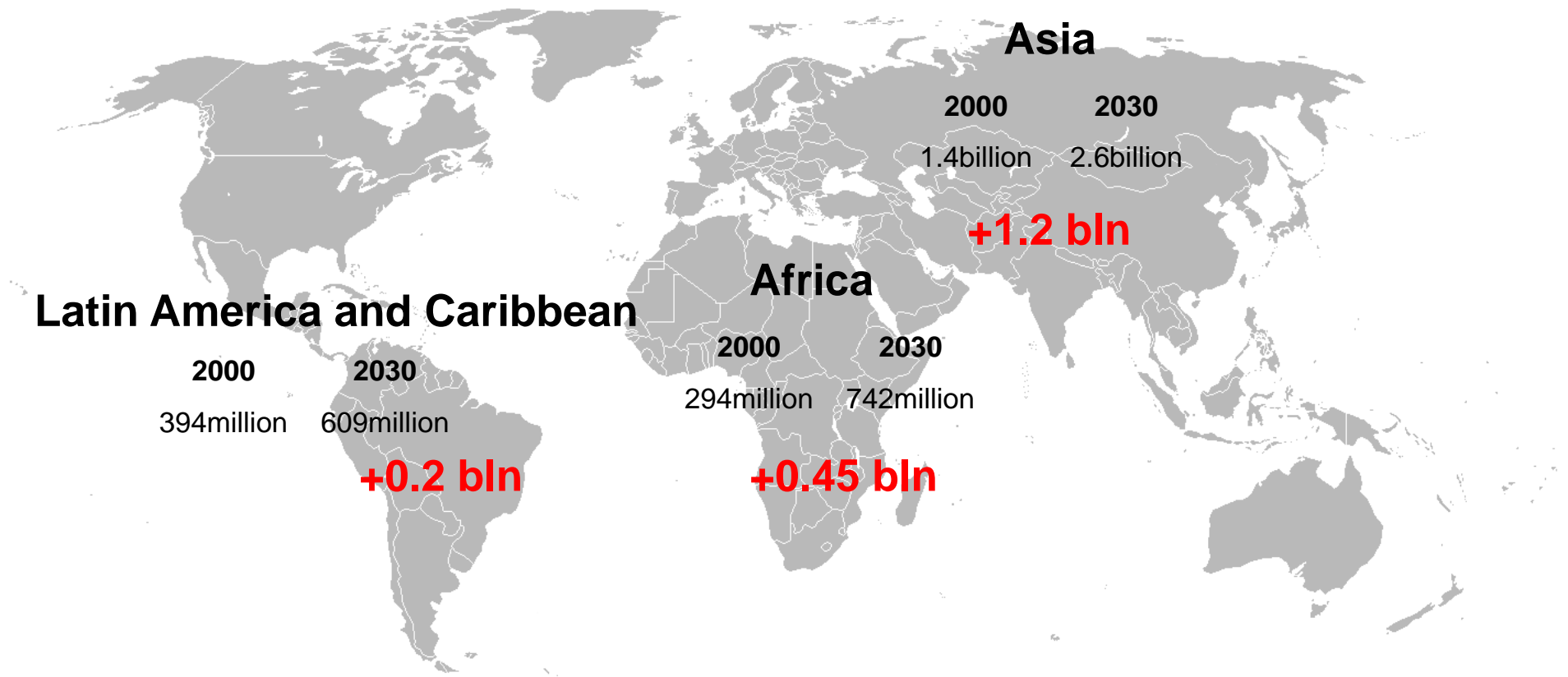 - Renewables have not yet received a lot of attention

Projected growth of city population

- New Mega Cities in Asia
- 50% of city population lives in cities smaller than 0.5 mln
- Virtually all population growth in the last decade in cities

- Continuous growth especially in:
  - Mega cities (> 10M)
  - Small cities (< 0.5M)

Source: UN 2004 World Urbanization Prospects

World

- Urban > 10M
- Urban 5M to 10M
- Urban 1M to 5M
- Urban 0.5M to 1M
- Urban < 0.5M
- Rural

Population (million)

1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Regional differentiation in urbanization trends

