SIGNINA CAPITAL AG

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Water Infrastructure

Quarterly Water Report
Q1 2019

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.

US Water Treatment, California: The project is a carbon capture and mineralization project based in Pittsburg, CA. The project will capture both wastewater and CO_2 emitted from a gas-fired power plant and combine these with locally sourced demolished/returned concrete as a process input material to produce several different "CO_2 sequestered" and "up-cycled" aggregate products for use by Bay Area businesses, governments and consumers in a wide range of low-carbon, high-value concrete mix designs. The wastewater and steam will be obtained from either the local power plant or from the sanitation district that can provide wastewater and the ammonia needed from their treatment plant which is located adjacent to the plant. As a result either method will use recycled water, which is legislatively supported in California. The whole process revolves around reusable and recyclable products. The carbon dioxide mitigation, waste water usage and demolished concrete process input provide a process producing recycled aggregates while reducing carbon dioxide.

II. Regional Market Information

News in Brief

- Green Bonds – 2018 Highlights. It was yet another strong year for Green Bond issuances. Since 2007 USD 521bn has been raised. See below report for full statistics https://www.climatebonds.net/files/reports/cbi_gbm_final_032019_web.pdf

- Can Hydropower Deliver Enough Energy to Turn On the World? https://www.machinedesign.com/motion-control/can-hydropower-deliver-enough-energy-turn-world

Thirsty work: Heineken aims to replenish "Every Drop" of water it uses by 2030[1]

Multinational brewer's "Every Drop" strategy aims to replenish and treat all the water it uses to brew beer in water stressed regions by 2030

Heineken has ramped up its water sustainability ambitions, pledging to reduce its water usage as well as replenish and treat all the water it uses for brewing in water stressed areas around the world by 2030.

The brewing giant said its 2030 'Every Drop' strategy, which was announced yesterday, had been developed in support of UN Sustainable Development Goal number six, which is dedicated to water protection.

Under the strategy, the multinational brewer pledged to fully balance and replenish every litre of water used in its products from areas that are water-stressed, as well as to work collaboratively with other users of local water resources to protect human health and boost communities. It also promised to maximise recovery, reuse, and recycling of its water, and to treat 100 per cent of its wastewater worldwide.

Heineken set several targets to reduce its water usage to an average of 3.3 to 2.8 hectolitres for its breweries in water stressed areas, and from 3.5 hectolitres to 3.2 on average for all its breweries worldwide.

Heineken currently treats 96.5 per cent of its wastewater worldwide in order to return it to the environment, but it today committed to go further by increasingly reusing treated wastewater in its own operations as well as sharing it with other users.

Of the 170 breweries the company operates around the world today, 26 are in water-stressed areas, it explained. Heineken said it would therefore be developing individual targets for each brewery in these water-stressed areas and prioritising the most relevant actions for each local watershed.

The company said it had developed a 'water triangle' comprising three key focus areas for action at each of these 26 breweries which would "need to be considered holistically with the aim of having the highest impact on the health of the watershed and the communities around it".

Water is of crucial importance to brewing beer, which is made up of 95 per cent water, but simply lowering water usage "will not be enough", according to the brewer. It therefore urged major water users across different industries to focus more on replenishing the water they use.

Jean-François van Boxmeer, Heineken CEO and chairman of its executive board stated: "Water is a precious, but unfortunately undervalued, resource. By 2025, two thirds of the global population could be living in water-stressed conditions. We need to do more to protect water so communities living in water-stressed areas can continue to thrive."

[1] https://www.businessgreen.com/bg/news/3072823/thirsty-work-heineken-aims-to-replenish-every-drop-of-water-it-uses-by-2030

Six ideas for CO_2 reuse: a pollutant or a resource[2]

Greenhouse gas carbon dioxide could be sucked out of the atmosphere and turned into a valuable raw material. Here are six promising carbon reuse ideas already in development

Several companies have demonstrated carbon capture either from industrial facilities and power plants or directly from the atmosphere. The technology, however, is costly and adopters are few – nowhere near the scale needed to meet the target.

