ROYAUME DU MAROC
Ministère du Tourisme

Soutenu par :

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de la Construction et de la Sûreté nucléaire

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Parlement de la République fédérale d'Allemagne



Towards a climate friendly accommodation sector through energy efficiency and renewable energy

Study for the carbon footprint and a Nationally Appropriate Mitigation Action (NAMA) in the sector of Tourism

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ABBREVATIONS AND ACRONYMS

- **NAMA:** Nationally Appropriate Mitigation Action
- **GHG**: greenhouse gas
- **Emission factor:** coefficient used to estimate the quantity of greenhouse gas emitted by a specific activity
- **tCO2.e**: tons of CO2 equivalent, unit used to measure the weight of GHG with a single gas indicator
- **Carbon intensity:** ratio between GHG emissions in tCO_2e and representative units of activities, for instance: tCO_2e/tourist, tCO_2e/night
- **Climate change adaptation:** ensemble of strategies and initiatives set up to reduce systems vulnerability, activities or sectors to climate change impacts
- **Mitigation of GHG emissions:** ensemble of strategies and initiatives set up to reduce GHG emissions of an activity or a sector

General information

<table>
<tr><td>NAMA title</td><td>Towards a climate friendly accommodation sector through energy efficiency and renewable energy</td></tr>
<tr><td>Country</td><td>Morocco</td></tr>
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• CO2
• CH4
• CFC</td></tr>
<tr><td colspan="2">State of approval of the NAMA by national authority
N/A</td></tr>
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1. Tourism and climate change in Morocco

1.1. Main socio-economic data

Morocco's tourism growth strategy was implemented in the early 2000s. Since its implementation it has pursued two master plans: Vision 2010, and the current Vision 2020, whose objectives are to double the size of the sector, reach a capacity of 200 000 new beds and to attract twice as many international tourists and three times more domestic tourists, compared to 2010.

In 2000, tourism accounted for 12.3% of GDP, 10.6% of employment, 13.1% of capital investments and 3.4% of government investments (Lanquar 2011). In 2014, the tourist sector's direct contribution was 6.7% of GDP and 4.7% of employment. Most tourism revenue is from leisure spending (86.2%) as compared to business spending (13.8%). Furthermore, it should be noted that in 2014, almost 35% of all spending was domestic, while 65% was foreign spending. Morocco is the 42nd country in the world in terms of tourism's direct contribution to GDP, and a leading tourism country in the region (WTTC 2015).

A significant economic growth expected in the tourism sector for 2030

The tourism sector is expected to become the second biggest one in Morocco (after agriculture). Compared to 2010:
. 470 000 new employments
. touristic receipts expected to be multiplied by 2 reach 140 Md DH
. the touristic GDP should gain 2 points

In the future, tourism's contribution to the economy is expected to grow in absolute, though not in relative terms. WTTC (2015) estimates that by 2025, tourism's direct contribution to GDP will almost double from US$7.4 billion in 2014 to US$15.2 billion, while the sector's direct contribution to GDP will remain stable at 8.1% of the total GDP. Small gains in its contribution to employment are expected, growing from 7.1% in 2014 to 7.4% by 2025.

Considering this expected evolution of the sector and the importance of combatting climate change, the ministry of tourism, with the support of the UNDP and UN Environment, is in charge of developing a NAMA (National Appropriate Mitigation Action, set of policies and actions that countries undertake as part of a commitment to reduce greenhouse gas emissions) for the sector. The NAMA was financed through the project "Advancing and measuring sustainable consumption and production (SCP) for a low carbon economy in newly industrialized countries (Advance SCP)". This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supports this initiative on the basis of a decision adopted by the German Bundestag.

1.2. Greenhouse gas mitigation policies and the tourism sector

Morocco has defined the objectives of its climate mitigation plan in its NDCs (see box) seeking to reduce its greenhouse gas (GHG) emissions by 17% (unconditionally) and 42% (conditionally) under business-as-usual projections, by 2030. Each of these goals is however, more difficult to achieve in scenarios of economic growth, as is envisaged for tourism. Here, the country expects a 4.6% growth rate of international arrivals and no significant change in domestic arrivals, increasing total tourist arrivals (domestic and international) from 32.9 million in 2015 to 43.2 million in 2030. As a result of this growth, as well as the changes in market compositions, tourism-related emissions are expected to grow from 20.3 $MtCO_2e$ in 2015 to 37.3 $MtCO_2e$ by 2030. This scenario already considers business as usual efficiency gains of up to 3% annual improvement.

NDC (Nationally Determined Contributions) related to tourism:

Directly:

. Energy efficiency in the tourism sector (86Mil USD, 1230 Mton CO_2e)

Indirectly:

. National solar plan for 2020 (9000Mil USD, 42000 Mton CO_2e)
. Private wind farms (195Mil USD, 1250 Mton CO_2e)
. National program for the promotion of photovoltaic (2000Mil USD, 10700 Mton CO_2e)
. Energy certification labelling for refrigerators (100Mil USD, 1460 Mton CO_2e

When using the Moroccan tourism emissions, projected until 2030 in this project, tourism would account for 26% of national emissions by 2030 (37.3 of 142 $MtCO_2e$ under the unconditional scenario) based on the overall national emissions as described in the Moroccan NDC. Under the conditional scenario (-42%), tourism would account for 36% of emissions by 2030 (37.3 $MtCO_2e$ of a total of 103 $MtCO_2e$). It needs to be highlighted that this comparison includes emissions from aviation, which are not included as a national obligation under the UNFCCC; however, these are currently not covered by effective policy, and are therefore important in terms of relative comparisons.

1.3. Climate change vulnerability of the tourism sector

Morocco is typically divided into seven climate zones. The recent climate evolution observed in the last 50 years already highlights a temperature rise and persistent drought. The kingdom of Morocco has already begun to take measures, above all for the agriculture though the Green Morocco Plan.

The climate in Morocco is usually divided into seven sub-areas, determined by the different environmental influences on the country: oceanic, continental, desert and Mediterranean. The map of the climatic zones of Morocco illustrates the climatic diversity of Morocco and the need for air-conditioning from simple to double depending on the zones.

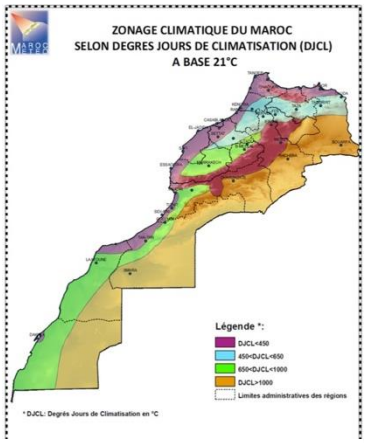


Figure 1 : Moroccan climate zone according to DJCL Source : CEEB project, ADEREE - PNUD

While the Tangier area benefits from rainfall due to oceanic disturbances, most of the country is sensitive to rising Saharan air, which can cause temperatures to rise above 40°C. The coastal regions, highlands and desert areas of the Sahara are the main climatic zones.

A study on recent climate change in Morocco and its neighboring countries reveals major conclusions: a trend of rising temperatures since 1950 despite marked interannual variability and an increase in average annual precipitation in contrast with the common belief of a decline in precipitation. This increase in precipitation is mainly due to atmospheric variations, which allow maritime trade winds to penetrate the African continent in a more pronounced way. However, this phenomenon does not make it possible to stem the drought, which has been raging in Morocco since the 1970s, forcing the government to put in place safeguard plans (particularly agriculture to make the Green Morocco plan viable).

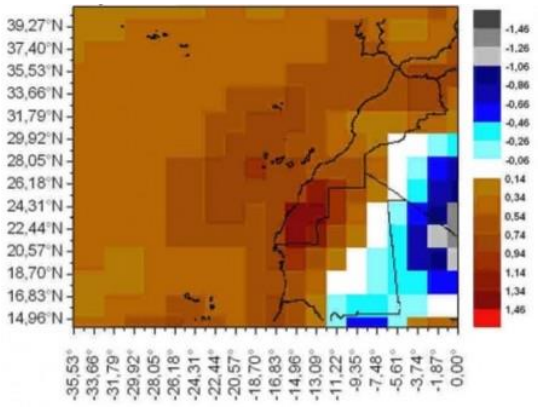


Figure 2 : Temperature evolution (in °C) in Morocco at a height of 2 meters, 1950-2008 Source: physio-geo. revues. Org

The future evolution of the climate can be considered thanks to climate projections. The 3rd national communication of Morocco at the United Nations Framework Convention on Climate Change gives some optimistic and pessimistic trends. A yearly rainfall decrease is expected, as well as a temperature rise (up to 7°C for the South-East regions of Atlas) are expected in all scenarios, with various impacts. Water resources are especially vulnerable and is expected to decline significantly from the year 2020. The seasonality is also expected to be impacted.

If the accommodation sector should consider these climate evolutions in their development strategies, the usual touristic sites may see a change in tourist attendance rates. The tourism comfort that is evaluated combining different climate parameters, is expected to decline over the entire territory (see figure 1). Tourists are expected to avoid summer seasons or change destinations (mountains or Europa) to find better comfort. This should increase the competitiveness among accommodation places, which will have to promote their equipment to limit this discomfort. The map below shows that overall for Morocco, the comfort index will decrease in contrast to an increase in mountainous and northern Europe.

The accommodation sector will be impacted by the climate change

Expected higher temperatures and a significant decline in water resources may result in a change in tourists' practices and more competitiveness among hotels.

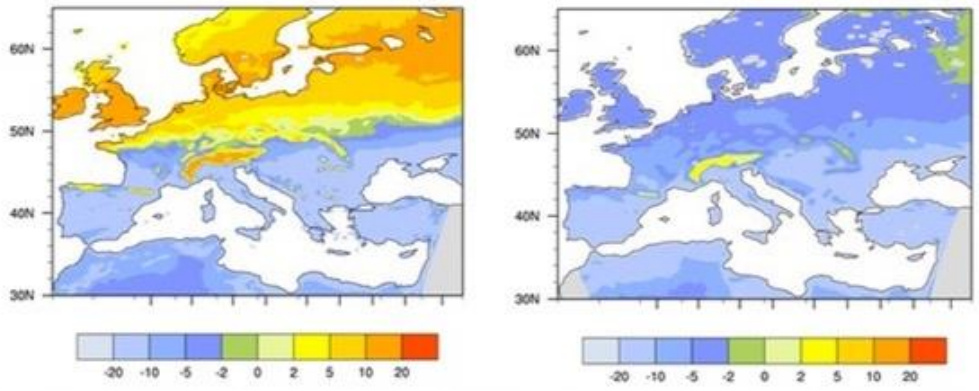


Figure 3 : Change in Tourism Comfort Index values (Mieczkowski indicator) for the period 2071-2100 relatively to 1970-2000, according to two projections (l. C4I, r. KNMI). Showing the expected tourism attractiveness decrease due to climate change

Ongoing climate change will require the accommodation sector to anticipate future climate related impacts. Better management of water and energy resources is needed, as well as a better strategy for food provisions. Urban heat waves may also affect the comfort of accommodation situated in city centers and require them to have better insulation systems and not always make use of air conditioning as the use of these systems can strenghten the heat waves. Specific research has been done on this topic[1] and highlights the expected main energy consumption needs for appliances in Morocco. In 2030, the lighting is expected to represent the main part and the aforementioned room air conditioners are expected to reach 11% of the share. Considering any kind of scenario (Business as Usual, policy scenario, Best Available Technology), the energy needs are expected to grow slightly.

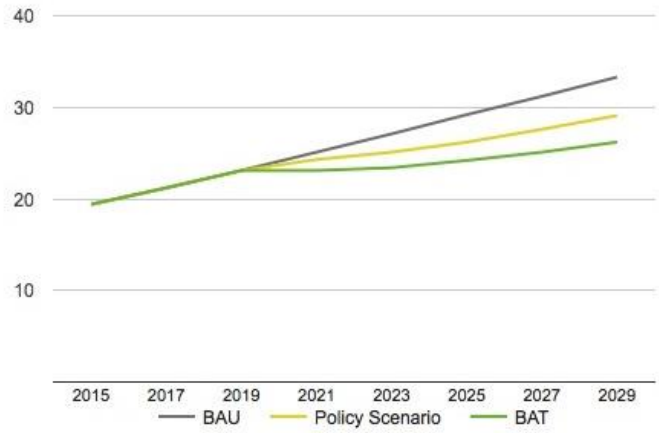


Figure 4 : Total energy consumption (TWh) of five appliances (lighting, refrigerators, room air conditioners, transformers, motors) in three scenarios (BAU, policy scenario, BAT) in Morocco (Source : united4efficiency.org)

Figure 5 : Projection of water consumption (m3/person/year) according to the optimistic scenario (Source : Sinan M. & Belhouhi A., 2015)

More details can be found in the climate change vulnerability assessment report[2], in ***annex 1***.

1 http://united4efficiency.org/country-assessments/morocco/

[2] Available in French in appendix

1.4. Moroccan tourism carbon footprint

Committed to reducing its greenhouse gas emissions, Morocco is an advanced country in terms of sustainable tourism with its strategy and implementation piloted by the Ministry of Tourism. The Ministry of Tourism held the presidency of the global partnership on sustainable tourism between 2013 and 2015. The Moroccan Ministry of Tourism, in collaboration with UNDP and the UN Environment, launched a call for tenders in 2016 to develop a NAMA and to better understand the impact of climate change on the tourism sector in the city of Marrakech, develop a strategy to mitigate GHG emissions and begin its implementation.
The objectives of the project were to first measure the carbon footprint of tourism in Marrakech, to identify issues of the mitigation of emissions and then to elaborate an expanded action plan in consultation with local actors. The aim of this project was to select and formalize a NAMA (Nationally Appropriate Mitigation Action) for the tourism sector.

Methodology

This work has been entrusted to Carbon 4 and TEC Conseil in order to provide an objective assessment of the work carried out under this NAMA.

The greatest difficulty in this type of work is the collection of data, both in terms of availability and robustness. Since data collection for the country as a whole was not possible at this stage of the project, Carbone 4 and TEC Conseil opted for a methodology commonly used in carbon footprints by extrapolating the calculated data for one representative city to the country as a whole. Although this method increases the margin of error of the results, it is based on a methodology validated by the GHG protocol and provides the first relevant estimate of the carbon footprint of tourism in Morocco. Based on the data calculated on the carbon footprint of tourism in Marrakech, an extrapolation according to national specificity was carried out in order to obtain a result closer to reality.

The extrapolation method from the Marrakech results to the carbon footprint of the whole country for the tourism sector is based on the differences between Marrakech and the tourism sector for the whole country in terms of the number of arrivals and the number of nights for international and domestic arrivals. Figures taken for the whole country are those from 2014 and are taken from the OECD survey (OECD, 2016) and UNWTO (2016). Multipliers are taken from these references to estimate the main values. The following assumptions were made: all the registered arrivals stayed within Morocco, trip distances have not been changed even though short haul trips from the main markets (France and Spain) may be shorter, these considerations would not significantly change the whole carbon footprint. The carbon emission factors for the different transport modes are the same as the ones used for Marrakech. For local transport, an average mobility carbon footprint has been added, corresponding to approximately 20 km/visitor/day.
According to this evaluation work, tourism in Marrakech represents 2%[3] of total tourism of Morocco's total emissions (2012) and 2.4%[4] of Morocco's GDP.

Key sources of emissions of tourism were taken into account, during the whole staying period of tourists:

- Transportation to and from Marrakesh - Transport to and from Marrakech
- Accommodation within the city
- Tourist activities (visits to monuments and shopping)
- On-site mobility
- Food and beverage consumed by tourists' activities
- Waste generation
- The construction of new hotel capacity to accompany the expansion of the tourism sector

[3] NDC Morocco, National Communication Climate Change (Marrocco's GHG emissions in 2012: 100.55 MtCO2e)
4 Key figures, Ministry of Tourism: 12% is the share of tourism in Morocco in GDP, and Marrakesh represents 20% of total tourism spending.

Figure 6 : Sources of carbon emissions of tourism in Marrakech

Different Moroccan organizations were involved in data collection for this study, especially the Moroccan Ministry of Tourism and the Moroccan Airport Authority. Data from the Organization of Economic Cooperation and Development (OECD, 2016) has been used and detailed data about local transport and domestic travel partly from Marrakech town hall.

Emission factors were also used to convert these data (km travelled, nights spent, money spent, etc.) into GHG emissions. Most of them come from the GHG footprint Moroccan tool developed by the FM6E (Fondation Mohammed VI pour l'Environnement). We also used emission factors from the French environment and energy management agency (ADEME) that we adapted to the Moroccan context. For the accommodation sector, emission factors were calculated from the CARMA v2.0.1 model[5].

Carbon Footprint of tourism in Morocco

In the following figure, the main source of emissions of tourism in Morocco is transport between tourist accommodation and Morocco (O/D transport), followed by tourist activities, accommodation, meals, waste management and local transport.

