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Making Green the Goal

Sustainability is the chosen path for ports seeking to capture future business while meeting environmental targets. BY DAN MCCUE

The newspaper article was as eye opening as the morning coffee that accompanied reading it.

According to the November 29, 2010 piece in the *London Guardian*, new research suggests that the latest generation of cargo container ships can emit almost the same amount of cancer- and asthma-causing chemicals as 50 million cars, and that low-grade bunker fuel has up to 2,000 times the sulfur content of diesel fuel used in automobiles.

As a result, the story says, pressure is mounting on the UN's International Maritime Organization and the European Union to tighten laws governing ship emissions.

In the meantime, the Obama Administration is implementing a 230 nautical mile, low emission buffer zone along the entire U.S. coast—an initiative that has its roots in academic research that found that pollution from the estimated 90,000 cargo ships plying the world's oceans leads to up to 60,000 deaths each year in the U.S. alone and contributes \$330 billion to the nation's healthcare costs.

According to the U.S. Environmental Protection Agency, the buffer zone could save as many as 8,000 lives a year.

Shipping is responsible for 18 to 30 percent of all the world's nitrogen oxide pollution and nine percent of the global sulfur oxide pollution; pollutants that are believed to deplete the world's ozone layer, contribute to global warming, and have a serious impact on health, including accelerating rates of lung and heart diseases.

Some, like COSCO CEO and president Wei Jiafu, have even gone so far as to promote the use of nuclear power aboard cargo ships as a way to green the world's fleets.

"As they are already onboard submarines, why not cargo ships?" Jiafu posed at a senior maritime forum during 2009's Marintec China in Shanghai.

But if such reports are compelling, they also share a glaring omission—an acknowledgement that ports in North America and around the world are responding to the fact that shipping emissions have increased dramatically since China and Southeast Asia's emergence as the world's manufacturing center.

For some, like the Port of Vancouver in British Columbia, becoming more sustainable in their operations is a reflection of their respective community's tradition of environmental stewardship and social responsibility, while for others, like the Port of Los Angeles, it's a matter, at least in part, of striving to get along peacefully with some very vocal neighbors.

Regardless of the motivation, though, it's clear that wharf-side, as in the words of Kevin Maggay, Air Quality and Environmental Management Division Supervisor for the Port of Los Angeles, "there's a ton of stuff going on" when it comes to the greening of international trade, and the best is yet to come at the North America's busiest gateways.

Getting mileage out of the Clean Truck Program

When it comes to the Port of Los Angeles—and by collaborative extension, the Port of Long Beach—it's hard to draft an all-inclusive list of environmental initiatives.

"It's a busy place in terms of environmental initiatives," Maggay acknowledged during a recent conversation with *WT100*. "It's an acknowledgement by our executive director, our board, and also the mayor of Los Angeles that we need to continue to grow and be competitive, and a mandate to do so—and to build up our infrastructure in the process—in an environmentally sensitive way."



A prime, high profile example is the port's Clean Truck Program. Although highly controversial when it was implemented, today, 94 percent of cargo gate moves at port terminals are made by trucks meeting the Environmental Protection Agency's 2007 heavy duty truck emissions standards (clean trucks) and more than 9,000 2007 compliant trucks are now registered to dray cargo to-and-from its facilities.

In addition, an emissions inventory conducted in 2009 showed a 50 percent reduction in truck-related emissions.

In November 2010, the port also updated its Clean Air Action Plan (CAAP) in collaboration with the Port of Long Beach, and it has also created a Port of Los Angeles Air Quality Report Card that shows overall reductions between 2005 and 2009, as captured by a unique standard of measurement—emissions per TEU.

"I think when you talk about environmental initiatives, you first have to consider the context," Maggay said. "Our focus, our main goal, if you will, is moving cargo and moving as much cargo as we possibly can. But at the same time, it's really been hammered into us that if we are going to grow, we are going to grow green."

