SIGNINA CAPITAL AG

# WATER INFRASTRUCTURE
# QUARTERLY REPORT – Q2 2023

## Waste Water, Mt. Holly, 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 private 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.

## Greenhouses, Virginia

A lot of the groceries produced in the USA are transported across the country and come from regions with little water (such as leafy greens which are still 99% field grown in the US). This creates high costs and carbon footprint along with a lack of consistency for fresh produce. The greenhouses today can control the environment to produce fresher quality produce, utilizing less water, is local and sustainable. The project will be developed in Virginia for the local market.

## Industrial Re-use, Blue Planet, California

The project is a carbon capture and mineralization project based in Pittsburg, CA. The company captures both wastewater and $CO_2$ emitted from a gas-fired power plant and combines 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 is obtained from the local power plant and the ammonia needed from their treatment plant 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.

The company is in its last stage of raising a mix of debt and equity, before reaching commercial viability in 2023. We are involved in the last debt round, but also on the equity side for bespoke advisory clients.

## Hydropower, Marseilles, 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.

## Hydropower, Braddock, Pennsylvania

A lock and dam hydroelectric water power project located on the Monongahela River, Pittsburgh. The site has obtained a FERC License (No. P-13739) with a 5.25MW capacity and is finalising development. The site, once producing energy will provide power to the local area with income being generated via the sale of the energy.

# CURRENT PROJECTS

Globally the second quarter this year has been strong from a global markets perspective especially with the hype around the future of AI. Inflation numbers are retreating but at a lower pace than originally thought leading to higher rates and uncertainty in the near term.

With the UN Water Conference last quarter and the continued emphasis regarding SDGs it appears that water infrastructure, sanitation and recycling remain focal points for the coming year. The water sector and reuse market continue to grow with technology making reusable water drinkable to the point where it could soon be a reality with the right legislation.

The hot summer and droughts in Europe only add to the long term water issues leading to the topic remaining at the forefront of global topics.

Similar to last quarter greenhouses and Blue Planet remain at the forefront of the ESG movement. Along with Canadian waste water it should be an interesting second half to the year with potentially significant updates and strides made.

# REGIONAL MARKET INFORMATION

## NEWS IN BRIEF

### Fourth Water 2050 Think Tank report envisions future water governance

https://www.awwa.org/AWWA-Articles/fourth-water-2050-think-tank-report-envisions-future-water-governance#:~:text=The%20latest%20report%20from%20the%20Water%202050%20initiative,broad%20categories%3A%20Implement%20a%20%E2%80%9COne%20Water%E2%80%9D%20governance%20approach

### Don’t call it ‘toilet to tap’ — California plans to turn sewage into drinking water

https://www.msn.com/en-us/health/medical/don-t-call-it-toilet-to-tap-california-plans-to-turn-sewage-into-drinking-water/ar-AA1eDpVk

### Unprecedented €2.2bn drought response plan approved in Spain

https://www.theguardian.com/world/2023/may/11/spain-approves-unprecedented-drought-recovery-plan

## US BREWERY USES UNUSUAL INGREDIENT IN BEER - RECYCLED SHOWER WATER[1]

Epic OneWater Brew is made by recycling the water that ends up down the pipes of showers, sinks and washing machines from a 40-story luxury residential building in San Francisco. Aaron Tartakovsky, the co-founder and chief executive of Epic Cleantec, the company that worked with Devil’s Canyon Brewing Company to create the beer, said that buildings globally use 14% of all potable water: “Almost no buildings reuse that water - that’s what we’re trying to change.”

**Fifteen Fifty, the luxury building the water is taken from, is designed to recycle 34,000 litres of greywater a day. And it’s this treated greywater - collected from washing machines and showers - that was used to create the ale. The beer is a Kölsch-style ale — a crisp, light-bodied drink originating from Germany.**

The start-up began their recycled beer brewing project last September for attendees of a conference on sustainable building technologies. Some 7,000 cans were created using 7,500 litres of recycled water. Although there may be some hesitance when it comes to cracking open a beverage containing treated wastewater, it is safe to drink.

