

# EMPLOYMENT RESEARCH BRIEF

## EMPLOYMENT IMPACT OF INFRASTRUCTURE INVESTMENTS IN MOROCCO

This country brief provides insights into the various employment outcomes of European Investment Bank (EIB)-financed investment projects in different infrastructure sectors in Morocco. The study focused on the three sectors of transport, sanitation and energy. One project was studied in each of the energy and transport sectors, while two projects were studied in the sanitation sector. In the transport sector the project was the Second National Program of Rural Roads (PNRR-2), while in the energy sector, the study examined the Solar Energy Plant in Ourzazate. In the sanitation sector, two projects in the areas of Oujda and Sebou were assessed.

### Infrastructure Development

Morocco enjoys one of the most developed infrastructure in Africa. Morocco's infrastructure and construction sector is a major economic driver and a foundational component of national commerce. Prior to 2011, the sector had been growing rapidly since the 1980's, fuelled primarily by government-led investment initiatives to develop the country's infrastructure as well as a substantial boom in the residential and commercial real estate markets.

Morocco is served by a Road **Transport Infrastructure** of 57,000 km. Of those, 35,000 km are paved, nevertheless, low rural accessibility remains a key challenge. Consequently, investment in constructing rural roads, or upgrading existing tracks increased as a result of the government's plans to develop rural areas. In fact, the 2020 Rural Development Strategy aims to improve conditions of the rural population by increasing their access to basic infrastructure and social services, including reducing the imbalance between provinces. The government invested in rural roads to bring significant social and economic benefits and allowing year-round access to social, community and administrative services, and markets, and by offering greater business opportunities.

The **Energy Infrastructure** in Morocco suffers from shortages of domestic energy sources. Despite the recent discovery of modest amounts of oil reserves in Morocco, most electricity is produced from imported fuel. Given the high electrification rate, which reaches 97% in rural areas, the government adopted a strategy in 2009 to accelerate the development of renewable energy. The strategy expects to increase the share of renewable energy to 30% by 2020. To achieve this target,

Morocco plans to invest USD13 billion in expansion of wind, solar and hydroelectric power generation infrastructure.

The **Sanitation Infrastructure** in Morocco is unevenly distributed across the country. The rate of connectivity to sewerage is estimated at 76% in large cities, and less than 40% in smaller cities. Urban sanitation infrastructure is poorly maintained due to the limited capacity of local governments responsible for operation and maintenance. Furthermore, only 8% of collected sewerage is treated due to limited capacity of water treatment facilities. As a consequence, many systems are degraded and in need for rehabilitation. Sewer overflowing is common during the rainy season.

The government developed the National Sanitation Program in 2006 to overcome the above mentioned weaknesses. The plan provides a policy framework for investments in sanitation to address the lagging coverage in sanitation services (especially in small towns), pollution control, and highlighting the wastewater reuse potential in Morocco. The plan aims to increase the overall rate of access to sanitation to 80%, and wastewater treatment to 60% by 2020.

### Construction Activity

#### Overview of potential and challenges

The construction sector is a key component of Morocco's economy, accounting for 6% of Morocco's GDP in 2011. During the past decade, growth has been relatively consistent for the sector. Between 2002 and 2012, at current prices, the value added within the sector increased by 131.1%<sup>1</sup>. The sector benefited from public investment in infrastructure which is expected to continue in light of national plans to improve infrastructure especially in the rural areas.

Morocco is continuing its ambitious efforts towards the development of its transportation, renewable energy and sanitation infrastructure. In fact, the total investments in transportation infrastructure during the period from 1998 to 2016, is valued at 340 billion MAD, with most of these investments occurring between 2012 and 2016.

<sup>1</sup> Ministry of Housing, Spatial Planning and Urban Policy, 2013

Nevertheless, the sector suffers from a number of challenges. Collections of due payments for contractors in some public works projects are delaying implementation and reducing productivity. Additionally, qualified workforce in technical and skilled professions is lacking. Finally, public-private partnership (PPP) framework and concessions agreement laws need reform.

