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Water Infrastructure

Quarterly Water Report
Q4 2018

I. Current Project Descriptions

Wastewater plant, NJ: A New Jersey-based Wastewater Treatment Plant where original funds were partly used to mount solar panels to increase energy efficiency of the plant, lower costs over time, and provide energy to the local municipality. The state of New Jersey requires electricity suppliers to secure a portion of their electricity from solar facilities located in NJ, creating a natural market for Solar Renewable Energy Credit (SREC) trading credits. The project not only reduces the plant's energy consumption but also improves its overall efficiency. We can surely extend our reach in this area and currently look at a broader investment opportunity in the same sector.

Sustainable Sewerage, Ontario: The Sustainable Sewerage market in Ontario currently undergoes a significant change when it comes to consolidation and strong demand for renewal of existing plants. Amongst others we are working with a public company which has developed a technology providing sewage collection and water treatment. It offers an all in one solution which is both cheaper to install and operate than traditional systems. The existing projects are all government linked and work closely with municipalities and we are currently working towards a PPP pipeline for its sewerage system. The provincial regulations regarding sewerage mean that many municipalities are required to change/install systems in the coming years. We have been implementing the first parts of the portfolio of existing projects and we will continue to implement more under the same framework. The constant diversification increased the security for the investors but also allows us to further reach into this market. The investment model has not changed, but the reach within Ontario has become broader.

Hydropower, Illinois: A lock and dam hydroelectric water power project located on the Illinois River. The site has obtained a FERC License (expires 2061) and is finalising development. Once the site is connected and producing energy it will provide power to the local municipalities and income will be generated by the power purchase agreement in place.

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II. Regional Market Information

News in Brief

- Climate change: The massive CO2 emitter you may not know about. Cement is the source of about 8% of the world's carbon dioxide (CO2) emissions, and utilises plenty of water in the process https://www.bbc.co.uk/news/science-environment-46455844

- Pure Water Brew Boise (Beer producer in Idaho, USA) launches wastewater reuse pilot program https://www.wwdmag.com/industrial-wastewater-recyclingreuse/pure-water-brew-boise-launches-wastewater-reuse-pilot-program

- UniCredit unveils European green bonds ETF. The development shows the demand by institutions for Green Bonds and its rapid growth in the past few years https://www.investmenteurope.net/news/4000130/unicredit-unveils-european-green-bonds-etf

How plants and animals are teaching scientists to fight climate change

In the emerging field of biomimicry, scientists and inventors take inspiration from trees, whales and coral[1]

The concept of biomimicry has been around for years. Designers have replicated the skin of the octopus to invent a camouflage surface that could help robots change colour and texture. They have studied squid and jellyfish to look for a better propulsion system for submarines. Furthermore Boston research hospital mimicked the behaviour of underwater worms to develop a glue that knits together fragile heart muscles.

Now, advocates of such bio-inspired engineering are urging inventors to apply nature's lessons to the challenge of global warming. Some of the most promising biomimicry designs have already been deployed, including several that capture carbon dioxide that would otherwise spew into the air and use it to make everything from plastics to a key element of concrete.

Blue Planet.aggregates

[1] https://www.nbcnews.com/mach/science/how-plants-animals-are-teaching-scientists-fight-climate-change-ncna924946

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Well beyond prototype stage is an innovation, inspired by the way marine organisms, like coral and clams, grow their hard superstructures. Blue Planet Ltd. of Los Gatos, California, is creating rock-like “aggregate” used as the main ingredient in concrete. It creates the material by relying on two waste streams — disposed and unused cement from building projects and carbon dioxide gas from power plants.

Blue Planet takes the carbon dioxide and combines it with a liquid solution to make a bicarbonate. The company then combines calcium drawn from reprocessed cement and mixes it with the bicarbonate to produce calcium carbonate, or limestone. The limestone can be formed into sand or gravel-sized rock — both major components that are mixed with cement to create concrete.

In nature, corals and molluscs combine calcium and carbon dioxide absorbed in seawater and secrete calcium carbonate skeletons, forming shells and coral reefs.

The ultimate impact of the Blue Planet process is that carbon dioxide — Earth’s principal heat-trapping greenhouse gas — is kept out of the atmosphere and is instead “sequestered” into new buildings. Brent Constantz is the marine scientist and Silicon Valley entrepreneur who founded Blue Planet.

The company plans to expand, drawing additional carbon dioxide from the Los Medanos power plant in Pittsburg, California, the large natural gas-powered plant that delivers electricity to San Francisco. Already, Blue Planet’s aggregate went into the concrete used to build a new terminal at San Francisco International Airport, which is due to open next summer.