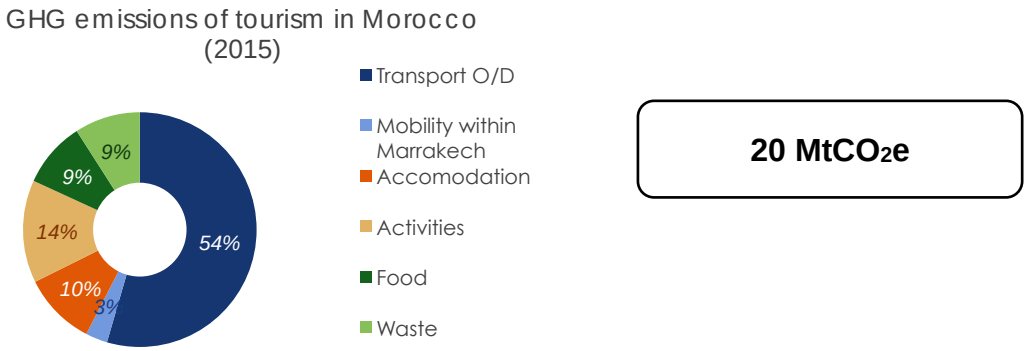
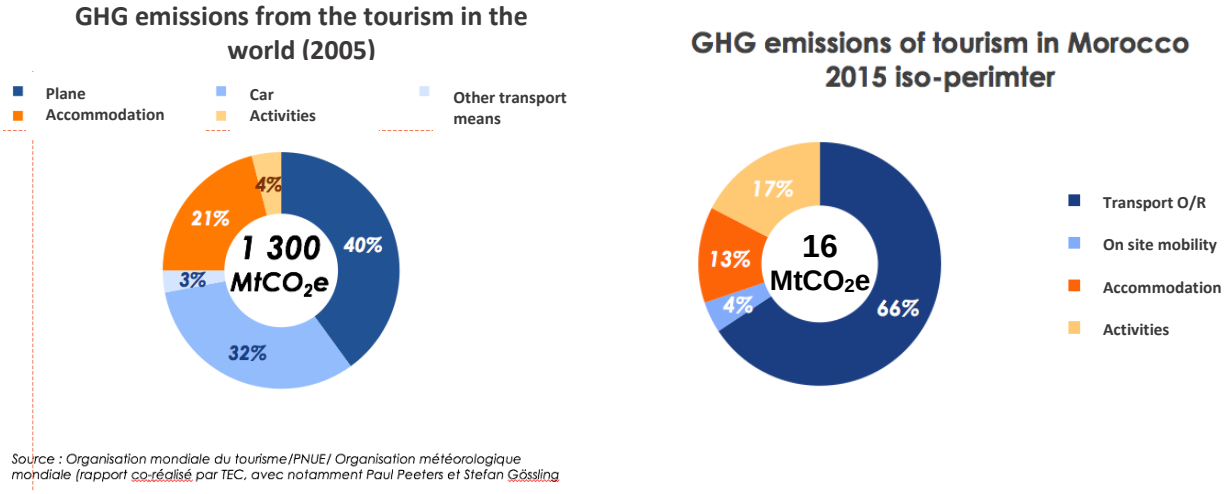


Figure 7 : CO2e emissions for Moroccan Domestic plus inbound tourism as divided over the main elements of tourism

More than half of all tourism related emissions are caused by O/D transport (54%) Due to greater distances and a higher emission factor, the 31% of tourists arriving by air account for 85% of the GHG emissions due to O/D transport. The second largest source of emissions is activities, constituting 14%

[5] The Breda University of Applied Sciences (NHTV) developed Carmatop project in cooperation with the Dutch tourism sector as a part of the "Carbon management for tour operators". This tool uses a range of parameters to estimate energy consumption per type of hotel such as: minimum and maximum room rate by night, total amount of customers reviews, the average room size, and the availability of several services. Also, a correction factor is applied in order to take into account hotels with Eco labels, etc.

of total emissions. Accommodation emissions (10%) is linked with the energy consumption of accommodation establishments. Waste and restauration each account for 9% of tourism emissions in Marrakech and on-site mobility accounts for only 3% of GHG emissions.



Source : Organisation mondiale du tourisme/PNUE/ Organisation météorologique mondiale (rapport co-réalisé par TEC, avec notamment Paul Peeters et Stefan Gössling

Figure 8 : CO2e emissions for global and Moroccan tourism

In total, Moroccan tourism accounts for 1% of global emissions for global tourism. Food and waste was removed from the scope as they were not included in the global analysis.

Transport remains the most emissive sector in both analyses with 75% of emissions for the world and 70% for Morocco. Activities represent a much higher percentage of total tourist emissions in Morocco (17% compared to 4% worldwide).

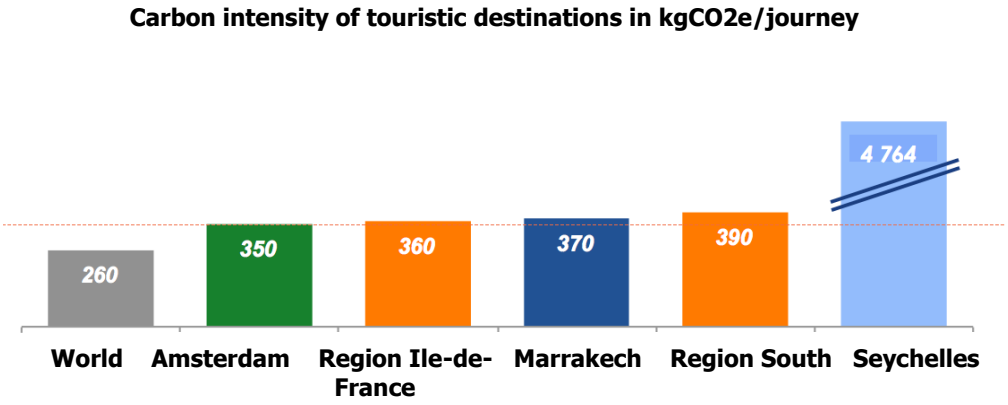


Figure 9 : CO2e emissions intensity for different tourism destination [6]

In terms of intensity, the city of Marrakech was compared to other tourist destinations. Marrakech can be considered representative of tourism in Morocco as it is one of the main tourist destinations. The graph above illustrates that the carbon intensity per tourist is similar to European cities such as Amsterdam or Ile de France. On the other hand, destinations such as Seychelles are much more carbon-emitting due to their remoteness and the contribution of air transport to reach the destination to the total emissions.

6 P. Peeters & Stefan Gössling, TEC Conseil (région PACA), Bilan Carbone Île de France, OMT

Sectorial analysis

To calculate the Carbon Footprint of tourism in Marrakech, a detailed analysis of each item of the carbon footprint was carried out. It is interesting to compare each station with the intensity at the global level to see how Marrakech is positioned (and by extrapolation Morocco).

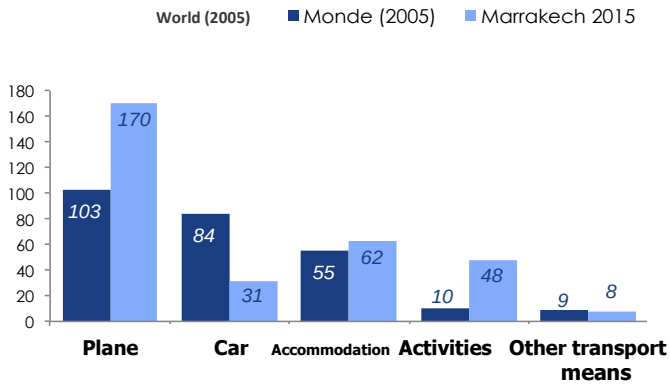


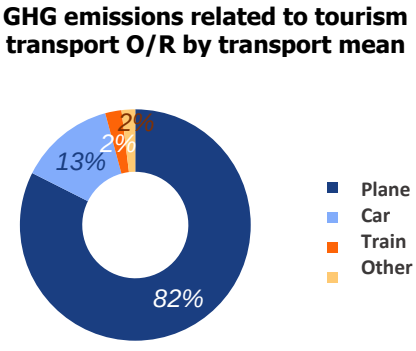
Figure 10 : Carbon intensity of global tourism and in Marrakech per item (kgCO2e/tourist)

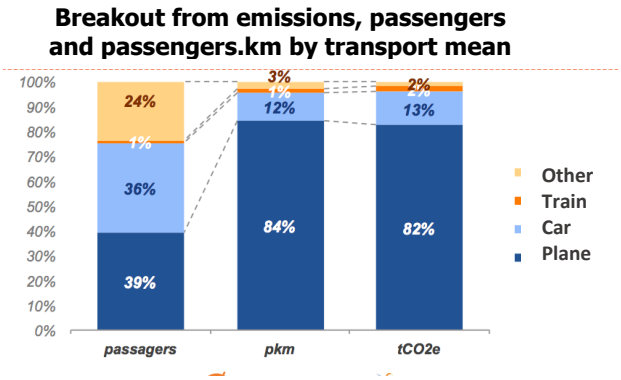
This graph illustrates the number of broadcasts per tourist. Transport (air and automobile) is by far the most important. The arrival of tourists in Morocco is mainly by airplane, which explains why it has the highest carbon intensity. Accommodation is the second most important job in terms of carbon intensity. A detailed analysis of these two main items is detailed below in order to better understand the degree of action that can be undertaken.

The difference in the activity item is most likely due to the difference in the scope of the calculation of emissions. The methodology used for this position at the global level has not been clearly identified at this stage.

Focus on transport emissions

As transport is the most important item, it is important to investigate the sources of emissions. Air travel and car travel account for 82% and 13% of transport emissions, respectively. Comparing the number of passengers and passenger-kilometres (indicating the total number of kilometres travelled per tourist "p. km") shows that the number of tourists traveling by car or airplane is about the same. However, the plane p. km is much greater than car p. km. This does not translate into more kilometres driven or a greater weight of emissions.

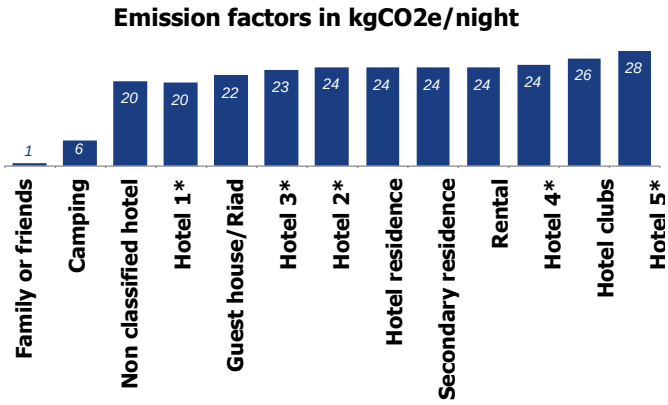


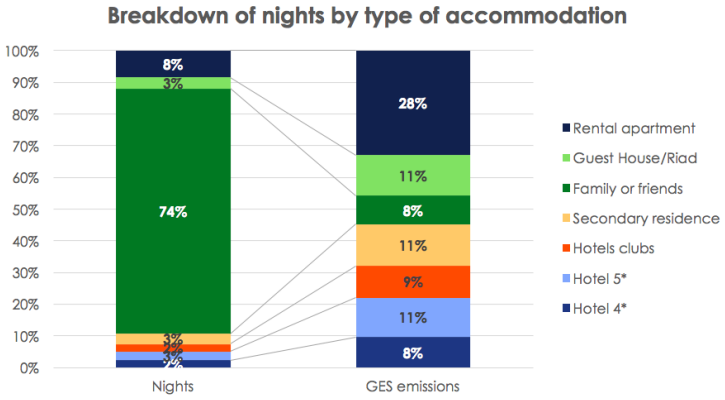


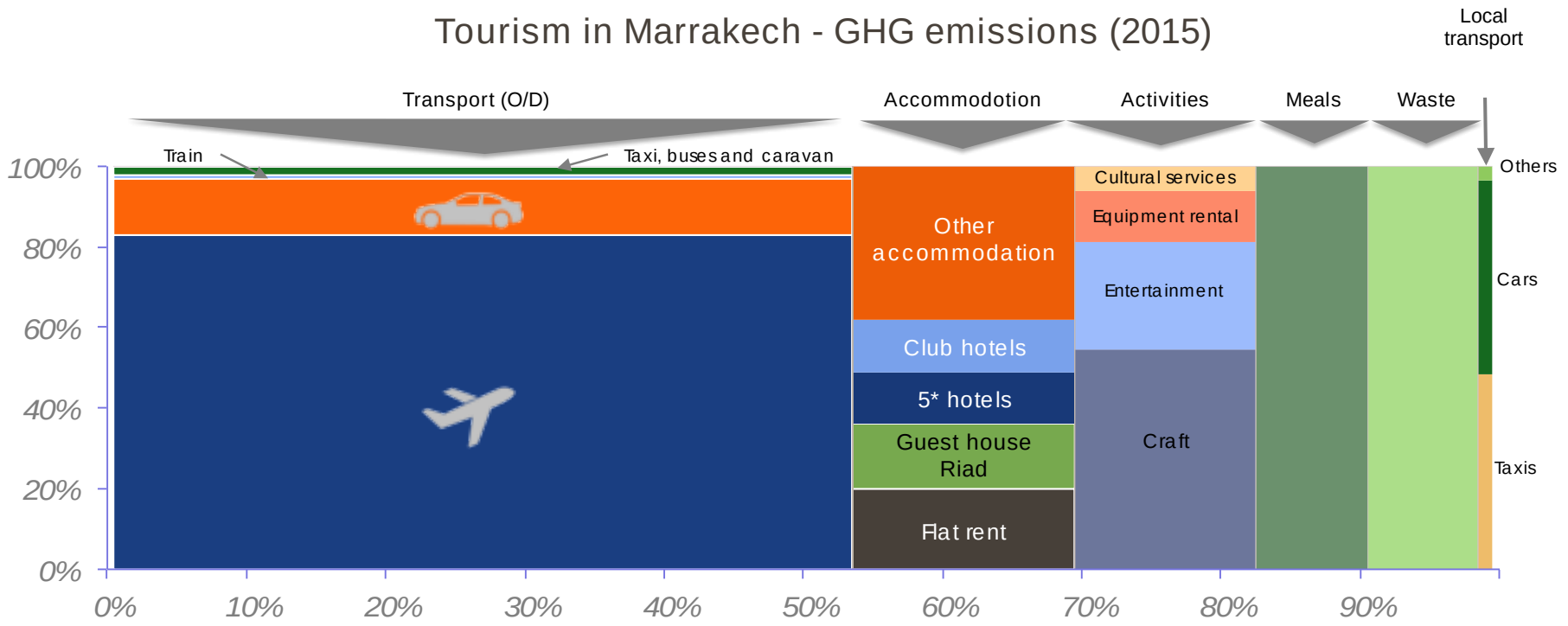
Focus on accommodation emissions

Emissions linked to energy consumption in accommodation establishments is the second largest source of emissions in Morocco's tourism sector and accounts for 34% of the total emissions. These emissions

are generated 51% by internal tourists. Whereas 51% emissions are generated by tourists staying with family and friends.
By comparing the factors of emissions per night for the different types of accommodation, the family and friends option is clearly the least emissive. Although hotels account for only 26% of overnight stays, they are responsible for 92% of GHG emissions.







The tourists' origin-destination transport is the largest source of emissions responsible for 54% of total GHG emissions:

- 82% of transport emissions are related to air transport
- 71% of transport o/d emissions are related to foreign tourists' transport

Accommodation is the second largest source of emissions, 16% of total emissions are related to energy consumption in hotels, Riads and others:

- Carbon emissions of accommodation are roughly equally shared between Riads, clubs, 4 and 5 stars' hotels and rented flats. It is then necessary to work on all accommodation types in order to significantly reduce carbon emissions in the accommodation sector.

13% of emissions are linked to tourists' activities in Marrakech such as cultural activities (museum for instance) and the purchase of handicrafts.

- The purchase of marketable handicraft products represents 55% of carbon emissions.
- More than 70% of emissions generated by tourists' activities are linked to foreign tourists.

Waste generation and catering each represent 8% of total emissions.

Lastly, around 1% of total emissions are related to tourists' mobility within Marrakech. Even this source represents low carbon stakes, it's important in terms of image and ratchet effect to set mitigation actions in order to reduce GHG emissions of domestic transport.

1.5. Baseline (2030) for the tourism sector and its GHG emissions

To establish a baseline of the Moroccan tourism carbon footprint (domestic and international arrivals), assumptions and limitations have been made for the increase in the number of arrivals, the distribution of markets (countries of origin, domestic), and the choice of transportation. Furthermore, the emission factors of all means of transportation, accommodation, tourists' activities, food and waste are required. These emission factors are presented in the section below.

