Expert Group Meeting on Sustainable Development Goal 7 & its Role in Mitigating impacts from Climate Change

Organized by the Division for Sustainable Development, UNDESA, in cooperation with UNDP Morocco & UNEnergy

13 November – 14 November 2016 - Mogador Express GUELIZ, Marrakesh, Morocco

PRESENTATIONS

Session 1: Regional Efforts on Sustainable Energy and Climate Change

- **Africa,** Mr. Crispen Zana, Senior Energy Advisor, African Union Commission
- **West Asia,** Ms. Radia Sedaoui, Chief Energy Section, ESCWA

Session 2: National Efforts on Sustainable Energy and Climate Change

- **UNDP,** Ms. Bahareh Seyedi, Policy Specialist, UNDP
- **India**, Mr. Hafeez Rehman, Senior Director, The Energy and Resources Institute
- **Brazil,** Mr. Marcio Schittini Pinto, Director, Ecometano
- **Ethiopia,** Mr. Tsegaye, Lemma Samson, Director, Solar Energy Foundation
- **Bolivia,** Mr. Roberto Ayala, Project Manager, PHOCOS

Session 3: Developing Capacities and Accelerating Innovation

- **Developing capacities at all levels to advance SDG 7 and address climate change**
- - Ms. Richenda Van Leeuwen, Senior Energy Expert
- **Accelerating Innovation: Nexus between energy and other SDGs**
- - Mr. David Bank, Chair, We Care Solar
- **UN HABITAT energy work and the New Urban Agenda**
- -Vincent Kitio, Chief Urban Energy Unit, UNHABITAT

Session 4: Implementing SDG7 and the 2030 Agenda

- **Towards 2030: Global Vision, Policies, and Path Forward**
- - Mr. Luis Gomez Echeverri, Senior Research Scholar, International Institute for Applied Systems Analysis (IIASA)
- **Role of UN-Energy in supporting SDG 7 and developing capacities**
- - Mr. Ivan Vera, Secretary of UN-Energy, UN DESA
- **Accelerating SDG7 implementation: Strategic focus for the UN system**
- Mr. Minoru Takada, Team Leader (Energy), UN DESA
- **Renewable energy and climate change**
- Elizabeth Press, Director, IRENA

- **<u>Session 1: Regional Efforts on Sustainable Energy and Climate Change</u>**
- **Africa,** Mr. Crispen Zana, Senior Energy Advisor, African Union Commission

Sustainable Energy Initiatives and Programs in Africa

Presented at the Expert Group Meeting on SDG 7 & its Role in Mitigating impacts from Climate Change
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in cooperation with UNDP Morocco & UNEnergy
13 November – 14 November 2016 –
Hotel Mogador Express GUELIZ
Marrakech, Morocco

by **Crispen Zana**, Senior Energy Advisor,
African Union Commission

Africa-EU Energy Partnership

Africa-EU Energy Partnership

Africa EU Energy Partnership at a Glance

*The AEEP is a long-term framework for strategic dialogue on energy issues between **Africa and the EU***

- Established in 2007, under JAES strategy
- Political framework for strategic energy dialogue
    - High Level Meetings
    - Stakeholder Dialogue
    - Thematic Workstreams
    - Monitoring Progress of the AEEP 2020 targets
    - Capacity support to African Counterparts

European Commission

COMESA

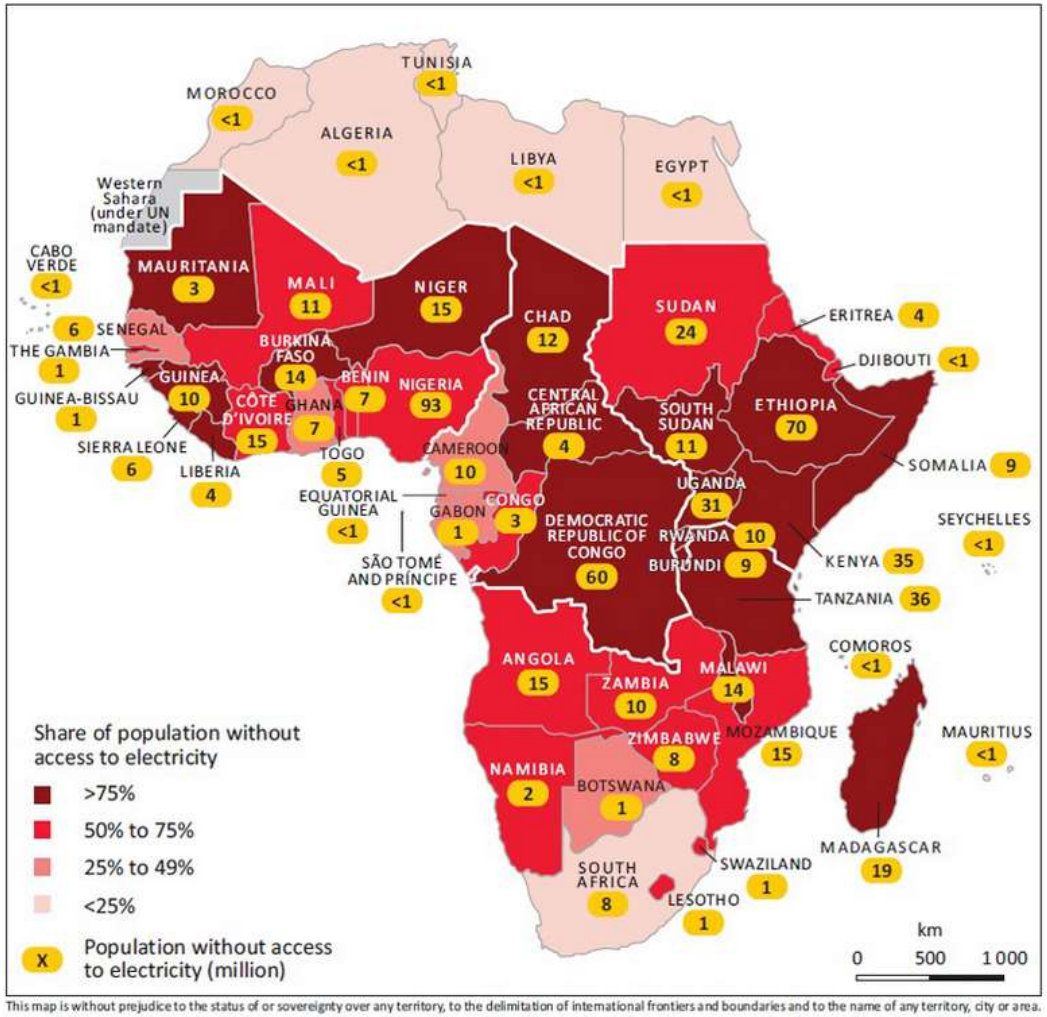
Federal Ministry for Economic Cooperation and Development

Ministero degli Affari Esteri e della Cooperazione Internazionale

Basic Information on Africa

- Total population - 1,086,000,000
- Area - 30,244,049 sq.km. (11,677,239 sq. ml)
- Africa is divided into five regions – North, West, Central, East & South.
- It is also divided into eight Regional Economic Communities (RECs)

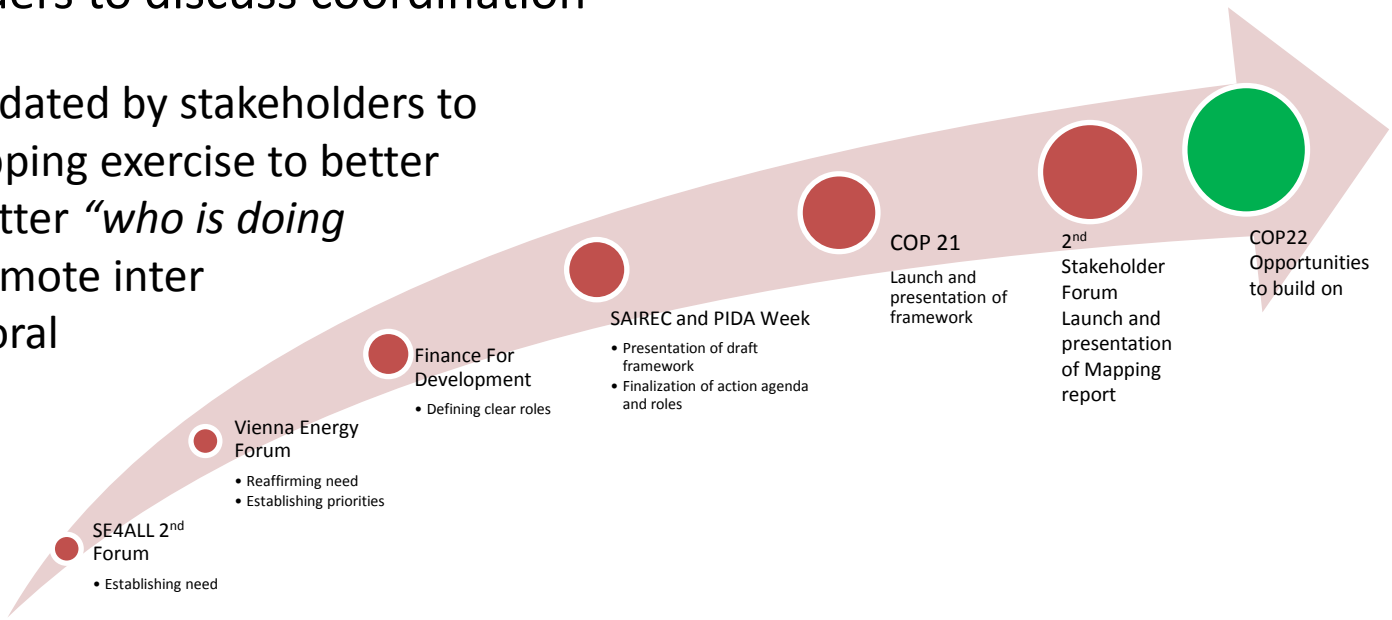
- Most recent reliable data in 2012 show 516m Africans had access to electricity – leaving 570m without.
- Growing at an average rate of 28.9m per year as measured in 2010-2012 (increase of 6.1% p.a.



Source: IEA

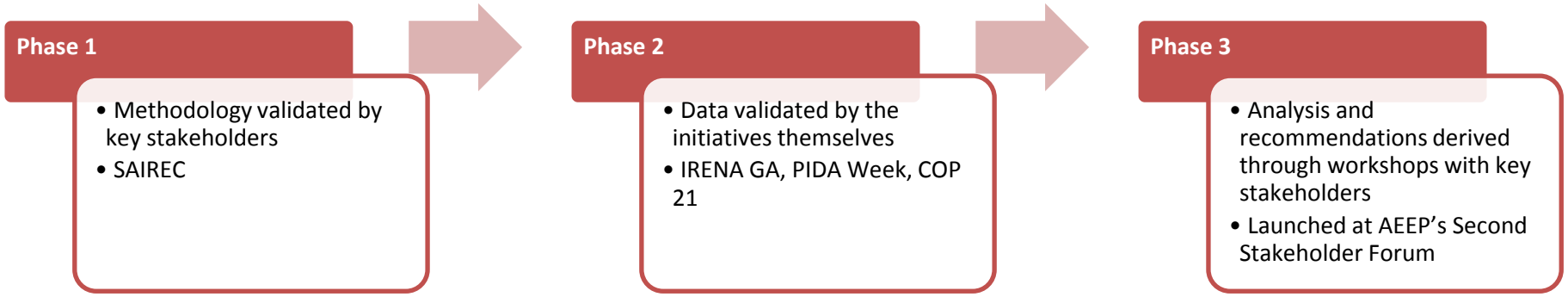
Background of the Mapping Exercise

- Increased focus on the energy sector in Africa in the lead up to COP21, resulted in new initiatives coming from the environment sector.
- Investments in energy sector are recently being prioritized catalysing multiple new international initiatives and donor programs
- AEEP conducted a "**Road to COP 21**" consultative discussion series with key stakeholders to discuss coordination
- AEEP was mandated by stakeholders to conduct a mapping exercise to better understand better *"who is doing what"* and promote inter and intra-sectoral coordination.



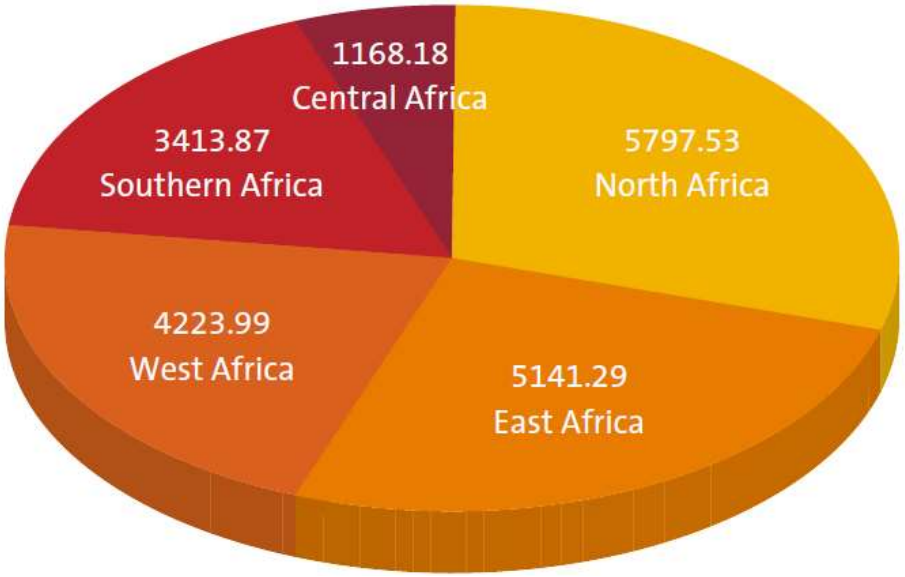
Summary

- **Objective: present information about donor initiatives promoting sustainable energy in Africa in a systematic approach, allowing for better coordination and results**
- "Lifting the fog" from the African Energy sector to reveal overlaps, potential synergies and gaps
- Key input to coordination efforts but also useful for the cooperation of practitioners and national governments
- Exercise undertaken through a phased consultative approach:

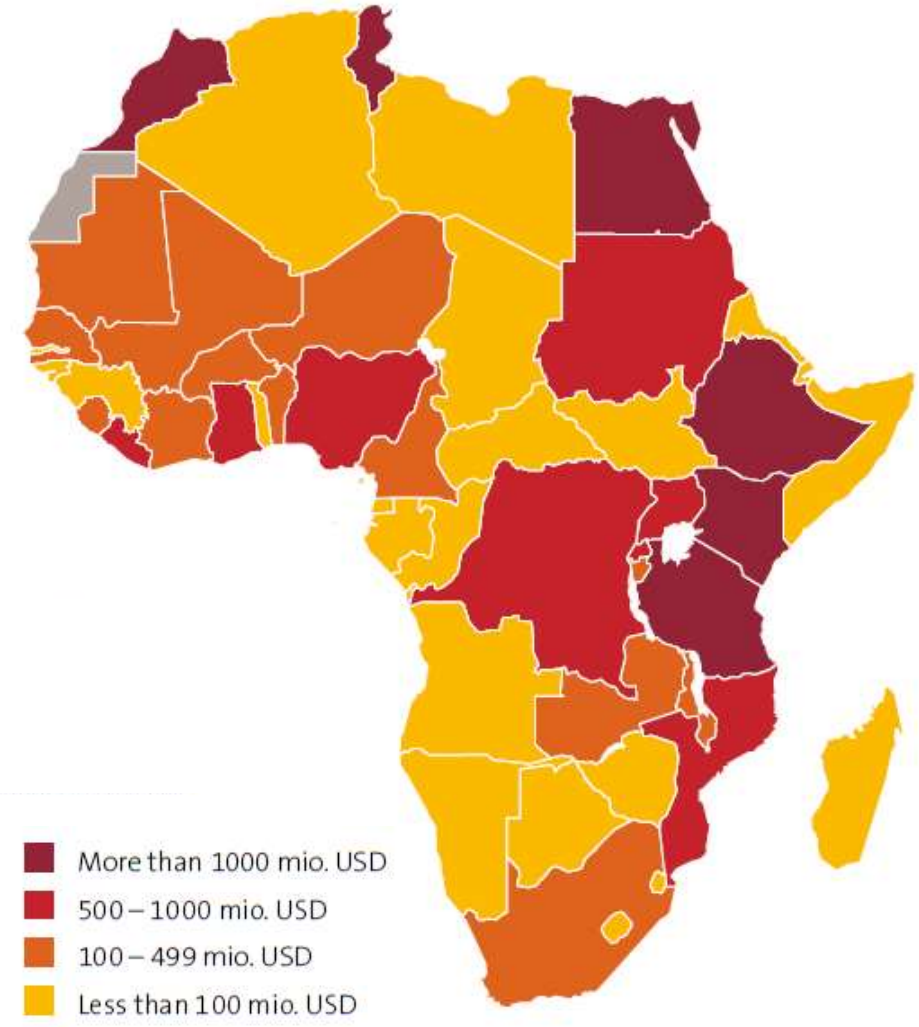


Results: Geographic distribution of ODA

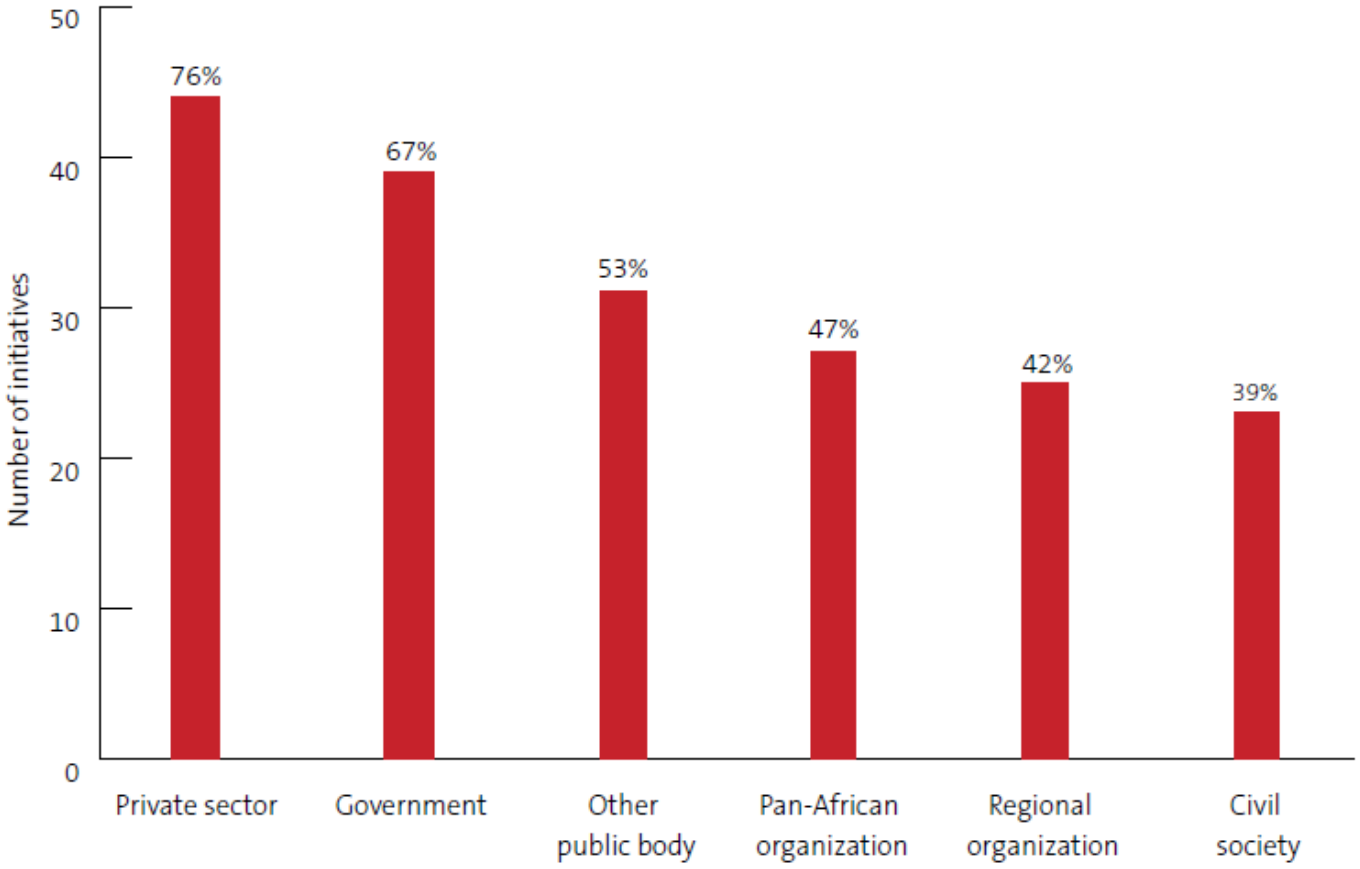
- Focus on several North and East African countries
- Central Africa receives least energy ODA



ODA flows to the energy sector in Africa by region, 2009–2013 (in million USD)

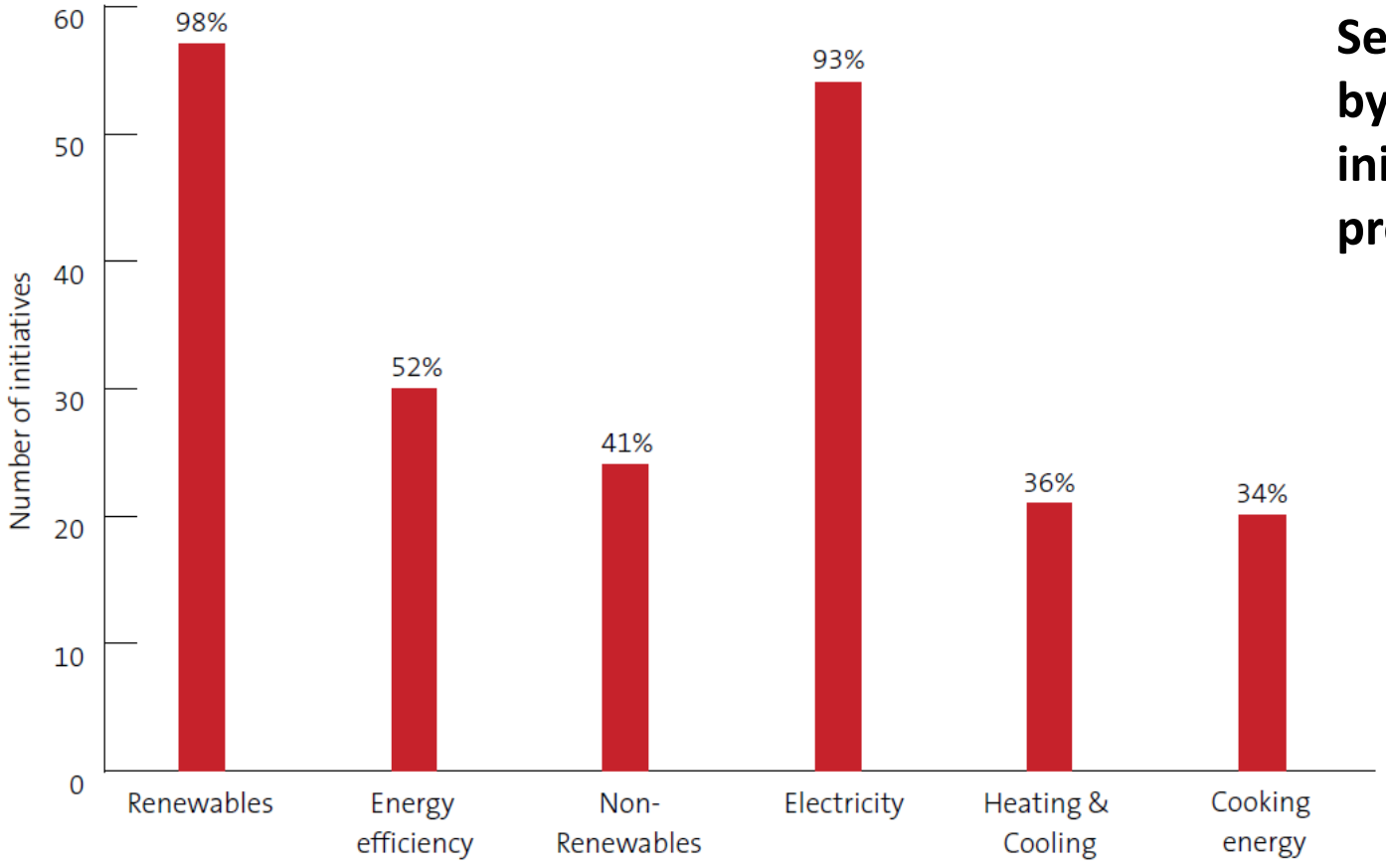


Results: High level of private sector involvement versus relatively low level of civil society participation



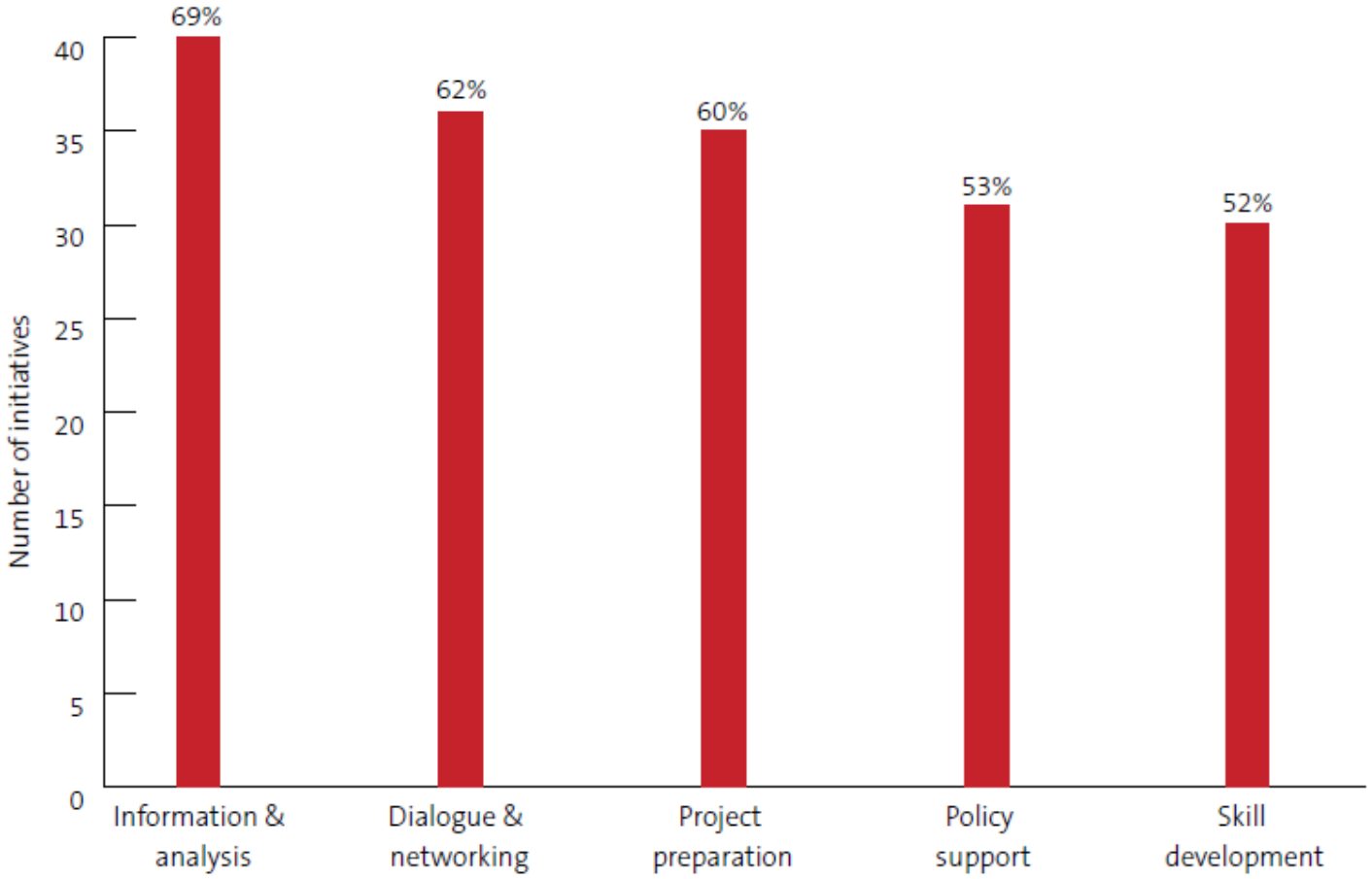
African partners involved in selected initiatives and programs

Results: Scope for more programs on cooking energy



Sectors covered by selected initiatives and programs

Results: Skill development is the least common type of technical assistance



Types of technical assistance provided by the selected initiatives and programs

Tracking developments in the African energy sector

- **80% of electric power in Africa is generated from fossil fuel**
- **Over 80% of African population depends on biomass for cooking**

Renewables:

- **Hydroelectric power (HEP)** remains the dominant RE technology supplying African grids. Between 2010 and 2015, 2,174MW of HEP capacity was added bringing the total to 35.18GW by end of 2015.

