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Carbon Market Opportunities in Southern Mediterranean Countries

Noriko Fujiwara, Monica Alessi and Anton Georgiev

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Abstract

To date, Southern Mediterranean countries have hosted a limited number of projects under the Clean Development Mechanism (CDM). There are three challenges to the participation of middle-income countries in future carbon markets: the limited size of future demand for offsets or credits; restrictions on the use of CDM credits in Phase III of the EU Emissions Trading Scheme; and the lack of prompt preparation for the start of new market-based mechanisms. This study examines existing and emerging activities in Southern Mediterranean countries that could fit into new market-based mechanisms. It explores options for the evolution of mechanisms and discusses the merits of post-2012 carbon funds in bridging the gap between the end of the first commitment period of the Kyoto Protocol and the entry into force of a new international agreement.

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Introduction

Several Southern Mediterranean countries are known for their rich endowment of energy sources [1] and vast potential to reduce energy-related greenhouse gas (GHG) emissions from the relevant sectors. From an energy policy viewpoint, an important question is how to finance investment in renewable energy sources. Renewables are abundant in the region but they cannot compete with the fossil fuels, which are heavily subsidised in oil-producing countries. There is an increasing interest in carbon markets, especially the Clean Development Mechanism (CDM), as a potential source of additional revenue streams and a way to leverage private investments. From a climate policy perspective, the overarching question is how to keep confidence in carbon markets during the possible gap period between the end of the first commitment period (CP1) (2008–12) of the Kyoto Protocol and the entry into force of a new international agreement (in 2020 at the earliest), during which major emitting economies are likely to take on emission reduction commitments. While the CDM will continue in the second commitment period (CP2) and a new market-based mechanism will be established under the new agreement, the current levels of ambition in emission reduction commitments communicated by developed countries have generated a high degree of uncertainty about the future demand for carbon credits or offsets. This report is an early attempt to combine the two perspectives through an analysis of the prospects for a carbon market with a special focus on renewable-sourced electricity generation.

This report first gives an overview of the mitigation potential in Southern Mediterranean countries, highlighting vast possibilities in the energy sector. Section 2 regards the CDM as a tool to tap into the mitigation potential and examines these countries' achievements, opportunities and challenges in CDM projects. The section closes by addressing the uncertainty about future demand for CDM credits. Section 3 explores options for new market-based mechanisms with reference to existing and emerging activities in the region. The section also delves into the uncertainty about the readiness of new market-based mechanisms that could be linked to nationally appropriate mitigation actions (NAMAs) and which could include sectoral crediting or trading. Section 4 turns to the merits of carbon funds as the way forward for a transition period until 2020. Section 5 gives concluding remarks.

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[1] For example, Algeria, Egypt and Libya are oil exporters.

The methodology adopted by this study can be regarded as bottom-up, in that data and case studies have mainly been collected at the project level and then analysed at the policy level. This study draws upon data on CDM projects that are publicly available and regularly updated by the UN Framework Convention on Climate Change (UNFCCC) and the UN Risø Centre.[2] These data are complemented by a literature review, and a compilation of ongoing and forthcoming projects in the region. Interviews and subsequent communications were held with experts from the UN Development Programme (UNDP), the Secretariat of the Union for the Mediterranean (UfM), the European Commission (DG Climate Action) and the private sector. Although these experts provided information in a personal capacity, the views expressed are attributable only to the authors.

Two issues of scope – geographical and temporal – deserve additional consideration. As noted above, the study has involved the review of data on CDM projects in Southern Mediterranean countries (or the MED-11)[3] except Palestine and Turkey, hereafter referred to as the MED-9 (see Table 2 in section 2). As the overall level of CDM project activities in the MED-9 is very low but the market potential is high, the study concentrates on a few programme/project activities in the electricity sector that could incentivise private sector investments (for further details, see section 2). While the MEDPRO project sets the time frame up to 2030 (Ayadi and Sessa, 2011), analysis in the report is limited to 2020 because the current EU climate policies and legislation have been framed accordingly. Likewise, the present policy discussion on the UNFCCC and the Kyoto Protocol mainly focuses on the period up to 2020.

1. An overview of the mitigation potential in the region

Even though its share of GHG emissions in the world is declining (20.3% in 1990 compared with 16.3% in 2005), the emissions of the Southern Mediterranean countries are nevertheless slowly rising. In 1990, Southern Mediterranean countries emitted 6,092 metric tonnes of carbon dioxide equivalent ($MtCO_2e$), reaching 6,150 $MtCO_2e$ in 2005 (WRI, 2010). In 2005, Turkey, Egypt and Algeria were the biggest total emitters, while Israel, Libya and Turkey were the biggest per-capita emitters.[4] A large share of these emissions is therefore energy-related, and the prospects for mitigation – mainly but not exclusively in the energy sector – are considerable.

This section gives an overview of the potential to mitigate climate change in the region, identifying the prospects and challenges.

1.1 Mitigation potential in the region

The potential for mitigating climate change in Southern Mediterranean countries spans several energy resources (natural gas, hydro and renewable energy sources – wind, geothermal and solar) and sectors (power, industry, transport, services and land management). Among the overall

[2] See UNFCCC, "CDM in Numbers" (http://cdm.unfccc.int/Statistics/index.html); UNEP Risø Centre, "Welcome to the UNEP Risø CDM/JI Pipeline Analysis and Database", last updated 1 March 2012 (http://cdmpipeline.org/).

[3] Southern Mediterranean countries are Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey.

[4] On total GHG emissions in 2005, Turkey is ranked first (390.6 $MtCO_2e$), Egypt second (222.8 $MtCO_2e$) and Algeria third (137.2 $MtCO_2e$). On per-capita GHG emissions in 2005, Israel is ranked first (11.8 $MtCO_2e$), Libya second (10.4 $MtCO_2e$) and Turkey third (5.5 $MtCO_2e$). Ibid.

possibilities for mitigation in the region, great emphasis has been placed on solar energy. Another real opportunity can be found in wind power. There are also some mitigation opportunities in sectors that are not involved in energy production, mainly in terms of energy efficiency measures. These could have a substantial impact owing to the high energy-intensity per unit of GDP in oil- and gas-producing Southern Mediterranean countries.

Research often centres on the potential for de-carbonisation of the power sector, with a strong focus on solar energy resources. The focus on solar energy is not surprising given the large desert areas with elevated levels of solar radiation, offering significant opportunities for energy production. Solar radiation is estimated at between 1,300 kWh/m_2/year on the coast and 3,200 kWh/m_2/year in the Saharan desert (see also Hafner and Tagliapietra, 2011).

The installed capacity of solar power, however, remains very limited to date. There are nonetheless a number of showcase projects across the region, and hybrid, integrated solar combined cycle plants are being envisaged or under construction in Egypt, Morocco and Algeria (see also Hafner and Tagliapietra, 2011). Still, it is not clear whether these projects are isolated initiatives or whether they are the first steps towards the wide-scale introduction of solar power in the region (Huse et al., 2010).

One of the major incentives for solar energy (CSP and PV) development in the region is to supply the fast-expanding markets of these countries in addition to the opportunity to export clean electricity to Europe. Interconnectors to the EU and other countries could contribute substantially to the decarbonisation of the European economy and the reduction of its dependence on fossil fuels. This would open up new opportunities for economic and technical cooperation between the two regions and in turn help Europe meet its long-term GHG emission reduction targets and mid-term renewable targets. Ummel and Wheeler (2008), for example, analyse the potential development of solar thermal electricity exports to Europe from representative sites in Morocco, Libya and Jordan, with the aim of delivering 55,000 GWh (gigawatt hours) to Europe by 2020, i.e. enough to satisfy the power demand of 35 million people. Such a programme would avert about 2.7 billion tonnes of CO_2 emissions over the lifetime of the facilities, as well as an additional 2.6 billion tonnes by accelerating cost reductions for investments outside the programme at a modest level of public subsidies. Concrete support measures, including subsidies, are discussed in section 1.2.

There are various developments underway that make these interconnections more likely to happen than in previous times:

- the opening of electricity markets, although this is possible to varying degrees in North African countries; and
- the reinforcement of physical links for power exchange among the North African and Mashreq countries themselves as well as towards Spain and Italy. CSP can potentially play an important role in this power exchange (World Bank GEF, 2006).

As stated above, the potential for mitigation through de-carbonisation in the power sector in Southern Mediterranean countries can extend beyond solar energy to include wind energy resources.[5] The possibilities afforded by wind power have started to be exploited: some sites in the region offer opportunities where the mean wind velocity largely exceeds 7 metres per second (m/s)

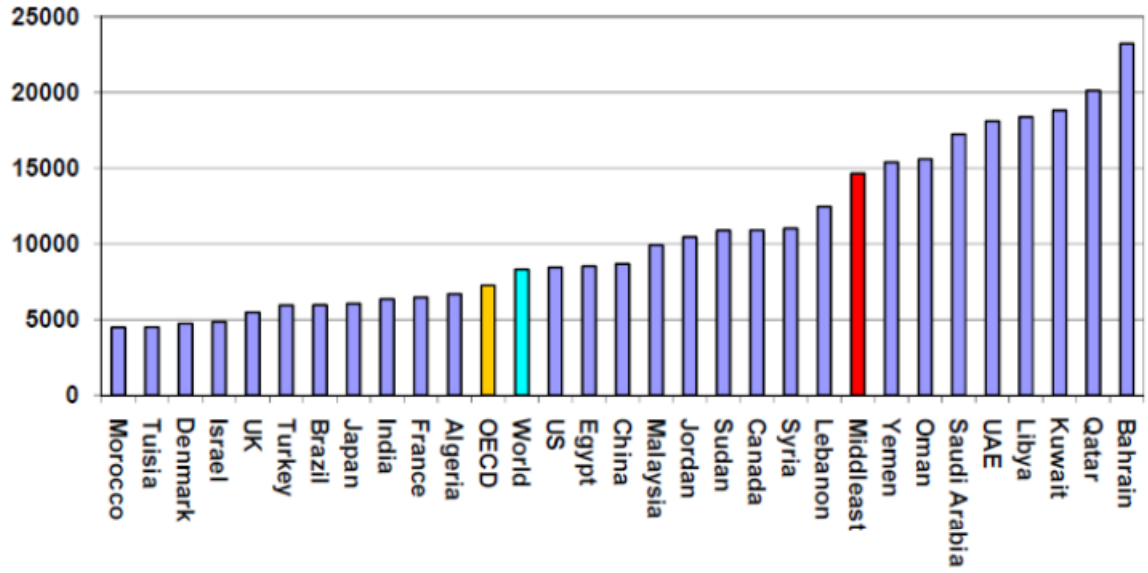
[5] The potential of hydroelectric power and biomass energy, on the other hand (other than with respect to urban waste), is limited by the region's climate and geography.

(up to 11 m/s for certain sites), with Egypt, for example, having one of the highest mean wind velocities in the world (11 m/s) (Hafner and Tagliapietra, 2011). Commercial projects are currently being developed in some countries, such as Turkey, Egypt, Morocco and Tunisia.

According to PricewaterhouseCoopers (2010), Europe and North Africa together could produce all their electricity from renewable energy sources by 2050 if the necessary framework conditions are set in place, their respective grids are sufficiently interconnected and the large-scale deployment of private investment takes place. While North Africa would consume 25% of the total, it would produce up to 40% of it, mostly from onshore wind and solar power. CSP plants with storage capacities would form the backbone of the export capacities from North Africa to Europe.

There are also important opportunities for mitigation in other sectors, starting with improvements in energy efficiency: due to an elevated energy-intensity per unit of production in oil-producing Southern Mediterranean countries, there is ample scope for the modernisation of the industrial, transport and service sectors and therefore for reducing their emissions. Figure 1 shows the energy-intensity of production in terms of BTU (British thermal unit) by unit of GDP in purchasing power parity (PPP) terms. The majority of oil-producing countries in the region are highly energy-intensive compared with the average figures in other world regions, as well as those in non-oil-producing countries in the region.

Figure 1. Primary energy intensity, 2005 (BTU/$PPP)



Sources: Babiker and Fehaid (2011), based on IEA Data (http://www.iea.org) and calculations by Babiker and Fehaid.

Another mitigation option in Southern Mediterranean countries is to reduce emissions through land management practices, but because of the desert climate of most of the land in the region, the possibilities are limited. Table 1 shows that the potential of North Africa for mitigation through land management practices (such as cropland management, grazing land management, the restoration of organic soils and of degraded lands) is among the lowest on the African continent, when compared with East, West and Central Africa.

Table 1. Estimation of the economic mitigation potential of agricultural and land management practices in Africa by 2030 ($MtCO_2e/yr$)

	Cropland management	**Grazing land management**	**Restoration of organic soils**	**Restoration of degraded land**	**Other practices**	**Total**
East Africa	28	27	25	13	15	109
West Africa	16	15	14	7	8	60
Central Africa	13	12	11	6	7	49
North Africa	6	6	6	3	3	25
South Africa	6	5	5	3	3	22
Total	69	65	61	33	37	265
	(26%)	(25%)	(23%)	(12%)	(14%)	

Note: Estimations at carbon prices of up to \$20/t of CO_2e.

Source: Smith et al. (2008) as cited in Pender et al. (2009).

1.2 Main challenges to mitigation actions in the region

The above section shows that the main potential for mitigation in Southern Mediterranean countries can be found in the decarbonisation of the power sector through the commercialisation of renewable energy sources, especially solar and wind. The majority of these countries have introduced renewable energy targets in the short and medium term (see Box 1). Replacing fossil fuel energy with renewable energy would help them control GHG emissions, which are on the rise.

Multiple challenges to the uptake of renewable energy have been identified in the region, including the following (Huse et al., 2010):

1) inadequate national institutions responsible for renewable energy development, and a lack of coordination among them;

2) inadequate or conflicting legal frameworks;

3) political instability, which may deter investors;

4) insufficient financial incentives;

5) technological obstacles;[6]

6) a lack of coordination among national planning offices on the one hand and regional and international organisations operating in the respective countries on the other, which often results in the duplication of activities or projects; and

7) a low level of awareness among both consumers and decision-makers about the potential benefits of renewable energy technologies.

Box 1. Renewable targets in selected North African countries

The targets below aim at increasing the share of renewable energy sources:

- Egypt – 20% of total electricity generation through renewable energy sources by 2020; 12% from wind energy and 8% from other sources (mainly solar and hydro);
- Morocco – 42% of renewable energy installed capacity by 2020 (cf. the Moroccan Solar Plan up to 2020); and
- Tunisia – 10% of renewable energy in total energy consumption by 2020.

Source: Hafner and Tagliapietra (2011).

The rest of this section primarily focuses on item (4), insufficient financial incentives, including artificially low domestic prices for fossil fuels, which are at only a fraction of world market levels and sometimes not even enough to recover production costs.

The generation costs of some renewable energy technologies are declining. There is wide variance in the levelised cost of energy (LCOE)[7] across assorted kinds of technology, such as CSP, wind power and gas-fired power (e.g. Turner et al., 2010; Turki and Missaoui, 2010; Sawin et al., 2010). In countries where no cheap hydrocarbons are available (e.g. Morocco), the cost of wind power, especially that of onshore wind, is already considered competitive with many fossil-fuel energy options in wind-rich regions (Resources and Logistics, 2010).

With other kinds of technology, however, the costs can remain prohibitive without some support aimed at reducing the market cost of electricity generated from renewable sources or at least measures targeted at increasing the cost of electricity generated from fossil fuels (or a combination of both). For example, as much as 87% of the cost of electricity produced by a solar thermal plant is attributed to the initial capital investment and installation costs (CIF, 2009c).

Under the above conditions an incentive is needed for consumers to buy electricity generated from renewable energy at a certain price or volume over a long period of time, thereby creating revenue streams that are independent of demand. Subsidies for renewable energy could take one of two forms: 1) offering higher prices than those available commercially (e.g. tendering, a feed-in tariff); 2) creating a second valuable good that represents the added value of the energy being generated from renewable sources (e.g. certificates) (MVV decon and WI, 2010b). Box 2 summarises the main support measures for renewable energy.

[6] Technological challenges are partly linked to the desert environment, the electricity grids and lack of data (Huse et al., 2010).

[7] The LCOE is the (average) cost of generating energy for a specific installation or generating system, i.e. the minimum price at which energy must be sold for an energy project to break even (Turner et al., 2010).

Box 2. Major support measures for renewable energy

Feed-in tariffs are measures that a) guarantee grid access to renewable energy producers and b) set a fixed guaranteed price at which power producers can sell renewable power to the electric power network. Some policies provide a fixed tariff while others provide fixed premiums added to market- or cost-related tariffs.

