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Gulf Oil States Seeking a Lead in Clean Energy

By ELISABETH ROSENTHAL

ABU DHABI, United Arab Emirates — With one of the highest per capita carbon footprints in the world, these oil-rich emirates would seem an unlikely place for a green revolution.

Gasoline sells for 45 cents a gallon. There is little public transportation and no recycling. Residents drive between air-conditioned apartments and air-conditioned malls, which are lighted 24/7.

Still, the region's leaders know energy and money, having built their wealth on oil. They understand that oil is a finite resource, vulnerable to competition from new energy sources.

So even as President-elect Barack Obama talks about promoting green jobs as America's route out of recession, gulf states, including the emirates, Qatar and Saudi Arabia, are making a concerted push to become the Silicon Valley of alternative energy.

They are aggressively pouring billions of dollars made in the oil fields into new green technologies. They are establishing billion-dollar clean-technology investment funds. And they are putting millions of dollars behind research projects at universities from California to Boston to London, and setting up green research parks at home.

"Abu Dhabi is an oil-exporting country, and we want to become an energy-exporting country, and to do that we need to excel at the newer forms of energy," said Khaled Awad, a director of Masdar, a futuristic zero-carbon city and a research park that has an affiliation with the Massachusetts Institute of Technology, that is rising from the desert on the outskirts of Abu Dhabi.

These are long-term investments in an alternative energy future that neither falling oil prices nor the global downturn seems likely to reverse. Even as the local real estate market is foundering, leaders in politics, business and research from across the globe will flock to this distant kingdom for three days starting Monday for the second World Future Energy Summit, which just one year after its inception here has become something of a Davos gathering on renewable energy.

This year's guest list includes a former British prime minister, Tony Blair, and the European Union energy commissioner, Andris Piebalgs, as well as the oil and gas ministers of Oman, Bahrain and the United Arab Emirates. In attendance will also be executives representing hundreds of companies, large and small, from BP and Credit Suisse to dozens of start-up companies from Europe and the United States.

"Truth is that locally money is tight as everywhere, and the property market is certainly taking a

correction downwards," said Richard Hease, whose Dubai-based company, Turret Middle East, organized the conference. "But on the renewable energy front, it is business as usual."

This new investment aims to maintain the gulf's dominant position as a global energy supplier, gaining patents from the new technologies and promoting green manufacturing. But if the United States and the European Union have set energy independence from the gulf states as a goal of new renewable energy efforts, they may find they are arriving late at the party.

"The leadership in these breakthrough technologies is a title the U.S. can lose easily," said Peter Barker-Homek, chief executive of Taqa, Abu Dhabi's national energy company. "Here we have low taxes, a young population, accessibility to the world, abundant natural resources and willingness to invest in the seed capital."

The vision of a renewable future in the gulf is rooted not so much in a fuzzy green sentiment — though that is starting to take hold — as in analysis of the region's economic future and the high-end lifestyles of its citizens.

"You see what the gulf states have achieved in terms of modern infrastructure and beautiful architecture, but this has come at a very high environmental price," said Mr. Awad of Masdar, standing in a field of 40 types of solar panels that the project's engineers are testing, and using to power offices.

"We know we can't continue with this carbon footprint," he said. "We have to change. This is why Abu Dhabi must develop new models — for the planet, of course, but also so as not to jeopardize Abu Dhabi."

The world is now consuming 80 million barrels of oil a day, and that could continue to rise steeply over the coming decades if population and consumption trends continue. That could mean having to add six Saudi Arabias worth of oil output just to keep up, according to Mr. Barker-Homek, at a time when scientists are warning that carbon levels need to be cut significantly to avoid potentially disastrous global warming.

To hedge their positions, then, an increasingly sophisticated generation of largely Western-educated leaders in the Middle East are seizing on green business opportunities, by seeding research in faraway nations.

The crown prince of Abu Dhabi, the wealthiest of the seven emirates that make up the United Arab Emirates, announced last January that he would invest $15 billion in renewable energy. That is the same amount that President-elect Obama has proposed investing — in the entire United States — "to catalyze private sector efforts to build a clean energy future."

Masdar, the model city that will generate no carbon emissions, is tied to the crown prince's ambitions. Designed by Norman Foster, the British architect, it will include a satellite campus of the Massachusetts Institute of Technology, as well as a research park with laboratories affiliated with Imperial College London and other institutions.

In Saudi Arabia, the new state-owned King Abdullah University of Science and Technology, or Kaust, gave a Stanford scientist $25 million last year to start a research center on how to make the cost of solar power competitive with that of coal. Kaust, now in its first grant cycle, also gave $8 million to a Berkeley researcher developing green concrete.

And it has other agreements as well, with Caltech, Cambridge, Cornell, Imperial, La Sapienza, Oxford and Utrecht, to name just a few.

In November, the Qatari government signed an agreement with Britain's visiting prime minister, Gordon Brown, to invest £150 million, or more than $220 million, in a British low-carbon technology fund, dwarfing the fund's investments from home.

For the rest of the world, the enormous cash infusion may provide the important boost experts say is needed to get dozens of emerging technologies — like carbon capture, microsolar and low-carbon aluminum — over the development hump to make them cost-effective.

"The impact has been enormous," said Michael McGehee, the associate professor at Stanford who received the $25 million Saudi grant. "It has greatly accelerated the development process."

Director of the largest solar cell research group in the world, Professor McGehee had tried and failed to get money from the United States government or American industries to commercialize cheaper solar cells. Research money is tight, he noted.

With the Saudi money he has hired 16 new researchers and expects the new energy cells to dominate the market by 2015. "People are astonished to see how big this grant is and where it came from," he said, noting that his past grants from the United States government were one-fiftieth that amount.

Experts say the vast investments from the gulf states have already restarted stalled environmental technologies.

Nancy Tuor, vice chairwoman of CH2M Hill, the Canadian construction firm that is building Masdar city, said that the sheer size of the investment had had a "forcing effect," pushing polluting industries to experiment with cleaner solutions.

For example, initial plans for Masdar excluded both aluminum and conventional concrete because the production of those materials generates high levels of carbon emissions, which warm the planet. Aluminum manufacturers protested and came back with a product that reduced emissions by 90 percent compared with regular aluminum; it is now included in the project.

Proponents say Masdar goes beyond creating new materials and is in fact exploring a new model for urban life. Masdar will use one quarter of the energy of a conventional city its size (about 50,000 people) — an amount that it will produce itself.

"When people think about sustainability, they think about devices," said Gerard Evenden, a partner at Foster and Partners, the British architectural firm that is designing the site. "But here

you're taking it to a city scale, which has much more of an impact — connecting the devices to the structure to the transportation to the people."

The city will have no cars; people will move around using driverless electric vehicles that move on a subterranean level. The air-conditioning will be solar powered.

With no industrial history, the gulf states say they have the advantage of starting from scratch in developing green manufacturing; countries like the United States are forced to retool ailing industries, like car manufacturing.

Also, although the gulf states have previously showed little interest in green energy like wind or solar, they have another advantage, Mr. Awad noted as he stood in the shimmering desert. "The sun shines 365 days a year," he said.