- **Solar** capacity has enjoyed exponential success installed capacity at end-2015 was 1,546MW, compared with 103MW in 2010.

- **Wind power** since 2010, 2,132MW of wind power has been added, more than doubling the 2010 capacity of 1,120MW and a project pipeline suggests of adding 5,000MW by 2020 if 43% of the planned projects are completed on time.

- **Other renewable technologies** show that some biomass in 2015 had capacity – 950MW compared for geothermal with 554MW – geothermal capacity is anticipated to increase in 2017-18 because of the GRMF.

Next Steps for Coordination

- Consultative process and engagement of key stakeholders has resulted in the Mapping Analysis Report commanding authority in both the environment and energy sector
  - Actively used and promoted by: NEPAD, RECP, Power for All, DFID among others
- Recommendations were adopted by the Stakeholders at the Second Stakeholder Forum, and a commitment to increase coordination efforts among actors
- Mapping to contribute to the Africa Renewable Energy Initiative and AEEP supporting coordination between environment and energy ministries and stakeholders
- Database to be digitalized in 2017 and include bilateral and national efforts
- Key input in to a coordination effort pioneered by the AUC , AfDB and NEPAD

Thank you for your attention!

Crispen Zana, Senior Energy Advisor,
African Union Commission

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Africa-EU
Energy Partnership


Coordinating and Aligning Initiatives to Meet the AEEP Targets
AFREA
AFRICA 50 · ELECTRIFI
AREF · GTF · SREP ·
AFRICA POWER VISION
PRG · PIDA · ITF · SE4ALL ·
TAF · ASEF · AECF
ENERGYAFRICA
RECP ·
EUEI PDF
ACP-EU ·
NEPAD
ADFD
ENDEV
IPPF
HEAT
ELECTRICITY
AEEP TARGETS
ACHEEVE IN 2020
Have a OVERVIEW
MONITORING
MAPPING RESULTS
REPORTS
WEBSITE
FORUM TO COORDINATE PARTNERSHIP
KEY POLICY RECOMMENDATION
DIFFERENT INSTRUMENTS
FACILITATING TEAM
1 CONTINENTAL LEVEL
2 REGIONAL LEVEL
3 NATIONAL LEVEL
LISTEN TO THE NEEDS
COLLECT DATA
ODA DISTRIBUTION
COORDINATION PLATFORM
OWNERSHIP
SECURITY
EFFICIENCY
Africa-EU Energy Partnership

- **West Asia,** Ms. Radia Sedaoui, Chief Energy Section, ESCWA

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Session 1: Regional Efforts on Sustainable Energy and Climate Change

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Economic And Social Commission For Western Asia

Ms. Radia Sedaoui
Chief, Energy Section
Sustainable Development Division

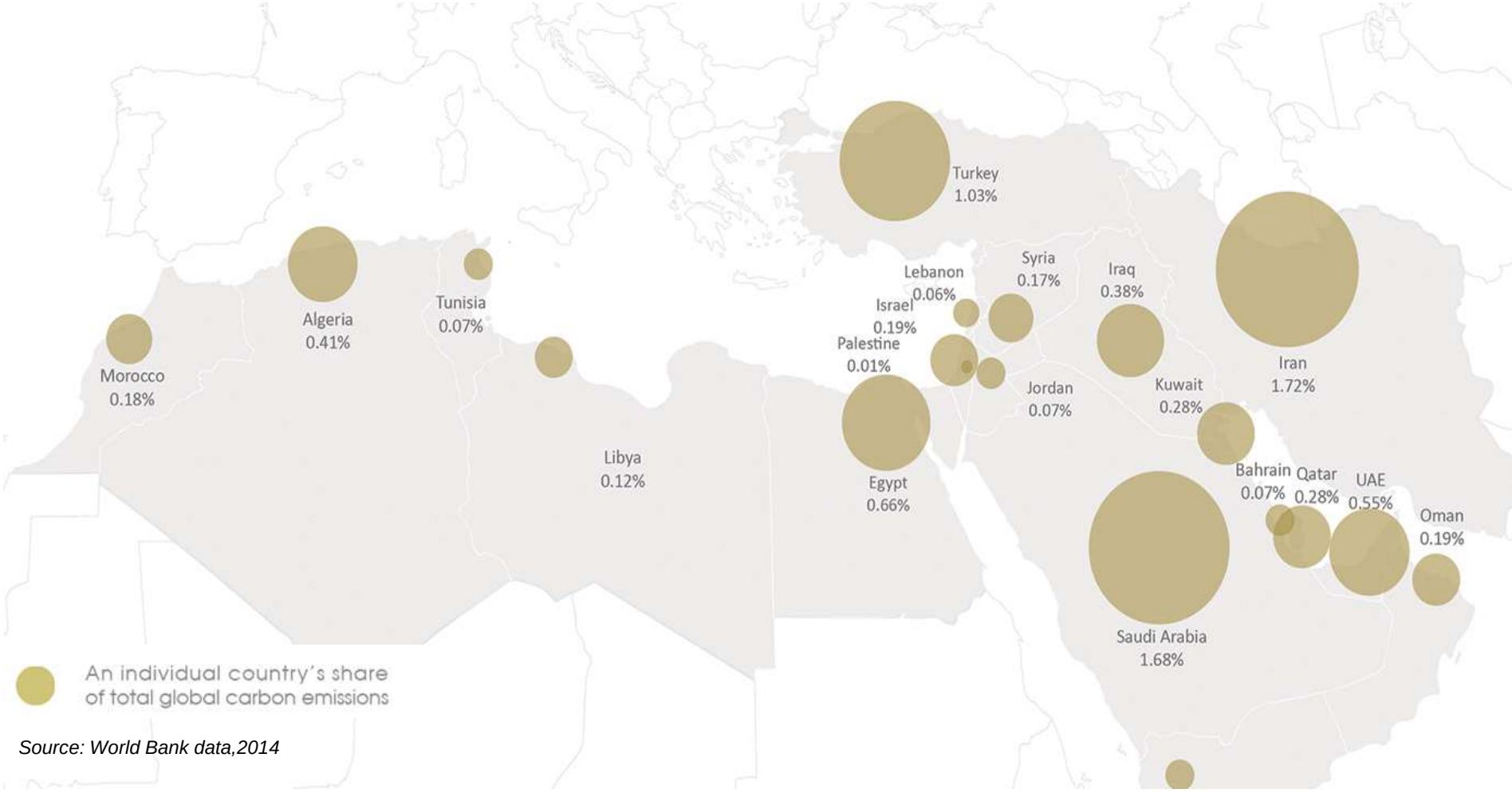
UNITED NATIONS
الاسكوا
ESCWA

40 YEARS

Energy Access in the Arab Region

- Many countries in the region are not able to provide adequate energy services for a significant portion of their population.
- About 54 million people in the Arab region (excluding South Sudan) have no access to the electrical grid, and about 48 million people are relying on biomass for cooking.
- The problem of refugees in the Arab region, where there are 11 million, representing approximately 54% of the world average.
- Lack of energy services aggravates the cycle of extreme poverty in the rural areas, and some peri-urban locations, resulting in poor social and economic conditions.
- Women and children suffer the most from the limited access to energy services; health, safety, and environmental problems usually associated with the use of inefficient solid fuels in households.
- Unemployment rate remains the highest in the world.

Share of Arab countries in total Carbon emission

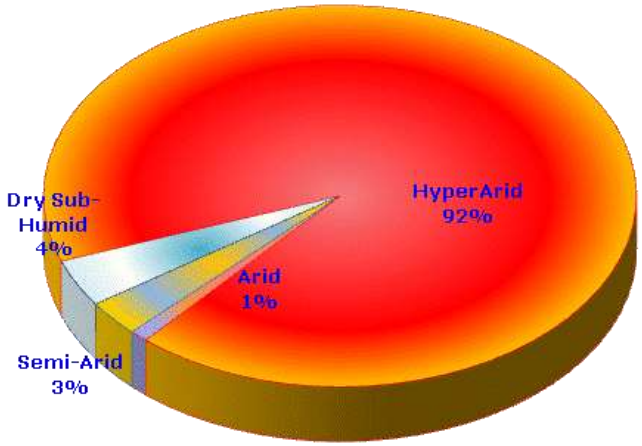


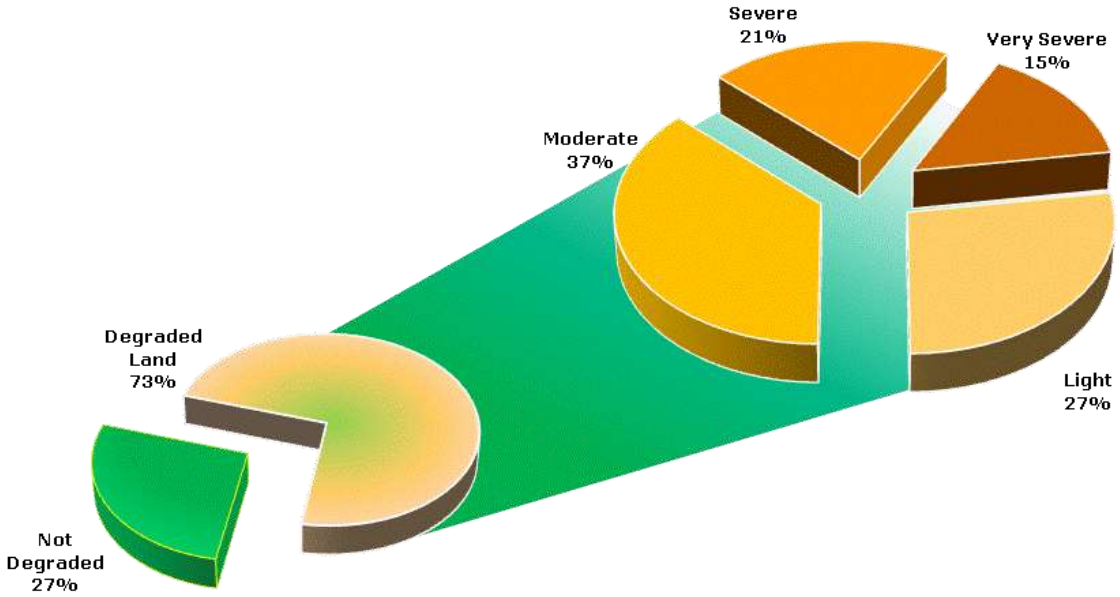
Source: World Bank data,2014

- Historically low rate of energy use and carbon emissions, the Arab world which constitutes 5% of the world's population, emits just under 5% of global carbon emissions,
- Except for Saudi Arabia, no single Arab country is responsible for more than 1% of global emissions.
- INDCs (or post-2020 climate action plans) were submitted by 19 countries, 3 missed INDCs (Libya, Palestine & Syria).

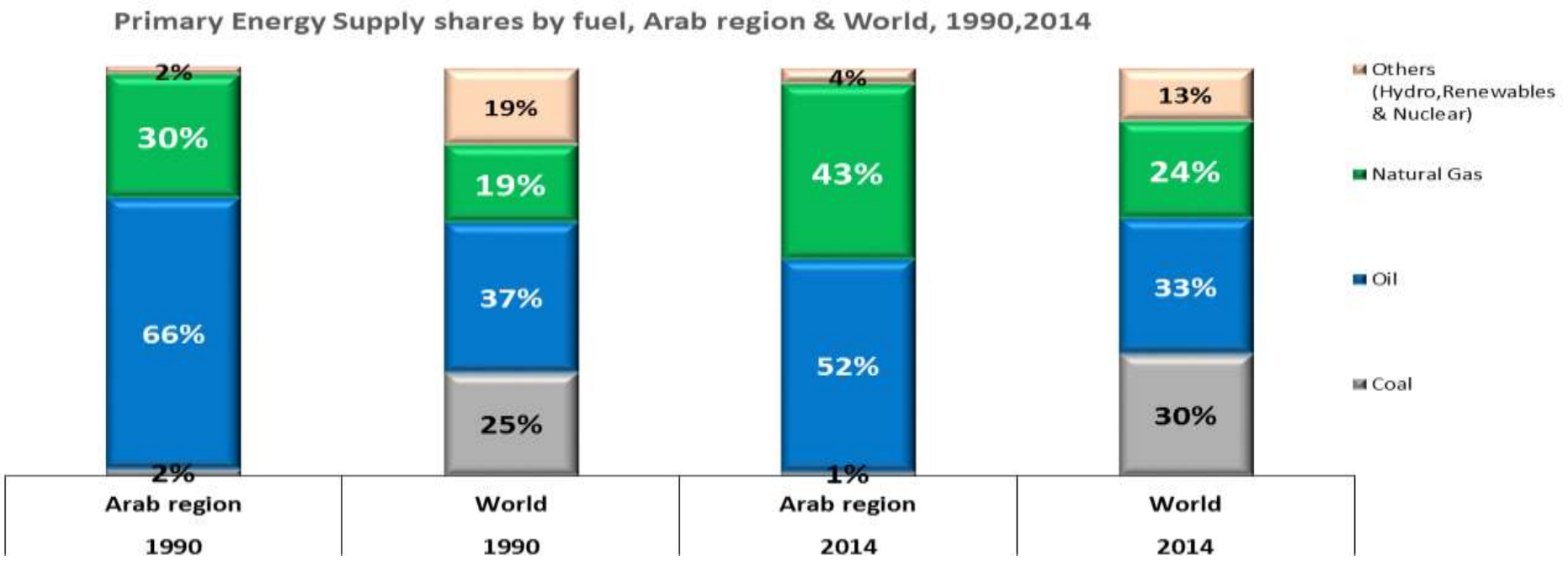
Challenges facing the Arab region (1/4)

It is a fragile area with more than 90% of the land classified as arid or hyper-arid (or desert) and the remaining classified as dryland highly subject to degradation and thus to desertification

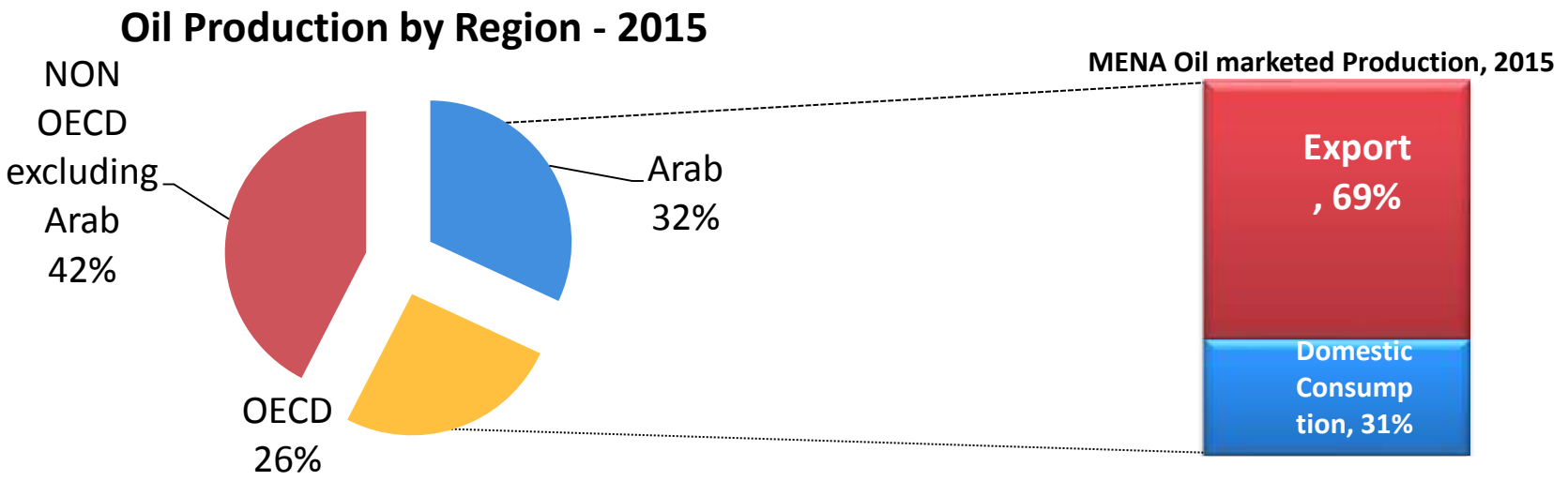


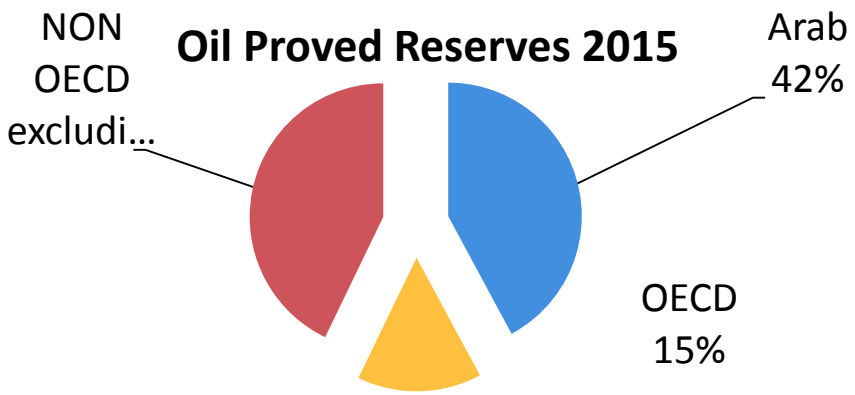


Primary Energy mix: World & Arab Region



Oil production and proved reserves by region, 2015

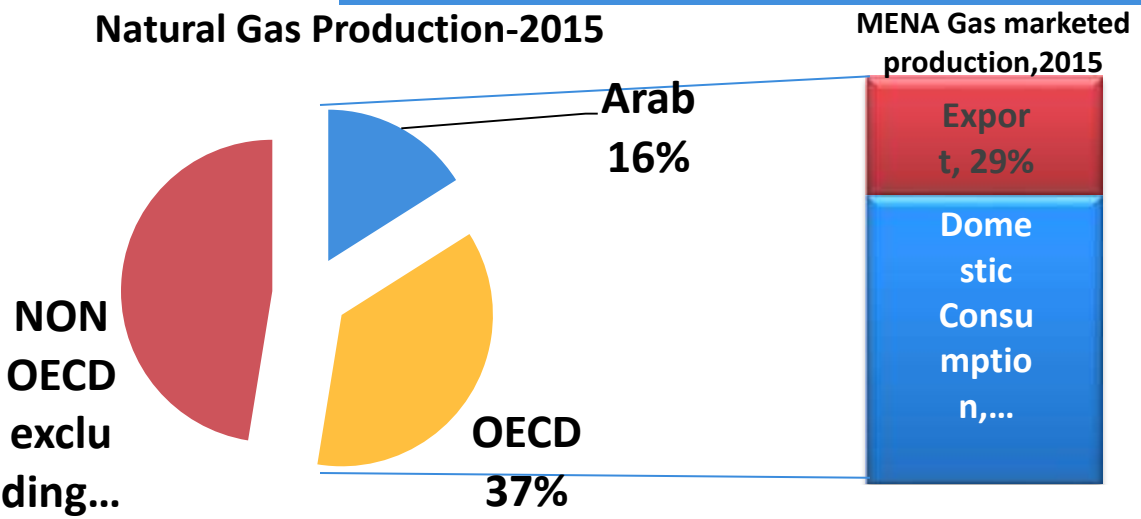


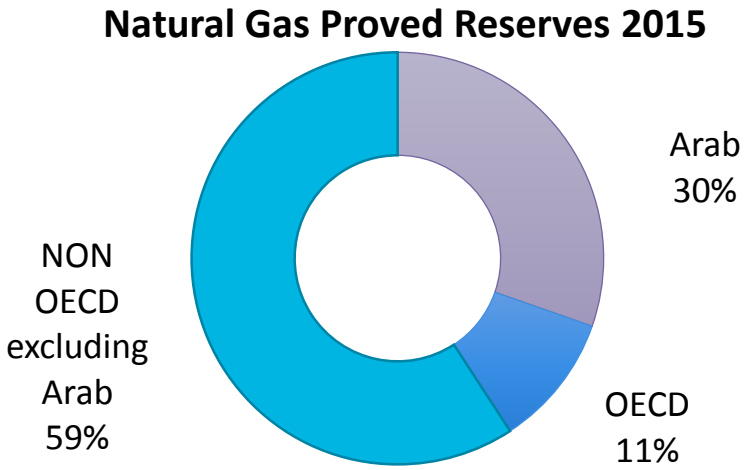


Data Source: BP2014, EIA2014

Note: Values in the pie chart do not sum to 100% due to rounding.

Natural Gas production and proved reserves by region, 2015

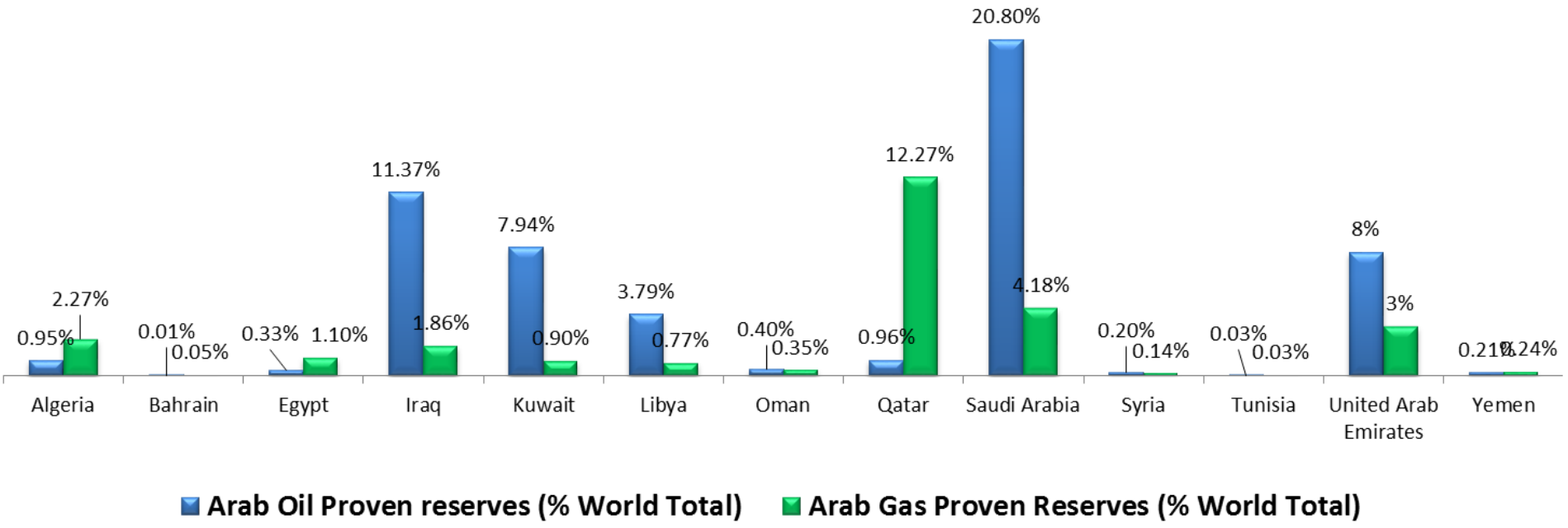




Data Source: BP2014, EIA2014

Note: Values in the pie chart do not sum to 100% due to rounding.