Last year, Stanford University engineers said that recycled wastewater is not only potable - it may even be less toxic than other sources of water due to how extensively it is treated.[2]

In June, Nasa[3] said astronauts on the International Space Station managed to recycle 98% of their wastewater for the first time. Special dehumidifiers even captured moisture released into the cabin air from the crew's breath and sweat.

When it comes to making beverages, Tartakovsky acknowledged there is a certain ick/yuck factor to overcome:

**"There's a mental perception that recycled water is not as clean as other sources of water. But what I often remind people of is that all water on this planet is recycled. The water we are drinking today is the same water that was consumed by the dinosaurs millions of years ago."[1]**

But the proof is in the pudding - or the pint glass. So what is the verdict?

**"The biggest thing was, [the beer] tastes good," Devil's Canyon owner Chris Garrett told the New York Times.**

Unfortunately for those keen to give it a try, the beer is not yet for sale as regulations in the US prohibit the use of recycled wastewater in beverages - but we may one day see these on our shelves.

## WATER-SOLUBLE CIRCUIT BOARDS COULD CUT CARBON FOOTPRINTS BY 60 PERCENT[4]

*Infineon Technologies is trialing the PCB in demo units ahead of a potential wider rollout.*

**German semiconductor maker Infineon Technologies AG announced that it's producing a printed circuit board (PCB) that dissolves in water. Sourced from UK startup Jiva Materials, the plant-based Soluboard could provide a new avenue for the tech industry to reduce e-waste as companies scramble to meet climate goals by 2030.**

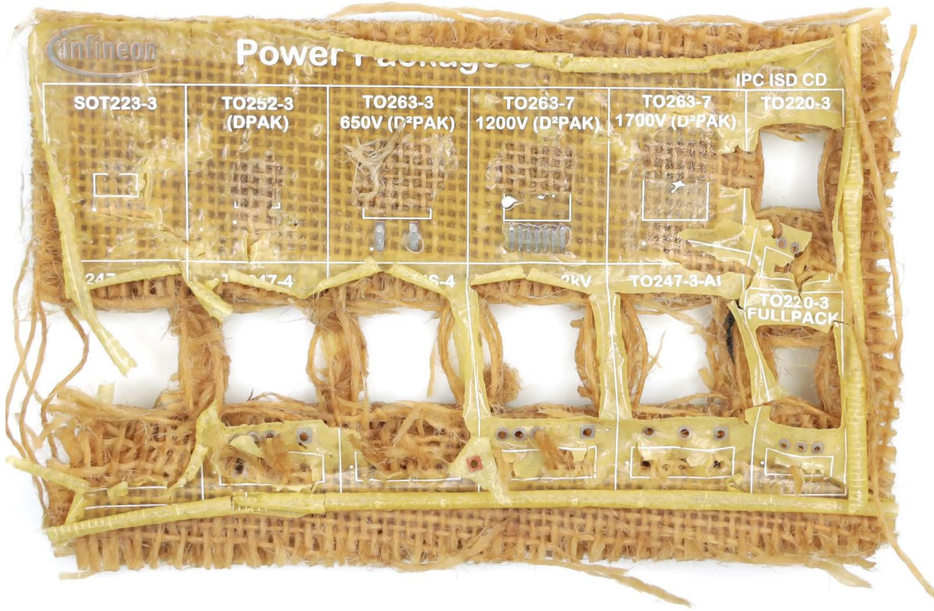
Jiva's biodegradable PCB is made from natural fibers and a halogen-free polymer with a much lower carbon footprint than traditional boards made with fiberglass composites. A 2022[5] study by the University of Washington College of Engineering and Microsoft Research saw the team create an Earth-friendly mouse using a Soluboard PCB as its core. The researchers found that the Soluboard dissolved in hot water in under six minutes. However, it can take several hours to break down at room temperature.

In addition to dissolving the PCB fibers, the process makes it easier to retrieve the valuable metals attached to it. "After [it dissolves], we're left with the chips and circuit traces which we can filter out," said UW assistant professor Vikram Iyer, who worked on the mouse project.