## Approach and Methodology

Two research methods were employed to quantify the employment impact of EIB infrastructure investments in Morocco. The first method examined specific case studies of projects funded by EIB. It aimed to answer the below four questions about direct employment through structured interviews, site visits, and document review.

1. How many direct jobs are created during construction, operation, and maintenance?
2. Who gets the jobs?
3. What kinds of jobs are created?
4. Do the jobs go where they are most needed?

The second method was a macroeconomic study that used multiplier analysis based on accounting frameworks such as the latest Input-Output table, and Social Accounting Matrix. The macroeconomic study was used to capture direct, indirect and induced effects on production, income and employment. (Findings using the macroeconomic study approach can be found under the section direct, indirect, and induced impacts of the projects).

## Projects Under Study

### The Second National Program of Rural Roads (PNRR-2)

PNRR-2 was launched in 2005 to increase the accessibility of 80% of Morocco's rural population to an all-weather road by 2015. The project consists of over 1,000 sub-projects with a total length of 15,560 km. Nearly 657 projects (or 9,742 km of roads) were proposed for upgrading/construction works, compared to 401 projects (or 5,818 km of roads) for rehabilitation works. The total project is expected to cost MAD 88 million.



PNRR-2 Sample Road in Khmeissat

The Fund for Road Financing (CFR), and the Directorate of Roads and Road Traffic (DRCR) are the implementing agencies for the project, with each agency being responsible for the rural roads it finances. Under a Framework Agreement,

the DRCR has, however, been designated as the oversight entity and construction manager for all PNRR-2 rural road subprojects, including those financed by the CFR.

### Solar Energy in Ourzazate Project

The project is the first plant of the Moroccan Solar Plan, which aims at installing 2 GW of new solar capacity in the country by 2020. If fully implemented, the project of 500 MW will be the largest solar plant in North Africa. The Moroccan Agency for Solar Energy (MASEN) is the project promoter who intends to develop the Ourzazate power plant considering all utility size and available solar technologies. It carried out a technologically neutral prequalification process for a first phase of at least 125 MW (and a target of 250 MW), which was awarded to a consortium using CSP parabolic trough technology with three hours' storage.



Ourzazate Project Site

The construction started in 2013 for commissioning in mid-2015 with a total cost of MAD 9.8 million. The project scope included the solar field, power block, substation, grid connection, and other ancillary facilities (access roads, water distribution system, flood protection, etc.).

### Sanitation in Oujda Project

This project aims at improving the provision of water supply and sanitation services, as well as flood protection for 450,000 residents in the north-eastern Moroccan municipality of Oujda<sup>2</sup>. It will increase the water supply levels, enhance wastewater infrastructure, lower the discharge of the pollution load into rivers and "oueds" and initiate the agricultural re-use of treated wastewater in line with Moroccan water policy objectives.



Oujda Treatment Plant

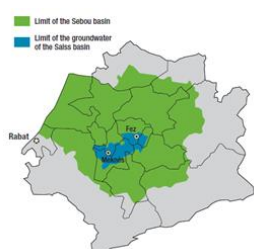
The project is a comprehensive upgrade of the sanitation and storm water drainage system in the city of Oujda. Three sub-projects were selected for evaluation in close collaboration with the project promoter, the Administration of Municipal and Electricity Distribution of Oujda (RADEEO). The three sub-

<sup>2</sup> EIB project appraisal document

projects assessed include the main sewer treatment plant, network replacement and relocation of collectors, and construction of retention basins. The total cost of these sub-projects was MAD 437 million.

### Sebou Basin Sanitation Project

The Sebou Basin Sanitation Project includes the sanitation of 17 urban centres located mainly in the Sebou river basin located between Taza in the east and Khenitra along the Atlantic Coast. Each of these projects includes the rehabilitation and extension of wastewater collection, drainage of rain water, and the construction of a secondary treatment plant of wastewater. The complete project has been designed to cover an equivalent of 750 000 inhabitants – equivalent with the construction of a wastewater collection network of 420 km, and 100 km of drainage networks.