Although they compete for cargo, the Ports of Los Angeles and Long Beach are long time partners in sustainability, a relationship highlighted by the Clean Air Action Plan.

"If we're going to be successful at being green, it has to be this way," Maggay said. "After all, the air is the air, and if you look at a map of the region, you

Truck emissions at the Ports of Los Angeles and Long Beach have been cut dramatically since implementation of the Clean Truck Program.



Newer model trucks are playing a key role in improving air quality in the San Pedro harbor area.

quickly see that it's really kind of an artificial dividing line between the ports.

"But that's not to suggest our collaboration begins and ends with Long Beach, we're currently working with the Ports of Seattle and Oakland to implement clean truck programs and clean air action plans very similar to our own."

While Maggay is quick to credit the port and city leadership for its role in making the Port of Los Angeles more environmentally conscious, he said the "really big driver" was the surrounding communities of San Pedro and Wilmington.

"They were the ones that really pushed us," he said. "It was a grassroots effort. They were being affected by port operations, and luckily they were very vocal about their concerns."

"As they organized themselves, and spoke out about their concerns—to our board, the mayor and others—we listened, and now many of the things they were advocating and requesting in terms of environmental initiatives are part of our every day culture," Maggay explained.

But if that responsiveness placed the Port of Los Angeles at the leading edge of port environmentalism, it also caused it to bear the full brunt of the birthing pains that go along with implementing something like the Clean Truck Program.

"It can be tough," Maggay said. "It took us over a year to develop the Clean Air Action Plan and at

first it was premised on the idea of having no net increase in emissions emanating from the port over time. Then, when we presented it to the board, they said, 'This is great, but why are we stopping here? Instead of striving for no net increase, let's become the cleanest port in the world and get the air as clean as we possibly can.'"

The directive sent Maggay and his team back to the drawing board and back to the conference room table with representatives from the Port of Long Beach, the local Air Quality Management District, the California Air Resources Board and the U.S. Environmental Protection Agency.

"Obviously, given the number of different points of view in the room, there was a lot of disagreement, but in the end, we were all pro-air quality and that allowed us to develop a plan," he said.

It's main pillar was the Clean Truck Program, which itself as a "really, really hard" initiative to develop.

"We had to go into the weeds and do a lot of research into how the trucking industry actually operates," Maggay recalled. "We spoke to drivers, licensed motor carriers, and we spoke to the industry at all levels—the cargo owners, the shipping lines—to see really what it would take to make this program happen."

"It's a really complex plan because there's not just an air quality component, there's the security component, maintenance, the financial component and, of course, it changed the whole trucking model," he said.

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The reason, Maggay said, is that when it comes to trade related logistics, the Port of Los Angeles was where trucks went to die.

“Just a few years ago, it wasn’t uncommon to come across a truck that was 20 or 30 years old in service in and around the port,” he explained. “It was the byproduct of a kind of evolution. The national trucking lines would invest in new trucks, put 300,000 to 400,000 miles on them and then sell them to a more regional trucking firm, who’d put another 300,000 to 400,000 miles on them, and then after that, they’d sell them to the drayage industry here at the port.

“So, what you’d have is an owner-operator who could buy a truck with almost a million miles on it for \$5,000 or \$10,000 and then enter the marketplace because there were so very few barriers to entry,” he said.

The trick was breaking that cycle. To do it, the port realized it needed to give owner-operators who couldn’t afford to make the leap from a \$5,000 to \$100,000 vehicle a way to become a part of the port’s emerging green operational structure.

Since 2005, the port has spent over \$110 million on grants and incentives to do just that, and according to Maggay, it has “paid off with the emission rates of key pollutants being cut in half during that time.”

But that’s not to say some people aren’t still skeptical about the success of the program. Many, for instance, say of course the emissions numbers are down—trade effectively slowed to a crawl during the global economic crisis.