Asia

2000	2030
1.4billion	2.6billion

+1.2 bln

Africa

2000	2030
294million	742million

+0.45 bln

Latin America and Caribbean

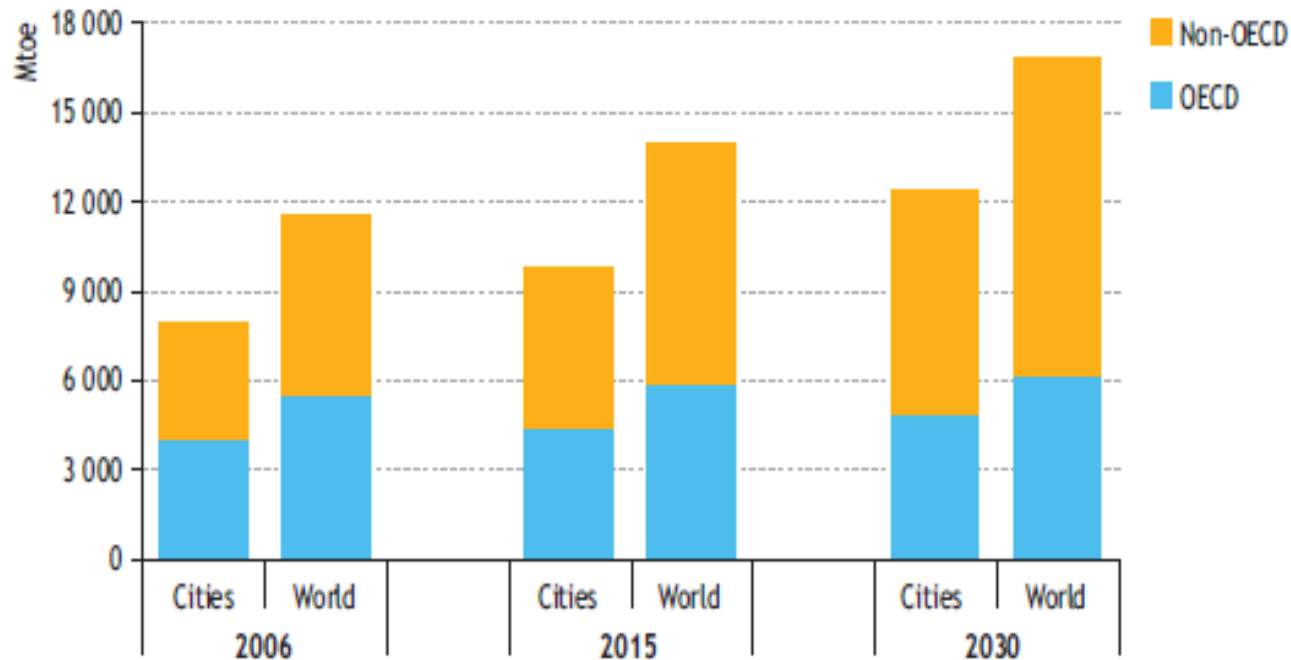| 2000	2030
394million	609million

+0.2 bln

Source: UNDESA 2009

Growing Cities and Growing Energy Demand

75% of energy use takes place in cities

Share of non-OECD rises from 50 to 65%

Source: WEO 2009

Renewables in cities

- Electricity supply, heating, cooling, transportation, materials
- Several functions: living, working, entertainment etc.
- New cities and renovation/replacement need to be considered separately
- Space limitations: import renewables from elsewhere
- Use existing energy infrastructure where possible (electrification, district heating, biogas etc)

13

Different options

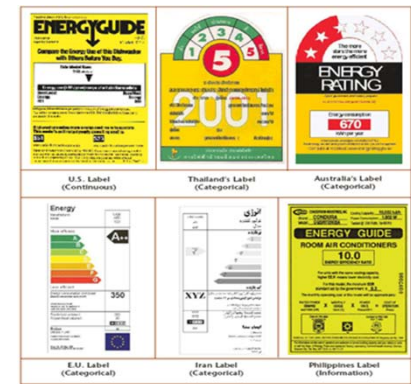| Functions	x	(Infra)structure	x	Behaviour

