

### SRREN: Renewable Energy in the Context of Sustainable Development

John Christensen, SRREN Lead Author Doha Climate Change Conference - November 2012



## **Renewable Energy and Sustainable Development.**

Historically, economic development has been strongly correlated with increasing energy use and growth of GHG emissions.

Renewable Energy can help decouple that correlation, contributing to sustainable development (SD).





## Indicators of links between energy use and economic development



40 - 75

Share of Population with an Income of less than USD 2 per Day [%]

5 - 40

<5

>75



Linking the SD assessment with the technical and policy chapters

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

## Renewable Energy contributing to Sustainable Development.

- RE can accelerate access to energy, particularly for the 1.4 billion people without access to electricity and the additional 1.3 billion people using traditional biomass.
- RE deployment can reduce vulnerability to supply disruptions and market volatility.
- Low risk of severe accidents
- Environmental and health benefits





## Renewable energy contributions to increasing energy access



Table 9.1 Millions of people without access to electricity in 2009 by region; projections to 2015 and 2030 under the IEA World Energy Outlook 2010, New Policies Scenario; and percentage of total populations with future access as a result of anticipated electrification rates (IEA, 2010b). \* Includes Middle East countries, \*\* includes OECD and transition economies

Region	2009			2015	2030	2009	2015	2030
	Rural	Urban	Total	Total	Total	%	%	%
Africa	466	121	587	636	654	42	45	57
Sub-Saharan Africa	465	120	585	635	652	31	35	50
Developing Asia	716	82	799	725	545	78	81	88
China	8	0	8	5	0	99	100	100
India	380	23	404	389	293	66	70	80
Other Asia	328	59	387	331	252	65	72	82
Latin America	27	4	31	25	10	93	95	98
Developing Country*	1229	210	1438	1404	1213	73	75	81
World**	1232	210	1441	1406	1213	79	81	85



Level 1 Basic Human Needs

**Electricity** for lighting, health, education, communication and community services (50-100 kWh per person per year)

Modern Fuels and Technologies for Cooking and Heating (50-100 kgoe of modern fuel or improved biomass cook stove) Level 2 Productive Uses

Electricity, Modern Fuels and Other Energy Services to improve productivity

- e.g.
- Agriculture: water pumping for irrigation, fertilizer, mechanized tilling
- Commercial: agricultural processing, cottage industry
- Transport: fuel

Level 3 Modern Society Needs

Modern Energy Services for many more domestic appliances, increased requirements for cooling and heating (space and water), private transportation (electricity usage is around 2,000 kWh per person per year)

RE has strong potential to contribute to increasing access Stand alone – mini grid – grid extension







## Renewable energy – GHG emissions and local air pollution



### A systemic approach is needed for a comparison of "cradle to grave" emissions.



#### **Background Economy**

#### Upstream

Resource Extraction Material Manufacturing Component Manufacturing Construction

#### **Fuel Cycle**

Resource Extraction / Production Processing / Conversion Delivery to Site

### Life Cycle Analysis approach

#### Operation

Combustion Maintenance Operations

#### Downstream

Dismantling Decommissioning Disposal and Recycling



INTERGOVERNMENTAL PANEL ON CLIMATE CHANES

# Lifecycle GHG emissions of RE technologies are, in general, considerably lower than those of fossil fuel options, even with CCS in most cases.



## Land-use change and bioenergy

- Bioenergy has potential for making significant contributions to SD, BUT if not properly managed activities can lead to negative impacts on SD
- The positive greenhouse gas balance of biofuels can be affected by direct and indirect land-use changes.
- Proper governance of land-use, zoning, and choice of biomass production systems are key challenges for policy makers.



## GHG emissions from modern bioenergy chains compared to fossil fuel energy systems, excluding land-use change effects.



15

## Barriers and Opportunities for Implementation of RE - in an enhanced SD context

## Barriers

- Socio-cultural
- Information and awareness
- Market and economic

## **Opportunities**

- Integrating SD & RE strategies
- International and national SD strategies
- Internalization of economic and social externalities





### www.srren.org

## Thank you for your attention!

John Christensen, SRREN Lead Author Doha Climate Change Conference Doha, Qatar, 28 November 2012



INTERGOVERNMENTAL PANEL ON Climate change