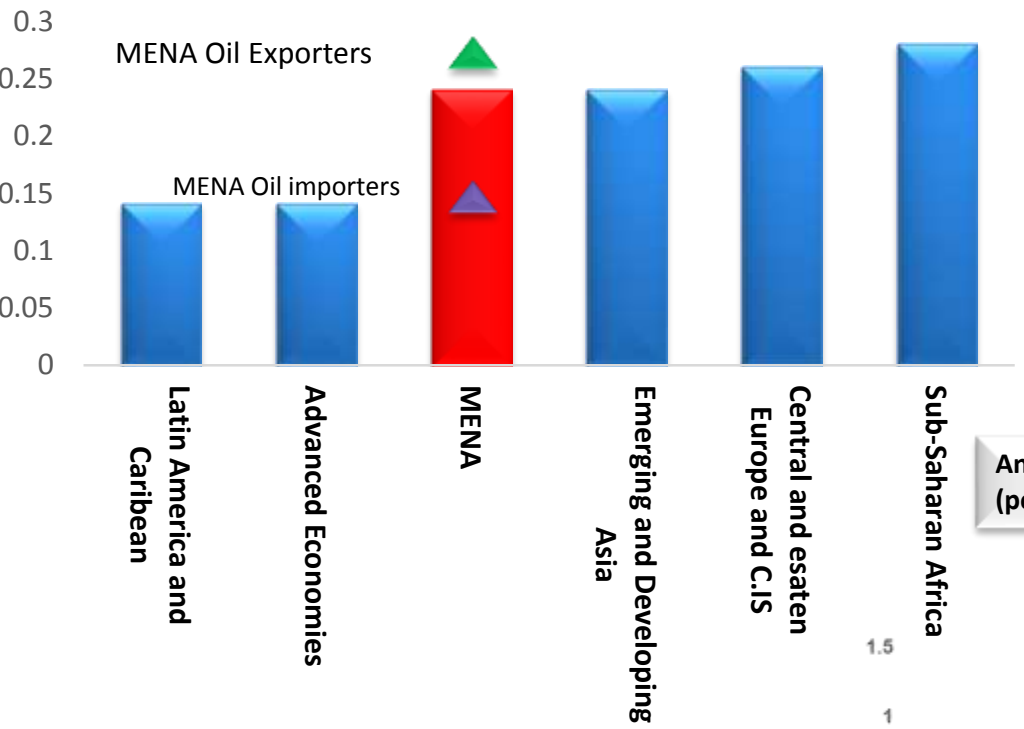
Arab countries Proven Oil & Gas reserves



Source: OAPEC, BP 2014

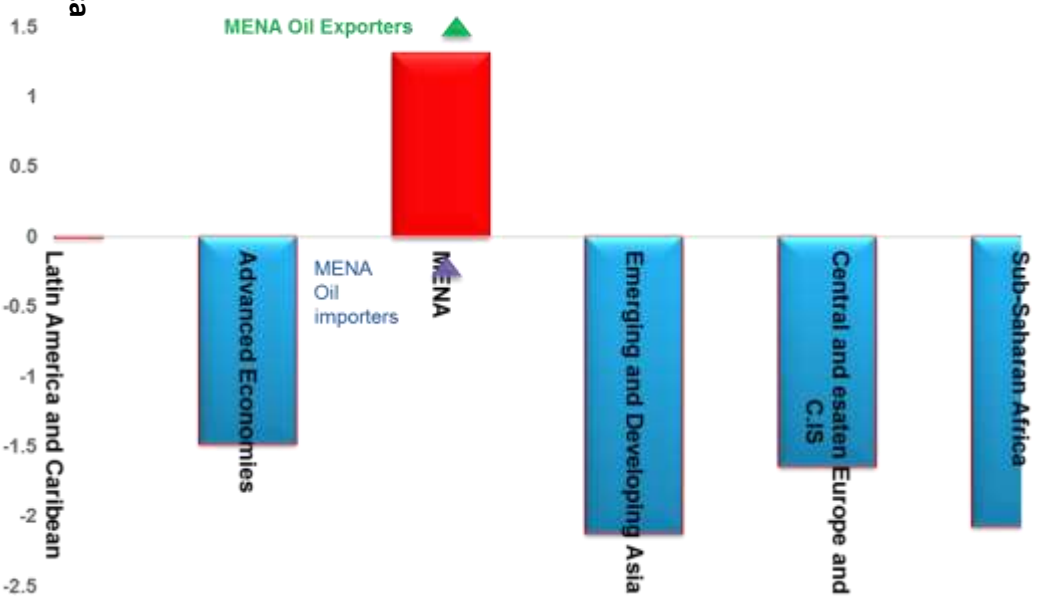
Energy intensity by region

Energy Intensity by region, 2010 (kg of oil equivalent/PPP GDP)



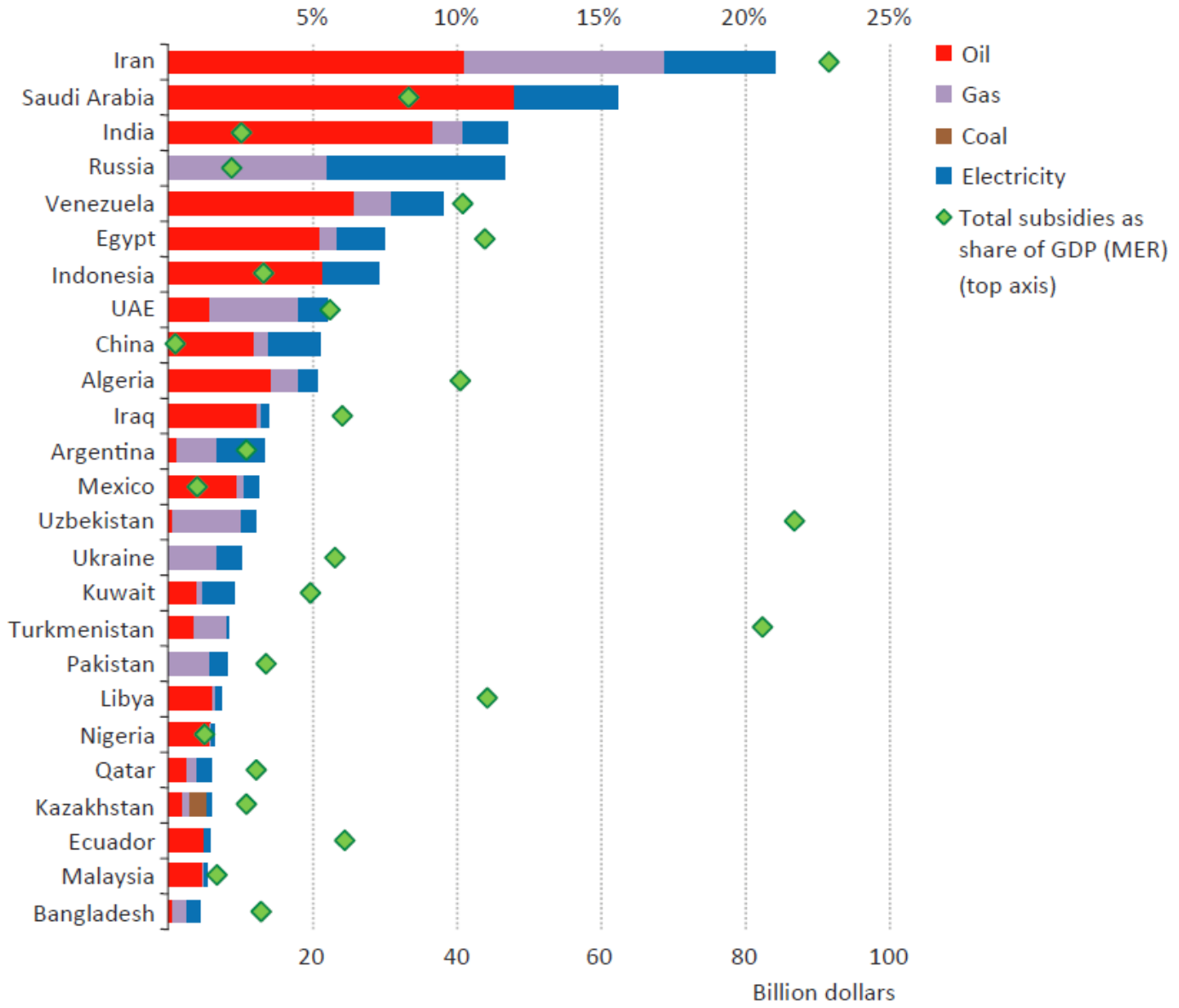
- Energy intensity is often used as a proxy for energy efficiency, but it is not a perfect indicator as it is influenced by a range of other factors, such as changes in economic structure and climatic conditions.

Annual Variation of Energy Intensity by Region, 2000–2010 (percent, kg of oil equivalent/PPP GDP)



Data Source: World Bank World Development Indicators database; and IMF staff calculations.
Note: PPP = purchasing power parity.

Economic value of fossil-fuel consumption subsidies by fuel for the top 25 countries, 2013



Note: MER = market exchange rate.

Source: IEA the New Policies Scenario WEO2014

Top 20 Gas Flaring Countries 2007-2012

Context

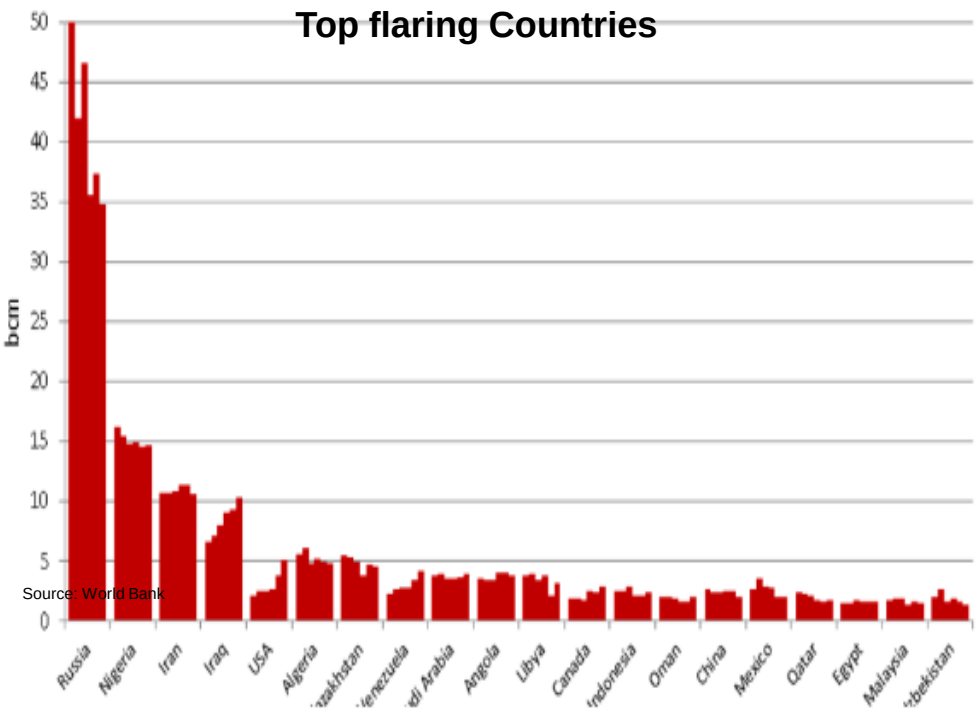
- Billions of cubic meters of natural gas is flared annually at oil production sites

Economics

- Waste of energy resources that could support economic growth

Environment

- Release of millions of tons of CO2 to the atmosphere, affecting climate change efforts



Source: Global CCS Institute, 2014

20 countries account for more than 80 percent of gas flaring.

Sustainable Energy in the Sustainable Development Agenda 2030

ESCWA as a Regional catalyst in promoting and supporting the development of RE policies in Arab countries

Regional Convening Power for Intergovernmental Mechanisms

- Works with LAS, IRENA and other regional entities on shaping a regional Sustainable energy strategy, including RE, and on providing Arab countries with key insights regarding the position that RE can have in their energy mix.

- Adopts an approach of cooperation with national institutions, at policy and strategy level to help Arab countries develop harmonised energy policies with SDG #7.

Capacity building, knowledge sharing:

- Provides capacity building material and workshops in relevant sustainable energy topics, including RE, to help shaping sustainable energy policies .

- Provides a channel of knowhow and ideas transfer to the Arab region through its cooperation with the other UN Bodies and international energy community .

ESCWA

http://www.escwa.un.org

Conducting studies & Advisory Services:

- Publishes studies, guidebooks and reports that provide information material and policy analysis that can help in shaping RE policy options including local RE manufacturing.

- Provides technical assistance to countries, upon request, including formulating RE policies

Informing Regional Processes for Global Negotiations & National Action:

- As a Forum for exchanging experiences on RE policy development between Arab countries, providing international benchmarking and promoting best practices

- Through its Energy Committee, ESCWA provides a convening ground for addressing, at a regional level RE policies development

ESCWA Activities in Relevance to the SDG 7 & SE4All

Implementation Approach

- Intergovernmental Com. on Energy & WP 2016 - 2017
- Publications, reports, fact sheets, EGMs, ….
- DA Projects (promoting RE investment in the Arab region,
- building capacities in developing green technologies in rural areas…
- Capacity building & knowledge sharing

Energy Access & Energy Security

- Policies, cleaner technologies, Market, for Conventional & Non-conventional energy resources
- Regional Interconnections
  Electricity Grids/ Natural Gas Supply
- Water-Energy-Food Nexus

Energy Efficiency (EE)

- EE in key Sectors: Power, Transportation, Industry
- EE Standards & Specifications and indicators
- Regional Initiatives to Upscale EE in Arab Member Countries

Renewable Energy (RE)

- Support RE Development
  Technology/Policies/ implementation Schemes, R&D
- Access to Energy Services in Rural Areas
  (improving living conditions)
- Regional cooperation/ integration: Local Manufacturing, Market, R&D

Climate Change Mitigation

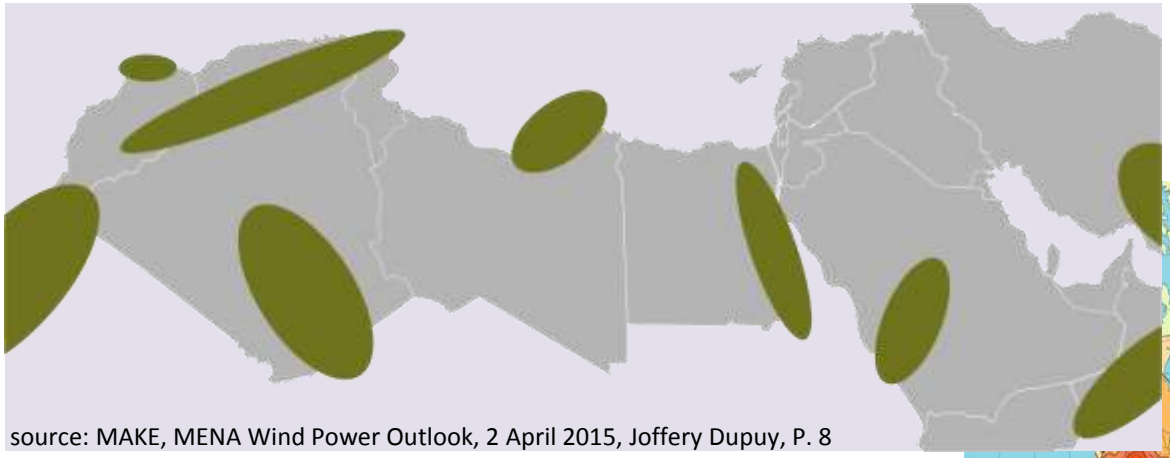
Program Mandated by ESCWA Committee on Energy & LAS Arab Ministerial Council for Electricity

Regional initiative related to RE $ EE that targets yhe Arab Region

- The League of Arab States “Arab Guideline for Improving Electricity Efficiency and Rationalize its Consumption at the End User". This guideline was approved during the twenty sixth meeting of the executive bureau of the Arab Ministerial Council for Electricity on 23/11/2010 (resolution number 195), and is the basis for the work being led by LAS (with MED-ENEC and RCREEE support) to help the different countries in the region develop their National Energy Efficiency Action Plan (NEEAP).

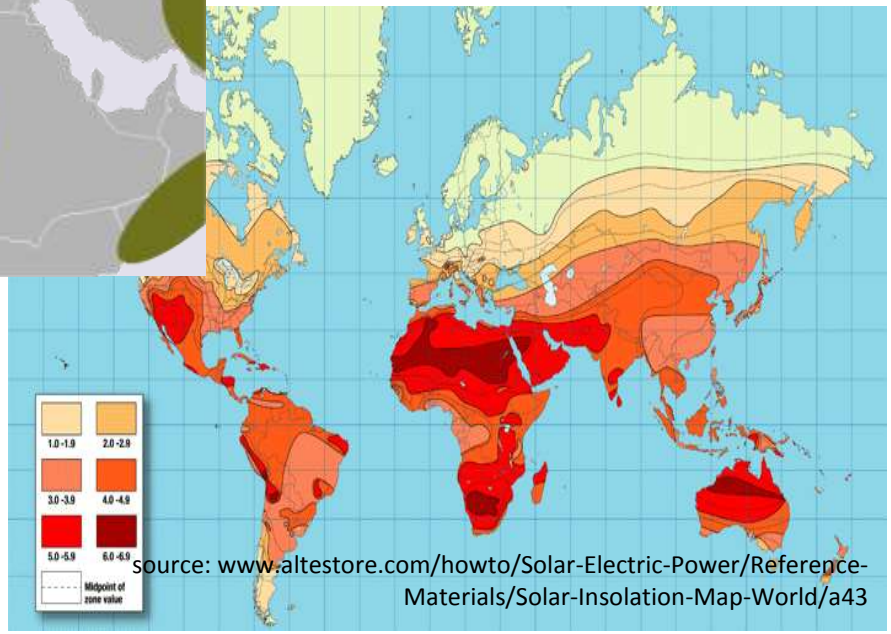
- The Pan-Arab RE Strategy 2030 adopted at the Third Arab Economic and Social Development Summit (2013) in Riyadh calling for the deployment of RE technologies in the region, and the subsequent road map developed by the League of Arab States to implement the Pan-Arab RE Strategy 2030 based on approved national targets.

Renewable energy potential in the Arab region



source: MAKE, MENA Wind Power Outlook, 2 April 2015, Joffery Dupuy, P. 8

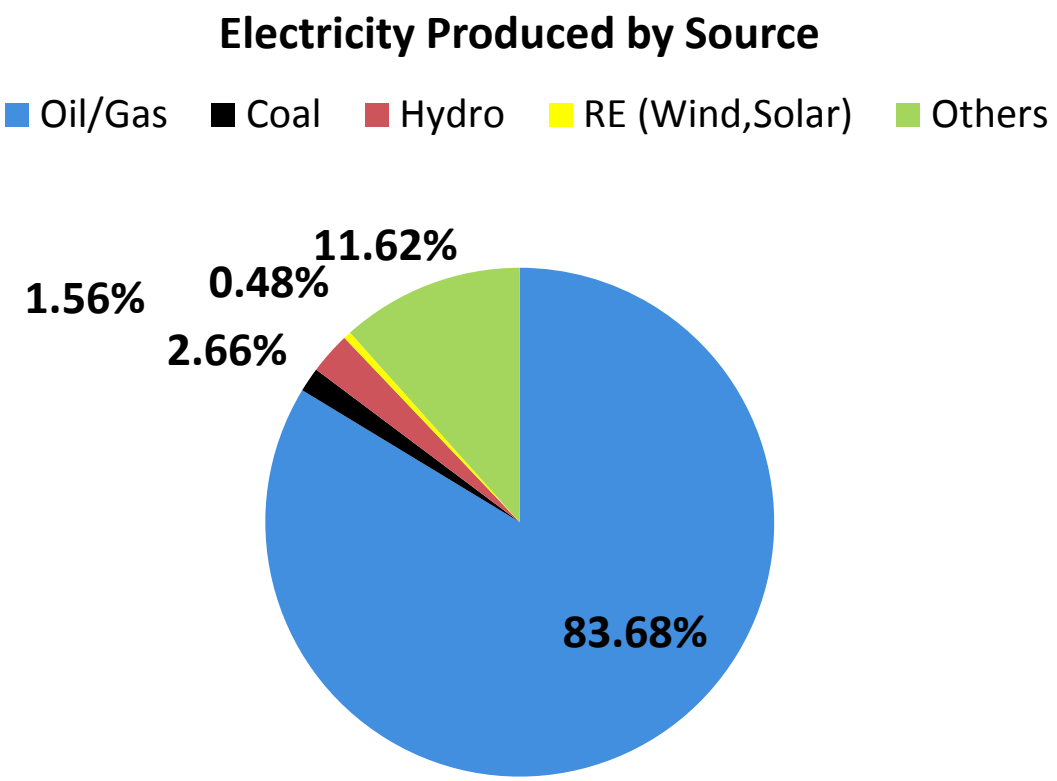
- Wind speed suitable for the production of electricity in various locations of many countries
- High Solar Irradiance



source: www.altestore.com/howto/Solar-Electric-Power/Reference-Materials/Solar-Insolation-Map-World/a43

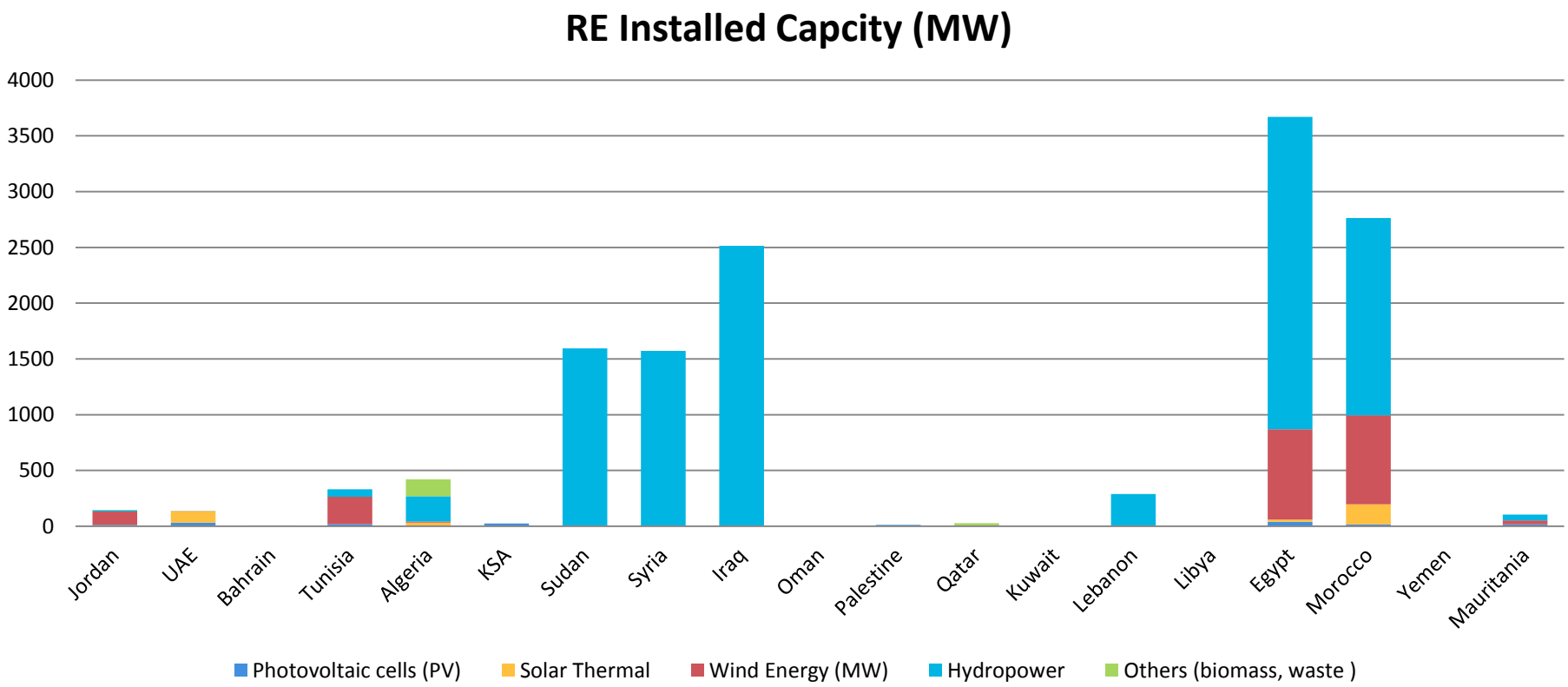
- Vast desert lands, semi-flat, and mostly uninhabited.
- Pilot and commercial projects, industrial potential, Technical staff and Cheap labor.
- Official interest in RE/ Plans and Policies to diversify the energy mix.
- Contribution to Energy Security.
- A tool to reduce emissions.

Contribution of RE sources in electricity produced in the Arab region



Global level: RE 19%, out of which 9% traditional biomass, 4% Hydro, 4% Geothermal power, solar heating and modern biomass, 2% wind, solar & biofuel, Nuclear's share is 2.5%.