Environmentally conscious innovators are therefore developing solutions that would turn the climate-warming pollutant into a marketable raw material, which would create a business case for costly climate-protecting technology. Production of CO_2-based bioplastics, fuel and even rock and carbon fibre have been tested, with proponents of such technologies hoping to create novel carbon sinks from objects of daily use.

Below are six interesting things that engineers and scientists have done with carbon dioxide:

1. Turn it into rock

Terminal One of San Francisco International Airport might look like any other international airport terminal – but it actually is quite special: it has been partially built with concrete incorporating CO_2 emissions. The concrete uses aggregate coated with artificial limestone developed by California-based Blue Planet.

Blue Planet wants to manufacture its carbon-sequestering rock where large CO_2 emitters, such as coal- or gas-fired power plants, are located. And that is usually near major population centres, where most of the construction work takes place. Brent Constantz, the founder, believes that such a set-up would make the artificial green rock competitive.

The process that Blue Planet uses takes flue gas from a natural-gas-fired power plant and turns it into calcium carbonate, essentially artificial limestone, a type of mineral with high-carbon content typical for natural sedimentary rock. A piece of rock substrate is then coated with this artificial limestone, which permanently sequesters the CO_2. Blue Planet can make rock aggregate sizes ranging from a grain of sand to gravel.

2. Make cement out of it

2007 a company called Calera, which operates a cement-making factory next to a large power plant on the US west coast. Calera produced two tonnes of CO_2-containing calcium carbonate per day using raw flue gas from the plant. The flue gas first reacts with an alkaline solution, releasing the CO_2; when combined with calcium, the CO_2 is trapped in the form of calcium carbonate, which is subsequently dried to make cement.

Conventional manufacturing of cement is, on the other hand, a major source of carbon emissions. The global cement industry is responsible for about 6 per cent of global carbon emissions, according to the Carbon Disclosure Project, a UK-based charity that encourages companies and cities to disclose the environmental impact of major corporations. The industry has achieved only minor emission reductions.

3. Feed it to algae to make carbon fibre

Carbon fibre is a wonder material hailed for its superior strength and light weight. But it has a dirty little secret. The current carbon fibre production methods are extremely energy demanding and thus polluting. According to some estimates, production of carbon fibres is in an order of magnitude more energy-intensive than the production of steel. Moreover, the material is made from petroleum: a fossil resource the world is trying to wean itself off.

[2] https://eandt.theiet.org/content/articles/2019/02/six-ideas-for-co2-reuse-a-pollutant-or-a-resource/

A team of scientists from the Technical University of Munich, Germany, unveiled their research into using algae to make precursors for carbon fibre manufacturing. The researchers envisage they could grow the glycerol-producing algae in ponds near the Mediterranean coast. The warm climate and easy access to seawater would reduce the cost of algae cultivation. The algae would be fed carbon dioxide captured at a power plant or industrial facility nearby, incorporating the carbon dioxide into their cells.

4. Turn it into insulation foam for housing

Econic Technologies, a chemistry start-up based in Alderley Park, near Manchester, UK, has developed a process that incorporates carbon dioxide from emissions into polyurethane foams and other plastic materials.

Polyurethane foam is used to make various products including mattresses, furniture upholstery and car seats. It is also used to make thermal insulation for houses, a market Econic Technologies hopes to enter. Experts consider a large-scale retrofit of the UK's notoriously energy-inefficient homes to be the number one step for the country to slash its CO_2 emissions in line with the October 2018 recommendations. Econic Technologies hopes insulation used in this retrofit could not only slash the emissions from heating but also trap emissions produced by other sources.

5. Feed it to algae to revive oyster reefs

Scottish researchers are using CO_2 produced during whisky fermentation to grow algae in special photobioreactors which could then be fed to baby oysters that marine scientists are nursing in an attempt to restore the population of native European oysters in the Dornoch Firth.

While the aim of this unique project, called DEEP (for The Dornoch Environmental Enhancement Project), is to revive the once rich ecosystem in the firth, it could, as a side-effect, isolate a bit of the climate-warming gas.

