

RENEWABLE ENERGY COUNTRY PROFILES  
**Middle East**



November 2012 edition

[www.irena.org](http://www.irena.org)





IRENA [Renewable Energy Country Profiles](#) take stock of the latest developments in the field of renewables at country level around the world. Each profile combines analysis by IRENA's specialists with the latest available country data and additional information from a wide array of sources. The resulting reports provide a brief yet comprehensive picture of the situation with regard to renewable energy, including energy supply, electrical generation and grid capacity, and access. Energy policies, targets and projects are also considered, along with each country's investment climate and endowment with renewable energy resources.

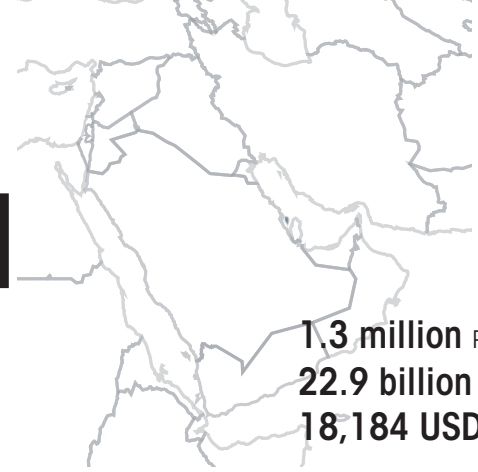
The energy statistics presented here span the period from 2009 until 2012, reflecting varying timelines in the source material. Since data availability differs from country to country, wider regional comparisons are possible only for the latest year with figures available for every country included. Despite the time lag in some cases, the evident differences and disparities between countries and regions around the world remain striking.

The current package of country profiles is just a starting point. The geographic scope will continue to expand, and existing profiles will be enhanced with new indicators, with the whole series maintained as a live product on the IRENA website ([www.irena.org](http://www.irena.org)). Your feedback on both the format and the content of these country profiles would be greatly appreciated. Please address any comments to [statistics@irena.org](mailto:statistics@irena.org).





# BAHRAIN



**1.3 million** Population (2010)  
**22.9 billion USD** GDP (2010)  
**18,184 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

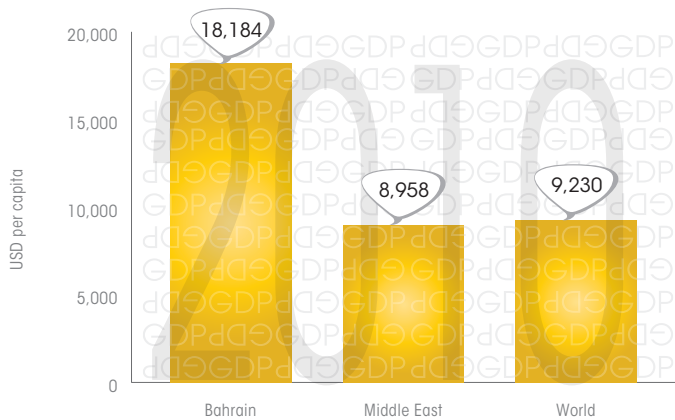
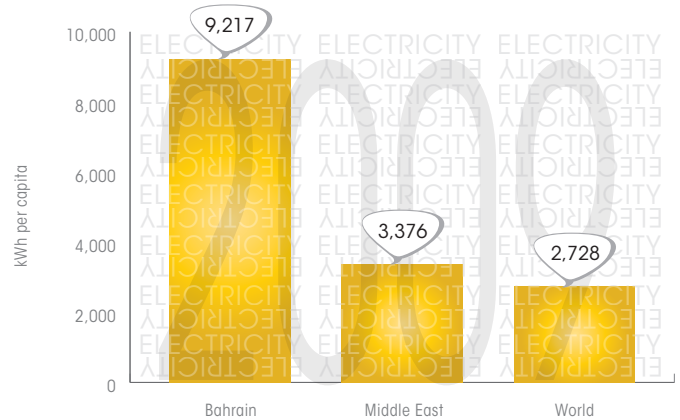


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

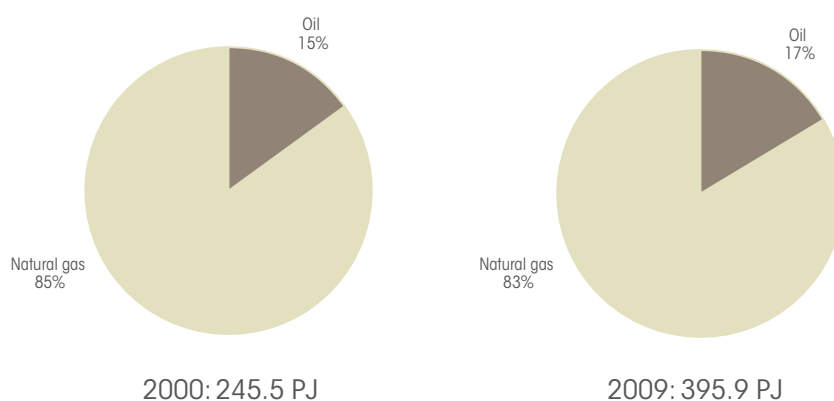
- Total Primary Energy Supply: 396.5 PJ - Of which renewables: 0.0 PJ (0.0%)
- Energy self-sufficiency: 185.3%
- Fuel imports\*: 224 million USD (2.2% of total imports)
- Electricity generation: 12.1 TWh - Of which renewables: 0.0 GWh (0.0%)
- Electricity use per capita: 9,217 kWh
- Electrical capacity: 3,168 MW - Of which renewables: 1 MW (0.0%)
- Electricity access rate: 99.4%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

- No information available

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 38 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 25 MW of waste-to-energy capacity addition announced (1 project)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

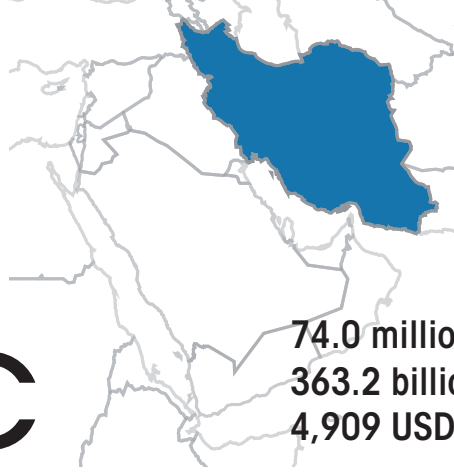
RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

**Wind** ● **Solar** ● **Hydro** ● **Biomass** ● **Geothermal** ● **Ocean** ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudice the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1 GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.



# ISLAMIC REPUBLIC OF IRAN

**74.0 million** Population (2010)  
**363.2 billion USD** GDP (2010)  
**4,909 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

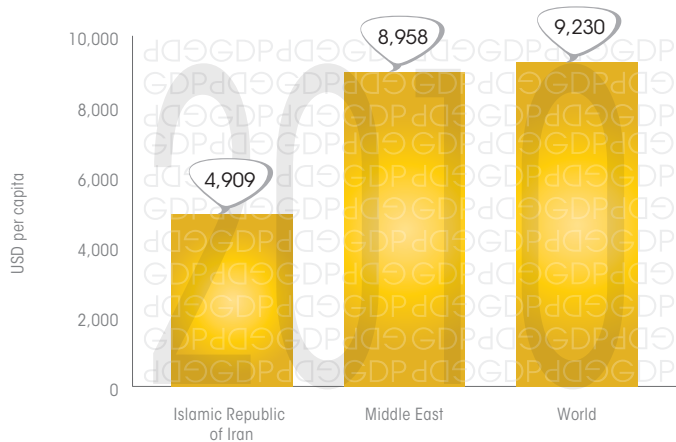
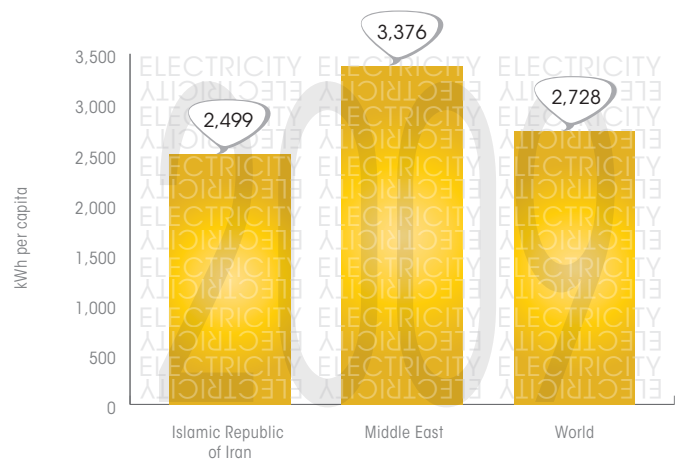


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

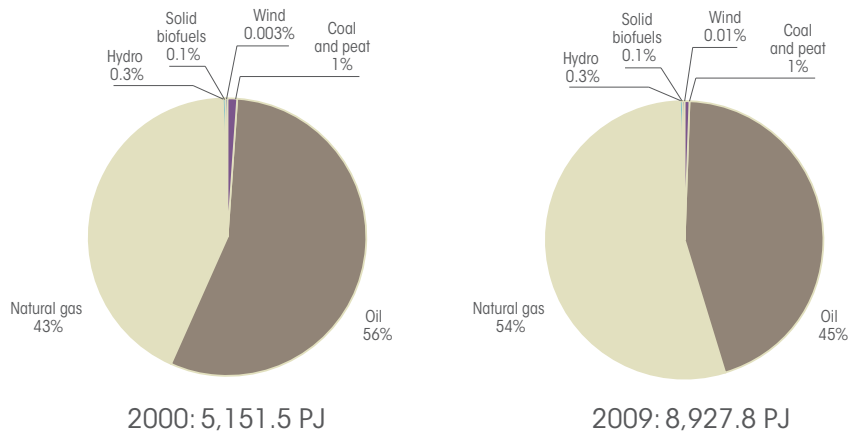
- Total Primary Energy Supply: 8,913.1 PJ - Of which renewables: 39.8 PJ (0.4%)
- Energy self-sufficiency: 160.4%
- Fuel imports\*: 6.8 billion USD (10.5% of total imports)
- Electricity generation: 221.4 TWh - Of which renewables: 7.5 TWh (3.4%)
- Electricity use per capita: 2,499 kWh
- Electrical capacity: 56.2 GW - Of which renewables: 7.8 GW (13.9%)
- Electricity access rate: 98.4%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

