

Renewable Energy and the Arab Region

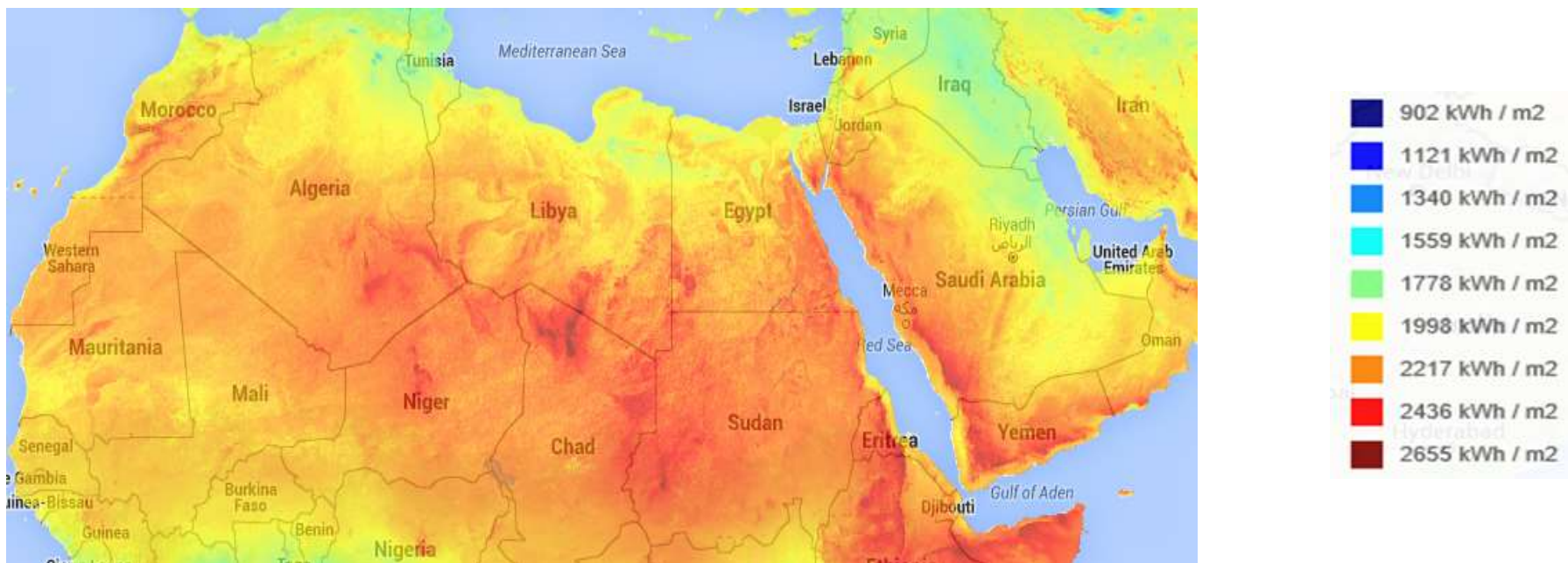
Gurbuz Gonul
Senior Programme Officer, Regions



Developing a Regional Renewable Energy Investment Pipeline
11-14 June 2017
Astana, Kazakhstan

RE Potential in the Arab World

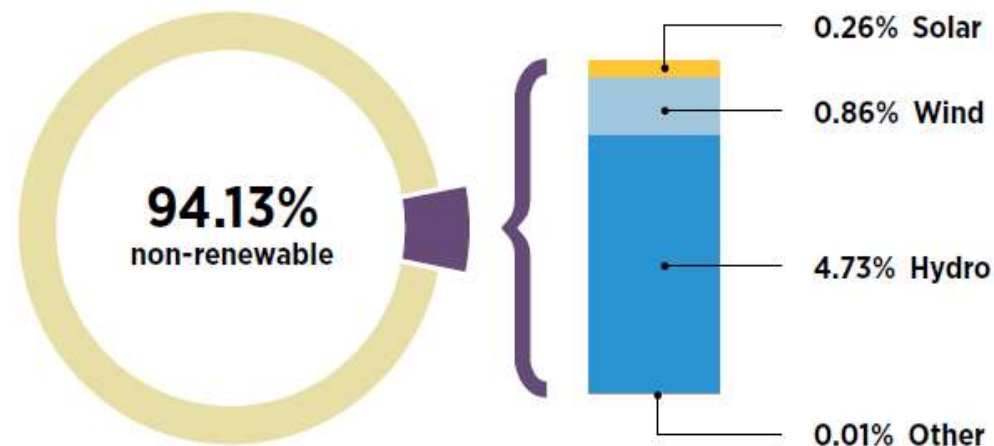
- Very high renewable energy potential, particularly in wind and solar
- Most Arab countries part of the Global Sunbelt with highest solar insolation levels in the world (6.5 kWh/m² per day)



Source: Mines ParisTech, retrieved from IRENA Global Atlas for Renewable Energy

Renewable Power in the Arab Region

Despite tremendous potential, renewable energy penetration remains low.



| | Non-Renewable Installed Capacity | Renewable Energy Installed Capacity (2015) | | | | | Total Installed Capacity |
|------|-------------------------------------|--|-------|--------|-------|----------|-----------------------------|
| | | Solar | Wind | Hydro | Other | Total RE | |
| [MW] | 218,726 | 616 | 2,000 | 11,000 | 36 | 13,652 | 232,378 |
| [%] | 94.13% | 0.26% | 0.86% | 4.73% | 0.01% | 5.87% | 100% |