A tradable, renewable energy certificate represents the certified generation of one unit of renewable energy (typically one megawatt hour). Certificates provide a tool for trading and meeting renewable energy obligations among consumers or producers (or both), and also a means for voluntary, green power purchases.

Renewable portfolio standards (RPSs) are also called renewable obligations or quota policies. Such a standard requires that a minimum percentage of generation sold or capacity installed be provided by renewable energy. Obligated utilities are required to ensure that the target is met.

It is common to combine trading in certificates with RPSs

Investment tax credits allow investments in renewable energy to be fully or partially deducted from tax obligations or income.

Production tax credits provide the investor or owner of qualifying property with an annual tax credit based on the amount of electricity generated by that facility.

Capital subsidies or consumer grants are one-time payments by the government or utility to cover a percentage of the capital cost of an investment, such as a solar hot-water system or rooftop solar PV system.

Net-metering allows a two-way flow of electricity between the electricity distribution grid and customers with their own generation. The customer pays solely for the net electricity delivered from the utility (total consumption minus self-production). A variation employing two meters is called 'net billing'.

Source: Sawin et al. (2010).

At present, existing support systems in the region mostly cover investment or other tax credits (e.g. Algeria, Morocco) or exemption from custom duties (e.g. Algeria, Egypt, Jordan, Morocco, Palestine and Tunisia) as well as provide land free of charge or at reduced cost. There are also provisions of capital subsidies or grants (e.g. Tunisia), net-metering (e.g. Jordan), public investment loans or financing (e.g. Jordan, Morocco and Tunisia) and public competitive bidding or tenders (e.g. Egypt) (Resources and Logistics, 2010; Sawin et al., 2010). A feed-in tariff exists in Algeria (see Sawin et al., 2010) and in Israel (Hafner and Tagliapietra, 2011). Although the Algerian premium may amount to 300% of the average electricity price,[8] the rate is so low that the

[8] In Algeria, a fixed premium is added to the electricity price, expressed as a percentage of the average electricity price that is set annually by the electricity market operator: 300% for solar (PV, CSP) and wind, 200% for energy from waste and 100% for hydro (Resources and Logistics, 2010; Turner et al., 2010).

scheme is not effective (see Resources and Logistics, 2010; MVV decon and WI, 2010a). Egypt planned to introduce a two-phase policy, starting with competitive bids and moving on to a feed-in tariff.[9]

It has been suggested that feed-in tariffs supported by grants and loan guarantees would be the most appropriate support system for the region (Huse et al., 2010; see also JETRO, 2010). Feed-in tariffs are well suited to countries whose utility sector has involved strong participation by the private sector (El Husseini et al., 2010). Yet this instrument was considered unaffordable under the existing market conditions in most Mediterranean partner countries (Resources and Logistics, 2010).

Two main factors further undermine the cost competitiveness of renewable energy in the region: significant subsidies for conventional energy sources and the external costs of using fossil fuels for power generation (El Husseini et al., 2010).

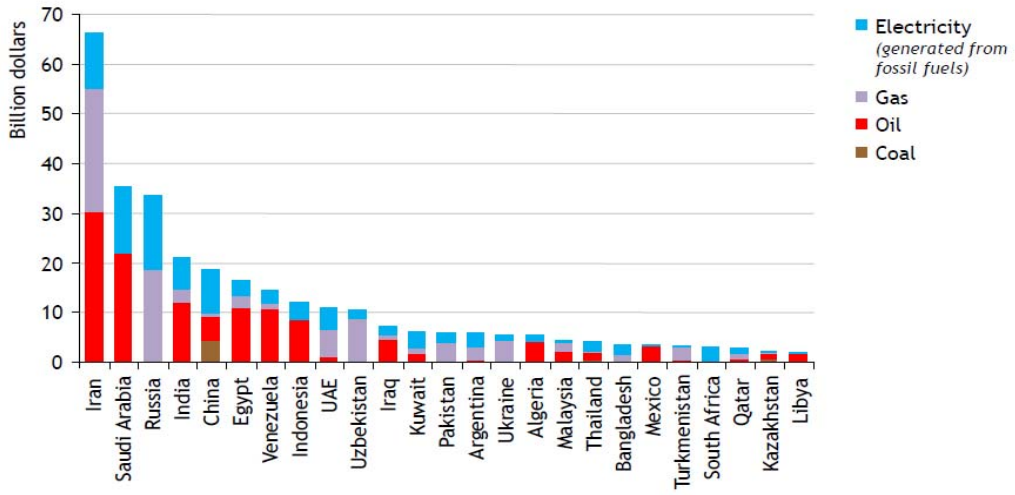
For the private sector engaged in renewable energy sources, it is a challenge to compete with long-established producers of electricity from fossil fuel sources. Most renewable energy technologies (except some very favoured sites for wind) have not been able to compete mainly because fossil fuels are so heavily subsidised in oil-producing countries in the region. These countries often subsidise fossil fuel use, with a considerable share of the world's €312 billion in total value of fossil fuel subsidies (IEA, 2010). Figure 2 shows the World Energy Outlook (IEA, 2010) calculations of the economic value of fossil-fuel consumption subsidies by country for 2009. In North Africa, the price of electricity in Egypt, Algeria and Libya is among the lowest in the world.

By regional standards, energy subsidies are low in countries importing fossil fuel energy, such as Morocco, Israel, Jordan and Tunisia. Morocco has phased out the bulk of its energy subsidies over the years. Several phased increases of electricity prices are not sufficient, however, given the annual inflation rates (ECOFYS Germany, 2009). Still, a rapid increase in government spending on energy costs, especially for the purchase of oil, would accelerate the reform process for reducing or phasing out energy subsidies.

Furthermore, the external costs of using fossil fuels for power generation, for example the costs of GHG emissions from fossil fuels, are not internalised. Accordingly, the value of avoided GHG emissions through renewable energy may be underestimated. It is even argued that many renewable energy technologies will not be cost-effective even if the market distortions are removed (MVV decon and WI, 2010b). Under the Clean Development Mechanism, these avoided emissions can be monetised. The CDM is designed to assist developing countries in achieving sustainable development by allowing entities from Annex I Parties under the UN Framework Convention on Climate Change to participate in low-carbon projects and obtain certified emission reductions (CERs) in return (Bosi et al., 2010). The next section looks at carbon finance with special attention given to the CDM.

[9] In the Egyptian two-phase policy, phase I aimed at adopting competitive bids through tenders based on the existing law with a view to revealing acceptable electricity prices and informing a later feed-in tariff for smaller projects. Phase II aimed at implementing a feed-in tariff for medium and small projects based on the new electricity law (ECOFYS Germany, 2009; MVV decon and WI, 2010a; Huse et al., 2010; Turner et al., 2010).

Figure 2. Economic value of fossil-fuel consumption subsidies by country, 2009



Source: IEA (2010).

1.3 The role of carbon finance

Flexible mechanisms, such as the CDM under the Kyoto Protocol, can be regarded as not only a tool for the mitigation of climate change by yielding GHG emission reductions but also a tool for carbon finance by creating additional revenue streams. Carbon finance can be defined as "resources provided to activities generating (or expected to generate) GHG (or carbon) emission reductions through the transaction of such emission reductions" (Bosi et al., 2010). The risks of investment in innovative technologies are perceived to be high owing to the initial capital costs. While this leads to higher expectations from investors for returns, the level of projected returns may not be sufficiently high to attract private investments. Existing projects in the renewable energy sector have benefited from donor-funded support programmes as well as the sale of CERs as an additional source of revenue (Resources and Logistics, 2010). Among other types of CDM projects, renewables rely on multiple income streams and are typically capital-intensive. Analysis of the UNFCCC's CDM Database (ex-ante expected investment in projects) shows that CDM projects require on average €100 in capital investment for each annual CER issued, and the figure could rise for more capital-intensive projects, such as renewable energy, for which CERs are only one of the multiple revenue streams (UN AGF, 2010).

Carbon finance does not fully meet the need for the upfront financing of clean development, as payment often comes upon the delivery of credits (Bosi et al., 2010) in ex-post crediting mechanisms like the CDM.[10] More importantly, revenue streams from carbon finance are neither predictable nor reliable, as the amount of revenue depends on the level of the carbon price, which is determined by demand and supply. Nevertheless, carbon finance could provide good operating support – if not capital support – for projects, currently through the sale of CERs (MVV decon and WI, 2010b). The new market-based mechanisms under discussion as successors to the CDM are

[10] In contrast, a green investment scheme enables a host country to receive advance payments for its sale of surplus assigned amount units (AAUs), which can be made conditional on future emission reductions, i.e. greening.

expected to help leverage private investments in long-term clean development, thereby scaling up climate finance and GHG emission reductions to the levels required to maintain the global temperature rise within the 2°C limit from pre-industrial levels (see section 3).

2. The CDM as a tool to tap into mitigation potential

The use of the CDM in Southern Mediterranean countries to date remains very limited.[11] Among Southern Mediterranean countries (or the MED-11), nine countries (Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Syria and Tunisia) are non-Annex I Parties under the UNFCCC and are eligible for hosting CDM projects under the Kyoto Protocol (the MED-9). Turkey is classified as an Annex I country under the Convention but is not assigned quantitative emission-reduction commitments under the Kyoto Protocol.[12] This status puts Turkey in a unique position: it cannot participate in any of the three flexible mechanisms under the Kyoto Protocol but it has generated non-Kyoto credits through more than 100 projects for voluntary carbon markets since 2005.[13]

The CDM Executive Board registered a total of 3,821 projects worldwide, with 48 (1.3%) in the MED-9: 22 in Israel, 10 in Egypt, 8 in Morocco, 3 each in Syria and Jordan, and 2 in Tunisia.[14] Algeria, Lebanon and Libya only have projects at the validation stage. As of February 2012, only four countries in the region had issued CERs: Egypt for 7,434 k (2 projects), Israel for 1,226 k (10 projects), Jordan for 986 k (1 project) and Morocco for 330 k (2 projects).[15] As for the expected average annual CERs from registered projects, the Executive Board estimates a total of 565 million CERs per year worldwide and 8.2 million CERs (1.5%) in the region: 3.2 million in Egypt, 2.2 million in Israel, 1.0 million in Morocco, 0.7 million in Tunisia, 0.7 million in Jordan and 0.3 million in Syria.[16] Further details are shown in Table 2.

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[11] This observation also applies to their neighbouring region: Iran with seven registered projects (0.7 million CERs are expected annually on average), Qatar with one project (2.5 million CERs) and the UAE with five projects (0.4 million CERs) (data as of 6 February 2012). See UNFCCC, "Registered project activities by host party" (http://cdm.unfccc.int/Statistics/Registration/NumOfRegisteredProjByHostPartiesPieChart.html) (data as of 6 February 2012); UNFCCC, "Expected Average Annual CERs from registered projects by host party" (http://cdm.unfccc.int/Statistics/Registration/AmountOfReductRegisteredProjPieChart.html) (data as of 6 February 2012).

[12] Although it is listed in Annex I of the Convention, Turkey is not included in Annex B of the Protocol, as it was not a Party to the Convention when the Protocol was adopted. See UNFCCC, "Kyoto Protocol" (http://unfccc.int/kyoto_protocol/items/3145.php).

[13] The exact number is not known due to the lack of a registry until August 2010. See UNDP Turkey, "Turkey Progresses towards the Post-Kyoto" (http://www.undp.org.tr/PF/Newsletter/ENG/2009/04/7.html); UNDP Turkey, "Turkey's New Carbon Registry", *New Horizons*, UNDP Turkey Monthly Newsletter, No. 57, September 2010 (http://www.undp.org.tr/Gozlem2.aspx?WebSayfaNo=2647). The country could participate in new mechanisms under a new multilateral/bilateral agreement (e.g. sectoral crediting in section 3.3) and in the longer term could consider the use of CERs or other international credits for a domestic emissions target or a domestic emissions trading scheme.

[14] UNFCCC, "Registered project activities by host party" (http://cdm.unfccc.int/Statistics/Registration/NumOfRegisteredProjByHostPartiesPieChart.html) (data as of 6 February 2012). The UNEP Risø Centre records a total of 3,812 registered project activities, with 48 in the region (UNEP Risø Centre, "CDM/JI Pipeline" as of 1 February 2012, http://cdmpipeline.org/).

[15] Source: UNEP Risø Centre, "CDM/JI Pipeline", as of 1 February 2012 (http://cdmpipeline.org).

[16] UNFCCC, "Expected Average Annual CERs from registered projects by host party" (http://cdm.unfccc.int/Statistics/Registration/AmountOfReductRegisteredProjPieChart.html) (data as of 6 February 2012).

Table 2. Host countries of CDM projects, by status

	At validation			Requested registration			Registered			Total						Issued	
	No.	kCERs	2012 kCERs	No.	kCERs	2012 kCERs	No.	kCERs	2012 kCERs	No.	%*	kCERs	2012 kCERs	%**	2020 kCERs	No.	kCERs
MED-9																	
Algeria	2	487	203	0	0	0	0	0	0	2	0	487	203	0	4,869	0	0
Egypt	9	1,205	1,494	1	25	25	10	3,238	14,557	20	0.3	4,468	16,076	0.6	49,769	2	7434
Israel	12	1,751	1,911	0	0	0	22	2,223	8,800	34	0.4	3,973	10,711	0.4	42,029	10	1226
Jordan	0	0	0	0	0	0	3	736	2,354	3	0	736	2,354	0.1	7,144	1	986
Lebanon	6	104	125	0	0	0	0	0	0	6	0.1	104	125	0	958	0	0
Libya	1	435	573	0	0	0	0	0	0	1	0	435	573	0	4,351	0	0
Morocco	9	685	1,477	0	0	0	8	1,021	2,526	17	0.2	1,706	4,003	0.1	17,050	2	330
Syria	1	456	722	0	0	0	3	321	644	4	0.1	777	1,366	0.1	7,775	0	0
Tunisia	3	117	197	0	0	0	2	688	4,125	5	0.1	805	4,322	0.2	8,076	0	0
MED-9's neighbouring region																	
Iran	6	3,038	4,419	0	0	0	7	720	1,870	13	0.2	3,758	6,289	0.2	38,074	0	0
Oman	2	836	1,672	0	0	0	0	0	0	2	0	836	1,672	0.1	8,364	0	0
Qatar	1	7	18	0	0	0	1	2,500	13,748	2	0	2,506	13,766	0.5	34,073	0	0
SA	2	504	641	0	0	0	0	0	0	2	0	504	641	0	5,040	0	0
UAE	12	948	849	0	0	0	5	356	825	17	0.2	1305	1,674	0.1	12,171	2	92
Yemen	2	445	940	0	0	0	0	0	0	2	0	445	940	0	4,452	0	0

Notes: SA=Saudi Arabia, UAE=United Arab Emirates. Palestine is not a party to the UNFCCC. Turkey is not eligible for hosting CDM projects. Yemen is the only least developed country in the region. Rejected projects are excluded. * % of all CDM projects; ** % of all 2012 kCERs.

Source: Adapted from Table 4, CDM Pipeline produced by Jørgen Fenhann, UNEP Risø Centre, 1 February 2012 (http://cdmpipeline.org/).

The potential for using the CDM is vast in the region. The highest potential for using CDM projects is limited to a few domains, such as renewable energy, fuel switching, energy efficiency and landfill fuel gas. Nevertheless, these domains together can deliver a considerable amount of emission reductions.

