

# PART

# 4

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# The green transition of Morocco





## The Government's strategy on the green economy

*Omar Hilale*

H.E. Ambassador Omar Hilale, outlines his Government's commitment to environmental protection and sustainable development, detailing the work of the Foundation for Environmental Protection as well as the leading role of its diplomacy in environmental issues. He highlights national initiatives in the fields of agriculture, industry and associated 'green market' oppor-

tunities, environmental impact studies, 'green citizenship', green cooperation between government departments and green training programmes. Emphasizing the boost to technical innovation from the green economy, he further describes the country's renewable energy choices and comments potential savings in terms of dollars and CO<sub>2</sub> emissions.

Since its participation in the Earth Summit in Rio de Janeiro, Morocco has embarked on an irreversible process of implementing the recommendations of the United Nations Conference on Environment and Development.

In 1992, as part of the implementation of these commitments and within the context of global sustainable and human development efforts and initiatives, Morocco developed a new strategy based on an integrated approach to development. It sets the government's guidelines to deal with development needs, protection of the environment and reducing the destructive impact of climate change.

In this regard, Morocco has adopted a series of development strategies, notably

the National Strategy for Environmental Protection and Sustainable Development, the implementation of the National Action Plan for the Environment (PANE), the 2020 Strategy for Rural Development, and the launch of the National Initiative for Human Development (NIHD).

To realise its ambitions, Morocco has committed itself to an extensive and broad programme in the fields of renewable energy and the green economy, opting for a new agricultural strategy called the Green Morocco Plan. The results achieved in these areas by Morocco in record time confirm the strategic importance the government assigns to sustainable development and rational management of natural resources.

In 2009, conscious of the scope and severity of the degradation of its biodiversity and determined to meet the challenges of protecting its environment and in conformity with the Royal guidelines, the Kingdom of Morocco issued the draft National Charter for Environment and Sustainable Development.

Thanks to its global vision of environment and biodiversity, the National Charter covers not only the environmental issue but is also a social project and an authentic reference for public policy in the country. It reflects efforts made in the field of environment and major advances in the institutional and legal fields to include environmental issues in public policies related to development. It was for this reason that all nation's institutions and various stakeholders responded to the call of His Majesty the King to strongly join this initiative and become involved in its implementation and achievement. Furthermore, the choice of Rabat by the 'Earth Day Network as a world city to host the celebrations of the 40th anniversary of the Earth Day is indeed a unique opportunity to demonstrate our country's commitment to the environmental cause. It bears witness to all Morocco's efforts to preserve the environment that justify its being considered a Development Model in Africa.

The designation of Morocco to host the festivities is a clear recognition of the commitment of the Kingdom, under the reign

of HM King Mohammed VI, to a proactive environmental approach in all sectors, in particular through a partnership approach involving all social and economic actors and a pragmatic approach with ambitious and realistic programmes. It is also the result of the commendable and significant efforts of Her Royal Highness Princess Lalla Hasna, President of the Mohammed VI Foundation for Environmental Protection, for the promotion and protection of the environment and the eco-system within a context of sustainable development.

Moreover, and by way of illustrating this commitment in terms of concrete projects, on 22 April 2010, HRH presided over the celebration ceremony of Earth Day and Sustainable Development, marked by the signature of several conventions and the presentation of a large number of projects to be carried out within a long-term environmental strategy. These projects aim to protect resources and eco-systems as well as monitoring the state of the environment in all regions of Morocco.

The outcome of the various programmes undertaken by the Foundation is noteworthy, with several initiatives launched since 2009. They include: the 'Eco-Schools' programme; the programme 'Young Reporters for the Environment', with two international prizes awarded to Morocco by an international jury in Paris; the co-organization with the Islamic Educational, Scientific and Cultural Organization (ISESCO) of a national workshop dedicated to sensitizing teachers to the relationship between environment, health and sustainable development; and the organization of a contest for 'Young Reporters for the environment' targeting students from four Arab countries: Jordan, Syria, Tunisia and Morocco.

Other initiatives launched under the auspices of the Foundation include the 'Clean Beaches' programme, many of which have been labelled 'Blue Flag' and the 'Qualit'air' programme, which seeks to raise awareness among mechanics, offering them environmental training programmes; organize campaigns of vehicle control, removing ordinary diesel and making provision for diesel 50 ppm; establish a national air quality monitoring network in major cities of the Kingdom; and launch an epidemiological study in partnership with

the Ministry of Health and with the assistance of a WHO expert.