**"Adopting a water-based recycling process could lead to higher yields in the recovery of valuable metals," said Jonathan Swanston, CEO and co-founder of Jiva Materials.**

**Jiva says the board has a 60 percent smaller carbon footprint than traditional PCBs — specifically, it can save 10.5 kg of carbon and 620 g of plastic per square meter of PCB.**

Infineon has produced three different circuit board prototypes using the Soluboard framework. The company is currently only using the dissolvable PCB for demo and evaluation boards, and it says around 500 units are now in use. However, it's "exploring the possibility of using the material for all boards" with an eye on expanding adoption over the next few years. Based on the results of stress tests, it also plans to "provide guidance on the reuse and recycling of power semiconductors removed from Soluboards" to lessen the chances of the salvageable parts from future production models going to waste.



- ✓ Accounts in balance
- ✓ SREC prices stable
- ✓ Incoming receivables within range of model
- ✓ Costs within range of model
- ✓ Meets target return of 7-9%

# WASTE WATER | MT. HOLLY, NEW JERSEY

A **New Jersey-based Wastewater Treatment Facility** (WWTF) where funds were partially 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. It also helped in 2010 to improve the infrastructure in an area that was hard hit during the financial crises.

**The site continues to operate and provide energy with the usual stronger summer months. Pricing appears to be stable.**

- **Monitor PPA component**
- **Monitor SREC eligibility and prices on the market (1 SREC for every 1000kW-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**

| UN SDG | ICMA CRITERIA | ESG POLICY SOLUTION |
|---|---|---|
| 6 CLEAN WATER AND SANITATION<br>7 AFFORDABLE AND CLEAN ENERGY | **Renewable energy**<br>• Climate change mitigation<br>• Natural resource conservation<br>• Pollution prevention and control<br><br>**Climate change adaptation** | **Clean energy creation** – solar panels provide clean renewable energy<br><br>**Pollution reduction** – the Waste Water Treatment Facility (WWTF) utilizes the solar panels energy via a power purchase agreement. This reduces the heavy amount of energy required by the WWTF which would otherwise be coming from non-renewable sources of energy<br><br>**Energy efficiency** – the proximity of the site to the waste water facility offers a high energy efficiency |

**ESG RISK MITIGATION** | • Renewable Energy consumption • Water Consumption



- ✓ **Accounts in balance**
- ✓ **Project updates**
- ✓ **Incoming receivables within range of model**
- ✓ **Meets target return of 7-9%**
- ✓ **Interest payments made on time**

# SUSTAINABLE SEWERAGE | ONTARIO

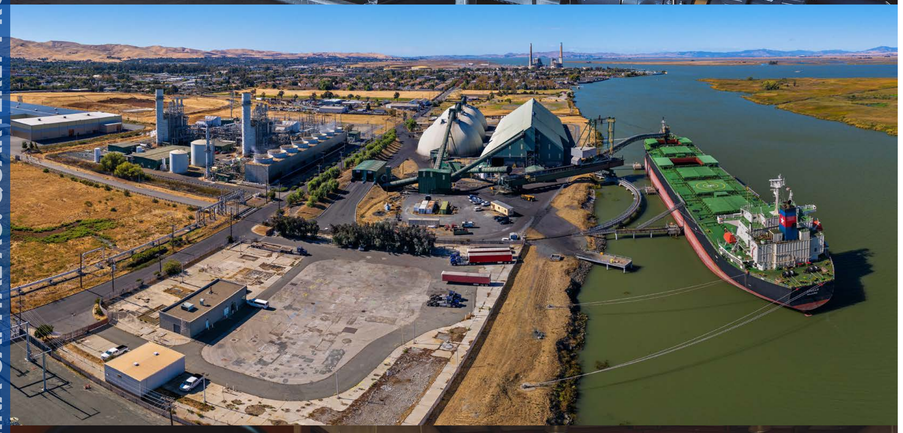
The Canadian wastewater market is highly fragmented. The market requires small impact installations, rather than traditional centralised large waste water treatment plants. Our existing 300 projects are government linked and only fully licensed projects with no planning risks are being considered. Signina focuses on business consolidation of mid-sized businesses, operating in project sizes of $5-50m. The small to mid-range business growth is supported by shifting demographic developments into smaller, satellite communities, as well as a stable favourable regulatory environment.