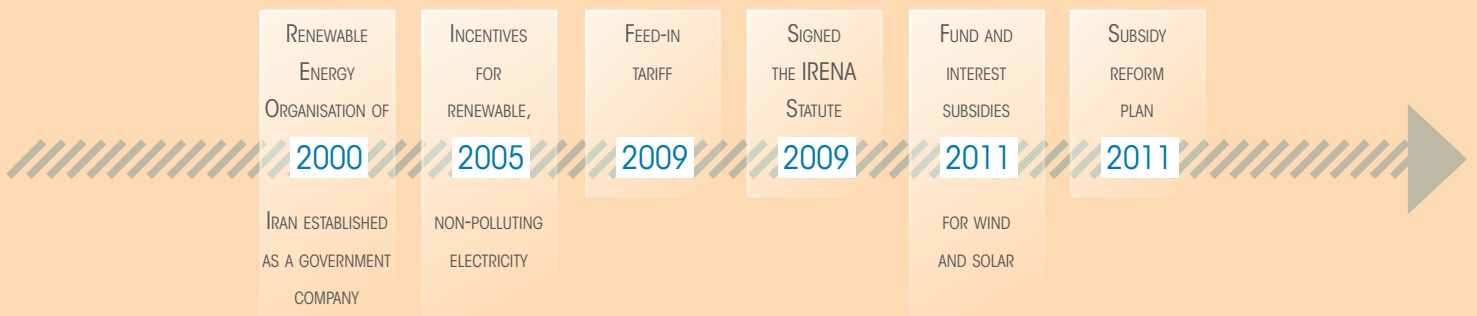
- 1,500 MW of wind capacity by 2013

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 144 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- No information available

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 1

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

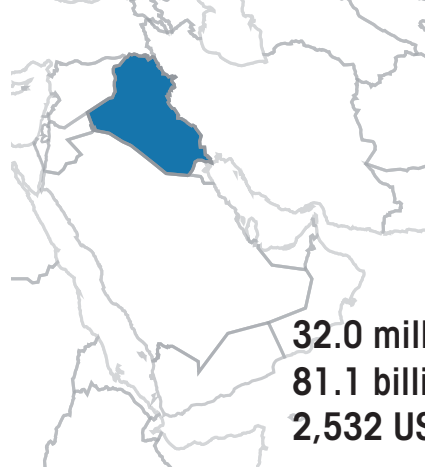
Wind ● Solar ● Hydro ● Biomass ● Geothermal ● Ocean ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudge the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

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Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

# IRAQ



**32.0 million** Population (2010)  
**81.1 billion USD** GDP (2010)  
**2,532 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

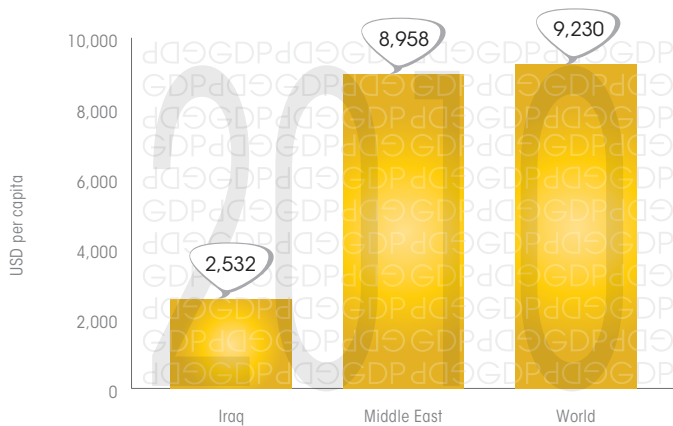
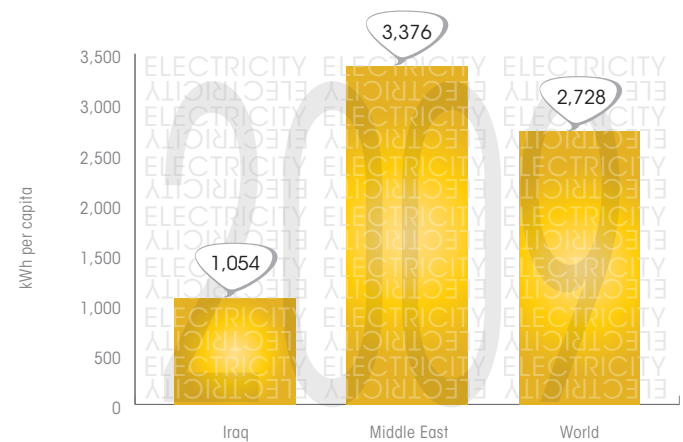


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

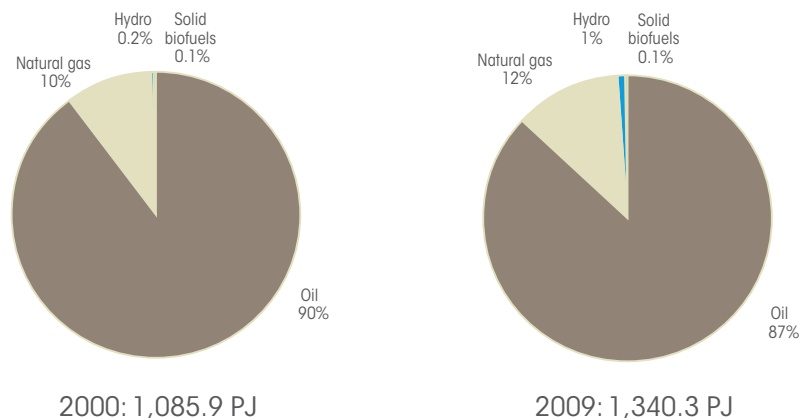
- Total Primary Energy Supply: 1,360.4 PJ - Of which renewables: 12.7 PJ (0.9%)
- Energy self-sufficiency: 381.4%
- Fuel imports\*: 629 million USD (1.5% of total imports)
- Electricity generation: 45.6 TWh - Of which renewables: 3,227 GWh (7.1%)
- Electricity use per capita: 1,054 kWh
- Electrical capacity: 9.2 GW - Of which renewables: 2,514 MW (27.2%)
- Electricity access rate: 86.0%
- Share of population using solid fuels: 5%

\* 2010

### TARGETS:

- No information available

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



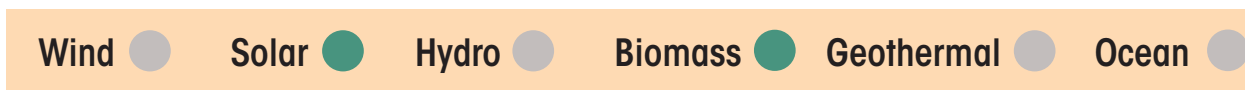
WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 164 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- Electrification of 15 remote locations by hybrid wind/solar generating stations with a combined capacity of 50 MW

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

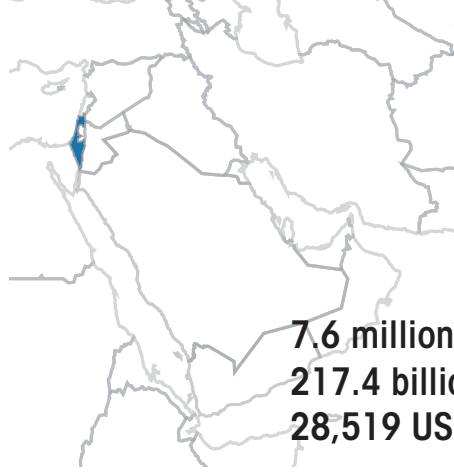


Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudice the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

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Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

# ISRAEL



**7.6 million** Population (2010)  
**217.4 billion USD** GDP (2010)  
**28,519 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

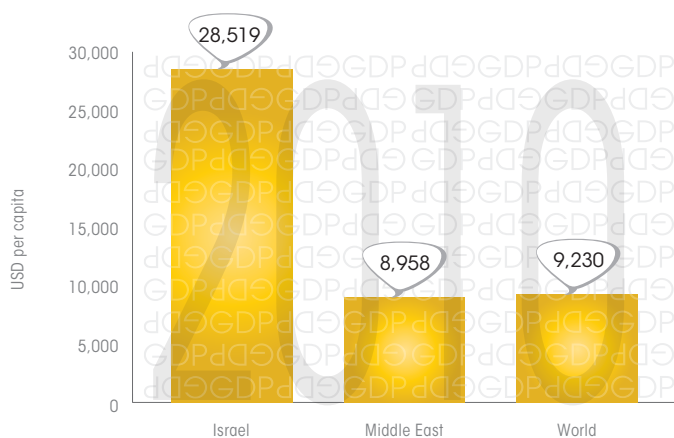
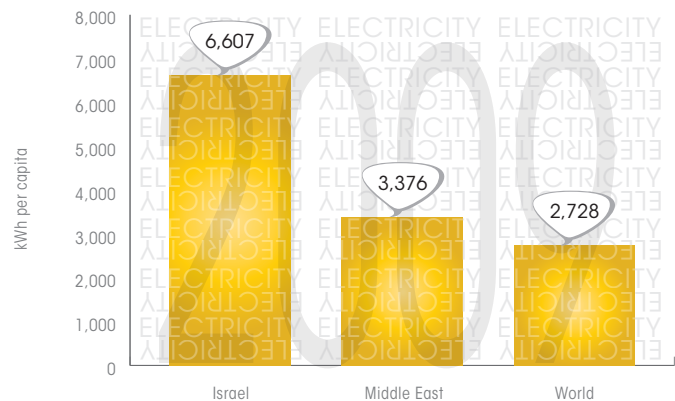


