

Green Cooling Tower Operations, LLC (dba Green Cooling Tower Solutions, GCTS) has developed a technology that will revolutionize the Cooling Tower industry. GCTS has patented an induced draft modular cooling tower that uses zero electricity to power its fan, instead relying on existing water flow (waste energy otherwise) inside facilities for power. This is significant because Cooling Towers consume approximately 2% of the world's electricity. Our approach is obviously new to the cooling tower business, but we have been field proven for nearly 5 years at Citgo's 427,000 barrel/day refinery in Lake Charles, Louisiana. Our cooling towers can be supplemental (designed to take partial load off of existing cooling towers), or independent (for replacement, retrofit, or new installations.) Conventional style cooling towers are typically powered by a 150 to 250 hp electric motor running 24hours/7 days a week, with some plants using up to 100 of these units. At .07/kw, this could be over \$9,000 per month per motor. Regions which have much higher electricity rates could capture even more savings or generate more revenue. The supplemental approach has additional benefits which may even have more significance than saving the electricity to power cooling tower fans. We provide a low cost solution to cold water limitations most steam powered plants (coal, gas, nuclear, oil) have suffered with for many years. The electricity savings we can provide at the fan motor is a simple calculation (usually .5-1.5% of generation), but improving steam turbine efficiency will be where one can see massive generation improvements with the same amount of fuel. Until now, operators had to overcome large upfront capital expenditures (with hyperbolic cooling towers) or parasitic load and O&M increases (with motor driven mechanical draft cooling towers). We are hoping to overcome these obstacles and provide plants with more power to distribute.

To be more specific, GCTS hydraulic horsepower formula is where we derive our energy to drive our hydro-turbine, which is directly connected to the fans. The majority of this energy is captured from reducing the inlet height of our counterflow cooling towers to 13-15 ft. as opposed to 35'-50' for crossflows and up to 60' for natural draft towers. We then subtract our inlet of 14.5', giving us 20' to 45' of head difference. Additional energy is built into Circulating Water Pump (CWP) systems primarily to maintain condenser (or exchanger) performance and to overcome plugging issues which ultimately restrict return flow to the cooling towers systems. Further, most CWP systems have even more pressure engineered into the pumps as a factor of safety to ensure the return water will make it through the cooling tower hot water inlets throughout pump, condenser, and exchanger life-cycles. All of this energy is wasted in motor driven cooling towers.

GCTS is also testing our cooling tower designs to replace inefficient aeration systems in wastewater treatment ponds. We have tested the water coming out of our cooling tower in wastewater application and the water is near fully saturated with oxygen. As we circulate cooler water, we expect oxygen readings to improve even further.

Listed below are five more additional advantages our GCTS technology will provide:

1. Reduced energy consumption: We can remove 100% of the electricity from cooling towers we replace. We can take 80% of the water and electricity load off existing cooling towers we supplement.

2. Production improvements: We address inefficiency problems many plants currently face with a truly affordable solution. Additional cold water in most plants usually takes an enormous capital expenditure, so most plants operate at a fraction of their capacity in warmer months. We have an international leasing program in place that can get customers immediate cost savings and immediate optimization of their plants with very little capital expenditure. The increased revenue of the optimization of the plants will usually dwarf the energy savings, especially in petroleum refineries that produce different products depending on the temperature of their process water.

3. Energy independent: Our technology can address primary or supplemental cooling needs without costly additional and sometimes unreliable backup generators during times of shutdowns, maintenance, or extreme heat. We believe we can be a key component in making nuclear safer.

4. Environmental compliance: EPA Section 316B is the catalyst for plants to evaluate retrofitting their plants from once through systems to closed cooling systems. This will essentially eliminate 95% of the current water demand industrial plants take from clean water sources such as rivers, streams, lakes, and oceans. We eliminate electrical infrastructure like switchgear, motor control centers, etc., and the electrical engineering involved with the equipment.

5. Improved conditions inside plants: Once installed, our technology is safer and more reliable than conventional type cooling towers.

GCTS hopes this provides the Committee with clarity and shows how we envision using our technology in providing energy efficiency, helping facilities overcome environmental issues with once through systems, aeration ponds, maintenance savings from the use of existing cooling towers, overcoming cold water limitations without energy penalties, and benefitting from reduction of carbon emissions.