International arrivals

The growth of international arrivals is based on the figure in the 2030 global tourism scenarios for Northern Africa by UNWTO (2011, for the last most representative long term growth rates), which is 4.6% per year. The UNWTO does not provide reliable figures for domestic travels. Therefore, the relationship between GDP per capita and trips per capita has been used for the whole Moroccan population as provided by Peeters and Dubois (2010). This model requires a population and GDP per capita growth projection for 2030. The population growth factor is provided by the United Nations (2011) and the GDP per capita by Bénassy-Quéré, Fontagné, and Fouré (2011). However, domestic travel tends to strongly decrease as an economy develops, as citizens begin to take international trips. A reduction of domestic travel by 2% per year has been estimated for the period 2015 to 2030. Therefore, despite the population and economic growth, domestic tourism will nevertheless stay constant, due to this higher propensity to travel abroad.

The following statistics and projections are taken as a starting point:

- Outbound trips by Moroccans in 2015 (UNWTO, 2016): 1.7 million
- Domestic trips by Moroccans based on our global tourism model (2015): 24.2 million
- Population: 34.8 million in 2015 and 39.86 million in 2030.
- GDP per capita $2,847 in 2015 and $4,189 in 2030
- Trips per capita in 2015 0.72 and in 2030 up to 0.86.

This leads to the following total number of trips:

CATEGORY	ARRIVALS		ANNUAL GROWTH RATE 2015-2030 %
	2015	2030	
International 2030	10 280 000	20,188,000	4.60%
Domestic 2030	22,600,000	23,027,000	0.12%
Total 2030	32 880 000	43,216,000	1.84%

Figure 11 : Estimation of arrivals between 2015 and 2030

Distances

Apart from these arrival numbers, there will also be a shift to more distant markets. To estimate this change, markets have been divided into short-haul air transportation (<1000 km one-way), medium haul (1000-6000 km), and long haul (>6000 km one-way) markets.

By redistributing the growth of medium and long haul markets and assuming long haul to also have growth in the average distance, it was possible to define the following growth rate assumptions:

TOURISM ELEMENT	ANNUAL GROWTH RATE (%PER YR
Short haul/domestic	0.12%
Medium haul growth rate	4.0%
Long haul growth rate	9.1%
Overall growth rate	1.84%
Additional long haul average distance growth rate[7]	5.5%

Figure 12 : annual growth rates per category of tourism

Based on the above results, it is possible to model the volume of trips and distances. Apart from the differentiation between source markets, there is no additional impact assumed on transport mode choice, meaning that the shares of transport modes for a given distance class are kept constant. Furthermore, the share of air transport (in pkm, passenger.kilometre) growth is significant, as can be seen in the excel model.

Length of stay and overnight stays

To relate the number of arrivals to the number of overnight stays, we assume a slow reduction of length of stay of 0.5% per year, conforming with past trends (Peeters & Dubois, 2010). Finally, we assume the local distance travelled to increase by 2% per year, which is a standard figure for mobility increases per person. This only affects local transport.

CO2 emission factors

Another critical assumption is about the CO_2 emission factors. A major decision has been made to improve the emission factor of electricity production in Morocco. According to Nationally Determined Contribution (NDC) an evaluation by Climate Action Tracker Partners (2017), Morocco is reasonably on track with the improvements. Measures that have been taken will reduce the total emission by 10%. Furthermore, the government has the ambition to increase the share of renewables in electricity to 42% in 2020 and 52% in 2030. Though measures and investments will be needed, the current situation with solar energy is that it may deliver cheaper electricity than fossil fuels. Combined with the ambitions and the possibility to start a NAMA for this goal, we assume for the baseline scenario that there may be a 30% improvement in the emission factor for electricity production by 2030, meaning an average improvement of 2.3% per year.

[7] The short haul and medium haul average distance is assumed to; be constant.

The following assumptions have been made

EMISSION CATEGORY	ANNUAL CHANGE (%/YR)	NOTES AND SOURCES
Air transport	various	The annual improvement is not a regular annual improvement factor, it is based on the method described by the 'Lee graph' from Peeters and Middel (2007)
Car transport (all kinds)	-1.5%	(Peeters & Dubois, 2010)
Train transport (electric)	-3.0%	As electricity
Autocar	-1.5%	As car
Taxi	-1.5%	As car
Caravane	-1.5%	As car
Ferry	0.0%	No reduction assumed because of lack of information.
Accommodations	-2.3%	As electricity
Households (where many domestic visitors stay)	-2.3%	As electricity
Activities	-2.3%	As electricity
Waste	-2.3%	As electricity
Food	-2.3%	As electricity

Figure 13 : baseline 2030 assumptions

Results

This section shows the results of scenario calculations that are based on a set of assumptions as outlined above. Of course, there is uncertainty about the future. This section is the result of systematic calculations, but it could be different if an assumption is wrong. The scenario calculations show the combined effect of improved efficiency, increased tourism and rising tourism transport volumes likely causing an 84% increase in CO_{2e} emissions from 20.3 Mton in 2015 to 37.3 Mton CO_{2e} in 2030. This increase is very much the result of a likely further shift towards air transport and longer distances resulting in Origin/ Destination transport constituting a share of 75% of total emissions (when it used to be 53%). Within this O/D transport, air transport will constitute a share of 94%. Within the scenario calculations, the share of air transport in the number of arrivals will increase from 31% to 46%.

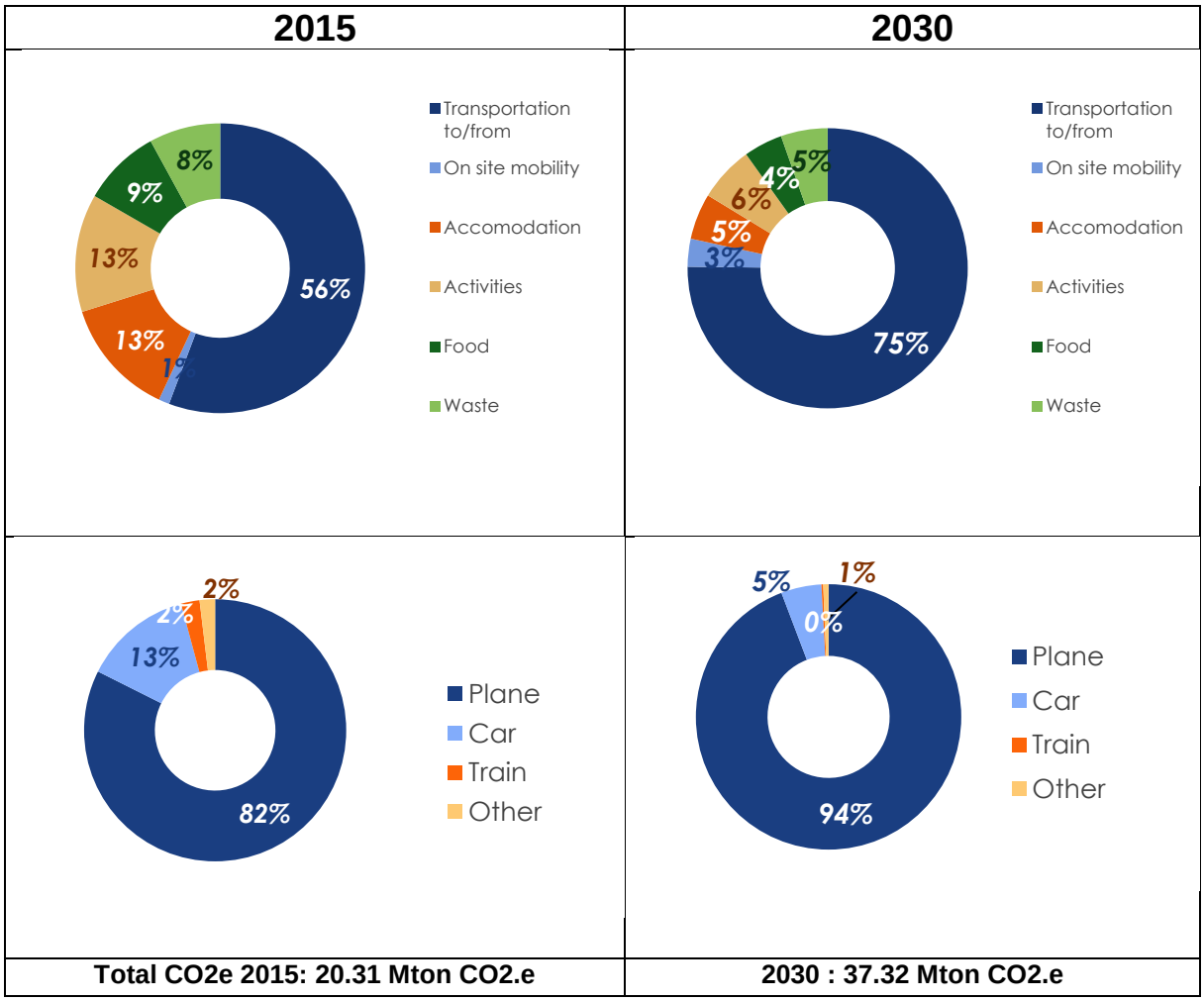


Figure 14 : overview of tourism sector emissions for the years 2015 and 2030 in Morocco. Top : overall tourism emissions. Bottom : Origin/ Destination emissions

2. Potential NAMAs in the tourism sector

2.1. International benchmark

Internationally, the sector of tourism is connected to many different official sectors of NAMAs. Actually, the only current NAMA which focuses on the tourism sector is one related to waste management in Dominican Republic. It presents a finance plan to achieve the adoption of alternative energy technologies through biomass and to address waste management in the tourism sector. This reference will also be used for the benchmark of potential NAMAs.

The emissions related to tourism are generally increasing because of the growth of the tourism sector, and environmental funds are expected to focus on this sector in the coming years. Compared to other tourism countries, the kingdom of Morocco shows relatively high emissions per visitor (see the carbon footprint here above). The recent Moroccan policies aiming at being a model of sustainable tourism should be highly profitable for the kingdom and a valuable argument for convincing possible financers. Because of this sector specificity, the work selecting potential NAMAs for the tourism sector is forced to analyze diverse criteria and sectors linked with the tourism sector, such as waste management, transport, and energy.

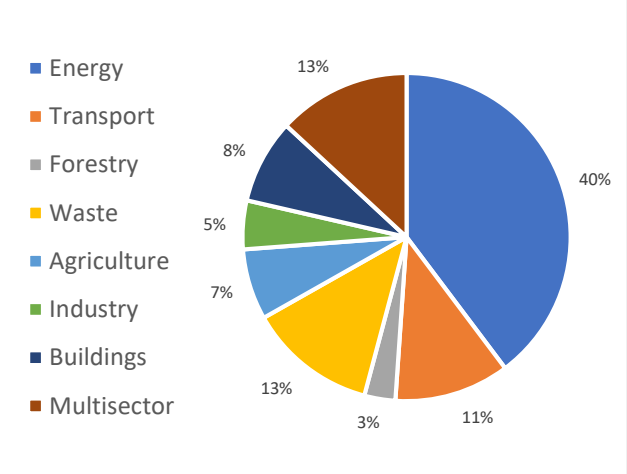


Figure 15 : Breakout of sectors addressed by NAMAs worldwide (source : NAMA database)

A quick view on the NAMA about tourism in Dominican Republic

Sector: waste
Objective: achieve wide-spread adoption of alternative energy technologies and address waste management in the tourism sector
Start of initiative : 2013
Financing : 370 M$ (20 requested for financing)
Mitigation potential : 0,85MtCO_2.e/year.
Current status : unknown

2.2. Inventory of potential NAMAs

To select the NAMA, a benchmark of existing measures worldwide in the tourism sector has been performed, and a list of criteria for each of the main NAMAs, finishing with a shortlist of 5 potential NAMAs.

A list of potential components (corresponding to policy measures) has been set up and discussed among experts and applied to the Moroccan situation.

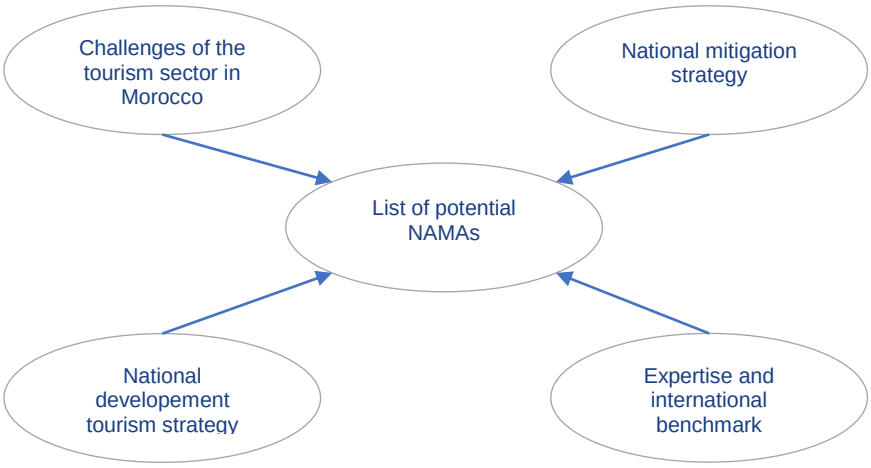


Figure 16 : Methodology for the definition of the potential NAMAs

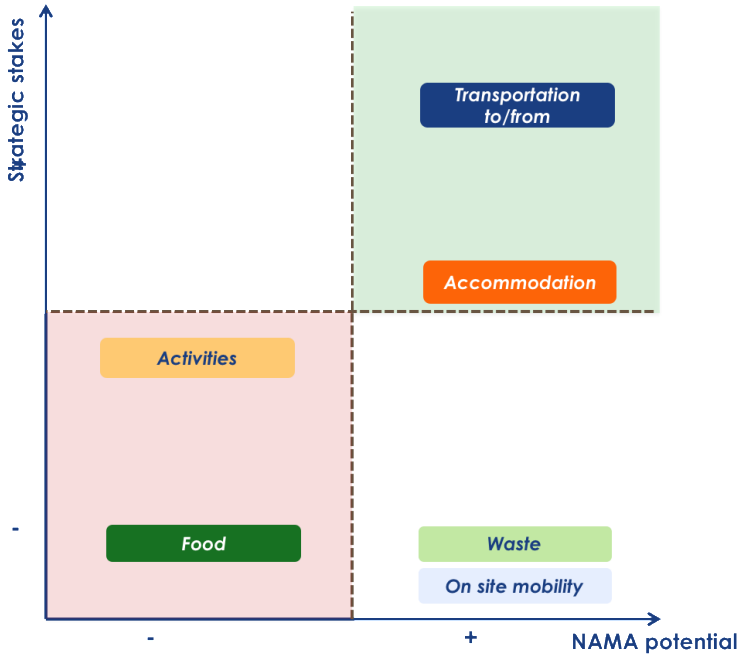


Figure 17 : NAMA potential and strategic stakes

These components were then gathered and translated into potential NAMAs. Following this, the potential of each potential NAMA was estimated and the first estimation of the relevance performed. A multi-criteria analysis was then completed to find the best choice, in terms of mitigation potential, policy relevance, co-benefits, and key factors of success or failure.
The NAMA suggestions are listed below:

NAMA 1: Towards zero carbon accommodation

- Objective: set up awareness campaigns and investment projects, in order to reach carbon neutrality for the accommodation sector for the year 2030
- Main components
  - Building capacity for the accommodation sector towards low carbon and resource efficient operations
  - Specific partnerships public/private for the financing of investments in low carbon systems
  - The implementation of low cost energy-efficiency measures
  - Finance and investment in highly efficient appllances and cooling systems
  - Self-sufficiency with solar, wind, and methane energy

    - Label for low carbon hotels
    - Development of zero carbon restaurants
- Estimation of mitigation potential: 4,2 MtCO2
- Cost range: 100-300M$

NAMA 2: Sustainable mobility in Morocco

- Objective: promote sustainable mobility in the whole territory by implementing awareness campaigns and infrastructure improvements
- Main components
    - Promotion campaign of local public transport in tourism resorts
    - Development of efficient and connected booking systems
    - Special tourist fares
    - Improvement of train and other transportation
    - Finance participation of tramway lines extension in cities for airport access or tourism purposes
- Estimation of mitigation potential: 0,1 MtCO2
- Cost range: 100-300M$

NAMA 3: Limiting GHG emissions in air transport

- Objective: reduce air transport emissions of tourists by implementing a list of innovative measures
- Main components
    - Incentives for carbon efficient airlines
    - Off-setting and empty seat penalty and the reuse of the generated money in low carbon projects
    - Non-air connection improvement with Europe and border countries
    - Routes and connections optimization
- Estimation of mitigation potential: 6,6 MtCO2
- Cost range: 10-50M$

NAMA 4: Promotion of low carbon tourism products

- Objective: promote low carbon activities and reassert the value of vulnerable areas
- Main components
    - Domestic tourism promotion campaign
    - marketing incentives for longer stays
    - low carbon mobility and activity promotion campaign
    - rural tourism development plan
- Estimation of mitigation potential: 2,3 MtCO2
- Cost range: 20-70M$

NAMA 5: Improving food value chains and waste management in touristic places

- Objective: optimize food supply circuits, support local production
- Main components
    - Development of food green belts around the cities and tourism resorts
    - Sustainable food procurement
    - Low carbon menus
    - Food waste management
    - Campaign promotion of Moroccan gastronomy
    - Improving energy efficiency in restaurants
    - Methanation development
    - Circular economy models or food value chains
- Estimation of mitigation potential: 1,0 MtCO2
- Cost range: 50-100M$

2.3. Multi-criteria analysis of potential NAMAs

To evaluate the potential NAMAs, this study has been presented to a list of stakeholders and actors[8] of the tourism sector in Morocco and has been discussed.

