



## CleanStream Reformer 1™

*Solutions Beyond Energy*

### Emissions-Free Waste-to-Energy Systems for Commercial and Multi-Family Residential.

#### Clean Energy from Solid Waste and Sewer.

The CleanStream Reformer 1 processes approximately one ton of dry waste (or two wet tons) per day to produce an estimated 150 kW of combined heat and power for habitation needs, offices, medical hospitals, water recycling, water heat treatment, growing food and other production. The CleanStream Reformer 1 (CSR 1™) can be fed with all manner of waste, including sewer, chemical, pharmaceutical, and solid waste from commercial operations - converting non-useful, often harmful waste into cost saving power, 24 hours a day. By capturing energy from waste, the system significantly aids in waste management, reduces disposal problems and eliminates the need to depend on expensive fossil fuels and related inefficient infrastructure.

#### Versatile Applications.

Power generated from the CleanStream Reformer 1 can be utilized in a variety of ways. The system can produce heat and electricity and power electric vehicles used by residents, workers and company fleets. Water purification systems can be incorporated into the facility. Rainwater, well water and even wastewater can be collected then purified by heat and filter systems to provide clean potable drinking water and water for general purposes. EQUARES Energy Company's partners can provide water-testing systems to assure Clean Water Act and other federal water quality standards are met.

The CSR 1 collects all building waste, e.g., solids, medical and plumbing waste, grounds maintenance grass and orchard clippings and greenhouse plant waste for conversion it into power for:

- Commercial residential
- Hospitals
- Schools
- Prisons
- Office buildings
- Hotels

#### The CleanStream Reformer 1 Will Pay for Itself.

The heat and power generated and the revenues from on-site waste processing generate sufficient net revenue to pay for the system in an accelerated time frame in most areas, especially where there is a lack of infrastructure. The system is prefabricated, skid-mounted in the factory and delivered to the site ready to install and operate. It is remotely monitored and requires very little maintenance.

#### Advanced Technology.

The CSR 1 is a no-combustion, steam / CO<sub>2</sub> reforming system that has been fully tested and commercialized both domestically and internationally. The system produces synthesis gas, "syngas" that is seamlessly fed into its attached fuel cell to produce emissions-free power.

#### Benefits

- Dedicated power plant
- Small footprint
- Easy to operate
- Monitored remotely
- Reduces waste from on-site operations and activities
- Complements solar power and water collection
- Provides combined heat and power
- Produces hydrogen-rich synthetic gas
- Can be scaled up

#### Main Characteristics

- 150 kW Combined Heat and Power (CHP) produced
- 94% Operating efficiency
- Steam / CO<sub>2</sub> reforming system
- One 75 kW Fuel cell
- Processing capacity: (1-ton pickup truckload (dry load))
  - 1 ton / day dry weight
  - 2 tons / day wet weight
- 686-700 Wet tons processed annually
- 50 - 60% Solids content
- 350 Working days annually, minimum

#### Complementary Systems

- Solar power systems
- Rooftop rainwater collection
- Greenhouse food production systems

## Solutions Beyond Energy

### No More Storage of Sewer Lagoon and Solid Waste On-Site

The CleanStream Reformer 1 can process all forms of waste including solid waste, chemicals, sewer sludge and medical waste. Complete waste removal allows facility operators to reduce the number of facilities committed to solid waste storage, sewer storage and treatment. No more garbage trucks hauling solid waste long distances to landfills or sewage lines connected to remote facilities. Revenues from residential waste treatment help cover the initial cost of the CSR 1.

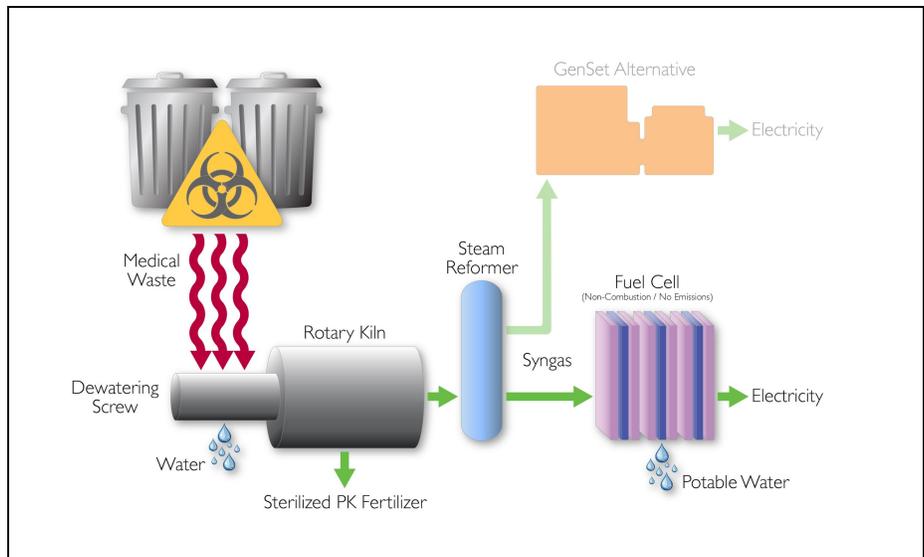
### Valuable Co-Products

The co-products of the CSR 1 include power, heat and phosphorus-potassium (PK) fertilizer pellets ready for 0-10-10 fertilizer applications or sending to companies to mix with nitrogen. The CSR 1 supports food production with heat, CO<sub>2</sub>, electricity and water purification.

There are three types of co-product water available from the system: water from de-watering excess moisture from the feedstock, heating it with the system and filtering it for use on land as nitrogen fertilizer, with additional treatment available for general use; pathogen-free ammonia water directly from the steam / CO<sub>2</sub> reforming process that can be further filtered for general use, and a little potable water that comes from running the fuel cells.

The electricity generated with the CleanStream Reformer 1 is enough to support approximately 85 homes (approximately 340 - 400 people produce 5-10 pounds of mixed waste per day, more households needed in low-waste communities).

Additionally, combined heat and power from the steam / CO<sub>2</sub> reforming process can be used for facility



CleanStream Reformer 1 system diagram



heating, air conditioning (absorption) chillers, and hot water heating to support more homes.

### Experience

EQUARES Energy Company™ is an advanced renewable energy systems (ARES) company committed to providing emissions-free waste-to-energy equipment and related monitoring services to support customers. Our team has over 50 years of direct experience in designing and building ARES equipment and facilities.

### Decentralized Power

Our direction comes from our members, 40% of whom pursued careers as chemical and mechanical engineers and design scientists and worked with NASA, Teledyne, and Westinghouse. We've come together to focus on advancing renewable energy to solve today's energy and waste problems. We believe in

decentralized, distributive power (stand-alone power) through highly efficient energy-conversion devices that are well above current applications.

Our technology works with existing utility systems or independently of them. We see that decentralization and democratization of energy are possible just using housing and facility waste that is abundantly accessible. Our CleanStream Reformer 1 benefits commercial and residential developments. It eliminates community waste and landfills.

EQUARES Energy Company's small, sustainable and stand-alone advanced renewable energy systems create premium power and valuable co-products while protecting the environment from the impacts of human habitation and production.



EQUARES Energy Company  
2610 Tennessee Avenue  
St. Louis, MO 63118  
+314-772-6047  
www.EQUARESEnergy.com