Maggay’s answer is to point to the port’s air quality report card and its emissions-per-TEU metric [it’s actually an emissions-per-10,000 TEU measurement], which he says enables the port to make “an apples-to-apples comparison” regardless of fluctuations in broader cargo volumes.

“When it comes to green, at least here in Los Angeles, having that transparency built into our green initiatives,

**If we are going
to grow, we
are going to
grow green.**

and therefore a way to confirm the validity of our claims is critical,” Maggay said. “There’s a bunch of eagle eyes on us, from community groups to labor to our industry partners and others, so we need to pay a lot of attention to detail, otherwise it comes back to us.

“Let’s just say, we’ve learned from our mistakes,” he said, before adding, “Of course, now we find ourselves in a very enviable position—one in which the community and

environmental groups don’t feel that we are doing enough, and the industry gets on us because they feel like we are going to far.

“But it’s a balancing act,” Maggay continued. “Any time you undertake a major program, you have to balance the needs of all your stakeholders.”

Achieving stakeholder buy-in

Getting older, pre-2007 trucks off the road has also been a major initiative at the Port of Virginia, according to Heather L. Wood, the Virginia Port Authority’s Director of Environmental Affairs.

Since implementing its voluntary green operator truck replacement program, the authority has helped the owners of more than 200 trucks to either retrofit their trucks with emissions filters or replace vehicles altogether.

The program currently has between 100 and 120 trucks on its waiting list.

Together, the 300 or so trucks represent 20 percent of the truck fleet currently servicing the port authority’s facilities.

“Basically, our program offers drivers and trucking companies two options: One is providing them with \$6,000 toward the purchase and installation of an EPA or California-approved diesel emission filtration device, and the other is providing them with \$15,000 toward the replacement of an older truck provided the trucker purchases a 2007 or newer model,” Wood said. “Of

course, both of those options are provided in the form of a rebate.”

Last August, the second option got a major boost when the ports authority teamed with a firm called Meadowbrook Leasing, which agreed to extend term or low-interest loans to drivers wanting to buy a new truck.

In that case, Meadowbrook has agreed to accept the \$15,000 from the port as a down payment for the vehicle, offsetting the finance payments immediately, Wood said.

“The initial finding for the program came from state DERA (Diesel Emission Reduction Act) as well as money secured through the American Reinvestment and Recovery Act...we’re trying to leverage more funding, talking to groups like the Coalition for Responsible Transportation, Virginia Clean Cities and others,” she said.

Wood said the impetus for the program was seeing what was happening along the West Coast in terms of state air quality regulations and wanting to avoid suddenly being thrust, unprepared, into a mandatory regulatory scheme.

“From a distance, it seemed like their regulations came into being and licensed motor carriers were put into a sort of tail spin,” she said. “We didn’t want to be in a situation where we were forced to come up with something quickly, and that’s why we started three years ago.”

To insure buy-in, the ports authority reached out to the trucking community, talked to them about the program and how it might work and asked them to take a leadership role in encouraging participation.

“From there, we moved on to local truck dealerships and maintenance shops, so they could not only have some of the parts and devices, but also to sort of just spread the word, and form these partnerships with our other partners to pull it together,” Wood said.

Cold ironing is one hot item

One approach to reducing port emissions that’s really beginning to catch on is cold ironing, a process the U.S. Navy relied on for years, and which has been growing rapidly on the cruise side of the industry. Basically, the ship runs its diesel engines until it docks, but then plugs into a shore-side power source and shuts its engines down, thereby reducing emissions while still ensuring the provision of essential crew services.

The Port of Los Angeles was the first U.S. port to utilize the approach (formally known as alternative maritime power) at a container terminal, with project partner China Shipping.

“We started out 10 years ago with a transformer on a barge that a ship could plug into directly, and today the concept is so popular that people are building the transformers into the ships themselves,” Maggay said. “It’s really amazing.”

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Cold ironing is a major tenet of the Port of Long Beach's "Green Port" initiative.