2.1 Potential for CDM projects

There is abundant potential for CDM projects in Southern Mediterranean countries. In its 2007 *Study on the Clean Development Mechanism (CDM) Project Identification in FEMIP Countries*,[17] the European Investment Bank (EIB) outlined the prospects of the following sectors in relation to CDM projects (EIB, 2007) (see also Table A1 in the appendix for additional details):

- In the energy sector, the potential of *solar energy* is very high and well distributed across the FEMIP countries. There are good prospects for *wind energy*, fairly evenly distributed across these countries, while those for *hydroelectric energy* are primarily concentrated in Turkey and to a smaller degree in Morocco, as well as some parts of Algeria, Tunisia and Egypt (EIB, 2007). There is potential for carbon capture and storage (CCS) in the energy sector (e.g. fossil-fuel power plants) in parts of the region. The In Salah project in Algeria involves stripping CO_2 from high CO_2-content natural gas (Global CCS Institute, 2011; Zakkour et al., 2011).
- In the industrial and services sectors, there is considerable potential for *fuel switching* from coal to natural gas for power generation in oil-/gas-exporting countries, such as Libya, Algeria and Egypt, as well as in oil-dependent countries with access to the natural gas grid, such as Turkey, Morocco and Israel. There is also very considerable potential for *energy conservation* in industry, through energy efficiency interventions and process modernisation in most countries. A large degree of this potential, however, is locked in small and medium enterprises (SMEs) and concerns medium-size investments. There are possibilities for the improvement of *energy efficiency* in services, especially in densely populated areas (EIB, 2007). There is also potential for CCS in such industry sectors as iron and steel blast furnaces, cement kilns and chemical processes (Global CCS Institute, 2011; Zakkour et al., 2011).
- In the household sector, there are extensive possibilities for the improvement of *energy efficiency in households*, especially in densely populated areas (EIB, 2007).
- In the waste and landfill management sector, there are good prospects for projects using landfill fuel gas in FEMIP countries, especially in Jordan and Israel, as well as in Turkey, Egypt and Algeria (EIB, 2007).
- In the transport sector, the prospects for fuel diversification are highly dependent on the country's possibilities for and need to engage in fuel switching. Thus, in oil-exporting countries (Libya, Egypt and Algeria), the biofuel potential seems to be relatively weak, with more promising solutions for the large-scale deployment of natural gas vehicles and the introduction of liquefied petroleum gas as a transport fuel. In more import-dependent countries, such as Cyprus, Malta, Israel, Lebanon, Morocco, Tunisia and Turkey, fuel

[17] FEMIP refers to the Facility for Euro-Mediterranean Investment and Partnership (including Morocco, Algeria, Tunisia, Egypt, Jordan, Israel, Palestinian Authority, Lebanon, Syria and Turkey).

diversification might be of strategic importance and could also include the production as well as the import of biofuels (EIB, 2007).

- In other sectors (including the agro-forestry sector), there is generally limited potential in the region, although there are prospects for some important forestation projects of local significance (EIB, 2007).

Other studies highlight the opportunities for CDM projects on a country basis. CDM project potential is estimated to be high in Egypt, Israel, Jordan, Morocco, Syria, Tunisia, Algeria and Libya, and medium in Lebanon (Amous and Abdel-Aziz, 2009 as cited in Marr and Wehner, 2009). The project areas comprise renewable energy, energy efficiency and the power sector and wastes in most of the countries identified above. There is also potential 1) in the oil and gas sectors in Egypt, Syria, Tunisia, Algeria and Libya; and 2) for fuel switching in Lebanon and Morocco (Amous and Abdel-Aziz, 2009 as cited in Marr and Wehner, 2009). A more recent study for the Regional Center for Renewable Energy and Energy Efficiency (RCREEE) (Perspectives and Alcor, 2011a) outlines the existing CDM potential in Jordan, Yemen, Syria, Libya, Lebanon, Algeria, Egypt, Tunisia and Morocco.[18] The report identifies 30 priority projects that could be registered before 2013:[19] 8 in Tunisia; 4 each in Lebanon, Egypt and Morocco; 3 each in Jordan and Yemen; and 2 each in Syria and Algeria (Perspectives and Alcor, 2011a).[20] Given the track record of 48 projects in the MED-9 in 2008–11, the number of projects that will have reached registration before the end of 2012 might be lower than that of the prioritised ones.

The key question is how to tap into the areas identified as having the prospects for CDM projects, for example in the electricity sector. While Algeria has been the only country to introduce feed-in tariffs in the region, Morocco and Tunisia have developed some arrangements for major electricity consumers (e.g. energy-intensive industries), which have some aspects of a feed-in tariff. Like a feed-in tariff, these arrangements provide developers with a clear, fixed regulatory framework that does not have to be negotiated on a case-by-case basis (MVV decon and WI, 2010c). They permit auto- or self-generators to develop wind parks for own consumption with the possibility of selling excess electricity to the state or a utility (e.g. Office National d'Electricité (ONE) in Morocco and the Société Tunisienne de l'Electricité et du Gaz).

For example, in 2006 Morocco launched the EnergiPro initiative, in which ONE offers two types of incentives. The first incentive entails an agreement that ONE will transmit all the electricity from a site of (self-)generation to other points of consumption in its own network. The transit tariff is a 'postage stamp' set at a fixed level to finance the grid enhancement to include the extra capacity (Amegroud, 2009) (see Table 3). Another incentive involves an agreement that ONE will purchase any excess generation. Every month ONE compares the total amount of electricity consumed by the industrial manufacturer with the amount produced by the turbines and buys any surplus at 60% of the wholesale price. The EnergiPro programme guarantees a fixed price for 20 years and the electricity price in Morocco is competitive (Amegroud, 2009; see also MVV decon and WI, 2010c; Ounalli et al., 2010).

[18] The RCREEE has 13 founding members: Jordan, Bahrain, Tunisia, Algeria, Sudan, Syria, Iraq, Palestine, Lebanon, Libya, Egypt, Morocco and Yemen. See RCREEE, "Home" (http://www.rcreee.org/).

[19] It is assumed that the projects that have at least initiated the development of a project design document will proceed to the registration stage by the end of 2012.

[20] The number of CDM projects quoted here include programmes of activities (PoAs). For the latter, see section 3.1.

Table 3. ONE tariffs for purchases of wind-power surpluses

Time of day	Regular tariff (MDH/kWh)	20% mark-up tariff (MDH/kWh)
Peak hour	0.456	0.548
Regular time of day	0.335	0.403
Off-peak	0.180	0.216

Source: www.industrie.one.ma/pdf/EnergiPro.PPT as cited in CIF (2009b), p. 44.

The EnergiPro initiative has been developed as a CDM project under which the developers are entitled to the resulting CERs. The project activities will achieve GHG emission reductions by avoiding CO_2 emissions from the business-as-usual scenario. It is claimed that CERs appear to tip the balance on the cost-benefit analysis, which could be a major incentive for investment in them (MVV decon and WI, 2010c). Examples of projects include wind farms in Tétouan and Akhfenir (OSS, 2010).

The above initiatives have introduced innovative contractual and financial arrangements with a view to engaging the private sector in the deployment of electricity generated from renewable energy sources. Yet they do not offer real subsidies and their applications are very restricted (MVV decon and WI, 2010a). There is a limit to what industrial consumers can generate beyond their own use (Ounalli et al., 2010). Hence, this implies that the EnergiPro initiative would suit the CDM and not new market-based mechanisms that could scale up emission reductions and carbon finance (see section 3).

2.2 Possible barriers to using the CDM in the region

There are many reasons why the use of the CDM in Southern Mediterranean countries is still relatively limited. Bottlenecks specific to the CDM include sustainable development (see below), baselines and additionality,[21] off-setting, governance, regulatory inefficiency, technology transfer and imbalances in regional distribution. Among these bottlenecks are capacity barriers, such as a lack of awareness, a lack of human capital and weak regional coordination (NEPAD-OECD Africa Investment Initiative, 2009):

- **The human capital is insufficient to respond to project-specific needs.** There is in general a lack of local knowledge and skills for operating and maintaining renewable energy plants. Other CDM-related tasks, such as conducting financial appraisals, developing a new methodology or applying approved methodologies, determining baselines of anthropogenic emissions, and the process of validation, verification and monitoring, can also be skill-intensive. Because of the dearth of local knowledge, developers often have to hire foreign professionals. This region, however, compared with sub-Saharan Africa, is richer in human capital.

[21] A project activity is 'additional' if GHG emissions are lower than the baseline, i.e. the emission that would have occurred without the project activity.

- **The lack of regional coordination on the sustainability criteria undercuts potential projects.** Currently, each host country has discretion over sustainability criteria, and there are a myriad of factors that countries consider when assessing whether a proposed CDM project complements their sustainable development priorities and national regulations. As a consequence, there is a lack of consistency in regional or sector-specific sustainability criteria, resulting in increased project development costs and obstacles in project duplication in different countries.

Another bottleneck is the lack of engagement of the private sector. It is pointed out that many of the key players in Southern Mediterranean countries, such as utilities and large industries, are state-owned. In Tunisia, for example, public institutions or state-owned enterprises are the main agencies executing CDM projects (MVV decon and WI, 2010b; ECOFYS Germany, 2009). Without budget constraints, financial performance is not a priority for them. There is little incentive for these agencies to go through the CDM process, which is complicated and cumbersome. The private sector has hardly been engaged, mainly owing to a lack of awareness about the prospective advantages of the CDM (ECOFYS Germany, 2009).

2.3 Suggested solutions to the barriers at the UNFCCC level

One of the major outcomes of the Durban climate change conference (COP17/CMP7) was to agree on the establishment of the second commitment period (CP2) of the Kyoto Protocol and the continuation of the CDM. In practice, after 2012 the Executive Board will be able to issue CERs for emission reductions achieved in developing countries (Morel et al., 2011).

Like the Cancún conference in the previous year, COP17/CMP7 continued to focus on enhancing the efficiency and transparency of decision-making in the present mechanism, especially improving the procedures for programmes of activities (PoAs) and simplifying regulations relating to PoAs (see section 3.1). Attention was also given to simplifying the modalities for demonstrating additionality (e.g. through standardised baselines), simplifying baseline and monitoring methodologies,[22] introducing 'materiality',[23] improving administrative efficiency in the registration of CDM projects and issuance of CERs, and capacity building for a more balanced regional distribution of CDM projects.[24] Particularly relevant is the decision about the detailed modalities and procedures for CCS,[25] which sets out definitions, the roles of the organisations involved, and

[22] See Draft decision CMP.7, "Further guidance relating to the clean development mechanism" on the UNFCCC website (http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cmp7_cdmguidance.pdf). For an overview, see for example Morel et al. (2011), Climate Focus (2012) and Baker & McKenzie (2011).

[23] Information about a CDM project will be "considered material if its omission, misstatement or the non-compliance with a requirement might lead, at an aggregated level, to an overestimation of the total emission reductions or removals" achieved by a CDM project equal to or higher than the pre-determined amount. See Draft decision CMP.7, "Materiality standard under the clean development mechanism", on the UNFCCC website (http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cmp7_cdm_.pdf).

[24] See Draft decision CMP.7, "Further guidance", UNFCCC, op. cit.

[25] See Draft decision CMP.7, "Modalities and procedures for carbon dioxide capture and storage in geological formation as clean development mechanism project activities" on the UNFCCC website (http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cmp7_carbon_storage_.pdf). For

the rules for participation requirements, validation and registration, monitoring, verification and certification, CER issuance and non-permanence. This decision will enable CCS project developers to (re-)submit a CDM methodology to the Executive Board, e.g. as in the case of the In Salah Gas Joint Venture in Algeria.[26]

In addition, Parties approved the establishment of the CDM policy dialogue, involving a panel of experts representing policy-makers, market participants and civil society (e.g. environmental NGOs) in order to review past CDM experience and to ensure the effectiveness of the mechanism in response to future challenges and opportunities.[27]

While the above reform has been driven by the Parties' willingness to address users' concerns without delay, continual changes to the operational rules might have increased the regulatory uncertainty as well as the complexity of the CDM.

2.4 Uncertainty about future demand for CDM credits

In addition, there are risks specific to the Kyoto Protocol framework and operational rules for flexible mechanisms, including the CDM. Under the Protocol, the CDM is the only existing flexible mechanism that provides access to developing countries. Despite the shortcomings discussed in the previous section, this scheme has garnered broad support from broad constituencies: host countries, compliance buyers, project developers and other stakeholders. To date the CDM has been the dominant crediting mechanism and is roughly estimated to account for about 70% of the demand for Kyoto Protocol units during the first commitment period (CP1) (Point Carbon, 2011). The EU ETS could support mitigation and adaptation activities in the region in two respects: first, as the largest source of demand for CDM credits; and second, as the potential source of contributions to climate finance through auctioning revenues.

First, on the demand side the EU and its member states have generated the largest demand for CERs among developed countries. Currently, the EU ETS Directive (2009/29/EC) enables the operators of the covered installations to surrender CERs or emission reduction units (ERUs) for compliance with the caps on their emissions. While the CDM will possibly continue in CP2 of the Kyoto Protocol, there will be uncertainty about the level of future demand for emission reductions from CDM projects.

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discussion on carbon finance (e.g. through the CDM) on CCS projects, see for example, Zakkour et al. (2011) and Global CCS Institute (2011).

[26] The In Salah Gas partners submitted a CDM methodology to the Executive Board in 2009, but the latter was then unable to accept the documentation because further guidance had not been provided. Before Durban no approved methodologies applicable to the CCS technology existed (Global CCS Institute, 2011). See In Salah Gas Stockage de CO_2, "About the In Salah Gas joint venture" (http://www.insalahco2.com/index.php/en/low-co2-gas-production/joint-venture.html#cdmMethodology).

[27] See CDM Executive Board, "EB 64 Report Annex I Terms of Reference for the Policy Dialogue on the Clean Development Mechanism", UNFCCC, Bonn, October 2011. See also the High-Level Panel on the CDM Policy Dialogue, "Homepage" (http://www.cdmpolicydialogue.org/).

Second, revenues from auctioning under the EU ETS in Phase III[28] would be part of the EU's contribution to climate finance, i.e. the joint commitment by developed countries to mobilising annual financial flows of $100 billion leading up to 2020.[29] Although member states will determine the use of revenues generated from auctioning, at least 50% of the revenues should be earmarked for selected purposes, such as the development of renewable energies to meet the 20% renewable energy target up to 2020,[30] and financing research and development in energy efficiency and clean technologies in the ETS sector.[31] They need to set in place and implement fiscal or financial support policies, "including in particular in developing countries, or domestic regulatory policies, which leverage financial support…and which have a value equivalent to at least 50% of the revenues generated from the auctioning of allowances".[32] The expected scale of financial flows depends on the level of the carbon price.

To the UN Framework Convention on Climate Change, the EU and its member states communicated an independent, quantified, economy-wide target of a 20% reduction of GHG emissions by 2020 compared with 1990 levels, and reiterated a conditional offer to move up to a 30% reduction of emissions by 2020 compared with 1990 levels (UNFCCC SBSTA and SBI, 2011a and 2011b; see also European Commission, 2010). The two conditions are that 1) other developed countries commit themselves to comparable emission reductions and 2) developing countries contribute adequately according to their responsibilities and respective capabilities.

Current discussion on moving the EU's GHG target beyond 20% is, however, largely driven by domestic interests rather than other countries' negotiating positions. A new roadmap for moving to a low-carbon economy in 2050 (European Commission, 2011a) foresees that the EU will likely outperform today's target of reducing GHG emissions by 20% in 2020. The roadmap further predicts that the EU will be able to achieve up to a 25% reduction *domestically*, i.e. real internal reductions of EU emissions and not offsetting through the carbon market, if the EU meets the 20% renewable target through actions proposed by the Renewables Directive (2009/28/EC – see European Parliament and Council of the European Union, 2009a) and the 20% energy efficiency target through full implementation of the energy efficiency plan (European Commission, 2011b).[33] This will not affect the amount of offsets to be allowed in 2013–20 under the ETS Directive

[28] In principle, the power sector will be subject to full auctioning from 2013, and industry sectors will gradually shift to auctioning: 20% in 2013 and 70% in 2020, aiming at 100% in 2027 (Art. 10(a) of the ETS Directive – see European Parliament and Council of the European Union, 2009b). Aviation, included in the EU ETS as of 2012, is subject to auctioning 15% of allowances in 2012–20 (European Parliament and Council of the European Union, 2009d).

[29] The EU has also pledged fast-start finance of €7.2 billion in 2010–12 and has been on track, delivering €4.68 billion in 2010–11. See "Fast-start finance" on the website of the European Commission, Climate Action (http://ec.europa.eu/clima/policies/finance/international/faststart/index_en.htm), last updated 28 November 2011.

[30] See Art. 10.3(b) of the ETS Directive (European Parliament and Council of the European Union, 2009b), and also Art. 9 of the Renewables Directive (European Parliament and Council of the European Union, 2009a).

[31] See Art. 10.3(g) of the ETS Directive (2009b), op. cit.

[32] See Art. 10.3, ibid.

[33] In addition, the European Commission proposed a new directive for energy efficiency (European Commission, 2011c)

(European Parliament and Council of the European Union, 2009b)[34] and the Effort Sharing Decision (406/2009/EC – see European Parliament and Council of the European Union, 2009c)[35] according to the roadmap (European Commission, 2011a).