Sources: RCREEE (2016), IRENA (2016), Arab Union of Electricity (2015)

Renewable Power in the Arab Region

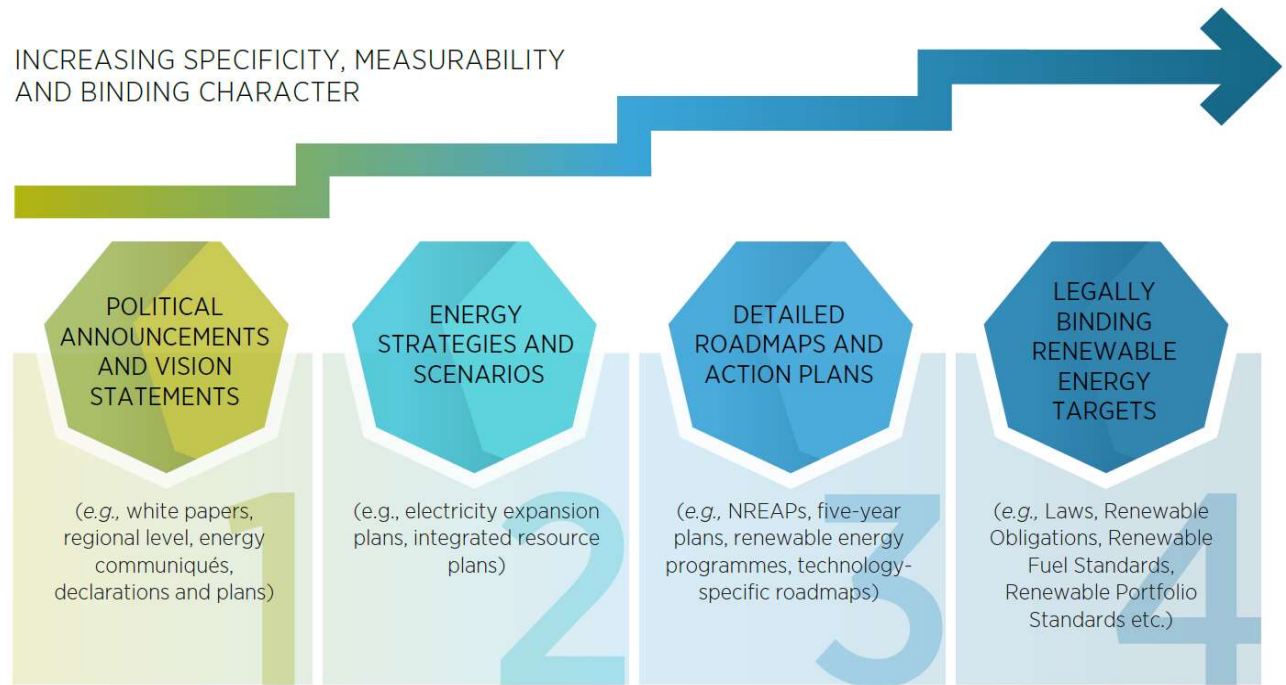
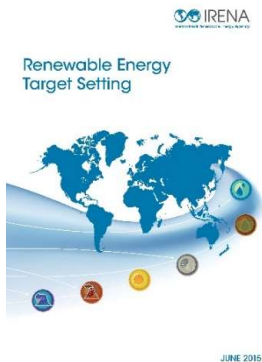
- In 2016, **USD 11 billion** were invested in renewables across the Arab region compared to USD 1.2 billion in 2008, a nine-fold increase in 8 years.
- In 2016, **5.8 GW** of renewables (excl. hydro) was operational or under construction, a five-fold growth since 2008.
- Targets to translate into a **combined 80 GW of renewable capacity** by 2030 based on national plans.
- Auctions in the region have recorded some of the **world's lowest prices** for solar PV and wind power projects.
- To achieve ambitions, **efforts needed** to enhance policy, regulatory, technical and economic frameworks enabling the scaled-up deployment of renewable.

Types of RE policies and measures

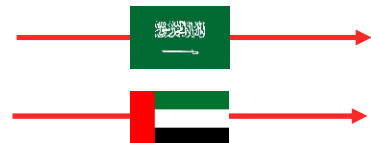
| NATIONAL POLICY | REGULATORY INSTRUMENTS | FISCAL INCENTIVES | GRID ACCESS | ACCESS TO FINANCE ^a | SOCIO-ECONOMIC BENEFITS ^b |
|---|---|---|---|---|---|
| <ul style="list-style-type: none"> ◆ Renewable energy target ◆ Renewable energy law/strategy ◆ Technology-specific law/programme | <ul style="list-style-type: none"> ◆ Feed-in tariff ◆ Feed-in premium ◆ Auction ◆ Quota ◆ Certificate system ◆ Net metering ◆ Mandate (e.g., blending mandate) ◆ Registry | <ul style="list-style-type: none"> ◆ VAT/ fuel tax/ income tax exemption ◆ Import/export fiscal benefit ◆ National exemption of local taxes ◆ Carbon tax ◆ Accelerated depreciation ◆ Other fiscal benefits | <ul style="list-style-type: none"> ◆ Transmission discount/exemption ◆ Priority/dedicated transmission ◆ Grid access ◆ Preferential dispatch ◆ Other grid benefits | <ul style="list-style-type: none"> ◆ Currency hedging ◆ Dedicated fund ◆ Eligible fund ◆ Guarantees ◆ Pre-investment support ◆ Direct funding | <ul style="list-style-type: none"> ◆ Renewable energy in rural access/cook stove programmes ◆ Local content requirements ◆ Special environmental regulations ◆ Food and water nexus policy ◆ Social requirements |

Targets in the global RE landscape

173 countries have at least one type of renewable energy target – up from **43** in **2005**



Note: NREAP: National Renewable Energy Actions Plans.