Energy efficiency & conservation

Building insulation

City planning

Efficient appliances

x

Renewable energy

Solar thermal & Solar PV

Localised RE generation

Change transport modes choices

Source: 7,8,9,10,11,12

14

Important city characteristics vary

- Local climatic conditions

- Renewable resource availability

- Infrastructure conditions and urban design, including density

- Existing building stock

- Financial and investment climate

- Economic and social conditions

- Urbanisation rates

Different approaches

Masdar City, Abu Dhabi

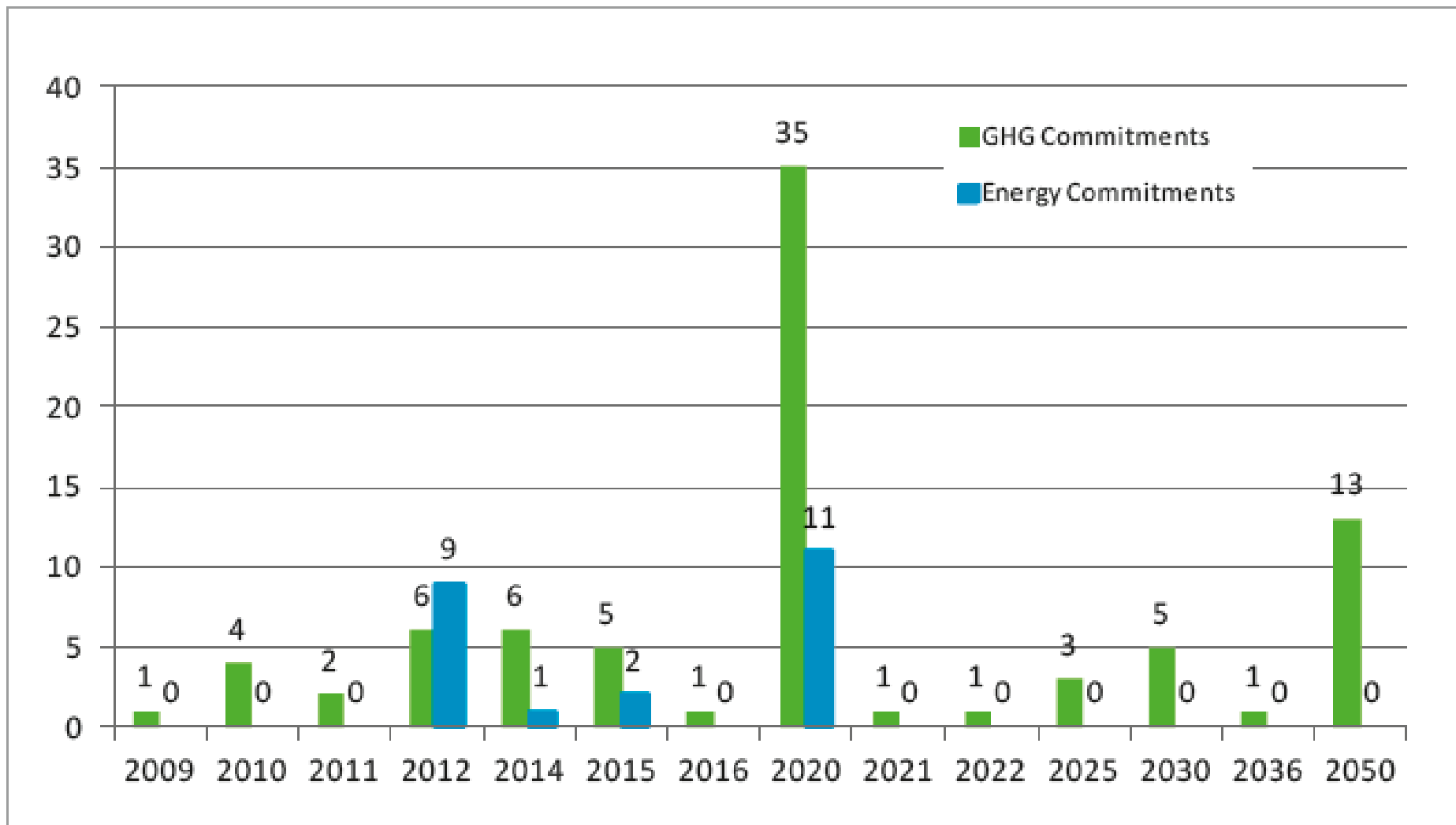- focus on Concentrating Solar Power (CSP), photovoltaic solar energy and on- and offshore wind energy

BedZed, UK

- 81% reduction in energy use for heating **5.2kWh/person/day**
- 45% reduction in electricity use **3.4 kWh/person/day**

