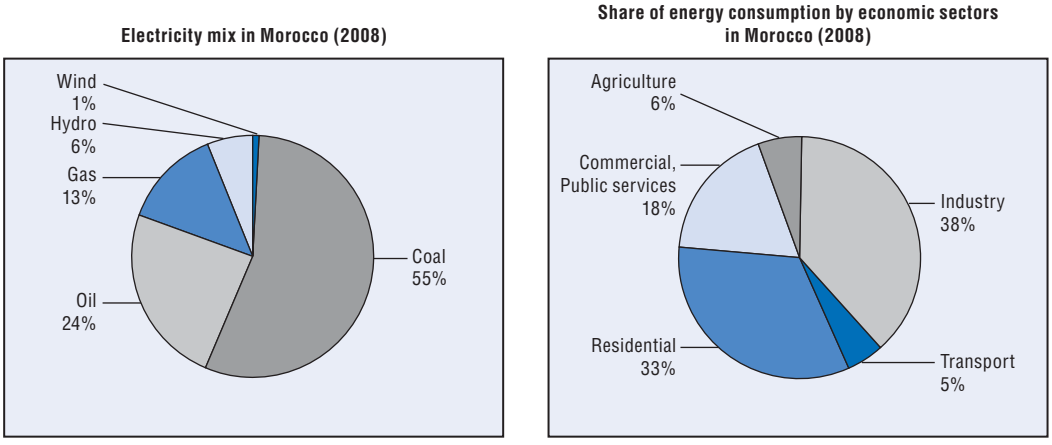
ANNEX D

Incentive schemes for renewable energies in Morocco

Figure D.1. **Energy overview for Morocco**



Source: IEA Statistics, 2010.

Access to electricity: 97% (one million inhabitants without access to electricity).

Energy imports: 95%.

Share of renewable energy in total electricity generation: 7%.

Expected evolution of electricity demand: electricity demand is expected to double by 2020.[1]

Expected employment generation: by 2020 in the renewable energy sector: 13 300.[2]

Renewable energy potential in Morocco:[3] Morocco has significant potential for solar energy with radiance on average of 2 300 kWh/m²/year. The vast inhabited lands in the south and east of Morocco also have the highest potential for solar energy. Wind energy farms can be developed along the Atlantic coast where the average annual wind speed is superior to 6 m/s. According to the results of a study conducted by the Renewable Energies Development Center (Centre du Développement des Energies Renouvelables, CDER) with GTZ of Germany, the wind power wind potential is 5 290 TWh/year (2 645 GW) and the technical potential is 3 264 TWh/year (1 632 GW).[4] However the areas with the highest potential for renewable energy have poor access to the power grid which limits their power potential in the short term.

National energy strategy in Morocco

In March 2008, a new comprehensive strategy for the energy sector launched by the Moroccan government prioritised the development of renewable energy and aimed to increase the share of renewable energy from 4% to 8% of the primary energy supply by 2012. The strategy targets especially the development of those wind energy fields that can be developed rapidly and at low cost. In 2009, the government adopted a more ambitious programme for renewable energy in which the portion of installed capacity of renewable energy in the power system will represent 42% of the total installed capacity by 2020, reaching a capacity of 400 MW by 2020.[5] Part of this programme consists of the Integrated Solar Energy Generation Project which focuses on the implementation of concentrated solar power (CSP) to generate electricity.

The objectives of the programmes are: to increase the energy independence of Morocco, which currently relies heavily on imported energy; to guarantee broad access to electricity at a fair price for the country's population; and to protect the environment. The energy programmes to be implemented by 2020 are detailed in the table below.[6]

	Solar energy programme	Wind energy programme
Capacity	2 000 MW (between 100 MW and 500 MW).	2 000 MW (of which 1 000 MW are either built or under development).
Annual production	4 500 GW.	6 600 GWh.
Investment	USD 9 billion.	USD 3.5 billion.
Sites	Five identified sites accounting for 10 000 hectares: Ain Beni Mathar, Ouarzazate, Sebkate Tah, Foum Al Ouad, Boujdour.	Five identified sites: Taza, Koudia Al Baida, Seuouk, Tiskrad, Boujdour.
Timeline	First new solar plant: 2014. Finalisation: 2019.	First new wind farm: 2015. Finalisation: 2020.
Economic impact	Approximately 1 million of toe per year saved 3.7 million tonnes of CO_2 emissions saved per year. 6 100 job created.	Approximately 1.5 million of toe per year saved. 5.6 million tonnes of CO_2 emissions saved per year 1 100 job created.