It is thanks to these achievements that the Foundation has, since December 2009, the status of observer at the UN Conference on Climate Change in Copenhagen.

In addition, many initiatives have been undertaken in the field of clean development, with important national programmes initiated, notably the establishment of laws necessary for the protection of the environment, namely to combat air pollution and provide for waste management, including prohibition of the use of non-biodegradable bags.

▼  
**A major step  
 has been taken in the  
 agricultural sector  
 which is strategic for  
 the socio-economic  
 development of  
 Morocco, representing  
 15 to 20 per cent  
 of national GDP**  
 ▲

The programme, adopted in 2008 and called '**the Green Morocco Plan**', constitutes the new agricultural strategy in Morocco aimed at providing a boost to the economy of the agricultural sector.

Morocco's commitment is also reflected in a number of initiatives taken by the different Ministerial Departments to draw the attention of Moroccan companies to the various business opportunities offered by the green market, create the appropriate environment for its development and facilitate access of Moroccan companies to major structural projects of the Kingdom, namely sanitation programmes and the solar plan.

Aware of the growing strength of the green economy, commonly called 'green business', and the opportunities it offers as the global economy of tomorrow, Morocco is determined to use it to trace a new path towards sustainable development. It is



thus committed to transforming the constraints linked to the respect of the environment into opportunities, advantages and benefits for development in terms of employment and industrialization. This is evidence of the level of maturity reached by Morocco after a number of structural reforms in the political, human, social and economic fields. Now, it is ready to include in its progress and evolution the concept of sustainable development in all its dimensions.

Morocco has managed to respond to the challenge thanks to the commitment of all its industrial actors and the devotion of all sectors, which have demonstrated a great ability to adapt to new rules and act in full compliance with the requirements needed in this area. Indeed, all business firms and companies feel involved with the integration of sustainable development into their management approach. The correlation between climate change and economic development is no longer a strange concept to them, having opted for a promising green approach leading to optimal economic, social and environmental returns.

One of the authentic achievements in this approach is the Environment law, which states that every industrial project must first carry out a thorough study of its environmental impact. Such a data base has today become a principle and working method for all stakeholders. This visible conviction by everyone (government, economic and political actors, associations, NGOs and citizens) and widespread ecological attitude constitute the beginning of a new concept that has largely found its place in Moroccan society, namely 'green citizenship'.

In addition to the contribution of national media and press agencies, this new concept has been translated into concrete



terms thanks to the emergence of a number of associations and civil society actors that play a key role in initiating and promoting it. Seminars and conferences have been organized at national and regional level to stimulate a debate, cover its challenges and launch an awareness campaign around the concept. The latter is targeting all sectors, private or public, all business functions and all citizens without exception, with the slogan “Green Business is everyone’s business”.

At Ministerial level, we notice synergies coordination between different Departments involved in the advocacy and promotion of the virtues of the green economy. For example, the Ministry of Energy is working with both the Ministry of Housing on energy efficiency in all buildings, particularly in new cities, and with the Ministry of Transportation to reduce greenhouse gas emissions through better management of urban space.

Regarding efforts in the field of education and training, a training programme is being set up making available qualified human resources to teach students the principles of sustainable development. Within this context, the competent Department collaborates with other partners such as the Agency for Solar Energy, and industries and businesses to identify needs as accurately as possible by 2015-2020, and translate them into educational programmes. Morocco’s reference base draws inspiration from foreign experiences in the fields of training in green technologies and ecological techniques.

Morocco’s implementation of the green economy also implies giving a strong boost to technological innovation as well as carrying out research and making progress in the field of sustainable development. This approach has led to developing innovative projects in renewable energy and energy efficiency, in addition to other

major projects like the National Liquid Sanitation Programme, whose total cost is estimated at 80 million dirhams in 2030 (approximately 9.6 million USD in January 2011), and the National Household Hazardous Waste Programme, whose total cost is estimated at 40 million dirhams in 2020, directly allowing for the creation of thousands of jobs.

As far as energy is concerned, several projects are underway including in the field of renewable energy. Within the framework of the strategy diversifying sources of supply of energy products initiated by H.M. King Mohammed VI, Morocco announced on 2 November 2009 an ambitious project in Ouarzazate to produce electricity from solar energy, with a capacity of 2,000 megawatts (MW), representing an investment of 9 billion dollars.

