



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



# UNIDO脱炭素プログラムを通じた 日本企業のビジネス展開支援

国連工業開発機関 永森



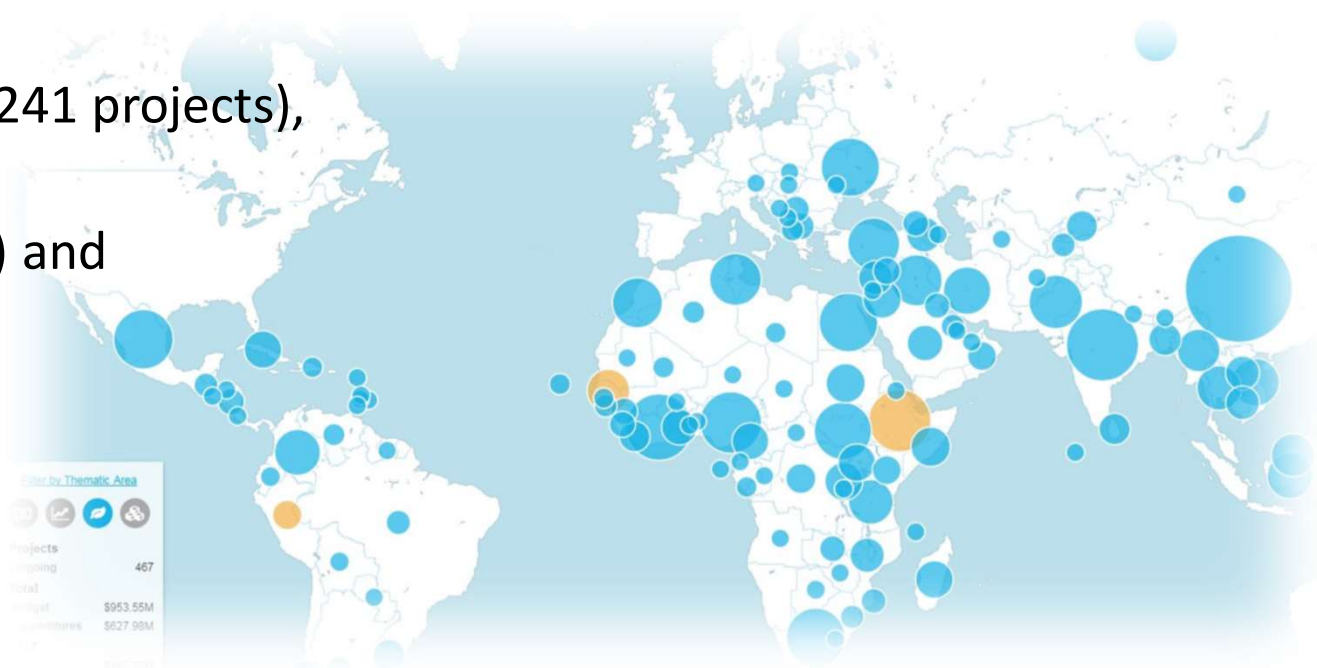


UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



## EAE Directorate in brief:

- **Structure:** Two Departments, with seven Divisions
- **Portfolio:** 650 million USD, 60% already disbursed
- **Geographical coverage:**
  - More than 90 countries (241 projects),
  - 4 regions (20 projects),
  - Inter-regional (2 projects) and
  - Global (27 projects).



# Project overview

- **Project title:** Promoting climate innovation and partnership for transition towards a deep decarbonization of society
  - **Objective:**
    - 1) **Identify pathways and options for industry deep decarbonization**, in the context of Nationally Determined Contributions (NDCs) and long-term deep decarbonization strategies.
    - 2) Building effective climate technology and innovation cooperation through **Joint Crediting Mechanism(JCM)**
-



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



- 1) Identify pathways and options for industry deep decarbonization, in the context of Nationally Determined Contributions (NDCs) and long-term deep decarbonization strategies.
- 2) Building effective climate technology and innovation cooperation through Joint Crediting Mechanism



