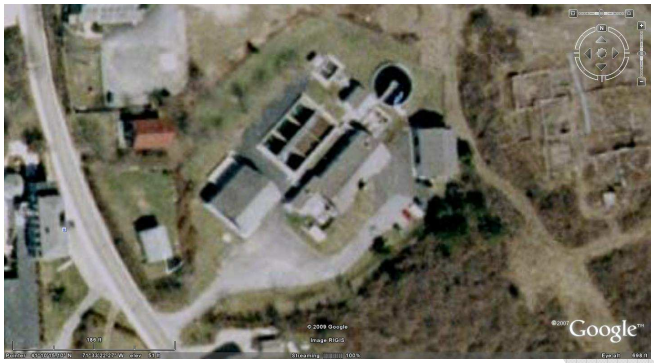
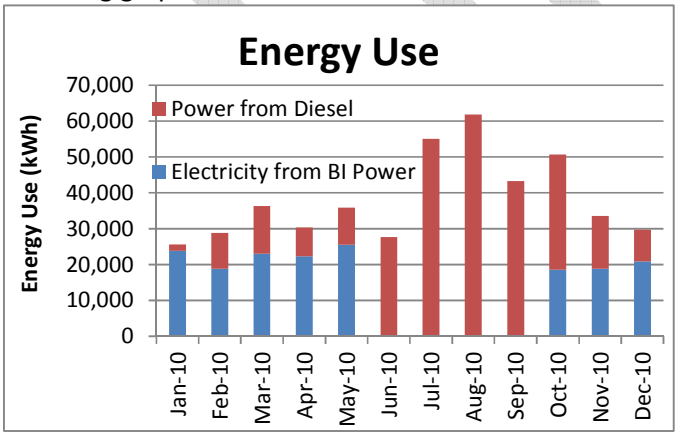
New Shoreham WWTF

The Block Island wastewater treatment facility (WWTF) treated an average daily flow of 0.11 MGD during 2010 using a conventional treatment process to reduce BOD, TSS and pathogens prior to discharge into Block Island Sound. In addition, the facility uses biological nutrient removal to reduce the concentration of nitrogen to below their permit's final effluent discharge limit.



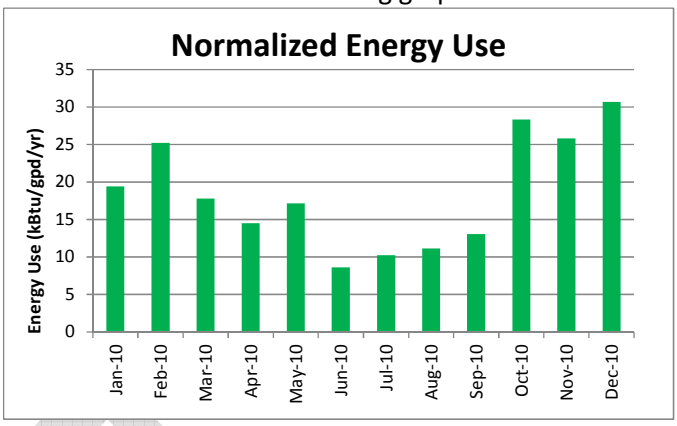
Superintendent: Raymond Boucher, (401) 662-9051
newshorehamwpcf@hotmail.com
Location: 1 Spring Street, New Shoreham, RI 02807
Electric Supplier: Block Island Power Company

The facility generates all of its electric power on-site during the summer using a 150 kW diesel engine generator at an estimated cost of $0.17 per kWh. The annual average electric cost was $0.36 per kWh. The amounts of energy used by the facility are shown in the following graph:



The average electric power demand was 52 kW. The monthly average daily flow is over 5 times higher in the summer than in the winter due to the tourism. An unknown amount of inflow and infiltration also occurs.

The flow-normalized energy consumption varies by month as shown in the following graph:



The average flow-normalized energy use was 18.5 kBtu/gpd/year. This value cannot be compared to other much larger facilities. However, the facility can still use Portfolio Manager (https://www.energystar.gov/istar/pmpam/) to monitor this value as they make improvements.

Treatment Process Details for 2010:

- Maximum design flow is 400,000 gpd
- The treatment process requires no primary clarifiers
- Aeration for secondary treatment is provided by positive displacement blowers through plate diffusers
- BNR takes place in anoxic zone with up to approximately 100% recycle
- Aerators are controlled manually based on DO
- Disinfection is by chemical addition
- Sludge is thickened to 16.5% using a belt press
- 50 DTY sludge is shipped by ferry to the mainland for disposal

Alternative sludge management methods such as local composing could be investigated further. Sequestering a portion of the sludge's carbon would be an environmental benefit and avoiding waste hauler's fees would be an economic benefit. However, a reliable year-round source of carbon such as yard or food waste or possibly seaweed would need to be used to assure the process has proper nitrogen to carbon balance.

It is technically feasible to utilize various sources of renewable energy that are available at the site to generate electricity that will satisfy a portion of the facility's electric demand as shown in the following table:

Renewable Resource	Actual Avg Power (kW)	% of WWTF	Total Project Cost
Hydroelectric	0.35	0.7%	$16,400
Solar (88 modules)	2.20	4.2%	$100,584
Wind (100 kW)	33	63%	$850,000

The most economically feasible project produces savings that yield the highest internal rate of return (IRR) shown in the following table:

Grant (illustrative)	0%	50%	75%	100%
Resource	Internal Rate of Return			
Hydroelectric	2.3%	11%	24%	-
Solar	7.4%	16%	30%	-
Wind	12%	27%	53%	-

Although wind is most economic, it also typically takes the longest get installed due to permitting issues.

The economic analysis assumes that Block Island Power would allow the facility to net-meter even though the utility is not mandated by RI legislation to do so. It is not known how the renewable generation would tie in electrically to the facility and its generator.

Competitive ARRA grant funds are available from the Rhode Island Office of Energy Resources (contact Barbara Cesar at 574-9105) to offset all or part of the cost a new renewable project. However, projects must be completed by March 31, 2011 and the funds are awarded after installation. If the facility has not included the project cost within their current year's fiscal budget then it is possible to get a bridge (short term) loan from the RI Department of Economic Development (contact Julian Dash at 278-91400) to finance the project and then pay off the loan when the grant is received.

The RI Renewable Energy Standard (RES) defines the renewable portion of a biofuel blend burned by a compliant facility as eligible for renewable energy credits (RECs). The facility would get a monetary credit of less than $50 per MWh for powering the existing engine generator with a biodiesel blend such as B20. However, in order to run the generator year-round, objectionable noise would need to be abated especially during the wintertime when ambient background noise is low. Studies are available (http://www.pprc.org/research/epp/BiodieselForGenerators.pdf) that describe the reliability of a biodiesel powered engine generator and include how to address issues such as the gel-point temperature.