Renewable energy—solar, hydraulic and wind power—will contribute in equal parts to the 2,000 MW. The future 500 MW solar site will be established in Tamezghitene, in the north-east of Ouarzazate and will begin operating in 2015. The estimated cost of the Morocco Wind Energy Programme, based on the creation of new wind farms to increase power output from the current 280 MW to 2,000 MW by 2020, is 31.5 billion dirhams.

In addition to reducing Morocco’s energy dependence from 97 per cent to 85 per cent, the implementation of such projects should allow annual savings of around one million tonnes of oil equivalent (TOE), to USD 500 to 700 million. Ecologically speaking, such projects would avoid the emission of 3.7 million tonnes of CO<sub>2</sub> per year.

To support this momentum for renewable energy development, Morocco has established a legislative framework through the adoption of a draft law on energy efficiency and involving several Ministerial Departments.

The creation of such a large project, focusing on solar energy and wind power, reflects Morocco’s irreversible choice to promote sustainable development and demonstrates its commitment to a clean and green economy, which fits within the framework of the Copenhagen process.

Morocco, motivated by its achievements at national level and experience in the field and a fervent advocate of environmental causes, has opted for an active diplomacy, committed to the respect of the environment and sustainable development, which has become its doctrine for action. In this regard, Moroccan diplomacy is constantly mobilized to serve the interests of both Morocco and the African continent in all international and multilateral fora.

The commitment to diplomacy in this field resulted in 2011 in the designation of Morocco as the coordinator of both the African Group in charge of the environmental issues and the World Meteorological Organization (WMO). This coordination gave rise to the genuine involvement of the Geneva African Group in environmental issues.

In this respect, Morocco will chair several meetings at both the ambassadorial and expert levels, in order to develop the African position and finalize the Group’s statements for 2011, a special year full of important meetings. This is especially the case regarding the follow up to decisions taken internationally on environmental issues at the 16<sup>th</sup> United Nations Conference on Climate Change in Cancun, which has just ended, and the involvement in this event of the African Group through its active participation and contribution. ◀



#### THE Author

### Omar Hilale

H.E. Ambassador Omar Hilale is Permanent Representative of Morocco to the United Nations Office in Geneva. Prior to that he was from 2005, Secretary-General

of the Ministry of Foreign Affairs and Cooperation of Morocco. Between 2001 and 2005, he served as Permanent Representative of Morocco to the United Nations Office in Geneva. A career diplomat, Mr. Hilale was Ambassador to Indonesia, Singapore, Australia and New Zealand, from 1996 to 2001. He also served as Deputy Head of Mission at the Moroccan Embassy in Monrovia from 1979 to 1980; First Secretary at the Moroccan Embassy in Addis Ababa from 1976 to 1979; and Second Secretary at the Moroccan Embassy in Algiers from 1975 to 1976.



## Switzerland-Morocco Foundation for Sustainable Development

Mohamed Mike Fani, President and Founder  
Offers a brief description of the vision, values, goals and work of the FSMD



The Switzerland-Morocco Foundation for Sustainable Development, FSMD (*Fondation Suisse Maroc pour le Développement Durable*) was created in 2004 and has since been recognized as a non-profit public service provider by the Finance Department of the Canton of Geneva. The FSMD is a non-profit and a non-governmental organization (NGO), with headquarters in Geneva.

Today, the FSMD is highly acknowledged for its role in boosting the socio-economic growth of Morocco. It has strong governance in driving its organization and managing its projects and has been granted the Consultative Special Status ECOSOC by the United Nations. This facilitates the FSMD's contribution as technical expert, adviser and consultant to the work programmes and goals of the United Nations, as well as by participating in ECOSOC and its various subsidiary bodies through attendance at their meetings and oral interventions and written statements on their agenda items.

Over the last two decades, Morocco has successfully implemented courageous and impressive programmes of social and economic growth. Moroccan leaders have continuously instituted solid reforms to liberalize trade relations especially with the E.U. and U.S., invested heavily in basic infrastructure, stabilized macroeconomic policy, diversified investment opportunities, improved education, and opened the political system. Strong economic progress has been observed, with growth rates averaging around 5 per cent during the last 10 years.

Despite progress, Morocco's growth remains vulnerable to natural and economic shocks, with social indicators out of sync with the country's income level. Morocco's youth is still heavily touched by unemployment (more than 30 per cent in urban areas) and large segments of the population remain socially and economically marginalized. Furthermore, Morocco's economic sectors are still tied to commodities highly dependent on foreign energy (97 per cent of energy needs are imported) and technologies and its trade balance is heavily linked to the E.U., especially France.