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

- Total Primary Energy Supply: 901.3 PJ - Of which renewables: 44.9 PJ (5.0%)
- Energy self-sufficiency: 15.2%
- Fuel imports\*: 10.4 billion USD (17.1% of total imports)
- Electricity generation: 55.0 TWh - Of which renewables: 97.0 GWh (0.2%)
- Electricity use per capita: 6,607 kWh
- Electrical capacity: 12.1 GW - Of which renewables: 40 MW (0.3%)
- Electricity access rate: 99.7%
- Share of population using solid fuels: < 5%

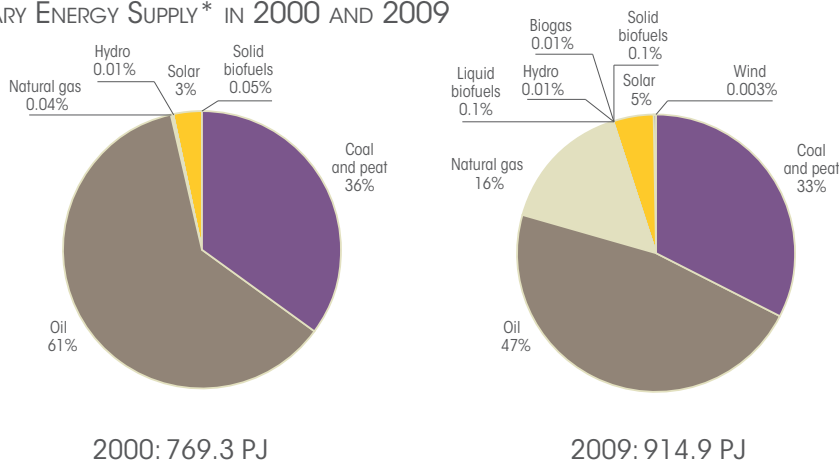
\* 2010

### TARGETS:

- 50% of final energy from renewables by 2020
- 5% of electricity generation from renewables by 2014
- 10% of electricity generation from renewables by 2020

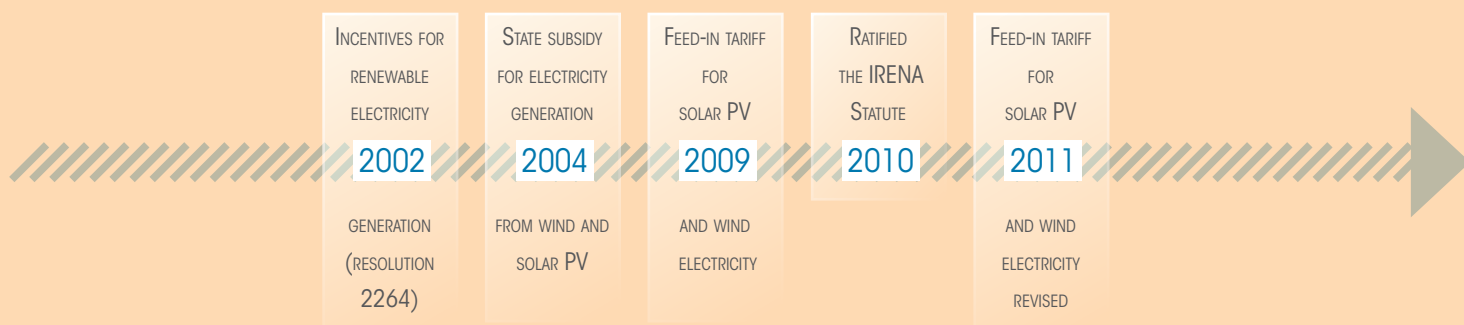


FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 34 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 50 MW of wind capacity addition by the end of 2013 (1 project)
- About 440 MW of wind capacity addition announced (5 projects)
- About 200 MW of solar photovoltaic capacity addition by 2015 (7 projects)
- 157 MW of solar photovoltaic capacity addition announced (9 projects)
- 370 MW of solar thermal capacity addition announced (2 projects)
- More than 32 MW of biomass-fired capacity addition announced (16 projects)
- 60 MW of marine energy capacity addition announced (2 projects)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 13

RENEWABLE ENERGY RESOURCES:

● High ● Medium ● Low ● Unknown ✕ Not applicable

Wind ● Solar ● Hydro ● Biomass ● Geothermal ● Ocean ●

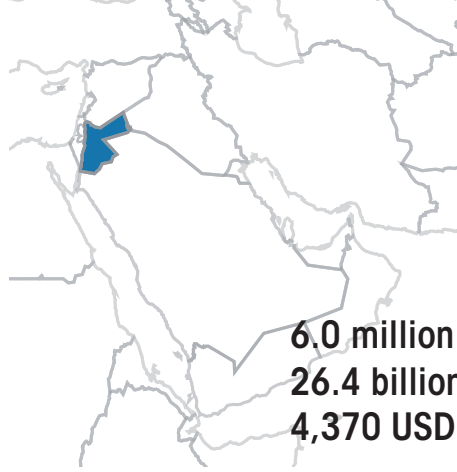
Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudge the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

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Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.



# JORDAN

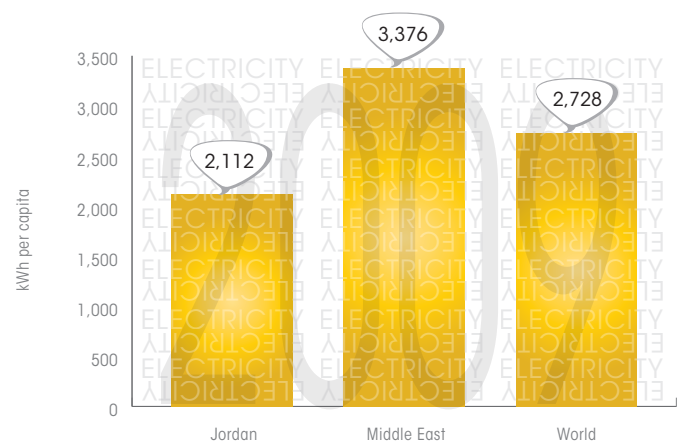


**6.0 million** Population (2010)  
**26.4 billion USD** GDP (2010)  
**4,370 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010



FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

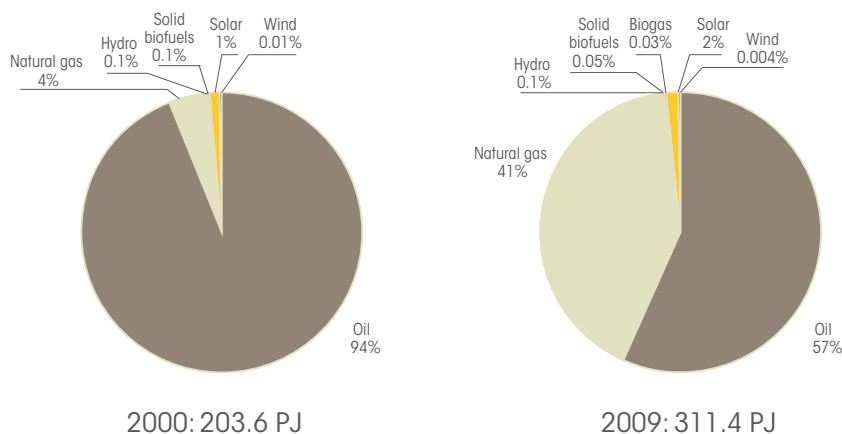
- Total Primary Energy Supply: 312.3 PJ - Of which renewables: 5.5 PJ (1.8%)
- Energy self-sufficiency: 3.9%
- Fuel imports\*: 3.4 billion USD (21.9% of total imports)
- Electricity generation: 14.3 TWh - Of which renewables: 69.0 GWh (0.5%)
- Electricity use per capita: 2,112 kWh
- Electrical capacity: 2,320 MW - Of which renewables: 69 MW (3.0%)
- Electricity access rate: 99.9%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

- 7% of primary energy from renewables by 2015
- 10% of primary energy from renewables by 2020
- 600 MW of wind capacity by 2015 and 1,200 MW by 2020
- 300 MW of solar photovoltaic capacity by 2015 and 600 MW in 2020
- 30 to 50 MW of waste-to-energy capacity

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 96 out of 183

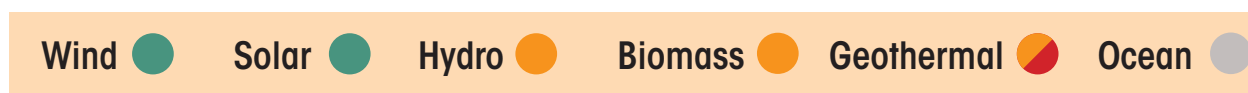
RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 100 MW of solar photovoltaic addition by the end of 2013 (3 projects)
- 100 MW of wind capacity addition by the end of 2014 (1 project)
- 150 MW of solar thermal capacity addition announced (5 projects)
- 200 MW of solar photovoltaic capacity addition announced (10 projects)
- 400 MW of wind capacity addition announced (5 projects)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 2

RENEWABLE ENERGY RESOURCES:

● High ● Medium ● Low ● Unknown ✕ Not applicable



Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudice the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

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Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

# KUWAIT



**2.7 million** Population (2010)  
**124.3 billion USD** GDP (2010)  
**45,437 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