Under the 20% scenario, without compromising environmental integrity, the EU has decided to add conditions to the acceptance of CERs that can be used for compliance with the EU ETS in Phase III (2013–20). Quantitative restrictions are set in the EU ETS Directive, taking into account that enough CERs or ERUs will remain unused in Phase II (2008–12) but be carried forward in Phase III (European Parliament and Council of the European Union, 2009b).[36] Qualitative restrictions – by both project type and host country – on CERs in Phase III are explained below. The Effort Sharing Decision, which allocates member states' commitments to emission reductions in non-ETS sectors, sets similar restrictions (European Parliament and Council of the European Union, 2009c), except on HFC and adipic N_2O, which a majority of member states have nevertheless committed to not buying after 2013.[37]

The EU has decided to set conditions for the acceptance of CERs by country and by project type in the ETS Phase III and in member states' mitigation actions in non-ETS sectors during the same period.[38] In 2013–20, the EU and member states will accept credits generated from eligible projects implemented in 1) least developed countries (LDCs),[39] 2) third countries in accordance with

[34] The ETS Directive extends the rights to use these credits for the third trading period and allows a limited additional quantity to be used in such a way that the overall use of credits is limited to 50% of the EU-wide reductions over the period 2008–20. For existing installations, and excluding new sectors within the scope, this will represent a total level of access of approximately 1.6 billion credits over the period 2008–20 (see "Emissions Trading System (EU ETS)" on the website of the European Commission, Climate Action (http://ec.europa.eu/clima/policies/ets/faq_en.htm), last updated 17 December 2008.

[35] The annual level of Clean Development Mechanism and joint implementation (JI) credits any member state could use in 2013–20 is limited to 3% of 2005 emissions, which remains the rule in the absence of international progress beyond the EU's 20% independent reduction commitment. The final agreement also allows member states that have to reduce their non-ETS emissions, or are allowed to increase them by up to 5% of 2005 emissions, to use an additional 1% of credits. See "Questions and Answers on the Effort Sharing Decision" on the website of the European Commission, Climate Action, (http://ec.europa.eu/clima/policies/effort/faq_en.htm), last updated 18 October 2010.

[36] Paragraphs 2 and 3 of Art. 11(a) provide the operators with limited access to CERs and ERUs issued in respect of emission reductions up until 2012 from eligible project types and these credits from projects that were registered before 2013 in respect of emission reductions from 2013 onwards. The access is limited to the extent that the levels of CER and ERU use allowed in Phase II have not been used up (European Parliament and Council of the European Union, 2009b).

[37] See Arts 5.1(a), (b), (c), (d) of the Effort Sharing Decision (European Parliament and Council of the European Union, 2009c).

[38] See Art. 11(a) in the EU ETS Directive (2009b), op. cit. and Art. 5(1) in the Effort Sharing Decision (2009c), op. cit.

[39] See Art. 11(a)(4) of the EU ETS Directive (2009b), op. cit. and Art. 5(1)(c) in the Effort Sharing Decision (2009c), op. cit.

bilateral sectoral agreements,[40] and 3) third countries that have ratified an international agreement if it is reached.[41] As for projects in non-LDCs, the EU will still accept credits after 2012 as long as they are registered before 2013. In other words, only new projects (registered after 2012) in non-LDCs will not be eligible to sell CERs into the EU ETS. For PoAs in non-LDCs the EU will accept the addition of new CDM programme activities (CPAs) to a PoA after 2012 as long as the PoA is registered before 2013.

In addition, the EU has decided to ban CERs and ERUs from certain industrial gas projects (HFC-23 and N_2O from adipic acid plants), starting from 1 January 2013 with a phase-out period until 30 April 2013 for credits from existing projects (European Commission, 2011f). Some implications of these restrictions for Southern Mediterranean countries are outlined below.

First, no countries in the region are identified as LDCs, hence CERs generated from CDM projects registered after 2012 in these countries will not be eligible for the ETS. Second, a lack of clarity about the contents or designs of the bilateral sectoral agreements (see section 3.5) would make it difficult for Southern Mediterranean countries to identify abatement activities that would be eligible for these mechanisms. Third, each host country will continue to be able to provide credits once it ratifies an international agreement, but the limits on credits from new projects only in LDCs will remain in effect. Fourth, there will be no effect of the above EU regulation on projects currently hosted by Southern Mediterranean countries. Among projects at various stages in the region (see Table 2), there is no HFC project. Furthermore, all 7 of the N_2O projects (4 in Israel, 3 in Egypt and 1 in Syria) address N_2O emissions from nitric acid plants, which fall outside the scope of the above EU regulation.

In effect, the elaboration of the proposed bilateral, sectoral agreements would be secondary to future demand for CERs, sectoral credits or any other tradable units. The level of future demand for credits from the CDM is uncertain. The window of opportunity for CERs in the region to enter the EU ETS is closing, unless such projects can be registered before 2013. As for new projects registered after 2012, the window will be open to CERs from projects that are determined to be eligible according to a number of criteria set out in the EU ETS Directive. In addition, credits to be generated through bilateral sectoral agreements will likely face high competition among carbon credits or offsets in the limited entry into the ETS Phase III (see also section 3.5).

3. Options for new market-based mechanisms

In Durban, a new market-based mechanism was defined as an instrument to enhance the cost-effectiveness of and to promote mitigation actions that, under conditions to be elaborated, may

[40] See Art. 11(a)(5) in the EU ETS Directive (2009b), op. cit. and Art. 5(2) in the Effort Sharing Decision (2009c), op. cit.

[41] See Art. 11(a)(7) in the EU ETS Directive (2009b), op. cit. and Art. 5(3) in the Effort Sharing Decision (2009c), op. cit.

assist developed countries to meet part of their mitigation targets or commitments,[42] i.e. developed countries may use the mechanism for offsetting their emissions. At the same time, the Parties emphasised that such a mechanism, as an aspect of opportunities for using markets to enhance the cost-effectiveness of and to promote mitigation actions, must meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid the double counting of effort and achieve a net decrease or avoidance (or both) of greenhouse gas emissions.[43] There will be a work programme to elaborate further elements of a new mechanism, with a view to recommending a decision at the next COP in 2012.

In the current context of discussion on new market-based mechanisms, this section considers several mechanism options and attempts to match examples of emerging mitigation activities in the region with these mechanism options. New market-based mechanisms could expand the scope of the conventional CDM beyond project levels to sector levels, and eventually to address mitigation actions, given different circumstances of developed and developing countries. The introduction of PoAs is an early example of an attempt to tap into emissions that were left out of the conventional CDM. In addition, mechanism options under discussion could include sectoral crediting, sectoral trading and the crediting of NAMAs (UNFCCC AWG-LCA, 2011b). Table 4 presents the main characteristics of these mechanism options.

While PoAs are implemented in developing countries according to the agreed procedures and methodologies, NAMAs and sectoral crediting can be put into practice in a differentiated and more flexible manner, taking into account different stages of development and different levels of access to financial resources and technologies. The scope and extent of NAMAs are determined by each host country.

The High-Level Advisory Group on Climate Change Financing (AGF) concludes that carbon markets are likely to perform well as a financing instrument for activities that are relatively tightly defined, where abatement is easily monitored and verified, and where transaction costs account for a small share of the overall value of abatement. Examples of abatement activities include renewable energy in the electricity generation sector, energy efficiency or fuel switching in the industry sector, and methane capture and destruction associated with coal mining or landfills (UN AGF, 2010). Support measures such as feed-in tariffs can complement the implementation of sectoral crediting or NAMA crediting, to achieve abatement beyond the baseline. The following sections introduce the concepts of PoAs, NAMAs and sectoral crediting respectively, and explore the potential for some emerging projects on renewable energy sources in Southern Mediterranean countries that could fit into any of these mechanism options and benefit from access to carbon finance.

[42] See the Draft decision CP.17 "Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention" on the UNFCCC website (http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cop17_lcaoutcome.pdf).

[43] Ibid.

Table 4. New options for market mechanisms for mitigation actions in developing countries

Mitigation action	Description	Possible funding sources	Measurement, reporting and verification (MRV) options
NAMAs	Countries communicate NAMAs, and actions are voluntary and non-binding. NAMAs aim at achieving a deviation in emissions relative to business-as-usual (BAU) emissions in 2020. The extent and scope of actions that can generate credits are likely determined by each country.	'Unilateral' or 'domestically supported' NAMAs: the host country's own resources. 'Internationally supported' NAMAs: climate finance provided by governments of developed countries. 'Credited' NAMAs: mainly carbon finance through credit markets Note: Developing countries are invited to submit information on NAMAs seeking international support, along with estimated costs and emission reductions as well as the anticipated time frame for implementation.	A registry to record NAMAs seeking international support will be established. Internationally supported actions will be measured, reported and verified domestically and will be subject to international MRV in accordance with international guidelines. Domestically supported actions will be measured, reported and verified domestically in accordance with general guidelines to be developed under the Convention. There will be international consultations and analysis of biennial reports under the Subsidiary Body for Implementation (SBI). See the Cancún agreements (Decision 1/CP.16).
Sector-based market approaches	A sectoral crediting mechanism could enlarge the scope beyond projects or programmes to the entire sector (e.g. electricity and industry). Developing countries make GHG reduction commitments in specific sectors (e.g. electricity and industry), even if they do not take on economy-wide targets.	Public finance: In return for a no-lose target to be set below the BAU, the host developing country could receive financial support from developed countries to achieve abatements. Private finance: Once these abatements beyond the target are credited and sold on carbon markets, the host developing country could receive additional finance from the private sector.	MRV procedures for sectoral approaches can be developed on the basis of data collected through the Asia-Pacific Partnership on Clean Development and Climate, the World Business Council for Sustainable Development (WBCSD) Cement Sustainability Initiative or other activities. Good data may be lacking in some major developing economies.

Table 4. cont'd

Sector-based market approaches (cont'd)	Developing countries could take on a 'no-lose' target for the covered sector that will be set below BAU emissions. Emission reductions achieved beyond the target would be credited for sale on international carbon markets. Failure to meet the target would not be penalised. Sectoral trading refers to a cap-and-trade scheme applied to a whole sector or a sub-sector within a country.		
Programme of activities	PoAs could expand the scope of mitigation actions from projects to programmes of activities.	Carbon markets	MRV procedures are clearly defined for the CDM. Project developers monitor and report on emission reductions in a manner consistent with the approved monitoring methodology.

Source: Adapted from Du Monceau et al. (2011).

3.1 Programme of activities

A CDM *PoA* is "a voluntary coordinated action by a private or public entity which coordinates and implements any policy/measure or stated goal (i.e. incentive schemes and voluntary programmes), which leads to anthropogenic GHG emission reductions or net anthropogenic greenhouse gas removals by sinks that are additional to any that would occur in the absence of the *PoA*, via an unlimited number of *CPAs*" (Annex 38, EB 32).[44] A PoA operates on the programme level and the programme activity level (CDM programme activity, CPA). The programme provides the framework and incentives for others to implement a policy or measure or stated goal, but actual emission reductions are achieved at the level of the CDM programme activities through specific measures (Marr and Wehner, 2009). Expanding the scope beyond project levels, a PoA would lower the transaction costs of project development, monitoring and verification. A PoA is considered suitable for the electricity and industry sectors, which can establish a credible baseline and can measure, verify and report GHG emissions (Project Catalyst, 2009; Marr and Wehner, 2009). In

[44] See Annex 38, "Guidance on the registration of project activities under a programme of activities as a single CDM project activity", EB 32 Report, CDM Executive Board, UNFCCC, Bonn (http://cdm.unfccc.int/EB/032/eb32_repan38.pdf).

particular, a PoA can apply to diffused projects where a large number of small to medium units are dispersed in space and occur over a period of time, e.g. end-use energy efficiency (Hinostroza et al., 2007 on a programmatic CDM).[45] Other potential areas include the dissemination of efficient home appliances, small renewable-energy equipment such as solar water heaters, the valorisation of solid and liquid waste, and reforestation (Turki and Missaoui, 2010).

PoAs were introduced in 2007, but the number of registered programmes has been limited. Registration procedures for PoAs have turned out to be too complicated for project developers. The length of the programme cycle is too long and the costs of programme development and validation are too high. In addition, PoAs have several bottlenecks, such as the evaluation of additionality, the CPA sampling methodology, the CPA starting date and the liability of designated operational entities (DOEs)[46] (Turki and Missaoui, 2010). The liability clause that holds a DOE responsible for CERs generated from the 'erroneous inclusion' of an ineligible CPA being registered as part of a PoA has been regarded as the most significant and debated implication of the CDM PoA guidance and the largest barrier to PoA development (Box 15 in Bosi et al., 2010). The Executive Board has been tasked with further addressing the liability and investigating the impact of possible approaches to tackling significant deficiencies in validation, verification and certification reports.[47]

There are several initiatives for supporting PoAs through capacity building (Turki and Missaoui, 2010; Sawin et al., 2010; Aasrud et al., 2010):

- the UN Environment Programme initiative for strengthening technical assistance to the designated national authority[48] and coordinating/managing entities;
- the PoA Supporting Centre, established by KfW Bankengruppe in 2008, for supporting public and private entities in developing countries to identify the PoA potential and implement low-carbon programmes;
- the CDM–joint implementation (JI) initiative, launched by the German government, for enhancing regional cooperation in the region on the CDM, particularly on PoAs;
- the World Bank Carbon Partnership Facility, targeting the future carbon market, with an emphasis on PoAs in urban areas or cities, e.g. energy efficiency in the transport and waste sectors; and
- the World Bank Community Development Carbon Fund, with its support for solar home systems and other off-grid, renewable energy projects.

Egypt and Tunisia respectively have one PoA registered. There is a recommendation to identify six more PoAs as priorities in the region that could be registered before the end of 2012: two in Egypt and one each in Lebanon, Tunisia, Morocco and Yemen (Perspectives and Alcor, 2011a).

[45] A distinction can be made in terms of 'bundling', as applied to a small number of medium to large units or small units in a large aggregation that belong to a limited number of owners and occur in a short period of time (Hinostroza et al., 2007).

[46] DOEs are independent auditors that assess whether a potential project/programme meets all the eligibility requirements of the CDM (validation) and whether the project has achieved greenhouse gas emission reductions (verification and certification) (Bosi et al., 2010).

[47] See Draft decision, CMP.7, "Further guidance", UNFCCC, op. cit.

[48] A designated national authority is an office, ministry or other official entity appointed by a Party to the Kyoto Protocol to review and give national approval to projects proposed under the CDM (Bosi et al., 2010).

For an example, Tunisia has developed the Programme for the Promotion of Solar Thermal Energy Installations (PROSOL) as a PoA with the aid of Germany through the German government agency GTZ (GIZ since 2011). The programme seeks to equip about 30,000 households a year with small solar water heaters (or 'solar collectors'). The targets were set to install 480,000 m_2 of solar water heaters and reach total installed capacity of 740,000 m_2 in 2008–11 (Breuer, 2009; JETRO, 2010). The annual installation rate increased from 7,500 m_2 in 2005 to 85,000 m_2 in 2009 (MVV decon and WI 2010b). Since its start in 2005, it is generally agreed that PROSOL has been very successful and led to the planning of programmes with similar structures in PV (PROMOVOLT) and insulation (PROMOISOL) (MVV decon and WI, 2010a; ECOFYS Germany, 2009). The main factors behind its success include

1) the offer of an allowance amounting to 20% of the cost of solar water heaters up to a maximum of 100 TND (equivalent to €55) for each square metre, directly disbursed to the supplier after installation of the equipment (ECOFYS Germany, 2009); and

2) a credit line from the utility, Société Tunisienne de l'Electricité et du Gaz (STEG) over five years to be repaid through the electricity bill (MVV decon and WI, 2010a).

Several other factors underlying its success have been observed (MVV decon and WI, 2010a). First, the rate of repayments and the extent of the credit were calculated so that the repayments were less than the observed savings from the installation of solar water heaters, which had a very good impact on the market. Second, the very low default rate among STEG customers almost guaranteed the repayments and reduced the perceived risk for suppliers and installers. Third, the credit facilities for customers also meant profitability for the STEG from the outset. The benefits to the state in terms of avoided subsidies are considered to be large. Despite its success, it is noted that Tunisia has a much smaller capacity of solar water heater per head (23 m_2 in 2007) than Jordan (100 m_2 in 2007), where energy prices are almost unsubsidised (MVV decon and WI, 2010b).