Within this context, the FSMD has emerged as a novel tool for socio-economic growth through know-how and competency transfer primarily between Switzerland and Morocco. The FSMD model aims at helping provide Morocco increasing freedom in assimilating novel technologies tailored to the kingdom's specific needs. The NGO is especially focused on boosting Morocco's transition from a fossil resources dependent economy to sustainable green development, this being the only option for

the sustainable growth of a country not blessed with significant fossil resources. The active integration of novel technologies through international partnerships is creating a new value growth dynamism, in which education and training, especially of young people, play a predominant role in securing the talents and workforce necessary to drive emerging business opportunities in the country.

The FSMD believes in Switzerland, thanks to the latter's distinctive culture of innovation and proven tradition of entrepreneurship, as a model strategic partner for Morocco, especially in the sector of green economy, identified as the key driver for Morocco's sustainable growth. Switzerland's extensive experience and expertise in this sector represent an interesting model for Morocco in terms of capital market structure, environmental standards, industrialization of R&D results and economic framework conditions.

The NGO, through its Swiss and Moroccan members, is today well positioned to empower partnerships between the two countries. Every two years, it traditionally organizes an economic symposium in Geneva bringing together leaders, decisions makers and professionals from Morocco and Switzerland, from which opportunities for partnerships and collaboration are likely to stem. So far, the Foundation is very proud of the number of projects successfully implemented between the two countries, with around 10 projects realized in the sectors of health and social development.

The FSMD is constantly pushing to implement projects that benefit the poor and the underprivileged regions by raising the awareness of socially responsible and green investment among the strategic players. The city of Oujda in the north-east of Morocco, with 20 per cent unemployment, provides a good illustration: three partnership agreements were signed at the Economic Symposium the Foundation held in Geneva on 5 November 2010 relating to waste treatment, wastewater treatment, renewable energy, good governance and E-government, respectively between: (i) the FSMD, the Urban Municipality of the City of Oujda and Holcim Morocco, (ii) the FSMD, the Urban Municipality of the City of Oujda and IFGRA; and (iii) the FSMD, the Urban Municipality of the City of Oujda and SGS Morocco SA.

In line with this, the FSMD is adding another building block to the green economy orientation by federating stakeholders from the public and private sector to jointly create a regional model that can be further leveraged across the country. ◀



# Renewable energy

## IN MOROCCO

Said Mouline explains the commitment to renewables of the Moroccan National Agency for Development of Renewable Energy and Energy Efficiency (ADEREE). He describes achievements in the fields of wind, solar, solar thermal, hydro and biomass energy. He outlines future plans to increase the capacity of renewable sources of energy and hence the proportion of the country's energy needs derived from renewable, with a focus on enacted laws, energy funding and potential energy exports.



### continuous commitment to renewables

In the early 1980s, the creation of the Renewable Energies Development Centre (CDER), which is now an Agency (National Agency for Development of Renewable Energy and Energy Efficiency, ADEREE), demonstrated the Moroccan government's determination to promote renewable sources of energy. Current policy aims to develop renewable energies in ways that complement other forms of energy and contribute to security of energy supply, to develop local industries and capacities, and to implement a strategy of partnerships with the private sector. The renewable energies policy is currently in its generalized implementation phase with large renewable energy and energy efficiency programmes, supported by national and international institutions and banks. In fact, Morocco remains committed to a vision of sustainable development in which sensitivity to ecological and environmental issues is considered essential.

### Why renewable now?

Morocco has some of the best renewable energy (RE) resources in the world, which have the potential to meet a rising and significant share of national energy demand. Many of the new technologies that harness renewables (including wind, solar, and biomass) are, or soon will be, economically competitive with the fossil fuels that meet 95 per cent of Moroccans' energy needs (2009). On the other hand, the electricity sector plays a crucial role in the development of industrial activities and socio-economics of the rural areas. Morocco has launched huge national development programmes in strategic sectors (health, tourism, industries, agriculture, education, infrastructure, etc.) and the need for security of energy supply and national energy production has become critical. Moreover, dynamic growth rates of RE in the world are driving down equipment costs, which leads to cost effective RE projects. Dependence on energy imports remains one of the main reasons for a key status being assigned to renewable in official plans for the energy sector. RE, including hydropower, accounted for 14.5 per cent of electricity produced in 2009.