With wastewater rates rising steadily, the risk-reward associated with Signina's consolidation strategy is readily apparent and has picked up pace since its start in 2008. With larger institutional mandates we have triggered more deals diversifying from the existing projects. Sustainable sewerage has become a major concern over the past couple of decades. The majority of the contracts are in municipalities that are rated A or higher by rating agencies. In addition there are various municipalities that do not carry any debt.

**The operations are as expected. Some of the new potential contracts have come to fruition or making significant progress in the past quarter. There also remains a pipeline of new business and contracts which are being assessed.**

| UN SDG | ICMA CRITERIA | ESG POLICY SOLUTION |
|---|---|---|
| 6 CLEAN WATER AND SANITATION<br>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE<br>11 SUSTAINABLE CITIES AND COMMUNITIES | **Sustainable water and wastewater management:**<br>• Pollution prevention and control<br>• Natural resource conservation<br>• Climate change adaption<br><br>**Eco-efficient and/or circular economy adapted products, production technologies and processes**<br>• Climate change mitigation<br>• Natural resource conservation | **Sustainability** - providing finance and assistance in creating and maintaining infrastructure for wastewater treatment and clean water<br><br>**Pollution prevention** - by creating sustainable sewerage infrastructure the need for septic tanks and landfill sites are heavily reduced. The waste water treatment assists an ongoing global problem with handling waste and impurities |

**ESG RISK MITIGATION** | • Water Re-use • Water Pollution




- ✓ **Accounts in balance**
- ✓ **Permitting process on schedule**
- ✓ **Timeline on Track**
- ✓ **In line to meet target return of 7-9%**

# INDUSTRIAL RE-USE | BLUE PLANET, CALIFORNIA

The project is a **carbon capture and mineralization project based in Pittsburg, CA.** It captures 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.

**The project and technology company continues operate as expected and has gained momentum from some large industrial firms.**

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

| UN SDG | ICMA CRITERIA | ESG POLICY SOLUTION |
|---|---|---|
| 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE<br>11 SUSTAINABLE CITIES AND COMMUNITIES<br>13 CLIMATE ACTION | **Climate change adaptation**<br>**Green Buildings**<br>• Climate change mitigation<br>• Natural resource conservation<br>• Pollution prevention and control<br><br>**Eco-efficient and/or circular economy adapted products, production technologies and processes**<br>• Climate change mitigation<br>• Natural resource conservation | **Reuse of wastewater** – the water will be obtained from either the local power plant or from the sanitation district. This results in recycling the wastewater<br><br>**Recycling products** – the process also uses locally sourced demolished concrete as a process input to create aggregate products for use in the Bay Area<br><br>**Sustainable buildings** – the aggregates created in the process are from renewable and green sources. This in turn does not impact the environment negatively and meets the goal of sustainable cities and communities |

**ESG RISK MITIGATION** | • Water Re-use • $CO_2$ Emissions Neutrality • Pollution


- ✓ **Accounts in balance**
- ✓ **Regulatory requirements kept to date**
- ✓ **Costs within range of model**
- ✓ **Timeline on Track**

# HYDROPOWER | MARSEILLES, ILLINOIS

**Hydropower, Illinois**: A lock and dam hydroelectric water power project located on the Illinois River. The site has obtained a FERC License (expires 2061) with a 10.26MW capacity. 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. The project is considered a small- or mid-sized project and has reduced the environmental impact dramatically. It entails a variety of environmental rules from the EPA that have been fulfilled with the FERC licence.The mandate looks at small hydropower facilities (below 25 MW) as such sites have minimal impacts on the surrounding area unlike large hydropower facilities which often have negative impacts on the surrounding environment.