The leader of the agency that oversees air quality in nine San Francisco Bay Area counties said that if the Blue Planet process proves as successful as imagined it could spread to other power plants and heavy polluters, like a cement factory south of San Francisco.

Jack Broadbent, CEO of the Bay Area Air Quality Management District believes the process has a lot of promise and sums it up as essentially learning from nature itself to be able to address a man-made problem.

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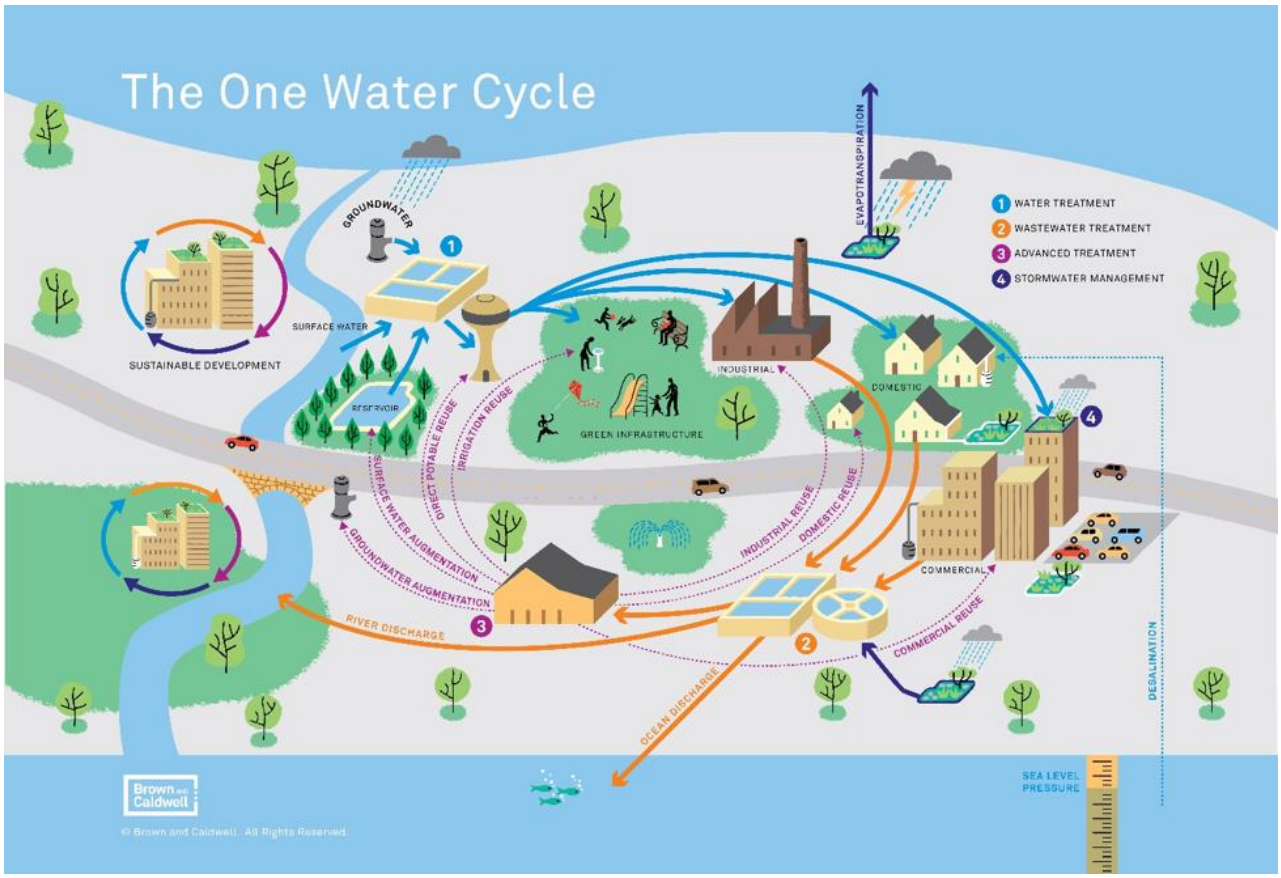
Just (re-)add water: How circular systems can enhance urban water cycles[2]

Communities are increasingly turning to water reuse as a tool to bolster water supply reliability in the face of numerous uncertainties. Droughts result in curtailments of surface water allocations that serve as drinking water lifelines to many cities. Communities that rely on groundwater may find their aquifers in a state of overdraft without adequate management or replenishment. In a world filled with uncertainty, many agencies are looking at water in every part of the urban water cycle as a resource that can be put to better use before discarding it.