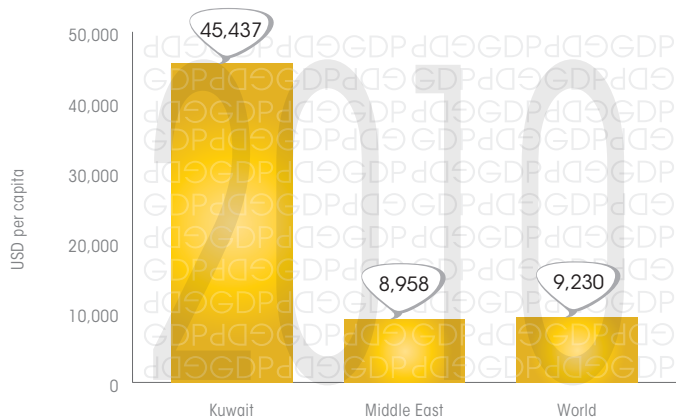
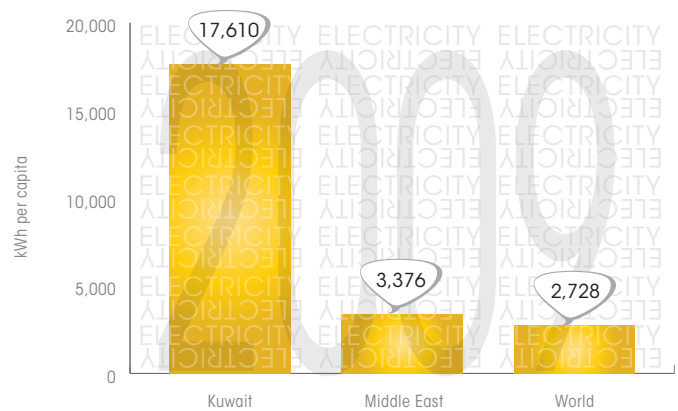


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



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## ENERGY NATIONAL PROFILE 2009

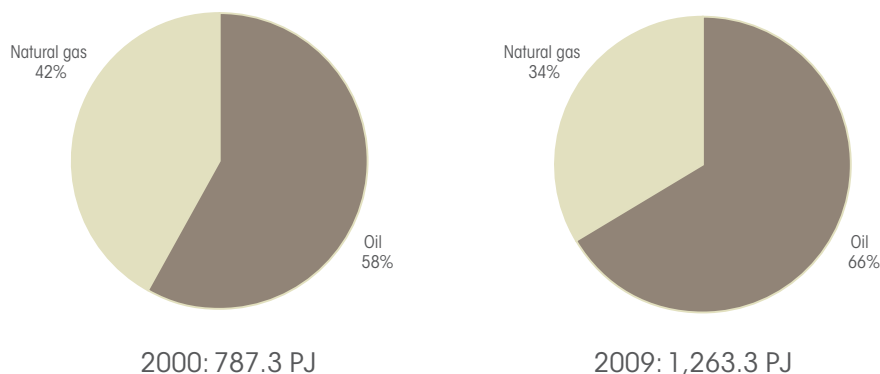
- Total Primary Energy Supply: 1,263.3 PJ - Of which renewables: 0.0 PJ (0.0%)
- Energy self-sufficiency: 431.6%
- Fuel imports\*: 271 million USD (1.2% of total imports)
- Electricity generation: 53.2 TWh - Of which renewables: 0.0 GWh (0.0%)
- Electricity use per capita: 17,610 kWh
- Electrical capacity: 10.9 GW - Of which renewables: 0 MW (0.0%)
- Electricity access rate: 100.0%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

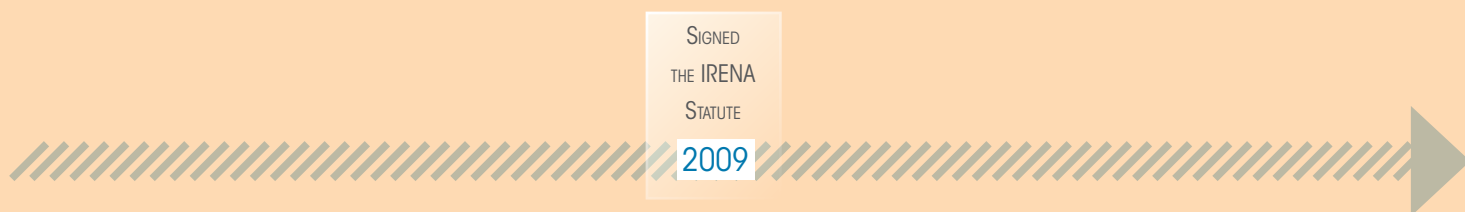
- 5% of electricity generation from renewables by 2020

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 67 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 70 MW of renewable capacity addition planned: solar photovoltaic (10 MW), concentrating solar power (50 MW), wind (10 MW)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

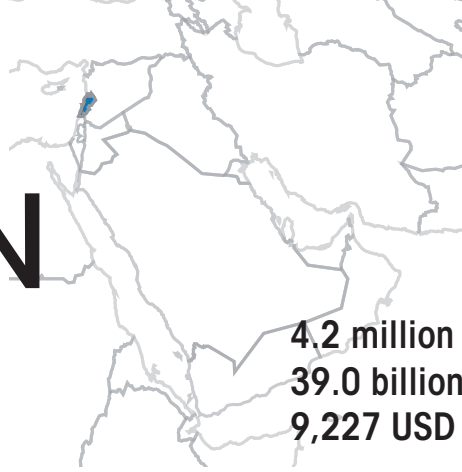
**Wind** ● **Solar** ● **Hydro** ● **Biomass** ● **Geothermal** ● **Ocean** ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudice the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

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Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1 GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

# LEBANON



**4.2 million** Population (2010)  
**39.0 billion USD** GDP (2010)  
**9,227 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

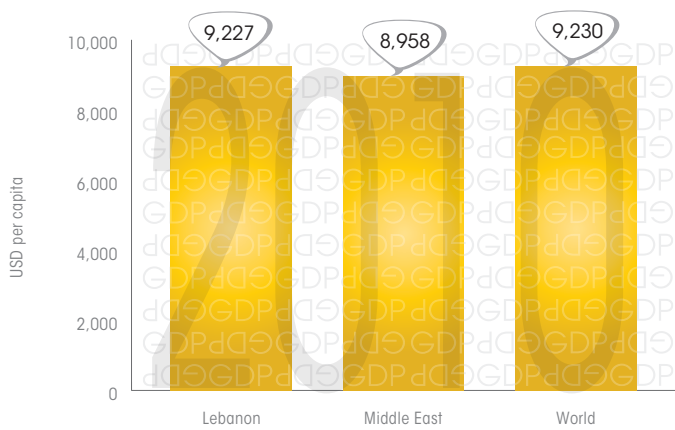
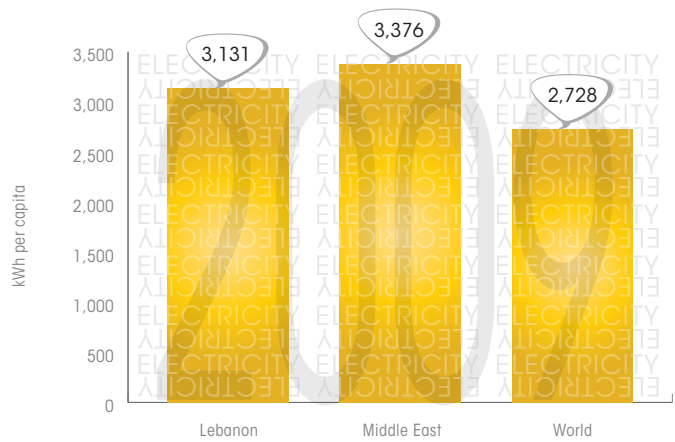


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

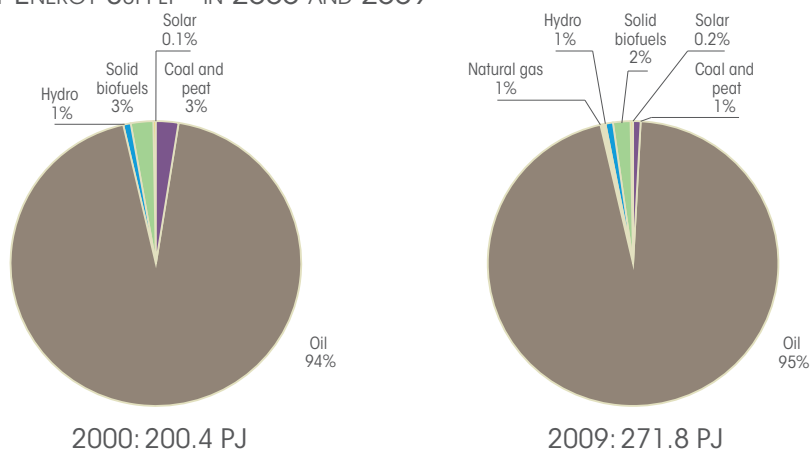
- Total Primary Energy Supply: 275.9 PJ - Of which renewables: 8.1 PJ (2.9%)
- Energy self-sufficiency: 2.8%
- Fuel imports\*: 4.4 billion USD (23.9% of total imports)
- Electricity generation: 13.8 TWh - Of which renewables: 622.0 GWh (4.5%)
- Electricity use per capita: 3,131 kWh
- Electrical capacity: 2,314 MW - Of which renewables: 280 MW (12.1%)
- Electricity access rate: 99.9%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

- 12% of electric and thermal supply from renewables by 2020

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 104 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- No information available

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

Wind ● Solar ● Hydro ● Biomass ● Geothermal ● Ocean ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not pre-judge the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

# OMAN



**2.8 million** Population (2010)  
**57.8 billion USD** GDP (2010)  
**20,791 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