PROSOL has been registered as a PoA under the CDM and validated by an auditor, TÜV.[49] The coordinating entity is the Agence Nationale pour la Maîtrise de l'Energie. While there is a lack of clarity in the rules for allocating CERs generated from projects in the state sector, it is generally agreed that CERs would belong to the developer (MVV decon and WI, 2010b). PROSOL has faced technical and administrative problems at the CPA level, especially concerning the high degree of liability of the designated operational entity, as discussed earlier (MVV decon and WI, 2010b; Turki and Missaoui, 2010). In addition, these programmes are less profitable and it is not practical to seek registration for SMEs, which form part of the private sector and account for a large portion of the potential savings. A possible solution initially proposed by the GTZ is to bundle smaller-scale activities into a PoA or sell emission reductions to voluntary carbon markets (Breuer, 2009). Given that the former option has encountered difficulties, especially in relation to the liability clause, it is worth considering the latter: the potential for PROSOL to develop into a 'supported' NAMA that may allow for the sale of credits to voluntary carbon markets (see the next section).

[49] See UNFCCC, "PoA 4659: Solar Water Heater Programme in Tunisia" (http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/7KX218NCPREWQ4YSB90MUI5T6FHZJA/view).

3.2 Nationally appropriate mitigation actions

The CDM has been established to designate the emission reductions from project-based activities that can be used to meet compliance objectives vis-à-vis GHG mitigation (Bosi et al., 2010). Under the Kyoto Protocol, CERs are counted as part of Annex I Parties' progress towards meeting their respective targets.

Another weakness is a lack of international assessment of the data on GHG emissions in developing countries. While emissions from CDM projects are subject to monitoring and verification in accordance with a UN decision,[50] the GHG emission levels of activities outside the CDM in non-Annex I countries may not have been subject to the same level of scrutiny, even though non-Annex I Parties have general commitments to provide national communications to the UNFCCC.

The Cancún agreements recognise that developing countries are already contributing, and will continue to contribute, to a global mitigation effort and that they could enhance their mitigation, depending on the provision of finance, technology and capacity-building support by developed countries. Parties agreed that developing countries would take nationally appropriate mitigation actions to achieve a deviation in emissions relative to business-as-usual emissions in 2020. Participation in NAMAs is voluntary. It was also decided that developed countries shall provide increased support for the preparation and implementation of the NAMAs of developing countries and for their reporting. A registry will be established to record NAMAs seeking international support and to facilitate the matching of various sources of support available from developed countries and provided for NAMAs (UNFCCC COP, 2011). The Durban conference provided further technical details about the registry with a view to making it operational by the next COP in 2012.[51]

Parties agreed to distinguish NAMAs into two categories depending on the source of support. Domestically supported (often called 'unilateral') mitigation actions will be measured, reported and verified domestically in accordance with guidelines to be developed under the Convention. Internationally supported (often called 'supported') mitigation actions will be measured, reported and verified domestically and subject to international measurement, reporting and verification (MRV) in accordance with guidelines to be developed under the Convention (UNFCCC COP, 2011). In theory, potential sources of international support can be further broken down into 1) government or carbon funds ('supported NAMAs') and 2) carbon markets through the sale of credits ('credited NAMAs'). It is argued that the MRV of supported NAMAs does not need to be as stringent as the MRV of credited actions or not necessarily be based on the emission reductions achieved (Jung et al., 2010). In the UNFCCC context, however, the distinction has been largely limited to the two types, 'domestically funded (unilateral)' and 'internationally supported (supported)' actions. A developing country reportedly aired reservations about the compartmentalisation of NAMAs into two types, arguing that a NAMA could be funded through a diverse range of sources (UNFCCC AWG-LCA, 2011d).

Some NAMAs could generate compliance grade credits for emission reductions that are measurable, reportable and verifiable in a quantitative manner. For example, the Tunisian Solar Plan, discussed

[50] See Decision 3/CMP.1 (UNFCCC CMP, 2006).

[51] See Draft decision, CP.17, "Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention" on the UNFCCC website (http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cop17_lcaoutcome.pdf).

in more detail below, defines "SMART (specific, measurable, attributable, timely)" outputs for the components, which can be used as indicators to monitor the actual emission reductions of the NAMA (GTZ, ECOFYS and BIFA, 2010). These credits can be sold to either Annex I Parties with quantified emission-reduction commitments or installations under mandatory cap-and-trade schemes. Emissions from other NAMAs are not easily measurable, reportable or verifiable. There remains an open question about which NAMAs or which level of NAMAs can generate compliance grade credits for at least some of the emission reductions achieved in developing countries (Ward et al., 2010).

Another concept is sectoral NAMAs. In practice, most domestic mitigation measures or programmes will be inherently implemented at a sectoral or sub-sectoral level, or in cities or regions (Ward et al., 2010). What is referred to as 'sectoral' typically relates to activities on a smaller scale than economy-wide in terms of sub-national sectors rather than transnational sectors.

Among other practical issues, one of the disputed matters would be the ownership of emission reductions financed by developed countries and achieved by developing countries, taking into account the need to avoid the double counting of emission reductions that are monetised. The EU interpreted the Cancún decision as meaning that "any emission reductions achieved through the purchase of emission reduction units will count towards action of those purchasing and not towards the action of the country selling emission reductions" and that "the exception is where emission reductions are not purchased and used for compliance purposes" (UNFCCC AWG-LCA, 2011b). Another issue is the need to avoid double counting with existing mechanisms, including the CDM. Some NAMAs, such as the Tunisian one, do not exclude the possibility for the continuation of the CDM (UNFCCC AWG-LCA, 2011a). The EU suggested that in principle, once a new market-based mechanism is applied, no new CDM registration would be eligible in the same sector in the same country, while existing CDM investments need to be honoured (UNFCCC AWG-LCA, 2011b).

In response to the invitation by the Conference of the Parties, 48 non-Annex I Parties (including Algeria, Israel, Jordan, Morocco and Tunisia) voluntarily communicated NAMAs as well as related contexts and conditions – for example, the support required for preparation and implementation – and considerations associated with these actions (UNFCCC AWG-LCA, 2011a) (see Table 5). They were also expected to provide information about the estimated costs and emission reductions, and the anticipated time frame for the implementation of NAMAs seeking support. Israel communicated the target of a 20% reduction in GHG emissions by 2020 below business-as-usual levels. Four other countries in the region did not link NAMAs to specific GHG emission-reduction targets. Instead, most of the Southern Mediterranean countries' NAMAs feature renewable energy deployment as strong aspects, which would enable them to meet their respective domestic targets to increase the share of renewable energy (for North African countries, see Box 1 in section 1.2). For example, NAMAs could include feed-in tariffs, which often lead to direct and short-term emission reductions (Pennell et al., 2010a, 2010b; Jung et al., 2010). Feed-in tariffs are further discussed in the next section (3.3) on sectoral crediting. NAMA opportunities have also been identified in other countries that have not yet made submissions, e.g. renewable energy investment in Egypt, which involves the introduction of feed-in tariffs and the establishment of a renewable energy development fund (Perspectives and Alcor, 2011b). The remaining discussion in this section looks at two submissions for NAMAs: Tunisia and Morocco.

Table 5. NAMA pipeline

Country	Instrument	Sector	Type	Publication date	Reference	Source of financing	Emission reduction goal
Algeria	GHG emissions below BAU levels	Renewable energy	n.a.	9 Mar. 2010	Copenhagen Accord, chapeau	–	–
Israel	GHG emissions below BAU levels	Renewable energy + energy consumption	n.a.	1 Feb. 2010	Copenhagen Accord	Domestic	GHG reduction of 20% below its BAU emissions in 2020
Jordan	Single project activities (CDM) + regulation	Transport + waste + energy consumption + conventional power production + agriculture and forests	Many	31 Jan. 2010	Copenhagen Accord	–	–
Tunisia	Single project activities (CDM) + enhancing forest carbon sinks	All	Many	18 May 2010	Copenhagen Accord	External support	–
Morocco	Single project activities (CDM)	All	Many	29 Jan. 2010	Copenhagen Accord	–	–

* 'Copenhagen Accord' refers to countries' submissions of information and their association with the Accord relating to Appendix II of the Copenhagen Accord.

** 'Copenhagen Accord, chapeau' refers to countries' submissions of information and their association with the Accord in relation to the list in the chapeau of the Copenhagen Accord.

Source: Adapted from the NAMA pipeline produced by Jørgen Fenhann, UNEP Risø Centre, 13 September 2011 (http://namapipeline.org).

The **Tunisian Solar Plan** was launched under the framework of the Mediterranean Solar Plan (MSP) (see section 3.3; see also Hafner and Tagliapietra, 2011) and has been considered part of the proposal for NAMAs (GTZ, ECOFYS and BIFA, 2010). The Tunisian Solar Plan was prepared with the aid of Germany through the GTZ (GIZ since 2011), KfW Bankengruppe and ECOFYS. It has two main characteristics. First, the Tunisian Plan is integrated into a regional initiative (the MSP) (Gutman, 2009).[52] Second, modelled on the MSP, the Tunisian plan incorporates a wide range of renewable energy technologies (not limited to solar energy) together with energy efficiency measures into a single concept (MVV decon and WI, 2010b).

The Tunisian Plan envisages 40 individual measures or projects clustered into five areas: 17 projects on solar thermal and electrical applications, 3 projects on wind energy, 7 projects on energy efficiency, 7 projects on other areas and 6 projects on implementation actions. Solar thermal projects are an extension of the **PROSOL** programme (MVV decon and WI, 2010b) discussed in section 3.1.

The Tunisian Plan, with implementation taking place over 2010–16, entails a total investment estimated at $2.8 billion (€2 billion) including $2 billion (€1.4 billion) to be financed from the private sector, i.e. private investments are to account for 73% (GTZ, ECOFYS and BIFA, 2010; JETRO, 2010). The above NAMA proposal suggests that two components – solar electricity generation and wind energy projects estimated at a total cost of €355 million – would suit new international funding because they are expected to leverage substantial private investments. The total investment needs are also broken down into a national contribution of €1.5 billion (80%) and the need for international support of €0.4 billion (20%), demonstrating a high degree of ownership by the host country (GTZ, ECOFYS and BIFA, 2010).[53]

The Tunisian Solar Plan is estimated to generate a mitigation potential of 1.3-1.5 million tonnes of CO_2e per year, representing 4% of the current annual emissions (MVV decon and WI, 2010b; GTZ, ECOFYS and BIFA, 2010). Assuming a carbon price of $10 per tonne, the sale of credits to be generated from the Tunisian Solar Plan could yield revenues estimated at $13-15 million per year. Over ten years, revenues from the sale of credits would in theory amount to $130 million, which is equivalent to 7-8% of the total budget for investments (MVV decon and WI, 2010b).[54] In reality, the availability of carbon revenues would depend on both the continuation of the CDM and the time needed for the readiness of a new market-based mechanism.

Morocco's NAMAs are built upon existing initiatives, including the National Plan for Priority Actions (PNAP) as well as its own solar plan. In 2008, the Moroccan government launched the PNAP to pursue low-carbon possibilities as part of its national economic and social objectives. The Plan has four pillars: the security of energy supply, access to energy, the promotion of renewable energy and energy efficiency, and regional energy integration among the Euro-Mediterranean markets. Implementation of the low-carbon policy options currently available would reduce annual GHG emissions by almost 40 million tonnes of CO_2e in 2030, equivalent to a 20% reduction from the business-as-usual scenario (CIF, 2009b). In wind energy alone the full implementation of all

[52] R. Missaoui, "Nationally Appropriate Mitigation Actions concept: Opportunities and challenges for MENA countries", presentation at the workshop on "National Energy Efficiency Action Plans", Amman, 5-6 December 2010.

[53] Ibid.

[54] Ibid.

projects in the pipeline under the PNAP could reduce emissions by 2.85 million tonnes of CO_2 per year (CIF, 2009b).

Moreover, the Moroccan government also launched a national solar plan in November 2009 (see also Hafner and Tagliapietra, 2011). The **Moroccan Solar Plan** set up national programmes for solar and wind energy in need of a total investment of $12.15 billion up to 2020 to catalyse private efforts to build solar and wind parks. Listed in Morocco's NAMAs, the solar power programme aims at developing 2,000 MW of solar energy (PV and solar thermal) on five sites during 2015–20. Implementation of these solar projects would avoid emissions of 3.7 million tonnes of CO_2 per year (UNFCCC AWG-LCA, 2011a; Hilale, 2011; MVV decon and WI, 2010c). Its investment cost would amount to $9 billion. The wind power programme seeks to build wind parks and is estimated to cost $3.15 billion (Mouline, 2011). In addition, the Moroccan NAMAs include the development of a 5,000 MW wind power installed base by 2030 under the **EnergiPro** initiative, which is similar to a feed-in tariff (as noted in section 2.1 as an example of CDM projects). The mitigation potential is estimated at 9.25 million tonnes of CO_2 per year. Morocco's NAMAs list two more projects to be developed under the EnergiPro initiative: 1) the installation of a wind farm with a total capacity of 20 MW by Ciments du Maroc (a Moroccan cement company), with the mitigation potential of 55,000 tonnes of CO_2 per year; and 2) the installation of a wind farm with a total capacity of 10 MW to be extended to 32 MW in 2010–12, with a mitigation potential of 88,000 tonnes of CO_2 per year (UNFCCC AWG-LCA, 2011a). Industry energy-efficiency measures mainly targeted at three sectors – cement, phosphates and sugar – have the potential to reduce emissions by 1.9 million tonnes of CO_2 per year (CIF, 2009b).

The Moroccan NAMAs are to be internationally 'supported' and include CDM projects. The World Bank Clean Technology Fund approved Morocco's request, as part of an investment plan for co-financing, for $150 million to support the Fond de Développement de l'Energie, which is built upon the PNAP and will mobilise financing in the range of $1.5-2 billion (CIF, 2009b; CIF, 2010b). Funds from Saudi Arabia, the UAE, the African Development Bank and the World Bank Group have already been pledged for the investment plan. In addition, the EU's fast-start finance in 2010–12 includes the European Commission's grant of €8 million to Morocco under the EU–UNDP Climate Change Capacity Building Programme, aimed at identifying opportunities for NAMAs and facilitating the uptake of mitigation actions by selected sectors over the period 2011–14 (Council of the European Union, 2010a; European Commission, 2011e).[55] It also counts Germany's provision of two grants to Morocco: for construction of a solar power plant financed by KfW Bankengruppe over 2010–22 at €10 million,[56] and for the promotion of wind energy and other renewables under the Moroccan Solar Plan during 2010–12 at €1.5 million (Council of the European Union, 2010a; European Commission, 2011d and 2011e). As the Moroccan NAMAs benefit from the proposed

[55] This programme aims at strengthening the capacity of developing countries to a) monitor, report and verify GHG emissions; b) identify opportunities for NAMAs in the context of national development, and support the design of low-emission development strategies; and c) facilitate the uptake of mitigation actions by selected sectors, with the participation of the private sector, as appropriate, taking into account national priorities and circumstances and national economic plans. The programme runs from 2011 to 2014, awarded with grants of €8 million (Council of the European Union, 2010a). Morocco is one of the 11 countries covered by the programme. Another participating country in the region is Egypt.

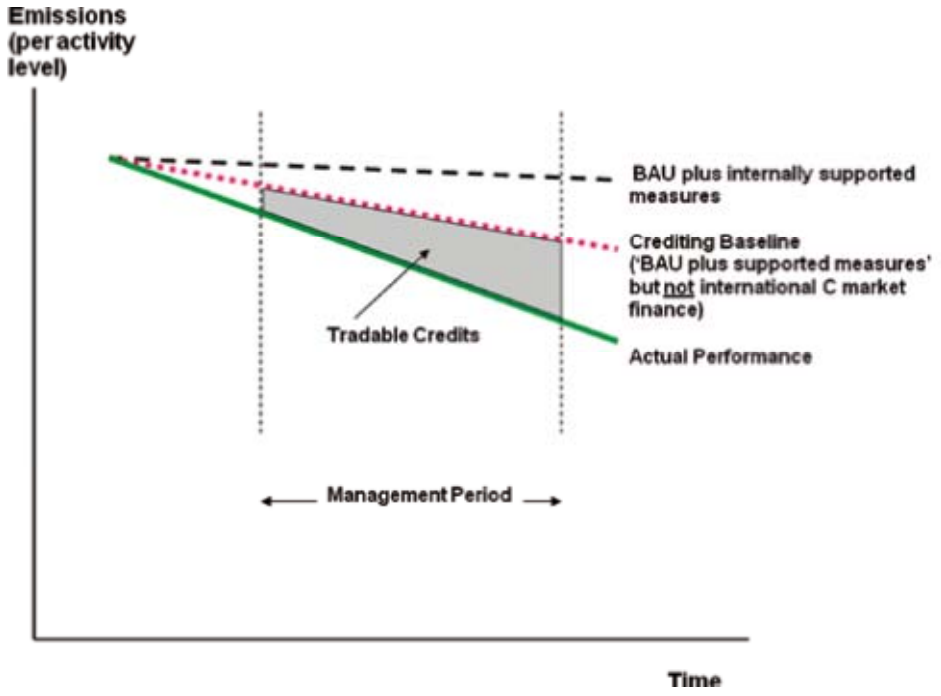
[56] The €10 million in fast-start finance was provided in addition to a subsidised loan of €100 million (European Commission, 2011d).

climate finance under the Cancún agreements, emission reductions delivered from these supported NAMAs will be subject to MRV according to international guidelines adopted under the UNFCCC.