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



# Tunisia

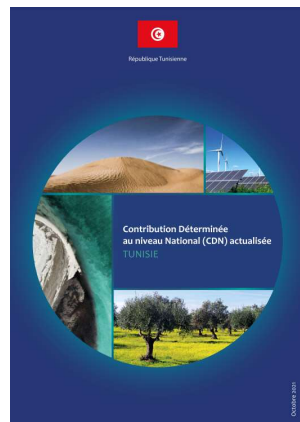


## Key Mitigation Plans and Strategies in Tunisia

- Tunisia submitted its updated Nationally Determined Contribution to UNFCCC in October 2021, **pledged 45% carbon intensity reduction by 2030 compared to 2010.**
- Tunisia also has developed Long Term Strategy to achieve **carbon neutral by 2050**, support by German government. (**not submitted to UNFCCC**)

### Nationally Determined Contribution

- **Title**  
Contribution Déterminée au niveau National (CDN) actualisée
- **2030 Target**  
[Conditional]  
**45% carbon intensity reduction by 2030**  
compared to 2010  
[Unconditional]  
27% carbon intensity reduction by 2030 compared to 2010
- **Covered Sector**  
Energy, Industrial Process, AFOUL, Waste



UNFCCC (2021)  
Contribution Déterminée au niveau National (CDN) actualisée

### Draft Long Term Strategy (not submitted)

- **Title**  
Stratégie de neutralité carbone et de résilience au changement climatique à l'horizon 2050
- **2050 Target**  
**Carbon neutral by 2050**
- **Covered Sector**  
Energy, Industrial Process, AFOUL, Waste

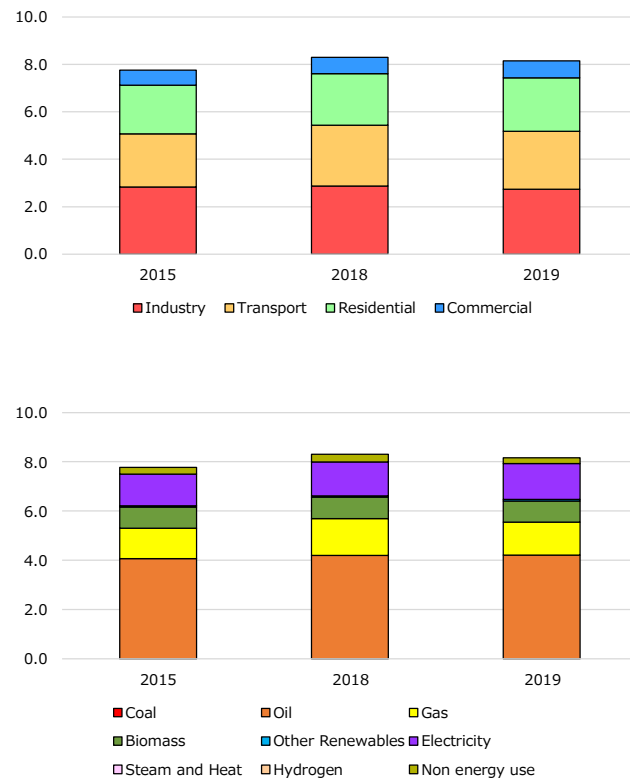


Ministry of Environment, Tunisia (2022)  
Stratégie de neutralité carbone et de résilience au changement climatique à l'horizon 2050

# Overview on Energy Supply and Demand in Tunisia

- “Industry and Transport” and “Gas and Oil” are key factor in factors to promote decarbonizations in Tunisia.
- Especially for Power generaion, **over 90% of electricity is generated by gas-fired** power plants.