**The project continues to move slowly both on from a construction aspect as well as any PPA finalisation. Hydropower continues to be a hot topic in the clean energy movement and will likely pick up momentum now the world is reopening. There continues to be some volatility in the pricing too which is being monitored closely.**

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

| UN SDG | ICMA CRITERIA | ESG POLICY SOLUTION |
|---|---|---|
| 7 AFFORDABLE AND CLEAN ENERGY<br>14 LIFE BELOW WATER | **Renewable energy**<br>• Climate change mitigation<br>• Natural resource conservation<br>• Pollution prevention and control<br><br>**Energy efficiency**<br>• Climate change mitigation<br>• Pollution prevention and control<br><br>**Environmentally sustainable management of living natural resources and land use**<br>• Natural resource conservation<br>• Biodiversity<br>• Climate change adaptation | **Renewable energy creation** - hydropower is a clean renewable source of energy which can be sold via a PPA agreement or via merchant wholesale pricing on hydropower exchanges<br><br>**Environmental management** – the small hydropower market goes through a rigorous environmental approval process to make sure there is minimal impact to the surrounding region<br><br>**Biodiversity conservation** – the environmental approvals for such projects include aquatic preservation to ensure the natural environment is not negatively impacted |

**ESG RISK MITIGATION** • **Project Size under 25mw** • **Renewable Energy Production**

- ✓ Accounts in balance
- ✓ Regulatory requirements kept to date
- ✓ Costs within range of model
- ✓ Timeline on Track

# HYDROPOWER | BRADDOCK, PENNSYLVANIA

**Hydropower, Pennsylvania:** A Lock and Dam Hydroelectric Water Power Project located on the Monongahela River, Pittsburgh. The site has obtained a FERC license (expires 1965) with a 5.25MW capacity. It is a similar project to Illinois and is in an advanced stage in the PPA negotiations to lock in a price for the first few years post commissioning. Furthermore the project has received state grants.

**The project is getting through its final approvals in order to construct the Hydropower plant. Alongside this step there continue to be discussions with some local groups to regarding PPA offtakes for when the site should be operational.**

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

| UN SDG | ICMA CRITERIA | ESG POLICY SOLUTION |
|---|---|---|
| 7 AFFORDABLE AND CLEAN ENERGY<br>14 LIFE BELOW WATER | **Renewable energy**<br>• Climate change mitigation<br>• Natural resource conservation<br>• Pollution prevention and control<br><br>**Energy efficiency**<br>• Climate change mitigation<br>• Pollution prevention and control<br><br>**Environmentally sustainable management of living natural resources and land use**<br>• Natural resource conservation<br>• Biodiversity<br>• Climate change adaptation | **Renewable energy creation** - hydropower is a clean renewable source of energy which can be sold via a PPA agreement or via merchant wholesale pricing on hydropower exchanges<br><br>**Environmental management** – the small hydropower market goes through a rigorous environmental approval process to make sure there is minimal impact to the surrounding region<br><br>**Biodiversity conservation** – the environmental approvals for such projects include aquatic preservation to ensure the natural environment is not negatively impacted |

**ESG RISK MITIGATION** | • **Project Size under 25mw** • **Renewable Energy Production**

- Off-take agreement signed
- All licenses acquired
- All EPC contracts and bonding signed
- Costs within range of model
- Timeline on Track

# GREENHOUSES | VIRGINIA, USA

A lot of the groceries produced in the USA are transported across the country and come from regions with little water (such as leafy greens which are still 99% field grown in the US). This created high costs and carbon footprint along with a lack of consistency for fresh produce. The greenhouses today can control the environment to produce fresher quality produce, utilizing less water, is local and sustainable.

There is continued growth of advanced greenhouse market (482 acres built or in construction in U.S. since 2018). There has been significant disruption in leafy greens caused by food safety (recalls), changing climate, and labour availability. There is an expected acceleration in food service driven by demand for food safety, resiliency, and quality representing a strong growth sector. The target crop segments benefit from demand for sustainably grown, local food, enhanced convenience and taste, and improved food safety.