Source: IRENA (2015), Renewable energy target setting.

Plans for RE in the Arab Region

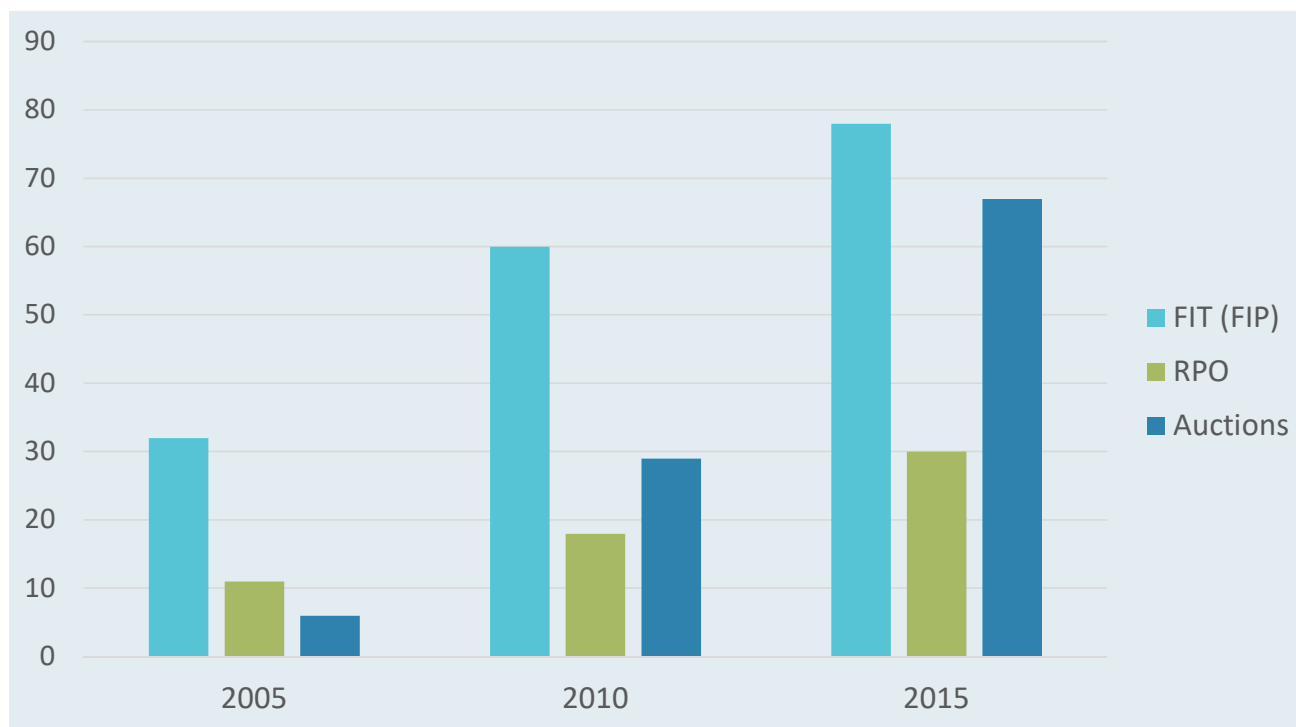
| | | Renewable Energy Targets | | | | | | Target Date | |
|----------------------|-----------|--------------------------|---------|--------|--------------------|------------|----------------------|----------------------------------|------|
| | | Wind | PV | CSP | Biomass | Geothermal | Total | | |
| | | MW | MW | MW | MW | MW | MW | | % |
| Algeria | | 1,010 | 3,000 | - | 360 | 5 | 4,375 | 15 | 2020 |
| | | 5,010 | 13,575 | 2,000 | 1,000 | 15 | 21,600 | 37 ³ /27 ² | 2030 |
| Bahrain | | - | - | - | - | - | 250 | 5 ³ | 2030 |
| Djibouti | | 300 | 200 | - | - | 500 | 1,000 | 100 ² | 2025 |
| Egypt | | 7,200 | 2,300 + | - | - | - | 9,500 | 20 ² | 2022 |
| Iraq | | - | 300 | - | - | - | 300 | 1 ² | 2020 |
| Jordan | | 800 | 800 | 100 | 50 | - | 1,750 | 10 ⁴ | 2020 |
| Kuwait | | 700 | 4,600 | 5,700 | - | - | 11,000 | 15 ² | 2030 |
| Lebanon | | 400 | 150-100 | - | - | - | 950-900 ⁵ | 12 ² | 2020 |
| Libya | | 600 | 344 | 125 | - | - | 1,069 | 7 ² | 2020 |
| | | 1,000 | 844 | 375 | - | - | 2,219 | 10 ² | 2025 |
| Mauritania | | 30 | 30 | - | - | - | 60 | 20 ² | 2020 |
| Morocco | | 2,000 | 2,000 | - | - | - | 6,000 ⁶ | 42 ³ | 2020 |
| | | 4,200 | 4,560 | - | - | - | 10,090 | 52 ³ | 2030 |
| State of Palestine | | 44 | 45 | 20 | 21 | - | 130 | 10 ² | 2020 |
| Qatar | | - | - | - | - | - | 1,800 | 20 ³ | 2030 |
| Saudi Arabia | | 9,000 | 16,000 | 25,000 | 3,000 ⁷ | 1,000 | 54,000 | 30 ³ | 2040 |
| Sudan | | 680 | 667 | 50 | 68 | 54 | 1,582 ⁸ | 11 ³ | 2020 |
| | | 1,000 | 1,000 | 100 | - | - | -2,100 | 20 ² | 2030 |
| Syrian Arab Republic | | 1,000 | 2,000 | 1,300 | 250 | - | 4,550 | 30 | 2030 |
| Tunisia | | 1,755 | 1,510 | 460 | - | - | 3,725 | 30 ³ | 2030 |
| UAE | Abu Dhabi | - | - | - | - | - | - | 7 ³ | 2020 |
| | Dubai | - | 5,000 | - | - | - | 5,000 | 25 ² | 2030 |
| Yemen | | 400 | 8.25 | 100 | 6 | 200 | 714.25 | 15 ³ | 2025 |