**Final Energy Consumption by Sector (top) and by energy type (bottom) [Mtoe]**



**Electricity Demand(top) and Supply(bottom) [TWh]**

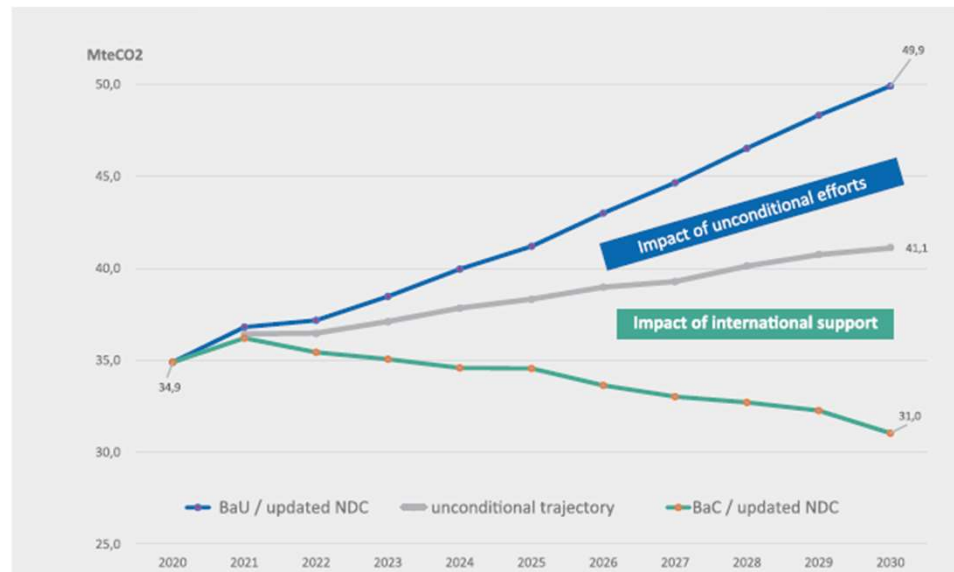


Source: IEA World Energy Balances, IEA Greenhouse Gas Emissions from Energy

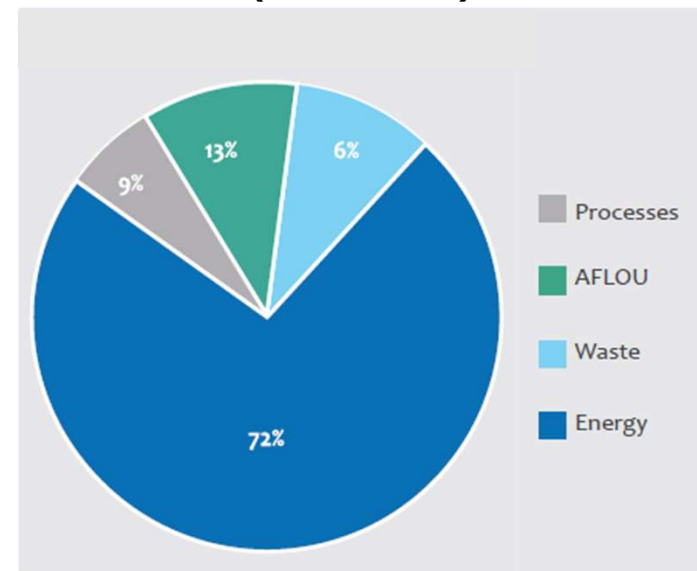
## Scenario Analysis toward 2030 in Updated NDC

- The revised NDC provides calculations of GHG emissions for three scenarios: the BaU scenario, the no-condition-action scenario, and the conditional scenario (BaC). Under the BaC scenario, emission in 2030 will be 31.0 MtCO<sub>2</sub>, which is 11% lower than 2020 (34.9 MtCO<sub>2</sub>e),.

### Net BaU and BaC Emissions Trajectory of Tunisia



### Distribution of Cumulative GHG Reduction (2021-2030)



Source: Republic of Tunisia, Updates Nationally Determined Contribution (NDC) (2021)



## About Draft Low Carbon National Strategy

- SNBC & RCC stands for a compilation of two strategies: the National Low Carbon Strategy (SNBC) and the Climate Resilient National Development Strategy (SNRCC).
- The Tunisian the Ministry of the Environment, German consulting firm HEAT, French consulting firm ACTERRA and German International Postal Service GIZ began the research in November 2021, and a pre-final version was published in March 2022.