To date, one of the obstacles to wider adoption has been the lack of an international standard for the plugs that are utilized, but here too the Port of Los Angeles has taken a leading role, working with the International Standards Organization in Geneva, Switzerland to develop a standard to allow any cargo ship to plug in at any port at any time.

In the meantime, the California Air Resources Board has since mandated that shipping lines cold iron at least 50 percent of their Southern California ship calls by 2014, and 80 percent by 2018.

"But it's not just here in the U.S.," Maggay said. "I just got an email from one of my contacts in China who said they are also looking at legislation that would mandate cold ironing at all of their ports."

Like their maritime brethren down the California coast, the Port of Oakland has a long history of environmental stewardship, something Richard Sinkoff, its director of Environmental Programs and Planning, said is part and parcel of living and working in what he described as "a bellwether state" when it comes to green and sustainable initiatives.

Although many of its early successes in this area involved water quality and reuse of dredged material, the Port of Oakland has had a formal air quality



Foss Maritime's hybrid tug at work at the Port of Long Beach.

improvement plan in place since 2009, a plan that's now reached its implementation stage.


Delphine Prevost, the Port of Oakland's senior maritime project administrator, said the strategy, which includes both a diesel emission reduction program and a cold ironing initiative, grew out of a 2008 air quality-related health risk assessment complied by the California Air Resources Board.

"They quantified the harmful emissions from seaport and non-seaport related sources, and looked at how those emissions were impacting the local populations in various communities," she said. "One of the things they found was that vessel emissions represent about 20 percent of the emissions from the seaport, and those emissions represent 30 percent of the health risk from seaport-related sources."

In response to its own study, the California Air Resources Board adopted a requirement that vessel emissions be dramatically reduced by 2020. One way to achieve this goal was requiring that vessels use cleaner fuels. The other is the aforementioned cold ironing regulation.

"The thing about cold ironing is that it's an easy concept to understand, but as in the case of applying any technology uniformly, it's not as easy as it sounds," Prevost said. "Here in Oakland, for instance, the first thing we've had to consider is making sure our power connections are compatible with other California ports because most ships that come here, go to other California ports first, notably LA and Long Beach."

"Another consideration is how to put in place an infrastructure that doesn't interfere with vessel loading or offloading, or the operations of cranes and so on," she continued. "Then there's the connectivity itself, which requires that we run a series of cables and conduits between power substations at the ports and place a connection at the wharf."



"It's all very complicated and its costly too—it'll cost \$100 million to put these connections at every single berth throughout the port," Prevost said. "The good news is the benefits are pretty amazing. Because the ships will be able to shut off their engines while at the port, we expect to see emissions reduced by about 90 percent."

Robin Silvester, President and CEO of Port Metro Vancouver, described green as 'easy' in the Great White North, where the mountain vistas outside his office window bring the importance of environmentalism home every day.

"It's part of our DNA, and I think something that we express through a two-fold approach: Getting one's own house in order, and then playing a leadership role in the broader port community," he said.

Silvester pointed to composting garbage, waste minimization, reducing employee commute times, and having a LEED gold certified headquarters as examples of the port authority getting it's "own environmental footprint in order."

"But the most important thing that we've done is to work with other key stakeholders in the gateway—we call ourselves the gateway to lower British Columbia—and focus on two or three key areas, one of the most significant being air quality improvements and air emissions reductions," he said.

As in Los Angeles and elsewhere, that effort boiled down to a focus on trucking, cargo handling equipment, and ship emissions.

"When it comes to trucks, I think we've had a slightly different approach when compared to the ports in the U.S.," Silvester said. "In the U.S. to date there has been quite a bit of federal funding around removing old trucks from the port environment. By comparison, what we've had is a long-standing program—for 10 years, so far—to basically, progressively raise the standard of trucks serving the port.