Contribution of RE in Electricity Production



Total RE capacity, **including Hydro:** 13,622 MW

RE with out hydro: 2,556 MW

Commercial Deployment of RE in the Arab Region

Modern Biomass

- Fermentation/Digestion
- Gasification
- Biogas extraction (waste, landfills, sewage treatment plants) to produce electricity
- Production of biofuels (Residues of some crops, oily trees)

Wind Turbines

- On Shore Wind Turbines / Connected large scale projects.
- Small wind turbines capacity, about 100kw Or less
- Dual systems (wind / diesel, wind / PV)

Solar energy

- Photovoltaic (PV) systems for electricity, lighting, wireless communications, advertising..., storage system, connected to the network, off grid
- Concentrated solar Power (electricity, water desalination)
- Solar Water Heating (SWH)

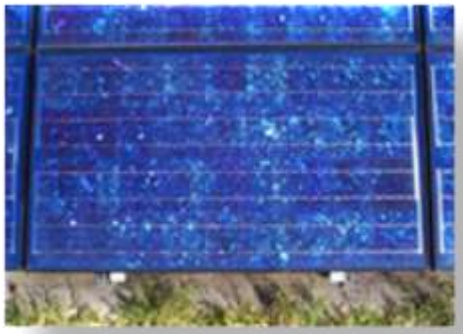
Other RE applications in the Arab region

Application	Deployment
Solar water heating systems (household & domestic, …) • Industrial processes (water / steam heat production) • Solar drying of agricultural crops, oven / Solar cooker	• Widely spread in most countries • Pilot / Demo Projects • Promoted to a certain extent
Off grid PV systems ▪ Lighting, wireless communications, advertising / signboards ..... ▪ Pumping / water desalination ▪ Dual systems (cells / winds ..)	•Widespread trade within numerous countries • Revolutionary experiments •Limited Experience
Small scale Wind turbines (> 100 Kw) • Pumping / water desalination • Dual systems for lighting / water pump (wind / diesel, wind / PV, ..)	• Deployed for water pumping purposes (early stage) •Limited
Modern Biomass • Briquettes (crops waste) for rural ovens, charcoal … • Biogas (methane) + compost (agricultural and animal waste, landfills) • Water and sewage plants to produce biogas and generate electricity for the treatment plant • Biofuel (ethanol) from some crops	▪ In some countries ▪ Widespread in some countries ▪ Limited (Egypt, Jordan) ▪ Limited (Sudan and Egypt)

Solar Energy Technologies for Electricity Production

Photovoltaic (PV)

Mono Crystalline



Poly Crystalline

Concentrated Solar Power (CSP)

Central Tower Receiver

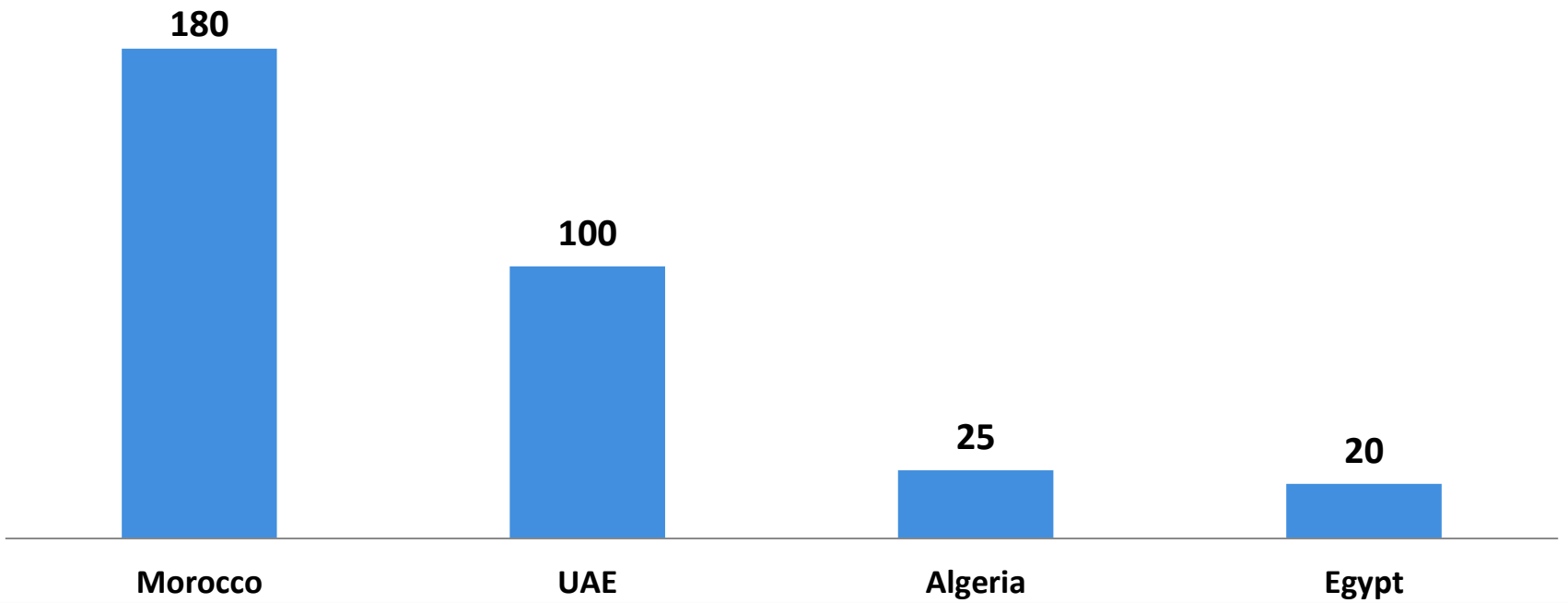
Parabolic Troughs

Stirling Dish

Flat Plate Collectors
(Fresnel Reflector)

Share of Electricity Production from RE (Continued)

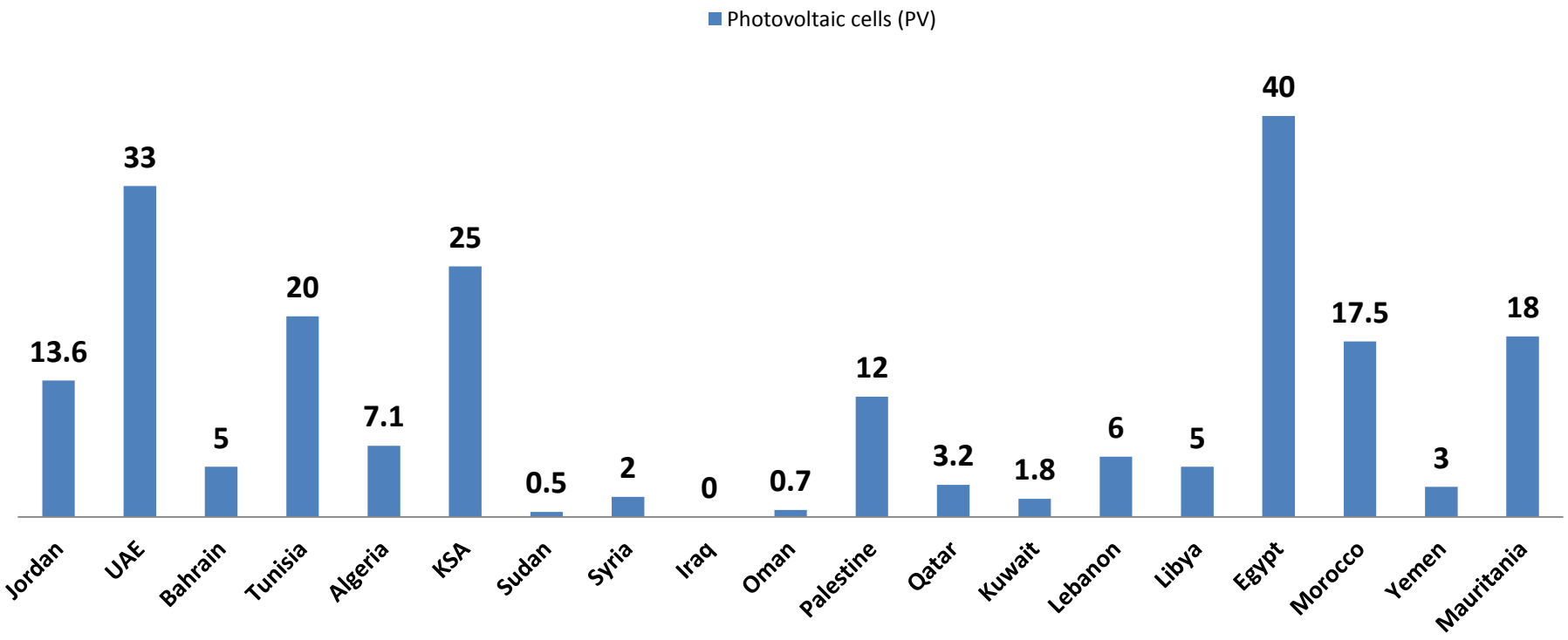
(B)Solar Thermal Power Plants (MW)



Total installed capacity by end 2015: around 325 MW
Experiences: field measurements, civil and electromechanical works, components assembly, installation, operation and maintenance
Local manufacturing: manufacturing of steel structure (Egypt's case), cables and wires, ….

Share of Electricity Production from RE

(A) PV SYSTEMS (MW)



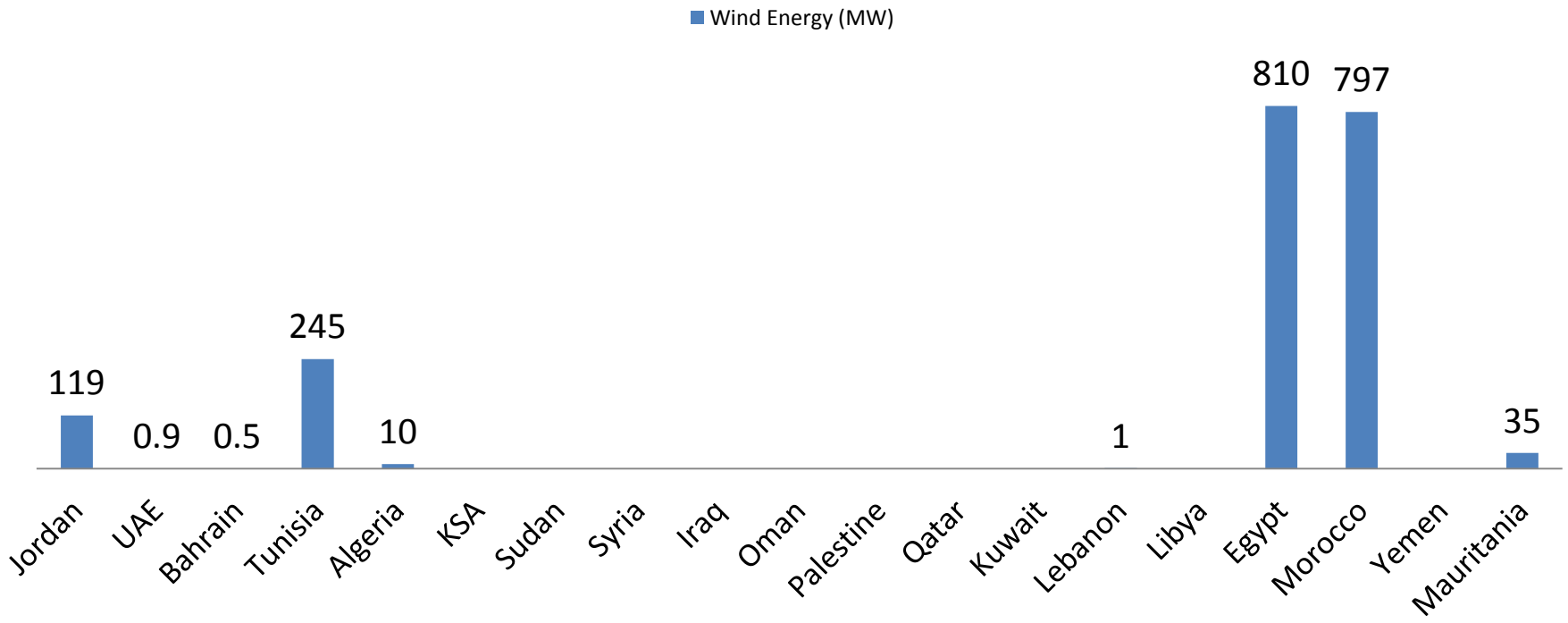
Total installed capacity at the end of 2015: around 213MW

Experiences: feasibility studies, tender documents, assembling the components of the system, installation, operation and maintenance.

Manufacturing: system structure, production of panels, electronic devices, glass, cable and wires. ...

Share of Electricity Production from RE (Continued)

(C) WIND FARMS (MW)



Total installed capacity by end 2015: around 2018 MW

Experiences: Environmental and Feasibility Studies, Wind Atlas, field measurements, civil and electromechanical works, installation, operation and maintenance.

Local manufacturing: metal towers, transformers, cables and wires, …..

RE Contribution in improving Living Conditions in Rural & Remote Areas

RE Application- Photos Speak up

Wind Farms for Electricity Production in the Arab Region

Tetouan Wind Station, Morocco

Zaafarana Wind Station, Egypt

Tafila Wind Station, Jordan

Sidi Daoud Wind Station, Tunisia

Enabling policies to promote financing RE investments in the Arab region

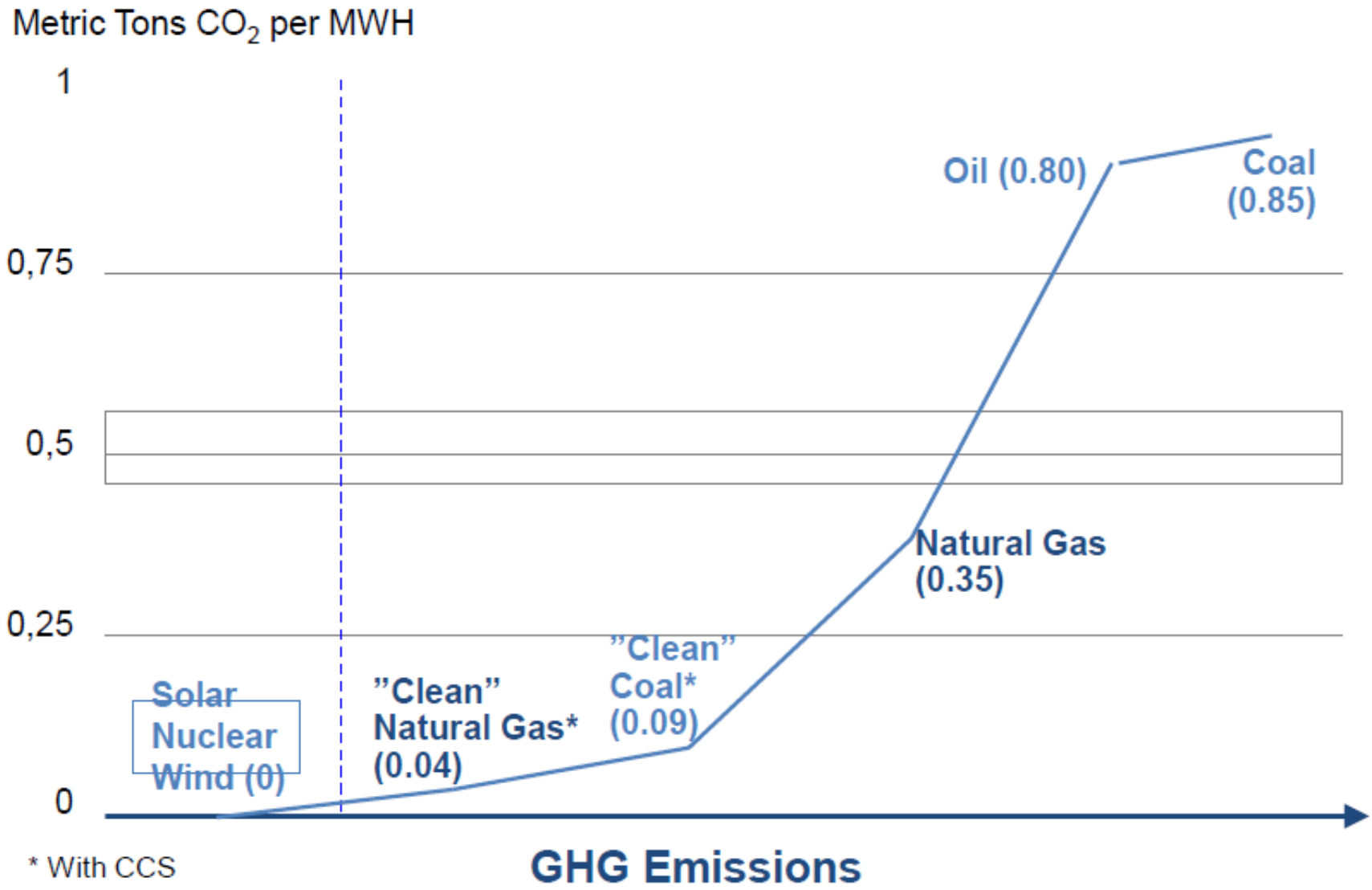
Context for policy development

- **Political Support** is key factor of success for Policy development and implementation
- **Good policies** are key catalysts for EE & RE development and essential for **generating / attracting Investments**
- **Policy frameworks** should **be complete**, make **economic sense** and be **implementable**
- Policy development should **engage all stakeholders**
- **Objectives and Guiding** Principles of the Policy must **enjoy a minimum** level of **consensus amongst stakeholders**
- Each country has its realities, and must develop their **own business models** to facilitate implementation of the Policy

Barriers and Challenges in the Arab Countries

- **Lack of adequate regulatory framework** for the **power generation** sector in some countries, provide no basis for EE&RE policy development.
- **Lack of institutional frameworks** for mobilizing and engaging the various stakeholders.
- **In the absence of strong political will**, some stakeholders may override the process of the application texts of the policies influencing implementation of RE projects.
- **Lack of technical expertise** and systems **capabilities**

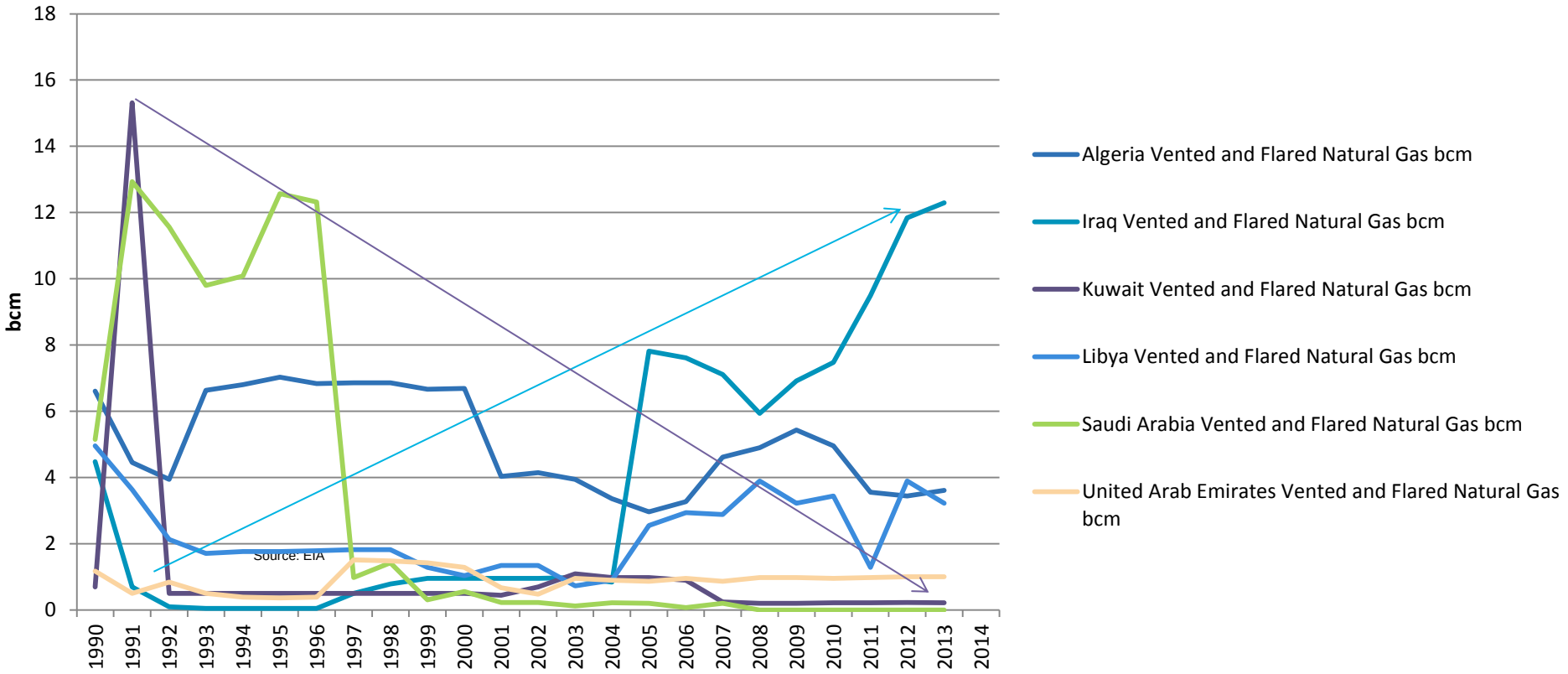
Natural Gas with or w/o CCS: Cleanest fossil fuel Lowest emission of CO2



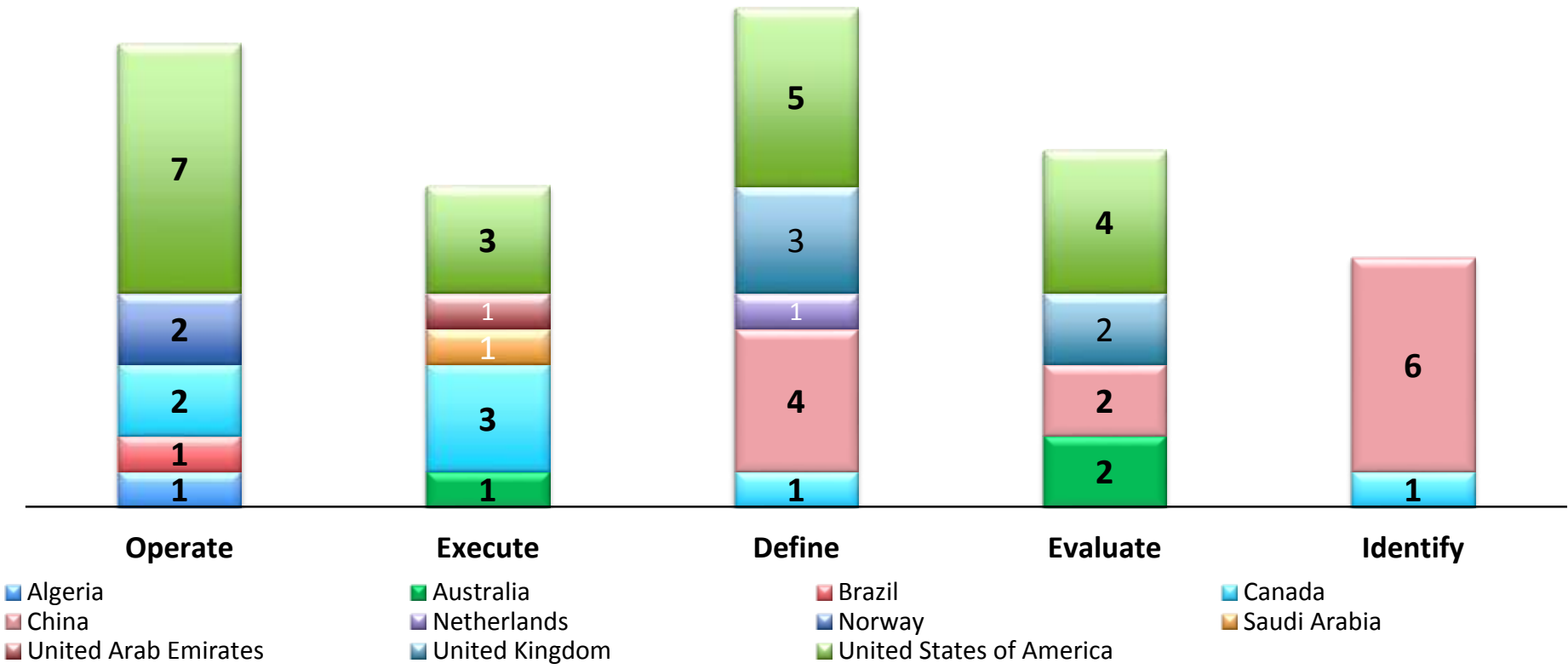
Source: IGU based on CERA

Flaring in the Arab countries

Kuwait reduced flaring to 0.2 bcm/year while it increased by almost 300% in Iraq to reach 12 bcm/year



Large Scale CCS projects by country and lifecycle



Data Source: Global CCS Institute, 2015


Energy Efficiency
Renewable Energy
Smart Energy management System
Public & Private Partnerships
financing mechanisms
Economic Diversification
Higher Education Institutions
Methane management
Zero Gas flaring
Deployment of CCS
Fuel switching to Natural Gas
Improving R&D, technology transfer
Effective Policy Reforms
Sustainable Future

THANK YOU

Economic And Social Commission For Western Asia

Ms. Radia Sedaoui
Chief, Energy Section Sustainable Development Division
sedaoui@UN.org

UNITED NATIONS
الاسكوا
ESCWA

40 YEARS

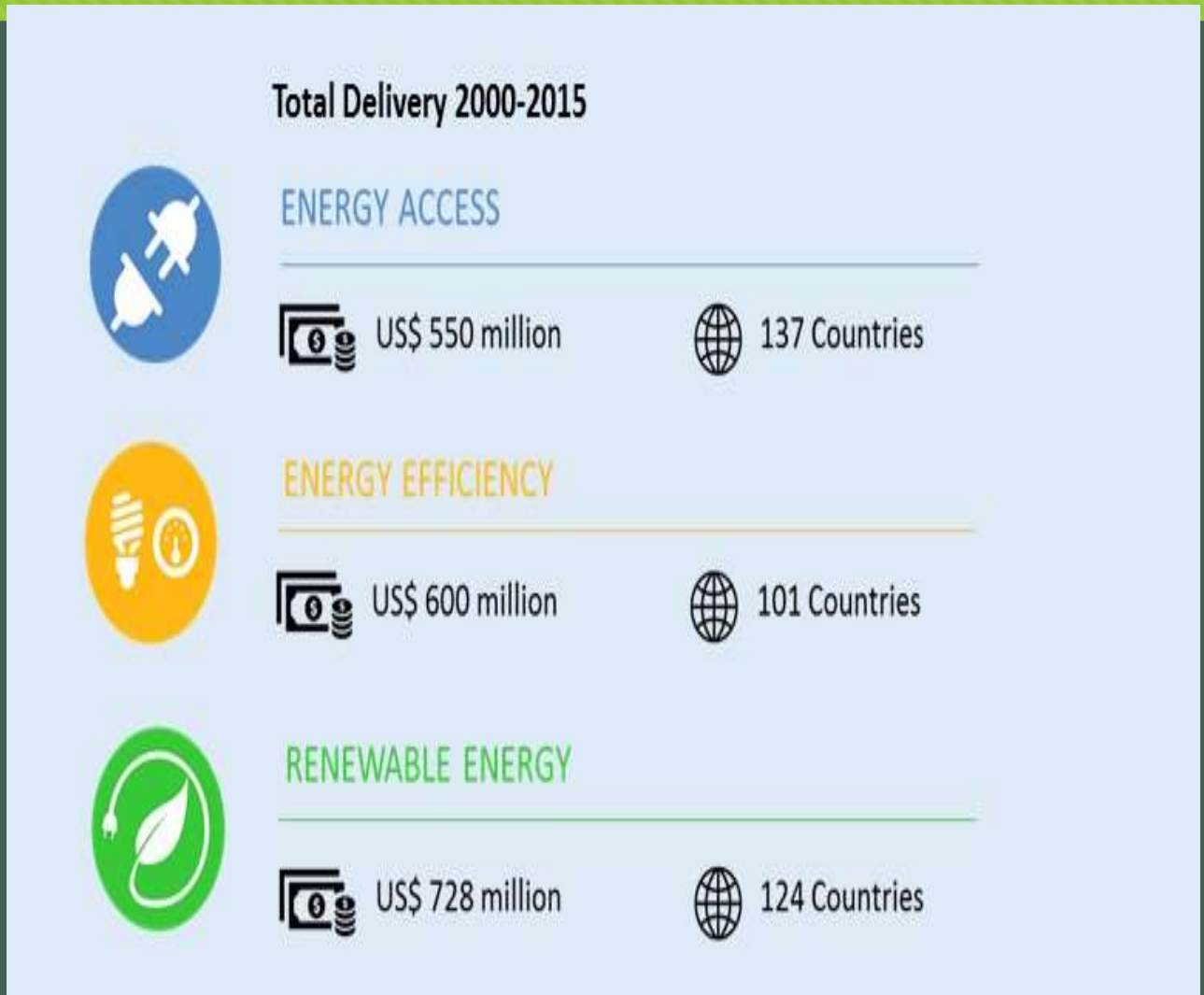
- **Session 2: National Efforts on Sustainable Energy and Climate Change**
- **UNDP,** Ms. Bahareh Seyedi, Policy Specialist, UNDP

50 YEARS

Empowered lives. Resilient nations.