### Composition of SNBC&RCC

Chapter 1	The Geography and Climate of Tunisia
Chapter 2	Vulnerability to climate change
Chapter 3	Current and past mitigation policies
Chapter 4	Vision towards Low-Carbon transition
Chapter 5	Low Carbon Strategy aiming for 2050 CN
Chapter 6	National Resilience Strategy
Chapter 7	Synergy of Interdependence and Synergy between 2 different strategies
Chapter 8	Implementation and follow up for the 2 different strategies

Source:Ministère de l'Environnement, Stratégie de neutralité carbone et de résilience au changement climatique à l'horizon 2050 (2022)

The following two future projection scenarios was analyzed in Chapter 5.

- ① **BaU Scenario**  
: Baseline scenarios considering growing sectoral trends to affect GHG emissions
- ② **BaC Scenario**  
: Low-carbon scenarios that regulate global warming to lower than 2 Celsius degrees, or 1.5 Celsius degrees under certain circumstances, by taking an ambitious path to the Carbon Neutrality by 2050

## Assumptions by Sector in Draft Low Carbon National Strategy

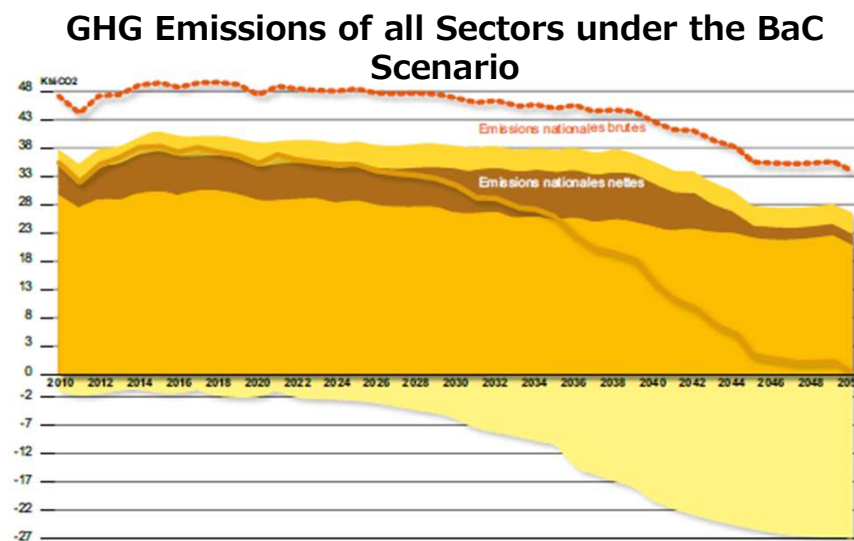
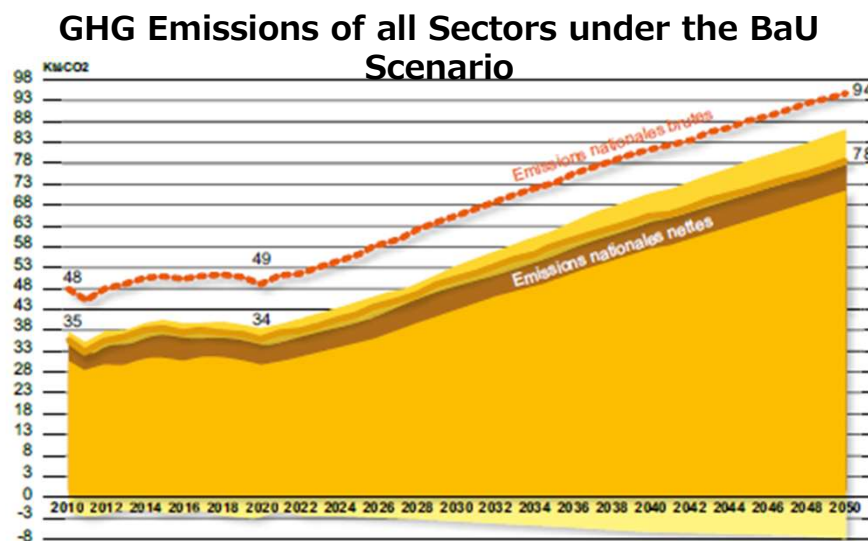
Examples of measures in each sector under BaC scenario