"Now, it's the same kind of program that our colleagues to the south have employed—for instance, today, if you want to bring a new truck into the port system, it has to be a 2007 or newer engine model—but it's been more cooperation based rather than something government funded, and to date, in terms of emissions, we've achieved the equivalent of removing 400 cars from the road, for [2010] alone."

Port Metro Vancouver has also deployed cold ironing, but thus far mainly at its cruise ship operations.

"Again, we had sort of a very Canadian collaboration," Silvester said. "We had the provincial government, two of the cruise lines, Princess and Holland America, ourselves, and the local power company, BC Hydro, and we all worked together to install shore power at Canada Place, which is our prime cruise terminal."

Commissioned in 2009, Silvester estimates the facility has already resulted in an emissions reduction equal to removing 800 vehicles from the road.

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The Port of Los Angeles was the first U.S. port to use alternative maritime power, also known as cold ironing, to power ships at berth with shore-side electricity. Cruise ships were early adopters of the technology, but container ships are increasingly using it as well.

electricity, it truly is a green, renewable energy-based development,” he said.

Now that the cold ironing is a proven winner at the cruise terminal, Port Metro Vancouver is looking at expanding it to its container operations.

“The Ports of LA and Long Beach have really been the pioneers in this area, and we’re basically waiting for their efforts on an international standards for a plug system to bear fruit before we move ahead,” Silvester said.

In the meantime, Vancouver has been actively pursuing what it calls its EcoAction initiative.

The program established three standards for ships using the port—gold, silver and bronze—based on the kind of fuel they use, whether they are capable of using shore power, and their own efforts to reduce emissions. The higher the ranking, the greater the reduction of the recipient’s harbor dues.

“Now, of course, we are only one port and can’t change the world, but one thing we can do is incentivize customers who do the right thing,” Silvester said. “Judging by the very good uptake we’ve had, I think it’s been a very successful program.”

On a parallel track, the port has rebranded its Port Metro Vancouver Blue Circle awards, wherein the port publicly recognizes shipping lines that have met the gold standard over the course of the previous year.

“Currently, we have 12 or 13 shipping lines meeting the standards, including both cruise lines and container lines, and I couldn’t be more pleased,” Silvester said. “I think it’s a good example of working with key customers and stakeholders to continue to improve standards.”



Silvester said that while the green mindset of Vancouver and its businesses certainly helps make implementing sustainable initiatives easier—after all, Vancouver is a municipality whose city fathers have publicly stated their goal is to make it the greenest city on earth by 2020—managing change is still, well, managing change.

“Part of it, as I said, is having your own house in order. Part of it is just being a continual advocate for this based on objective data,” he said. “But in a practical sense, the successful implementation of green strategies is a matter of knowing what your baseline is—knowing your starting point—prioritizing your goals, know what you have to do to deliver, and then trying to be as collaborative as you can to bring those goals to pass.”

“We also put a lot of focus on the community relationship,” Silvester continued. “We see ourselves as partners and we’re always looking to work with them on a lot of initiatives where our paths cross over.”

“Community outreach is a key part of the long term,” he added. “We want to be here for the long term and expect to be and we know we know we need the community to be here for the long term, both in terms of the consumption that is assisted by the port, being able to import goods, and also we need the economic activity to create the exports to flow out through the port.”

Balancing business with the environment

Another good example of how open communication is a key to fulfilling both green and business objectives occurred some 3,400 miles from Vancouver, at South Florida’s Port Everglades.



Facing a potential lack of berths in light of growing container volume, the port, which is located just outside of Fort Lauderdale, wanted to expand an area called its south port turning notch—a move that would allow it to create four to five additional berths.

The problem—both from an environmental and public relations perspective—was a conservation easement signed 20 years ago, in which the port promised it would never again invade a stand of nearby mangroves, a species critical to Florida’s estuarine environs.

“It was a classic case of economic viability seeming to be in direct opposition to environmental stewardship, and when we presented our proposal, we expectedly ran into a buzzsaw of opposition,” said Port Director Phillip C. Allen.