A sample of the most relevant actors has been individually interviewed to review the details of the most promising potential NAMAs and to end with a final list of potential NAMAs with precise details to be directly circulated at the Ministry of Tourism for the final choice.

The criteria for the evaluation were:

- Mitigation potential (in Mtons of CO2)
- Cost estimation (finance needs for the NAMA in $, loans or grants)
- Political coherency (relation with existing programs and main policy directions)
- Finance possibilities (available investment tools for auto-financing)
- Societal co-benefit (acceptance, relation with
- Economic co-benefit
- Environmental co-benefit
- Other key factors (barriers and levers in relation with existing strategies, national objectives or missing/available key elements)

If the NAMA does mainly focus on the mitigation potential, it is also evident that the objectives of the NAMA should be based on existing measures and relevant actors, to maximize its attractiveness for local and external financers .

Figure 19 : the main NAMA has been selected after a discussion with a selection of 30 actors related to the tourism sector in Rabat

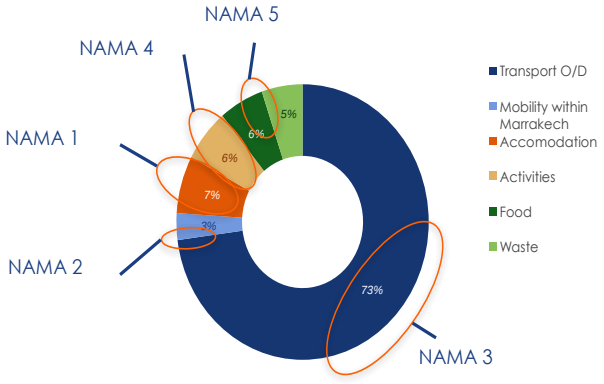


Figure 18 : Breakout of tourism emissions in 2030 with parts targeted by the potential NAMAs

Though the NAMA showing the greatest mitigation potential is focused on airplane emissions, which is currently the biggest element of the carbon footprint (more than 50% of all emissions) in Morocco and supposed to be even more important in the future (reaching more than 70% of all emissions), this potential NAMA was not able to be selected due to the difficulty of its implementation, and also because the emissions of air transport are not considered in the NDC. This NAMA may be kept as a suggestion for a transnational NAMA or a national policy of air ticket taxation to utilize these revenues for alternative transport modes.

[8] The French minutes of the meeting and the list of available stakeholders are available in appendix.

The potential NAMA based on local transport and the NAMA concerned with the promotion of sustainable tourism have not been chosen because of their low mitigation potential. However, some elements of the proposal based on food management have been kept as the choice of the main NAMA, which will be developed: a NAMA based on an objective of zero emissions in the accommodation and touristic restaurants sectors and a specific adaptation objective for resort restaurants.

The detailed propositions for the NAMA for the sector of tourism in Morocco may be found in ***appendix 2***.

Figure 20 (next page) : summary of all criteria for the choice process of the main NA

NAMA	Measures	Mitigation potential (MtCO2.e)	Cost	Policy coherence	Finan-cing	Social	Econo mical	Enviro-nment	Key factors (levers, obstacles)
	• Training of consultants • Use of standards • Audit + low-cost measures • Subsidies and systems for renewable energies • Label zero carbon / focus on hammams and food	4,3 11%	+++ Subsidies and audits but possible partnerships	+++ Strong, existing similar programme and strategic goals	++ Public/private partnership, energy funds	+ Aware-ness of the energy resource, stability	+++ Energy independance, jobs energy sector	++ Resources (water), less fossil fuel	+ Existing MRV, available funds - Strong engagement needed
	• Promotion of public transport • Booking systems • Special rates • Infrastructure for trains and tramways	0,4 1%	++ Costly infra-structures	++ Average, train develop-ment	+ Multilateral coope-ration	+ Popularity, life quality	+++ Taxed products	+ Air quality, urban heat islands	+ Period - Difficult financing
	• Incentives for airlines • Carbon offsetting for the empty seats • Packages for multi transport • Optimisation of routes	6,6 17%	+ Few (regulation office)	++ Example as sustainable tourism destination	++ Carbon funds	++ Vulnerable zones	++ Value creation	++ Air quality	+ Mitigation, innovation - Legal?
	• Campaign for inland tourism • Long period tourism • Support of low carbon activities • Vulnerable zones	2,3 6%	++ Subsidies and promotion	+++ Current program-mes GIZ/NDC	+++ public subsidy	+++ Equity m/w, stab. existing jobs	++ activities	+++ ressources,vulne-rable zones	+ Existing funds, adaptation - NDC objectives
	• Green belts • Organic waste • Promoting the local gastronomy • On site methanation	1,0 3%	++ Support developme nt and subsidy	++ NDC strategy , « Bon pour le Climat »	++ Soft loan, pub/private partner-ship	++ Urban exodus, link prod/cons.	++ Continuity agriculture jobs	+++ Public health, water, ground, polluting	+ Formal. Agri-culture (water) - Mitigation

3. Towards a climate friendly accommodation sector: a NAMA for the tourism sector

3.1. Main description

This NAMA **proposes to 'eliminate' emissions from an entire subsector, accommodation, which in 2015 represented 10% of emissions from Moroccan tourism**. This will make a significant contribution to emission reductions, specifically considering the anticipated growth of the sector with another 200,000 beds until 2030. The NAMA will also generate global attention, as Morocco would be the first country in the world to pursue a sector-wide decarbonization strategy in tourism. As the following description highlights, the cost of achieving this goal is moderate, and has the simultaneous benefit of reducing operating costs and vulnerabilities related to future fluctuations in energy cost, while also improving national energy autonomy. The value of such a strategy in terms of marketing Morocco as a technologically advanced, green destination can be considerable.

Should the NAMA be fully implemented by 2030, it would correspond to the mitigation of 4.2 $MtCO_2$ (7% of anticipated emissions of 37.3 $MtCO_2e$ in 2030). The implementation of the NAMA will follow a specific procedure: all accommodation establishments with the exception of private accommodation will receive technical assistance to implement measures that are available at a negative cost (this includes staff training, as well as technology change with pay-back times of up to 2 years). A total of 3707 accommodation businesses will have to implement the measures suggested (technical/behavioral change) (see details below). Notably, their energy cost will decline as a result of these measures, which should yield average energy savings of 15% (Gössling 2011). To implement these measures, a systemic capacity building and financing program which will in turn enhance the accommodation operating and the efficient use of resources. When the implementation of the training and management program for hotels is completed after approximately two years, an institution will be able to contribute to further management related energy reductions in related sectors (e.g. housing, offices, utility buildings, schools). In hotels, remaining energy requirements will be covered by a switch to renewable energy sources, involving both in-house supplies (solar power on rooftops), as well as investments in larger-scale energy production (solar, wind, biogas). The production capacity installed will be additional to Morocco's pledges (UNFCCC).

The secondary element of the NAMA is to reduce emissions from food use and waste generation. Food is an important aspect of the attractiveness of Morocco for international tourists (Kivela, Crotts 2006), but food also contributes significantly to emissions from the sector (9%). To improve the food sourcing, this NAMA proposal focuses on the development of green belts around the cities, the promotion of sustainable procurement of food, the promotion of Moroccan gastronomy and vegetarian meals, and the optimization of food waste management (through specific recycling processes and methanation to make use of biogas). This will reduce the amount of greenhouse gas emissions (methane), while simultaneously provides a low-carbon energy source for cooking. After methanation, food waste can be used as compost to enrich soils.

The NAMA thus integrates resource and energy conservation with capacity building and empowerment through job and new knowledge generation. It integrates the use of fossil fuels with aspects of resource production (food) and waste avoidance, and closes production-consumption loops, thus contributing to the development of circular, and green economies.

Objectives

- To reduce emissions from accommodation by 2030, in tourism growth scenario
- To develop financial mechanisms to support the use of renewable energy, and improvement of energy efficient operations in the accommodation sector
- To develop procurement schemes to support sustainable sourcing of food
- To develop circular economy models to maximize resource use and avoid waste through various measures, including methanation to create biogas

3.2. Components

The NAMA includes several components, detailed below. The components should appear in the following order, to ensure the consistency of the NAMA action.

1/ Building the capacity of the accommodation sector towards low carbon and resource efficient operations

The provision of training programs for energy consultants for the implementation of energy efficiency measures in accommodation places and touristic restaurants, awareness campaigns and a joined research program to develop the needed technology at a local level.

2/ Finance and Investment mechanisms to support the transition to renewable energy and energy efficient operations, and technologies

Creation and management of specific funds for investment to be used for zero interest loans and covenants for energy feed in tariff, based on competitive advantages for accommodation managers.

3/ Sustainable procurement of goods and services (food and technical), from construction to room features

This component will build the capacity and create a community of practice of procurement experts in the hospitality industry and an exchange platform to facilitate lessons learned and collectively identify recommendations on how best to leverage procurement practices to reduce greenhouse gas emissions, improve resource efficiency and accelerate the shift towards a more resilient, resource efficient development of the tourism sector.

4/ Awareness campaign for customers and employees

Awareness campaign for tourists and employees through specific information campaigns, specific dedicated events, awareness tools and a promotion campaign of good practices for raising the awareness of tourists based on existing programs.

5/ To promote energy efficiency standards in the entire accommodation sector

Audit of accommodations and recommendations for implementation of measures (technical and process oriented) for energy efficiency, renewable energy production and sustainable food management. Energy audits and technical support for low energy devices, self-supply systems, negotiation contracts with energy and food providers. Based on existing programs (Clé Verte, Eco Binayate, Bon pour le Climat), the implementation of a labelling program for the accommodation sector with high objectives and a communication program for tourists, integrated in existing classification and labels systems. This should also be oriented towards international tour operators.

Audience targeted by the NAMA

The accommodation places targeted here by the objectives of the NAMA may be distinct according to the following criteria:

Category of accommodation: the NAMA is aimed at accommodations with investment capacity, meaning that professional accommodation managers are targeted. In order of priority, hotels, motels, hotel clubs, apartment hotels and guesthouses are proposed accommodation types to be targeted. Nonprofessional accommodations such as Airbnb won't be considered in this report.

Category of tourism: a distinction between tourism types will be made according different zones (seaside, cultural, business, well-being, etc.). However, no restriction should be made so far. The type of tourism may affect the awareness campaign and the communication strategy.

Type of management: a significant number of accommodations are not directly managed by owners in Morocco, these owners are likely to be abroad (Moroccans residing abroad). These Moroccan-owned accommodations are managed by international chains (Accor, Hilton…) and decision centers are not always in Morocco. The training of consultants should distinguish between the different audit approaches as the manager may not have the decision power.

Restaurant service: as the NAMA is also aimed at optimizing food management, accommodations with food service will be prioritized.

How many beds per hotel category in Morocco?

. 38158 beds in 5* hotels (93 hotels)
. 46863 beds in 4* hotels (195 hotels)
. 33043 beds in 3* hotels (239 hotels)
. 17202 beds in 2* hotels (243 hotels)
. 15378 beds in 1* hotels (282 hotels)
. 28196 beds in bed and breakfasts (1950 bed and breakfasts)
. 24367 beds in apartment hotels (198 apartment hotels)
. 22000 beds in hotel clubs (40 hotel clubs)
. 4868 beds in camping (22 camping)
. 5214 beds in holiday homes (323 holiday homes)
. 7769 beds in other categories
Source : Ministry of Tourism (2016)

Location: there is no restriction on the location of the accommodation as the NAMA is a national action. All zones (rural, coastal and urban) are concerned.

3.3. Mitigation potential

Assuming the aforementioned measures are successfully implemented for all 3727 accommodations and related restaurants reported by the Ministry of Tourism, the potential mitigation effect could be **4.2 MtCO2e**.

Assumptions

However, to calculate a more realistic figure for 2030 the following is assumed:

- When an enterprise receives a low carbon label, the assumption is that on average the emissions have been reduced by 90% per guest-night (assuming that an effective change and full investment on low carbon technology will reach 90%) for that particular accommodation. This 90% increase in efficiency includes the combined effect of efficiency savings according to the Moroccan Policy Scenario, Minimum Energy Performance Standards (MEPS)[9] and the NAMA directed at Moroccan accommodations and restaurants.
- The NAMA program is supposed to come into effect from 2020 onwards.
- Based on the experience of an existing accommodation labelling scheme in Morocco (Clef Verte), it's assumed that there will be 100 additional accommodations plus restaurants per year in the program, translating to 2.7% of all eligible enterprises per year. This development has been taken as an average per year.
- The total accommodations/restaurants between 2020, the first year with all measures implemented, and 2030, the goal year, thus will be approximately 1000 accommodations/restaurants.

Realistic mitigation potential

Based upon the above assumption, a more realistic figure of saving for 2030 is **1.1 MtCO2e** reduction. This is 3.0% of the tourism 2030 emission BAU scenario emissions and 24% of accommodation/restaurants emissions. Evidently, after 2030 the program should be continued, and the effects will further increase. It's expected that the implementation rate could even be substantially increased by the end of the period 2020-2030 because of learning effects, social effects (communication, a positive reception of the program) and additional available funding due to the operational savings from the program.

Mitigation potential related to the number of successful implementations

To estimate a mitigation potential according to the number of accommodations taking part in the NAMA program, an estimation rule can be used. 90% of the accommodation emission is expected to be saved with all NAMA components being successful implemented.

For instance, the use of cooling systems in business for refrigerators and air conditioning units – is increasing by around 15 per cent a year. For the most part, appliances are inefficient and employ outdated technology. Not only do they consume a large amount of energy but they also continue to use fluorinated or chlorinated hydrocarbons as refrigerants. Leaks in appliances allow these gases to damage the climate and the ozone layer. They are responsible for the equivalent of around two to three million tons of direct CO2 emissions globally. It is estimated that Morocco could cut its energy consumption for cooling by 21 per cent if modern technology were put in place. Efficient lighting in hotels could cut energy emissions by 34%[10].

For an average number of 100 guests/night per hotel, an expected mitigation potential can be estimated at **420 tons CO2e** (accommodation and restaurant, about 50% for each).

[9] See http://united4efficiency.org/country-assessments/morocco/.

[10] See https://united4efficiency.org/country-assessments/morocco/

With an objective of 100 hotels/year, 42 000 tons of CO2e can be defined as an objective. This estimation allows objectives to be set for periods or to re-estimate the mitigation potential according to the number of hotels entering the NAMA process.

3.4. Co-benefits

This NAMA's co-benefits include sustainable development benefits; changes in economic structures towards green growth including employment opportunities; as well as significant environmental benefits in terms of energy/emissions reductions and water use.

Social:

Through staff trainings, one of the objectives of this NAMA will be **growing awareness about energy issues**, and its importance in terms of provisions and cost. Through the NAMA, employees will learn about energy use and production (capacity building), and saving energy. Notably, this training will include background information on climate change as well as the cost saving benefits of the NAMA. This will make it attractive for staff members to **reduce energy consumption** not only in the hotel, but also in their respective homes. Programs like these are particularly successful when employees participate in savings.

For example, Hilton Worldwide set targets and measured performances in its 2007-2014 Global Sustainability Initiative, with the goal of creating a pro-environmental team culture. The results of the campaign included a 15% decline in energy consumption and a reduction in water consumption by 8 per cent. In total, 16,000 team members were trained in the programme, saving US$16 million over the period of 2005-2008, this was virtually entirely achieved through staff member behavioural changes. (To involve the team, 3000 mountain bikes were awarded for participation.)

A co-benefit of training programmes is therefore a significant decline in energy consumption (15% in hotels), and perhaps equal savings in home contexts, helping employees to save money at home. Accommodation businesses can foster interest in energy and water reductions by rewarding staff with technological contributions. For example, in exchange for staff contributing to energy and water savings in accommodations, hotels may make a financial contribution to the installation of solar power panels in staff homes, or reward staff with low-flow shower heads or other water or energy-saving devices installed at home.

This is a mechanism to save resources even outside the hotel while simultaneously rewarding staff for their contribution. When staff become producers of their own energy, it increases **economic and social stability**, as more individuals become owners of energy production, and less dependent on exterior provisions. The outreach potential is considerable for the employees in the accommodation sector in Morocco, and thus provides a direct avenue to mainstreaming energy efficiency and renewable energy interest in the wider population.