Sebou Basin



Sebou Basin-Project Site

The National Office of Potable Water and Electricity (ONEE), is managing the project with the support of supervision services. The study selected three out of seventeen sub-projects for evaluation in consultation with ONEE. These three sub-projects were located in Zuouit cheikh, Ifrane and Guercif, and include eight lots encompassing two wastewater networks, three treatment plants, two pumping facilities, and one electrification facility with a total cost of MAD 237 million.

## Employment analysis

### Labour market synopsis<sup>3</sup>

Morocco has a stable and increasingly diversified economy with a steady growth of GDP between 2000 to 2012 at an average of 5%. This steady growth, decreased in 2012, but the government is implementing several reform measures to improve productivity, encourage investment, and catalyse growth. Unemployment apparently decreased in association with economic growth and reform measures. In fact, unemployment reached 8.9% in 2011, compared to 13.4% in 2000.

The construction sector remains a key employer in Morocco, creating about 50,000 annual jobs between 2000 to 2011, and employed 13.5% to 15.4% of the total active population.

Nevertheless, the sector mainly employs unskilled Moroccan male workers, aged 15 to 44, who have the second lowest level of education after those employed by the agricultural sector.

### Box 1: Unemployment in Morocco, Quarter 3/2013

**Unemployment rate: 8.8%**

Males, Females: 7.8%, 9%

**Unemployment in rural areas 3.2%:**

Males, Females: 4.3%, 1.0%

**Unemployment in urban areas 13.8%:**

Males, Females: 12.4%, 18.9%

**Economic participation rate 49.2%:**

Males, Females: 74.4%, 25.6%

Source: National Planning Commission, 2013

Incompatibility exists between the labour market supply and demand, especially in the construction sector. There is a need to improve the capacities and skills of the workforce to the competencies required by the employers.

### Impact of projects on the job market (Direct employment using the case study approach)

Direct employment generated by PNRR-2 was quantified using a sample of four sub-projects out of 119 EIB-financed sub-projects. The total direct employment created by these four sub-projects is nearly 218 person-years. Extrapolating the findings to the remaining sub-projects results in an overall direct employment of 7,700 person-years. Additionally, operation and maintenance is expected to require an additional 1,280 person-years, thus, increasing the overall direct employment of PNRR-2 to 8,980 person-years.

Table 1: Employment Breakdown of PNRR-2

Position	Employment Breakdown (%)	Education Level	Average Salary *
Project Managers & Engineers	4%	U: 100%	17,000
Technicians	9%	U: 60% H: 40%	8,500
Skilled Labour	43%	H: 95%	4,200
Unskilled Labour	39%	S: 20% D: 80%	2,500
Security Guard	4%		
Administrative	1%	U: 90% C: 10%	4,200

U: University Degree, C: Community College, H: high school degree,

S: 10-12 years of schooling, D: Less than 10 years of schooling

\* Moroccan dirham per month

Skilled and unskilled labour comprise about 80% of the total employment created by the project, and is occupied by workers with modest educational attainment. The majority of the employed were adult males. About half of the workers were hired permanently (for the project duration), while the remaining were daily casual workers.

<sup>3</sup> Source: National Planning Commission, 2013

Direct employment of the **Ourzazat Solar Energy Project** was assessed by examining the employment created by the first phase of the project. The direct employment resulting from the construction, supervision, and project management of this phase was estimated at 950 person-years. Extrapolating this finding to the remaining phases of the project results in 5,175 person-years, of which 3,000 person-year are generated during construction, in addition to 2,175 person-years for operation and maintenance.