“It forced us to go back and take a look at the options, and also to work with the environmental community to arrive at an acceptable alternative,” he said. “Interestingly enough, by keeping the lines of communication open, we really became familiar with the concerns of the environmental community and they us, and as a result we ultimately were able to compromise.”

The plan eventually presented to the Broward County Board of County Commissioners by representatives of both Port Everglades and the environmental community was for the port to take out eight-and-half acres of mangroves, and replace it with 16 acres of mangroves at an adjacent location.



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Florida's Port Everglades was able to advance plans for a vessel turning notch after finding a way to address environmental concerns. Meanwhile, the Port's energy management system will significantly reduce energy costs.

The plan even had the support—expressed in writing—from the National Audubon Society.

"You know, we've got a lot of things going on that fall within the realm of sustainability, including the recent completion of a \$5 million energy management system in our cruise terminals, which has significantly reduced our energy use, and we're currently implementing a \$1.4 million diesel emission reduction system. But, I think that collaboration with the environmental community was probably the most green thing we did [in 2010]," Allen said.

"Every port is a three-legged stool—the legs being the environment, the community, and the economy," he continued. "I mean, as I sit here, 200 manatees are warming themselves outside my office in the warm water outflow from the local utility. Clearly, environmental concerns are something we're confronted with every day. "So it's something I'm always mindful of, and I recognize that to make it all work you can't see those legs as mutually exclusive," Allen said.

What of the health concerns associated with the bigger ships that are coming on line today?

While Maggay didn't dismiss the dire reports cited at the start of this article, he did point to the efficiencies that will be realized as bigger ships take on more and more of the world's cargo handling duties.

"First of all, you'll have fewer ships coming into port, because it's more efficient to carry large amounts of

cargo on one large ship rather than two or more smaller vessels," he said. "Also, I think people have to realize that emissions don't rise proportionally to the amount of cargo that's on board; just because you double the number of containers doesn't mean you've doubled emissions.

"In fact, by virtue of their being new, these ships are outfitted with the latest technological advances. Therefore, they're actually much more green-oriented than the ships that have been calling on our ports in the past," he said.

"So, the reality is, these ships are going to be a lot cleaner, they're going to plug in at the dock and turn their engines off, so the whole operation will be cleaner," Maggay continued. "In fact, one of the things we're working on now is to find a way to ensure that only the newest and cleaner ships call on our port. We're actively speaking with shipping lines and cargo holders to see what it would take for them to only route their cleanest ships to the ports of LA and Long Beach. Typically, we don't have any say in terms of what ships call here—we don't own them and they sail under international flags. So, it's a matter of determining how we incentivize them in order to get the cleaner ships here or whether we can achieve that goal through some other program."

"Every port is a three-legged stool—the legs being the environment, the community, and the economy"

Looking for the next green breakthrough

If the Port of Los Angeles' Clean Truck Program was the high-profile initiative of its recent past, the port's Technology Advancement Program (TAP) and a collaborative initiative called PortTechLA promises to have an even longer lasting and broader impact.

TAP is a joint program between the ports of Los Angeles and Long Beach focused on identifying, demonstrating and evaluating new and innovative

technologies that have significant potential to reduce air pollutants.

"We included TAP in our updated Clean Air Action Plan because we knew the plan itself would get us so far, that we could achieve significant emission reductions, but we didn't want to wind up five or six years from now, stuck with the same solutions," Maggay said.

"The last thing we want is to end up in a position where we implement all of our known solutions and still have an air quality problem at the end of the day," he continued. "With TAP, which is basically an open solicitation process, we're constantly evaluating and considering new technology, whether through demonstration projects or emission testing, things like that."

In practice, a TAP advisory board meets every six weeks to evaluate the latest proposals of investors and scientists. Among the questions being asked around the table are: what are the potential emissions reductions? Is the technology feasible? And, is it technology one that terminal operators will actually use?