With some 515,000 employees in accommodation in Morocco, the benefits of a training program could be substantial. Ideally, this could result in the installation of more than half a million water saving devices in households, and several hundred thousand solar panels in the homes of staff members. Finally, in regard to the restaurant sector, similar benefits can be anticipated with regard to reducing food waste, but also in terms of hotels producing their own herbs and, vegetables. Even here, programs for staff may be introduced to generate interest for at-home production, for instance in the form of small, water efficient greenhouses.

Tourism is a sector that is employment-intensive and which offers job-opportunities in particular to women. Where employees are involved in management, as shown by the Hilton chain (Bohdanowicz et al. 2011), they will not only make contributions to energy and resource savings but take this knowledge 'home' with them, initiating secondary cycles of mitigation. Working with energy savings is thus a means of saving resources and money for employees through the transmission of knowledge. This is a form of empowerment that is specifically relevant for women, who are often in charge of household finances. Their representativity should be enhanced for every level of decision (executive, operational).

- **Economic**:

The mainstreaming of energy production generates greater resilience for the entire economic sector (energy supply, energy cost). It also enables a greater number of individual businesses to become producers of energy, and to thus delegate responsibilities, costs and benefits of renewable energy

production. In the context of the Paris Agreement, it lowers the sector's susceptibility to energy taxation and other market-based measures to reduce emissions. Finally, renewable energies are small-scale, and thus have significant employment benefits, creating new economic opportunities for electricians, engineers, and suppliers throughout the country. For example, the German renewable energy sector employs 0.8% of the workforce (355,000 out of 42.6 million), indicating the enormous qualified, long-term employment potential of this sector. As outlined, the NAMA provides a strong cross-cutting element, in which hotel resource savings due to staff behavioral changes can be made partially available to employees. This has the potential to influence more than half a million households to install solar panels and water or energy saving devices. This could therefore generate tens of thousands of new jobs in associated sectors, such as the renewable energy sector or the retail/installation sector (water savings). As these systems can be used indefinitely, demand for cyclic replacements as well as reparation and control services would support stable and self-financing jobs in this sector.

- **Environmental**:

The NAMA is relevant to the environment because it will help to reduce overall energy requirements, and to switch remaining energy requirements to renewable, local energy production. This will reduce energy requirements and fossil fuel use, both leading to a decline in the emission of greenhouse gases. Small-scale energy production also has a wide range of other environmental benefits, such as lower area requirements (use of rooftops for solar), as well as reduced water use (15% of global freshwater use contributes to energy production, including fossil fuels and hydro). An added environmental benefit from the restaurant part of the NAMA is that staff may become more interested in at home production of vegetables or herbs, mainstreaming small-scale production of food.

The table here below provides an overview of co-benefits and indicators that may be used to measure these benefits.

Co-benefits	Indicators
Economic - Financial savings for participating businesses (energy) - Avoided cost (waste) - Increasing energy independence through renewables, with long-term cost decline - Regional multiplier effects through local food sourcing - Reputational gains for Morocco as green destination, leading de-carbonisation efforts - Reducing vulnerabilities through local producteion of food, energy (no dependency on imports)	- Cost of energy/bed night - Cost of waste/bed night - Share of renewable power used - Share/amount of local food use - Media reports on NAMA - Share of local production
Environmental - Avoidance of greenhouse gas emissions (accommodation, transportation of food, waste) - Local food production - Circular economy models developed to maximize use of resources and waste - Lower consumption of non-renewable resources - Optimization of the use of water thanks to the improvement of the environmental performance	- Emissions of GHG (total/bed night) - Share/amount of local food production - Volume of water consumed - Density of air pollutants - Amount of waste/bed night - Recycling rate
Social - Local development benefits (tourism, food production) - Empowerment of staff through enhanced knowledge base and integration in planning of low-carbon operations - Empowerment of women in new low-carbon knowledge economy	- Employment in tourism (direct/indirect) - Number of employees trained - Share of female employees

Tableau 1 : Co-benefits of energy savings and indicators

3.5. Implementation

Two steps implementation

We suggest a 2 step implementation of the NAMA, based on an 8 year timeline:

- Phase 1: Preparation, set-up and pilot

The first phase would focus on a capacity building programme on energy management and resources efficiency. A pilot phase with a restricted number of accommodation places with different specificities would take place in representative locations, to face the levers and obstacles of the protocol. This phase would need an estimated length of 3 years.

- Phase 2: Full implementation and scale-up

Respecting the NAMA objective, a national replication based on the results of the first phase would then occur with an objective of 1000 accommodations (representing 26% of all accommodations considered by the Ministry of Tourism).
An estimated length of 5 years is considered, bringing the NAMA to an overall length of 8 years.

Suggestion of pilot phases in Marrakech and Tangier

To start the implementation of the NAMA, the city of Marrakech is a relevant suggestion for a pilot phase. Being one of the most representative touristic places, and already used as a place of demonstration. To cover different climate scenarios and accommodation behaviors, another city should be used for the pilot phase. Tangier has been suggested by the Ministry of Tourism and the Secrétariat d'Etat chargé du Développement Durable as a complementary representative touristic location.

Existing material, initiatives and actors will be considered

The implementation plan is based on as many existing elements as possible. Meetings with local actors helped to list the material which could be used to ease the implementation process, for instance:

- Institutions already working on the topic, able to have a role in the development of the NAMA : above all AMEE (for training and guidelines), SIE (for investment tools), SMIT (for interactions with hotel managers, in cooperation with the Ministry of Tourism).
- Training programs based on existing guidelines and recent experiences such as "Mosquée Verte", "Eco-Binayate" labels from the ADEREE, or "Bon pour le Climat" from the GIZ.
- The implementation of the "Affichage Environnemental", with the objective of estimating the carbon footprint of some accommodation places in Marrakech, recommending low cost actions and working on a labelling program for the impacts of the nights spent in each hotel
- Policy recommendations from the Ministry of tourism such as the ones highlighted each year during the "Trophée Maroc du Tourisme Responsable" event.

National objectives and new regulations

The national objectives already designated tourism to be one of the main sectors to be investigated for specific mitigation actions. But some important regulation updates are expected and will help investments to be made, such as the new thermal regulations[11] for the hotel sector from the Ministry of Energy, requiring that every main building to complete an energy audit and respect energy consumption thresholds. A recent law[12] also focuses on the renewable energy production and allows producers to sell their energy excess to neighboring customers.

[11] http://www.mem.gov.ma/SitePages/TestesReglementaires/Loi47-09.pdf
[12] https://renewablesnow.com/news/morocco-amends-renewable-energy-law-507698/

A NAMA designed to ease investment process

Moroccan institutions have highlighted the fact that subsidies will not improve consumer impulses for main renovation procedures, and that they are limited because they do not completely solve the investment issue for accommodation managers. Specialists of the SIE or AMEE recommend investment tools to be developed to match managers expectations. The needs of NAMA finance would mainly include the provision of investment funds, dedicated to give accommodation managers specific finance levers for their renovation or system investment needs. Zero interest loans dedicated to specific and eligible investments, ESCO (energy service company investing in systems and receiving benefits from energy savings), leasing, fund guarantees are different means to ease the investment on a large scale. Some have already been tested, and others have been listed by energy institutions in Morocco. Public financers would also be welcome to raise interest in major national companies. These investment tools would be the core of the NAMA project.

Long-term cooperation and continuous progress

To avoid short term interests and the disappearance of accommodation after the first contacts, the NAMA is designed in order to ensure continuous progress and long-term cooperation. As energy efficiency takes time (usually years between the first audits and the concrete implementation), the NAMA aims at using grants to give consultants the possibility to return to accommodation managers as long as is needed and to ensure long-term cooperation. This lack of time is usually the main obstacle for investment, especially for energy investments which can be costly. Awareness campaigns directed towards customers and employees are also intended in a way to encourage investment from sources outside of governmental institutions.

Wide dissemination as the final objective

In Moroccan context and following COP22, the feeling to belong to a global environmental movement is perceived positively by most of the sectoral actors. Thus, it is important to support this feeling at the stakeholders level such as consumers in developing a communication strategy targeted on the topic, between the different actors of the sector in order to enable the emulation and belonging feelings. Cooperation with booking platforms should be a part of this dissemination strategy and integrated as far as possible, highlighting information about the reduction of the accommodation's environmental impact. Some institutions (bookdifferent.com for instance) provide this kind of information in their booking confirmations.

3.6. Details of the components

Component 1

Capacity building for the accommodation and restaurant sectors

Based on existing material and training programs, this component will mainly be devoted to training consultants. An existing training program and guidelines from the AMEE (formerly ADEREE) may be used as a reference for the technical aspects of the program. National consultants should be trained to provide recommendations for investments in energy and food management optimization, tailored to the specificities and budget of the accommodation.

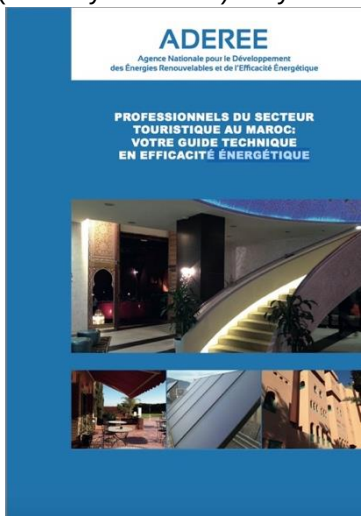


Figure 21 : Technical guidelines developed by ADEREE aiming at professionals of tourism sector

The training program should also focus on an awareness campaign, as consultants are also expected to manage this campaign (which will be detailed below). This component will also be used to simultaneously clear the framework conditions and regulation needs.

The "Affichage Environnemental" has already run training programs on Marrakech, based on cooperative monitoring of hotel indicators. This monitoring work was a preliminary step before a list of action recommendations could be provided. This approach, which gives good results, can also be used as a part of the capacity building strategy, and it also refers to the restaurants.

An embedded research program will also be associated with the training. The objective will be to investigate and document the technical issues that the NAMA could face during the dissemination and subsequently proposing solutions, while also including national providers.

Poste	CONSOMMATION D'ENERGIE (kWh ep)		Répartition (%)
	Total annuel	Par nuitée	
Chauffage – ventilation - climatisation	8 900 209,22	204,01	76,49
Equipement électrique	1 242 808,66	28,49	10,68
Textile	712 588,90	16,33	6,12
Eclairage	511 463,36	11,72	4,4
Eau	268 895,39	6,16	2,31
Alimentaire	-	-	-
Produits d'accueil	-	-	-
Produits d'entretien	-	-	-
Total	11 635 965,54	266,72	100,00

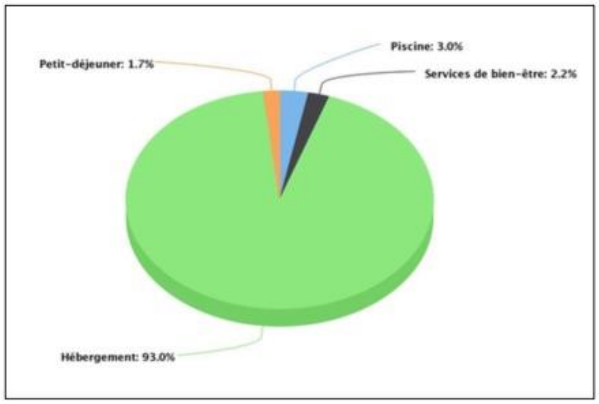


Figure 22 : example of energy reporting done in cooperation with the hotel staff (Source : Betterfly Tourism)

Some Moroccan research institutes may contribute to focusing on the main issues which need to be addressed (for instance, the IRESEN[13], Institut de Recherche en Energie Solaire et en Energies Nouvelles, or the CNRST, Centre National de Recherche Scientifique et Technique[14]). These research topics can also be considered as spin-offs for other sectors, with comparable buildings (health, hospital, care-homes, schools, offices, etc.). This research program aims also at raising interest in private companies which can contribute to the main investment funds (see details below).

[13] www.iresen.org/index.php/

[14] http://www.cnrst.ma/

Actors: The AMEE could be needed for the training of consultants, in cooperation with the Ministry of the Environment and the Ministry of Energy. Research institutes and private energy and food providers should be associated for this component.
The Ministry of National Planning, Urban Planning, Housing and City Policy
(Ministère de l'Aménagement du Territoire National, de l'Urbanisme, de l'Habitat et de la Politique de la Ville) can also be used to introduce and enhance the legal framework and support actions.

Timeline: This component should be the first one to start after fully developed preparation work has been done to set up the main specificities of the NAMA. The embedded research program should be released as soon as possible and give results before the first implementation phase (pilot) is completed. The training program should be dimensioned to the pilot size, report on the requirements of consultants after the pilot phase and be disseminated to a larger scale for the second phase of the NAMA. This section will be the opportunity to launch the investment fund(s), to develop a competitive bidding (with related calls) that will allow the identification of key private partners partnering for pilot projects.

Component 2

Finance and Investment mechanisms to support the transition to renewable energy and energy efficient operations, and technologies

At the core of the NAMA lies an investment fund designed to give accommodation managers and owners the incentives to undertake the implementation of measures based on the recommendations given by national consultants.

The cost-effectiveness being critical for most of the accommodation managers, the investment funds need to be investigated and not only presented as loans opportunities.

According to the category and size of accommodations and the energy efficiency or food management measures chosen, a set of investment tools have to be defined. Expensive investment for a large 5* hotel renovation with a renewable energy production system, biomass fired cogeneration plant for instance, will need a totally different investment structure compared to the installation of light bulb replacements for small family-run bed and breakfasts.

Some possible investment tools

- Zero interest loans
- Loans guaranteed by the funds
- Leasing
- ESCO (energy service company)

See the finance plan for other suggestions

To tailor these investment needs, the component 2 needs to investigate the existing, already investigated, or requested investment tools and design a matrix to find the most appropriate one for each investment.

The implementation of this component 2 will firstly require the identification of the different investment tools and to evaluate their pertinence in the Moroccan context, and their possible use. The investment fund should then be correctly sized and delineated. When this has been done, private partners should be approached (some of them are already part of the process if they took part in the research program), so they can be a part of the investment tools offer (through leasing for instance).

Possible roles can be the generation from credit lines (soft loans), guarantees for banks investing in the fund or wanting to offer equity contracts.

Actors: The SIE (Société d'Investissements Energétiques) is a national state actor, dedicated to fulfilling the objectives of the energy mix. The SIE can take action in the development or the investment of energy projects. It can also be used as a major source of information for the choice of investment tools and their best use.

The SMIT, in cooperation with the Ministry of Tourism, may also approach the main actors of the hotel industry to investigate their investment needs. A national bank needs to manage the main investment fund.

Example of specific existing funds: Plan Renovotel

. A funds dedicated to the investments of accommodation
. common loan between private bank, Caisse Centrale de Garantie (CSGH) and Dar Ad Damane (DAD)
. Required : 7 years of establishment, feature on the list managed by the committee for the ranking of accommodation places, be solvent

Timeline: This component should be active during the start of the NAMA project, before the training phase of the consultants, so that a first list of investment tools can be prepared before the training program.

Component 3

Sustainable Procurement of goods and services, from construction to room features and energy appliances

Based on the training program presented in the component 1, the component 3 includes all the contact phases with the main recipients of the NAMA : the accommodation managers and owners.

The audit of accommodations is a set of meetings, which consists of a first contact and first analysis of an accommodation, additional visits to list the tailored recommendations, a synthesis of recommendations and list of suggested investment tools specific to the accommodation, support for the decision maker to complete an investment plan. This will be followed by regular meetings to review the progress of the implementation of measures and to go further with future climate friendly actions over long-term cooperation (may last between 1 to 5 years).

As this audit phase is a very time-consuming process, a selection of accommodation places will be performed by the Ministry of Tourism as a first step, based on several indicators (solvency, interest in energy efficiency, location, renewable energy capacity of the place, food management specificities, etc.).

To estimate the capacity needs of this phase, a ratio will be considered, based on an estimation of the number of accommodations that will not follow the program to its end. As this ratio is important for the process in order to focus on the accommodation places more likely to implement the measures, the audit phase will include regular milestones. If an accommodation does not complete a milestone, it won't be considered any further.

In our evaluation, we estimated a percentage of 30% of accommodation places to implement measures in our highlighted sectors (energy efficiency, renewable energy, food management), at different levels of implementation (between 30,000 € and 300,000 €). If this estimated ratio appears low, it is because we want to be as realistic as possible and reflect the considerable obstacles of convincing managers to invest.