This has led to "The One Water Cycle" concept (see Brown and Caldwell diagram of the cycle below):

The urban water cycle starts with raw water, moves through drinking water treatment then delivery to homes and businesses. Once used, sewers convey it to wastewater treatment plants, where it is treated to public health standards for discharge to rivers, land application, the ocean, or treated further for recycled water. Some water is purified through advanced treatment processes and used to augment water supplies.

Purified water injected into aquifers to augment water supply also can halt groundwater subsidence or seawater intrusion, providing multiple benefits. Wastewater treatment facilities can produce energy via co-generation to supply some energy needs and offset their carbon footprint. Communities may consider alternative water supplies, such as seawater desalination, storm water capture, or water reuse to increase water supply reliability and resiliency to prepare for the future.



[2] https://www.greenbiz.com/article/just-re-add-water-how-circular-systems-can-enhance-urban-water-cycles

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What is water reuse?
Water reuse involves additional treatment of wastewater for other uses. Non-potable reuse, also known as recycled or reclaimed water, is suitable for uses such as landscape or agricultural irrigation, industrial cooling or toilet flushing. Potable reuse involves advanced treatment processes to produce purified water for addition to groundwater aquifers or reservoirs to supplement a community's water supply.

Drivers for water reuse in the urban setting
Communities have been employing non-potable reuse for decades, mostly for landscape irrigation. One limitation for non-potable reuse is that the demand is seasonal, with increased need during the hot, dry summer months.
Additionally, most non-potable water systems must be built with a separate, purple pipe distribution system. Purple piping are lines designated for recycled water, which is treated to a level suitable for irrigation and industrial use, but not for drinking. This results in a binary pipe network with high capital costs and operations and maintenance requirements separate from the potable water system. Long pipelines are expensive, and cross-connection prevention requirements add complexity to non-potable reuse systems. These limitations and challenges have led to new trends and innovations for water reuse in an urban setting.

Potable reuse
As a result of limitations and challenges associated with non-potable reuse, many communities are considering potable reuse as a way to maximize a precious resource before they discharge it to a river or the ocean. Advanced treatment processes such as reverse osmosis and advanced oxidation processes have been demonstrated in California for almost two decades to provide purified water for injection to groundwater, as a tool to stem the tide of seawater intrusion and to augment drinking water supplies.

Decentralized systems
San Francisco leads the way in decentralized, non-potable water reuse systems in the U.S. The headquarters of the San Francisco Public Utilities Commission uses the Living Machine to treat all of its wastewater onsite, producing recycled water to supply water for 100 percent of the buildings' urinals and toilets.
The future
Utilities, trade organizations and equipment providers are pushing to innovate urban reuse. Communities may seek expanded applications for water reuse and push for regulatory approval of additional uses, as is the case in Colorado to add more official non-potable uses such as urinal and toilet flushing. Much current research is focused on optimizing treatment processes used in potable reuse applications, evaluating performance of alternative treatment processes, and anticipating needs associated with direct potable reuse.

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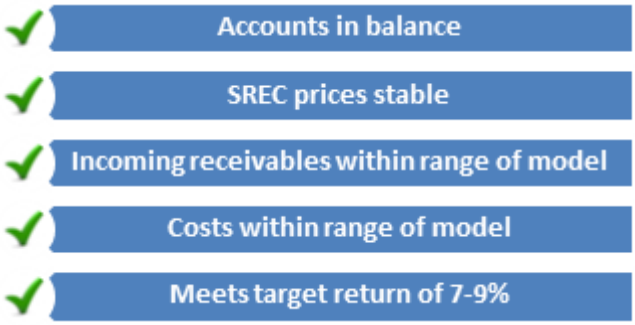
III. Ongoing Projects

Wastewater plant, NJ:

The energy created for Q4 2018 remains consistent and in line with expectations for the winter months. The SREC energy prices remain at stable levels in New Jersey and with a PPA already signed the 2018/19 year should again be a solid year for the asset.

- Monitor PPA component
- Monitor SREC eligibility and prices on the market (1 SREC for every 1000 kW-hours of electricity produced)
- Monitor regulatory shifts in clean energy incentive programs (RPS) and timelines
- Document any changes to the investment expectations
- Online monitoring of the solar power as well



Sustainable Sewerage, Ontario

The previous quarter has seen continued movement and progress with the pipeline. The design and build element continues to provide promise with Brooks Road nearing completion with an operation and maintenance contract already in effect. The pipeline of opportunities to purchase operating sites continues to be of significance and is constantly reviewed. There are sometimes portfolios for sale and at times single sites. It requires significant work to make sure the potential assets are purchased at a fair price as various sites need upgrading from the old systems. The regulatory and environmental compliance implies many of the older systems need upgrading with operators not willing or in the position to make these upgrades.