3.3 Sectoral crediting with a sectoral no-lose target

A sectoral crediting mechanism (SCM) seeks to expand the scope of mitigation beyond a project (the target of a conventional CDM) to the sector or sub-sector, accompanied by a wide range of policy interventions, including financial incentives and other support measures. At a sectoral level, the new market-based mechanism could circumvent additionality testing – a main barrier to developers of CDM projects. Another difference is that an SCM sets a threshold based on a sectoral benchmark well below the business-as-usual scenario, a reference level for the conventional CDM. The threshold can be set lower, depending on the availability of financial resources: the country's own resources, external support from governments of developed countries and finance from carbon markets. The SCM will credit emission reductions achieved beyond that level with or without external support (Figure 3).

Figure 3. Simple depiction of a sectoral crediting baseline

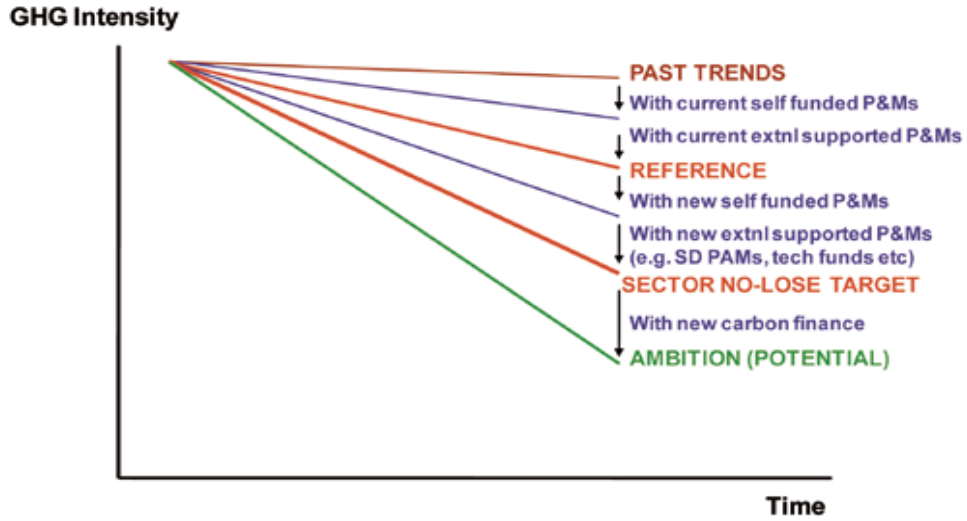


Source: Ward et al. (2008).

Implementation of an SCM consists of a number of steps: 1) boundary setting; 2) data collection for baseline setting; 3) baseline setting; 4) the measurement, reporting and verification of emissions; 5) the issuance of credits; and 6) sales of credits. Capacity building activities, both administrative and institutional, are needed throughout the process. There are several variations of these steps. For example, a baseline can be expressed in terms of absolute emissions, carbon or emissions intensity, or such non-GHG parameters as a technology penetration rate. The baseline can be set domestically

or internationally. For the former, the government of the host country can negotiate with independent experts to set a sectoral benchmark. For the latter, the government can negotiate with other parties to set a sectoral no-lose target (SNLT) (Figure 4) as part of a comprehensive international agreement. An SNLT is a non-binding target for a developing country: the host country will be rewarded for overachieving the threshold but not penalised for underachieving it in the relevant sector. Credits can be 1) initially issued to the government of a host country, then to installations in the relevant sector or 2) directly issued to the latter. The variation is related to whether only the government can sell credits or the installations can also do so.

Figure 4. Development of sectoral no-lose targets



Notes: P&Ms = policies and measures; SD PAMs = sustainable development policies and measures
Source: Ward et al. (2008).

The effective implementation of an SCM depends on the creation of incentives for host developing countries on the one hand, and those for the private sector on the other. At an international level, a host developing country could obtain access to scaled-up finance under an SCM compared with financial flows expected from the CDM. At a national level, an SCM alone cannot fully function on its own and should be seen as a supplement to any existing policy framework and support policies that directly incentivise activities for abatement at an installation level.

The key challenge to the effective implementation of an SCM is motivating or incentivising investment decisions at a company level when the return to individual companies under the scheme depends on the performance of the sector as a whole (Turner et al., 2010; Aasrud et al., 2009; UN AGF, 2010). They may hesitate to unilaterally invest in reducing the carbon intensity of their operations without knowing that their competitors will follow. Some guarantee is needed to ensure that these operators' unilateral investment in abatement activities will be rewarded for every additional unit of emission reductions, even in the case of the sector's overall underperformance. Such a guarantee could take the form of either benefits provided under a domestic measure (e.g. a domestic cap-and-trade system) or revenues from the sale of credits on international carbon markets.

Part of the revenue from the sale of credits could also be earmarked to pay for the high upfront costs of the investment.

Another challenge is strong governance, which is required to maintain the integrity of government spending and crediting revenue. Acting as a buffer, the government or other financial bodies could provide loans in return for the future delivery of sectoral credits, underwriting forward contracts with international buyers of the credits (Turner et al., 2010). In so doing the buffer would assume the delivery risk, i.e. the entire sector's underperformance against the target. Success in target setting and the implementation of support measures is key to minimising the delivery risk. Sound practices in data collection and management are a precondition in all stages of the implementation of an SCM, from target setting to the monitoring, reporting and verification of emission levels against the target (Turner et al., 2010).

Sectors that are considered suitable for an SCM usually include the electricity sector, energy-intensive industries in a narrow sense, and could also cover transport or forestry. To be eligible for crediting, emissions from the covered sectors should be measurable, reportable and verifiable. Sectoral emissions data should be robust enough to set a baseline and enable actual emission levels to be monitored. Turner et al. (2010) argue that an SCM combined with an SNLT is more appropriate for the electricity sector than industry sectors partly because a performance target can be easily calculated given the homogeneity of electricity generation (on the potential of an SCM in the electricity sector, see also Baron et al., 2009). In the electricity sector, the SNLT could be based on the carbon intensity rather than absolute emissions. If either form of GHG emission target is not possible, the SNLT could be loosely linked to a proxy, like a renewable energy target. The SNLT must be set at the level of the emission reductions expected under the feed-in tariff or other support measures, such as tradable, renewable energy certificates and renewable portfolio standards (RPSs) (see Box 2 in section 1.2 above).

The target for the electricity sector could be largely achieved by building new facilities for renewable energy as a result of investment decisions at a company level (Turner et al., 2010). Feed-in tariffs, for example, could provide a guaranteed return through a higher price for electricity but do not pay for the high upfront costs associated with renewable builds. Hence, these companies may need financial assistance beyond the level of resources available through private finance or existing measures in order to build these renewable facilities. A possible solution, as described earlier, is that of loans provided by the government or financial bodies in return for the future delivery of sectoral credits, which could help electricity generators cover the investment costs and achieve abatement beyond the target.

One of the key questions for implementation is how to allocate potential carbon revenues domestically to good performers. For the electricity sector, Turner et al. (2010) recommend a centralised crediting approach, by which the government distributes credits to entities in accordance with the abatement achieved. An alternative is channelling revenues from the sale of credits on international markets back to entities, for example, by financing feed-in tariffs or tax incentives (Aasrud et al., 2010).

Turner et al. (2010) conclude that at present, among world regions North Africa has the least favourable conditions for the implementation of SCMs for several reasons:

- In North Africa the electricity sector is regulated.

- In most countries no financial support measures or systems for renewable energy (e.g. feed-in tariff) have been set in place. No country in the region has a clear, transparent, non-discriminatory framework for support (MVV decon and WI, 2010a; El Husseini et al., 2010).
- Governance is too weak and central support by the government is not sufficient.
- The capacity of both the public and private sectors is too weak.
- Countries in the region have a limited engagement in the CDM.

Nevertheless, it is interesting to explore possibilities for implementing SCMs, taking a few examples of mainly solar-powered electricity projects in the region: DESERTEC, the CSP plan in the region supported by the World Bank Clean Technology Fund (CTF) and the Mediterranean Solar Plan under the framework of the Union for the Mediterranean.

First, **DESERTEC** is a concept initiated by the Deutsche Gesellschaft Club of Rome (the German Association of the Club of Rome)[57] to exploit the solar resources in the Sahara desert for the production of electricity chiefly through CSP technologies for export to Europe, the Middle East and North Africa (see also Hafner and Tagliapietra, 2011). The concept has been transformed into a €400 billion project to be implemented by the DESERTEC Industrial Initiative, a consortium of more than 55 companies and institutions in the above regions.[58] From a European perspective, the project has dual advantages: the project aims at 1) meeting 15% of Europe's electricity needs and a large part of North Africa's own demand by 2050 by importing CSP and other renewable-sourced electricity via high-voltage cables; and 2) helping EU member states meet the target of increasing the share of renewable energy by 20% EU-wide by 2020. Under Art. 9.4 of the Renewable Energy Directive (European Parliament and Council of the European Union, 2009a),[59] electricity from renewable energy sources produced in one or more third countries through joint projects with one or more EU member states can be taken into account for compliance with their national overall targets. The consortium is expected to seek public funding for investment costs of about €400 billion in total. There is also increasing attention being paid to the potential for raising additional revenues from the sale of CERs, on the assumption that DESERTEC projects can be considered eligible for the CDM or a new market-based mechanism. GHG emission reductions from the generation and consumption of electricity in developing countries may be eligible, as the example of **EnergiPro** shows (see section 2.1). Still, emission reductions resulting from the export of clean electricity to developed countries (Annex I Parties) are not eligible to earn credits under the CDM.[60] The designs

[57] See Deutsche Gesellschaft Club of Rome, "DESERTEC – Sauberer Strom aus den Wüsten" (http://www.clubofrome.de/desertec.html); see also DESERTEC Foundation, "Start" (http://www.desertec.org/).

[58] See DESERTEC Industrial Initiative (Dii), "Home" (http://dii-eumena.com/).

[59] Art. 9 of the Directive addresses joint projects between member states and third countries. Paragraph 1 states that "[o]ne or more Member States may cooperate with one or more third countries on all types of joint projects regarding the production of electricity from renewable energy sources. Such cooperation may involve private operators". Paragraph 2 states that "[e]lectricity from renewable energy sources produced in a third country shall be taken into account only for the purposes of measuring compliance with the requirements of this Directive concerning national overall targets if the following conditions are met" (European Parliament and Council of the European Union, 2009a)

[60] R. Kelly (UNDP) quoted in J. McGarrity, "Africa-EU renewable link may qualify for carbon finance", *Point Carbon News*, 25 January 2011.

of an SCM could be tailored through bilateral negotiations, and therefore might be able to accommodate regional and transnational initiatives like DESERTEC.

Second, the Middle East and North Africa (**MENA) CSP Investment Plan** supported by the CTF aims at supporting investment in CSP in five countries – Algeria, Egypt, Jordan, Morocco and Tunisia. This programme envisages accelerating the deployment of 10-12 commercial CSP plants over a three- to five-year period to provide the critical mass of investments. Among the CTF investment plans[61] (e.g. CIF, 2009a, 2009b), this is the only regional programme: it focuses on markets in the five countries where transformational outcomes are most likely. The transformational outcomes may be served by accelerating the economies of scale for a technology that could become the least costly over the longer term and replicating the programme in other countries in the region with high GHG emissions (CIF, 2009c). The MENA CSP Investment Plan integrates national targets for renewable energy and sub-targets for each technology, and national solar plans in some countries (e.g. the Moroccan Solar Plan and the Tunisian Solar Plan). The Investment Plan will require investment of about $5.6 billion in total: contributions from the CTF will amount to $0.75 billion; in addition, the Plan is expected to mobilise a further $4.85 billion from other sources, including international financial institutions (IFIs) (CIF, 2009c). Carbon finance is also expected to complement commercial and IFI lending. The programme is estimated to generate GHG emission reductions of at least 1.7 million tonnes of CO_2e per year from the energy sectors of these countries (Coma-Cunill et al., 2009). These estimated emission reductions account for about 1% of the total CO_2 emissions from the energy sector and about 0.5% of the total emissions from these countries (CIF, 2009c). Given this potential, modest revenues from carbon finance are expected. After the initial support for the three- to five-year period by the CTF comes to an end, potential funding through an SCM could step in to fill the gap.

Third, the **Mediterranean Solar Plan** is a flagship initiative of the UfM, which brings together countries from both sides of the Mediterranean, building on what was formerly known as the Barcelona process.[62] From the outset, the MSP has been envisaged as both a major international initiative on energy policy and a major action to mitigate climate change developed and implemented in the framework of the EU's relations with its neighbourhood.

The MSP aims at preparing the ground for creating the necessary political, institutional and physical infrastructure for the development of dynamic, regionally integrated and ultimately self-sustained markets for renewable energy and energy efficiency (REEE) technologies in the Mediterranean basin. This in turn will underpin the emergence and consolidation of safe, secure, affordable and environmentally friendly energy systems in the wider UfM area (including in non-Mediterranean countries as well). The MSP is technology-neutral among REEE technologies, even though it has a clear initial focus on the electricity sector. The above aim, namely the development of enabling conditions, includes the build-up of at least 20 GW of new generation capacities fuelled by solar or other renewable energy sources by 2020 (UfMS, 2011; see also Hafner and Tagliapietra, 2011).

An MSP Master Plan identifying the necessary requirements for the achievement of these goals shall be defined by late 2012 and submitted for political approval by the member states. The MSP Master Plan will mainly focus on 1) the development of propitious framework conditions, taking

[61] The CTF also approved the investment plans of Egypt and Morocco in the region. See section 3.2.

[62] See EU External Action Service,"Euro-Mediterranean Partnership (EUROMED)" (http://eeas.europa.eu/euromed/index_en.htm); see also Secretariat of the Union for the Mediterranean (UfM), "Home" (http://www.ufmsecretariat.org/en/).

into account the outcomes of past or ongoing initiatives; and 2) a roadmap seeking to detail the phases, activities and precise timelines for the implementation of the different activities recommended.

Among other achievements to be considered are 'best practices' for financial support and investment guarantee mechanisms, including concessionary loans from donor organisations; own contributions from UfM member states; commercial engagement from private investors as well as income from import–export schemes (e.g. Art. 9 sources); carbon finance mechanisms and other innovative financing schemes. As examples of member states' contributions, France reported a grant of €0.80 million to a project supporting development of the MSP and capacity building of participating countries in the region for the period in 2010–12 (Council of the European Union, 2010a; European Commission, 2011e). Germany reported a grant of €2.90 million to a similar project supporting the MSP (European Commission, 2011e).

Carbon finance mechanisms in this context could include an SCM. As discussed in the example of DESERTEC, GHG emission reductions resulting from the export of clean electricity to developed countries will not earn credits under the CDM. Yet emission reductions through generation and the consumption of clean electricity in the region may do so and could be monetised under an SCM, provided the necessary agreements with the EU are in place. After initial funding through concessionary loans from IFIs or member states' contributions, an SCM could step in and provide an additional revenue stream.

A major problem common to the MENA CSP Investment Plan and the MSP could be the timing of intervention by an SCM. It is foreseen that the mechanism would not be ready at least in the next few years, considering the time needed to agree on the establishment and operational rules (see section 3.4). This timing will be too late for the above initiatives to achieve the objectives of expanding renewable energy sources by 2020. Some financial flows to bridge the gap period could be expected from the Green Climate Fund, aimed at supporting projects, programmes, policies and other activities in developing countries under thematic windows.[63] Discussion on the fund, however, remains at an early stage with operational questions left unanswered on both the delivery and disbursement sides.