¹ Including hydro ² Electricity generation ³ Installed capacity ⁴ Primary energy ⁵ Including 400 MW hydro ⁶ Including 2,000 MW hydro ⁷ Waste to energy ⁸ Including additional 63 MW hydro

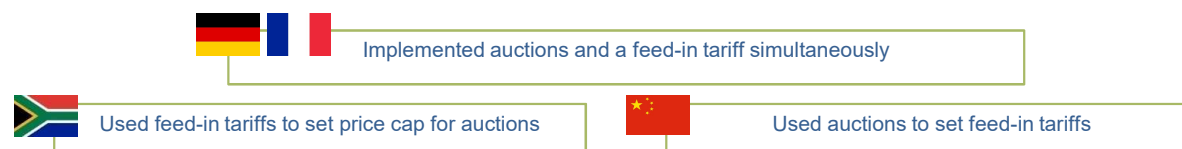
Sources: IRENA (2016b); LAS/RCREEE (2016b)

Trends in RE support policies

Number of countries with renewable energy policies, by type

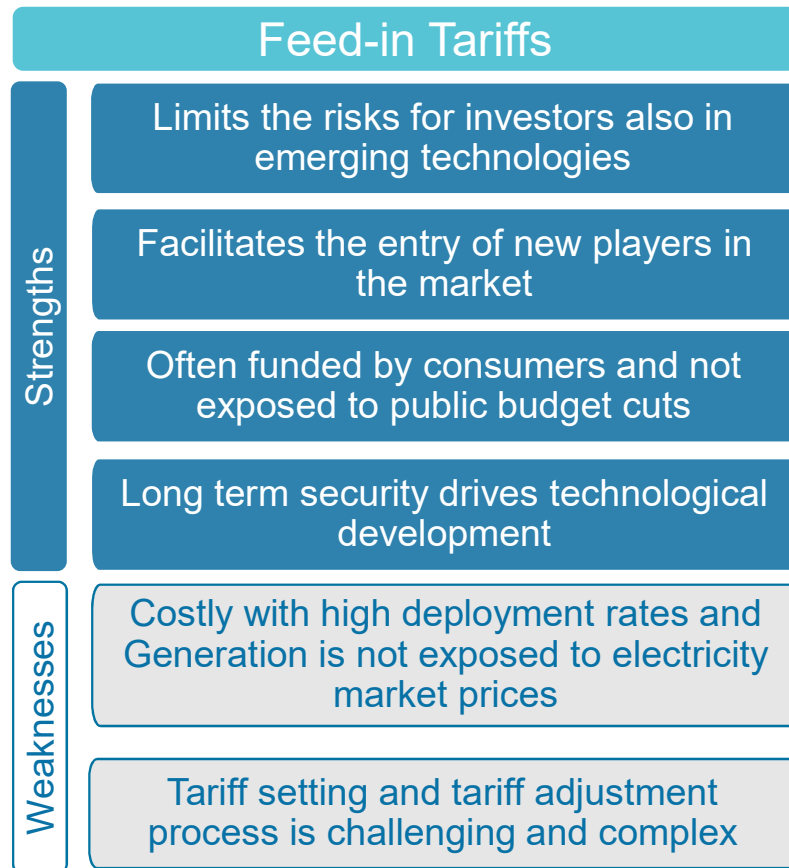


Source: Based on REN21 Global Status Report (2005 to 2016).