The major food chains need reliable produce which is hard with purely field grown facilities. Therefore similar to other areas in infrastructure the various food service, retail and integrated growers are happy to sign off-take agreements to guarantee a reliable product. Such greenhouses are plentiful in Europe reducing the technology risk to being tried and test.

| UN SDG | ICMA CRITERIA | ESG POLICY SOLUTION |
|---|---|---|
| 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE<br>12 RESPONSIBLE CONSUMPTION AND PRODUCTION<br>15 LIFE ON LAND | **Energy efficiency**<br>• Climate change mitigation<br>• Pollution prevention and control<br><br>**Environmntally sustainable management of living natural resources and land use**<br>• Natural resource conservation<br><br>**Eco-efficient and/or circular economy adapted products, production technologies and processes** | **Food Security** – The sites create standardized produce. The classic agriculture method leaves a lot of the quality down to the elements. This could lead to bad harvests. The Greenhouses secure the output quality and quantity.<br><br>**Enivronmental Management** – The greenhouses reduce the amount of water required in order to grow the fresh produce. As it is under strict conditions the process can be optimized. Furthermore the sites are local rather than cross country. |

**ESG RISK MITIGATION** | • Water Consumption • Pollution • Water Re-Use

# LATEST DEVELOPMENTS

**The main areas from last quarter remain at various stages of progress. Furthermore there are a couple of other highlights:**

1 **Carbon linked projects** – Blue Planet continues to operate as expected. The SFBA site is producing aggregates as expected. The team aims to start producing on a more industrial scale and are seeking to finance growth. Sulzer, Chevron and Mitsubishi are three of the large industrial companies Blue Planet is partnering with.

2 **Agricultural Greenhouses** – Same as Q1: the opportunity has completed due diligence and planning permissions. The site in Virginia received endorsement from the Governor of Virginia https://www.governor.virginia.gov/newsroom/news-releases/2023/march/name-998794-en.html We will have further updates in Q3 regarding progress and timelines.

3 **Waste water in Canada** – the area continues to grow. The regulatory framework implies that many development owners and sites need compliant oversight. The opportunity to consolidate the market with ownership projects continues to increase but the next few months will be key in seeing how such projects will need to be structured. There does not appear to be any deal breaking pitfalls to such assets.

4 **Hydropower** – the industry remains at the forefront of the energy transition theme. As a result of rising rates and inflation PPAs are being reviewed across the board to see what pricing should be in such an environment. There should be a more concrete update later this year.

# REFERENCES


1. **This beer is made from recycled shower water**
   https://edition.cnn.com/2023/08/01/world/beer-from-recycled-shower-water-epic-cleantec-scn-spc/index.html

2. **The cleanest drinking water is recycled**
   https://engineering.stanford.edu/magazine/cleanest-drinking-water-recycled

3. **NASA Achieves Water Recovery Milestone on International Space Station**
   https://www.nasa.gov/mission_pages/station/research/news/water_recovery_milestone

4. **Water-soluble circuit boards could cut carbon footprints by 60 percent**
   https://www.engadget.com/water-soluble-circuit-boards-could-cut-carbon-footprints-by-60-percent-201845709.html

5. **Q&A: Making Earth-friendly electronics**
   https://www.washington.edu/news/2022/04/21/sustainable-electronics/


# LEGEND

## INDUSTRY

**Waste Water symbol:** refers to projects in the US and in Canada and includes water treatment, water discharge and waste water treatment.

**Re-cycle symbol:** refers to industrially used water that is recycled or re-used and cleaned for our projects.

**Hydro symbol:** refers to any project that generates energy out of flowing water.

## PROGRESS

**Cloud / Contract:** the planning stages and contracts are drawn up and we have fully due diligenced all security matching our criteria.

**Rocket / Money:** execution of all major contracts, licences and financing has been agreed upon.

**Cog Wrench:** Construction is in progress.

**Bar Chart:** project is producing cash flows or fully financed and up and running.

## COLOUR

**Brown-yellow:** contains current or past brownfield status combined with extensions or upgrades.

**Brown:** brownfield projects mid-stage projects that we entered relatively early with a limited or de-risked construction period.

**Green:** greenfield projects mean that we are an active part since the very beginning of the projects. This is unusual for us and only applies to a fully de-risked contractual situation.

# SIGNINA CAPITAL AG

Zurich-based Signina Capital AG was established in 2006. Signina is a full spectrum advisory firm in the water infrastructure sector. The team has more than 100 years of combined industry experience. They have placed in excess of USD 1 billion of capital with the private and public sector into environmentally and commercially strategic water infrastructure assets. It is currently overseeing more than USD 750 million of active water infrastructure assets.



SIGNINA CAPITAL AG

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