**Table 2: Employment Breakdown of Solar Energy Project**

Position	Employment Breakdown (%)	Education Level	Average Salary*
Project Managers & Engineers	21%	U: 100%	33,000
Technicians	6%	C: 85% H: 15%	31,000
Skilled Labour	1%	H: 95%	3,900
Unskilled Labour	70%	D: 100%	3,300
Security Guard	--	--	--
Administrative	2%	U: 90% C: 10%	15,000

U: University Degree, C: Community College, H: high school degree, S: 10-12 years of schooling, D: Less than 10 years of schooling  
\* Moroccan dirham per month

The employment breakdown of the Solar Energy Project in Ourzazat is shown in the table above. Unskilled labour is by far the largest employment category, and accounted for 70% of total employment. The majority of the employed in this category has less than 10 years of schooling. On the other hand, 27% of the total direct employment went to project managers, engineers, and technicians who generally possess a university degree.

Analysis of the three sub-projects selected from the **Sanitation Project in Sebou Basin** indicate that these projects created 470 person-years for construction and project management services. Extrapolating the findings to the remaining 17 projects funded by the EIB results in 1,600 person-years of direct employment during the construction phase, in addition to 1,625 for operation and maintenance over the project life span of 25years. This results in a total direct employment of about 3,225 person-year.

**Table 3: Employment Breakdown of Sebou Sanitation Project**

Position	Employment Breakdown (%)	Education Level	Average Salary*
Project Managers & Engineers	19%	U: 100%	8,000
Technicians	7%	C: 70% H: 30%	4,000
Skilled Labour	16%	--	3,200
Unskilled Labour	49%	--	2,500
Security Guard	4%	--	2,500
Administrative/ services	5%	--	--

U: University Degree, C: Community College, H: high school degree, S: 10-12 years of schooling, D: Less than 10 years of schooling  
\* Moroccan dirham per month

Employment breakdown indicates that the majority of the employed, about 65%, were skilled and unskilled workers. Project managers, engineers, and technicians composed 19% and 6% of total employment, respectively. Similar to the previous two projects, the majority of the employed on the sanitation project in Sebou were adult males.

Employment data of the three sub-projects of the **Oujda Sanitation Project** were analysed to quantify the direct employment created by the project which resulted in 951 person-years for construction. Applying the above figures for the entire project resulted in a total employment of 2,000 person-years for construction, in addition to 252 person-years for operation and maintenance.

**Table 4: Employment Breakdown of Oujda Sanitation Project**

Position	Employment Breakdown (%)	Education Level	Average Salary*
Project Managers & Engineers	2%	U: 100%	14,950
Technicians	6%	C: 70% H: 30%	8,450
Skilled Labour	42%	--	5,900
Unskilled Labour	50%	--	2,600
Security Guard	--	--	--
Administrative	--	--	--

U: University Degree, C: Community College, H: high school degree, S: 10-12 years of schooling, D: Less than 10 years of schooling  
\* Moroccan dirham per month

The employment breakdown of Oujda Sanitation Project is shown in the table above. The majority of the jobs went to skilled and unskilled workers at 42% and 50%, respectively. Project managers, engineers, and technicians accounted for a mere 8% of total employment.

### Direct, indirect and induced impact of projects (results of the macroeconomic study)

Simulating the impact of the four projects on employment is summarized in the table below. The simulation shows that the projects will create 102,000 person-years of direct, indirect, and induced employment. The majority of these jobs are direct and indirect effects (81,000 person-years), while 21,000 person-years are induced employment effects.

**Table 5: Direct, Indirect and Induced Employment Effects**

Project	Employment Job Opportunity	T1 (Indirect effects multiplier)*	T2 (Indirect + Induced effects multiplier)**
PNRR -2 (MAD 88 million)	49,529	2.58	3.83
Solar Energy (MAD 9.8 billion)	39,854	4.41	4.86
Sanitation, Oujda (MAD 437 million)	5,854	2.48	2.88
Sanitation, Sebou (MAD 237 million)	7,528	2.29	2.68

\* T1 is type I Leontief multiplier.  $T1 = \text{Sum}(\text{direct} + \text{indirect}) / \text{direct}$ .

\*\*T2 is type II Leontief multiplier.  $T2 = \text{Sum}(\text{direct} + \text{indirect} + \text{induced}) / \text{direct}$ .



