

Morocco: The Land of Dialogue and Coexistence and the Crossroads of Civilizations is the Buyers Club Pioneer in Super-Efficient AC with Climate-Friendly Refrigerants

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Abstract

The Kingdom of Morocco (Morocco) is fully committed to the protection of the stratospheric ozone layer and climate, and is working on domestic policy, in cooperation with industry and environmental non-governmental organizations (NGOs). According to Climate Action Tracker (CAT), Morocco is one of only two countries with a plan to reduce its carbon dioxide (CO₂)-equivalent emissions enough to limit warming to 1.5 degrees Centigrade (C) if all other countries did the same. Morocco, with 35% of electricity already generated by renewables, has a National Energy Strategy of generating 42 percent by 2020, and 52 percent by 2030, respectively. Furthermore, Morocco plans to rapidly accelerate the transition to super-efficient air conditioning (AC) using refrigerants less damaging to climate, which can reduce electricity consumption far enough so that only renewable energy is all that is needed. Other African countries will learn from the success in Morocco and implement similar policies to leverage the positive impact on the global environment.

This paper explains how Moroccan government authorities are cooperating with international organizations in finding the way forward with a combination of more stringent Minimum Energy Performance Standards (MEPS), private and public AC Buyers Clubs, and economic incentives such as import duties that favour efficiency and caps the global warming potential (GWP) of refrigerants used in imported room ACs. The Morocco AC Buyers Club will use comprehensive calculations of the carbon footprint and economic impact of room ACs tailored to local Moroccan climate and use conditions.

The remarkable Moroccan ambition is to replace older ACs country-wide with next-generation super-efficient ACs using refrigerants more friendly to climate and in doing that collect and destroy in local cement kilns the obsolete refrigerants and recycle the other components. Buyers' Clubs will reduce the cost by bulk purchase and professional installation, and service will assure that the maximum energy efficiency is achieved and maintained during ownership. This strategy

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drastically reduces energy use, with savings spent locally rather than on imported fuel and electricity, while improving local air quality, and creating year-around jobs in AC installation and service. These reductions in greenhouse gases (GHGs) can be counting toward Morocco’s Nationally-Determined Contribution (NDC) toward the Paris Climate Agreement. What is accomplished in Morocco can be replicated with lessons learned in all of Africa.

Montreal Protocol, Kyoto Protocol, and Paris Climate Agreement Market Drivers

The Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) controls *production and consumption* of hydrochlorofluorocarbons (HCFCs) that will be *phased out*; controls the *production and consumption* of hydrofluorocarbons (HFCs) that will be *phased down*; and pursues increases in the energy efficiency of refrigeration, air conditioning, and thermal insulating foam. The Kyoto Protocol controls *emissions* of HFCs, and the Paris Climate Agreement strengthens the HFC phasedown and energy efficiency ambition with national pledges NDCs to reduce HFC, CO₂, and other greenhouse gas emissions.

The Importance of Synergy in HCFC Phaseout, HFC Phasedown and Energy Efficiency

Until recently, most companies phasing out HCFC-22 refrigerants in room ACs choose HFC-410A as a refrigerant replacement worldwide. HFC-410A is a blend of refrigerant fluids with 50% HFC-32, which is energy efficient but mildly flammable, and 50% HFC-125, which is energy-inefficient but has the chemical effect of making the blend non-flammable. In 2011, Japanese and Indonesian companies and governments, coordinated by the United Nations Development Programme (UNDP) and with the collaboration of one non-governmental organization, realized that ACs could be re-designed to safely use mildly-flammable HFC-32 refrigerant and could achieve higher energy efficiency and lower refrigerant cost while reducing life-cycle CO₂-equivalent (CO₂-eq) refrigerant emissions (Sadatani, 2011; Andersen et al., 2018b and 2018c) by two-thirds. At about the same time, Indian and Chinese companies, with German government collaborators, determined that ACs could be re-designed to safely use highly-flammable HC-290 (propane) refrigerant as long as the refrigerant charge was so small that the risk would be acceptable if leaked into occupied spaces (GIZ, 2011 and 2013).