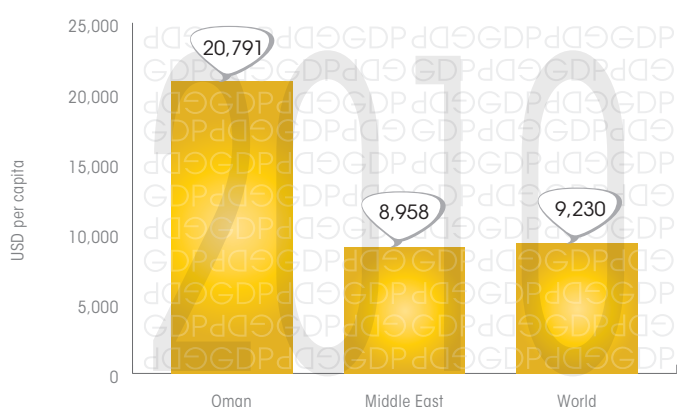
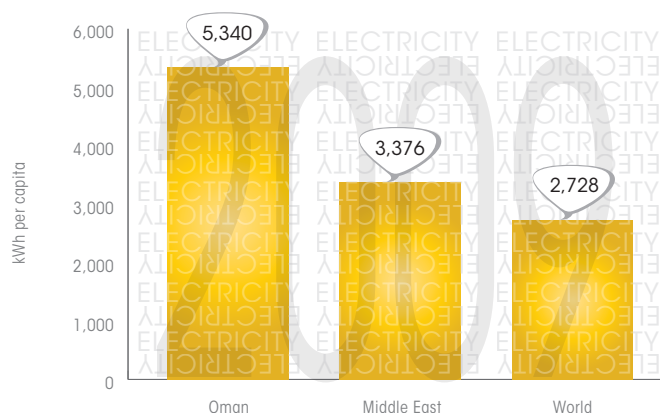


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

- Total Primary Energy Supply: 624.4 PJ - Of which renewables: 0.0 PJ (0.0%)
- Energy self-sufficiency: 450.6%
- Fuel imports\*: 1.2 billion USD (6.2% of total imports)
- Electricity generation: 17.8 TWh - Of which renewables: 0.0 GWh (0.0%)
- Electricity use per capita: 5,340 kWh
- Electrical capacity: 4,202 MW - Of which renewables: 0 MW (0.0%)
- Electricity access rate: 98.0%
- Share of population using solid fuels: < 5%

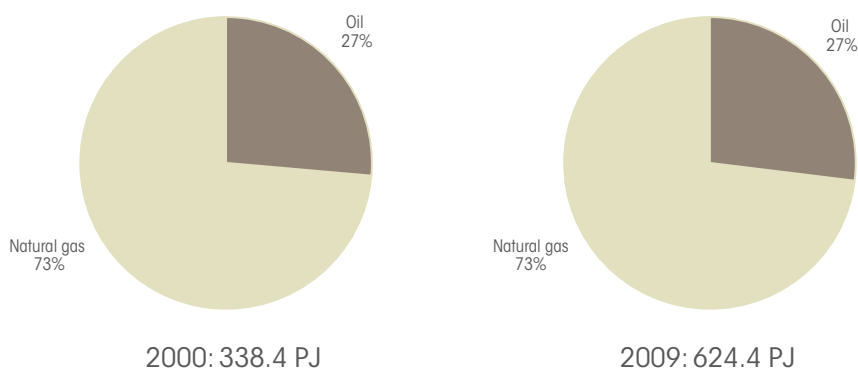
\* 2010

### TARGETS:

- No information available

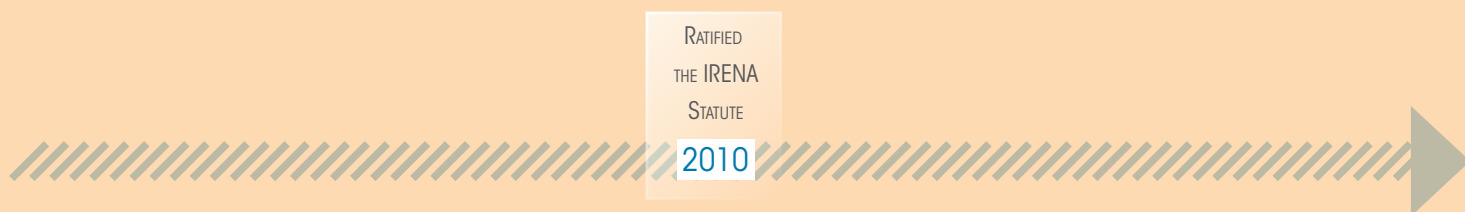


FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 49 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 100-200 MW of solar photovoltaic capacity addition announced (1 project)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

Wind ●
Solar ●
Hydro ●
Biomass ●
Geothermal ●
Ocean ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudge the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1 GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.



# QATAR



**1.8 million** Population (2010)  
**127.3 billion USD** GDP (2010)  
**72,398 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

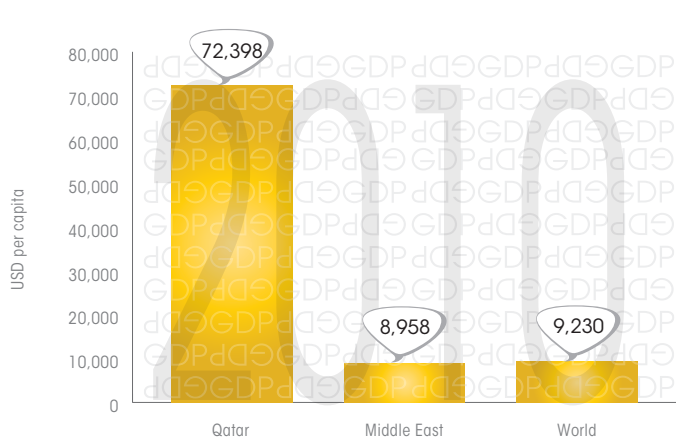
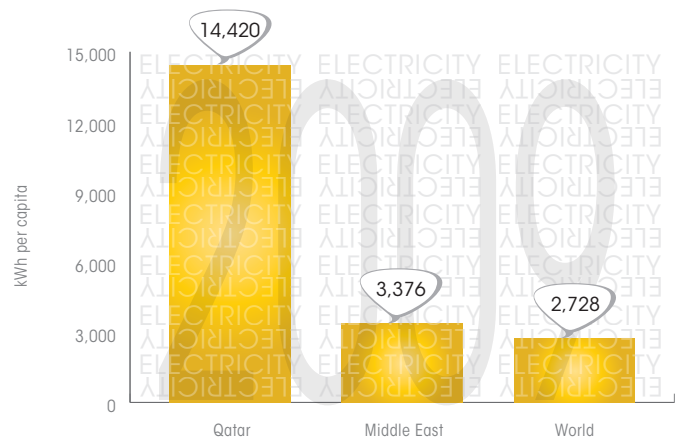


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

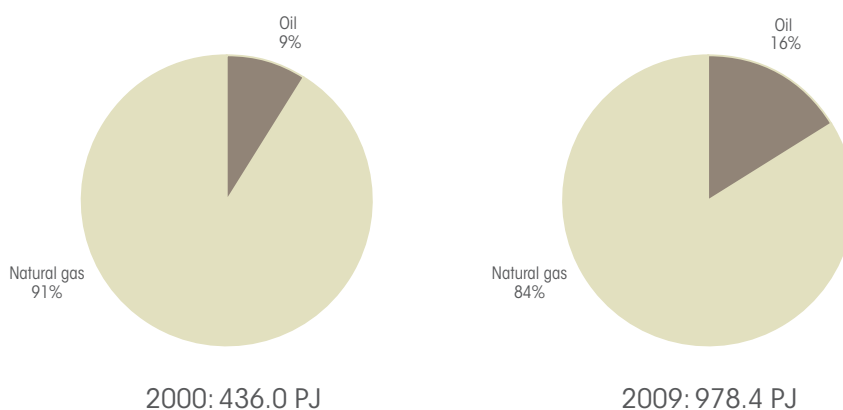
- Total Primary Energy Supply: 978.4 PJ - Of which renewables: 0.0 PJ (0.0%)
- Energy self-sufficiency: 612.4%
- Fuel imports\*: 140 million USD (0.6% of total imports)
- Electricity generation: 24.8 TWh - Of which renewables: 0.0 GWh (0.0%)
- Electricity use per capita: 14,420 kWh
- Electrical capacity: 3,893 MW - Of which renewables: 0 MW (0.0%)
- Electricity access rate: 98.7%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

- No information available as of mid-November 2012

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 36 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 100 MW of solar photovoltaic capacity addition to be implemented by 2014

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

Wind ● Solar ● Hydro ● Biomass ● Geothermal ● Ocean ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudice the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1 GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

# SAUDI ARABIA



**27.4 million** Population (2010)  
**450.8 billion USD** GDP (2010)  
**16,423 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

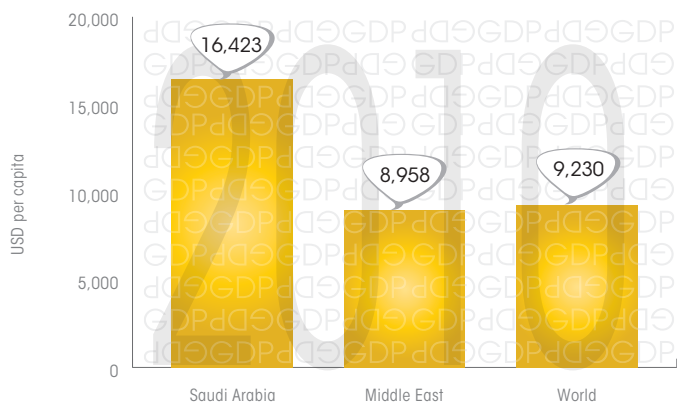
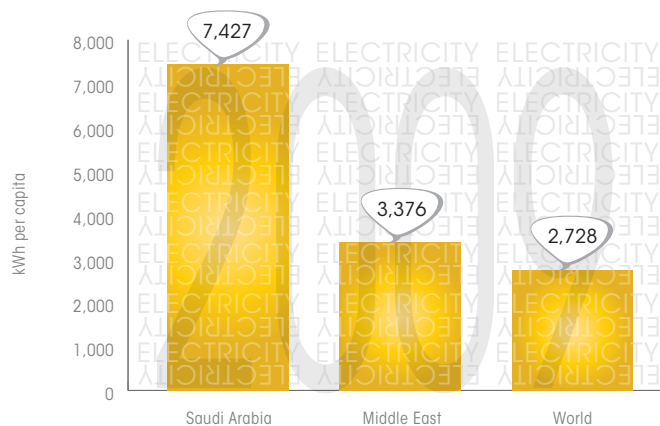