In related news Clearford was awarded two new projects in India. While this is not directly related it proves the system works in different, and at times more difficult, conditions[3]. In addition Clearford and Koester are continuing to realise the synergies between the two companies and the benefits of the joint company could be realised in the year ahead.

The UV Pure Generation 3 product has been showcased and the warehouse equipped to handle the likely demand. The strong pipeline for the product will also be used as an upgrade for many operating sites. The product will be more efficient and cheaper to maintain once installed. There is excitement surrounding this product.

- Maintain monthly communication with Kevin Loiselle and Mark McGuire regarding projects
- Document any changes to the investment expectations

[3] https://www.clearford.com/news/clearford-announces-two-new-village-sanitation-projects-and-a-new-industrial-contract-in-india-update-on-q4-2018-revenues-and-a-reduction-in-interest-costs/

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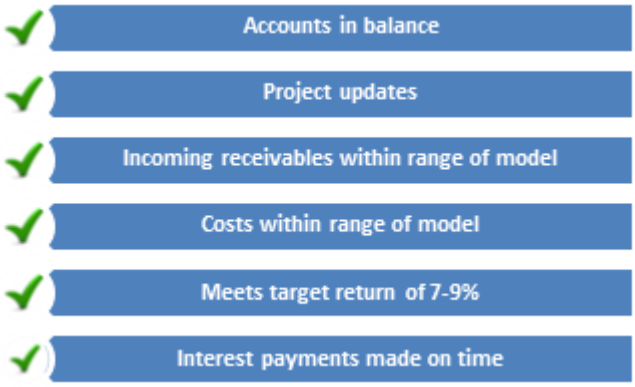
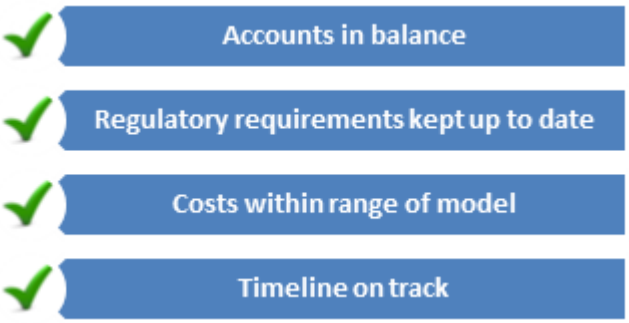


Hydropower, Illinois

The site continues to be delayed with a small amount of construction work conducted in Q4 2018. The volatility in the electricity prices over the past six months has led to discussions regarding potential PPAs. This volatility has opened up the market to higher prices than in recent years with various off-takers wanting to avoid the market variability by agreeing to a PPA. We will obtain PPA proposals within the first 8 weeks of 2019 and then move forward with a fully financed model. In addition we also expect all engineering and construction work reports for 2018, which will be reported upon. There is also a continued effort to explore further financing on debt level which is bearing some results. We remain in close contact with the electricity traders.

- Maintain monthly communication with onsite project manager
- Document any changes to the investment expectations
- Monitor the financial reporting, cash flows and accounts



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IV. Latest Developments

Latest Actions

There are three main areas where exciting future developments are occurring:

1. In a similar manner to the last two quarters regarding the operating contracts in Canada, there are various individual sites and portfolios of assets with potential availability for sale. They depend on the pricing and upgrading requirements being viable. A couple of sites have expansion potential but as a result these sites need further due diligence to value the asset and the expansion.

2. The Canadian projects have led to traction across the border in the US. Koester had designed and build a site in NY State and so there appears to be a potential pipeline on the North Eastern States. Here there seems to be an emphasis with large sites with multiple uses (such as golf courses) which appeals on a design and build perspective as well as operating contracts.

3. The potential from Texas currently seems to be on hold and may become interesting again in a few months. The Californian potential in water treatment remains. The most intriguing of the projects relates to capturing both wastewater and CO2 emitted from a power plant, combining them with locally sourced demolished concrete as a process input material to produce CO2 sequestered aggregate products for use in a wide range of concrete mix designs. The use of CO2 and wastewater provides a great use for these products with California being the ideal location with the green emphasis in the State.

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