3.4 Possible routes for the evolution of mechanism options

The above discussion on renewable energy points to at least two possibilities for the evolution of mechanism options:

1) a path from PoAs to supported NAMAs,[64] e.g. **PROSOL** in Tunisia; and

[63] See UNFCCC, "Transitional Committee for the design of the Green Climate Fund" (http://unfccc.int/cooperation_and_support/financial_mechanism/green_climate_fund/items/5869.php).

[64] See also Puhl et al. (2011), a study on the path from PoAs to NAMAs with four case studies, including a renewable energy programme; and also Perspectives and Alcor (2011b) with regard to a bottom-up approach from CDM PoAs to NAMAs. Yet a recent document from the CDM Methodology Panel cautions that "the Meth Panel recommends to define a maximum emission reduction threshold per CPA, above which no CPAs should be allowed to be included, but be registered as an individual CDM project activity instead" (see CDM Methodology Panel, "Review of large scale methodologies for their application to programme of activities", Information note, 54th meeting report of the CDM Methodology Panel, Annex 24, UNFCCC, 2012). If this recommendation is adopted, the prospect for PoAs in scaling up the level of activities would be rather limited.

2) a path from the conventional CDM to NAMAs, e.g. **EnergiPro** in Morocco.

These two options address the evolution of mechanisms rather than transition between mechanisms because there could be overlaps in mechanism designs and they cannot be mutually exclusive. For example, Tunisia assumes that the PoAs and NAMAs could exist side by side, which risks the double counting of GHG emissions. Morocco does not take an explicit position in this regard in its submission on NAMAs but includes EnergiPro in NAMAs (UNFCCC AWG-LCA, 2011a). Since PROSOL and EnergiPro have experienced baseline setting and crediting through PoAs and the CDM, to the extent that they achieve the level of compliance grade credits they could become candidates for credited NAMAs.

Outside the CDM there could be two possible approaches to future mechanisms:

3) national solar plans as part of (potentially credited) NAMAs, assuming that clean electricity is produced and consumed domestically, e.g. the **Tunisian Solar Plan** and the **Moroccan Solar Plan** with support from the World Bank Clean Technology Fund; and

4) regional and transnational solar plans as part of sectoral crediting mechanisms, assuming that clean electricity is produced and consumed domestically but its excess electricity can be exported, e.g. **DESERTEC**, the **MENA CSP Investment Plan** (with support from the World Bank Clean Technology Fund) and the **Mediterranean Solar Plan**.

Since these solar plans or similar initiatives have not yet been tested in baseline setting and crediting for carbon finance, they may first target supported NAMAs with limited crediting. As they improve their capacity for MRV, they could consider moving NAMAs from limited to full crediting, and shifting their sales of credits from voluntary carbon markets to mandatory carbon markets.

The EU has called for gradually phasing out the CDM, with exceptions for access by LDCs and phasing in new market-based mechanisms, which could include sectoral crediting, sectoral trading and NAMA crediting (e.g. UNFCCC AWG-LCA, 2011b). One possible route would be a move from the project CDM to sectoral crediting, then through sectoral trading to a cap-and-trade system (e.g. Fujiwara, 2009). While a number of Parties put forward their views or proposals for one or more market-based mechanisms to be set up under the Convention (UNFCCC AWG-LCA, 2011b and 2011c), these are not necessarily linked to the future of the CDM or the process of moving beyond the CDM. There is a need to sketch out the full picture as to how the CDM and new mechanisms can live side by side. Part of the reason for this situation could be the two-track process of the UN negotiations: the CDM reform falls under the Ad-hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) while new market-based mechanisms fall under the AWG-LCA.

The main challenges to the proposed move are how to smooth the transition between the different mechanisms and how to avoid the risk of double counting, given that different mechanisms could exist side by side at least during a transition period. For the former, there will be a question about how to unlock the status quo by creating incentives for Parties to move forward, for example through financial and technology support as well as capacity building. For the latter, a question has been raised as to a risk of double counting between CDM projects and NAMAs or sectoral crediting activities.

The authors wish to thank Robert Kelly (Regional Technical Adviser, Climate Change Mitigation – MENA region, UNDP) for this information.

3.5 Uncertainty about new mechanisms

In the absence of a new international agreement, the EU ETS Directive enables the EU to enter into bilateral agreements with third countries, specifying the levels for using credits from sectoral projects. Such agreements provide for the use of credits to be generated from eligible project types, including "renewable energy or energy efficiency technologies which promote technological transfer and sustainable development", and from projects where the baseline used is set below the level of free allocation under the transitional free allocation in the ETS Phase III (i.e. sectoral benchmarks) or "below the levels required by Community legislation" (European Commission, 2011d).[65] It is unclear at present exactly what would be the contents or designs of the bilateral sectoral agreements, although the current ambiguity may be intended to leave some flexibility in the terms of bilateral negotiations.

The above provision provides the EU with a legal basis to discuss the possibility for sectoral crediting or trading in bilateral channels in parallel with multilateral UN talks on NAMAs and new market-based mechanisms. Bilateral negotiations have the advantage of engaging fewer countries than the UNFCCC negotiations, which are currently engaging about 190 countries. An additional merit is that the EU could negotiate bilateral sectoral agreements with its neighbouring countries as part of a package deal in the context of a strategic partnership, such as the UfM. In the package deal an effective issue linkage could raise the chance of agreement.

The Durban outcome led to the definition of a new market-based mechanism and an invitation to Parties for submissions on modalities and procedures. Nevertheless, it usually takes years to agree on the establishment of a new market mechanism and could take even more time to set up operational rules.[66] Some market analysts assume that in effect the CDM will likely be dominant as a default until 2020 (e.g. Point Carbon, 2011).

To speed up the preparation process, at least two programmes for capacity building have been launched. First, the World Bank Partnership for Market Readiness develops packages of capacity building and implementation support for actions, including a range of market instruments in 15 middle-income countries, which are called 'implementing countries'. Among Southern Mediterranean countries, Jordan, Morocco and Turkey have been approved as implementing countries.[67] Second, the Nordic Council of Ministers has considered setting up a test financial facility for up-scaled mitigation programmes under the auspices of the Nordic Environment Finance Cooperation (NEFCO) to buy credits from pilot projects or programmes underpinned by up-scaled mechanisms, sectoral or NAMA crediting (Nordic Council of Ministers, 2011). A study recommended that NEFCO target middle-income developing countries, including Morocco and Tunisia (Ward et al., 2010).

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[65] See Arts. 11(a)(5) and (6) in the EU ETS Directive (2009b), op. cit., and the Regulation on how free emission allowances should be allocated from 2013 to industrial installations covered by the EU ETS (European Commission, 2011c). The Regulation sets out the rules, including the benchmarks to be used by the member states in calculating the number of allowances to be allocated for free annually in these sectors.

[66] For example, the Kyoto Protocol established flexible mechanisms and the Marrakech Accords (Annex, Decision 3/CMP.1, UNFCCC, op. cit.) decided the modalities and procedures for these mechanisms.

[67] See World Bank Carbon Finance Unit (CFU), "Partnership for Market Readiness" (http://wbcarbonfinance.org/Router.cfm?Page=PMR&ItemID=61218&FID=61218).

Lastly, even if sectoral credits become available for sale, they will likely compete with other tradable units globally and regionally. In international carbon markets, sectoral credits will probably compete with a large quantity of CERs to be generated from the existing pipeline of registered CDM projects. In the EU ETS, they could well face competition with not only CERs from projects in the pipeline but also CERs to be generated from new CDM projects hosted in LDCs and tradable units to be generated from domestic offset projects administered by EU member states.[68]

Under these circumstances, any major decision to set up a bilateral crediting mechanism will likely come too late for Southern Mediterranean countries. Even if they are ready and able to deliver credits for sale, they will face high competition with other tradable units for limited entry into the EU ETS.

4. The merits of carbon funds

Under uncertainty about future demand, some or all of the post-2012 credits generated from existing and new mechanisms could be purchased by a variety of carbon funds. Some have a track record of investment in CDM projects in the first commitment period (CP1) of the Kyoto Protocol (2008–12). For example, the World Bank has run funds and facilities for ten years in cooperation with governments (e.g. Denmark, Italy, the Netherlands and Spain), institutions (e.g. the EIB) and firms. The World Bank has signed agreements with a few Southern Mediterranean countries, such as Egypt, Jordan and Tunisia, for these funds to invest in CDM projects.[69] Others have been recently established and earmarked for the purchase of post-2012 credits (Alberola and Stephan, 2010).

The advantage of a public carbon fund is its ability to assume risks arising from the absence of a legal framework. For example, to help create a critical mass of credits, the World Bank launched the Prototype Carbon Fund in July 1999 and made it operational in April 2000 without waiting for the emergence of clear demand for carbon credits, as expected from the entry into force of the Kyoto Protocol.[70] Similarly, despite uncertainty about the future demand for credits, several consortia of public financial institutions, including the European Investment Bank, have launched post-2012 carbon funds (see Box 3).

If the EU continues to aspire to expand the carbon market, without waiting for the emergence of clear demand, it could contemplate setting up its own post-2012 carbon fund – for example a fund of funds to incorporate existing financial windows like the Mediterranean Carbon Fund. Setting up an EU post-2012 carbon fund to purchase CERs or sectoral credits might be politically more acceptable to opponents of raising the level of the 2020 GHG emission-reduction target up to 30%.

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[68] See Art. 24(a) of the EU ETS Directive (2009b), op. cit. and Art. 10 of the Effort Sharing Decision (2009c), op. cit.

[69] Egypt has one composting project to be financed by the Carbon Fund for Europe and one landfill gas capture and flaring project to be financed by the Spanish Carbon Fund. Jordan has one landfill gas project to be financed by the Carbon Fund for Europe. Tunisia has two landfill gas recovery and flaring projects to be financed by the Italian Carbon Fund and one wind farm project financed by the Spanish Carbon Fund. See World Bank Carbon Finance Unit (CFU), "Carbon Finance at the World Bank: List of Funds" (http://wbcarbonfinance.org/Router.cfm?Page=Funds&ItemID=24670).

[70] For the Prototype Carbon Fund, see World Bank Carbon Finance Unit (CFU), "Prototype Carbon Fund" (http://wbcarbonfinance.org/Router.cfm?Page=PCF&ItemID=9707&FID=9707).

Box 3. Examples of post-2012 carbon funds

World Bank Umbrella Carbon Facility. The World Bank set up the second tranche of the Umbrella Carbon Facility (UCFT2), a fund of funds earmarked for the purchase of CERs to be generated in 2013–18. Initial funding of €68 million was contributed by Deutsche Bank, GDF Suez and the Swedish Energy Agency. The second tranche will become fully operational when it reaches a total capitalisation of €105 million. The 17 projects and programmes under consideration will involve a total potential reduction of 26 million tonnes of CO_2eq in 2013–18.

Mediterranean Carbon Fund (MCF). Under the framework of the UfM, this fund has been launched by six public, financial institutions: the EIB, CDC Climat (a subsidiary of the Caisse des Dépôts), KfW Bankengruppe, Cassa depositi e prestiti, Agence Française Développement and PROPARCO. The fund was expected to be set up in 2011 at an overall size of €200 million. The goal is to generate and deliver carbon credits mainly from projects on renewable energy, energy efficiency or waste management by 2020.

Post-2012 Carbon Fund. This fund was launched in 2008 by five banks: the EIB, Caisse des Dépôts, KfW Bankengruppe, Instituto de Credito Oficial and the Nordic Investment Bank. Initial funding of €125 million was committed. In addition, the Post-2012 Carbon Fund and Orbeo invest in Africa's largest wind farm near Tangiers in Morocco, which is owned by the Office National de l'Electricité (ONE) with participation by the Fonds Capital Carbone Maroc (see below). The project aims at generating 284,000 CERs per year.

EIB-KfW Carbon Purchase Programme II. Since December 2009, the second tranche of this programme has purchased CERs and ERUs directly from project developers for delivery to EU ETS compliance buyers up to 2020. The second tranche was allocated €100 million: €43 million was used to purchase around 5 million CERs, of which 89% was expected to come from PoAs. In the first tranche, €88 million was invested in 20 CDM projects in 2007–09 and expected to yield about 8 million CERs.

Fonds Capital Carbone Maroc. This fund was set up in 2008 by the Caisse des Dépôts et Gestion du Maroc (CDG) and is managed by CDG Capital Private Equity. The fund is targeted at investment of €26.5 million. It is the largest carbon fund in French-speaking Africa. The CDG has a 50% stake in the fund, and the EIB and Caisse des Dépôts have 25% each. The fund acquires credits for the period 2008–17.

Sources: The World Bank, the MCF, the EIB, Alberola and Stephan (2010) and *Point Carbon News*.

Concerning the World Bank UCFT2, see "New funding for post-2012 carbon credits", press release, World Bank, 12 January 2011; see also World Bank Carbon Finance Unit (CFU), "Umbrella Carbon Facility T2" (http://wbcarbonfinance.org/Router.cfm?Page=UCFT2&ItemID=53224&FID=53224). For the MCF, see CDC Climat, "Work begins on setting up a Mediterranean Carbon Fund", press release, 17 June 2010 (http://www.cdcclimat.com/spip.php?action=telecharger&arg=503). For the Post-2012 Carbon Fund, see T.C. Barrett, "Financing for a low-carbon society", presentation at the Brussels Economic Forum 2010, Brussels, 25 May 2010 and J. McGarrity, "Consortium agrees large post-2012 CDM deal", *Point Carbon News*, 25 October 2010. For the EIB-KfW Carbon Purchase Programme II, see KfW Carbon Fund (2011), "Introducing the EIB-KfW Carbon Programme II", presentation (http://www.kfw.de/kfw/en/KfW_Group/Sustainability_and_Climate_Protection/PDF/2011-12-31_Presentation_EIB-KfW_Carbon_Programme_II_(English).pdf). For the Fonds Capital Carbone Maroc, see EIB, "Fonds Capital Carbone Maroc" (http://www.eib.org/projects/pipeline/2008/20080347.htm).

It is essential to integrate post-2012 carbon funds into the overall framework to support new mechanism options (see also sections 3.2 and 3.3), thereby catalysing private investments in the transition towards a low-carbon economy. For example, in the existing framework of the UfM, the EU and member states could support preparation for and implementation of national solar plans or the MSP. They could enter into negotiations for bilateral agreements with Southern Mediterranean countries on credits to be generated from sectoral projects that are implemented in the latter with the former's support. The MCF could guarantee the purchase of post-2012 credits upon future delivery as an incentive for individual companies to pay for upfront investment costs.

5. Concluding remarks

There are three challenges facing middle-income countries – not specific to Southern Mediterranean countries – in relation to capturing the carbon market opportunities created by the EU on the horizon: the limited size of future demand for carbon offsets or credits (as discussed in section 2.4), quantitative and qualitative restrictions on the use of CERs in the EU ETS Phase III (2013–20) (section 2.4) and the lack of prompt preparation for the start of new market-based mechanisms (section 3.5). These challenges are not mutually exclusive, but are related to one another. Uncertainty about a future international agreement exists on both the demand and supply sides, with a lack of clarity about further commitments by Annex I countries in the second commitment period of the Kyoto Protocol, about the levels of ambition in emission reduction commitments and mitigation actions communicated by developed and developing countries under the Cancún agreements, and about new market-based mechanisms.

To date, Southern Mediterranean countries have not fully tapped into the vast potential for Clean Development Mechanism projects. The region's share accounts for only 1.3-1.4% of the total registered projects worldwide and expected average annual credits from these projects. There are a number of barriers to or bottlenecks in the development of CDM projects. Among others this study has focused on 1) the lack of capacity for operation and management, 2) the lack of regional coordination and 3) the lack of engagement of the private sector. At the UNFCCC level, Parties have taken a series of decisions to improve the efficiency, transparency, governance and environmental integrity of the mechanism. The UN organisations (UN Environment Programme and UNDP), international financial institutions (the World Bank and the African Development Bank) and the EU and its member states have supported capacity-building programmes and other initiatives aimed at improving the conditions for carbon finance and market readiness in the region.

In parallel with the CDM reform, improvements in PoAs and capacity-building efforts, Parties to the Convention started considering modalities and procedures for new market-based mechanisms. Although Southern Mediterranean countries do not host a large number of CDM projects, they have some interesting examples, especially in the area of renewable energy, which may be useful for other parties seeking to operationalise the concepts of these new mechanisms. This study highlights a number of possible options for the evolution of mechanisms with reference to existing activities:

Within the CDM

- a path from PoAs to supported NAMAs, e.g. PROSOL in Tunisia;
- a path from the conventional CDM to NAMAs, e.g. EnergiPro in Morocco;

Outside the CDM

- national solar plans as part of (potentially credited) NAMAs, given domestic production and consumption of clean electricity (i.e. as long as there is no export to Annex I Parties), e.g. the Tunisian Solar Plan and the Moroccan Solar Plan; and
- regional and transnational solar plans as part of sectoral crediting mechanisms, given domestic production and consumption of clean electricity (as above), e.g. DESERTEC, the MENA CSP Investment Plan and the Mediterranean Solar Plan.