Delivering Sustainable Energy in a Changing Climate

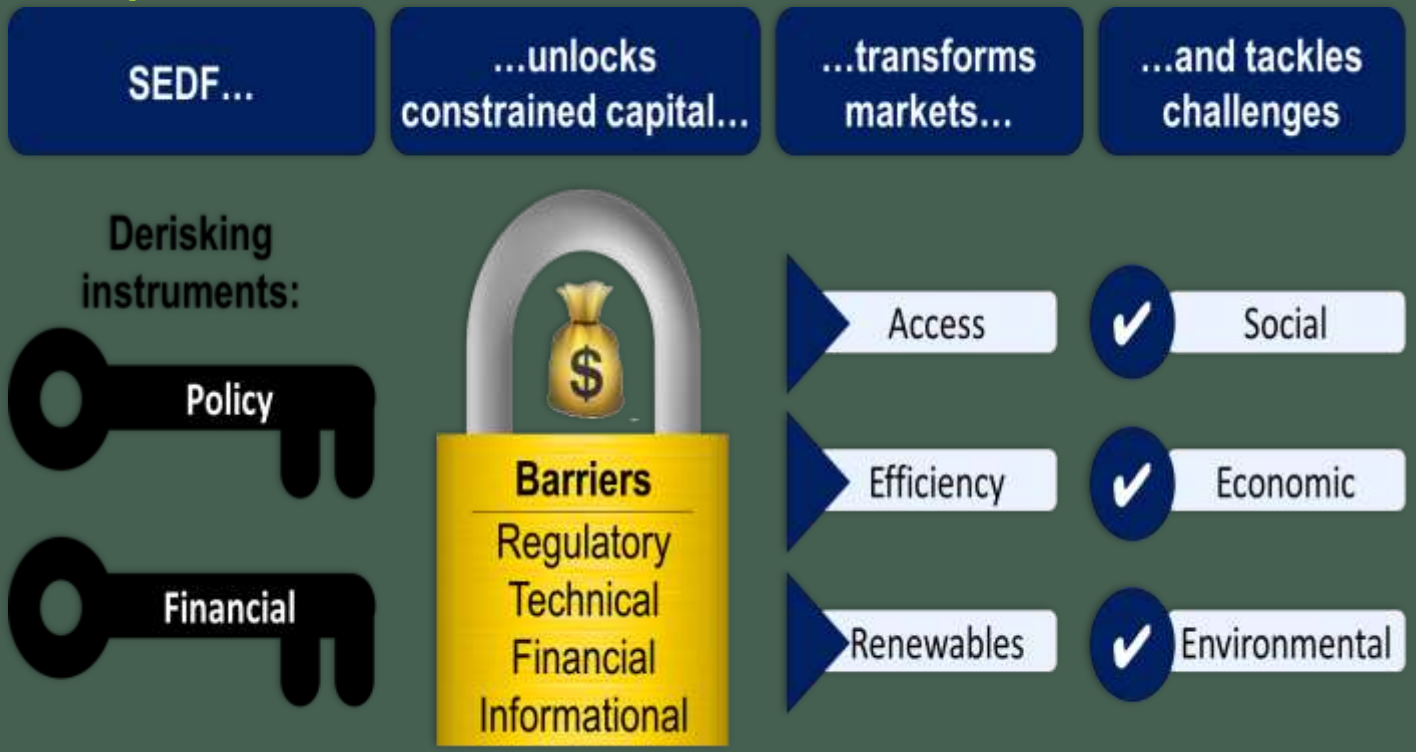
Drawn from experience in over two decades



Sustainable Energy Strategy for 2016-2021

- Recognizes social, economic and environmental challenges linked to energy
- Fully aligned with SDG7
- Focus on Energy Access; Energy Efficiency; Renewable Energy (also covered transport and sustainable cities)
- Strong link with Climate Change agenda and the Paris Agreement

UNDP's approach/theory of change



UNDP IN ACTION

As of September 2016

Empowered lives.
Resilient nations.

CURRENTLY

25 sustainable energy projects

9

Being implemented or developed in

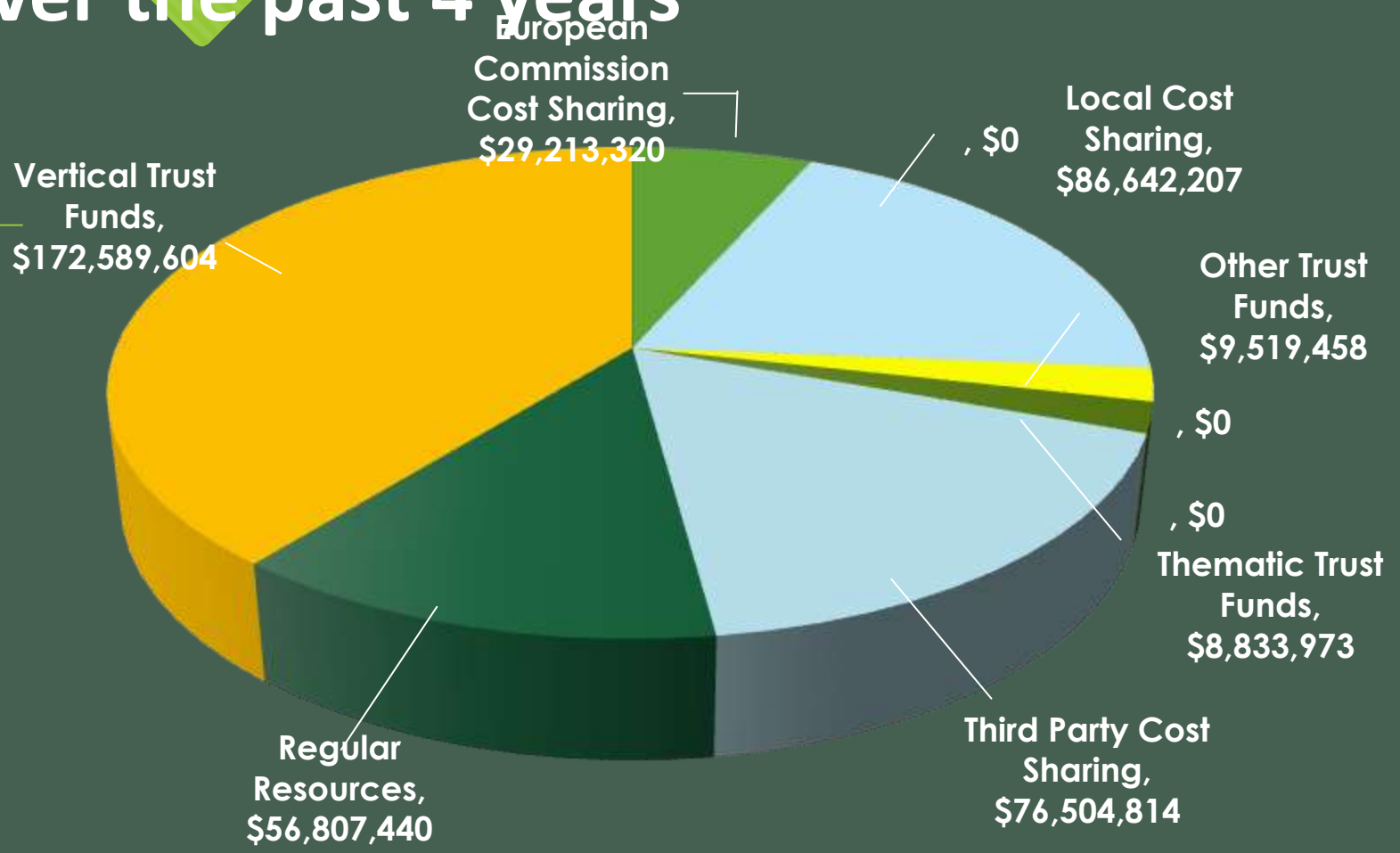
113 countries

with over **US$ 1 billi**

in grant financing

and **US$ 5.9 billion** in co-financing

Funding Sources for Energy Programming over the past 4 years



Funds from the Global Environment Facility (GEF) make up 99% (US$ 171,616,959.79) of Vertical Trust Fund energy investment over the past four years.

UNDP's Current Energy Projects per Region 2016

UNDP

Empowered lives.
Resilient nations.

UNDP's Work on Sustainable Energy in Africa, 2012-201

Empowered lives. Resilient nations.

Over the past 4 years, UNDP implemented

95 Sustainable Energy Projects

benefiting

3.3 **5** Million people

impacting

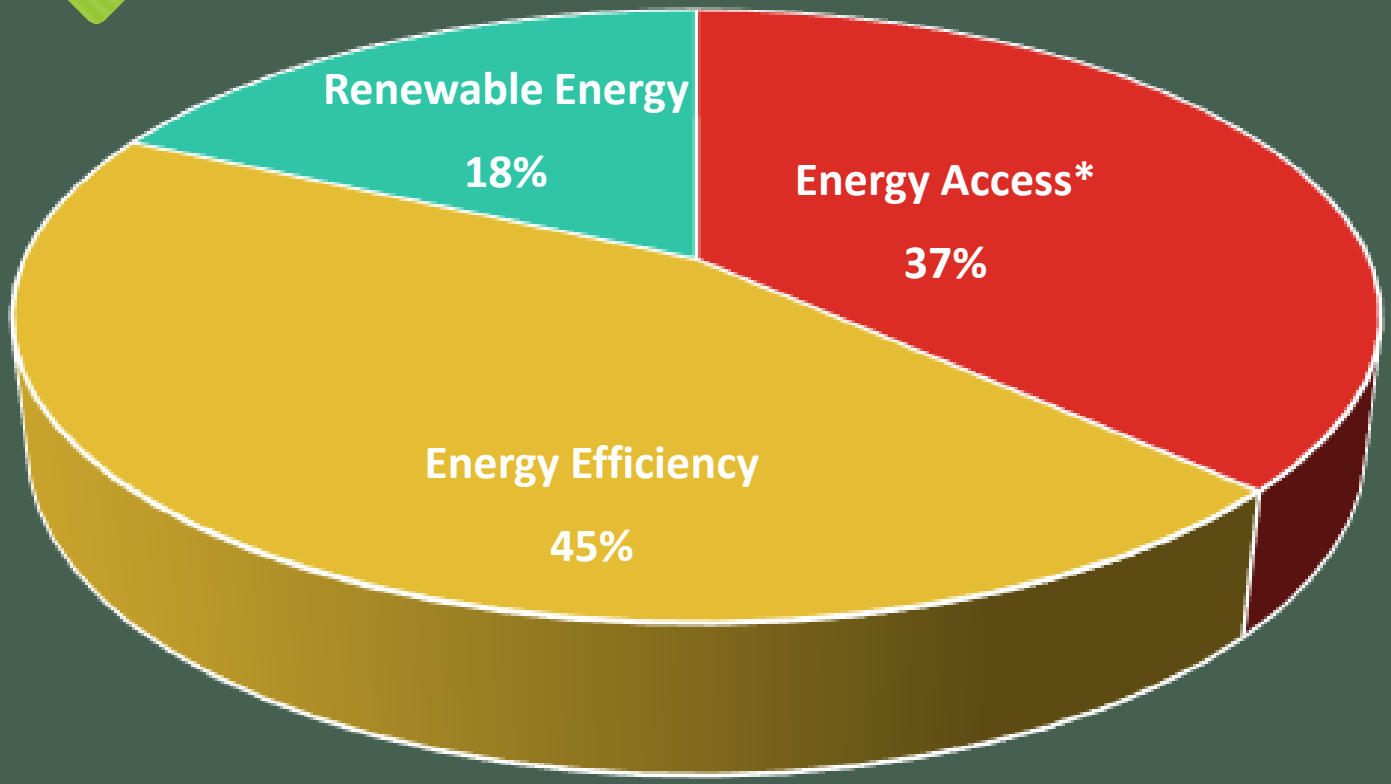
3,472 Communities

leading to

23 million tCO_2eq directly reduced

in **38** Countries

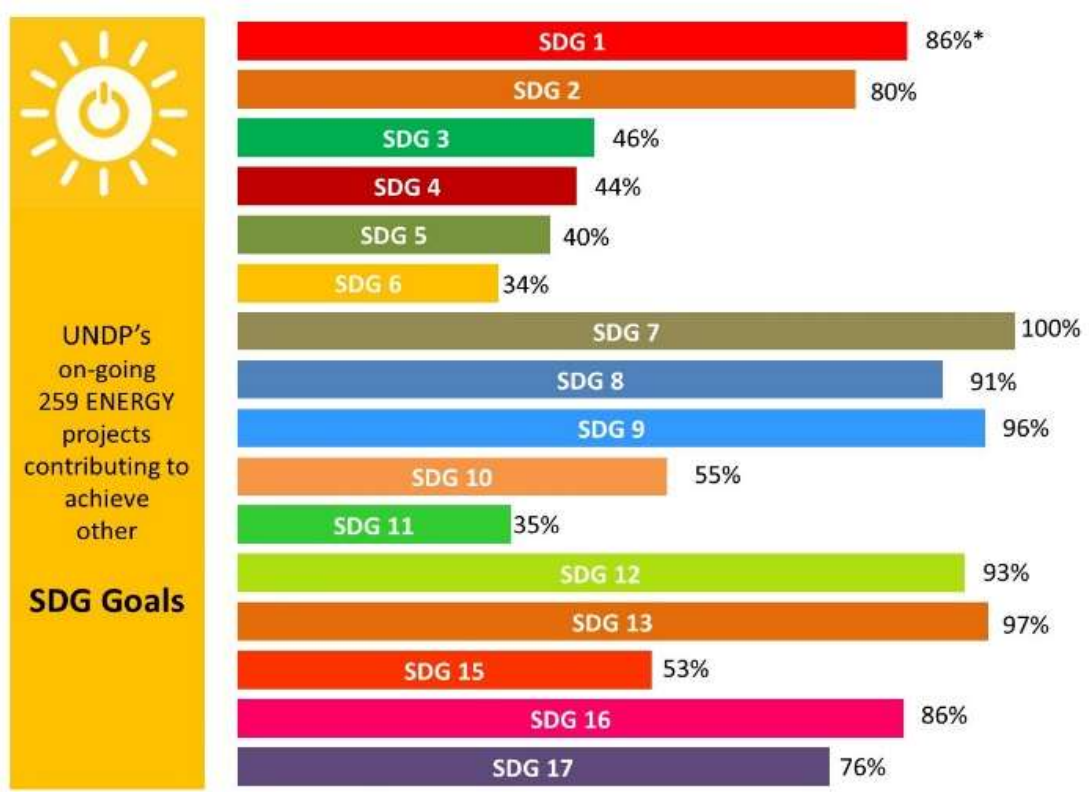
Portfolio breakdown of projects by Thematic Area (2016)



**Out of the 97 energy access projects, 88 projects (90.7%) are renewable energy based energy access projects.*

for achieving Sustainable Development

Empowered lives.
Resilient nations.



SDG	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17
No. of Energy projects contributing to achieve other SDGs	223	206	119	113	104	87	259	235	249	143	91	242	250	138	222	197

*Percentage of UNDP's on-going Energy projects contributing to achieve individual SDGs

Development benefits around the world in 2015

- In Africa, UNDP's energy activities reduced 10 MILLION tons CO2 emissions which is equivalent to 4.3 MILLION tons of coal burnt.
- In Zambia, UNDP benefitted 1.5 million people with energy access and improved energy efficiency by installing solar PV panels at health care clinics.
- In Asia Pacific, provided over 800,000 people with sustainable and affordable access to energy through improved cook stoves, solar lamps, solar PV panels or solar heaters.
- In Europe and CIS, directly benefited 812,000 people, improving energy efficiency in residential buildings or by installing street lighting systems, helped equip over 3,000 private and public buildings including health centers, schools and municipality buildings with sustainable energy technologies
- In the Arab States, benefited 138,335 people, through interventions such as the reconstruction of electricity distribution infrastructure or installation of solar water pumps or panels in fragile states.
- In Palestine, enabled at least 3,000 students in Palestine to return to rehabilitated schools and educational facilities through improved energy access.
- In Latin America, strengthened capacities in 14 countries to develop energy related policies, laws and strategies such as national energy plans or strategies, but also INDCs, national energy efficiency standards or sectorial strategies.

Empowered lives.
Resilient nations.

THANK YOU!

- **India**, Mr. Hafeez Rehman, Senior Director, The Energy and Resources Institute

Energy Scenario in India and SDG7 Pathway

Dr Ibrahim Hafeezur Rehman

Adjunct Professor, TERI University

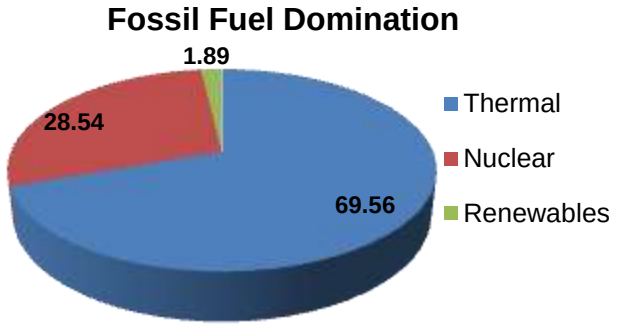
Senior Director- TERI Europe

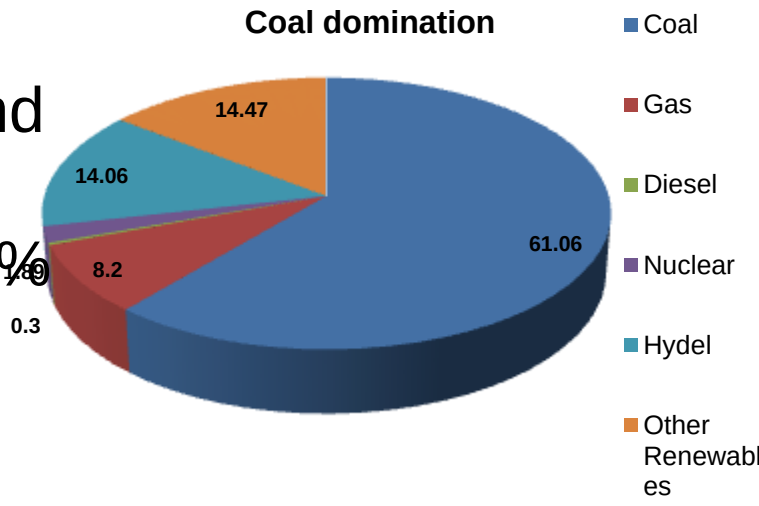
OVERVIEW

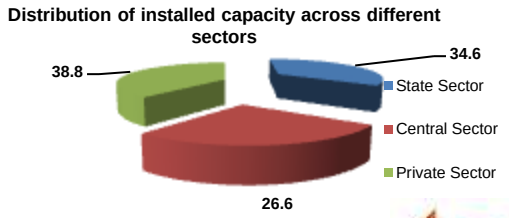
- Existing Energy Scenario
- SDG 7
- Objectives
- Indias Nationally Declared Commitments
- NDC Drivers
- Financial implications of meeting SDGs
- Key Challenges

Energy Scenario

- Per capita energy consumption increased from over 2000 to over 8000.
- 18% of the world's population, uses only 6% of the world's primary energy.
- By 2016 total energy production 670 Mtoe.
- 25% of projected global energy demand to come from India
- Energy demand/capita (2040) - still 40% below world average
- Over 50% of new generation capacity (2040)-from renewables and nuclear



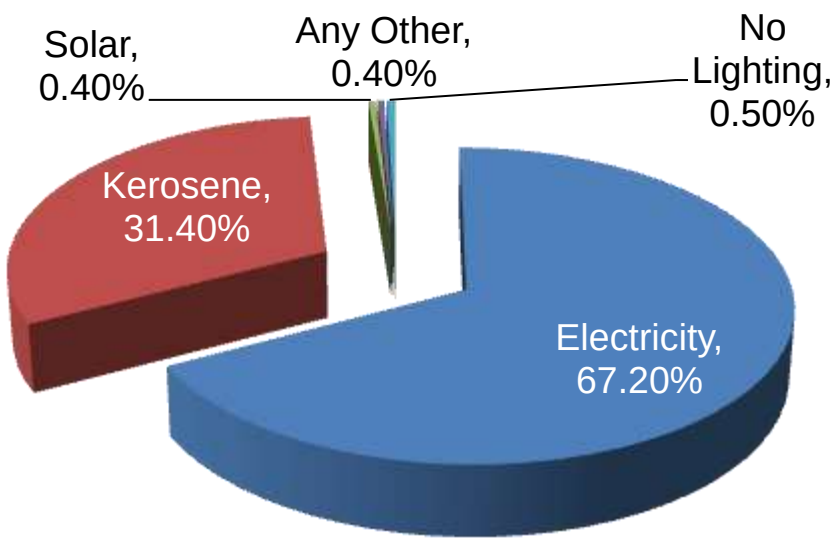




Source: MoP, 2016; IEA 2016

Energy Access Scenario

- 240 Million without access to electricity
- 700 Million dependent on traditional wood stoves

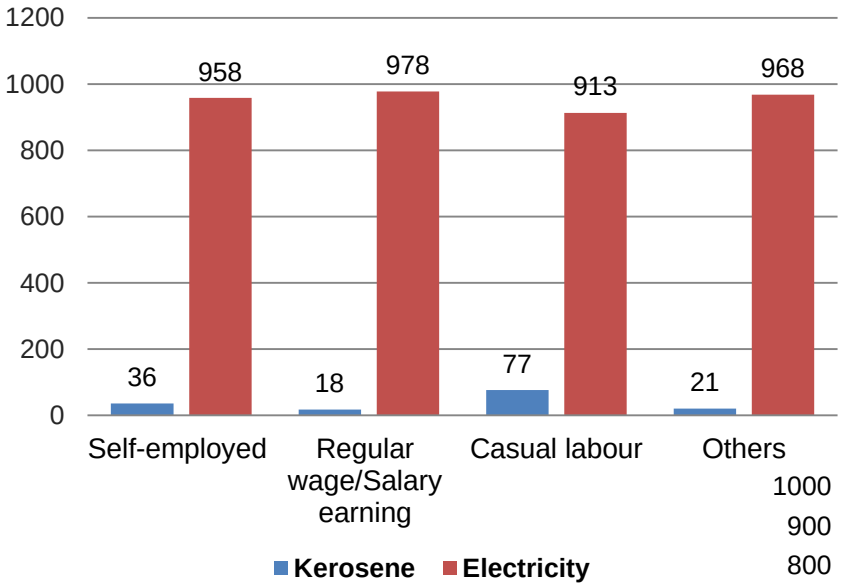


- At the All-India level
  - 55.3 % rural households and 92.7% urban households use modern electricity as a primary source of energy for lighting
  - 31.4% households, both rural and urban combined, use kerosene
- Alternate energy based decentralised electricity sources serve a small population of un-electrified / poorly-electrified HHs

Source: Census of India, 2011

Electricity vs Kerosene
Reliance based on nature of HH

Urban Consumers Based on HH Type (per 1000)

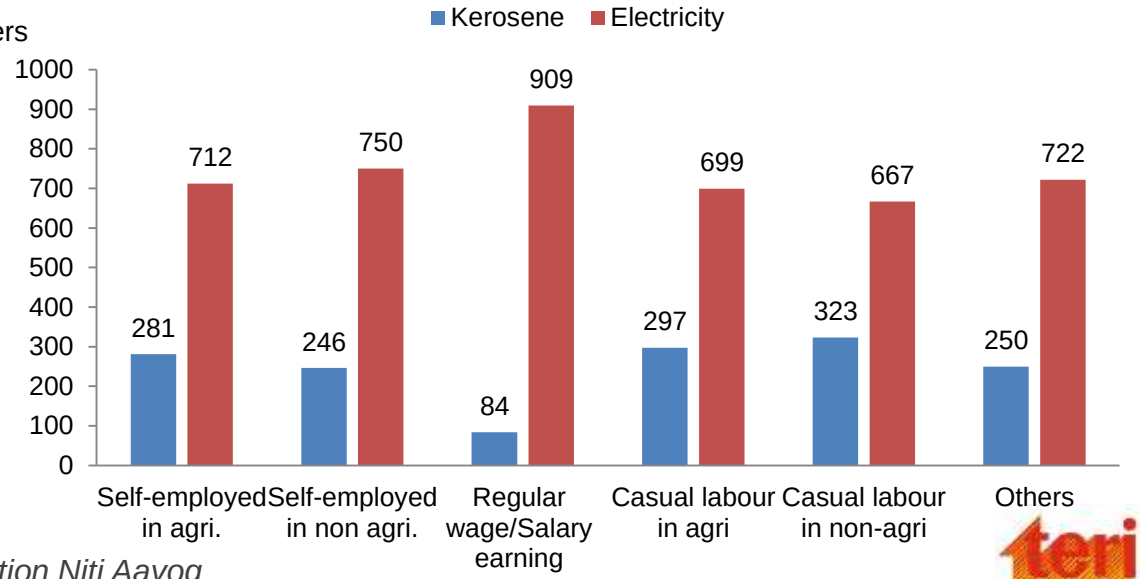


In both urban and rural areas, **households engaged in casual labour tend to have limited access to grid electricity.**

Probable reasons: lack of proper supply, lack of proper documentation for a connection, migrant nature of labour, among others.

The poorest of poor are also the most energy poor.