### A huge potential

With a 3,500-km long coast and average wind speeds of up to 11 meters per second in the north (Taza, Tangier, Tetouan) and south (Tarfaya, Dakhla, Laayoune), Morocco's wind power potential is estimated at 25,000 mw. The conditions for solar energy are also extraordinarily favourable, 5.5 kwh/m<sup>2</sup>/day and 3,000 h/year. Over 200 feasible Micro Hydro Power projects ranging from 15 to 100 kw have also been identified. Marine energy projects, including algae fuel production and valorisation, are currently under development.



### A commitment at the highest level of the state

In March 2009, a royal letter to the participants at the Energy Forum mentioned:



In our effort to secure our energy supply, we must stress how important it is to diversify energy sources, mobilise renewable resources.

Together with renewable energy, energy efficiency can deeply transform the sector thanks to the new technologies and the social attitudes they imply.



It also called for the expanded use of renewable energy to meet the twin challenges of increasing renewable energy investments and social development. It gave strong support to the use of renewable energy resources and to environment protection. This strategy was reinforced

by the two national 2,000 MW solar and 2,000 MW wind energy programmes, which call for an investment of USD 12.15 billion (in solar and wind parks) over the next decade to catalyze private efforts to build a renewable energy future. Specifically, the plan calls for renewable energy to reach 42 per cent of electrical capacity by 2020.

### Solar energy targets and initiatives

#### The 2,000 MW Solar Energy Programme

On the 2<sup>nd</sup> of November 2009, Morocco launched an ambitious 2,000 MW solar power programme, estimated at USD 9 billion, to be completed in 2020. It is, in fact, an energy revolution in Morocco's efforts to respond to the global increase in the cost of energy, growing national demand and environmental protection. With high solar potential, the five sites selected for the programme — Laayoune, Boujdour, Tarfaya, Ain Beni Mathar and Ouarzazate — will soon be host to photovoltaic and solar thermal energy plants. The sites will cover 10,000 hectares and should produce up to 2,000 MW of electricity, with an annual saving of one million tons of oil.



#### Ain Beni Mathar (East Morocco):

Morocco has considered the installation of its first solar thermal plant, a 470 MW natural gas unit, including a 20 MW solar unit. The project comprises a unit based on solar energy (a solar field of cylindrical parabolic mirrors covering a land surface of approximately 20 ha.) and a natural gas combined cycle unit. The site is located in Ain Beni Mathar, 86 km south of the city of Oujda. Solar production is estimated at up to 55 Gwh/year.

### Photovoltaic systems: decentralized photovoltaic solar electrification

Currently, photovoltaic solar energy in Morocco is used mainly in rural and off-grid areas. Distribution is estimated as follows:

- rural electrification: sub-programme of decentralized rural electrification (150,000 households to be electrified by Photovoltaic Systems, SHS) and community applications, 6 MW<sub>p</sub>;
- water pumping: 1.12 MW<sub>p</sub>;
- commercial sector (telecommunications, TV relays, radio, etc.): 5.85 MW<sub>p</sub>;
- other applications: 1.1 MW<sub>p</sub>.

### Wind power parks a large potential

In recent years, wind has become an increasingly attractive source of renewable energy. Wind energy is the world's fastest-growing energy technology and Moroccan capacity has more than doubled in the past three years. Wind power currently supplies about 1.86 per cent of national electricity needs but capacity is expanding rapidly. Wind power amounts to an installed production capacity of 280 MW and 720 MW are under construction. About 5 sites have been identified for the next 1,000 MW programme, all of which have considerable development potential. Numerous private foreign operators are interested in using wind power in Morocco to produce green electricity. A Wind Atlas produced by ADEREE is available for those who wish to consult it.



Tangier Wind Park

### The 2,000 MW Wind Parks Initiative

Since the first wind power plant installed in Koudia El Baida in 2000, several further wind parks have been built. The largest one, the 140 MW in Tangier, was set up in 2009. The national programme aims to install a number of new wind farms, raising installed electrical wind power from

the current 280 MW to 2,000 MW by 2020. Five parks have already been installed: The Koudia Al Baida Wind farm (50 MW capacity), The Abdelkhaled Torres wind farm (3.5 MW), The Essaouira Wind farm (60 MW), a private wind park (Lafarge - 30 MW) and the 140 MW wind farm at Tangier. 720 MW are underway. Other regions have been identified, mostly located in the north and south of Morocco, to implement the second 1,000 MW parks: Tanger 2 (150 MW), Koudia El Baida à Tétouan (300 MW), Taza (150 MW), Tiskrad à Laayoune (300 MW) and Boujdour (100 MW). The project investment cost, estimated at USD 3.15 billion, will be covered by national and international public and private funds or other financing mechanisms.