Energy Sector	Industrial Process Sector	AFAT Sector	Waste Sector
<ul style="list-style-type: none"> <li>• <b>80% of electricity generated in 2050 will be replaced to renewable energy</b></li> <li>• 40% of primary energy balance becomes renewable ones</li> <li>• The primary energy consumption in 2050 halves compared to that of BaU</li> <li>• The primary energy intensity in 2050 accounts for one third in a comparison with those in 2020</li> <li>• <b>End-use electrification accounts for 43% in 2050</b></li> </ul> <p>Source: Ministère de l'Environnement, Stratégie de neutralité carbone et de résilience au changement climatique à l'horizon 2050 (2022)</p>	<ul style="list-style-type: none"> <li>• Reduction of Nitric Acid Emissions</li> <li>• <b>Employment of CCS in the Cement Sector will start in 2040, as well as neutralizing the process emissions by 2050</b></li> <li>• To comply with Kigali Amendment on HFC, emissions will be reduced by 6 times in a comparison with the BaU in 2050</li> </ul>	<ul style="list-style-type: none"> <li>• 43% (4.3 million ha) of agricultural lands including rangelands will be covered by the actions for restoration and conservation of land and ecosystems, and for the optimal use by 2050</li> <li>• For the sake of the livestock optimization, 100% of cattle and sheep will be covered in 2050</li> <li>• 342,000 ha of grain fields will be covered by BPA and conservation agriculture by 2050</li> <li>• Implementing organic farming over 660,000 ha by 2050</li> </ul>	<ul style="list-style-type: none"> <li>• Residential waste generation will be reduced by 20% in urban areas and 10% in rural areas in 2050 compared to those in 2020</li> <li>• Raising the recycling rate of residential waste produced to 36% in 2050</li> <li>• Implements Organic collection (compost) or Energy collection (RDF and electricity) for 70% of waste in 2050</li> <li>• By conducting a 100%-systematic electric collection at landfill with a degassing/flaring system, it enables to generate 1 million tons of alternative fuels (such as RDF) to supply</li> </ul>

ed.

## Scenario Analysis in Draft Low Carbon National Strategy

- Under the **BaU scenario, total GHG emissions will nearly double in 2050** from 49 MtCO<sub>2</sub>e to 94 MtCO<sub>2</sub>e .
- **In the energy sector, total GHG emissions in 2050 are projected to be more than double from those in 2020.** On the other hand, **a decoupling of net emissions and economic growth** can be seen in the fact that GDP growth is projected to be about 4.4 times from 2020 to 2050.
- Under the BaC scenario, **significant increases in absorption, particularly in the AFOLU sector, will contribute to carbon neutrality.**



- Total emission
- Net emission
- Waste
- Industrial Process
- Energy
- AFOLU

Source:Ministère de l'Environnement, Stratégie de neutralité carbone et de résilience au changement climatique à l'horizon 2050 (2022)

Copyright Mizuho Research & Technologies, Ltd. All Rights Reserved.

## Funding to achieve Decarbonization in NDC

- According to the NDC, US \$19.3 billion funding will be required between 2021 and 2030. Detailed estimates include US \$14.3 billion for mitigation, US \$4.3 billion for adaptation and US \$700 million for supports in capacity building.
- For access to the Article 6 mechanism, Tunisia is actively preparing to demonstrate and apply a carbon tax on energy products and a credit scheme in the power generation and cement manufacturing sectors as a pilot carbon pricing instrument.