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

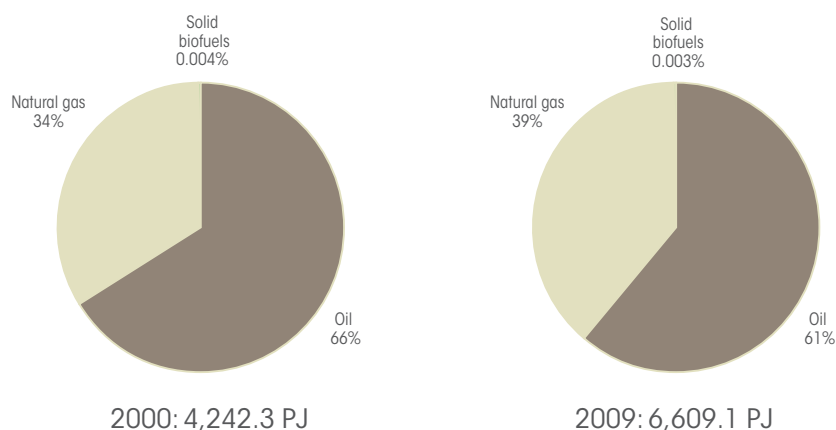
- Total Primary Energy Supply: 6,609.1 PJ - Of which renewables: 0.2 PJ (0.0%)
- Energy self-sufficiency: 334.7%
- Fuel imports\*: 17 million USD (0.0% of total imports)
- Electricity generation: 217.1 TWh - Of which renewables: 0.0 GWh (0.0%)
- Electricity use per capita: 7,427 kWh
- Electrical capacity: 44.5 GW - Of which renewables: 0 MW (0.0%)
- Electricity access rate: 99.0%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

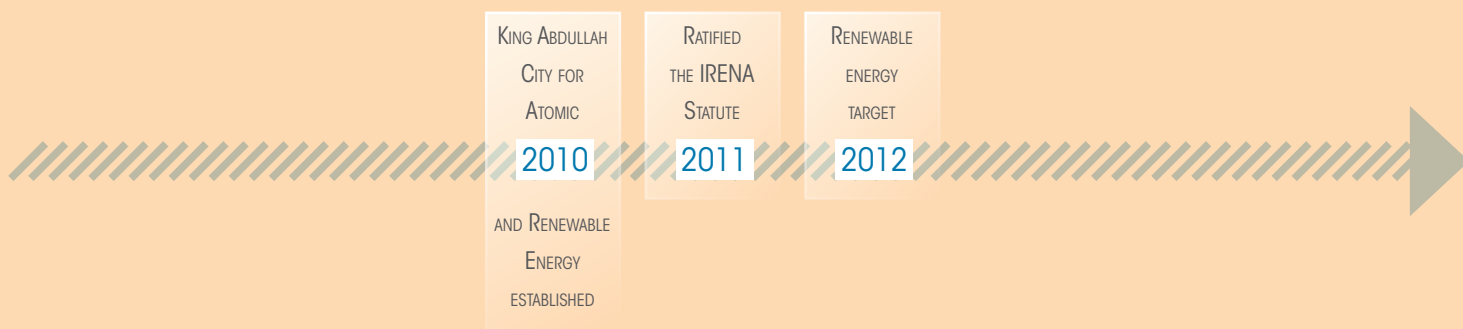
- 54 GW of renewable capacity by 2032: solar photovoltaic (16 GW), concentrating solar power (25 GW), wind (9 GW), waste-to-energy (3 GW), geothermal (1 GW)

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 12 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 10 MW of solar photovoltaic capacity addition announced (1 project)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

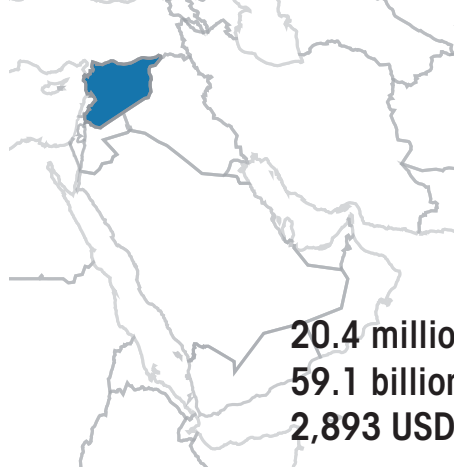
RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

Wind ● Solar ● Hydro ● Biomass ● Geothermal ● Ocean ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudice the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1 GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.



# SYRIAN ARAB REPUBLIC

**20.4 million** Population (2010)  
**59.1 billion USD** GDP (2010)  
**2,893 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

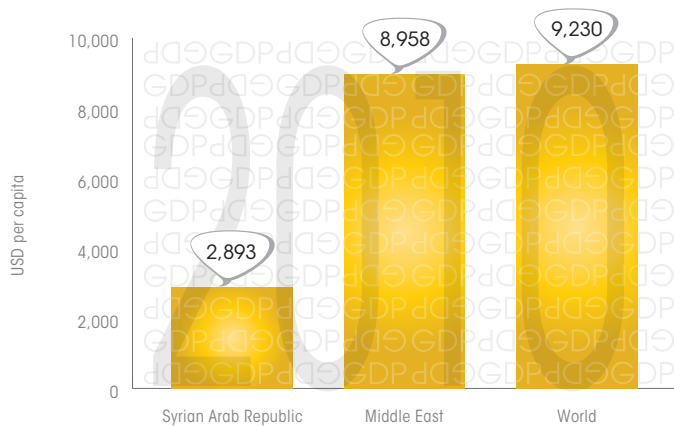
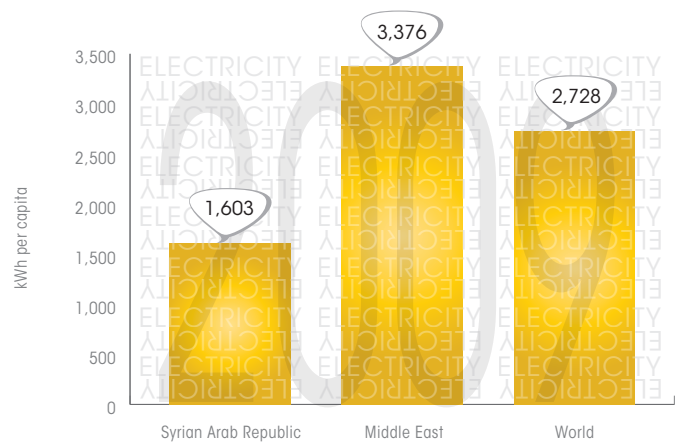


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

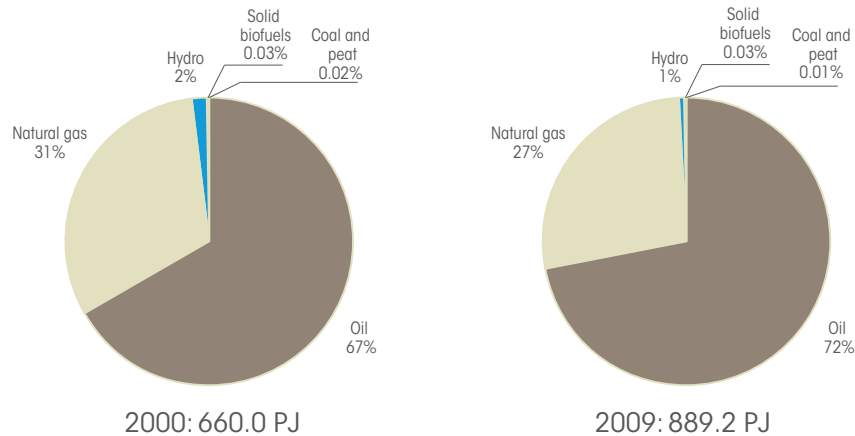
- Total Primary Energy Supply: 889.0 PJ - Of which renewables: 7.0 PJ (0.8%)
- Energy self-sufficiency: 112.6%
- Fuel imports\*: 1.9 billion USD (11.2% of total imports)
- Electricity generation: 43.3 TWh - Of which renewables: 1,866 GWh (4.3%)
- Electricity use per capita: 1,603 kWh
- Electrical capacity: 8.2 GW - Of which renewables: 1,250 MW (15.2%)
- Electricity access rate: 92.7%
- Share of population using solid fuels: < 5%

\* 2010

### TARGETS:

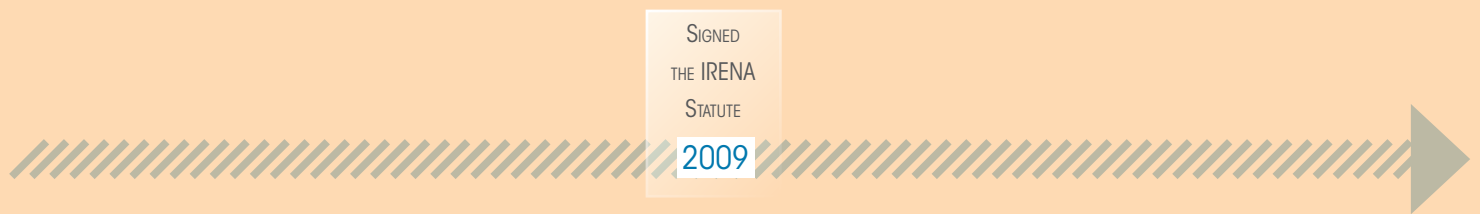
- No information available

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



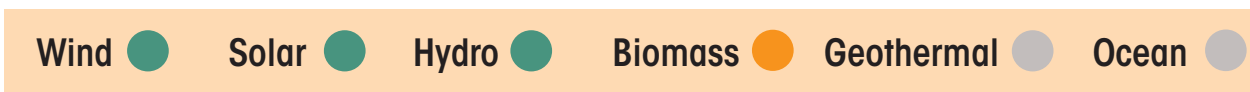
WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 134 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 340 MW of wind capacity addition announced (4 projects)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable



Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudge the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.