Rizhao, China

- 30% reduction of energy consumption
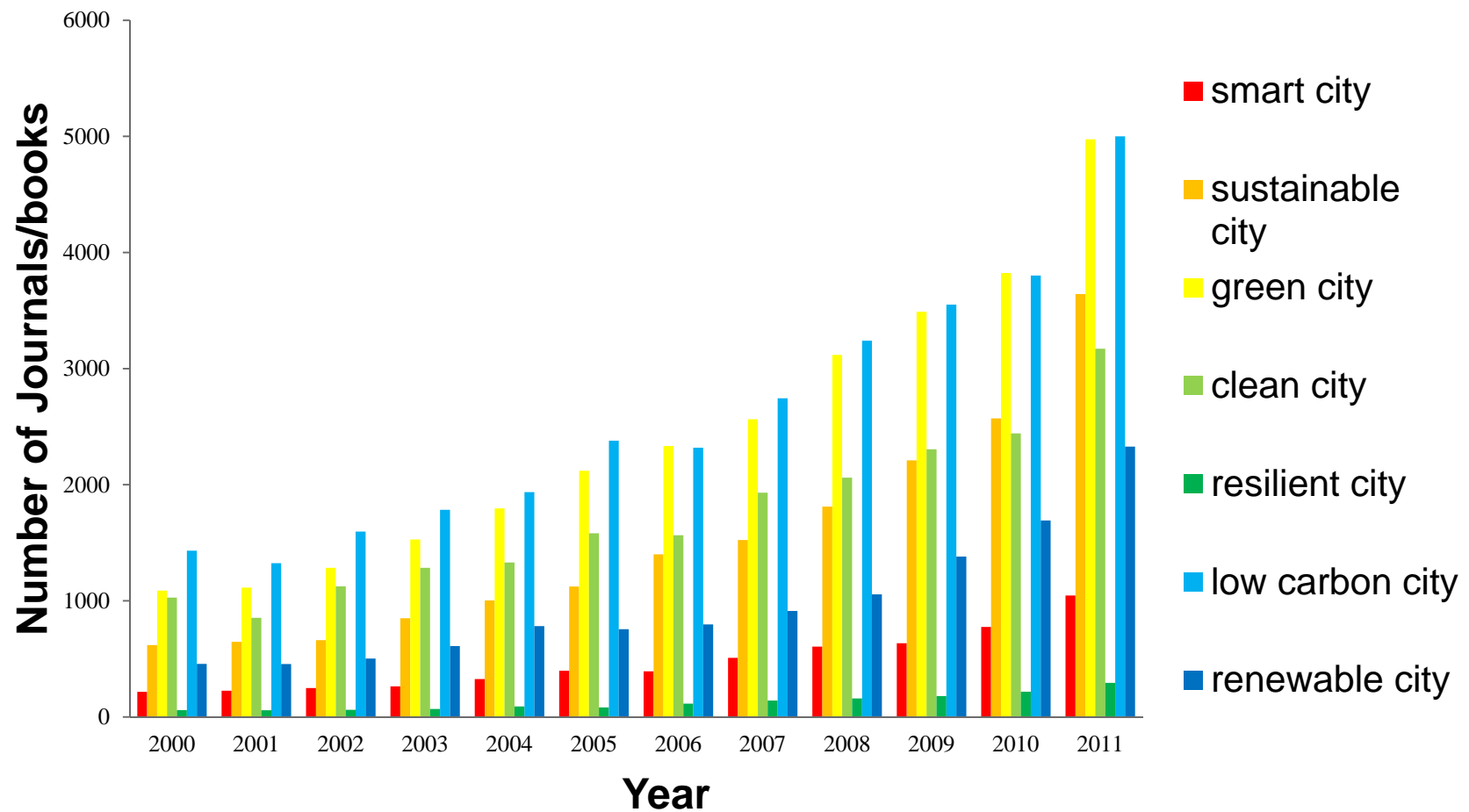- Annual CO_2 savings of 52,860 tonnes from solar water heaters

Different targets and time horizons

Source: ICLEI 2011 Carbon Cities Climate Registry

Many concepts, libraries full of reports
What are the barriers?

IRENA's activities on renewables in cities

- There are no detailed statistics available
    - Try to assess the situation today and improvement options
- Key preparatory documents that characterize options
    - Desalination
    - Solar water heating and cooling
    - Biofuels
    - ….

- Key options
    - Smart cities
    - Solar water heating
    - Underground heat and cold storage
    - Electrification

Outcomes

- Identify prospects, technological barriers, financing, and development and policy needs for the deployment of renewables in cities
- Identify opportunities and barriers for deployment of renewables across different city sectors
- Create synergies among different regional and national efforts
- Develop an action agenda that takes advantage of opportunities and addresses challenges (timeline, indicators, milestones, financing needs, regulatory reform needs etc)
- Specify the role of different actors
- Stimulate dialogue among different stakeholders impacting renewables in industry
- Help to build networks across different regions and countries
- Contribute to increased energy security, a reduction of greenhouse gas concentrations, and stimulate economic growth and RE deployment

Thank you !

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