"That's the thing about solutions," Maggay said. "You can have the greatest plan in theory, but if it doesn't fit into operations, or somehow diminishes operational efficiency, it's going to be a nonstarter."

Among the initiatives to come out of the TAP program is the Port of Los Angeles' hybrid tug, which operates on batteries whenever the tug isn't in assist mode. Another is an energy capture system attached to its shipside cranes, which captures the heat generated during one container move and uses it during the next.

"When you use a crane, most of the energy is used in the lift, while the placing of the container on the ground is basically a matter of breaking, which generated a lot of heat," Maggay said. "What this system does is capture that heat and converts it back into energy for the next lift, reducing our energy consumption on a container move by 50 percent to 70 percent."

Companies and entrepreneurs are expected to be demonstration-ready when they apply for consideration under TAP. By comparison, PortTechLA is more of a tech-business incubator designed to help with research and development, business services and other back-end business functions.

"The two programs really go together," Maggay said. "The way we look at it, the scientists and inventors who come up with these technologies are brilliant, but a lot of them have no experience with business development, marketing, accounting, the kind of services that turn an

idea into a business. Through PortTechLA, we work with the local chambers of commerce and other partners to foster the technology commercialization process."

But it's not just altruism that is inspiring the Port of Los Angeles' activism in this area. That fact is, Maggay admitted, the port can't meet its long-term green goals without these entrepreneurs.

"The Port of Los Angeles currently has two tiers of clean air objectives, those we've established for 2014 and those we're set for 2023," he said. "Now, as far as 2014 goes, I think those are realistic goals. If we take advantage of every strategy out there that's known as of today, we should be able to meet them. It's only a few years away.

"As for the 2023 goals, the reality is we set those goals not knowing what technologies will exist five years or a decade from now to help us achieve them," he continued. "That's where these technology advancement programs come in. We set high goals for 2023, and we don't know how to get there. We need to find the technologies to get us there. So, we set the bar high and we plan to push hard for the creation of the technology we need to get there because the reality is, nobody but the ports are going to push the development of new port technologies."

Sinkoff said the reality is the same at the Port of Oakland, where he described long-term emissions goals as "aspirational."

"Our board of Port Commissioners recognized the there was a gap between what the existing technology



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The Port of Virginia is looking at all types of alternative energy sources, including solar and wind power.

can actually achieve and the long-term goals they set for emissions reductions at the port, and there's no question that it's a stretch, based on concerns over health risks rather than logistics," he said.

"But it's important not to overstate the significance of that," Sinkoff continued. "Our Port Commissioners established an objective of reducing our emissions by 85 percent by 2020, and we know we can get to 81 percent by relying on cold ironing and other things we're putting in place.

"So it's really that last four percent of reductions that we're talking about, that last four percent that will require new technologies, and I think that's a good thing honestly, because having such a gap will stimulate innovation and new emerging technologies entering the market," Sinkoff said.

"The other thing is, it's very hard to quantify the impact of experience and building up a track record,"

he added. "Every time you implement something your learning curve grows, you identify obstacles and possibilities and that tends to stimulate others, people who identify a new emerging market and try to serve it."

As for its own green future, the Virginia Ports Authority is looking toward hybridization, particularly in terms of power generation and energy conservation at its facilities.

"Basically, we're wide open and eager to consider anything that is a cleaner fuel or a cleaner power source that cuts our costs," the VPA's Wood said. "Right now, we're trying to develop some strategic plans in that area to see what direction we would like to go in, whether that means solar power or taking advantage of some of the wind power generation that's going to be built off the east coast of Virginia.

"We've already begun to embrace cleaner fuels in some of our equipment, most notably with the hybrid locomotive we currently have and the two ultra-low emission locomotives we're going to have on site within the next 45 days," she said. **wt**

Contributing writer Dan McCue lives in Charleston, SC, where he writes frequently on global trade, foreign direct investment, and port-related issues.

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