### Hydroelectricity in progress

Hydroelectricity is currently the largest producer of renewable power in Morocco, generating around 14.1 per cent of the nation's total electricity production in 2009. Total hydro capacity amounted to 1,265 MW in 2009 and a further 472 MW are planned. Morocco is also interested in developing decentralised small hydropower projects for isolated areas. The amount of hydroelectric power generated is strongly affected by changes in precipitation and surface runoff. Hydroelectric power does not necessarily require a large dam – some power plants use just a small canal to channel river water through a turbine and a number of these projects is currently under development by ADEREE. A small or micro-hydroelectric power system can produce enough electricity for a home or remote village.

### Biomass preservation

Biomass can be utilized for all three major energy needs: electricity, heating/cooling and transportation fuel. However, each usage is distinctly different from the others, especially with regard to efficiency/ the percentage of energy utilized from the biomass source.

### Rational use of wood fuel in rural areas

Biomass accounts for an important share of Moroccan energy consumption (34 per cent), representing a major deforestation problem (30,000 hectares annually). It is estimated that about 50 per cent of the

population using fuel wood collects it from neighbouring forests (in the neighbourhood of 10 km) while the other 50 per cent buys the wood, with an average monthly consumption of about 50 kg/household. In order to improve the use of fuel wood, programmes carried out by ADEREE and other national and international partners have focused on fuel switching and energy efficiency. These include:

- Dissemination of small agricultural Bio-Digesters for producing Biogaz. Since 1983, more than 350 units have been installed in different regions of country. For example, an ADEREE/GTZ cooperation programme introduced more than 100 Biogaz digesters in the pilot region of Souss Massa to encourage this technique and reduce thermal deforestation.
- Dissemination of fuel wood-saving stoves for cooking and heating in rural zones and encouragement to consume gas.
- Promoting the use of wood energy-saving technologies for urban and rural hammams through training, supervision, awareness-raising, informative and incentive measures to save neighbouring forests. The new technologies can attain a 78 per cent efficiency rate.

ADEREE is also working on an algae fuel pilot project near TanTan in the south of the country.

### National energy efficiency programmes

National energy efficiency programmes aim to achieve a 15 per cent energy saving by 2020 in the following main sectors: industry, transport, residential and tertiary. Energy efficiency programmes are to be implemented through the Energy Efficiency Codes in Residential Buildings and Energy Efficiency

The Programme for the Improvement in Commercial and Hospital Buildings in Morocco (carried out by ADEREE and institutional partners) includes the following components:

1. Setting up a Building/Construction Energy Efficiency Code Authority;
2. Designing, implementing and evaluating Building/Construction Energy Efficiency Regulations through thermal building codes for hospitals, hotels and housing;

3. Developing guidelines for technical professionals (hospitals, hotels/services, housing);
4. Comprehensive Barrier Review/Promotion of knowledge-sharing;
5. Developing the local market for solar water heating systems. The goal is to implement 440,000 m<sup>2</sup> to be installed in 2012 and 1.7 million m<sup>2</sup> by 2020.

### Policy, regulatory framework, RE/EE funds and institutional reforms

Morocco has set up a several incentive measures to promote renewable energy, with new enacted renewable energy laws and institutions in the last twelve months. Its strategic geographic location and its liberalization policy enable it to export toward an extensive market where demand is strong (Europe, Africa and the Middle East). A law on projects for Renewable Energy (Law 13-09) has been promulgated in the parliament as well as a new law to transform the national renewable energy development centre (CDER) into a renewable energy and energy efficiency agency (ADEREE), and the creation of the Moroccan Agency for Solar Energy (MASEN), which will be in charge of carrying out all technical, economic and financial studies necessary for the implementation of the 2,000 MW solar programme. Another energy investment company (*Société d'investissement énergétique-SIE*) has also been created to invest in projects to increase the production capacity of renewable energy and intensify energy efficiency. In fact, the Renewable Energy law set up the legal framework for promoting investment for export, assistance in site selections, permits and authorization, access to the national grid and electrical interconnections, export of RE, and so on.