Action	Economie d'énergie	Temps de retour sur investissement
1. Isolation du réservoir de stockage d'eau chaude.	10%	< 1,5 ans
2. Isolation des conduits.	15%	< 1,5 ans
3. Subdiviser la production.	25%	< 6 ans
4. Dimensionnement de l'utilisation.	Variable	< 6 ans
5. Substitution des éléments obsolètes.		
• Brûleur (de plus de 8 ans)	9%	< 4,5 ans
• Chaudière (de plus de 8 ans)	7%	< 6 ans
• Chaudière et brûleur	16%	< 6 ans
6. Contrôle de combustion, nettoyage des surfaces d'échange de chaleur.	8%	< 3 ans
7. Nettoyage de l'échangeur thermique.	12%	< 1,5 ans
8. Contrôle de la température de l'eau chaude.	5%	< 1,5 ans
9. Mise en place des compteurs.	15%	< 4,5 ans

Figure 23 : Example of list of measures with energy savings and payback time indicators. Source: AMEE

The content of the audit synthesis has to focus on the main recommendations of the AMEE for energy efficiency (system management, fridges and light energy efficiency, optimization of heating and air conditioning systems, etc.), renewable energy production (photovoltaic to provide electricity for self-consumption and supplying contracts with neighbors, thermic solar for hot water or hot bathes, biomass cogeneration, etc.), and food management (organic waste management in relation to biomass development, food providers contract to support local producers and optimize carbon footprint related to transport and production, promotion of vegetarian menus, etc.).
To have a long-term effect, an incremental decision process should be designed in order to start with low cost measures with quick payback time.

As the NAMA aims at supporting tourism business managers, specific attention needs to be made for the presentation of recommendations. The competitive advantages of these recommendations need to be clearly emphasized in order to address the expectations of accommodation managers.

This component will focus on technical and procedural changes whereas the component 4 will deal with behavioral changes.

Competitiveness advantages of technical investments

Beside energy saving or environmental reasons, some competitiveness advantages have already been used and mentioned by the SIE to stimulate investment, especially in the tourism sector, as they're appreciated by tourists. Some examples are listed below:

- Hot bathes with water coming from thermic solar systems
- The esthetic of energy efficiency lightbulb systems
- The air in well insulated rooms is more comfortable compared to air conditioning (less dry)

Actors: The AMEE and the Ministry of Tourism are expected to work in cooperation for providing and managing human resources (consultants). A centralized system needs to be set up to gather and analyze the indicators of interest and the implementation of measures for each accommodation. The ministry of Environment, in charge of managing a MRV system for other sectors (Photovoltaic plan), may develop an extension for the monitoring of audit progress. The SIE can give feedback on audit details and ensure that competitive advantages are well highlighted.

Timeline: The component should start, only when the components 1 and 2 are significantly advanced, considering every suggestion from the first components and reporting on obstacles and levers. This component should take place during the pilot phase in the field, whereas national dissemination should take place over a longer period (5 years and even more, if the NAMA reaches its objectives).

Quick payback measures to start the incremental process

A wide selection of light measures show very quick payback time and can be used to initiate the process. They can engage the accommodation managers in more ambitious measures if the expected gain is proven.
Acting on employee behavior or negotiating energy or food provision contracts often yield high gains without any need for material investment.

Focus on restaurants

Restaurants are a part of the operating costs of the accommodation sector. A significant part of their energy mix is related to restaurants (fridge, cooker). Aside from energy efficiency measures, local purchase plans can help strengthen the quality of the food and meet tourist expectations (especially vegetarian choices).
Food waste management is also directly related to the energy systems allowing for methanation projects. Therefore, it's important to work on tourists behaviors while suggesting appropriate menus.

Component 4

Awareness campaign for customers and employees

This component is deeply connected to component 3 because it will be implemented at the same time, during the audit period and because it also gives a strong incentive to accommodation managers to implement suggested measures.

Raising awareness about the challenge of being a climate friendly accommodation can be done while addressing 2 audience types, the customers and the employees. The customers of hotels are more and more used to seeing advice for ecological measures to be adopted, often being considered as an incentive to not consume. Furthermore, it's proof that tourists spend their holidays in places which consider environmental challenges, it's more and more appreciated and sometimes even requested.

Innovative awareness and communication methods

A lot of innovative solutions can be used in this awareness campaign. Specific trainings directed towards the employees can give them clues for an eco-friendly day to day routine (for example IFORE trainings or specific guidelines).
NAMA by-products can be used as communication means and awareness tool such as thermometers or little boards with indications for good gestures in rooms or restaurants.

For the same reasons, the employees of the tourism sector are the ones who can support customers while giving them advice or information about the optimized energy management system. They will also play the role of climate friendly lifestyle advisors when they come back home. As the tourism sector is the second largest economic sector in Morocco, this lever cannot be ignored.

Successful renovation campaigns have already relied on local intermediates to reach their objectives. Recently, the "Mosquée Verte" initiative used imams to raise awareness of renovation needs in mosques as examples to present some renovation opportunities.[15]

[15] http://www.usinenouvelle.com/article/le-maroc-veut-convertir-ses-mosquees-au-vert-ecologique.N433677

A relevant part of energy savings can already be obtained thanks to behavioral changes, before technical or procedural updates. Simple gestures such as the adjustment of the water temperature or pressure, less frequent replacement of towels, or air conditioning temperature adjustment can sometimes have better results compared to technical solutions.

Figure 24 : Training plan from the AMEE

This component would be managed by consultants, during the audit period.

Trainings dedicated to employees will be held and include different modules (for instance, behavioral changes, better system management, relation with customers, choice of restaurant menus, waste management). This is motivated by the fact that upgraded technical systems or processes are often wrongly used if employees are not trained, and the expected benefits are then lost. The strategy of simple gestures for customers need to also be integrated into the training program for the employees so that the employees can act as advisors and clearly communicate the benefits of the strategy. A specific point of attention needs to be addressed between the consistency of the requested gestures of the customers and the actions of the employees. For instance, suggesting a lower frequency of towels replacement will only be successful if employees find strategies to ask customers when the towels need to be replaced, and if employees are trained to then act on these requests, for instance not replacing towels when this is not demanded by the customers, and this is monitored.

Customer awareness campaigns are sometimes not well accepted by accommodation managers because they fear their customers may be disturbed by reminders for behavioral changes. However, as the discussion about climate change challenges is more and more documented in the media, customers change their attitude and often feel better when they consider that they behave correctly. This is usually achieved by giving written information in the hotel rooms or hotel devices. These kinds of programs can be supported by the Ministry of Tourism by implementing a national program to provide free and simple graphic or video documents to be used and disseminated on different media, including booking platforms.

It will also act as a means of communication, giving customers information about the NAMA in the kingdom of Morocco. Different examples of awareness campaigns for customers can be easily found in the media, sometimes with positive impact on the visitor numbers[16].

Actors: The consultants of component 3 can be used for this component, in cooperation with representatives of the Ministry of tourism. The Ministry of Tourism can use its communication means to support the initiative and use their image as a lever for the dissemination of the awareness campaign. Additional events can also be organized out of the accommodation area to communicate details about the project (at the airports arrival, for instance).

Timeline: both campaigns, for customers and employees should take place during the first contact phases with the accommodation.

[16] http://www.lhotellerie-restauration.fr/journal/hotellerie/2017-07/Comment-sensibiliser-les-clients-aux-bons-gestes-pour-la-planete.htm

Component 5

Label for climate friendly accommodations

The labelling process is an opportunity to communicate the process and improve visibility of the accommodation places that invested in optimization processes. Labelling can therefore be used as a tool to convince other accommodations to enter the NAMA process.
As labelling can be used to invoke competitiveness among accommodation places, the labelling process should not be addressed only to accommodation managers but to the customers as well. This can then be related to the awareness campaign for customers, detailed in component 4.

As numerous sets of existing labels already exist in Morocco, the objective here would be to investigate the best labelling alternatives (how to best build upon these, extending an existing label and focusing on the existing frameworks, without creating new labels).

Different levels for different mitigation objectives can be defined (based on the percentage of emission reduction or the number of implemented measures, the energy efficiency level based on the kWh consumption by m2, etc.). The Fondation Mohammed VI pour la Protection de l'Environnement already supports the international Clef Verte labelling program. The structure of such a labelling program can also be used as a reference to know to what extent the NAMA program can be disseminated thanks to a similar approach.

The specific work done by "Affichage Environnemental" (as previously mentioned) focuses on this labelling approach. What makes it relevant is that they focused their work on the Moroccan accommodation sector (in Marrakech) and they offer a very detailed example of what a label could look like. Their project also mentions the whole implementation approach of the label (as previously mentioned for the capacity building and the audit components). This is complementary to the NAMA approach.

As further step, the Ministry of Tourism is considering making this work a regulation, this could provide strong support for the labelling program.

Existing programs in Morocco

Some labelling programs are already active in Morocco and can be used as reference, such as:

- Eco-Binayate (energy performance for construction, 3 levels, used to add value)
- Bon Pour le Climat (gastronomy label released for the COP21, started to be implemented in Morocco by GIZ, eco-simulator of carbon performance of each meal, used to raise awareness among customers)
- Clef Verte (international environement label, with funding from Fondation Mohammed VI, 125 accommodation places already labelled)
- Affichage Environnemental, which is described more in details in the text here below

Figure 25 : example of label used for the "Affichage Environnemental" project in Marrakech, with focuses on climate impact, water and non-renewable resources consumption (Source : Betterfly Tourism)

Actors: The Ministry of Tourism already knows most of the labelling programs which can be used to add value to accommodation places as their role is also to communicate about them and use them as a lever.
The Fédération Nationale de l'Industrie Hôtelière (FNIH) is a complementary actor for this component and the whole NAMA process.

Timeline: the labelling program has to be anticipated and its structure needs to be clear, before the pilot phase begins.

Figure 26 : screenshot of the website of Bon Pour Le Climat with restaurants which did take on measures to be part of the program and be known as climate friendly restaurants

3.7. Cost and finance

Cost estimation

The cost range of the suggested NAMA ranges from ~ 140M€ to 290€ and is based mainly on loans for investment tools to fund accommodation managers' projects.

It is important to predict a phasing approach in order to create proper and solid conditions for the NAMA policy at the national level. The timeframe for the full implementation of the national policy on mitigation in the tourism sector is fixed at 8 years, however it should last longer, as this could be a continuous road towards sustainability and reductions of GHGs emissions.

Finance plan

As suggested above, the following implementation phases are proposed and described below:

- Phase I) Preparation, set up, pilot phase
- Phase II) Full implementation and Scale-up

Phase I) Preparation, set-up and pilot phase *(Timeline: Year 0 to year 3)*

- Regulatory and legal framework

During this phase, the government will create the enabling conditions for the implementation of the NAMAs targets. That is, the **regulatory and legal framework** should be clear, including **law instruments** and codes of conduct as well as **governmental agency roles and responsibilities** (which will be described here below). Such framework should include **legal obligations, targets** and build the basis for financial instruments to be applied in the sector to achieve the expected changes. The recommendation is to create governance systems that could be verified and monitored through either national technical agencies and private actors from the sector. Such framework should predict a timeframe for the regularization of common **practices and penalties** to be applied in case of non-compliance.

- Investment tools for sustainable finance

More in detail, the abovementioned instruments should clearly mention the financial instruments and the possibilities for **sustainable finance**. For example, the development of feed-in-tariffs and Power Purchase Agreements for hotels that may overperform and that will be able to reinject electricity into the grid. Other instruments should be considered as soft loans by banks and specialized entities, as well as private equity for financial agents willing to invest in the sector. Carbon markets and green electricity schemes are complementary options to accelerate investments in larger scale for renewable energies**.**

More specifically, component 2 of the NAMA (regarding EE and RE improvements) will be in charge of developing these finance tools and defining investment rules according to the different profiles of accommodation sites. Taxes, fees and bank rates should be considered and facilitated in order to leverage investment.

- Consultation of public and private institutions

In this sense, such framework should also cover the **consultation and involvement of public and private financial institutions**, civil society organizations and a grievance mechanism; so that the design and implementation instruments account for the specificities of the sector in Morocco.

- Definition of sub-components

Finally, during this phase, key actors and staff of the regulatory system should be trained and properly equipped so to proceed with the first pilot activities (audits). At the end of this first phase, some pilot projects under each sub-component of the NAMA (component 2 of the NAMA) will be chosen and supported to test the proposed system. The sub-components are split into the following categories reflecting the main sectors aimed at by the NAMA:

(i) Decentralized energy efficiency measures;
(ii) Decentralized renewable energy production; and,
(iii) Centralized waste management for restaurants.

The detailed estimated costs of the implementation of this phase, as well as the available financial instruments for fundraising and operationalization is summarized in the table below.

In total, without considering the current governmental operational costs, the **first step of the preparation phase (before the pilot)** is expected to cost between **1,0 and 1,7 M€** for all components (calculations are available on figure 27p46 and in the table p48-49).. For such costs, the recommendation is first to mobilize national and current funds, as well as search for GoG (General Operating Grants) for operating the program when necessary.

- Pilot phase

The pilot phase will be hold in priority in Marrakech and Tanger but other relevant targets and initiatives might be selected in other places

Activities described in the NAMA components (audits, trainings and awareness raising within the sector) should at most rely on current national funds for development so that the mechanism is sustainable. Eventually, the recommendation for punctual support could be done through GoG (General Operating Grants), but that shouldn't be a funding pillar of the NAMA implementation in order to avoid blockages caused by dependency on external and donor funds.

For the selection of the pilot projects and start-up of the financing schemes, it is highly recommended to set-up **Public-Private Partnerships (PPP)** in order to boost components related to energy efficiency and production. The PPP, thanks to a competitive dialogue will raise competitions between private partners in order to support the development of public utility project. On building, management and food supply, the PPP will provide to the public sector key expertise and skills it can' mobilise in such sort time and for specific needs in order to develop efficiency the NAMA. On the other side, the public sector will act as risk taker for futures initiatives that private sector is not driving of implementing yet.

This will only be possible if the government establishes the basis for green economic growth, proposing, for instance to remove "feed-in-tariffs" for energy production surplus, as well as "tariff degression" and disincentives. In addition, as mentioned before, the instruments within the PPP could include soft loans and private equity. Other innovative results-based finance mechanisms could also be mobilized, but that will certainly depend on the current financial landscape of Morocco. Such instruments would provide positive signs for **impact investors** that are willing to invest in green technologies within a country with competitive and robust support.

This pilot phase should allow the testing of the designed labelling system and provide field feedback in order to undertake the necessary adjustments. In total, the second step of the **preparation phase (pilot)** is expected to cost **between 0,8 and 4,8 M€.** For such costs, the recommendation is first to develop public-private partnerships and then request additional credit lines. The finance is mainly based on loans.

The selected pilot projects should implement the requested activities previously described following the specifications of the program. During this phase, trainings and awareness-raising for the accommodation sector are expected to take place once a year.

Additionally, at the end of the period, a consultation round is expected in order to collect feedback and to eventually propose adjustments to the proposed NAMA system. Such activities could be run with the government's own funds and additional GoG from multilateral and bilateral organizations.

The total funds necessary for phase 1, are estimated between 1,7 million € and 6.5 million € depending of the magnitude of the pilot projects to be implemented. As previously mentioned, such funds are to be collected mainly through private-investments (PPP).

Phase II) National implementation and Scale-up ***(Timeline: Year 4 to 8)***

- Replication in the national territory

This phase will be based on the experience from the pilot phase. In that sense, the lessons learned from the pilot projects will feed into the current design of the system and support the potential of scaling up. During this phase, trainings are expected to take place annually, as well as the expansion of projects, and finally, when operators start producing energy, direct payments for results are expected to take place. This phase will also comprise trainings and audits in line with the NAMA proposal.
For the estimates, it was considered that the program would aim 1000 accommodation places that entered into the NAMA protocol, using different levels of investment tools (on average 30000€ to 300000€ per accommodation site like during pilot phase). A 10% increase was added to the costs to include eventual inflation and currency variations. The main differences between the two finance scenarios are in the average investment effort needed by the accommodation places.

For the low scenario, it is considered that 70% of the accommodation places will request an average investment effort of 30000€, and 30% will request an average investment effort of 300000€, reaching 111M€ of total finance needs (0,7 MtCO2e of mitigation potential while applying a 50% efficiency reduction rate for the 70% of the accommodation with the lower investments).

For the high scenario, it is considered that high investment needs will mostly be needed, and that 70% of the accommodation places will need an average investment of 300000€. In this scenario the total finance needs will be 219M€ (1,0 MtCO2e of mitigation potential while applying a 50% efficiency reduction rate for the 30% of the accommodation with the lower investments)..