6. Turn it into fuel

The idea to turn carbon dioxide emissions into synthetic natural gas that could be used as a fossil-fuel replacement has been around for quite a while. However, most known processes that could do the job are rather energy-intensive.

In late 2017, researchers from the US Department of Energy's Idaho National Laboratory published a paper in the journal Green Chemistry describing a process that offers a much more energy-efficient way. For the first time it seems that it is possible to directly reduce captured CO_2 into carbon monoxide and hydrogen using specialised liquid materials that make the CO_2 more soluble and allow the carbon-capture medium to be directly introduced into a cell for electrochemical conversion to synthetic natural gas.

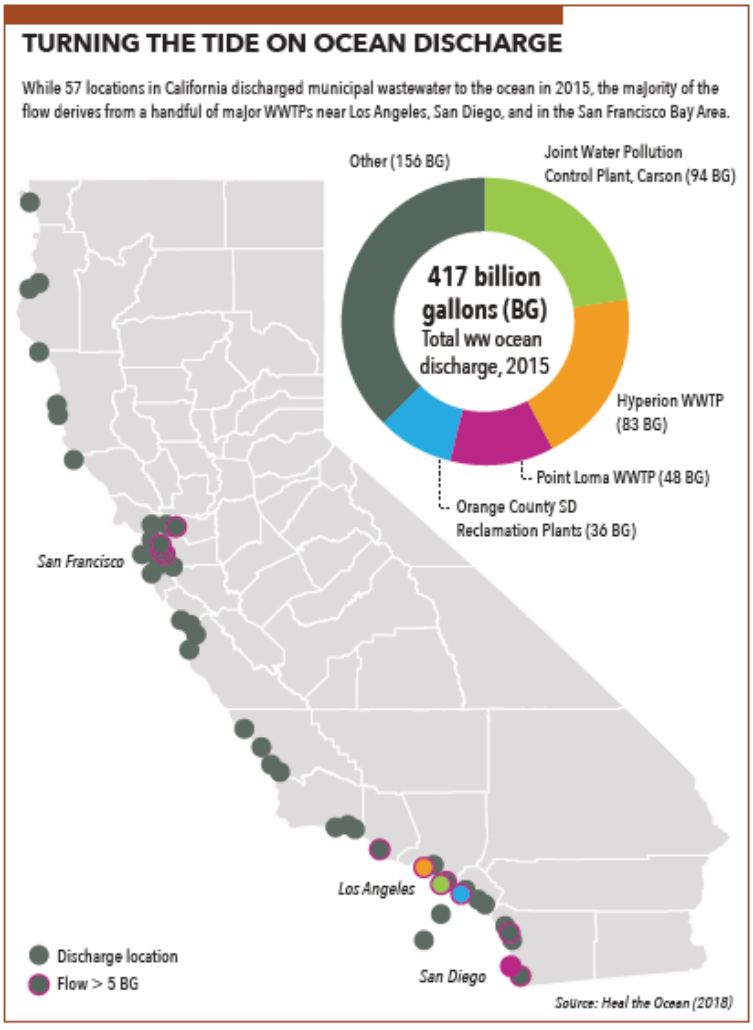
Ocean discharge ban heralds increased reuse in California[3]

Proposed legislation would effectively prohibit the discharge of treated wastewater to the ocean by 2040. Is the state-wide decree necessary to meet long-term water recycling goals?

A bill introduced last month in California aims to significantly reduce the volume of treated wastewater that municipal utilities in the state discharge to the Pacific Ocean over the next two decades. With the state lagging behind on its own water recycling targets, the intention is that prohibiting ocean discharges would accelerate the adoption of wastewater reuse initiatives.

SB 332 – introduced by Senators Hertzberg and Wiener – would require all wastewater treatment plants in the state that discharge through an ocean outfall to reduce their discharge flows by at least 50% by 2030, and by at least 95% by 2040. In 2015, approximately 417 billion gallons (1.6 billion m^3) of wastewater was discharged to the ocean in California at 57 locations.