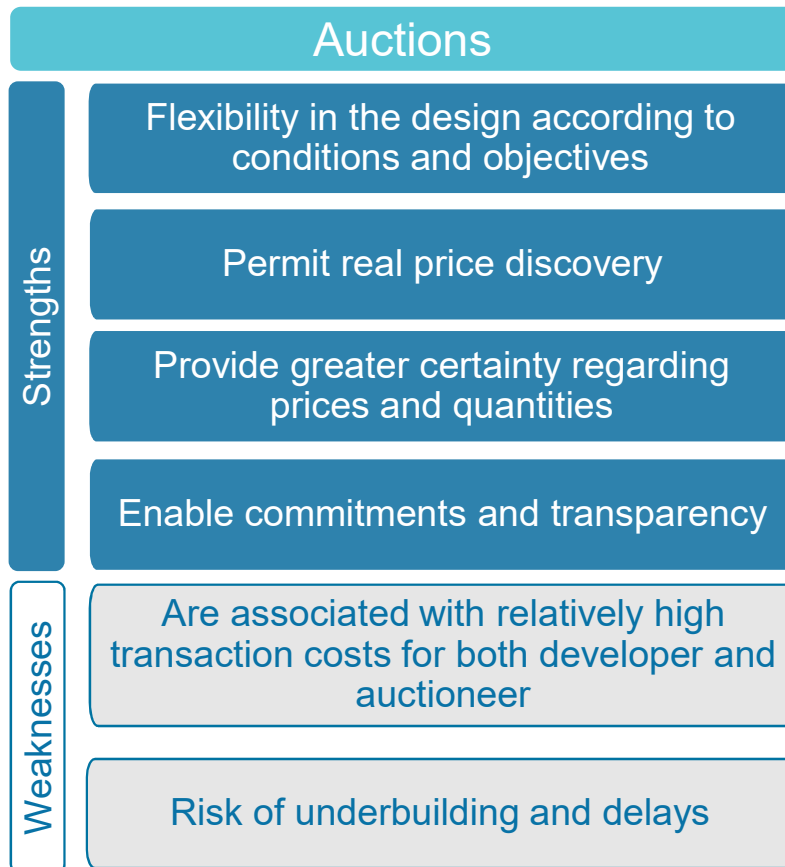
RE support policies in the region

| | Competitive Bidding | Direct Proposal Submission | FIT | Net Metering |
|------------------------|---------------------|----------------------------|-----|--------------|
| Algeria | | | ● | |
| Egypt | ● | ● | ● | ● |
| Jordan | ● | ● | ● | ● |
| Kuwait | ● | | | |
| Lebanon | ● | | | ● |
| Morocco | ● | | | ● |
| Oman | ● | | | |
| State of Palestine | ● | | ● | ● |
| Syrian Arabic Republic | ● | | ● | ● |
| Tunisia | | | | ● |
| United Arab Emirates | ● | | | ● |
| Yemen | ● | | | |



Experience in the Arab region

- Pre-defined feed-in tariff rates were adopted in Egypt, Algeria, Jordan and Syria, and Palestine
- The applied schemes vary greatly
- Egypt has run two rounds of FITs to date with varying degrees of success
- By January 2017, the Ministry of Electricity has reportedly received 23 expressions of interest to develop 1,295MW of solar PV and eight to build 550MW of wind power capacity