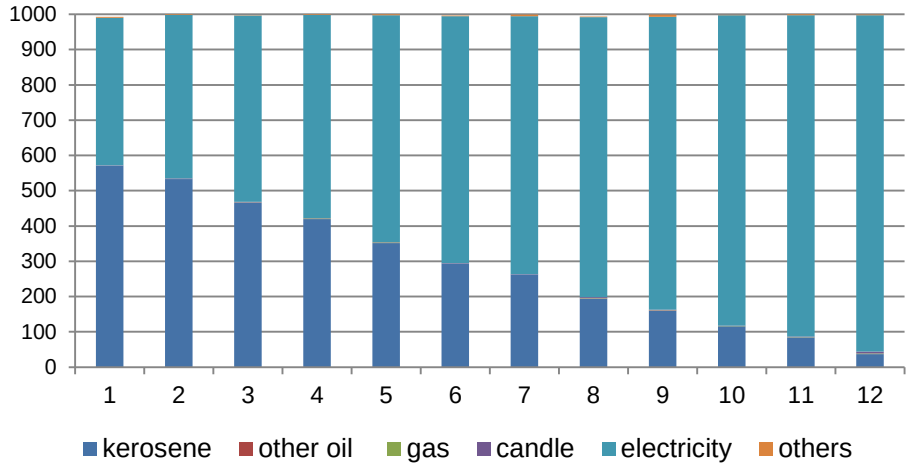
Rural Consumers Based on HH Type (per 1000)



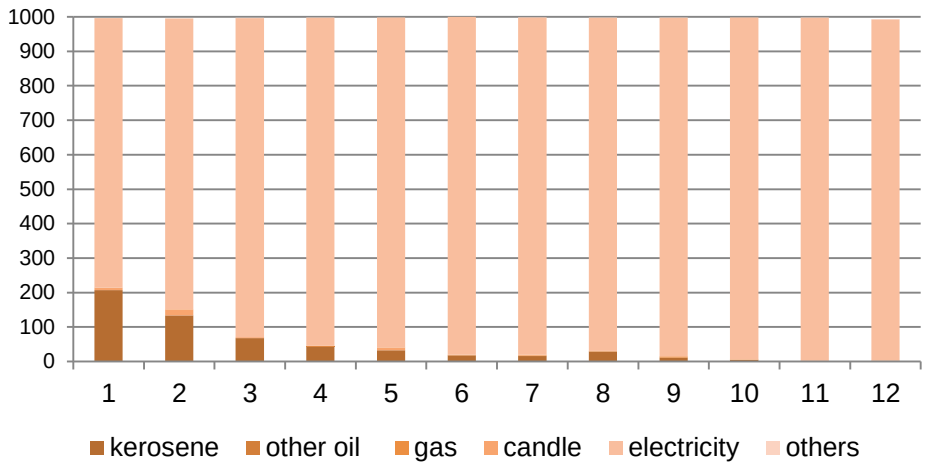
Source: NSSO 68th Round (2011-12); TERI Presentation Niti Aayog

Energy Use for Lighting
Income based consumption

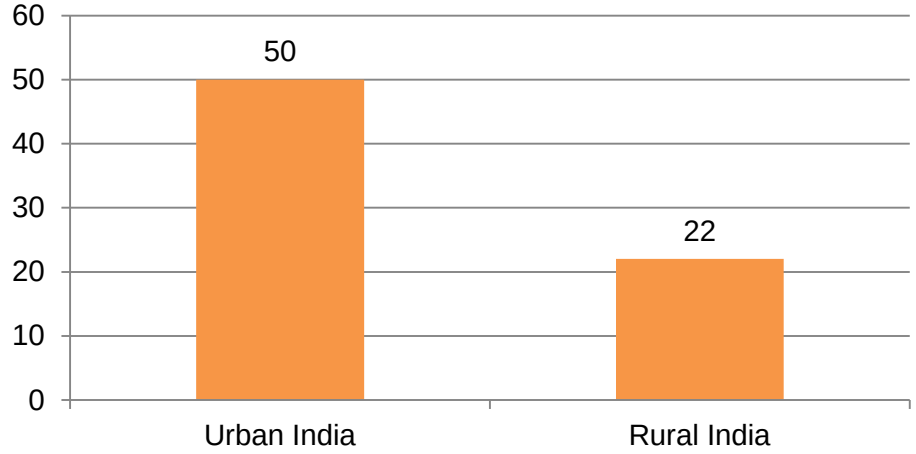
MPCE-class wise Lighting Energy Use (RURAL)



MPCE-class wise Lighting Energy Use (URBAN)



Share of electricity in household fuel expenditure (%)



96% Urban HHs pay
INR 87.20 on per capita basis

74.2% Rural HHs pay
INR 25.11 on per capita basis

But 4% Urban + 25.8% Rural HHs still lack access to electricity services

Source: NSSO 68th Round (2011-12); TERI Presentation Niti Aayog

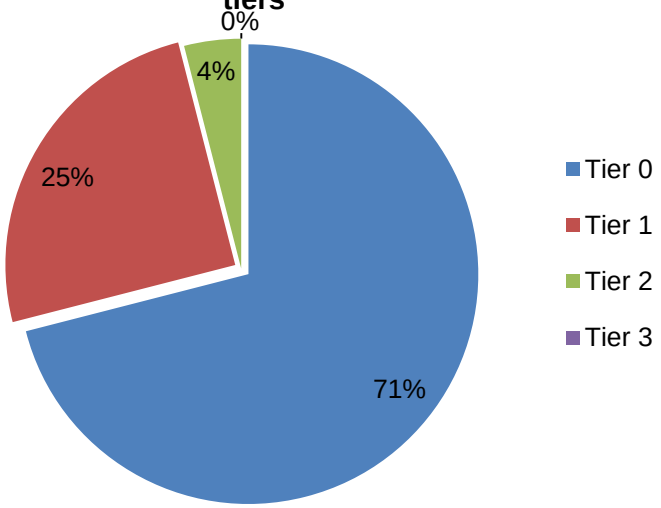
Cooking Energy Access Scenario

Type	% of usage in India	Efficiency	Emission	Challenges
Improved Biomass Cook stoves	4%	40%	NO2,CO, PM, black carbon (BC), and organics like PAHs	• Effective financing or subsidies maybe necessary • Require frequent training on usage • Technology standardization (geography/Fuel)
Biogas	0.4% 1 million households	55%	CO2 neutral, does not emit greenhouse gases	• Little Technology Advancements • Contain Impurities • Not Attractive on Large Scale
Electricity based cooking (Induction or Electrical)	0.2 % 300 thousand households	Electrical-74% Induction-84%	Does not produce any emissions.	• Necessity of adequate Electricity supply, • Specialized cookware is an issue. • Sophisticated technology/after sale issue
LPG & PNG	17.5%	64%	Very low C02 emission.	• Fossil fuel (finite resource) • Markets not developed (remote area) • Absence of adequate infrastructure/supply chain • Irregular supply • Unaffordable for BOP mass
Traditional Biomass cookstove	70% Over 160 million.	17%	Emission of green house gases-CO2,CO, CH4, N2O, CH3Cl emission.	• More fuel used • Inefficient • Health Hazards

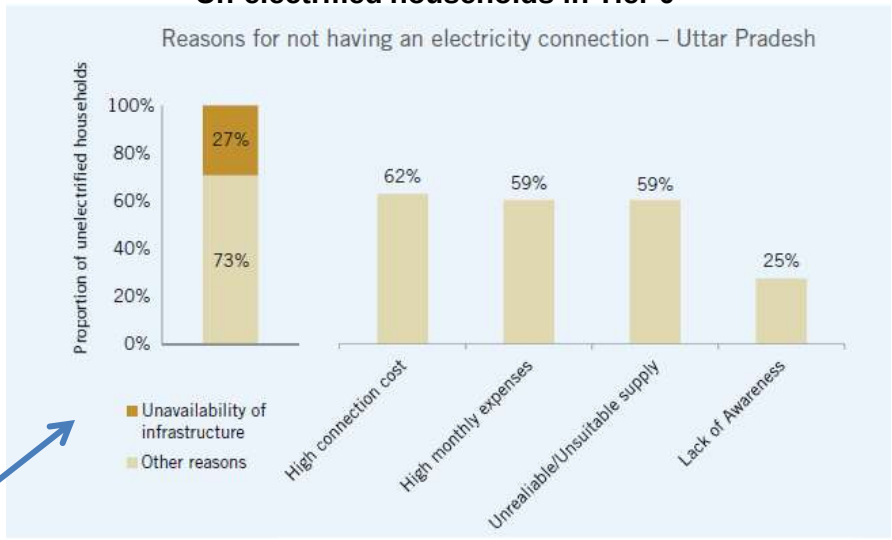
Source: TERI Divisional Presentation on ICS, 2016

Electricity Access : What happens in GTF

Spread of rural households across electricity access tiers



Un-electrified households in Tier 0



Tier / Dimensions	Tier 0	Tier 1	Tier 2	Tier 3
Capacity	54%	7%	4%	NA
Duration	5%	40%	96%	NA
Reliability	33%	44%	9%	NA
Quality	25%	29%	15%	NA
Affordability	-	46%	-	NA
Legality	-	21%	-	NA

Source: CEEW Report, September 2015

Electricity Access : Key Attributes

Based on level of **MPCE classes** and the **access to energy for lighting** – certain attributes remain unmet with declining MPCE classes.

To enable transition towards universal electricity access – it is important to prioritize and address attributes that ensure at least basic consumptive needs are fulfilled

Source: Global Tracking Framework

Key Concerns In Poorly Electrified Regions

Dissatisfied customers ➔ Increasing number of defaulters ➔ Shrinking markets ➔ Reduced viability and profitability of distributed generation business models ➔ Failure to deliver access to modern electricity services

Specific Challenges – Energy Access

Supply

- Finance
- Infrastructure
- Reach
- Market Barriers

Investment Capital; Revenue Recovery

Under capacitated power distribution infra;

Inefficient set ups to ensure continuity of providers;

Quality of Power Supply – reliability, voltage, duration;

Remote geographical locations; Difficult terrains

Limited market penetration – absent last mile agents;

Low return on Investments

Demand

- Affordability
- Availability / Accessibility of Energy Options
- Limited Power Supply Options
- End-use Perceptions

Income driven choices;

Limited flexible payment options for energy;

Lack of low cost and user-friendly technologies;

Limited capacity options to serve seasonal demand variations (productive / consumptive use);

Rostering; Load Shedding;

Lack of awareness & acceptance of alternate options

Lack of trust on providers (poor after sale services)

Source: TERI Presentation to Nitti Aayog, 2016

Rationale for renewable energy push

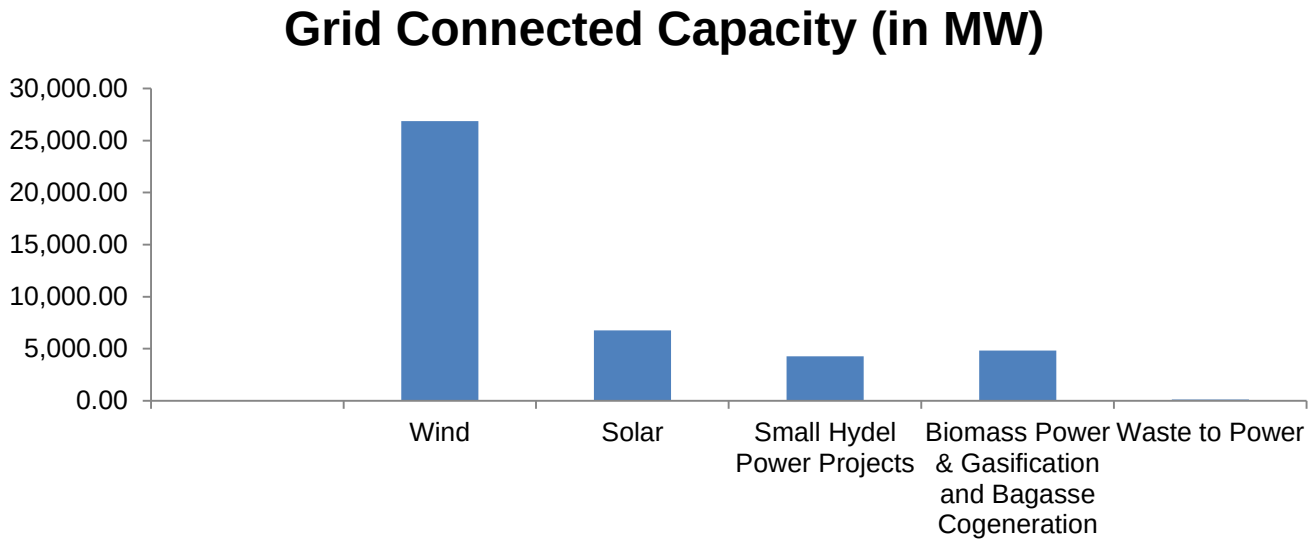
- Due to the low quality of Indian coal, continuing the BAU scenario will require India to import coal from South Africa, Austria and other countries.

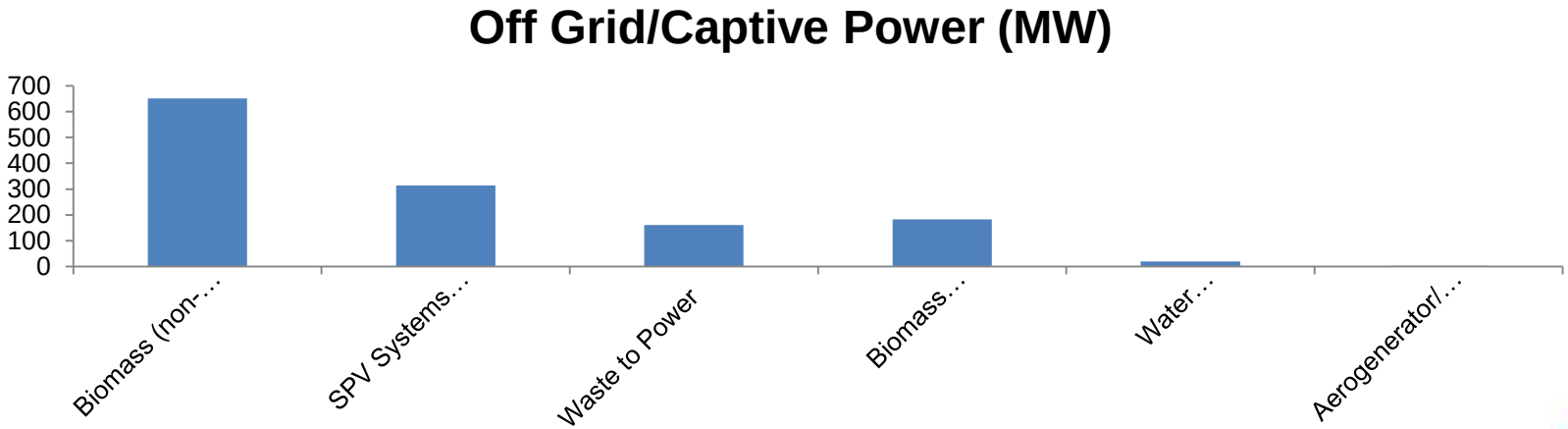
- This will increase India's energy insecurity due to high dependence on foreign imports.

- Increasing market prices of coal and falling prices of renewable energy costs further provide a rationale for India to choose alternative energy sources beyond fossil fuels.

Renewable Energy (Other than Large Hydro) Scenario

Target 175 GW by 2022





Source: MNRE, 2016

Energy intensity Scenario and challenges

- **Energy intensity dropped till 2006 , increased in 2006-2007; dropped in 2007-2008 - rising since 2009**
- **Per capita CO2 from increased 0.69 in 1990 to 1.58 in 2014 - Still per capita CO2 emission is1/3 rd of global average**
- **New coal-fired plants -Nearly 50% of the net coal capacity added globally.**
- **India's reliance on oil imports - above 90% by**

Source: RIS, 2016

SDG 7 Global Targets

7.1 By 2030, ensure universal access to affordable, reliable and modern energy services. 1.2 to 1.1 and 3 bn to 2.9

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix- required annual growth rate of 7.5%

7.3 By 2030, double the global rate of improvement in energy efficiency – required annual 2.6% drop

Source: RIS, 2016

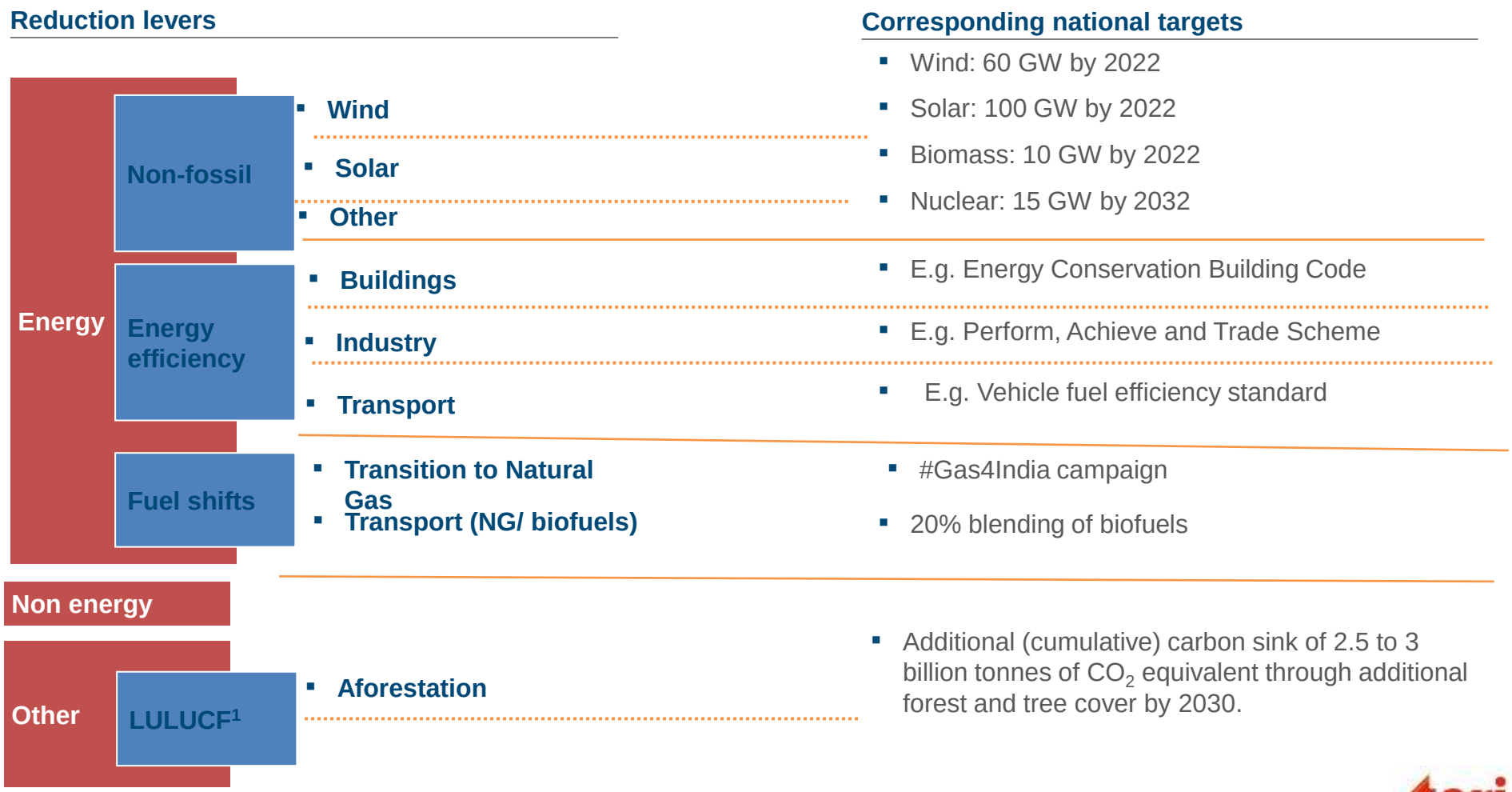
Intended Nationally Determined Contributions

Energy

- **Universal access to energy by 2030. Will be achieved in physical terms but challenge is in real delivery terms**
- **A 33%-35% decrease in emissions intensity of GDP by 2030 (compared to 2005). This will be overachieved under current policies**
- **40% non-fossil power generation capacity target by 2030. This target is in line with current policies.**

Source: TERI Presentation on INDCs, 2016

NDCs - Main Drivers



1 LULUCF: Land Use, Land Use Change and Forestry

Source: TERI Presentation on INDCs, 2016

Financial implications of meeting SDGs

- Over $400 Billion as capital investment in production
- Reduces the fossil fuel component from 60% to 50% the -increases to over $500 Billion of capital investment
- Net-zero emissions by 2050, - by 2030 it must reduce fossil fuel energy component from 50% to 27% -cost $675 Billion as capital investment.
- Overall finance required is estimated at $854 billion with an expected gap of $406 billion.

Source: TARA, DA, 2015

Conclusion

SDG7.1

Close to 100% village electrification

Household electrification at around 60%

Indicative Challenges

Investment Capital & revenue recovery; Under capacitated infra; Issues with quantity and quality of power ; remote locations & difficult terrain; Low return on Investments

Pathways/Initiatives

Deendayal Upadhyaya Gram Jyoti Yojana,, Efficient Household Lighting Programme; Off grid programme including rural micro grids,

SDG7.2

Non fossil fuel 40% of total installed capacity by 2040

175 GW-Renewable Power by 2022

Indicative Challenges

$ 200 Billion needed; Off gird and grid synergy

Pathways/Initiatives

Jawahar Lal Nehru National Solar Mission.; Generation based incentive for wind; Viability Gap Funding; Accelerated depreciation for solar; National Clean Energy Fund ;Preferential Tariff; Renewable Purchase Obligations & Certificates; Debt Inst &FDI

SDG7.3

A 33%-35% decrease in emissions intensity of GDP by 2030

Indicative Challenges

Inefficient functioning of the Power sector; low cost power to key groups

Pathways/Initiatives

Energy Conservation ACT- BEE ; UDAY; Building energy codes; Standard and labelling of appliances; Creation of institutional set up; Energy conservation fund ; DSM, NMEE, DISCOMS Capacities; NMEE part NAPCC 2008

Thank You

- **Brazil,** Mr. Marcio Schittini Pinto, Director, Ecometano

OVERALL NATIONAL EFFORT ON SUSTAINABLE ENERGY AND CLIMATE CHANGE IN BRAZIL

Expert Group Meeting on Sustainable Development Goal 7 & its Role in Mitigating Impacts from Climate Change

UNDESA | UNDP Morocco| UNEnergy

November 2016

HIGHLIGHTS

- GREENER WHEN COMPARED TO 2015
- +77% GROWTH IN WIND ENERGY (10GW INSTALLED + 7 UNDER CONSTRUCTION)
- +400% GROWTH IN RESIDENTIAL SOLAR (+5.500 CONNECTIONS vs 293 IN 09/2014)
- + 45% GROWTH IN THERMAL SOLAR
- +18.6% ETHANOL FUEL USE AND -9.5% GASOLINE FUEL USE
- RENEWABLES IN ELECTRICITY = 74,6% (‘14) -> 75,5% (‘15)
- RENEWABLES IN FUELS = 18% (‘14) -> 21% (‘15)
- ENERGY RELATED EMISSIONS: 485MM TCO2 (‘14) -> 462MM TCO2 (‘15)