Japanese AC manufacturers quickly transitioned from HFC-410A to HFC-32 for almost 100% of domestic sales and in many export markets. One company in India (Godrej) has been “leapfrogging” from HCFC-22 to HC-290 in a portion of their ACs for domestic sales but is so far not involved in the export market. Chinese companies are slowly introducing HFC-32 and HC-290 ACs in their domestic markets and Germany is the first market in the European Union (EU) to accept HC-290 ACs from China (Midea, 2018).

Table 1: Montreal Protocol Status and Technical Performance of Refrigerants for Room ACs

REFRIGERANT	PROTOCOL			PERFORMANCE		
	Montreal	Kyoto	GWP*	Flammable?	Efficient?	Obsolete?
HCFC-22	Phaseout	No control	1,760	No	Yes	Yes
HFC-410A	Phasedown	Emissions	1,924	No	No	Yes
HFC-32	Phasedown	Emissions	677	Mildly	Yes	No
HC-290	No control	No control	~3	Highly	Yes	No

*GWP values are from the Intergovernmental Panel on Climate Change (IPCC) Assessment Report Five (AR5) for the 100-year timescale.

Countries Without AC Manufacture Can Stop Dumping and Buy from Any Global Source

In Morocco and all of Africa there is little AC manufacture and limited assembly from parts manufactured elsewhere (total knock-down assembly – TKA). This is a disadvantage because all the labor and profit of manufacture is elsewhere, but an advantage during times of rapid technology upgrades, because choosing the best next-generation ACs from a new foreign source offering fair and favorable prices has no consequences to domestic employment, investment, and profits. In fact, times of rapid technical progress with manufacturing factories being totally refurbished for the new manufacture can create the opportunity to build those new factories closer to the markets with local labor.

According to a new analysis published in the Duke Environmental Law & Policy Forum (Andersen et al., 2018), environmental dumping is the practice of exporting products to another country or territory that: 1) Contain hazardous substances; 2) Have environmental performance lower than is in the interest of consumers or that is contrary to the interests of the local and global commons, or; 3) Can undermine the ability of the importing country to fulfil international environmental treaty commitments.

In Morocco and all of Africa, foreign companies have been dumping obsolete and inefficient HCFC-22 and HFC-410A ACs despite the fact that they supply more energy efficient ACs with lower-GWP refrigerants in their home markets (Andersen et al., 2018a). Inefficient ACs dumped into countries overload energy resources, undermining national and local efforts to manage energy, environment, health, and climate goals.

World Bank experts warned that “following the prohibition of HCFC-22 in a number of developed countries, the Maghreb region markets were flooded with air conditioning equipment using R-22 at rock-bottom prices, creating serious problems for the renewal and maintenance of equipment stock, and ultimately jeopardizing the commitments made in the context of the Montreal Protocol” (Khalfallah et al., 2016).

Now, with the phaseout ozone-depleting and high-GWP HCFC-22 and opportunity to leapfrog ozone-safe but high-GWP HFC-410A, there will be even greater dumping of inefficient equipment with obsolete refrigerants that may not be available at affordable prices for service over the life of the AC. The likelihood of rapidly increasing prices of obsolete refrigerants adds to the economy of insisting on super-efficiency using lower-GWP refrigerants with reliable future availability. Fortunately, Morocco can choose the combination of anti-dumping tools that puts the interest of Morocco, its citizens, and the global climate first.

Morocco will Leapfrog HFC-410A and Demand Affordable Super-Efficient ACs

Morocco, and all of Africa, can leapfrog HFC-410A and choose next-generation refrigerants, thereby avoiding the expensive and non-sustainable growth of the inventory of obsolete HCFC-22 and HFC-410A ACs. The advantage to Morocco and Africa is that money saved by super-efficient

ACs is spent in local communities, and funds available from avoided purchase of fuel and power plants are reinvested in Moroccan growth, prosperity, and jobs. Furthermore, less combustion of fossil fuel and biomass for electricity reduces local air pollution and contributes to Morocco's pledge to do its part to protect climate through NDCs.

Morocco will demonstrate that Buyers Clubs can reduce the purchase price of the most affordable AC equipment while government policy discourages the continued dumping of inefficient ACs with refrigerants hazardous to climate and the financial interest of developing countries.