### Investment Financing required for supporting the NDC low-carbon scenario over the period of 2021 through 2030 (million US\$ 2020)

SECTORS/AREAS	Total	Sahre*
<b>ENERGY</b>	11,785	82.6%
Energy efficiency	5,755	-
Renewable energy	4,377	-
Infrastructures (enhancing the electrical system)	1,653	-
<b>PROCESSES</b>	675	4.7%
<b>AFOLU</b>	753	5.3%
<b>WASTE</b>	1,182	6.1%
Solid waste	313	-
Sanitation	869	-
<b>TOTAL</b>	<b>14,273</b>	<b>100%</b>

Source: Republic of Tunisia, Updates Nationally Determined Contribution (NDC) (2021)

\* The total sum may not match all the time due to rounding differences.

Copyright Mizuho Research & Technologies, Ltd. All Rights Reserved.

## Tunisia's Hydrogen Strategy: In the Alliance with European Countries

- In December 2020, Tunisia signed the Tunisia-German Alliance for Green Hydrogen, based on long-term cooperation with Germany in the energy sector. The alliance includes focusing on areas such as establishing test units for hydrogen production and building research as well as capacity. Germany will provide a 31 million euro subsidy to Tunisia.
- The European Hydrogen Backbone initiative plans to secure 5 European hydrogen procurement routes as of 2030. One of these projects, Corridor A, seeking the procurement of low-cost green hydrogen through the existing pipeline, "Trans-Mediterranean Pipeline", which connects Algeria, Tunisia and Italy.



### Five hydrogen procurement routes in Europe

- **Corridor A**  
: North Africa & Southern Europe
- Corridor B  
: Southwest Europe & North Africa
- Corridor C  
: North Sea
- Corridor D  
: Nordic and Baltic regions
- Corridor E  
: East and South-East Europe

Source: Tunisia government, Signature MoU alliance tuniso-allemande sur l'hydrogène  
European Hydrogen Backbone, Five hydrogen supply corridors for Europe in 2030  
(2022)



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



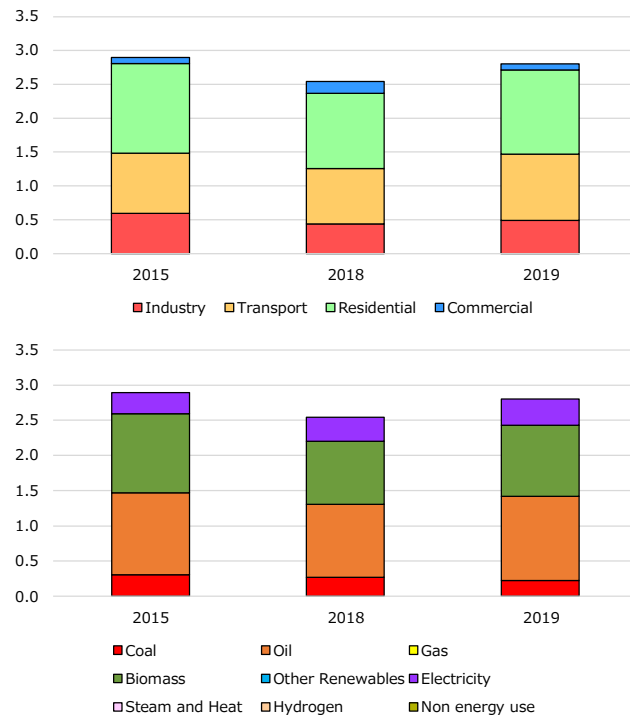
# Senegal



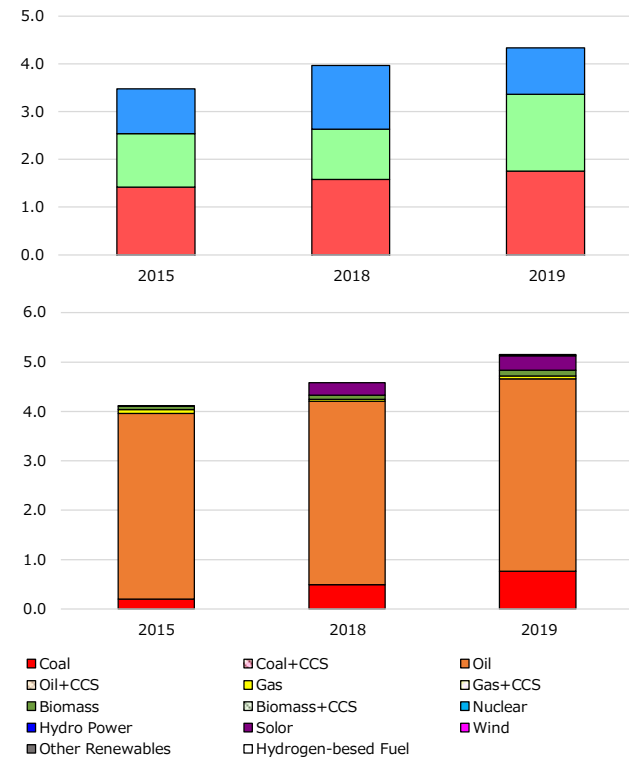
# Overview on Energy Supply and Demand in Senegal