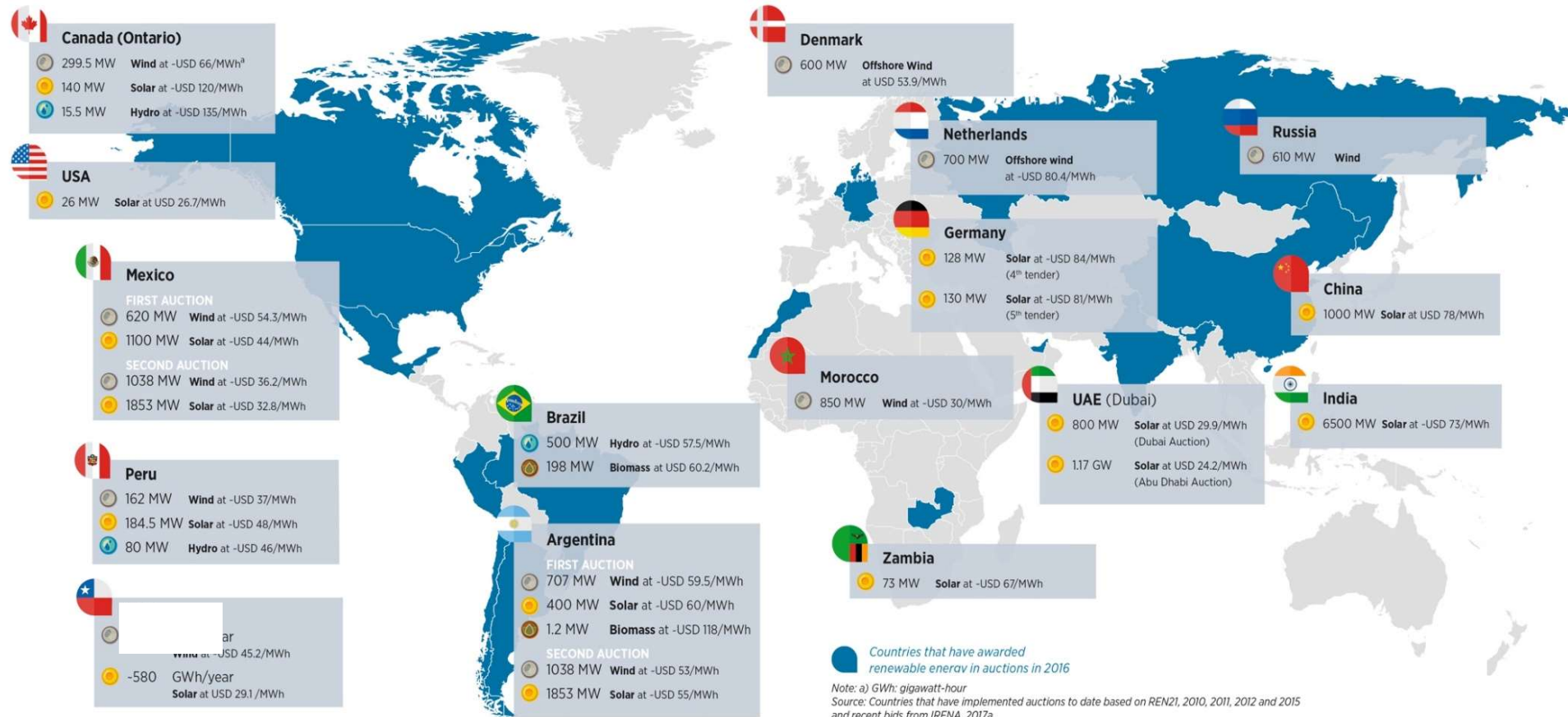


Experience in the Arab region

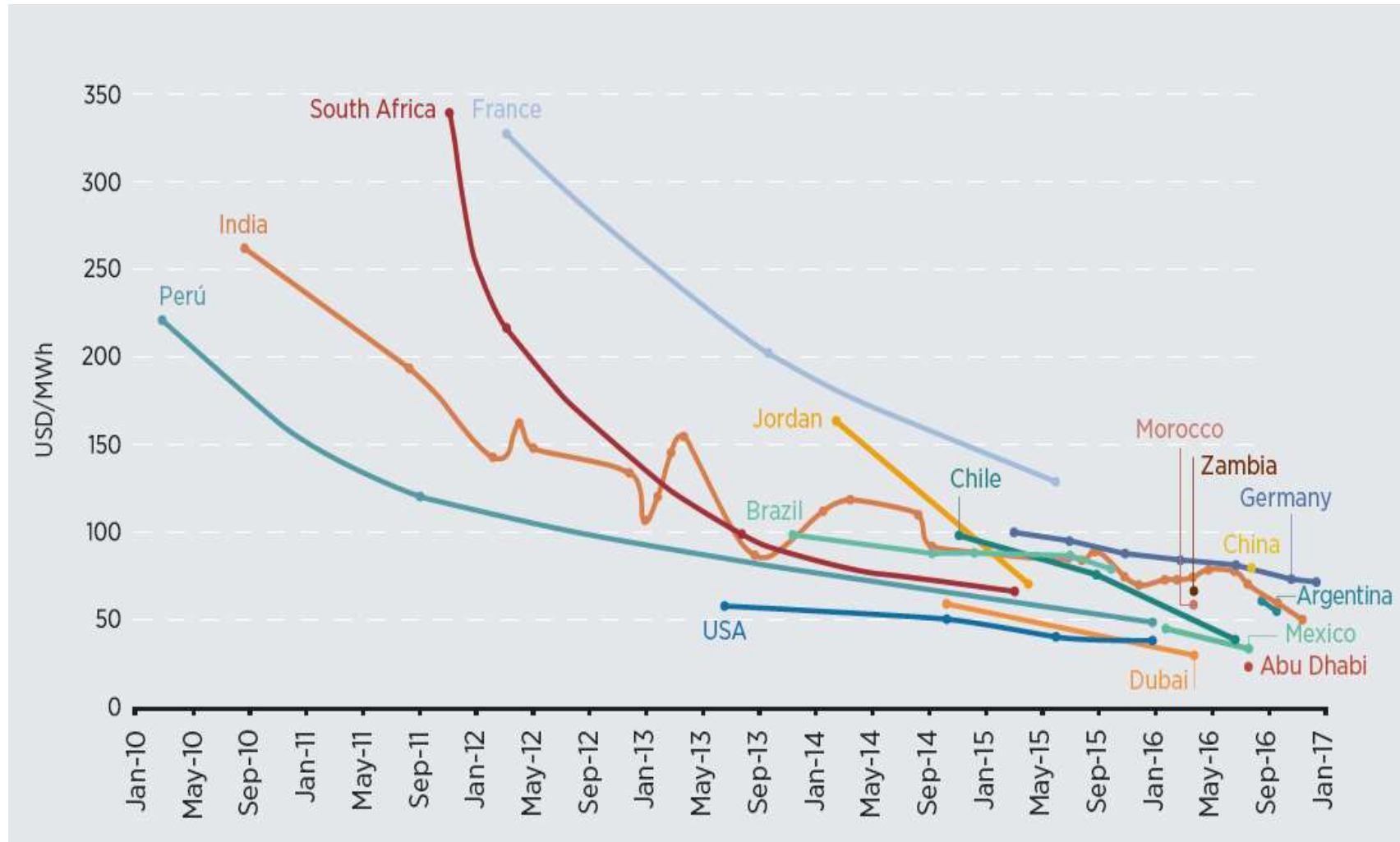
- At least 12 countries in the region have conducted or planned to conduct competitive bidding
- There are ongoing auctions for 2GW solar power and 1GW wind
- An estimated 6.9GW of solar and 400MW of wind power capacity will be procured through competitive bidding in the next few years
- Countries such as Algeria, Egypt, Kuwait and Saudi Arabia are targeting largest RE tenders in the region

Renewable Energy Auctions

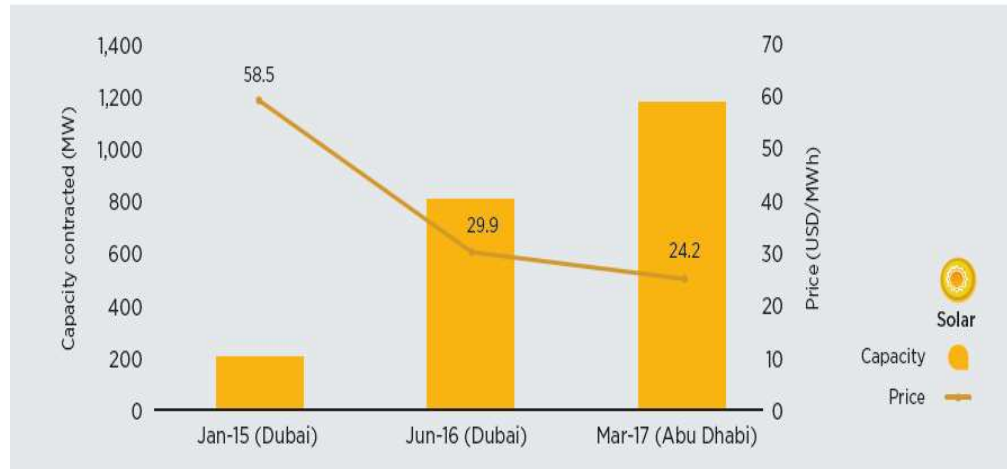
Recent highlights globally and in the Arab region