Moroccan Geography, Climate, and Energy Situation

Morocco is located at the northwest tip of Africa. It has a 2017 population of about 36 million (MHCP, 2018). Its capital is Rabat, and the largest city is Casablanca. Other major cities include Marrakesh, Meknes, Oujda, Tangier, Fes, and Salé.

Population and economic growth are increasing the demand for room AC. Morocco can satisfy the new demand for AC with a combination of expanded electric generating capacity, including low-carbon wind and solar power and other sources of renewable energy, and through increasing energy efficiency.

Morocco has a hot Mediterranean climate similar to that of Italy and Spain, with lush forests in the northern and central mountain ranges of the country, and drier conditions and inland deserts in the southeast. Most regions have distinct seasons. About 95% of the population lives in the central and northern coastal plains.

The Moroccan coastal plains experience moderate temperatures due to the cold Canary Current off its Atlantic coast. Cloud forests are found west of the Rif and Middle Atlas Mountains and, at higher elevations, the climate can currently sustain alpine ski resorts.

Southeast of the Atlas Mountains, the climate is very dry, with long and hot summers. Southeastern Morocco is very hot, and includes portions of the Sahara Desert, where sand dunes and rocky plains are dotted with lush oases.

Central and northern coastal plains are fertile agricultural lands that produce olives, citrus fruits, and wine grapes. Most water in this region is supplied by artesian wells. Barley, wheat, and other cereals are grown in the northwest without irrigation.

Winds are strongest in the very north and south and very east. Solar irradiation tends to be stronger towards the southern and more continental parts of the country (Energylopedia, 2018).

Moroccan Economy and Foreign Relations

Morocco is a member of the United Nations (UN) and belongs to the African Union (AU), Arab League, Arab Maghreb Union (UMA), Organisation of Islamic Cooperation (OIC), the Non-Aligned Movement, and the Community of Sahel-Saharan States (CEN-SAD). France and Spain are the primary trade partners and foreign investors. About 75% of foreign investment is from the

European Union, about 20% is from the Arab League, and all other foreign regions invest approximately 5%.

The major resources of the Moroccan economy are phosphates, tourism, and agriculture. Morocco is the world's third-largest producer of phosphorus after China and the United States, with Morocco holding nearly 40 percent of global reserves (Vaccari, 2009). Tourism is focused on Morocco's coast, culture, and history, with 60% of Morocco's tourists visiting ancient Roman and Islamic sites. About 40% of the nation's workforce is employed in agriculture, primarily in fruit, vegetables, spices, nuts, livestock, fisheries, and building materials, including cork and cabinet wood.

The Importance of an Enlightened Banker's Perspective Crafting the Moroccan AC Buyers Club

Bankers are masters of rate-of-return and pay-back and know that energy savings can accumulate into fortunes. They are concerned about and involved in their communities and are trusted advisors in sustainable investment. It is a strength that bankers have access to money for investment and that they set an example by their own investments for others wanting to do their part for sustainable prosperity. Importantly, local banks are often owned by national or international organizations or are partner with other financial institutions, which allows success in one location to be quickly replicated.

With little time to take action to protect climate, it is vital that trusted and respected financial institutions take the lead on investment that saves money and protects climate. Guided investment can be cost-effective and sustainable for buyers of ACs and profitable for suppliers of new technology that will want to continuously improve their products and support their customers to achieve lowest carbon footprint.

The first partner in the Morocco Bankers AC Buyers Club is BMCE Bank of Africa, with additional Moroccan banks welcome to join as the project scales up.

BMCE Bank of Africa is an internationally oriented Moroccan banking group, with a presence in more than thirty countries in Africa, Europe, and Asia, and 15,000 employees worldwide. The bank is a pioneering leader in sustainable finance and the first Moroccan institution to sign in 2016 the United Nations Global Compact (UNGC) and has integrated environment, human rights, labour law and the fight against corruption in their business practices. BMCE Africa Group also subscribes to the Equator Principles, UNGC, Positive Impact Finance Manifesto, and Mainstreaming Climate Action in Financial Institutions. In 2016, the Bank became the first bank in Morocco to issue green bonds by public offering, signed agreements to finance adaptation to climate change and measured its carbon footprint. This exemplary leadership is aimed at identifying and mitigating the environmental and social impacts from the bank's operations in line with global best practice.