Incentives to the private sector for the development of renewable energies

Prior to the adoption of the National Energy Strategy, the Moroccan government had developed two other mechanisms to encourage the development of renewable energy plants.

As part of a national rural electrification programme starting in 1996, the Moroccan government entered into a public private partnership with an energy company to supply 16 000, then 37 000 more rural households of solar PV systems to produce electricity, given that incorporating them into the general electrical grid was too expensive (see Box 3.11 on the TEMASOL case study). Under this fee-for-service partnership, the private operator, selected through a competitive tendering process, is in charge of implementing the solar programme, managing the technical and financial aspects of the programme, performing maintenance on the installed systems, replacing equipment and collecting user fees in 24 Moroccan provinces. Customers pay an initial connection fee and a monthly service fee.

In September 2006, ONE launched the EnergiPro programme directed at energy intensive industrial groups to promote the auto-production of renewable electricity. The scheme was extended by a new law in 2009, which now allows the relevant companies to produce their own energy for up to 50 MW of installed capacity. This initiative is supported

by the following incentives:[7]

- *Administrative assistance:* ONE provides the company with land and with the required natural conditions for renewable energy if the production site of the company does not meet this requirement.
- *Infrastructure subsidies:* The transit of the renewable energy produced by the industry to the place of consumption through the electrical grid of ONE at fixed tariff of 0.06 MAD/kWh.
- *Price incentives:* The guaranteed purchase by ONE of all energy produced in excess of the company's energy consumption at an incentive tariff. This fixed tariff is equivalent to 20% more of the peak tariff applied by ONE. This tariff has since been revised to take into account the off-peak tariff as well.

There have been successful initiatives under the EnergyPro programme. For instance, the Lafarge wind plant in Tetouan has an energy capacity of 32 MW and its annual production is estimated at 38 GWh/year. This represents about 40% of the total consumption of the factory.[8] However, the overall impact of EnergyPro is limited because companies must have important capital reserves in order to launch an industrial activity that goes beyond their day-to-day operation.

In addressing its renewable energies targets, Law 16.08, adopted by Morocco in 2008 to promote large scale renewable electricity generation projects, offers the possibility for industrials to develop and produce electricity from renewable energy on a concession basis with ONE. For the most part, ONE is responsible for the procurement and management of the renewable energy plant; it publishes calls for tender and presides over the attribution of contracts. The type of contract and related incentives vary from one contract to another. In general, the private sector builds the plants as an independent power producer under a build-operate-transfer agreement which includes the following incentives:[9]

- *Infrastructure subsidy:* ONE endeavours to grant access to its grid and to the interconnections with regional markets to the extent that it is reasonably feasible in order to increase export opportunities of the company.
- *Contract guarantee:* During a 20-year period, ONE will purchase electric energy from the project company pursuant to a PPA to be entered into with the project.
- *Price subsidy:* Under the PPA, the price of electricity bought by ONE from the company is higher than the price for end-users. As such it is an indirect price subsidy.
- *Carbon credit:* The company owns the carbon credits associated with the project. Once monetised, they increase the company's profits.
- *Administrative assistance:* ONE assists the company in selecting the site, receiving the permits and authorisations it needs.
- *Financial support:* In some circumstances ONE can provide an equity contribution capped to a certain percentage.
- *Special tax privilege zone:* The investor must use 35% of its equipment sourced locally from Morocco. The Kyoto Pole, currently under construction, will be a tax-free manufacturing zone dedicated to energy efficiency. Investors are strongly encouraged to have equipment and parts manufactured locally, either through setting up/developing a local manufacturer, or through the Kyoto Industrial Pole.

To support private sector participation in Morocco's National Renewable Energy Strategy, the government has established several institutions and programmes which can

provide incentives to private investment in renewable energies. In addition to incentives discussed elsewhere, the government has implemented an investor credit for R&D/job training: the government has created specialised courses in wind energy at major engineering schools and universities. It also provides training of technicians in wind and solar energy at vocational training institutes.