Possible factors leading to successful entry into these mechanisms would be the capacity for data collection and management as well as experience in baseline setting and crediting. In this respect, the electricity generation sector is considered suitable for testing a NAMA or a sectoral mechanism. The main issues include how to smooth the transition between different mechanisms and how to avoid the risk of double counting. One of the key challenges to the implementation of a sectoral crediting mechanism is incentivising investment decisions at a company level through support measures such as feed-in tariffs. Another key challenge is to have sufficient sectoral data to estimate business-as-usual emissions, set a crediting threshold and measure actual emissions.

In the absence of a new international agreement, the EU ETS Directive provides the EU with a legal basis to discuss the possibilities for sectoral crediting or trading through bilateral agreements with third countries. The EU could negotiate bilateral sectoral agreements with its neighbouring countries as part of the UfM, for example. At present, exactly how bilateral agreements will look is unclear. Such bilateral agreements will need to be tailor-made to address the special circumstances of the host country or the targeted sector(s). Both the EU and the third country will benefit from engaging the private sector in a consultation process, as the latter has the data, technology and know-how that are essential to the implementation of a sectoral mechanism.

Market participants warn, however, that without prompt preparation for a new mechanism the CDM will likely be dominant as a default up to 2020. The Durban climate change conference resulted in the definition of a new market-based mechanism and an invitation to Parties for submissions for modalities and procedures. Thus a way forward for a transition period until 2020 would be to turn to a variety of post-2012 carbon funds, an instrument to help create a critical mass of post-2012 credits before the emergence of a clear demand. Under the UfM framework, the EU and member states could negotiate bilateral agreements while the Mediterranean Carbon Fund could guarantee purchase of post-2012 credits upon future delivery. Looking forward, the EU could further contemplate setting up its own post-2012 carbon fund, for example, a fund of funds to incorporate existing financial windows like the Mediterranean Carbon Fund.

Leading up to 2020, it would be pragmatic for Southern Mediterranean countries to engage in the UN process for setting up a NAMA registry and matching promising NAMAs with potential donors, while they prepare for bilateral negotiations with the EU and member states. The Mediterranean region offers an interesting test case for an integrated approach to carbon markets: there is an institutional set-up (the UfM), a financial facility (the Mediterranean Carbon Fund) and a region-wide initiative with substantial potential for energy-related emission reductions (the Mediterranean Solar Plan) that could fit into a new market-based mechanism. The outcomes of the Mediterranean Solar Plan could feed into not only the mid-term scenario-building process for Southern Mediterranean countries across policy areas, but also the ongoing process of elaborating new market-based mechanisms at the UNFCCC and EU levels.

List of abbreviations and acronyms

AAU	Assigned amount unit
AGF	(High-Level) Advisory Group on Climate Change Financing
AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action under the Convention
BAU	Business as usual
BTU	British thermal unit
CCS	Carbon capture and storage
CDG	Caisse des Dépôts et Gestion du Maroc
CDM	Clean Development Mechanism
CER	Certified emission reduction
CH_4	Methane
CHP	Combined heat and power
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	Carbon dioxide
CO_2e	CO_2 equivalent(s)
COP	Conference of the Parties
CP1	First commitment period (of the Kyoto Protocol)
CP2	Second commitment period (of the Kyoto Protocol)
CPA	CDM programme activity
CSP	Concentrating solar power
CTF	Clean Technology Fund
DOE	Designated operational entities
EIB	European Investment Bank
ERU	Emission reduction unit
ETS	Emissions Trading Scheme
FEMIP	Facility for Euro-Mediterranean Investment and Partnership
GDP	Gross domestic product
GHG	Greenhouse gas
Gt	Gigatonne (one tonne x 109)
GWh	Gigawatt hour (corresponds to 1,000,000 kWh)
HFCs	Hydrofluorocarbons
IFI	International financial institution

JI	Joint implementation
kWh	Kilowatt hour
LCOE	Levelised cost of energy
LDC	Least developed country
LFG	Landfill fuel gas
m/s	Metres per second
MCF	Mediterranean Carbon Fund
MED-9	Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Syria and Tunisia
MED-11	Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey
MENA	Middle East and North Africa (Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, West Bank and Gaza, and Yemen)
MRV	Measurement, reporting and verification
MSP	Mediterranean Solar Plan
MSW	Municipal solid waste
$MtCO_2e$	Metric tonnes of CO_2 equivalent
MW	Megawatts
NAMA	Nationally appropriate mitigation action
NEFCO	Nordic Environment Finance Corporation
NG	Natural gas
N_2O	Nitrous oxide
ONE	Office National d'Electricité
PFCs	Perfluorocarbons
PNAP	Plan National d'Actions Prioritaires
PoA	Programme of activity
PPP	Purchasing power parity
PROSOL	Programme de Promotion de l'Utilisation du Chauffe-eau Solaire
PV	Photovoltaic
PVC	Photovoltaic cell
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
REEE	Renewable energy and energy efficiency
RES	Renewable energy sources
RPS	Renewable portfolio standard
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice

SCM	Sectoral crediting mechanism
SME	Small and medium-sized enterprise
SNLT	Sectoral no-lose target
STEG	Société Tunisienne de l'Electricité et du Gaz
TND	Tunisian dinar
TWh	Terawatt hour (corresponds to 1,000,000,000 kWh and 1,000 GWh)
UAE	United Arab Emirates
UCFT2	Umbrella Carbon Facility Tranche 2
UfM	Union for the Mediterranean
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development

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Appendix 1. CDM project potential

Table A1. CDM project potential for various project categories

Project categories	Description	Estimated potential in the Mediterranean region
Fuel switching in power production	Coal/oil to natural gas (NG)	• Coal-to-NG potential exists in Morocco, Israel and Turkey; not only the co-firing of biomass and fuel switching, but also clean coal technologies might be considered. • There is oil-to-NG potential in (first tier) Libya (Algeria and Egypt already produce most electricity in gas-fired power plants); (second tier) Lebanon, Jordan and Syria; and (third tier) Israel, Morocco, Tunisia, Turkey, Malta and Cyprus. • An NG oversupply in Turkey or good grid connection in Tunisia and Turkey might stimulate additional fuel switching. • Countries with an already high share of NG in power generation are more prone to diversify primary energy sources.
Fuel switching in industry	Oil to NG	• There is significant potential for fuel switching in industry within most countries in the region, except perhaps Malta and Cyprus. • In developing countries, fuel switching in the industry sector generally lags behind the power sector due to the time required for grid development.
Energy efficiency in centralised power generation	Process upgrading and co-generation	• Depending on the industrial/domestic heat demand or the presence of a significant geographical discrepancy between heat supply and demand, there is significant widespread potential for process upgrading or combined heat and power (CHP) in the Mediterranean, especially in countries with a large industrial sector, such as Algeria, Libya and Egypt. • No data/information has been found on the potential for CHP in the Mediterranean power sector.

Table A1. cont'd

Energy efficiency in industry	Process upgrading and co-generation	• There is significant potential for energy efficiency in industry in the Mediterranean, which could be implemented in parallel with fuel switching to NG in industry.
Energy efficiency in services	Energy system upgrading	• There is significant potential in countries with a large service sector (i.e. tourism). The decentralised nature of the service sector complicates the implementation of energy efficiency measures, because of coordination issues and information/ knowledge asymmetries. • Options include the use of energy-efficient lighting/cooling/heating systems, building design, etc. • Small-scale CHP based on NG could compete with solar heat production, depending on the respective country's strategy for NG and power grid development.
Energy efficiency in households	Energy system upgrading (lighting, heating, cooling and building design)	• There is significant potential in the Mediterranean, in light of urbanisation. The decentralised nature of this sector complicates the implementation of energy efficiency measures, because of coordination issues and information asymmetries. • Options include the use of energy-efficient lighting/cooling/heating systems, building isolation, etc. • Small-scale CHP based on NG could compete with solar heat production, depending on the respective country's strategy for NG and power grid development.
Wind	Renewable energy sources (RES)	• The potential of wind energy is fairly evenly spread across the Mediterranean region. Numerous countries already have practical experience in implementing wind power. • Country potential depends on coastline and available suitable acreage for onshore and offshore placement. • Implementation further depends on national policy concerning power generation.

Table A1. cont'd

Solar (thermal and photovoltaic (PV))	RES	• There has been modest usage of solar energy potential in the Mediterranean region so far. • Solar energy (either thermal or PV) has some of the highest RES potential in the Mediterranean and is widespread across the region. • There is significant potential for large-scale, solar power generation (possibly combined with fossil thermal and/or desalination). • Small-scale (off-grid) decentralised solar has significant rural as well as urban potential. • Implementation currently depends on economics of the technology.
Hydroelectricity	RES	• The overall potential is concentrated in just a few areas, mainly Turkey, Morocco and some parts of Algeria, Tunisia and Egypt. • A fairly standard RES option under the CDM.
Reforestation/biomass/agriculture	RES	• The strict water supply situation in the region is the main determinant of aforestation/reforestation or biomass production. • Energy crops are likely to compete for land with food crops. • There is potential for energy crop production, requiring significant irrigation, mainly concentrated in Turkey, Morocco, Algeria and Egypt. • There is potential for energy crops (i.e. jatropha) that have low irrigation requirements and which are suitable for arid regions (i.e. to prevent desertification), widely spread across the region.
Geothermal (conventional)	RES	• The potential for conventional, geothermal energy production is limited to just a few countries within the region, such as Turkey and Egypt. There are possibly some small parts of Algeria, Morocco, Tunisia and the eastern Mediterranean that are economically exploitable.

Table A1. cont'd

Geothermal (conventional) (cont'd)	RES (cont'd)	• There is possibly significant and more widespread potential for hot dry rock. • There are relatively high upfront investment costs (exploration and drilling).
Ocean energy (tidal and wave)	RES	• The ocean energy potential, based on tidal and wave movements, is of limited importance in the Mediterranean region. This is certainly the case in the short to medium term, owing to the current status of the technology. • For the medium term, there may be a niche market on the Atlantic coast (Morocco).
GHG abatement	N_2O, CH_4 (methane-capture landfill fuels, waste water treatment, etc.), HFCs, PFCs, fugitive and CO_2 (CCS)	• There is significant GHG abatement potential, especially with respect to the abatement of N_2O (cement/fertilizers) and CH_4 (landfill/waste water) emissions. • With regard to landfill fuel gas (LFG), a high degree of potential has been identified not only in Jordan and Israel, but also in Turkey, Egypt and Algeria, primarily depending on municipal solid waste (MSW) management. Other countries have LFG potential too. There may also be niche opportunities in Malta and Cyprus. • There is some niche potential for HFCs and PFCs, but it is uncharted at the moment. More country specific- and bottom-up analysis is required.

Source: EIB (2007).

Appendix 2. CDM projects focusing on N_2O emissions from nitric acid plants

Israel has four registered projects targeting N_2O emissions from nitric acid plants:

- UNFCCC, "Project 1113: Project for the catalytic reduction of N_2O emissions with a secondary catalyst inside the ammonia reactor of the nitric acid plant at Fertilizers & Chemicals Ltd., Haifa, Israel" (http://cdm.unfccc.int/Projects/DB/SGS-UKL1178309988.91/view).
- UNFCCC, "Project 1174: Project for the catalytic reduction of N_20 emissions with a secondary catalyst inside the ammonia reactor of the N3 nitric acid plant at Haifa Chemicals Ltd., Israel" (http://cdm.unfccc.int/Projects/DB/SGS-UKL1181899889.9/view).
- UNFCCC, "Project 1370: Project for the catalytic reduction of N_2O emissions with a secondary catalyst inside the ammonia reactor of the N4 nitric acid plant at Haifa Chemicals Ltd., Israel" (http://cdm.unfccc.int/Projects/DB/SGS-UKL1191245775.71/view).
- UNFCCC, "Project 1369: Project for the catalytic reduction of N_2O emissions with a secondary catalyst inside the ammonia reactor of the N1 & N2 nitric acid plants at Haifa Chemicals Ltd., Israel" (http://cdm.unfccc.int/Projects/DB/SGS-UKL1191241778.72/view).

Egypt has one registered project focusing on N_2O emissions from nitric acid plants:

- Ministry of State for Environmental Affairs and Egyptian Environmental Affairs Agency (MSEA–EEAA), "CDM Projects in Egypt – Registered" (http://www.eeaa.gov.eg/english/main/cdmapu_registered.asp).
- UNFCCC, "Project 0490: Catalytic N_2O destruction project in the tail gas of the nitric acid plant of Abu Qir Fertilizer Co." (http://cdm.unfccc.int/Projects/DB/TUEV-SUED1151930566.53/view).

Egypt also has one project under validation and two projects in the pipeline, all of which aim at N_2O emissions from nitric acid plants: (under validation):

- UNFCCC, "N_2O Abatement at Semadco (Egypt)" (http://cdm.unfccc.int/Projects/Validation/DB/ZTOT7SQCXOBDSQQHYCLEM645Y1JK3E/view.html) and Ministry of State for Environmental Affairs and Egyptian Environmental Affairs Agency (MSEA–EEAA), "CDM Projects in Egypt – Pipeline" (http://www.eeaa.gov.eg/english/main/cdmapu_pipeline.asp) (Nos. 44 and 45 in the pipeline).

Syria has one registered project targeting N_2O emissions from a nitric acid plant:

- UNFCCC, "Project 4042: Catalytic N_2O abatement project in the tail gas of the nitric acid production plant in G.F.C, Syria" (http://cdm.unfccc.int/Projects/DB/JQA1287024676.23/view).

About MEDPRO

MEDPRO – Mediterranean Prospects – is a consortium of 17 highly reputed institutions from throughout the Mediterranean funded under the EU's 7th Framework Programme and coordinated by the Centre for European Policy Studies based in Brussels. At its core, MEDPRO explores the key challenges facing the countries in the Southern Mediterranean region in the coming decades. Towards this end, MEDPRO will undertake a prospective analysis, building on scenarios for regional integration and cooperation with the EU up to 2030 and on various impact assessments. A multi-disciplinary approach is taken to the research, which is organised into seven fields of study: geopolitics and governance; demography, health and ageing; management of environment and natural resources; energy and climate change mitigation; economic integration, trade, investment and sectoral analyses; financial services and capital markets; human capital, social protection, inequality and migration. By carrying out this work, MEDPRO aims to deliver a sound scientific underpinning for future policy decisions at both domestic and EU levels.

Title	MEDPRO – Prospective Analysis for the Mediterranean Region
Description	MEDPRO explores the challenges facing the countries in the South Mediterranean region in the coming decades. The project will undertake a comprehensive foresight analysis to provide a sound scientific underpinning for future policy decisions at both domestic and EU levels.
Mediterranean countries covered	Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey
Coordinator	Dr. Rym Ayadi, Centre for European Policy Studies (CEPS), rym.ayadi@ceps.eu
Consortium	Centre for European Policy Studies, **CEPS**, Belgium; Center for Social and Economic Research, **CASE**, Poland; Cyprus Center for European and International Affairs, **CCEIA**, Cyprus; Fondazione Eni Enrico Mattei, **FEEM**, Italy; Forum Euro-Méditerranéen des Instituts de Sciences Economiques, **FEMISE**, France; Faculty of Economics and Political Sciences, **FEPS**, Egypt; Istituto Affari Internazionali, **IAI**, Italy; Institute of Communication and Computer Systems, **ICCS/NTUA**, Greece; Institut Europeu de la Mediterrania, **IEMed**, Spain; Institut Marocain des Relations Internationales, **IMRI**, Morocco; Istituto di Studi per l'Integrazione dei Sistemi, **ISIS**, Italy; Institut Tunisien de la Compétitivité et des Etudes Quantitatives, **ITCEQ**, Tunisia; Mediterranean Agronomic Institute of Bari, **MAIB**, Italy; Palestine Economic Policy Research Institute, **MAS**, Palestine; Netherlands Interdisciplinary Demographic Institute, **NIDI**, Netherlands; Universidad Politecnica de Madrid, **UPM**, Spain; Centre for European Economic Research, **ZEW**, Germany
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