A state-wide mandate would also help offset complacency when drought conditions improve (on 14 March, California was declared drought-free for the first time in 376 weeks), and help utilities justify the costs of advanced treatment facilities to their ratepayers.



The proposal is similar to legislation adopted in Florida in 2008, which has since spurred the development of various reuse initiatives. Some observers have questioned, however, whether a state-wide mandate is necessary, given that the vast majority of the wastewater discharged to the ocean in California is accounted for by a handful of large facilities, most of which have long-term strategies in place to incorporate reuse.

For instance, the Metropolitan Water District of Southern California is planning a $3.4 billion advanced wastewater treatment facility in Carson, to recycle up to 150MGD (567,750m3/d) of secondary effluent from the Joint Water Pollution Control Plant, which is the largest ocean discharger in the state.

Meanwhile, the City of Los Angeles announced last month that it would spend $2 billion on upgrades at the 450MGD (1.7million m3/d) Hyperion WWTP to recycle 100% of the wastewater it treats by 2035. Despite this, past proposals to implement a similar ocean discharge mandate in California have failed to pass into legislation, and have been opposed by groups including the Association of California Water Agencies on the basis that the proposals “included an unachievable mandate that would undermine existing local and regional efforts and cost local agencies and their ratepayers billions of dollars.”

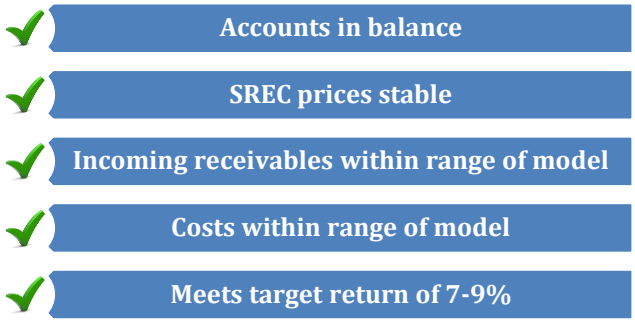
[3] GWI, Issue 3, March 2019

III. Ongoing Projects

Wastewater plant, NJ:

The energy created for Q1 2019 remains in line with expectations for the winter. The SREC energy prices remain at stable levels in New Jersey. There are no issues with the PPA which is signed through until summer of 2019. The current prices suggest a new PPA should be on the horizon at a reasonable pricing level. We have already started discussions accordingly.

- 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

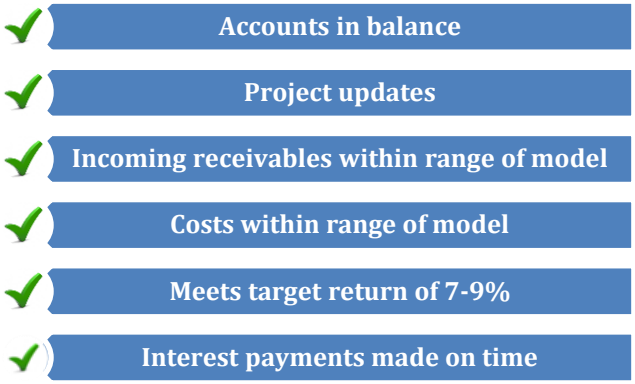


Sustainable Sewerage, Ontario

The first quarter has seen the completion or near completion of a couple of the design and build sites – Broccolini site in Ottawa and the Brooks Road site. An additional operating contract was awarded near the end of the quarter with another couple of sites under discussion. With the completion of projects and additional operational contracts the pipeline continues to grow. Similar to before there are some portfolio assets for sale which require significant due diligence to ensure the upgrades and operational needs are both possible and profitable. There appears to be an increase in number of potential assets on the market in the last few months. The regulatory and environmental compliance in Ontario continues to have an impact on the Province implying many of the older systems will need upgrading. This element however takes longer to reap the benefits with the long duration it takes to implement change.

The UV Pure Generation 3 product has received the environmental permits required to sell the device. It has now launched with sales underway. The product is a large upgrade from the old generation being more efficient. This launch has been much anticipated.