- “Residential and Transport” and “Oil” are key factor to promote decarbonizations in Senegal.
- Especially for Power generaion, **over 75% of electricity is generated by oil-fired** power plants.

Final Energy Consumption by Sector (top) and by energy type (bottom) [Mtoe]



Electricity Demand(top) and Supply(bottom) [TWh]



Source: IEA World Energy Balances, IEA Greenhouse Gas Emissions from Energy

Copyright Mizuho Research & Technologies, Ltd. All Rights Reserved.

## Key Mitigation Plans and Strategies in Senegal: NDC

- In 2020, Senegal submitted its Nationally Determined Contribution to UNFCCC, **pledged 29% emission reduction by 2030 compared to BAU (conditional target)**.
- The conditional target will be achieved by 999 MW of installed renewable capacity by 2030, and carbon market (under Article 6).

### Senegal's Nationally Determined Contribution

#### ■ Target (compared to BAU)

[Unconditional target (CDN)]

2025: ▲5%

**2030: ▲7%**

[Conditional target (CDN+)]

2025: ▲23%

**2030: ▲29%**

#### ■ Projections of emissions by covered sectors

Projections of emissions by covered sector		BAU	CDN	CDN+
<b>Energy</b>	Reduction (% BAU)	-	▲10%	▲41.2%
	Emission (Gg CO2e)	(23,927)	(21,523)	(14,048)
<b>Industrial Processes</b>	Reduction (% BAU)	-	▲0%	▲8.1%
	Emission (Gg CO2e)	(3,953)	(3,953)	(3,631)
<b>Waste</b>	Reduction (% BAU)	-	▲11%	▲65.28%
	Emission (Gg CO2e)	(2,575)	(2,292)	(893)

Source: Senegal NDC(2020)

#### ■ Strategic actions by 2030 (CDN+)

- Installed capacity:

Source	CDN+
Solar	335MW
Wind	250 MW
Hydro	314 MW
Biomass	50 MW
CSP	50 MW
Sum	999MW

- Energy efficiency improvement, clinker substitution, gas use in cement production
- Sustainable transportation and acceleration of hybrid cars
- Carbon market (under Article 6)



# Energy Projections by IEA ①

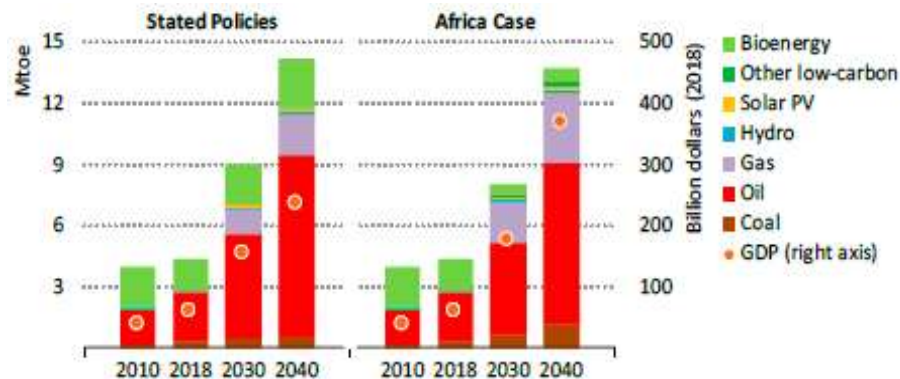
- Regarding long-term outlook, IEA published “Senegal Energy Outlook (2019)” and conducted scenario analysis toward 2040.
- In the Africa Case scenario, compared to the Stated Policies scenario, Senegal’s economy could grow larger, while lowering growth in energy demand, by utilizing new gas resources and boosting the use of renewables in power sector.
- **Electricity demand increases dramatically in both scenarios, supported by gas.**