BMCE Bank of Africa activities on climate protection include technical assistance on outreach and marketing strategies to build customer awareness and fill the pipeline with clean-energy

projects, training of local architects, design engineers, energy auditors to identify and secure low-interest funding for sustainable energy projects.

Moroccan Politics and Climate Leadership

Morocco is a constitutional monarchy with an elected parliament. Executive power is exercised by the King, while legislative power is vested in both the King and the two chambers of parliament, the Assembly of Representatives and the Assembly of Councilors. The King can issue a *dahir* decree, which has the force of law.

The twenty-second session of the Conference of the Parties (COP 22) to the United Nations Framework Convention on Climate Change (UNFCCC) and the twelfth session of the COP serving as the meeting of the Parties to the Kyoto Protocol (CMP 12) took place in Marrakech, Morocco from 7 to 18 November 2016.

Moroccan King Mohammed VI made the following proclamation at COP 22:

“In the name of our shared destiny and in the name of our historic responsibility, I urge all parties to work on translating our commitment to the values of justice and solidarity into actions, by:

Providing the countries of the South, especially the least developed, as well as insular states, with such urgent financial and technical support as will enhance their capacities and enable them to adapt to climate change;

Advanced countries honoring their commitments and mobilizing 100 billion dollars at least, by 2020, which was the key to the Paris Agreement;

All the parties being involved in facilitating the transfer of technology, and working for the development of research and innovation in the field of climate;

Non-Governmental players, including companies, local communities, NGOs from civil society, giving strong impetus to the Global Climate Action Agenda.”

Morocco was among the first countries that proposed an Amendment to the Montreal Protocol to phase down HFCs.

Morocco promotes South–South cooperation as a long-term goal and is a natural force in establishing equitable economic relations with other African countries through leadership on energy efficiency and by promoting low-carbon wind and solar electricity generation. Headquarters of many African banks are in Morocco or have regional and national branches. Refrigeration and air conditioning manufacturers, assemblers, and distributors will want to locate new facilities in countries like Morocco that are piloting next generation technology and pursuing government policies that favour the highest affordable energy efficiency.

Morocco Electricity Generation and Energy Imports

Morocco's lowest power-consumption periods are typically October through March, 22:00-07:00, and April through September, 23:00-07:00. High power-consumption periods are typically October through March, 07:00-17:00 and April through September, 07:00-18:00. Peak power-consumption periods are October through March, 17:00-22:00, and April through September, 18:00-23:00 (Lydec, REDAL, and CRI Tangiers, 2018).

Electricity tariffs for residential and commercial consumers are under a social tariff scheme fixed by periodic decrees from the Prime Minister with some rates depending on monthly consumption levels. Tariffs are relatively high by regional standards but remain below generation costs. Residential tariffs are lowest for electricity consumed for basic necessities (lights and refrigeration) and become progressively higher for consumption above such necessities.

In 2015, Morocco's total electricity demand reached about 34,400 Gigawatt hours (GWh). About 30,000 GWh were produced in Morocco, and the remainder was imported from abroad, mainly from Spain (Chentouf, 2018). In 2015, Morocco's electricity production capacity was about 8,200 megaWatt (MW), divided roughly between coal (31%), fuel and diesel (10%), hydroelectricity (22%), gas (26%), wind (9%), and other (2%). Domestic production capacities will be increased by 6,500 MW by 2020. Of this new total capacity of around 14,500 MW, solar and wind energy will each represent about 4,000 MW and 2,000 MW respectively (PAREMA 2017). Morocco has set targets to increase the share of electricity generating capacity from renewables to 42% by 2020 and 52% by 2030, as well as targets for reducing energy consumption by 12% by 2020, and 15% by 2030 through energy efficiency. The country is on track to meet its renewable energy targets according to the Moroccan Agency for Sustainable Energy (MWN, 2018).

Morocco depends on imports for more than 95% of energy supply, with coal and oil still dominating the country's energy mix. Saudi Arabia, Iran and Russia are the main sources of oil imports. 93% of natural gas is imported from Algeria, while 7% is sourced locally. Import of electricity has increased from Spain. Energy imports (crude oil and oil products, coal, natural gas and electricity) amounted to 102.5 billion Moroccan dirham (MAD) (about US\$ 10.8 billion) in 2013, representing about 27% of total imports (International Energy Agency, 2014). Morocco hopes to be able to increasingly produce electricity for export to Europe from renewable energy.