### Energy development funds

Morocco has, in its efforts to increase energy security and reduce its vulnerability to oil price shocks, set up a fund, called "*Fond de Développement de l'Energie (FDE)*", currently with USD 1 billion in deposits. Its legal status and operational priorities are set out in the Finance Act of 2009. The FDE's present priority areas lie in developing generation capacity and security of supply, developing renewable energy and energy



efficiency. This fund will be instrumental in achieving financial closure for projects with the greatest potential for GHG emissions savings and that face viability gaps due to additional costs or risk premiums. The focus will be on: (a) increased penetration of renewable energy into Morocco's electricity generating portfolio, with an emphasis on wind power, and (b) energy conservation measures, particularly industrial energy efficiency and urban transport. The majority of FDE funds are to be invested with the aim of generating returns for the State. Such projects will include, but will not be limited to, power generation from renewables.

All the renewable energy and the energy efficiency projects will be implemented using carbon funds (Clean Development Mechanism with 5 projects already registered, the clean technology fund, etc.).

New industrial parks dedicated to the production of industrial components for the renewable energy and energy efficiency sectors are being implemented with the objective of developing the renewable energy industry. The first one is located near Oujda. Furthermore, a new policy calls for the inclusion of specific courses and research and development in these sectors in the curricula of a number of universities and engineering schools.

### The regional approach

Morocco has a leading role in Euro-Mediterranean energy cooperation through its electricity interconnections with neighbouring countries. The country also adapted its new legislation to facilitate green energy export. It has joined the Mediterranean Solar Plan and Moroccan companies are involved in the MedRing and Desertec projects.

In conclusion, Morocco is, with its highly proactive renewable energy policy, demonstrating that, at national and international level, the technological progress made in the last few years, the increasing cost of fossil fuel and the high level commitment to renewable energy, energy efficiency and environment protection, are the main drivers in the ongoing growth of its national renewable energy market. ◀



THE Author

**Saïd Mouline**

Director of the Moroccan Agency for Development of Renewable Energy and Energy Efficiency (ADEREE)



# MANAGEM

80 YEARS OF DEVELOPMENT AND VALORISATION OF NATURAL RESOURCES

Ismail Akaley, General Manager at MANAGEM describes how his company specializing in the production and valorisation of base metals, precious metals and cobalt, has been able to creatively transform environmental protection constraints into business opportunities. Through its own research

and development of recycling techniques and recuperation of waste matter, it has been able to improve the lives of citizens living around its industrial installations, contribute towards the career opportunities of young people and help create small enterprises and jobs.

**A** key actor in Morocco, MANAGEM Private Group, specializes in the production and valorisation of base metals, precious metals and cobalt.

In each branch of its activities, MANAGEM deploys its highly specialized competences, its advanced technology equipment and its strong capacity in research and development, allowing the group to constantly meet its clients' needs from different sectors such as the steel industry, aeronautics, energy, industrial tools, the chemical industry and electronics.

### **A historical engagement for local and regional development**

The mining activity historically has always been a strong tool for local development and is still nowadays an important linchpin in the development of and a driving force

behind the provision of medical services, schools and socio-cultural infrastructure in the regions where it is implemented.

For more than 80 years, MANAGEM has accelerated and facilitated access to vital needs, in particular to drinking water, electric sources and new technologies.

In addition, MANAGEM contributes to the development of communities surrounding its production plants, mainly by promoting and encouraging children's education, supporting various programmes for rural women and democratizing access to water through various partnerships.

### **Ethics at the centre of MANAGEM's social policy**

MANAGEM's social policy is carried out according to principles and today the group is proud to have a human resources policy based on shared values, corporate culture, clear and open communication and a motivating system of incentives.



One of MANAGEM's subsidiaries, *Compagnie de Tifnoute Tiranimine* (CTT), has received the General Confederation of Moroccan Enterprises (CGEM) Corporate Social Responsibility Label.

In addition, thanks to the health and safety system, the hydrometallurgical units and the Research Centre received the Occupational Health and Safety Assessment Series (OHSAS) 18001 in 2010.



### Act for the environment, one of MANAGEM's key values

MANAGEM considers the protection of the environment one of its priorities by pushing hard to minimize the environmental impact of its activities. The Group has mobilized efforts in the field of recycling industrial effluents, waste water minimization and treatment, dust control and plantation and management of open spaces.

The know-how acquired over the years and the important efforts in research and development deployed by MANAGEM's Research Centre have allowed the group to view environmental restrictions as real development opportunities.