## <Scenarios>

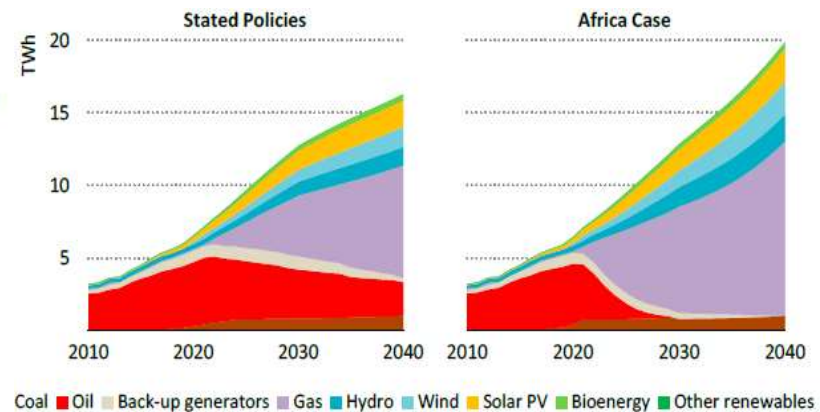
**Stated Policies** : Reflects existing policy frameworks and plans, taking into account the regulatory, institutional, infrastructure and financial circumstances that shape the prospects for their implementation.

**Africa Case** : Based on the premise of Agenda 2063 (adopted in 2015 by the Heads of State and Governments of the African Union), the continent’s inclusive and sustainable vision for accelerated economic and industrial development. This includes the achievement of full access to modern energy by 2030.

**Senegal primary energy demand [Mtoe] and GDP[Billion dollars]**



**Senegal electricity generation by technology [TWh]**



Source: IEA (2019) Senegal Energy Outlook

IEA. All rights reserved.



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



- 1) Identify pathways and options for industry deep decarbonization, in the context of Nationally Determined Contributions (NDCs) and long-term deep decarbonization strategies.
- 2) Building effective climate technology and innovation cooperation through Joint Crediting Mechanism



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

# UNIDO-JCM the first project



- Farmland Co., Ltd.
- Kenya/Introduction of Solar Power plus Battery to PJ Dave Flora Ltd.





UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

# TICAD8 Side event 25th August 2022



## UNIDO AND JAPAN SIDE EVENTS AT TICAD8: PARTNERING FOR AFRICA'S GREEN INDUSTRIAL DEVELOPMENT



Session 2		
Time	Topic	Speaker
11:20	Introduction	Mr. Kazumasa Nagamori, Project Manager, UNIDO
11:25	<i>Recent Developments of the Joint Crediting Mechanism (JCM)</i>	Mr. Masaki Nakayama, Researcher, Ministry of the Environment, Japan
11:35	<i>Research and analysis on potential investment through advanced technologies towards decarbonized society</i>	Mr. Tomoki Hirayama, Chief Consultant, Mizuho Research & Technologies Ltd.
11:45	<i>Case 1: Projects in Africa</i>	Mr. Hiroki Ishida, Director, AAIC Partners Africa Limited
11:55	<i>Case 2: Projects in Africa</i>	Mr. Tatsuhiro Maruhashi, Manager, JFE Engineering Corporation
12:05	<i>Case 3: Projects in Africa</i>	Mr. Hiroaki Ichihashi, President, Mitsubishi Heavy Industries France
12:15	Q&A	
12:25	Closing remarks	Ms. Katarina Barunica, Industrial Development Officer, UNIDO