Morocco Partnership on Super-Efficient ACs Using Lower-GWP Refrigerants

The Government of Morocco is partnering with Moroccan banks and international NGOs with high ambitions to transform the local markets to affordable next-generation ACs with the lowest life cycle footprint (Andersen et al., 2018b, 2018c), and to leverage that national leadership to all of Africa. The partnership will put the people of Morocco and the global environment above any other interest and will work diligently toward the attainment of these noble goals.

The Morocco National Ozone Unit, the *Ministre de l'Énergie, des Mines et du Développement Durable*, and the *Agence Marocaine de l'Efficacité Énergétique* together with IGSD; Paris and Washington DC), The Energy and Resources Institute (TERI; New Delhi), and the University of

Maryland Center for Environmental Energy Engineering (UMD CEE, USA) will quickly accomplish five independent but coordinated pilot projects in Morocco, including the following:

- 1) Pilot localized life-cycle carbon footprint analytical metric (Andersen et al., 2018b and 2018c)
- 2) Pilot business plan to upgrade ACs at BMCE Bank of Africa
- 3) Pilot government green ACs Buyers Club for public buildings
- 4) Pilot initiative to Liaise with likely suppliers of affordable super-efficient ACs to Morocco
- 5) Pilot plan to develop private and public ACs Buyers Club for Morocco

The plan is to “learn-by-doing” and to take lessons forward to all of Africa, with the ultimate goal of a private/public Buyers Club that will negotiate the affordable purchase of super-efficient ACs for banks, government buildings, universities, and hotels complying with national private or administrative procedures.

The partnership will accomplish this goal within the legal system of Morocco, through harmonized equipment specifications and Buyers Club procedures, taking into account financial incentives and Paris Agreement obligations. The working hypothesis is that the carbon saved by market transformation will count as part of the NDCs and/or can be sold in the carbon market.

Summary and Conclusions

Morocco is fully committed to protection of the stratospheric ozone layer and climate, and is working on domestic policy, in cooperation with industry and environmental NGOs, that will rapidly accelerate the transition to super-efficient air conditioning using refrigerants less damaging to the climate. It is anticipated that the new comprehensive and localized life-cycle carbon metric will prove that energy efficient ACs are more important to sustainability prosperity and environmental quality in Morocco than previously estimated, and that the Morocco Banker’s Buyers Club will make next-generation ACs available at a far lower price. *It is the vision of this initiative of Morocco that other African countries will benefit from its success and implement similar policies to leverage the positive impact at the national level and on the global environment.*

Organizational Perspectives

Energy Efficiency Leadership of Agence Marocaine de l’Efficacité Énergétique

The Moroccan Agency for Energy Efficiency is the strategic office of the Ministry of Energy, Mines and Sustainable Development, whose mission is to implement national energy policy that increases energy independence while preserving the environment, including protection of the global climate.

The vision of AMEE is to become a leading energy efficiency agency, a hub of excellence, and a crossroads of institutional, civil society, private sector, national, and international cooperation. AMEE is also responsible for monitoring and

coordinating energy audits, raising awareness, and promoting energy efficiency measures, cooperation, and communication.

Buildings consume about 25% of Morocco's annual energy budget, with air conditioning responsible for a large and increasing peak load as incomes grow from economic development and temperatures increase due to climate change.

Just one month after the Morocco Banker's AC Buyers Club was organized, AMEE got on board, with a memorandum of understanding signed with the Institute for Governance & Sustainable Development to cooperate in developing more effective analytical methods to identify the highest efficiency room air conditioners available that use refrigerants friendlier to climate. AMEE and IGSD immediately partnered with the (UMD CEEE), and, within nine months of the MOU, published in the ASHRAE Journal a model called Enhanced and Localized Life Cycle Climate Performance (EL-LCCP), which quantifies direct refrigerant, indirect electricity, and embodied greenhouse gas emissions using hour-by-hour carbon intensity of electricity and temperatures to reflect urban heat islands and the stacking and clustering of air conditioner condensers. The model takes into account the knowledge that high ambient temperatures degrade the efficiency of electricity generation, transmission, and distribution. The policy implication is that higher energy efficiency avoids more electricity expense and carbon footprint than previously realized.