AGENDA

1. FINANCING
2. ELECTRICITY
3. FUELS

SUSTAINABLE ENERGY FOR ALL

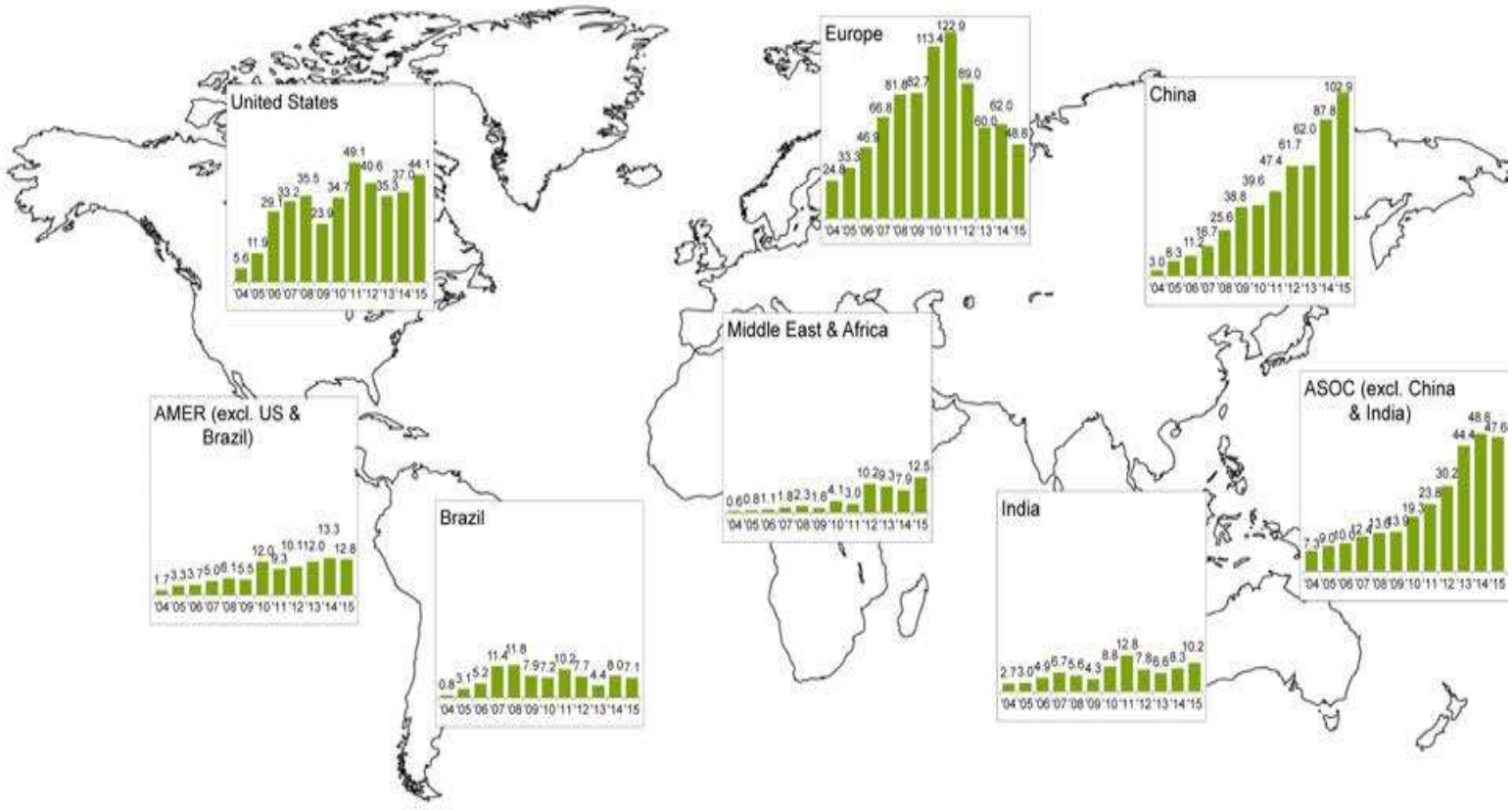
UNDESA

UNDP

SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD

BRAZIL DOES NOT INVEST ENOUGH

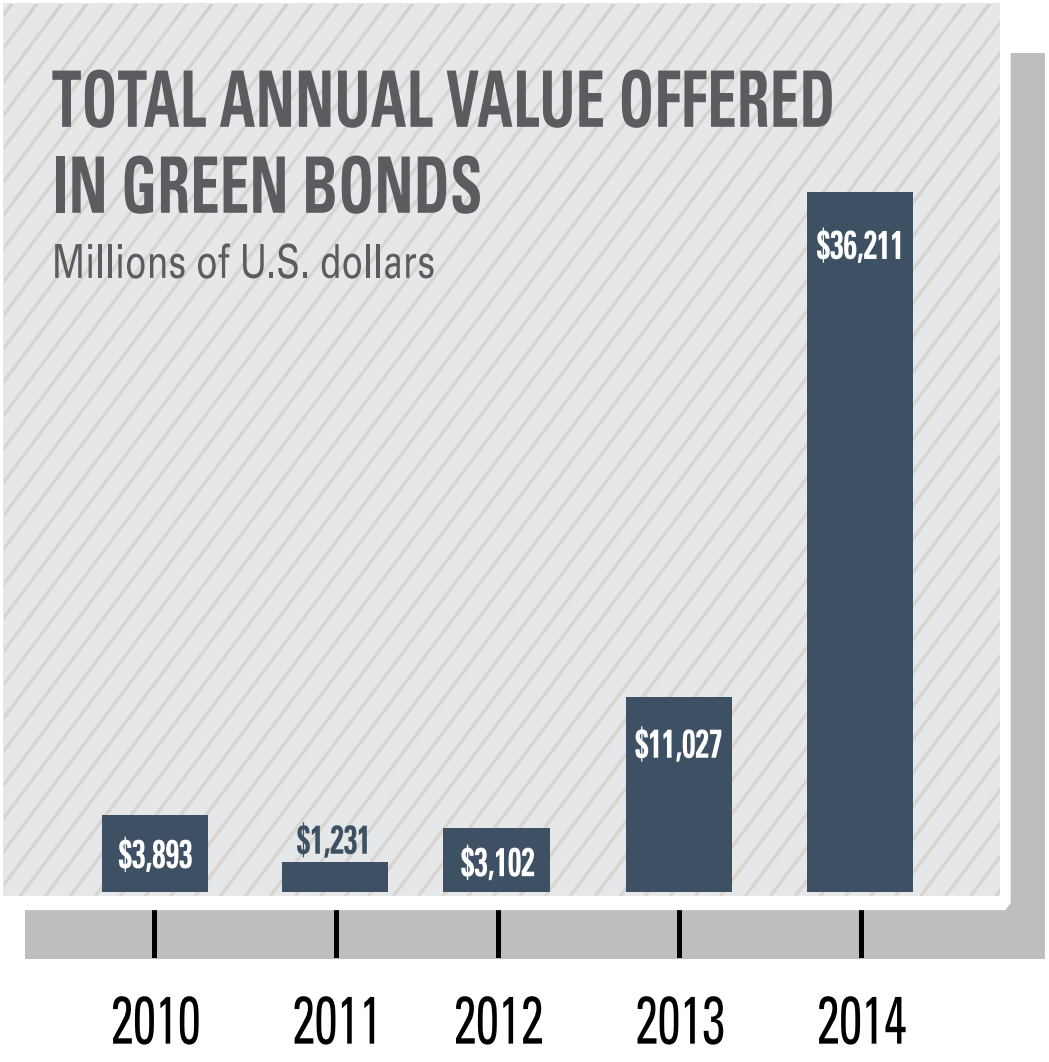
FIGURE 12. GLOBAL NEW INVESTMENT IN RENEWABLE ENERGY BY REGION, 2004-2015, $BN



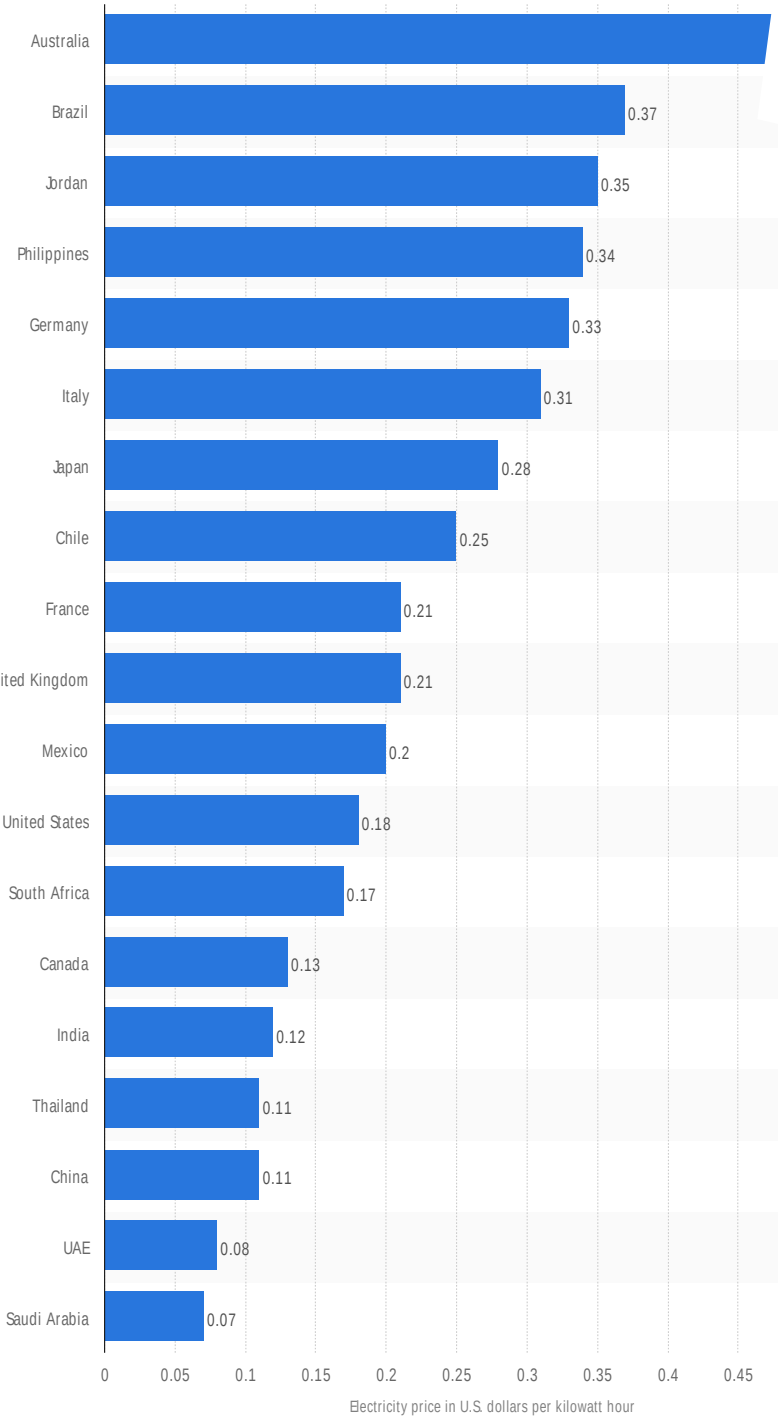
New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals.

Source: UNEP, Bloomberg New Energy Finance

BRAZIL BARELY ENJOYS THE SUSTAINABILITY FINANCING EXISTING ENVIRONMENT...



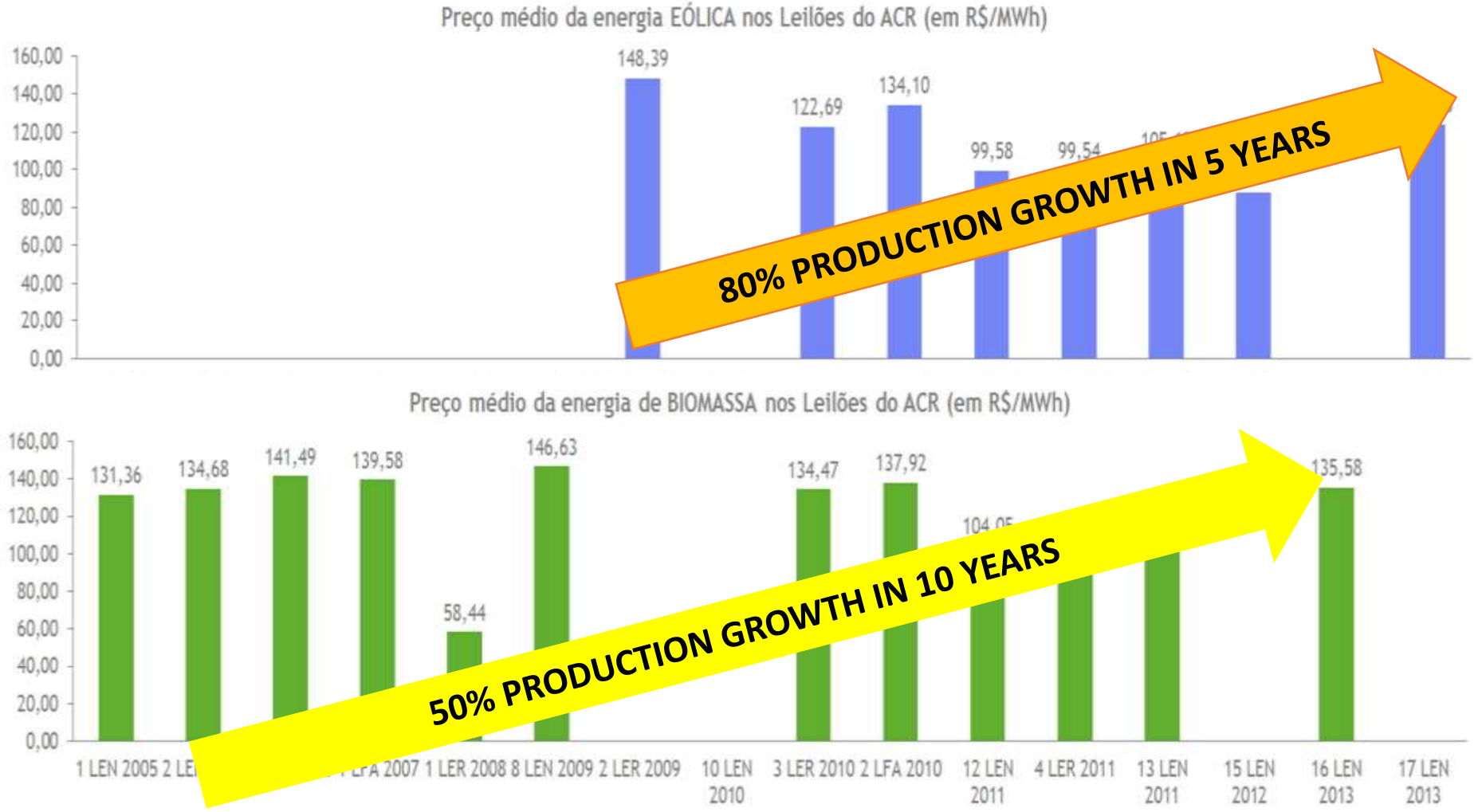

ELECTRICITY
BRAZILIAN ELECTRIC SECTOR PROVIDES DIFFERENT “GREENING” INCENTIVES



RENEWABLES HAVE THE MISSION TO REDUCE PRICE AND INCREASE ENERGY EFFICIENCY


2015/2016: NET METERING
REGULATION + SHORT TERM PRICE
SUBSIDY = RESIDENTIAL SOLAR BOOM

MIXED PRICING STRATEGIES SIGNAL GROWTH SIZE



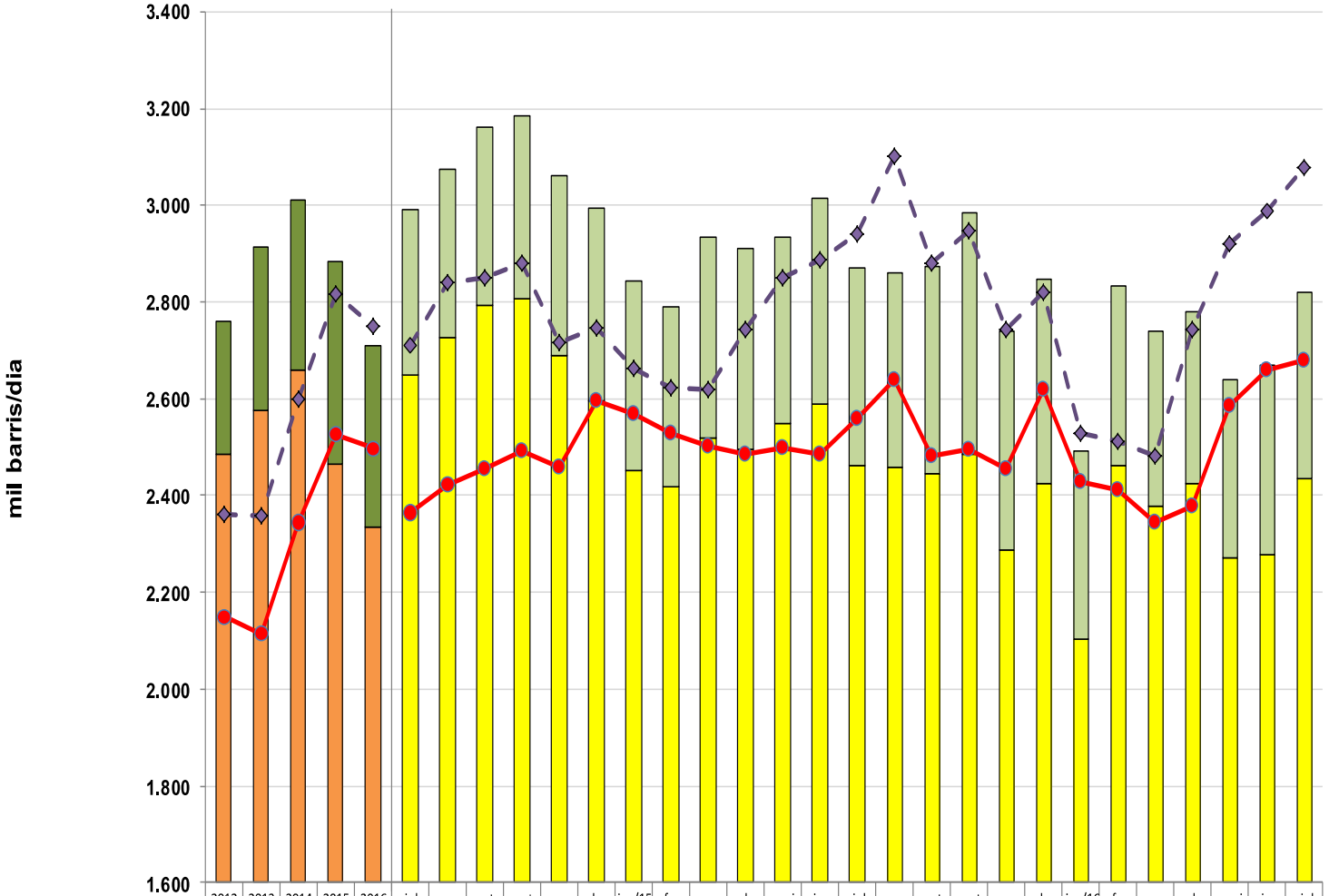
TREMENDOUS POTENTIAL: +400 ETHANOL PLANTS, LESS THAN 15O COGEN UNITS


AT THE END OF THE DAY CLOSE TO 70%
OF TOTAL ELECTRICITY COMES FROM
RENEWABLE SOURCES

OPPORTUNITY FOR DIESEL SUBSTITUTION AND BIG EMISSION REDUCTION CONTRIBUTION

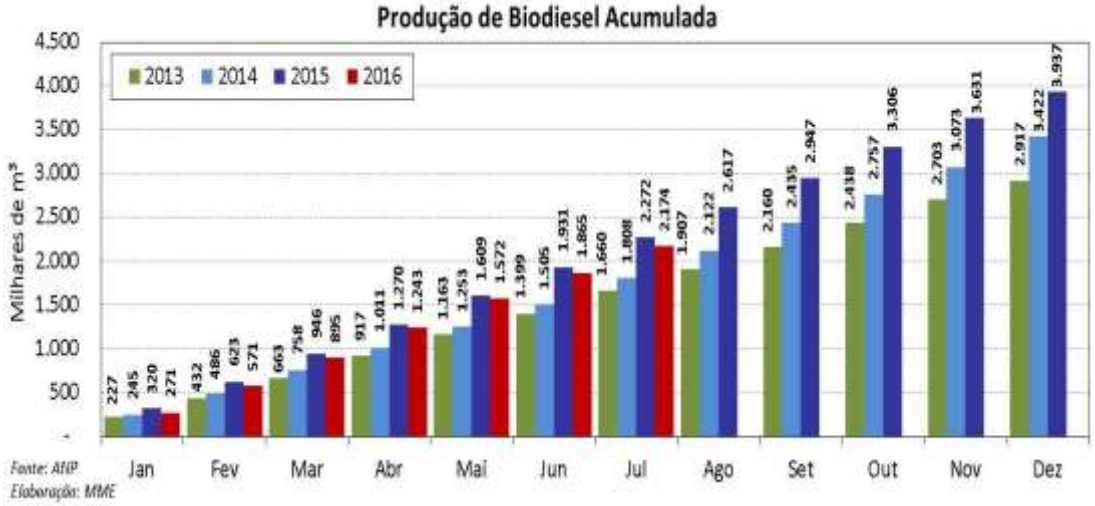
FUELS

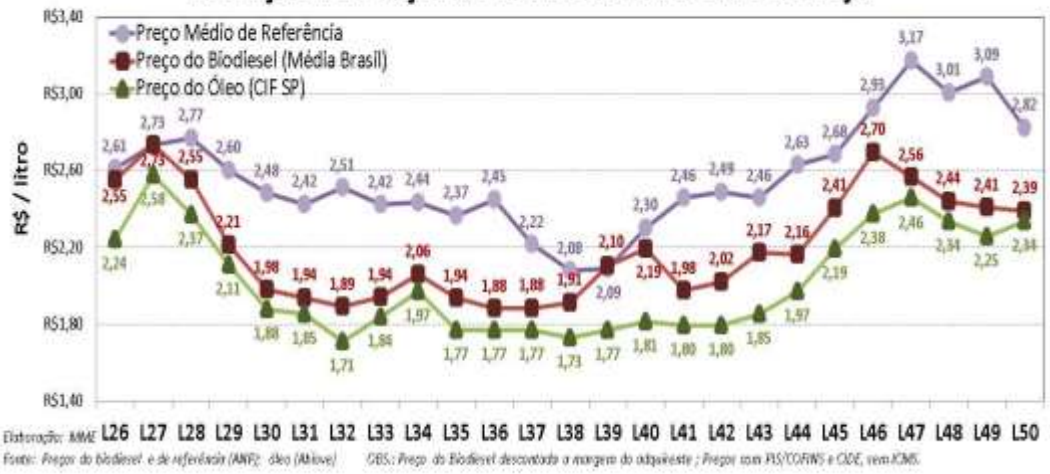
FOSSIL X RENEWABLE; PRODUCTION X DEMAND



	2012	2013	2014	2015	2016	jul	ago	set	out	nov	dez	jan/15	fev	mar	abr	mai	jun	jul	ago	set	out	nov	dez	jan/16	fev	mar	abr	mai	jun	jul
Cons. Renováveis	277	337	353	418	375	342	349	368	379	373	397	391	372	415	416	385	423	410	403	429	501	452	421	388	371	361	358	368	392	386
Cons. Aparente Derivados	2.485	2.577	2.659	2.465	2.336	2.649	2.725	2.795	2.807	2.690	2.597	2.452	2.418	2.519	2.494	2.548	2.591	2.461	2.458	2.445	2.484	2.289	2.426	2.103	2.463	2.379	2.424	2.272	2.279	2.435
Prod. Petróleo	2.149	2.114	2.345	2.526	2.498	2.365	2.423	2.455	2.494	2.457	2.596	2.568	2.528	2.503	2.484	2.498	2.485	2.559	2.641	2.481	2.496	2.457	2.619	2.428	2.412	2.345	2.377	2.587	2.659	2.678
Prod. Petróleo + Renov.	2.362	2.357	2.600	2.819	2.751	2.711	2.840	2.851	2.882	2.718	2.748	2.662	2.624	2.619	2.742	2.852	2.888	2.942	3.101	2.880	2.949	2.742	2.822	2.529	2.514	2.483	2.742	2.922	2.989	3.077