Indirect employment was significantly higher for all projects. While direct employment ranged between 20% to 40% of total employment, indirect employment ranged between 40% to 70%. Induced effects were much smaller for the sanitation projects and the solar energy, and ranged between 9 and 15% of total employment. On the other hand, induced effects of the roads project were the highest at 33% of total employment created by the project. This could be explained by the large number of workers employed on the project and by the suppliers. These workers generate induced employment through local consumption.

The simulation, as summarized in the table below, also indicates that four projects created an additional added value of about MAD 11.8 billion. Nearly 85% of it was created by the roads and the solar energy projects, while only 15% was created by the two sanitation projects.

**Table 5: Direct and Indirect Output Effects**

Project	Total*	Direct	Indirect
PNRR -2 (MAD 88 million)	4,756	62.2%	37.8%
Solar Energy (MAD 9.8 billion)	5,309	59.3%	40.7%
Sanitation, Oujda (MAD 437 million)	712	61.7%	38.3%
Sanitation, Sebou (MAD 237 million)	989	63.4%	36.6%

\* MAD million.

## Concluding remarks

- The Moroccan construction and public works sector is a key component of the economy accounting for 6% of Morocco's GDP in 2011. Government's plans to improve water and sanitation infrastructure, rural roads and renewable energy is expected to result in significant investments in public works. Consequently, the sector is expected to remain a significant contributor to economic growth. Given that the construction sector has been a major employer in Morocco, investment in the sector is expected to sustain growth and job creation.
- The analysis of the four projects above indicates that the majority of the sector's workers are Moroccan nationals who filled almost all position types from project managers and engineers, to unskilled workers.
- With the exception of the solar energy project, 20-40% of employment was created for skilled workers. Skilled and unskilled workers accounted for 81% of direct employment created by PNRR-2, 71% of Ourzate Solar Project, and 65% and 92% of the sanitation projects in Sebou and Oujda.

- Although the construction sector in Morocco mostly employs workers with limited skills and limited educational attainment, incompatibility of labour supply and demand is a key challenge facing the employers.
- Investment in roads, sanitation, and solar energy can create significant direct, indirect and induced benefits to the Moroccan economy. Direct employment during construction is substantial, especially in sanitation and roads. Operation and maintenance for all projects create long-term employment for technicians and skilled workers.

## Way Forward

### Practical recommendations that can enhance the employment impact in the sectors (or sub-sector)

- Aligning labour supply and demand to meet the needs of the sector's employers is needed. This could be done by improving vocational and technical training programs in partnership with the employers to ensure that the graduates possess the competencies required in the market.
- Designing and implementing a certification program for unskilled and semi-skilled positions could help improve the capacity of sector's workers, and improve their skills given their generally modest levels of educational attainment. The certification could also improve the attractiveness of the sector, increase the wages of skilled and unskilled workers, and ultimately enhance the sector's productivity.
- Capacity development and certification of operation and maintenance staff could encourage creation of specialised small enterprises that can be contracted to provide operation and maintenance especially for water, sanitation and road network. Given the significant number of workers needed for operation and maintenance, these activities could support local economic growth, and at the same time, maintain the quality of the infrastructure.

## Key ILO resources

1. Employment Impact Assessment of Infrastructure in three Mediterranean Partner Countries. Final Report – Morocco. April, 2014.
2. Macroeconomic Employment Impact of EIB Infrastructure investment in Morocco. Final Report – October, 2014.
3. ILO Data Guide for Infrastructure Employment Impact Assessment, 2016.

## Other Resources

1. National Planning Commission, [www.npc.ma](http://www.npc.ma)
2. The 2020 Strategy for Rural Development, Morocco
3. The National Sanitation Program, Morocco, 2008.
4. Ministry of Housing, Spatial Planning and Urban Policy, [www.muaf.gov.ma](http://www.muaf.gov.ma), 2013

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For more information on links between infrastructure investment and employment creation, visit the website of the Employment Intensive Investment Programme:

<http://www.ilo.org/global/topics/employment-intensive-investment/lang--en/index.htm>