AMEE participation in the Buyers Club project is strengthening the commitment of the Government of Morocco to stop the dumping by foreign manufacturers of obsolete and inefficient ACs that have unaffordable energy costs, pollute the air, and contribute to climate change. The obvious next step is to develop and implement policies that provide incentives to public and private markets for super-efficient next-generation ACs.

Morocco National Ozone Unit for the Montreal Protocol

The Morocco National Ozone Unit is part of a global network of offices specifically created under the Montreal Protocol to share information, build capacity, and guide investment to phaseout ozone-depleting substances (ODS) that cause skin cancer and cataracts, suppress the human immune system, damage agricultural and natural ecosystems, and deteriorate paints and plastics.

Morocco, the Federated States of Micronesia and Mauritius with the first countries in 2009 to advocate the control under the Montreal Protocol of ozone-safe HFCs that were once necessary to rapidly phaseout ODSs but are powerful GHGs no longer needed because technically and environmentally alternatives have been commercialized or will soon be commercialized.

On Saturday October 15, 2016, all 197 UN Parties agreed the Kigali Amendment to the Montreal Protocol to phase down the production and consumption of HFCs

and also agreed by Decision to simultaneously increase energy efficiency during the transition. Morocco choose to phasedown HFCs under the fastest schedule for developing countries qualified under Article 5 (A5) Parties, rather than take the slow schedule allowed by choice for A5 Parties with high ambient temperatures.

The HFC phase down agreement is by far the single largest measure taken so far to mitigate climate change emissions since the Paris Agreement. Coming just weeks after countries agreed on a program to limit greenhouse gas emissions from aviation under the International Civil Aviation Organization (ICAO), and after sufficient ratifications of the Paris Agreement to bring it into effect on 4 November 2016, the Montreal Protocol amendment builds even further momentum for immediate, international action on climate change.

Developed countries are already engaged in the HFC phasedown with technologies that have lower life cycle ownership costs than the obsolete HCFC and HFC equipment. Because the next-generation equipment is superior in technical, environmental, and financial performance Morocco is organizing the Buyers Club to encourage ACs with lowest carbon footprint and to stop the dumping of obsolete equipment that is inferior in every way but profitable to the foreign companies that dump it in our unsuspecting markets even when it cannot be sold in their own.

Morocco has the ambition to be among the first to embrace the next-generation technology and enjoy the financial savings, clean air and climate protection. Morocco anticipates that by being first we will become a model for all of Africa and in doing so be a top candidate for local manufacture of the superior equipment for our own market and southern Europe and all of Africa where high ambient temperatures and long cooling seasons require ACs designed, installed, and serviced for these conditions.

The strategy is to merge business and environmental ambitions and enlist the full power of the Moroccan people and its government to transform markets. We are fortunate to have the leadership of BMCE Bank of Africa and the vision of AMEE in working on the Enhanced and Localized Life Cycle Climate Performance model that takes into account the conditions in Morocco such as urban heat islands, stacked and clustered AC evaporators, and the degradation at high ambient temperatures of the energy efficiency of thermal-electric power plants, transmission and distribution systems. It is significant that MEMDD is also part of the team.

Buyers' Club leadership by Morocco will help drive climate-safe HFC alternatives into the market at full economy-of-scale and competitive prices that other developing and developed countries will also want to enjoy. Widespread upgrades of MEPS and actions to stop dumping of obsolete equipment will further harmonize the global campaign for affordability of climate protection.

The global phase down of HFC on the original Kigali Amendment schedules can prevent warming of up to 0.5°C by 2100, simultaneous energy efficiency upgrades

during the refrigerant transition can double that. Furthermore, the emerging technically and economically feasible refrigerant phasedown schedule Morocco hopes to follow with nothing but super-efficient ACs can do even more with every country on board.