For the national replication of the NAMA, the finance needs are mostly based on loans for a very large number of accommodation places, based on the results of the pilot phase. With the costs related to the other components (replication of the capacity building, the costs for the labelling and awareness processes), this second phase finance is estimated to cost between **123 and 243 M€.**

Assumptions

A list of the main assumptions used for the finance plan can be found here:

Item	***Estimated price (€)***
Training material (component 1)	50 000 (p.year)
Training of consultants (pilot phase)	Between 30 000 and 50 000 (p.year)
Embedded research program	Between 300 000 and 500 000€ (p.program)
Investment tools for pilot phase	Between 300 000 and 300 000€ (p. accommodation place)

Audit cost (pilot phase)	Between 3000 and 7500€ (p. successful audit, i.e. with implementation of NAMA measures)
Evaluation of implementation phase	100 000 (p. year)
Training of consultants (national replication)	Between 2000 and 3000 € (p. consultant)
National fundraising and investment funds management	Between 5,0 and 10,9 M€ (5% from the investment funds)

Figure 27 : main assumptions used in the finance plan

Figure 28 (next 3 pages) : finance plan

Tourism NAMA Simplified Financing Plan Morocco

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Phases		Tentative Schedule Years 0	1	2	3	4	5	6	7	8	Potential Financial Instruments for running each activity	*to be better defined according to national priorities and context specifities Indicative costs*	Calculations			TOTAL	
I Preparation, Set-up and pilot														Value ranges			
Component	Activities												#Units	low	high	low	high
C0.1	Legal framework design (including targets, instruments and penalties)	x									National funds	Current Operational costs					
C0.2	Public consultation with specific actors (financial institutions, hotels leaders, tourism civil society relevant actors)	x									National funds	Current Operational costs					
C0.3	Definition of the regulatory control system, labelling and governmental agencies in charge	x									National funds	Current Operational costs					
C0.4	Approval of the legal and regulatory framework (including power purchase, labelling and incentives as "tariff degression")		x								National funds	Current Operational costs					
C1.1	Preparation of the training of specialized staff and acquisition of equipments	x									National funds and BoG (General Operating Grants)	Up to 50'000€ per year including simple monitoring materials (tablets, thermometers, etc)	1	50000	50000	50000€	50000€
C1.2	Training of consultants for the accomodation sector (pilot phase)			x	x						National funds and BoG (General Operating Grants)	Up to 50'000€/year/campaign One-month training for 5 consultants (15 accommodation places totaling 100'000€ for each consultant during the pilot phase).	2	30000	50000	60000€	100000€
C1.3	Affiliated research program to enhance the available systems at a local level			x	x						Grant	between 300000 and 500000€/research program. 3 research programs considered (3 topics to be defined for the sectors: energy efficiency, renewable energy, food management)	3	300000	500000	900000€	1500000€

Tourism NAMA Simplified Financing Plan Morocco

v05 Dec.2017

Phases		Tentative schedule Years 0	1	2	3	4	5	6	7	8	Potential Financial Instruments for running each activity	Indicative costs*	Calculations				
												*to be better defined according to national priorities and context specifities					
C2.1	Fundraising for implementing the actions and end of set-up phase		x	x							Public-Private Partnerships (including options as soft loans, equity and result-based finance) with impact investors – creation of specific funds for pilot projects based on each of the scopes defined below.	From 30'000 to 300'000€ needed per pilot accomodation according to co-funding needs and size of operation (see below)					
C2.2	Selection and set up of finance instruments for accomodation managers	x	x								National funds	Current Operational Costs					
C2.3	Selection of pilot projects (suggestion of subcategories specities) and credits allocated from the investment funds			x	x						National funds operating Grants and impact investments (upfront costs estimates)	Total costs ranging from: 450'000,00€ low 4'500'000,00€ high				0€	0€
	(#1) decentralized renewable energy production				x						Loan + specific investment tools (equity, leasing)	30'000-300'000€/pilot	5	30000	300000	150'000€	1'500'000€
	(#2) energy efficiency measures				x						Loan + specific investment tools (equity, leasing)	30'000-300'000€/pilot	5	30000	300000	150'000€	1'500'000€
	(#3) centralized food waste management				x						Loan + specific investment tools (equity, leasing)	30'000-500'000€/pilot	5	30000	300000	150'000€	1'500'000€
C3.1	Pilot projects audit and recommandations					x	x				National fund/GoG (General Operating Grants) for control and evaluation systems; in addition Public-Private Sector Partnerships (with private impact investors, equity and soft loans)	7500€ / successfull audit (average considering different levels of audit and number of visits according of the invesment process of each accomodation). We estimate 1/3 accomodation will start an investment	15	3000	7500	45'000€	112'500€
C4.1	Pilot projects awareness campaign of employees and customers					x	x					Estimation 10% of the whole audit price, considering one awareness campaign for alle employees (approx. 1 day long) and awareness campaign material (flyers, notices) for customers	45	300	750	13'500€	33'750€
C1.4	Evaluation of implementation by responsible agents					x	x				National funds and GoG (General Operating Grants)	Operational costs up to 100'000€/year	2	100000	100000	200'000€	200'000€
C0.5	Consultation and Feedbacks to the current systems, and adjustments						x				National funds and GoG (General Operating Grants)	Operational costs					
																1'718'500€	6'496'250€

Tourism NAMA Simplified Financing Plan Morocco v05 Dec.2017																	
Phases		Tentative schedule Years 0 1 2 3 4 5					6 7 8	Potential Financial instruments for running each activity	*to be better defined according to national priorities and context specifities Indicative costs*	Calculations						
II) Full implementation and scale-up (national replication)							y6 y7 y8									
Activities																	
C1.4	National training of consultants based on the program						x x x	National funds and GoG (General Operating Grants)	Extension to the whole territory, training phase for every major touristic city. We consider a training program for 1 consultant for 30 accomodation places. Training cost of 3000€/consultant. (Considering the 15 pre-trained consultants for the pilot phase may join the phase, but 15 may quit the program)	100	2000	3000	200 000€	300 000€		
C2.4	National fundraising for expansion of the investment funds						x x x	National funds and GoG (General Operating Grants)	Cost dedicated to run the invesment funds = 5% from the investment funds amount	5%			5 550 000€	10 950 000€		
C2.5							x x x	Loan + specific investment tools (equity, leasing)	Average investment between 30000 and 300000€	low/high investment price	30000	300000				
									Estimation low 70% of accomodation places have a 30000€ investment, 30% have a 300000€ investment. Estimation high 30% have a 300000€ investment, 70% have a 70% investment	1000	30000	300000	111 000 000€	219 000 000€		
C3.3	Expansion of the audit program to other hotels/restaurants						x x x	National fund/GoG (General Operating Grants) for control and evaluation systems; in addition to grants and Public-Private sector Partnerships with private impact investors, equity and soft loans)		1000	3300	8250	33 000 000€	82 500 000€		
C4.2	Expansion of awareness campaign for the program to other hotels/restaurants						x x x		To be defined according to the first pilot experience, but here we will consider the same average costs for the first phases with 10% increase.	included in cell above						
C5.1	Label for climate friendly accommodation and restaurants						x x x	National funds and GoG (General Operating Grants)	Estimation 2% of the cost of the investment process/year	3	7400 000€	18 460 000€	22 200 000,00€	43 800 000,00€		
	Direct payments for renewable energy production and reimbursement of loans						x	National funds, return from investments (by reducing electricity bill, eventually overproduction and increase in visitors), eventually carbon finance	According to installed capacity and size of projects involved							
													122270000	242880000		
									IPhase 2 :		122 270 000,00€	###	242 880 000,00€	0,00€		
									IPhase 1, 2 :		123 988 500,00€		249 376 250,00€			
											13 776 500€		27 708 472€	Annual average		
											1 148 042€		2 309 039€	Monthly average		

3.8. Economic viability

Financial Viability

A quick financial analysis was done to predict the potential return on investment of the climate-friendly measures. According to a few assumptions that need to be verified in the set-up phase, notably discount rates, currency fluctuations, inflation and bank rates for lending and borrowing, the potential NAMA could have a IRR of approximately 143% until 2030 (for the high investment scenario, with average savings based on existing case studies). That said, as several scenarios were established for investment, financial support and implementation, such values could easily be changed.

This financial analysis is based on expected gains for the accommodation sector. Different sources give high saving values for different sets of energy efficiency measures implemented in hotels. the average economy per bed (18 MAD/bed.night) given by the AMEE and results from different case studies (see the box with the case studies of Betterfly Tourism) have been used for the analysis. Occupation rates have also been considered.

Quick payback solutions pilot projects in hotels in Marrakech

Pilot studies have been done in Morocco about possible environmental upgrades in touristic places in Marrakech by the *Betterfly Tourism* French office in 2017 (Affichage Environnemental). A low finance plan has been studied and confronted to possible economic and environmental gains. Different categories have been investigated and detailed energy efficiency and water management plans have been presented. These case studies have shown that low investment programs (on light systems, air conditioning or water systems) are sufficient to reach significant gains. For an investment plan between 50 000 and 500 000 MAD, most of the case studies showed gains between 25 000 and 500 000 MAD with very short payback (either 1 or 2 years).
This study is available on the SCP Clearinghouse portal.

Moreover, it is important to underline that this return on investment is the results of a good equilibrium between different “quick wins” activities and other activities offering a return on investment over the long term. It is essential to implement all the NAMA activities in order to keep this balance and generate quick wins as well as transformative and structural changes in the sector so that it is economically viable.

Cash inflow opportunities

Out of the cash inflow generated by the refund of the loans, it is important to indicate that carbon finance could also be used to leverage private result-based investors. In this sense, carbon certification could also be considered to measure emission reduction targets and to provide additional finance for the NAMA. Projects must follow international certification requirements and third-party audits in order to certify the results in terms of tCO_2e. Such certificated results can be traded in the marketplace. For this, an adapted national system could be created, including a performance-based payment by economic agents that are not able to reduce their carbon footprint. If the government wishes to include such an option, the present NAMA should be presented as “credited” NAMA. It is not clear how such instruments would enter into the UNFCCC’s agreements and how the evolvements of such credit generation would be included and available for carbon trade. However, the government can claim the willingness to have a credited NAMA so that in future, the credits generated under the policy can be eventually liabilities or assets. The UNFCCC defined a credited NAMA by the opportunity for the NAMA to generate credits for emissions that might be sold under carbon market mechanisms. Under this hypothesis the NAMA must be registered as such at UNFCCC.
Finally, the financial balance of the present NAMA will largely depend on the type of financial resources gathered for its implementation these could include: grants, loans and direct investment from the private and governmental sectors. A detailed finance plan is needed to investigate this point.

3.9. MRV (Measurement Reporting and Verification) system

The objective of this NAMA is to reduce GHG emissions of the accommodation sector until carbon neutrality is achieved by raising the awareness of professionals and customers of the accommodation sector and the development of renewable energy. In order to ensure efficient running of the project and the implementation of actions, a Measurement Reporting and Verification system is proposed to manage the various actions.

Analysis of current international MRV practices

In order to measure the effectiveness of the actions implemented by the NAMAs, a measurement system known as MRV (Measurement Reporting Verification) must be set up. This system would propose specific indicators to measure changes, reporting at different time horizons and methods to verify data and information.

There are two categories of indicators, divided into several types.

- Quantitative indicators: These are indicators whose variables can be measured using standardized units of measurement: These indicators can be financial, technical or measure a number of implemented processes.
- Qualitative indicators: These are indicators whose variables cannot be measured using standardized units of measurement. These indicators can also be financial, technical or process indicators.

MRV indicators under NAMA:

In order to facilitate the setting up of the MRV for NAMA, we proposed a global approach (or comparative approach) similar to the one which could have been set up within the framework of NAMA habitat in Morocco. As this method is very common in NAMA, it allows for "large-scale data analysis of evaluation protocols of the energy efficiency program for buildings".
This approach requires quantitative data collection in order to compare them to the BAU. It will therefore be important to try to find a balance between the quantitative indicators that will make it possible to objectify the progress of actions and the qualitative indicators.
For instance, a KPI (Key Performance Indicator) is a commonly used measure for performance comparison. Since the amount of emission reductions is the primary concern of a NAMA, the KPI should be expressed as GHG emissions. As part of the actions related to accommodation, its unit will be reduced per unit of gross floor area (kgeqCO2 / m2). For measures aimed at waste, it can be reduced to used (kgCO2/user).

The required aggregate data

Required data for the indicators that can be used to evaluate the project implementation progress and the mitigation impacts could be obtained from institutional and operational actors in the Moroccan accommodation, tourism and energy sectors. Initial data (baseline) will always be used as a reference to measure the evolution of each needed data.
Firstly, the required resources for data collection and the establishment of indicators are to be sought from institutional and operational actors in the energy, housing and tourism sectors.
In a second stage, the data will be more easily collected by the consultants on site, as it has already been tested during the “Affichage Environnemental” project.

Preparation of MRV system :

Upstream of this approach, several actions and studies are to be implemented in order to facilitate the monitoring of the various programs and also their evaluation in terms of climate impact. These actions are listed below and are also detailed in the reference indicators by component:

- Capacity building and technical support for the MRV technical team. A well-designed MRV plan can facilitate access to financing. The Measurement, Notification and Verification (MRV) system of these actions is important to generate transparency about their effectiveness and facilitate decision-making. However, this cannot be done without capacity building and some technical support.

- Awareness-raising among stakeholders (institutional, professional, NGOs, financing companies, energy distributors, associations, etc.).
- Training of the MRV technical team: MRV tools, data processing, reporting, project management, types of project financing, etc.)
- Training of MRV system partners: Energy distributors, equipment suppliers, foreign exchange board, HCP, Architects and BET, finance companies etc...
- Strategy and communication adapted to the MRV system: Tools (website, newsletter, media, etc.),

The table below synthesizes some progress indicators that could be used for the NAMA.

Towards a climate friendly accommodation sector through energy efficiency and renewable energy - MRV				
N°	**Qualitative indicator**	**Quantitative indicateur**	**Reporting frequency**	**Entity responsible for monitoring**
Component 1: Capacity building for the accommodation sector				
Upstream work for monitoring indicators: **- Definition and preparation of training for experts** **- Setting up or integration in a web platform of exchange for the participating organizations, the trained experts and the different contents.**				
1	Evaluation of behavioral changes following training capacity building of consultants. A questionnaire distributed to the trained consultants will allow them to have their vision on this evolution.	/	Semester	MRV Technical Team – (AMEE or else)
2	/	**Financial indicator**: - amount of funds allocated for the capacity building	Semester	MRV Technical Team – (AMEE or else)
3	/	**Process indicator**: - number of training sessions - number of participants of each session	Quaterly	MRV Technical Team – (AMEE or else)
4	/	**Impact indicator**: -number of enterprises that participated and scope in terms of the bed-nights they provide and/or the turnover they reach per year	Quaterly	MRV Technical Team – (AMEE or else)
Component 2: Specific partnership public/private for the investment process for the accommodation places				
Upstream work for monitoring indicators: **Restructuring of the different financing solutions that already exist for each type of accommodation.** **Energy performance improvement sheets by typology to better identify solutions**				
1	Evaluation of the most efficient investments in terms of energy savings due to the consultants' experience feedback.	/	Yearly	MRV Technical Team
2	/	**Financial indicator:** **-** Number and amount of loans granted by each partner bank - Number of renovated dwellings - Number, volume per type of solutions and equipment concerned	Quaterly	MRV Technical Team- Ministry or national authority responsible for the environment, tourism and housing

		- Number of subsidies awarded by type of beneficiary (individuals or hotels) - Amount of corresponding energy savings (ex ante)		
3	/	**Process indicators:** - Type and amount in € of investments needed - Technical indicators per investment project (for example for the renewable energy development: installed capacity (kW) and annual produced energy (kWh) - May be add cost in € per kW installed and kWhr produced?	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
4	/	**Impact indicato :** - Amount of emissions saved due to investments made (tCO2eq/m2)	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
Component 3: Audit of accommodations and recommendation for implementation of measures (technical and process oriented) for energy efficiency, renewable energy production and food management				
Upstream work for monitoring indicators: **- Develop standard actions for each type of accommodation to prioritize the most effective actions and follow up on them.** **- Make solutions available on the platform to communicate on it.**				
1	Feasibility of the proposed measures	/	Yearly	MRV Technical Team
2	Quality and detail of the collected data needed to evaluate energy savings of each measure	/	Yearly	MRV Technical Team
3	/	**Financial indicators:** - Amount of funds allocated for the audit - Total cost of the proposed measures over five years - Total potential revenues of the measures in terms of (energy) cost savings over five years	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
4	/	**Process indicator:** - Number and type of low cost measures per hotel	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
5	/	**Mitigation potential:** - Potential energy savings allowed by each suggested measure (in kWh) and carbon emissions reduction potential (in tCO_2e)	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
Component 4: Awareness campaign of customers and employees				
Upstream work for monitoring indicators: **- Provide access to the platform for sites wishing to participate in projects to provide them with brochures or solutions for their employees and customers.**				

1	Evaluation of the customers' behaviors evolution after the awareness campaign	/	Semester	MRV Technical Team
2	List of actions that can be implemented within the accommodation types	/	Semester	MRV Technical Team
3	Communication support for clients and users	/	Semester	MRV Technical Team
4	/	**Financial indicator:** - Amount of funds allocated for the awareness campaign	Semester	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
5	/	**Process indicator:** - Number of awareness campaigns - Number of employees participants - Number of sensitized customers	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
6	/	**Mitigation potential:** **-** Monitoring the effectiveness of the various measures implemented. For example % of towel not washed - Calculation of avoided GHG emissions for each measure.	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
Component 5 : Labelling strategy for climate friendly accommodations				
Upstream work for monitoring indicators: **To carry out a comparative analysis of the different labels and select three of the most relevant labels to reach target values on energy consumption and waste reduction. For energy consumption labels, try to establish average carbon performance to facilitate the monitoring of energy consumption.**				
1	Continuous evaluation of Label energy performance	/	Semester	MRV Technical Team
2	/	**Financial indicator:** - Funds in € allocated for the label program implementation	Semester	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
3		**Process indicator:** - Number of companies that have been made aware of labels - Number of companies wishing to obtain a label - Number of companies having obtained a label	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
4	/	**Mitigation potential:** - Calculation of the energy savings before/after the label has been rewarded in relation to a reference situation (tCO2/m2 & tCO2 avoided) - Calculation of avoided waste (tons of waste) and saved emissions (tCO2)	Quaterly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism and housing
For the whole NAMA				

Upstream work for monitoring indicators: **- Description of the reference situation (baseline) to be able to calculate the performance of the shares set up.**				
1	Quality of data used to calculate the annual carbon emissions of the accommodation sector. In an approach similar to the sector's carbon footprint in this report, this analysis of data quality should help refine the results.	/	Yearly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism
2	/	**Impact Indicator :** - Annual energy consumption (per type of energy: electricity, gas…) of the accommodation sector (in kWh) - Annual carbon emissions of the accommodation sector in tCO2e - Annual energy consumption (per type of energy: electricity, gas…) of the accommodation sector (in kWh) - Annual carbon emissions of the accommodation sector in tCO2e - Annual carbon intensity of the accommodation sector in tCO2e/m2 - Annual % emissions savings compared to the baseline for all the above indicators.	Yearly	MRV Technical Team - Ministry or national authority responsible for the environment, tourism

Please note that it is necessary to update the emission factor of electricity production mix in Morocco to calculate the carbon emissions of the accommodation sector related to electricity consumption. Indeed, the Moroccan accommodation sector can benefit from the important efforts of Morocco to develop renewable energies and decarbonize its power production mix.