# UNITED ARAB EMIRATES

**7.5 million** Population (2010)  
**297.6 billion USD** GDP (2010)  
**39,625 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

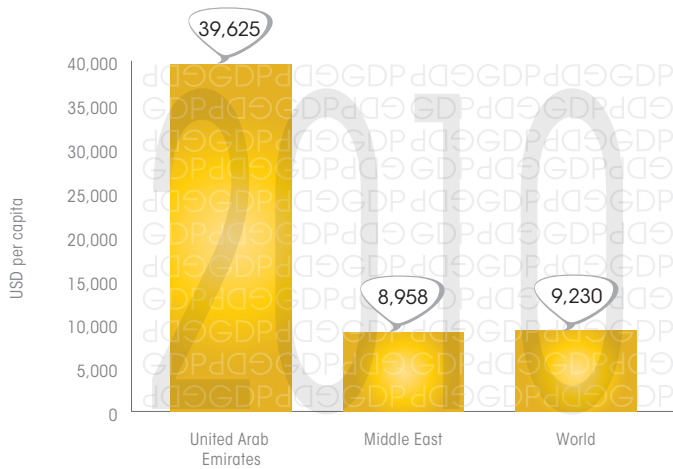
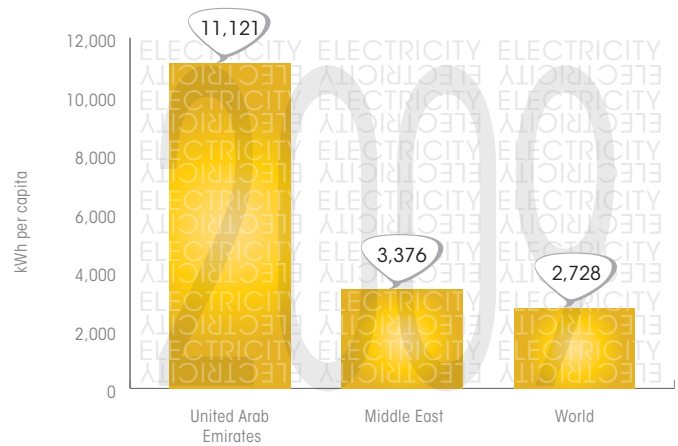


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

- Total Primary Energy Supply: 2,526.8 PJ - Of which renewables: 1.0 PJ (0.0%)
- Energy self-sufficiency: 279.7%
- Fuel imports\*: 2.0 billion USD (1.3% of total imports)
- Electricity generation: 90.6 TWh - Of which renewables: 0.0 GWh (0.0%)
- Electricity use per capita: 11,121 kWh
- Electrical capacity: 23.2 GW - Of which renewables: 20 MW (0.0%)
- Electricity access rate: 100.0%
- Share of population using solid fuels: < 5%

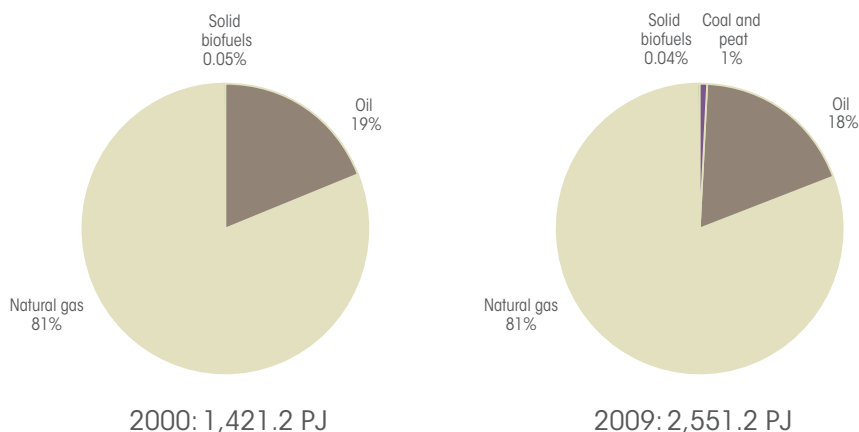
\* 2010

### TARGETS:

- Dubai: 5% of final energy from renewables by 2030
- Abu Dhabi: 7% of electricity generation capacity from renewables by 2020

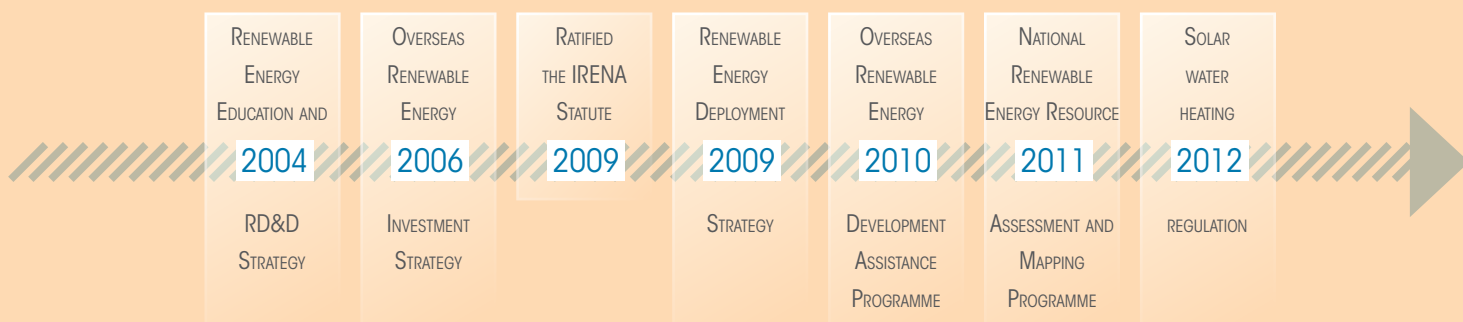


FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 33 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 100 MW of solar thermal capacity addition by early 2013 (1 project)
- 13 MW of solar photovoltaic capacity addition by the end 2013 (1 project)
- 28.8 MW of wind capacity addition approved (1 project)
- 100 MW of waste-to-energy by the end of 2016 announced (1 project)
- 100 MW of solar photovoltaic capacity addition announced (1 project)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 3

RENEWABLE ENERGY RESOURCES:

● High ● Medium ● Low ● Unknown ✕ Not applicable

Wind ● Solar ● Hydro ● Biomass ● Geothermal ● Ocean ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudge the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

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# YEMEN



**24.1 million** Population (2010)  
**31.0 billion USD** GDP (2010)  
**1,291 USD** GDP per capita (2010)

FIGURE 1: GDP PER CAPITA FOR 2010

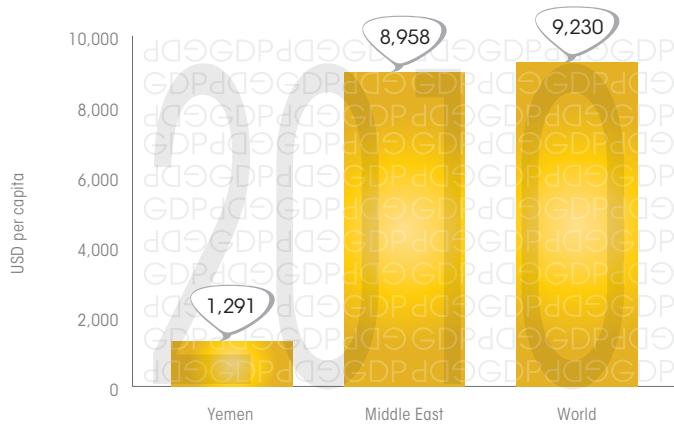
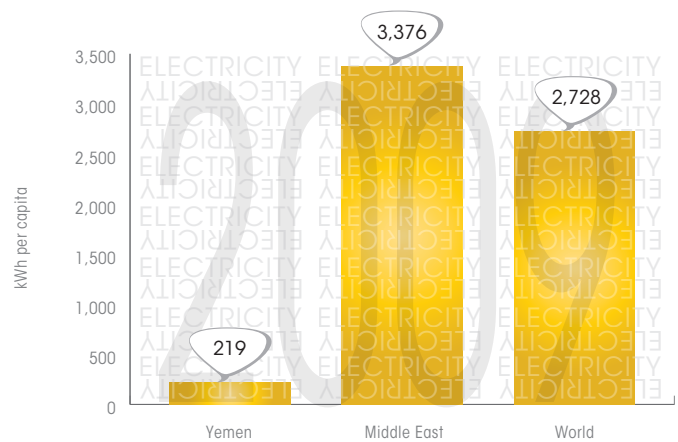


FIGURE 2: ELECTRICITY USE PER CAPITA FOR 2009



The Middle East includes Bahrain, the Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen.