Competitive bidding

ONE has been in charge of the generation and transmission of electricity in Morocco under the authority of the Ministry of Energy and Mining since 1963. Since 1994, the Decree 2-94-503 allows power plants with ratings above 10 MW to be built and operated by private enterprises, on condition that the project is subject to open tendering and that the power produced is sold to ONE.

Private investors are allowed to develop and produce electricity from renewable energy through concessions obtained from ONE. ONE is responsible for the procurement and management of wind plants; it publishes calls for tender and presides over the attribution of contracts which consists of two phases: pre-qualification, and short-listing of the best proposals.

The type of contract and related incentives offered varies from one contract to another. Generally, the private investor builds the plants as an independent power producer under a build-own-operate-transfer agreement and obtains the incentives outlined in Article 17 of the Framework Investment Law,[10] including:[11]

- contribution of 20% to the operating expenses;
- contribution of 5% to investment costs and;
- contribution of 20% to staff training costs, both for new hires (MAD 15 500 [USD 1 800] to 40 000 [USD 4 700]/employee/year) and for in-service training (MAD 5 000 [USD 590] to 20 000 [USD 2 300]/person/year).

The competitive bidding contracts apply to both solar and wind power capacity. Companies are also given incentives to use local equipment, either through the bidding requirements or through a preference for proposals with a higher share of local equipment. According to the features of each contract, the investor can also benefit from a number of additional incentives including:

- *Power Purchase Agreements (PPA):* The price of the electricity bought by ONE from the company is determined on a case-by-case base, and any tariff that may be in excess of the usual cost of electricity is not visible. The tariff may be negotiated between the operator and the distributor, or may be already fixed. The agreement typically is binding for 20-25 years and ownership of the renewable energy electricity plant is generally transferred entirely to ONE at the end of the contract.
- *Access to the national grid:* ONE endeavours to grant access to its grid and to the interconnections with regional markets to the extent that it is reasonably feasible in order to increase the exports opportunities of the company.
- *Grants:* The government provides grants of up to 10% of capital expenditure with a ceiling of MAD 200 000 (USD 23 700).
- *Carbon credit:* The investor owns the carbon credits associated with the project and can trade them freely.

- *Access to land:* ONE assists the investor in selecting the site, receiving the permits and authorisations for the land.
- *Access to finance:* ONE, as well as the Société d'Investissements Énergétiques (SIE) and the Fonds du Développement de l'Énergie (FDE) (both financed by sovereign funds) can have an equity stake in the project.
- *Soft loans or loan guarantees:* Development agencies and banks can grant the developer a soft loan or a loan guarantee. In the past Proparco (the financing arm of the AFD), and the European Investment Bank, amongst others, have participated in such projects.
- *Tax-free zones:* According to the area where the project is set up, it may be exempted from taxes and VAT. The authorities are currently working on setting up a Kyoto Industrial Pole which would be a tax-free zone dedicated to energy efficiency and renewable energies.[12] Investors are encouraged to develop the local manufacturing of equipment for renewable power generation.

Net metering

The Moroccan "EnergiPro" programme[13] is similar to FiT schemes but differs in the sense that it applies only to companies producing their own electricity. In September 2006, ONE launched the EnergiPro programme, which allowed energy-intensive industrial groups to produce their own electricity through renewable energy resources up to 10 MW of installed capacity. This was later expanded to 50 MW of installed capacity in 2009 by Law 13.09. This initiative is supported by the following incentives:[14]

- *Incentive tariffs:* ONE purchases all energy produced in excess of the company's own energy consumption at an incentive tariff set by ONE. The set tariff used to be 20% above the peak tariff applied by ONE. This tariff has since been revised and is now 20% above average prices during normal hours.
- *Guaranteed tariffs:* ONE guarantees to purchase the excess electricity produced by the company for a period up to 20 or 25 years. In return the company is obliged to sell all its excess electricity to ONE.
- *Administrative facilitation:* For smaller installations, with a capacity below 2 MW, a simple declaration is sufficient in order to produce electricity. Sites exceeding an installed capacity of 2 MW need official authorisation.
- *Access to land:* ONE provides land with the required natural conditions for renewable energy if the original production site of the investor does not allow for efficient power generation.
- *Access to the grid:* The transit of the renewable energy produced by the company to the place of consumption through the electrical grid of ONE is at a fixed tariff of MAD 0.06/kWh for all plants in service before 2011, and at MAD 0.08/kWh for plants commissioned after that date.
- *Green certificate:* The investor is entitled to the carbon credits associated with the project.