#### The group has already implemented several projects on mining waste recovery and industrial effluents:

##### **Bou Azzer's mining waste valorisation**

Since 1929, the cobalt mine of Bou Azzer has accumulated millions of tons of solid waste from gravimetric treatment for the production of a cobalt concentrate. Thanks to a hydrometallurgical process developed by MANAGEM's Research

Centre REMINEX, the environmental restriction has become an opportunity, with 500 tons of cobalt metal produced every year from this solid waste.

##### **Sodium sulphate project**

MANAGEM's different hydrometallurgical units produce liquid effluent rich in salt (sodium sulphate). These effluents are stored in evaporation tanks. The development of hydrometallurgical activities, which generate more than 700 m<sup>3</sup> of liquid effluents per day, encouraged the group to develop an environmental and sustainable solution involving salt crystallization of sodium sulphate, a marketable product, and a water recycling unit. This unit, which started up in 2009, produces 25,000 tons of sodium sulphate and recycles 200,000 m<sup>3</sup> of water per year.

##### **E-waste recycling project**

MANAGEM, with its expertise and command of treatment processes, has created, through its Cobalt and Specialties Branch, a recycling field for the valorisation of non-ferrous and precious metals waste. This e-waste recycling project was born within the MANAGEM Research Centre in 2006.

In December 2009, a partnership agreement was signed between CTT and *Al Jisr*,

a Moroccan NGO working in education. This partnership allowed the project to be upscaled to include a social component.

Under the project, the *Al Jisr Association*, through the Green Chip project, is in charge of collecting, dismantling and sorting e-waste in workshops equipped by MANAGEM. These dismantling workshops are located in some schools and involve young people in academic failure. The goal is to show them the way to create their own dismantling workshops in order to become CTT suppliers.

CTT is in charge of the valorisation of dismantled products, nonferrous and precious metals, and the sale of the other dismantled products such as steel and plastic.

The partnership with *Al Jisr* contributed to:

- Supplying e-waste;
- Facilitating the integration of young people in academic failure
- Reducing the digital bill in Morocco

The valorisation process of electronic cards and nonferrous metals has allowed the group to treat 1,500 tons/year and facilitated the creation of 80 dismantling workshop and more than 200 jobs.

**Dismantling workshop** of electronic waste.  
Green Chip, Casablanca



The group plans to increase progressively its treatment capacity to 100,000 to 120,000 tons per year, with the potential of 1,500 to 2,000 kg of gold, 15 to 20 tons of silver, and an annual turnover of USD 100 to 120 million.

### **Pyrrhotite project**

The solid waste from the Guemassa polymetallic mine (an unusual iron sulphide mineral with a variable iron content) is stocked on more than 100 hectares. At present, the potential is more than 20 million tons, with an annual increase of 1 million tons.

With this in mind, the MANAGEM group has launched a project of pyrrhotite valorisation to produce sulphuric acid, iron oxide and electrical energy with zero waste. In this way, it has transformed a constraint, solid waste, into a real asset to promote sustainable development.

Through the treatment process developed by the MANAGEM research centre,

involving a baking furnace, mining waste is transformed into a number of different value added products:

- Sulphuric acid, a strategic reagent for MANAGEM plants;
- Iron oxide, a raw material for the steel industry;
- Electricity, to be used for plant's needs.

This industrial unit will, according to the economic feasibility study, allow the treatment of 100,000 tons of waste (pyrrhotite) to produce:

- 100,000 tons of sulphuric acid, covering MANAGEM's own needs;
- 140,000 tons of iron oxide, a marketable product for the steel industry;
- 4.5 MWh (megawatt hour) of electricity, covering 50 per cent of the Guemassa plant needs.

The project has been presented with the Cleaner development Mechanism (CDM) due to the fact that it is capable of producing energy at the same time as avoiding the emission of 7,000 tons of CO<sub>2</sub> per year.

### **Partnership with the Moroccan Cleaner Production Centre (CMPP)**

In June 2009, MANAGEM Group signed a partnership agreement with the Moroccan Cleaner Production Centre or *Centre Marocain de Production Propre* (CMPP) with the aim of promoting cleaner production, efficient use of resources and sustainable development.

CMPP is member of an international cleaner production network set up by the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP)

The centre has access to national as well as international expertise in different fields related to cleaner production, resources efficiency, sound environmental technologies and sustainable development. ◀



Development that meets the needs  
of the present without compromising  
the ability of future generations  
to meet their own needs

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