POORLY STRUCTURED BIODIESEL PROGRAMME, ALBEIT PRODUCTION INCREASE, THERE IS NO PRICE DECREASE

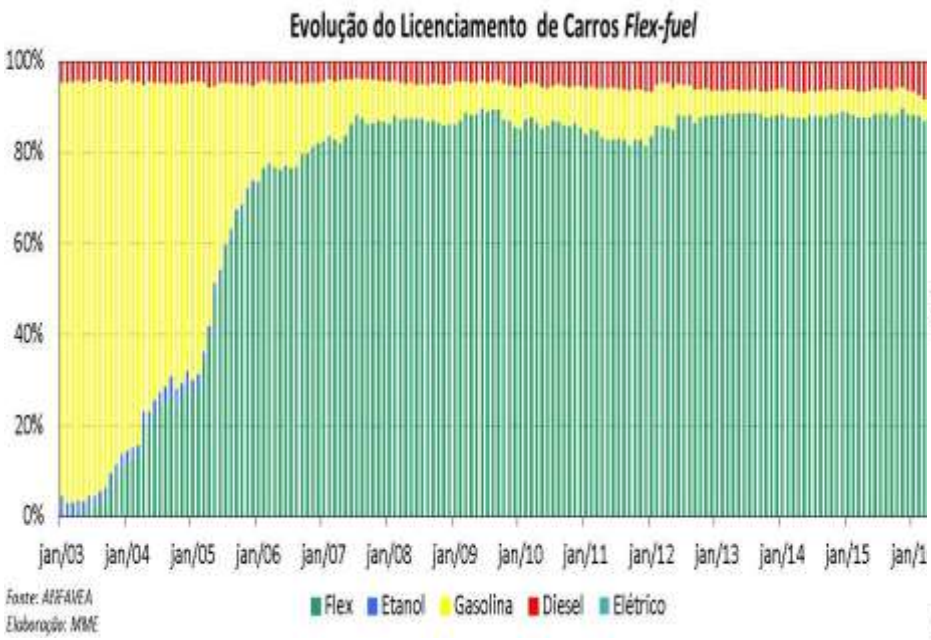


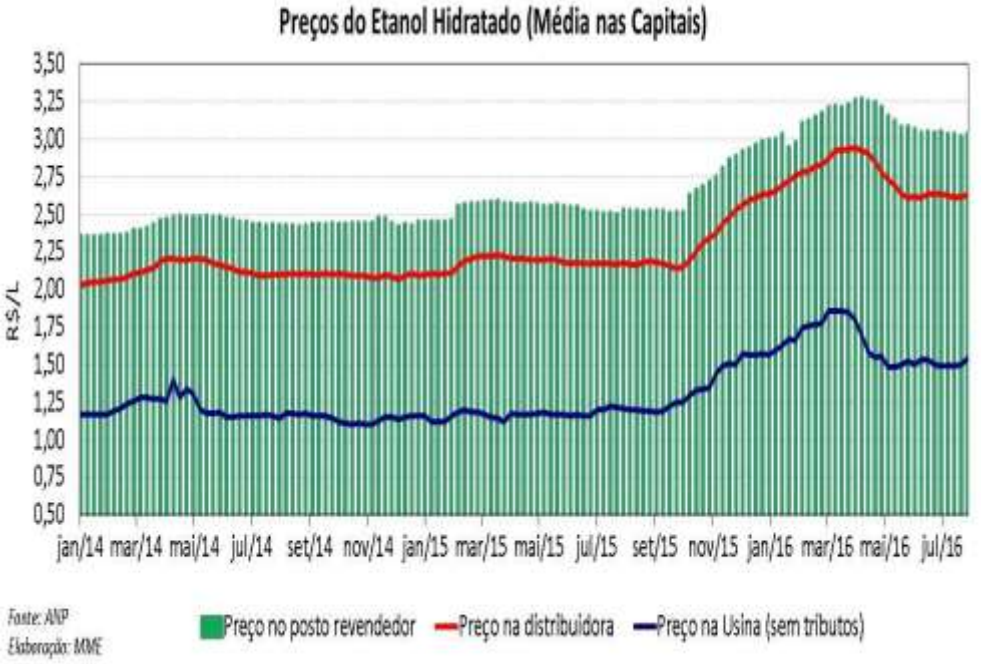


SUBSIDIES DO NOT HELP SUSTAINABLE GRO

CORRELATION TO SUGAR DOES NOT HELP, BUT TREND SHOWS MIXED STRATEGIES DO NOT HELP SUSTAINABLE GROWTH

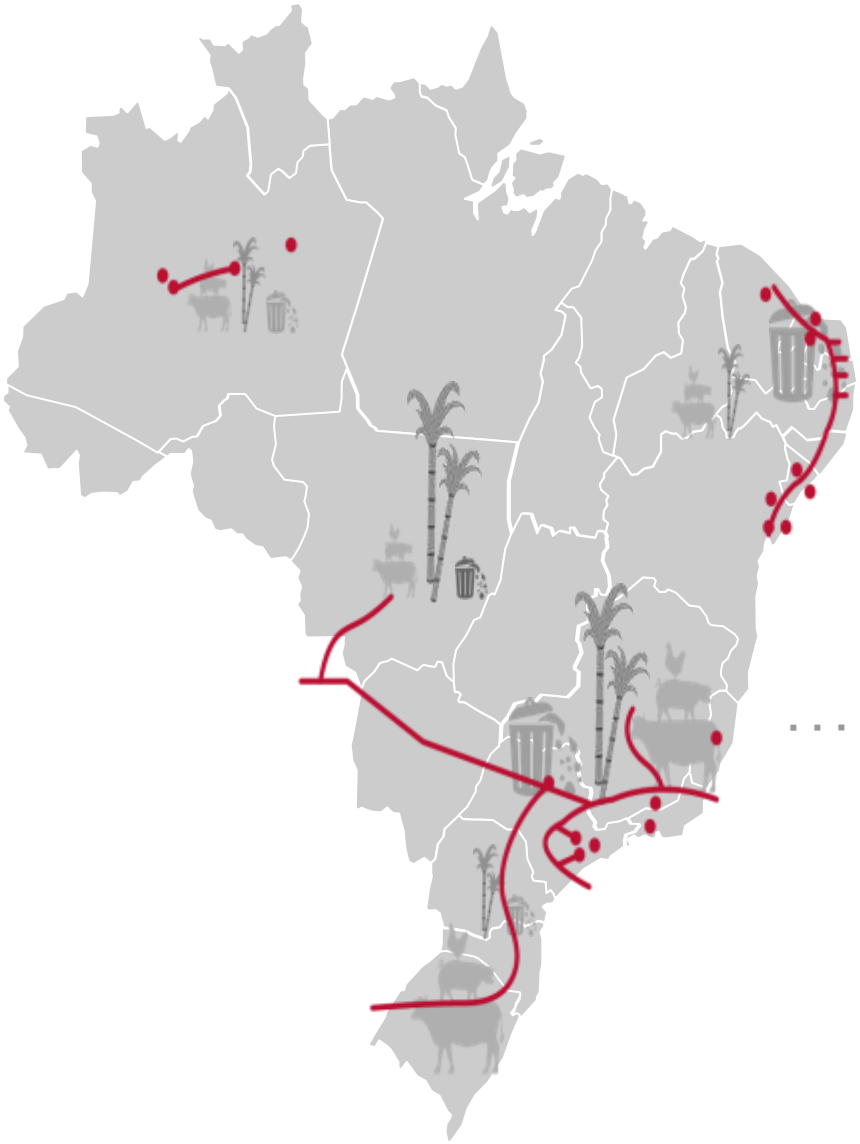
ETHANOL: ALBEIT NEW DEMAND CYCLE = FLEX FUELS, PRICE DOES NOT DROP





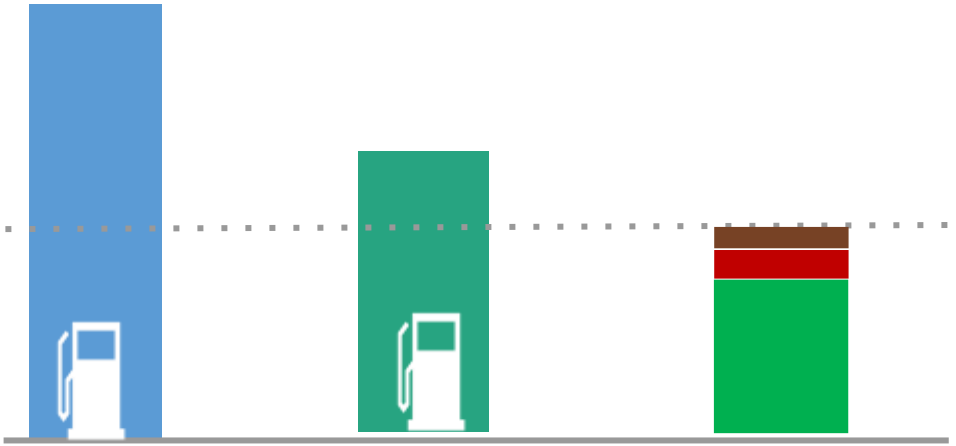
THE MOST SIGNIFICANT RENEWABLE ENERGY GREENFIELD OPPORTUNITY IN THE WORLD

BIOMETHANE OPPORTUNITY



Biogás
52 Billion
m^3/year

BIOMETHANE
28,5 Billion
m^3/year



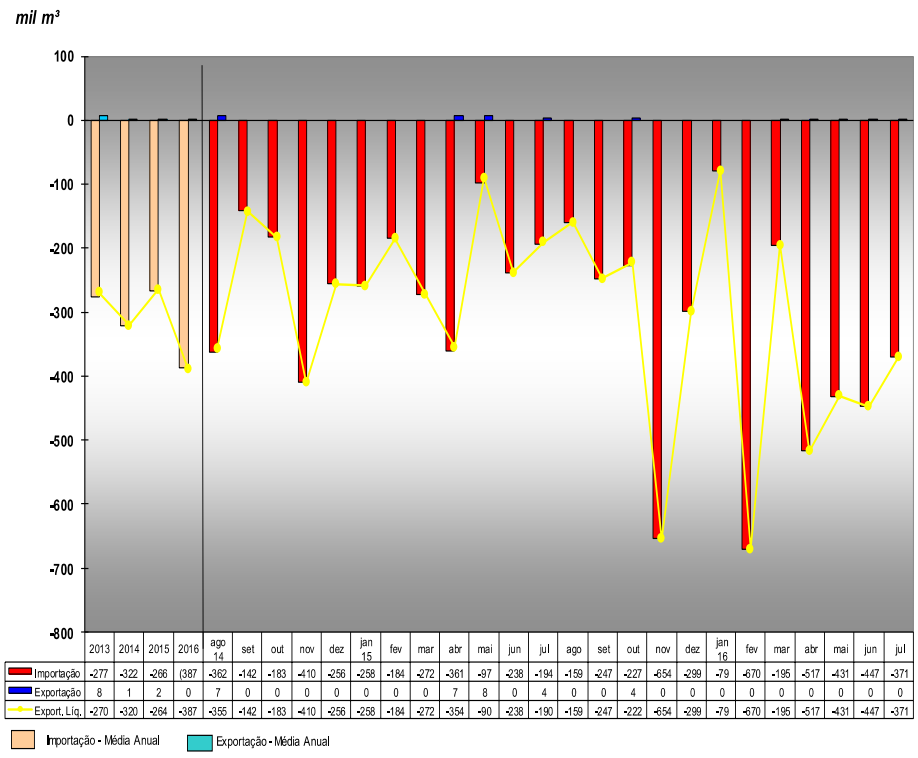
Diesel
60 Bi de litros
44%
Substitutio

Gás Natural
39 Bi de m^3
73%
Substitutio

Biometano

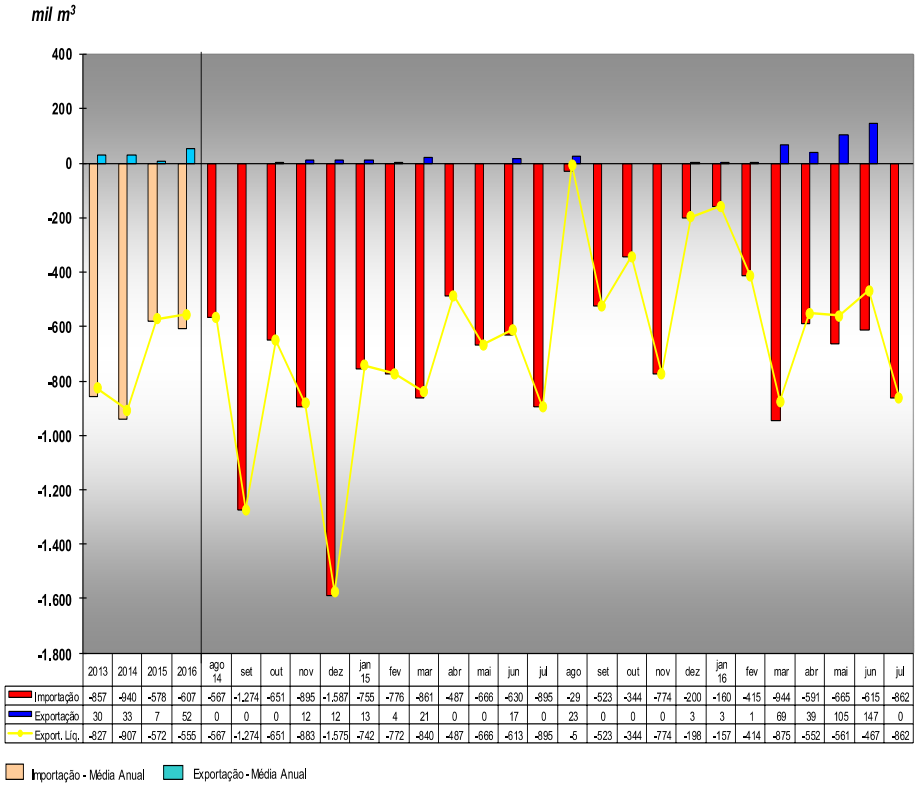
NEGATIVE COMMERCIAL BALANCE LGP+DIESEL

7.4) GLP - Exportação e Importação: Média anual e valores Mensais de ago/14 a jul/16



	2013	2014	2015	2016	ago 14	set	out	nov	dez	jan 15	fev	mar	abr	mai	jun	jul	ago	set	out	nov	dez	jan 16	fev	mar	abr	mai	jun	jul
Importação	-277	-322	-266	(387	-362	-142	-183	-410	-256	-258	-184	-272	-361	-97	-238	-194	-159	-247	-227	-654	-299	-79	-670	-195	-517	-431	-447	-371
Exportação	8	1	2	0	7	0	0	0	0	0	0	0	7	8	0	4	0	0	4	0	0	0	0	0	0	0	0	0
Export. Líq.	-270	-320	-264	-387	-355	-142	-183	-410	-256	-258	-184	-272	-354	-90	-238	-190	-159	-247	-222	-654	-299	-79	-670	-195	-517	-431	-447	-371

7.8) Óleo Diesel - Exportação e Importação: Média anual e valores Mensais de ago/14 a jul/16



	2013	2014	2015	2016	ago 14	set	out	nov	dez	jan 15	fev	mar	abr	mai	jun	jul	ago	set	out	nov	dez	jan 16	fev	mar	abr	mai	jun	jul
Importação	-857	-940	-578	-607	-567	-1.274	-651	-895	-1.587	-755	-776	-861	-487	-666	-630	-895	-29	-523	-344	-774	-200	-160	-415	-944	-591	-665	-615	-862
Exportação	30	33	7	52	0	0	0	12	12	13	4	21	0	0	17	0	23	0	0	0	3	3	1	69	39	105	147	0
Export. Líq.	-827	-907	-572	-555	-567	-1.274	-651	-883	-1.575	-742	-772	-840	-487	-666	-613	-895	-5	-523	-344	-774	-198	-157	-414	-875	-552	-561	-467	-862

IMPORTANT BENEFIT ON TRANSPORT + INDUSTRIAL EMISSIONS

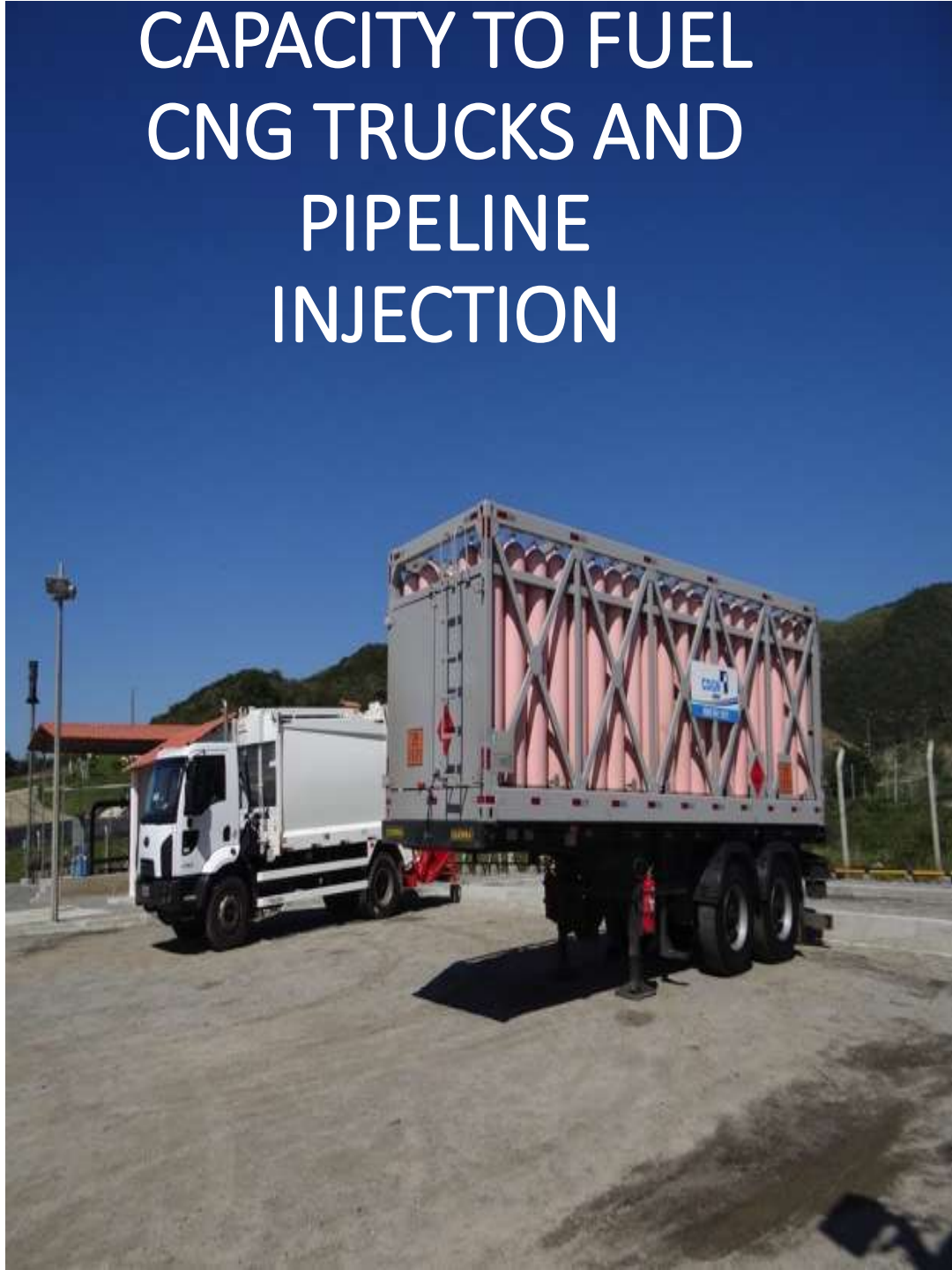
Uma referência na produção de biogás

A Usina Dois Arcos, da EcoMetano, que produz biogás purificado (biometano) a partir de resíduos sólidos urbanos de oito municípios da Região dos Lagos, foi apresentada como estudo de caso no International Conference on Renewable Energy Gas Technology (Regatec) 2015. O evento reuniu em Barcelona, na Espanha, especialistas e empreendedores na produção de biometano por meio de conversão microbiológica e termoquímica de biomassa e resíduos de todo o mundo.

O investimento na usina foi de R$ 20 milhões, incluindo a instalação do aterro sanitário. A estimativa de produção é de cerca de 8 mil m³ de biometano/dia, chegando a 15 mil m³/dia em 2020. O aterro recebe aproximadamente 700 toneladas/dia de resíduos sólidos urbanos. No início, o biometano será fornecido em cilindros, como gás natural comprimido (GNC), para clientes industriais. Futuramente, a usina poderá ser ligada à rede de distribuição da CEG e da CEG Rio, concessionárias de gás canalizado do Estado.

REVISTA ECONOMIA RIO
AGOSTO 2015

CAPACITY TO FUEL CNG TRUCKS AND PIPELINE INJECTION



OVERALL NATIONAL EFFORT ON SUSTAINABLE ENERGY AND CLIMATE CHANGE IN BRAZIL

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+55-21-3177-5900

SUSTAINABLE ENERGY FOR ALL

UNDESA

UNDP

SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD

- **Ethiopia,** Mr. Tsegaye, Lemma Samson, Director, Solar Energy Foundation

Expert Group Meeting on the Sustainable Development Goal 7 and its Role in Mitigating impacts from Climate Change
Organized by the Division for Sustainable Development of UNDESA, In Cooperation with UNDP Morocco and UN-Energy

13 November – 14 November 2016

Mogador Express GUELIZ

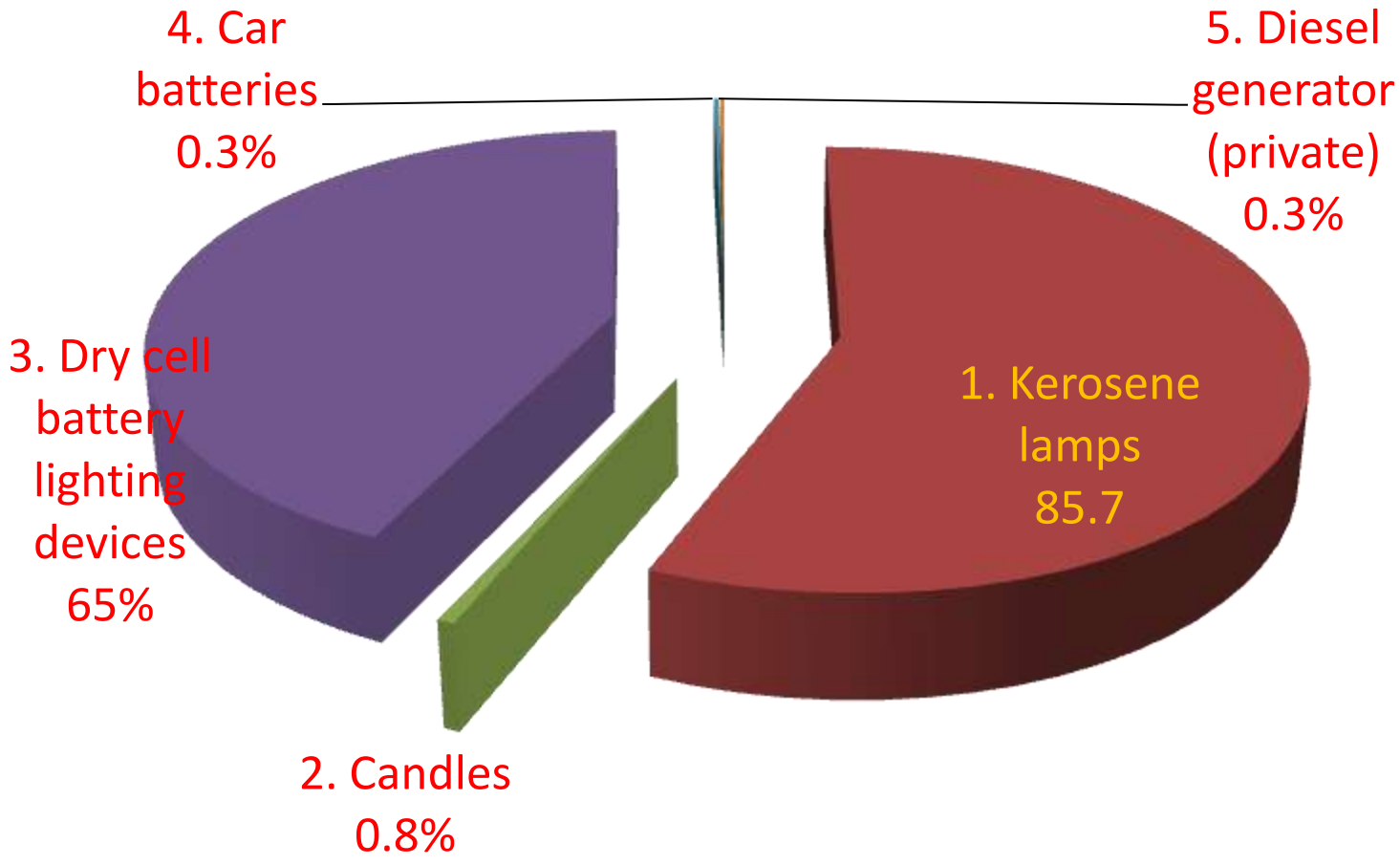
Marrakesh, Morocco

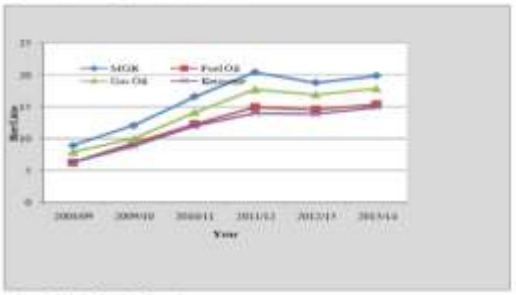
Sustainable energy and Climate Change activities in Ethiopia

- Population over 99Million
- Urban 20% rural 80%
- GDP growth 9.6%
- Access to electricity Urban 23% rural 8%

Energy source for lighting % of HHs

(4 main regions, lighting Africa report)





Over 14 million House holds are with out electricity access

The amount of dry cell batteries used and discarded annually by the rural households is estimated at 278 million units (lighting Africa)

Based on the 2014 price of kerosene, it is estimated that over 235 million litres are used each year for lighting by rural households. (Source. Lighting Africa report)

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I am tired;

The country's vision is to build a middle-income climate resilient green economy by 2025 through zero net carbon growth

CLIMATE RESILIENT (CR)

- Climate change results in changes to weather which will impact across the whole economy.
- A climate resilient economy will be protected from the negative impacts of climate change and seek opportunities in a changing climate.
- Builds on and incorporates the Ethiopia's Program of Adaptation to Climate Change (EPACC) and other relevant analysis.

GREEN ECONOMY (GE)

- Ethiopia is committed to be a middle income country by 2025 (USD $1000 GDP per capita)
- Development ambition is laid out in the Growth and Transformation Plan (GTP)
- A commitment to foster zero net carbon growth
- This low carbon growth create employment and provide wider socio-economic benefits.

- **Finance**
- Sources of finance for implementing the CRGE strategy will come from government, private finance, development partners, carbon trading schemes and financial mechanisms of multilateral environmental agreements

Plans

- **GTP II**

- ✓ During GTP II, the implementation of the CRGE Strategy will continue and the post-2015 SDGs related to a green economy will be integrated in all sector activities. In agriculture, adapting to climate change and mitigating GHG emissions will be pursued through the enhanced productivity of the crop and livestock sub-sectors and protecting and rehabilitating forests.
- ✓ In the energy sector, renewable sources of energy such as geothermal, wind and solar, will form an increasing share of overall capacity. Leapfrogging to energy efficient technologies will be a key objective in the transport sector and the expanded industry sector. At the end of GTP II, the GoE anticipates reducing GHG emissions by 147 million metric tons.
- ✓ The growth of overall power generating capacity is projected to reach 17,347MW by the end of the GTP II,
- ✓ 3.6Mill lanterns and 400,000 SHS by 2025(rural electrification with renewables)
- ✓ 300 MW Feed in Grid Solar planned for different region
- ✓ 800MW of Wind power
- ✓ 1000MW GeoThermal

Countries Potential

Resource	Unit	Exploitable Reserve	Exploited (In-service)
Hydro Power	MW	45000	<5%
Solar	kWh/m2/day	4 - 6	,, 0%
Wind Power	GW	1300	.. 0% (171 MW)
Geothermal	MW	5000	.. 0% (7 MW)

- 50,000 solar home Systems installed in 7 year instalment loan(REF)
- Close to 60,000 SHS and 1million lanterns disseminated (by private companies and NGOs)
- The current GTP has a target to increase generation capacity to over 17,000 MW by 2020, with an overall potential of 35,000 MW by 2037,
- Hydropower current generation 3715MW and ongoing projects with 8950MW including GERD
- Wind installed capacity ,324MW in total (51MW Adama I, 120MW Ashegoda, 153MW Adama II)
- Ethiopia has started constructing a geothermal electric power generating capacity of 1,000 MW per year in the Rift Valley. The first phase, which will produce 500 MW per year, will be completed in 2018. The second phase, which will generate another 500 MW per year, will be completed in 2021.

Access To Electricity

Why not used or The Gaps

- Suppliers mostly based in big cities
- Rural settlements, difficult to access, very scattered
- Lack of awareness on available quality products
- Shortage of local stock
- Lack of professionals

Consumer Campaigns by Lighting Ethiopia program of IFC

LIGHTING GLOBAL
QUALITY VERIFIED PRODUCTS

SOLAR HOME SYSTEM KITS

FOSERA GROUP
LSHS 9800+Lamps+Panel

MOBISOL
Mobisol Family SHS 19" TV

OMNIVOLTAIC POWER CO. LTD.
OvCamp HS1-144_LB2244

OvCamp Solar Home System

SOLARWORKS!
Solar Home System

ZIMPERTEC
Litio Solar Home System Kit

PICO SOLAR PRODUCTS

ANJI DASOL SOLAR ENERGY SCIENCE & TECHNOLOGY CO.
SSL200

AZURI TECHNOLOGIES LTD.
Indigo Duo Solar Home System

BAREFOOT POWER LTD
Barefoot Firefly/
Firefly Mobile

GO 250/GO 255

Connect 600

D.LIGHT DESIGN
A1

S20

D20

S100

S2

S300

FOSERA GROUP
Pico Solar Home System
Family – PSHS 2800, PSHS
7000 and others

FREEPLAY ENERGY
Solar Energy Centre

FUTURA
Energy Station Plus

GREENLIGHT PLANET INC
Sun King Home Eco

Sun King Pro 2

Sun King Home Plus

Sun King Pro All Night

Sun King Home

Sun King Solo

Sun King Mobile

GS YUASA INTERNATIONAL LTD.
AKARi

Mini Moshi-Moshi

INDIA IMPEX SUNLITE
JS30-MOB

JUA ENERGY
Home Mate

M-KOPA SOLAR
M-KOPA 3

MIBAWA SUPPLIERS LTD.
Mibawa Solarpack 3

MICROMARK
Compact LED Solar Light

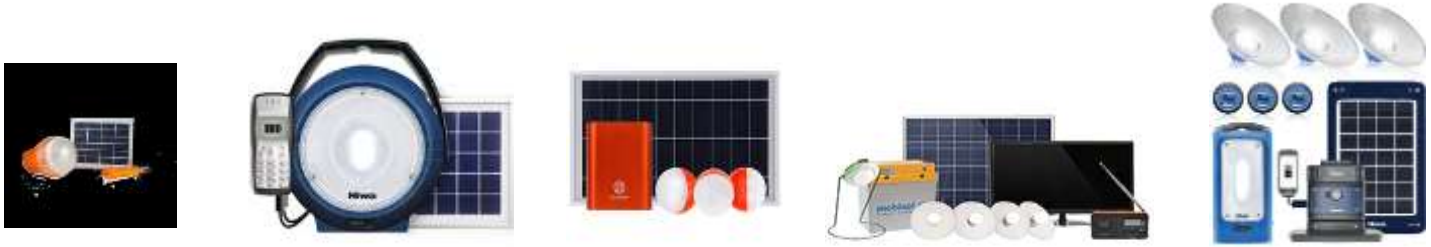
Challenges

- Unclear import procedure and Regulation of Solar equipments
- Lack of local quality testing facilities
- Different procedures from regional energy bureaus on implementing projects
- Access to finance and managing available finance
- Duplicated efforts by donor organizations
- Few genuine players for the sector

Affordability

or

Availability



- **Solar Energy Foundation and activities and experiances**

Why Solar for the Rural

- Kerosene lamp side effects , its cost and access to it
- shortage of fire wood ,which is already a cause of deforestation
- Water supply
- Health
- Education
- Information (Radio, Tv)
- Distance to shops
- The only alternative for the rural's from clean energies

STIFTUNG SOLARENERGIE-SOLAR ENERGY FOUNDATION

→ SEF was established in 2005 in Germany by the founder Dr. Harald Schutzeichel

→ Registered in Ethiopia as an international NGO in 2007

Mission: Poverty alleviation and creating a long-term sustainable solar market in Ethiopia

- Knowledge transfer, by train solar technicians and make them available for the developing solar market
- Creating Jobs

Our Projects

- Light For Education,I,II,III
- Scaling up Solar Energy Supply(Revolving Fund)
- Lighting Rural homes and community services
- Solar power installation for Health institutions
- Lighting Student Homes

Light for Education

REMA project approach

SHS installed free

Users saving small amount monthly which they used to spend previously for Kerosene

This saving is used for replacements(battery, lamps…)

Light for Education project ,Cont…

- Elected community members are responsible for the saving collection
- Technicians, trained from the community and employed by the community, they are responsible for after sales service
- System will be removed if users defaulted for three consecutive months
- 2200 HH of REMA solar Village received solar lights
- Street lights installed in different spots
- Schools got solar lights for adult evening class

Solar water pumping, REMA




Water Disinfection



Our approach cont.

Scaling up solar energy supply (revolving fund)

- Different size solar systems distributed on credit & cash sales approach
- Credit facility (five, three, two years) for only fix installed systems not for lanterns

ST 2

ST 10

Power Box

Media Box

DC TV

Our approach cont.

- We developed smart charge controllers for credit sales (PAYGO)
- Over 30000 different size Solar Lighting systems distributed

Remote Control

RFID

Pay -to -own

- **Lighting Rural Homes and Community Services (Arso Amba)**

✓ Users cover 25% of the material cost on cash and credit bases

✓ Over 700 House Holds electrified

Solar Power Installation for Health Institutions(36)

Lighting Student Homes



1000 Students from two elementary schools received one M300XL Niwa Solar Lantern

Solar Technicians Training Center

REMA, First Solar village North Shoa

Solar Valley, Tatek, Addis Ababa

Creating Jobs

recruitment

Training

Graduation

On job training

Job Creation

SOLAR SOLDIERS

Commitment

End User Training

Challenges for local solar business

- Hard currency for import
- Finance, Loan from local and abroad
- Fake and copied products available in the market , and bad price competition

Suggestions to accelerate clean energy access and to reach SD goals

- **TRUST**
- **Awareness**
- Distribution Network
- After sales service
- Product availability
- Local Assembly and next step, from lanterns to SHS
- Proper training for technicians
- Establishing strong association of stakeholders

- 20Million USD allocated for MFIs and Private companies through DBE as loan for renewable technologies from World Bank

Switch the light on!

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Thank you