## ENERGY NATIONAL PROFILE 2009

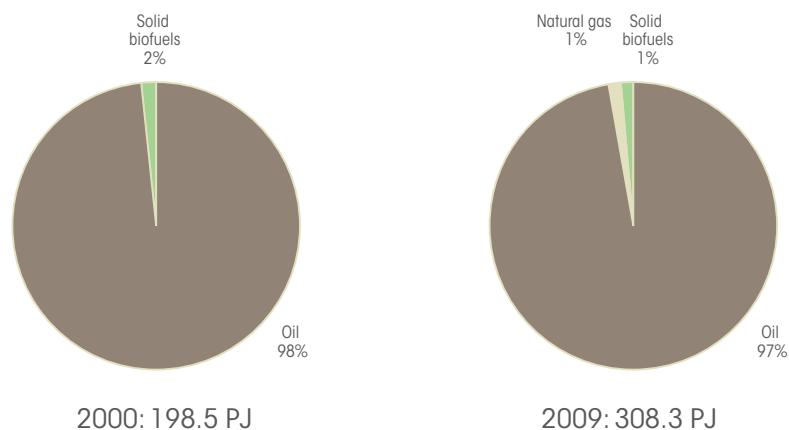
- Total Primary Energy Supply: 308.3 PJ - Of which renewables: 4.3 PJ (1.4%)
- Energy self-sufficiency: 206.7%
- Fuel imports\*: 772 million USD (8.0% of total imports)
- Electricity generation: 6.7 TWh - Of which renewables: 0.0 GWh (0.0%)
- Electricity use per capita: 219 kWh
- Electrical capacity: 1,330 MW - Of which renewables: 0 MW (0.0%)
- Electricity access rate: 39.6%
- Share of population using solid fuels: 36%

\* 2010

### TARGETS:

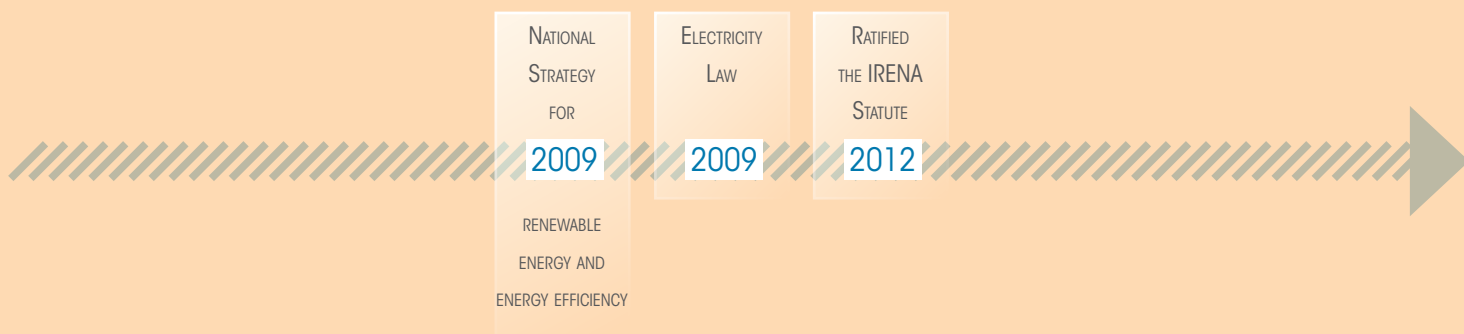
- 15% of electricity generation from renewables by 2025

FIGURE 3: TOTAL PRIMARY ENERGY SUPPLY\* IN 2000 AND 2009



\*excluding electricity trade

POLICIES IN PLACE TO PROMOTE RENEWABLE ENERGY SINCE THE RIO CONFERENCE OF 1992



WORLD BANK EASE OF DOING BUSINESS INDEX FOR 2012: Ranked 99 out of 183

RENEWABLE ENERGY PROJECTS FROM THE GOVERNMENT AND PRIVATE SECTORS:

- 60 MW of wind capacity addition announced (1 project)

NUMBER OF REGISTERED CLEAN DEVELOPMENT MECHANISM PROJECTS FOCUSING ON RENEWABLE ENERGY: 0

RENEWABLE ENERGY RESOURCES: ● High ● Medium ● Low ● Unknown ✕ Not applicable

Wind ● Solar ● Hydro ● Biomass ● Geothermal ● Ocean ●

Note: The information on resources should be taken as an indication only. It refers to a general trend of available resources, and does not prejudice the feasibility of individual projects. The thresholds are indicative, and do not refer to any technological choice. The analysis is based on the literature.

Sources: Population and GDP: World Bank; Energy data: IEA, IRENA analysis based on UN data; Share of fuel imports in total imports: World Trade Organisation; Electrical capacity: IEA, EIA; Electricity access rate: World Energy Outlook 2011 database (IEA); Share of population using solid fuels: World Health Organisation; Targets: REN21, IRENA; Policy/legislation: IEA, Reegle, IRENA research; Ease of doing business index: World Bank; Renewable energy projects: Bloomberg New Energy Finance, IRENA research; Clean Development Mechanism projects: UNFCCC; Renewable energy resources: IRENA analysis

Units: USD: United States dollar; kWh: kilowatt-hour; GWh: gigawatt-hour (1GWh=10<sup>6</sup> kWh); TWh: terawatt-hour (1 TWh=10<sup>3</sup> GWh); PJ: petajoule; MW: megawatt; GW: gigawatt (1 GW=10<sup>3</sup> MW). Please also refer to the glossary for explanations on the terms used in the country profile.

# GLOSSARY

## 1 – PRODUCTS

**Coal** comprises the solid fossil fuels consisting of carbonised vegetal matter (hard coal and brown coal) and the products derived from them (e.g. patent fuel, coke, blast furnace gas, coke oven gas).

**Peat** is a solid formed from the partial decomposition of dead vegetation under conditions of high humidity and limited air access. Peat is not considered a renewable resource as its regeneration period is long.

**Oil** covers the liquid fossil hydrocarbons comprising crude oil, liquids extracted from natural gas (NGL), fully or partly processed products from the refining of crude oil (e.g. gasoline, diesel) and functionally similar liquid hydrocarbons and organic chemicals from vegetal or animal origins.

**Natural gas** includes natural gas but excludes natural gas liquids, which are included in oil and oil products.

**Nuclear** shows the primary energy equivalent of the electricity produced by a nuclear power plant assuming an average thermal efficiency of 33%.

**Wastes** are materials no longer required by their holders and which are used as fuels. They comprise municipal waste and industrial waste.

**Hydro** shows the energy content of the electricity produced from devices driven by fresh, flowing or falling water. Hydro output excludes output from pumped storage plants.

**Biofuels** are the solid, liquid or gaseous material obtained from living or recently living organisms (e.g. wood, charcoal, biogasoline, biodiesels, vegetal or animal waste).

**Solar** is the energy that is captured from solar radiation to produce a useful energy output (electricity from solar photovoltaic, heat or electricity from solar thermal).

**Geothermal** is the energy of the heat that is extracted from the earth, usually in the form of heated water or steam.

**Ocean** shows the energy content of the electricity produced by tidal movement, wave motion, ocean current and other sources of marine energy.

**Wind** shows the energy content of the electricity produced by wind turbines.

**Renewables** are sources of energy which are naturally replenished as they are used. They include hydro, biofuels, solar, geothermal, ocean and wind. For the purposes of energy statistics, the renewable portion of municipal waste is also included.

## 2 – ENERGY NATIONAL PROFILE BOX

**Total Primary Energy Supply** is the net flow of fuel or energy into the national territory from production, external trade, international bunkers and changes in stocks. Note that this value includes electricity trade unlike the pie charts presented later, which can result in small differences in values and the share of renewables.

**Self-sufficiency** is the ratio of domestic production divided by Total Primary Energy Supply. A value below 100% means that the country is a net energy importer, i.e. that it has to import or draw from its stocks the energy needed to meet the part of demand that is not met by domestic production. Conversely, a value above 100% indicates that the country is a net energy exporter.

**Fuel imports** show the amount spent on importing coal and peat, oil, natural gas and electricity in the country. For most countries, this amount includes cost, insurance and freight (CIF) (source <http://www.wto.org>).

**Electricity generation** is the total amount of electricity produced in power plants (i.e. the gross electricity production).

**Electricity use** is the electricity available for consumption, defined as the sum of domestic production and external trade minus the transmission losses.

**Electrical capacity** is the net maximum installed capacity of all power plants at the end of the year concerned, i.e. the maximum power that can be supplied, continuously, with all of the plant running, at the point of outlet to the network.

**Electricity access rate** is the share of the population with access to electricity

**Share of population using solid fuels** is the percentage of the population that relies on solid biofuels, coal

and peat as the primary source of domestic energy for cooking and heating (source <http://www.who.int>).

### 3 – OTHER INDICATORS

**World Bank ease of doing business index** ranks economies from 1 to 183 in 10 areas of business regulation: starting a business, dealing with construction permits, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts, resolving insolvency and getting electricity (source: <http://www.doingbusiness.org>).





**Registered Clean Development Mechanism (CDM) project:** the CDM allows emission-reduction projects in developing countries to earn certified emission reduc-

tion credits which can be traded and sold, and used by industrialised countries to meet a part of their emission reduction targets under the Kyoto Protocol. A project is registered when the Executive Board of the CDM gives its final approval (source: <http://cdm.unfccc.int>).

### 4 – RESOURCES

Note: Data on the assessment of the resources of tidal power and ocean current is not available. Therefore, and for the purposes of the resource assessment only, ocean energy is limited to wave energy.

For each renewable energy source, the rating is explained in the table below.

	Wind	Solar	Hydro	Biomass	Geothermal	Ocean
<b>High</b> 	Several areas with average wind speed above 7 m/s at 50 m high	Several areas with global horizontal irradiation above 1800 kWh/m <sup>2</sup> per year	One or more sites can be equipped with a large hydro-power facility (>10 MW)	Maximum identified theoretical potential above 100 PJ incl. agriculture, wood and residues	One or more sites can be equipped with a large scale facility (>10 MW)	Wave power above 30 kW/m
<b>Medium</b> 	Several areas with average wind speed between 5 and 7 m/s at 50 m high	Several areas with global horizontal irradiation between 1200 and 1800 kWh/m <sup>2</sup> per year	One or more sites can be equipped with a medium scale hydro-power facility (1-10 MW)	Maximum identified theoretical potential between 10 and 100 PJ incl. agriculture, wood and residues	One or more sites can be equipped with a medium scale facility (1-10 MW)	Wave power between 10 and 30 kW/m
<b>Low</b> 	No area identified with average wind speed above 5 m/s	No identified area with global horizontal irradiation above 1200 kWh/m <sup>2</sup> per year	One or more sites can be equipped with a small scale hydro-power facility (<1 MW)	Maximum identified theoretical potential below 10 PJ incl. agriculture, wood and residues	One or more sites can be equipped with a small scale facility (<1 MW)	Wave power below 10 kW/m
<b>Unknown</b> 	No data identified by IRENA as yet					





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