Price trends: Solar PV auctions



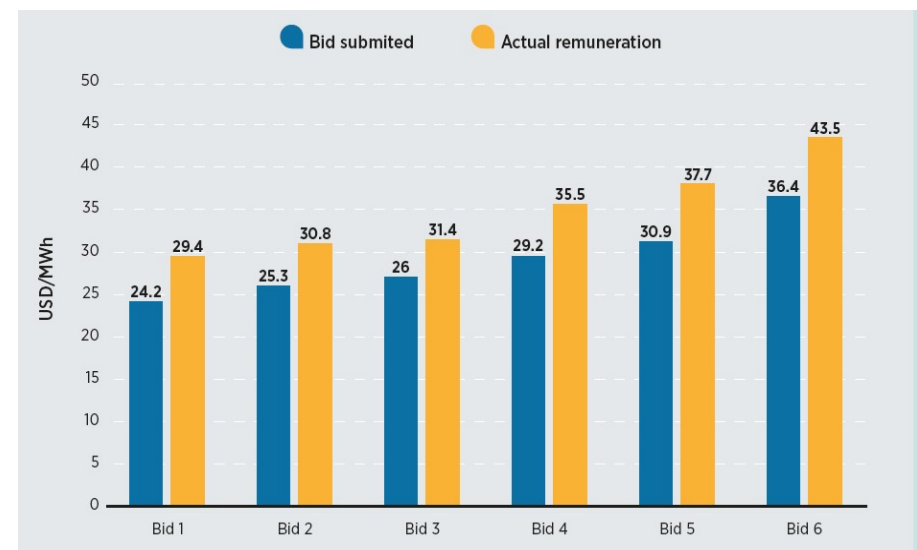
Price trends: Solar PV auctions in UAE



- ◆ Abundant solar resources and favorable economic conditions
- ◆ Ownership structure
- ◆ Auction design (project size, project specificity, grid connection)

Remuneration profile in Abu Dhabi

- ◆ Energy delivered from Jun to Sep counts for 1.6 times as much as energy delivered from Oct to May
- ◆ Therefore, the bids do not reflect the actual remuneration of the project.