Sustainability Leadership of BMCE Bank of Africa

BMCE Bank of Arica operates about 700 branches in Morocco, about 600 branches in 19 other countries of the African continent and has offices in France, Spain, United Kingdom, China, Italy, Germany, UAE, Belgium, Canada, and the Netherlands. BMCE Bank of Africa was the first Moroccan institution to sign the UNGC and ranks among the best companies in terms of environmental standards, social responsibility and corporate governance. These achievements reflect the rapid evolution towards finance with a sustainable impact on the economy, the environment, the climate and society.

BMCE Bank of Africa is proud to stand up for sustainability, access to the latest technology, and affordable prices that support the quality of life and prosperity of the people of Morocco and Africa and are honoured to be a founding partner in the Morocco Banker's AC Buyers Club. We know that our bank can lead by example and will be influential in persuading other organizations to make new and expanded investment in replacing older inefficient ACs with next-generation equipment using climate-friendly refrigerants and the latest energy efficient design.

The BMCE Bank of Africa contribution to the project has two dimensions. The first dimension is that like all businesses in Morocco, BMCE Bank of Africa air conditions our offices during the hottest weather but we have not previously focused on choosing the technology with the lowest carbon footprint and we had not appreciated that the refrigerants offered in Morocco deplete stratospheric ozone and force climate. The second dimension is that we are a bank that fundamentally understands that small savings can grow into fortunes and that savings from higher energy efficiency will be spent locally for Moroccan prosperity rather than on imported fuel and powerplants from wealthier countries previously profiting from our unsustainable waste.

Early on, BMCE Bank of Africa volunteered to "pilot" the energy efficiency investigation in our own buildings and to develop a business plan for our own facility investment and as a model for other organizations to discover if they have overlooked cost-saving and profit-increasing opportunities. BMCE Bank of Africa welcomes the opportunity to finance our residential and commercial customers for higher energy efficiency through investment in ACs with lowest carbon footprint.

In testing the energy efficiency of our ACs we are learning the savings from energy efficiency are not small and will therefore grow into larger fortunes, and that the savings spent locally can have a substantial benefit through increased disposable

income with ripple effects for the portion spent on education and health as the foundation of future economic development.

Working on this project has also brought us closer to hard-working energy experts in the Government of Morocco that work on energy and environment. We are learning from each other and teaching each other how to achieve our common ambitions at lower cost and with the greater satisfaction that comes from teamwork. We are also impressed with the capability and passion of our non-governmental organization partners in validating our sustainability efforts and in suggesting new activities that are good for the quality of life in Morocco, the global climate, and the BMCE Bank of Africa bottom line profit.

Selected Acronyms and Abbreviations

AC	air conditioner, air conditioning
AMEE	Agence Marocaine de l'Efficacité Énergétique
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
AR5	Assessment Report 5 of the IPCC
AU	African Union
BAU	business-as-usual
BMCE	BMCE Bank of Arica
BTU	British thermal units
C	Centigrade
CAT	Climate Action Tracker
CEN SAD	Community of Sahel-Saharan States
CFC	chlorofluorocarbon
CO ₂	carbon dioxide
CO ₂ -eq	carbon dioxide equivalent
COP	Conference of the Parties (to the UNFCCC)
CPM COP	meeting of the Parties to the Kyoto Protocol
EL-LCCP	Enhanced and Localized Life Cycle Climate Performance
GHG	greenhouse gas
GWh	gigaWatt hours
GWP	global warming potential
HC	hydrocarbon
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
IGSD	Institute for Governance & Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
LCCP	life-cycle climate performance
MAD	Moroccan dirham
MAGHREB	Predominately the Muslim north African region of Algeria, Morocco, Tunisia, Libya and Mauritania
MEMDD	Ministère de l'Energie, des Mines et du Développement Durable
MEPS	minimum energy performance standard
MNOU	Morocco National Ozone Unit
MW	megaWatt
MWN	Moroccan Agency for Sustainable Energy
NAM	Non-Aligned Movement
NDC	nationally-determined contribution (to the Paris Climate Accord)
NGO	non-governmental organization
ODS	ozone-depleting substance
OIC	Organisation of Islamic Cooperation
TERI	The Energy and Resources Institute
TKA	total knock-down assembly
UMA	Arab Maghreb Union
UMD CEE	University of Maryland Center for Environmental Energy Engineering
UN	United Nations

UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNGC	United Nations Global Compact

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