In certain circumstances, the investor is allowed to sell the electricity surplus to local and foreign consumers, particularly in Europe, via the national electricity grid.

The interest of the measures is twofold: First, investors who wish to sell their excess power face a known, clear, regulatory framework within which they plan their investments. They are also encouraged to reduce their own electricity consumption in order to be able to sell more electricity to ONE. For the authorities, the interest lies in the fact that they obtain

an increase in the share of renewable energy in the national energy mix without paying a large subsidy, given that the subsidised tariff is only applied to the energy produced in excess of the company's own consumption.

Small renewable energy units

As part of a national rural electrification programme which began in 1996, the Moroccan government launched a scheme to roll out photovoltaic (PV) home solar systems. Such a system was well suited to the geographical location of homes in remote mountainous areas. ONE entered into a public-private partnership with a private operator to carry out the programme. The chosen method was a fee-for-service partnership. Under this scheme, the private operator, selected through a competitive tendering process, is in charge of implementing the project, managing the technical and financial aspects of the programme, performing maintenance on the installed systems, replacing equipment and collecting user fees in 24 Moroccan provinces. Customers pay an initial connection fee and a monthly service fee. In order to make this project profitable for the private investor, ONE set up the following incentives (see also Box 3.11 for a detailed case study):

- *Equipment grant:* ONE's equipment grant covers 66% of the equipment costs enabling electrical service at affordable rates. In fact, the final connection fees of rural solar customers were reduced by 40%, bringing them closer to urban electricity rates.
- *Administrative assistance:* ONE had previously identified the eligible households for the electrification service, saving time and resources for the investor.

The programme was successful in its objective insofar as the electrification rate which was around 15-20% in 1996 is now estimated at 98% and has encouraged the use of renewable energy. However, the subsidies and costs to the state related to such a programme are significant. In Morocco most of this has been financed by international donors including the European Investment bank, the Japan Bank for International Co-operation, the Inter-American Development Bank, and the *Agence Française de Développement*. For the partner energy company the benefits consist mostly of the positive association with renewable energy and a closer relationship with the public authorities, rather than a substantial profit.

Notes

1. 2e Assises de l'énergie du Maroc (31 mai 2011), "Les énergies vertes, un élan pour le Maroc", Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, Oujda.
2. 2e Assises de l'énergie du Maroc (31 mai 2011), "Les énergies vertes, un élan pour le Maroc", Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, Oujda.
3. *www.siem.ma/en/energy/moroccan-potential*.
4. Regional Centre for Renewable Energies and Energy Efficiency, January 2010.
5. 2e Assises de l'Énergie (May 2011), "Strategie énergétique: Bilan d'étape", Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, Morocco.
6. 2e Assises de l'Énergie (May 2011), "Strategie énergétique : Bilan d'étape", Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement, Morocco.
7. Fonds d'investissement climatiques (September 2009), "Fonds pour les Technologies propres : Plan d'investissement pour le Maroc".
8. *www.evwind.es/noticias.php?id_not=5632*.

9. Office National de l'Électricité (2008), "The Chourouk Initiative: 500 MW solar by 2015 – Invitation for the expression of interest and prequalification of companies and consortia".

10. Loi-Cadre n° 18-95, Formant Charte de l'Investissement : *www.maghrebarabe.org/admin_files/unpan005731.pdf*.

11. Ministère de l'Énergie, des Mines, de l'Eau et de l'Environnement du Maroc (May 2011), "Stratégie Énergétique : Bilan d'étape – Deuxième assises de l'Énergie".

12. *www.one.org.ma/FR/pdf/Dakhla%201-3%20MW.pdf*.

13. *www.leconomiste.com/article/energies-renouvelablesbrl-offre-energipro-amelioree*.

14. Fonds d'investissement climatiques (September 2009), "Fonds pour les Technologies propres : Plan d'investissement pour le Maroc".

DATABASES

IEA Statistics, 2010.