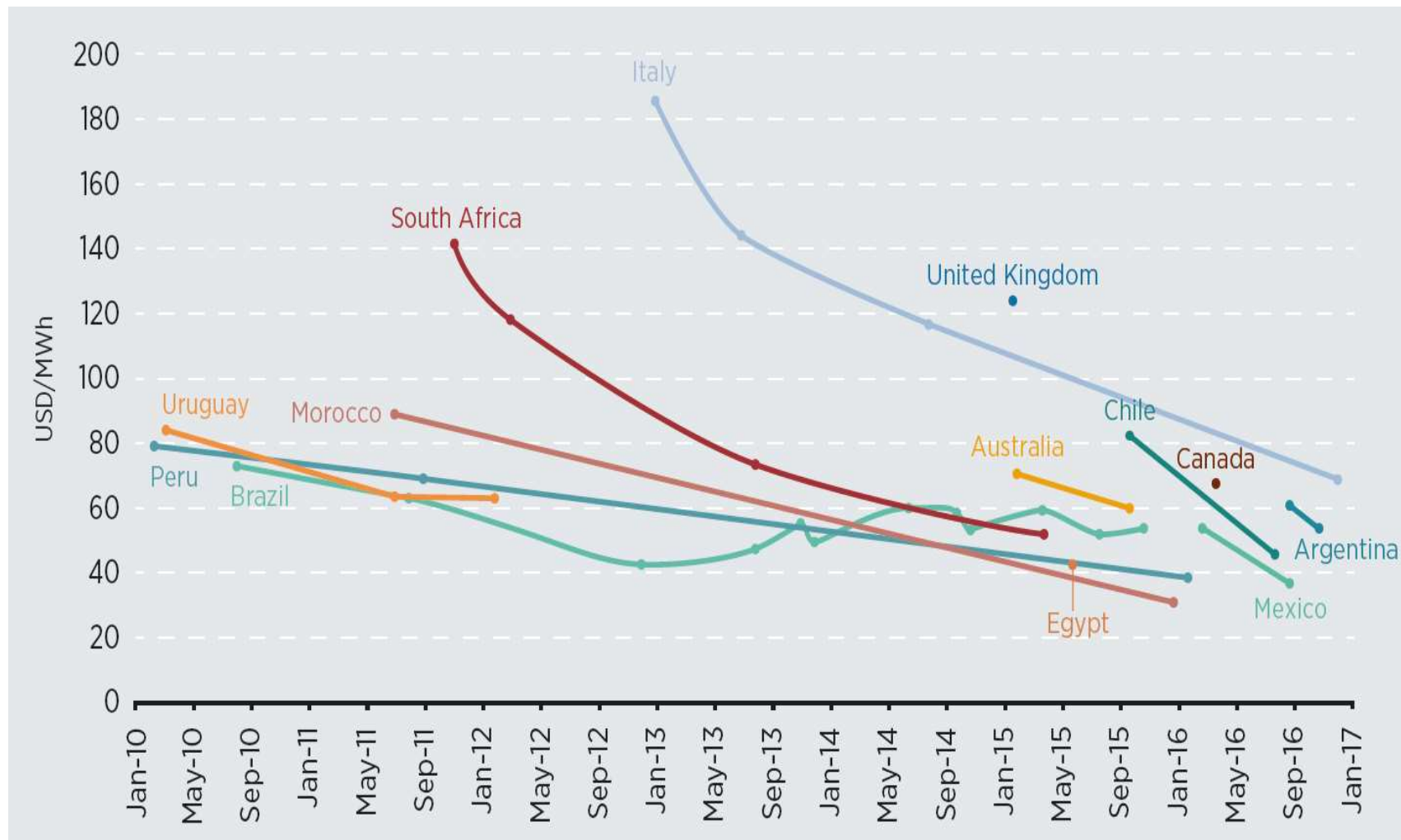


Price trends: Solar PV auctions in Jordan



- ◆ Abundant solar resources
- ◆ Enabling environment towards the RE target of 600 MW by 2020
- ◆ Jordan Renewable Energy and Efficiency Fund

Price trends: Onshore wind auctions



A favored support mechanism to promote roof-top solar PV

Most countries in the region have introduced net-metering regulations, often coupled with FITs for small scale installations

The region has excellent opportunity to benefit from its enormous solar energy resources through promoting roof-top PV installations

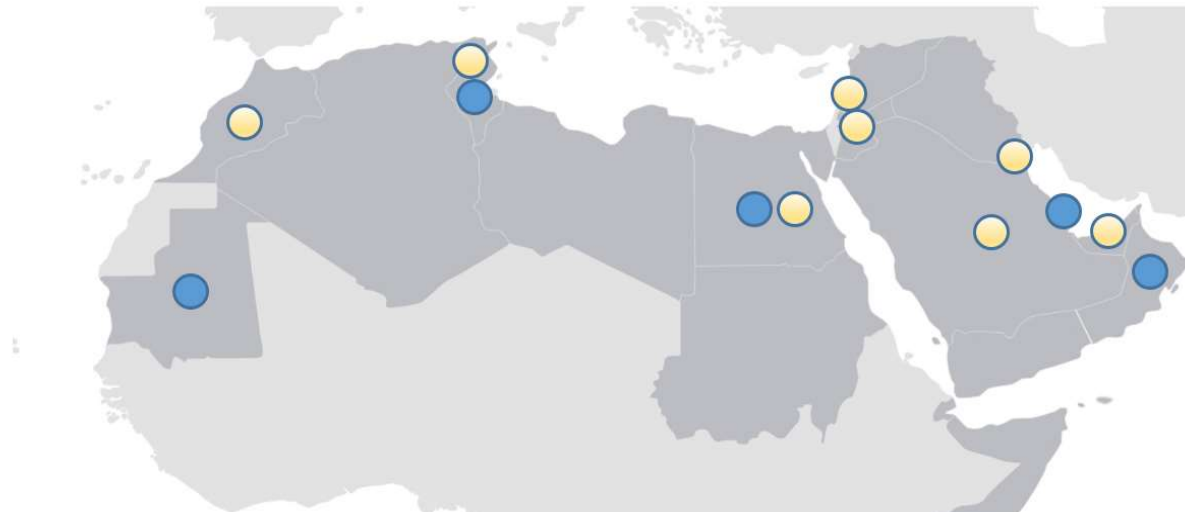
Shams Dubai

- Dubai launched the programme in 2014 to encourage distributed power generation
- It creates a regulatory environment for medium-sized solar PV plants – roughly more than 50 kW range
- For quality assurance, it allows only registered service providers to install PV plants
- Many potential developers are commercial and industrial consumers having the highest tier in the tariff structure

Fiscal incentives offered in the region

| | Corporate Tax Rate (%) | Withholding Tax on Interest (%) | Withholding Tax on Dividends (%) |
|---------------------|---|---------------------------------|----------------------------------|
| Algeria | 23 ¹ | 10 | 15 |
| Bahrain | No corporate tax for most companies in Bahrain ² | 0 | 0 |
| Egypt | 22.5 ³ | 20 | 5-10 |
| Iraq | 15 ⁴ | 15 | 0 |
| Jordan | 20 ⁵ | 5 | 0 |
| Kuwait | 15 | 0 | 0-15 |
| Lebanon | 15 | 5-10 | 10 |
| Libya | 20 | 5 | 0 |
| Morocco | 10-31 | 10 | 15 |
| Oman | 12 ⁶ | 0 | 0 |
| Palestine | 15-20 | 0 | 10 |
| Qatar | 10 ⁷ | 7 | 0 |
| Saudi Arabia | 20 | 5 | 5 |
| Sudan | 10-20 | - | - |
| Syria | 10-28 | 7.5 | 0 |
| Tunisia | 30 | 20 | 0 |
| UAE | 0 ⁸ | 0 | 0 |
| Yemen | 20 ⁹ | 10 | 10 |

(Source: Arab Future Energy Index Report, 2016)



Country Support

- RRA Oman (2015)
- RRA Mauritania (2015); post RRA
- RRA Tunisia (in progress)
- RRA/REmap Egypt (in progress)
- REmap UAE (2015)
- Qatar National Stakeholder Consultation (2017)

Regional Initiatives

- Pan-Arab Clean Energy initiative
- RE Market Analysis for GCC (2016)
- RE Manufacturing Potential for:
 - Egypt, Morocco and Tunisia (with EIB, 2015)
 - Jordan, Lebanon and the UAE (with UNESCWA, in progress)

Thank you for your attention