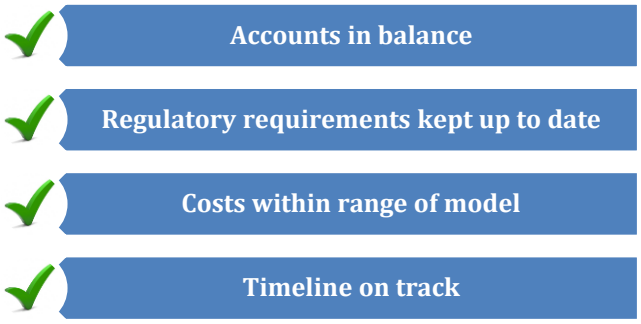
- Maintain monthly communication with Kevin Loiselle and Mark McGuire regarding projects
- Document any changes to the investment expectations



Hydropower, Illinois

The site continues to be delayed through the winter with minimal construction work in Q1 2019. There continues to be volatility in the prices with January usually being volatile due to weather conditions. This has led to further interest in a potential PPA. As stated last quarter various off-takers wanting to avoid the market variability by agreeing to a PPA. The process has taken longer than hoped but there appears to be some traction to have a PPA term sheet signed in Q2 2019. With a full model ready to go and a continued effort to explore further financing on debt level a PPA term sheet should be the trigger for positive progress in the coming months.

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

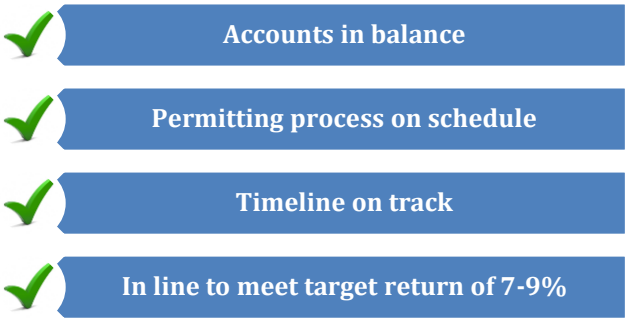


US Water Treatment, California:

The project was financed in Q1 2019 with the development of the project is going as planned. The team recently spoke at the inaugural "Grounded Summit" in Sonoma[4] explaining the technology solution using waste products, rocks, air and waste water to produce aggregates that can be used. The first interest payment will be made in May and there is no suggestion of project delays with permitting taking time as expected. There was an additional article regarding the technology published as the founder and the technology for using the waste products conversion gains traction[5].

In addition there was a short abstract written describing the project and its potential. It is available upon request[6].

- Maintain monthly communication with project team
- Document changes and delays to the permitting process



[4] https://sustainablebrands.com/read/product-service-design-innovation/inaugural-grounded-summit-showcases-radical-climate-solutions-need-for-more
[5] https://grist.org/sponsored/the-breakthrough-that-could-actually-reverse-climate-change/

[6] Global Water Strategies – Abstract BP January 2019

IV. Latest Developments

Latest Actions

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

1. There continues to be various individual sites and portfolios of assets in Canada with potential availability for sale. Currently a portfolio of assets has been shortlisted and is undergoing due diligence. As always it depends on the pricing and upgrading requirements being viable. This current pipeline appears to be the strongest over the past few quarters and there should be significant development in the second quarter.

2. The water treatment market presently seems to be the most active, led by the government legislative changes along with the large corporations shifting towards sustainability (see Heineken article above). There are many companies with varying technology looking to find green solutions to the global macro issues. While there is additional capacity in the California Treatment project purchased in the quarter there are also additional potential projects. Many of which require due diligence on both the concept and jurisdiction they operate in.

3. The Texas potential still appears to be on hold and may become interesting again soon as suggested last quarter. Hydropower deals are also resurfacing with some projects offering interesting dynamics with regards to financing structure.

4. In the second quarter we will be planning our trip to the US in order to visit all plants and potential projects. We foresee the actual travelling happening in the 4th quarter 2019.

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