Reporting

The reporting of the different actions will have different time horizons. Therefore, we propose a reporting process that will make it possible to organise the combination of indicators and to prepare interim reports. We propose a three-step process:

1. Accommodation companies participating in one or more programs become members of a public organization / foundation or sign an agreement with that organization.

2. Accommodation companies must report yearly on energy consumption and the various actions taken. They will then be converted directly to CO2 (using a simple web form or in some other practical way). Companies may be accompanied by the consultant in charge of their follow-up appointments. This consultant will remain the company's main contact with the program. They will also provide an opinion on the company's overall approach to monitoring.

Some Moroccan hotels have their own tools for monitoring energy and water consumption by final use. As a first step, these hotels can report to the Agency/Foundation on their energy consumption (fuels by type and power consumption) using this tool. If necessary, this tool could be shared among other Moroccan hotels and upgraded in others to calculate CO2 emissions using energy consumption.

An existing solution: the MRV system of the State Secretariat to the Minister of Energy, Mines and Sustainable Development, in charge of Sustainable Development

For the needs of other programs (especially the solar national plan), the Moroccan State Secretariat to the Minister of Energy, Mines and Sustainable Development, in charge of Sustainable Development already implemented a MRV system, with inputs designed for energy reporting. This MRV system provides possible interfaces to be used for the reporting and could be updated for the NAMA for the tourism sector. A meeting already took place for the preparation of this report.

3. The Organism/Foundation collects all the information and reports on the overall effect to the Moroccan Ministry of Tourism. Several types of reporting are to be prepared:
- Quarterly reporting: which allows the management of investments and actions implemented. This can take the form of an excel spreadsheet. This document will be easy to prepare if a web platform bringing together all stakeholders carries out the follow-up of its actions above.
- Semi-annual reports: In addition to the quantitative data and qualitative data are added based on evaluations of feedback from on-site consultants. This report provides a more qualitative assessment of the programme and the different actions. It will also make it possible to reorient certain actions determined by the consultants on site to be more effective and to disseminate the best practices.
- Annual reports should include spreadsheets used to estimate energy and emission savings. Reports should describe and explain the progress of the NAMA implementation and its sustainable impacts on the accommodation sector.
- A more substantial interim report will also be prepared midway through the overall programme. It will comprise the following points:
    - An overview of Project activities from beginning of operations to the present activities of the Project;
    - An assessment of Project strategy;
    - An assessment of Project progress towards results;
    - An assessment of Project implementation and adaptive management;
    - Assessment of sustainability of Project outcomes; and
    - Conclusions and recommendations.

Verification

Verification by an independent body is proposed. This body would audit the reported data included in the annual report especially the calculation of annual energy savings and carbon emissions of the accommodation sector in Morocco.

Third party verification is proposed for GHG emissions and sustainable development impacts. A proportion of the verification costs could be covered by international donors. Verifiers must be accredited according to the requirements of accreditation bodies recognized by both the NAMA donor and Morocco.

As a large number of activities will take place under the umbrella of NAMA, a sampling method will be applied. The details of this approach will be agreed on by NAMA donors and Morocco.

The annual report will form the basis of the audit process.

3.10. Management

The management of the NAMA requires actors with specific roles. The Ministry of Tourism is in charge of following the main implementation steps and maintaining contact with every possible implied actor.

These actors have the following main roles:

- Governance to lead the main implementation steps and tasks.
- Technical support for capacity building, definition of technical needs
- Financial support for the management and the raising of funds for investment supports.

The following actors are suggested because they have been part of the thinking process of the definition of the NAMA and their possible roles have been discussed with their managers. This list is not exhaustive.

Governance

- ***Ministry of Tourism***

The Ministry of Tourism is expected to be the main supervisor of the NAMA implementation. Being already in contact with most of the accommodation managers of investment suggestions or the implementation of laws and certainly the promotion of tourism. The Ministry of Tourism should be the main actor responsible for engaging with accommodation managers. The initial capacity needed to initiate the first steps of the NAMA should come from the resources of the Ministry of Tourism (preparation phase). Also, to be considered, the awareness-raising and educational aspects of the NAMA may be managed by the communication department of the Ministry, used to disseminate climate actions specific within the tourism sector.

Main actions: management of the NAMA steps, supervision of the NAMA implementation, communication and dissemination in the field, to connect with other actors.

- ***UNDP***

The Moroccan office of UNDP (United Nations Development Program) is already in charge of the NAMA definition. Being in charge of the first definition steps of the NAMA, it has an overview on the objectives and possible actors to be added in the project. They are the implementing partners of the project, with the UN Environment and IKI (see below), they are intended to be the main national contact for the first implementation phases in close cooperation with the Ministry of tourism. The skills of UNDP suggest that they can also have a role during the implementation of the NAMA, such as an allocation role for the investment tools of the accommodation sector.

Main actions: follow the implementation and report to the climate funds and climate institutions, lead the definition of the terms of references for the detailed implementation plan, lead the allocation of credits in cooperation with an accredited bank.

- ***UN Environment***

UN Environment (United Nations Environment Programme) will be in charge of supporting the NAMA implementation and leading the next steps in cooperation with the Moroccan UNDP office. They are the main focal point of the project at the international level.

Main actions: lead the whole process from the concept note to the national implementation.

Technical support

- ***AMEE*** (Agence Marocaine pour l'Efficacité Energétique)

Formerly named ADEREE, the AMEE is the agency of energy efficiency in Morocco. Their main tasks are to suggest new regulations, lead national programs, connect national actors and privates, lead national expertise for the market of energy efficiency and renewable energies and promote it through awareness campaigns. The AMEE has already released specific guidelines for the tourism sector and could train consultants for the specific challenges of energy renovation of hotels in Morocco.

Possible actions: support capacity building and provide training guidelines, support changes in regulation.

- ***CTCN*** (Climate Technology Centre & Network)

This UN organization supports national efforts to accelerate and enhance action on climate change. Their mission is to assist emerging countries with the development and transfer of technologies. They are already present in Morocco supporting the development of renewables, especially the solar plan. As an embedded technology program is suggested in the first component of this NAMA, such an organization could help to focus some existing technologies for the specific needs of the accommodation, relating to the 3 main components of the NAMA.

Possible actions: support for technology transfer.

- ***Fondation Mohammed VI pour la Protection de l'Environnement*** (FM6E)

The Foundation's fundamental mission is awareness-raising and education for sustainable development. The Foundation generates awareness of environmental issues, the right to a healthy environment and sustainable development, as enshrined in the Constitution of the Kingdom of Morocco. The Foundation is already following some aspects and is active in the management of the label Clef Verte which already reports and disseminates the energy efficient and nature respectful touristic structures in Morocco (and elsewhere).

Possible actions: support for awareness and education aspects of the NAMA and cooperation for labelling.

- ***SMIT*** (Société Marocaine d'Ingénierie Touristique)

Being under the authority of the Ministry of Tourism, The Moroccan Agency for Tourism Development – SMIT is a government institution created in December 2007 by the Moroccan government in order to implement the development strategy of the tourism product in Morocco. SMIT puts attractiveness at the heart of its concerns with an ambition to increase the value of the best assets of each tourism domain to maximize competitiveness. SMIT's intervention is about the influencing strategies that are related to tourism projects, by defining and implementing promotional measures able to support the attraction of the Moroccan destination as a hub of tourism investment. It's mostly directed at the investment of new capacity building but has an experience of linking private funds and accommodation managers.

L'AMEE et le Ministère du Tourisme doivent travailler en coopération pour fournir et gérer les ressources humaines (consultants). Un système centralisé doit être mis en place pour rassembler et analyser les indicateurs d'intérêt et la mise en œuvre des mesures d'atténuation pour chaque hébergement. Le Secrétariat d'État chargé du Développement Durable, en charge de la gestion d'un système MRV pour d'autres secteurs (plan photovoltaïque), peut développer une extension pour le suivi des progrès de l'audit.mrv

Possible actions: connecting with accommodation managers for technical support and the raising of funds.

Financial support

- ***Accredited national bank***

Needed for the management of funds, a national accredited bank has to join the project. As far as possible based on the national territory, the aim would be to allocate the investment tools to accommodation managers. To do this and to be used as a source of guaranteed funds, this bank needs to meet some specific requirements. It may also need to be accredited to the needs of financiers.

Possible actions: managing funds, providing the guidelines for long term financing.

- ***SIE*** or SIEM (Société d'Investissements Energétiques)

The SIE is considered to be the financial arm of the State, used for the execution of the energy mix. One of their main roles is to develop financing solutions for national projects and to focus on financial leverage. For the tourism sector and the energy efficiency in general, they have already recognized the main financial obstacles for accommodation managers and suggested possible investment protocols.

Possible actions: suggestions of investment tools and cooperation for the definition of financing protocol.

Other actors

- ***Ministry of Environment and Ministry of Energy***

The ministry of environment actively works with the Ministry of Energy on legislation. Current thermal regulations have been updated and numerous new regulations are on their way to be promulgated. Some of these regulations concern obligations like the mandatory energy audit for new energy use thresholds, some others concern new market opportunities like the possibility to sell renewable energy to neighborhoods. They have also had a role in coordinating with other NAMA or national environment programs, they might also cooperate with the Ministry of Tourism on other aspects of the NAMA such as the MRV system (thanks to the MRV System developed by the Ministry of Environment for instance).

Possible actions: supporting new specific regulations for the benefits of the development of the NAMA, provide MRV system.

- ***GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit), AFD (Agence Française de Développement) and other development agencies***

Development agencies already support environmental initiatives that may be directly linked to the main objectives of the NAMA, such as Bon pour le Climat (GIZ) for the food management or the development program for rural tourism of the AFD.

Possible actions: provide existing active programs which can be linked to the NAMA.

3.11. Legal and organizational aspects

Updates to specific laws are currently promoted in Morocco which should have a direct impact on the project. These laws are as follows:

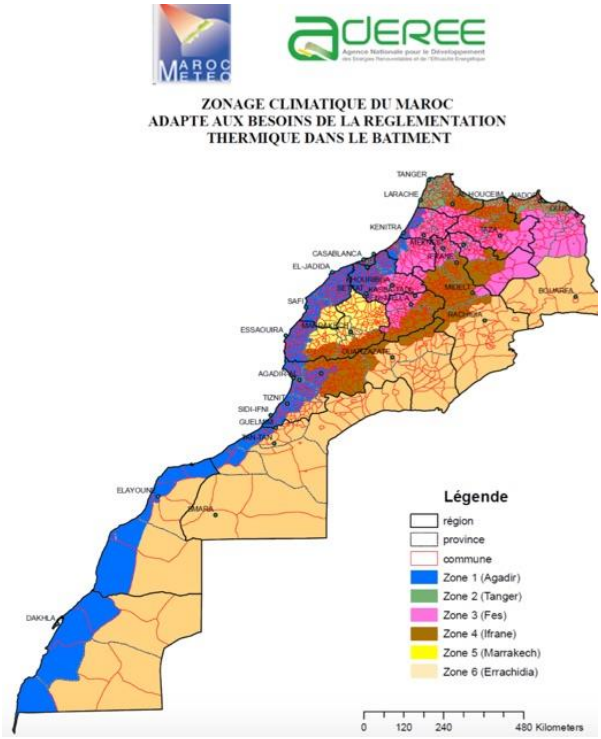

Figure 29 : Climate zones for the thermal regulation in Morocco (Source : ADEREE)

- A new legal framework has been set up for thermal regulation about new constructions (Réglement Thermique de Construction au Maroc, RCTM). It was adopted in 2013 and it applies to every new building, residential or service, to be built. Audits and energy upgrades should be used to evaluate the level of each equipment and insulation. These regulations respect the main climate zones of Morocco.

- A new legal obligation now requires hotels with a high consumption (more than XXX tons equivalent petrol) to do an audit and list measures to be implemented to reduce consumption to below the fixed threshold

- Although it's not planned to allow carbon certification on a national scale in Morocco, new legal considerations should allow local feed-in tariffs, from energy producers directly to the customer (neighborhood). This should be considered in the investment tools, more details can be found here.

3.12. Transformational aspects and paradigm

Transformational aspects

This NAMA allows global **evolution of the quality** of the accommodation sector, the comfort, and the knowledge of energy efficiency in Morocco, easily applicable to other economic sectors.

The emergence or reinforcement of existing or **new markets** (food management, energy efficiency, and renewable energy above all), on a **national scale**, could give Morocco a leading role in the promotion of sustainable tourism when border countries are required to include similar programs in their national development plan.

The need of including local actors, both for the technical fulfillment of the implementation and for awareness aspects, suggests that the **communication** about the needs of achieving a climate friendly accommodation sector also aims at the civil society.

With the energy needs of the accommodation sector being comparatively high, compared to the rest of the society, aiming to reduce energy consumption will also contribute to a change in the energy mix of Morocco and be a step forward for **energy autonomy**.

Besides these transformational aspects for the country, the NAMA will also contribute to a **different perception of international tourism** and reflect the environmental commitment of the kingdom of Morocco. As the awareness for climate change issues is growing internationally, the NAMA will contribute to the **competitive advantage** of the tourism sector in Morocco compared to other countries.

Paradigm

This NAMA project illustrates the process of **energy transition** in Morocco, in a world influenced by the Paris Agreement. The idea is to move from a situation where energy is relatively cheap and abundant (and even often subsidized for fossil fuels), to a situation where on the one hand it becomes costlier, but where, on the other hand, it's **gains in energy efficiency and excellence in environmental management** give competitive advantages to the country. In this perspective this a paradigm shift.

3.13. Key factors of success/failure

Success

- The implementation of the Paris Agreement and the Moroccan NDC will create a favorable context for the NAMA.
- The new thermal regulations in place for hotels are a strong incentive to act.

Failure

- Lack of priority given to environmental and energy issues by hotel managers.
- Risk of delays in the project. If consultant training and hotels audits are not immediately followed by the mobilization of in investment fund, the efforts might be lost.
- Lack of empowerment of the Ministry of tourism in the field of environmental management. However, Moroccan ministry of tourism had a leading role in global sustainable tourism, in particular through the Marrakech process on sustainable production and consumption, which makes it a good candidate to implement such a pioneer NAMA
- Cost of photovoltaic too low at the moment, therefore it may be hard to get accommodation managers involved.
- Most of the institutions and regulations existing, training program are already designed, economic market self-standing, technical feasibility, linked with NDC

APPENDIX

- **APPENDIX 1: Analysis of vulnerability of the Moroccan tourism (French)**
- **APPENDIX 2: List of potential NAMAs, evaluation criteria and comparison**
- **APPENDIX 3: Minutes of the meeting for the list of potential NAMA (30/05/17) (French)**
- **APPENDIX 4: References**
- **APPENDIX 5: List of interviews**
- **APPENDIX 6: Restitution BEGES Tourisme Maroc**
- **APPENDIX 7: Benchmark projets Maroc**