CURRENTS

Considering Cogeneration

Clean Power Whose Time has Come...Back

By Marsha W. Johnston

Behind the manicured lawns and spotless streets of the U.S. Marine Corps Recruiting Depot on San Diego Harbor rises a gleaming maze of pipes and towers. It's a 25-megawatt combined heat and power (CHP) electricity plant that recycles its exhaust.

At the entrance to the plant, Dave Hermanson, west coast general manager for EPCOR Operations, points across an open field to the sleek new terminal at San Diego International Airport and a slice of as-yet undeveloped Navy-owned coastline. "We're talking to the airport about their expansion," he says. "We've been looking for a better use for some of our excess steam capacity, and we could put in an absorption chiller to make cold water, run a pipe under the field and provide green air conditioning to the new terminal," he says. EPCOR is also offering this natural air conditioning, as well as clean electricity, to Nickelodeon. The network wants to build a resort on adjacent U.S. Navy land.

Mike Stewart, plant manager at a congeneration facility in San Diego, California.

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The CHP plant is the smallest of three owned and operated in San Diego by EPCOR's company Primary Energy for the Marine Corps and the Navy. At all three, natural gas turbines drive electrical generators. The hot gas exhaust from those turbines goes to a heat recovery steam generator, providing 100 percent of the steam requirements (for heating and cooling) for the USMC Depot, San Diego Naval Station (Navasta) and North Island Naval Air Station. The steam generator also produces electricity.

Such CHP technology is also referred to as cogeneration or distributed generation and, increasingly, as "recycled energy." The principle is the same—convert unused energy waste streams from a given source, often fossil fuel, into electricity or useful thermal energy. Furthermore, do it locally to eliminate the energy loss from costly transmission. The result is little or no increase in fossil fuel consumption and significant cuts in carbon emissions.

The concept of making a fuel do double duty for greatest efficiency is not new. "District heating," circulating steam heat to multiple central city buildings from steam-generated electric power plants, has been used for decades in Europe. "Under Governor Jerry Brown [now the state's attorney general], California led the country in cogeneration," say Hermanson. "And that allowed consumers to build alternative energy projects, and the utilities had to buy the energy at the rate they would have spent to make it."

And state and local legislators are passing Renewable Portfolio Standards (RPS) that require utilities to get a

specified percentage of their electricity from carbon-neutral sources. Today, 24 states plus the District of Columbia have RPS policies, according to the U.S. Department of Energy. Four other states, Illinois, Missouri, Virginia and Vermont, have non-binding goals for the adoption of renewable energy.

Although only seven of the state RPS plans specify recycled energy, CHP or cogeneration, they include recent additions such as North Carolina's Senate Bill 3, passed in August. Ivan Urlaub, executive and policy director for the North Carolina Sustainable Energy Association, says, "In the legislation, if the source of waste heat is a renewable resource such as wind, solar or biomass, it's considered a renewable. If it's an improvement in traditional sources, it's an energy-efficiency measure."

Through 2021, at least 7.5 percent of state utilities' retail electricity must come from renewables, and the other 2.5 percent can be either renewables or efficiency measures. In 2021, it must be 7.5 percent renewables and five percent either renewable or efficiency. The recently passed House version of the Energy Bill, still to be resolved with the Senate version at presstime, includes a provision for waste energy recycling.

Some legislators have noted that flagship renewable energies such as wind and solar are both fairly costly, so they are looking anew at the cost-effective potential of recycled energy. "We want clean energy, we want it cheap, and RPS standards that don't include clean energy will get harder and harder to fill," says Tom Casten, chairman of Westmont, Illinois-based Recycled Energy Development, which has been building industrial cogeneration plants for 30 years. Furthermore, adds Casten, "Not all states are well situated for wind or solar, but they are universally well situated for recycled energy."

A recent Environmental Protection Agency (EPA) study examined 16 major industries and found enough waste energy to support 96 gigawatts of new clean power capacity and generate 19 percent of the country's electricity. The Energy Information Agency lists only 10 gigawatts of operating generation from waste energy. Tapping available waste energy could replace 190 coal plants, power 48 million homes and slash U.S. greenhouse emissions by 17 percent. The U.S. would meet the supposedly unachievable 2020 Kyoto Protocol goals and reduce power costs, notes Casten, adding that big industrial concerns like Dow Chemical and Chevron have begun looking into the potential recycled energy might offer their businesses.

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