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Introduction

Chairman Shaheen and members of the Subcommittee, it is privilege to share with you GE's thoughts on the opportunities and challenges to address domestic and global water supply issues. As the Chief Technology Officer for GE Power & Water, Water & Process Technologies, it is my responsibility to effectively manage the approximately $100 million that GE invests in clean water research and development every year, and it is these complex issues that my team and I strive to address each and every day. I welcome this opportunity to outline for you GE's research and development efforts in critical areas including treating impure sources of water; increasing reuse/recycling of treated water; reducing cost and energy consumption required to treat water; and meeting increasingly stringent regulatory requirements for discharged water.

Background

GE is a diversified global company that provides a wide array of products to meet the world's essential needs. From energy, water, and transportation to healthcare and security, we deliver advanced technology solutions through a broad business portfolio to promote cleaner, more efficient energy alternatives; provide more efficient aircraft engines and locomotives; increase the availability of clean, safe water; and improve access to quality healthcare.

The businesses that comprise GE Energy — GE Power & Water, GE Energy Management and GE Oil & Gas — have more than 100,000 global employees and generate annual revenues of about $40 billion. GE Energy provides integrated product and service solutions in all areas of the

energy industry including coal, oil, natural gas and nuclear energy; renewable resources such as water, wind, solar and biogas; as well as other alternative fuels and new grid modernization technologies to meet 21st century energy needs.

GE has long recognized the connection between energy and water. In 2008 GE integrated its water and power generation businesses to better meet customer needs and address significant global challenges, creating GE Power & Water. With a broad array of power generation and energy delivery technologies, GE works in all areas of the energy industry—including gas and steam turbines; renewables such as wind and solar; alternative fuels, including biofuels, coal gasification and liquefaction; and nuclear energy. Our Power & Water team also develops advanced technologies to help solve the world's most complex challenges related to water availability and quality. Numerous products are qualified under ecomagination, GE's initiative to aggressively bring to market new technologies that will help customers meet pressing environmental challenges. The following chart outlines the wide array of technologies encompassed by GE Power & Water.

The roots of the GE's Water & Process Technologies business date back to 1925 and became a GE business in 1999, evolving from a series of acquisitions over the last 12 years. This business currently employs nearly 8,000, including 400 scientists and engineers located in 10 major technical centers around the globe who are dedicated to developing solutions in collaboration with our customers, addressing problems associated with water purity and recovery.

This team also has access to GE's network of Global Research Centers (GRC), which are located around the globe. The GE GRC is one of the world's largest and most diversified industrial research labs, creating true breakthrough technologies for GE's businesses over the last 100 years. Today, GE Research has a world-class team of scientists and engineers partnering with the technical team in our Water & Process Technologies business to develop the next generation of solutions, making water more accessible and more affordable for our customers, in a time of increasing water challenges.

R&D Focus

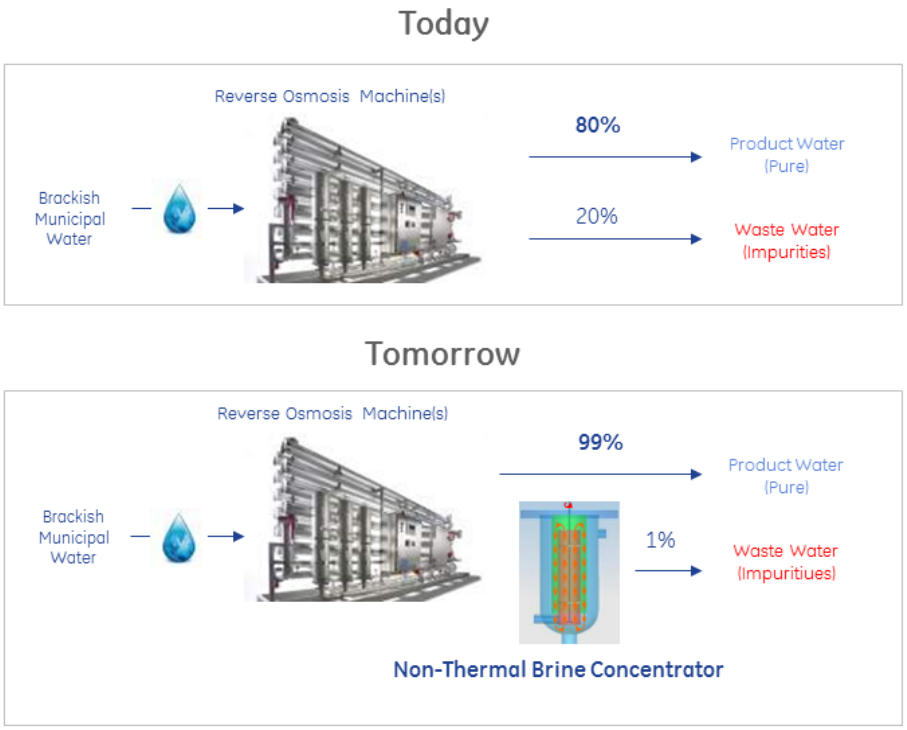
Our business has identified several themes of importance to our customers, and my team has aligned its research and development activities with these important themes. These themes are to: 1) develop capability to treat increasingly impure sources of water; 2) develop ability to reuse or recycle a higher percentage of treated water; 3) reduce cost and energy consumption required to treat water; and 4) develop solutions for customers to meet increasingly stringent regulations on impurities in discharged water.

Following are a few specific examples of new technologies we are developing to help customers meet these challenges.

Improved Recovery from 'Brackish' Water Sources

We are working to reduce the cost and improve the recovery of water extracted from relatively salty and impure rivers and lakes. These sources are typically referred to as 'brackish' water. Today, using state-of-the-art technology, when pure water is produced from brackish sources, about 80% of the water is recovered as clean water. The remaining 20%, which contains all the salts and many of the impurities that were present in the feed water, must be discharged. GE Water and Process Technologies is developing a new technology that will allow recovery to exceed 99% in a process that will require only modest capital investment and will be very efficient to operate. This technology, called the Non-Thermal Brine Concentrator, will provide a much more efficient way to extract very pure water from brackish feed water sources. The impact of this new technology is illustrated in Figure 1, below.

Figure 1...Non-Thermal Brine Concentrator for improved water recovery

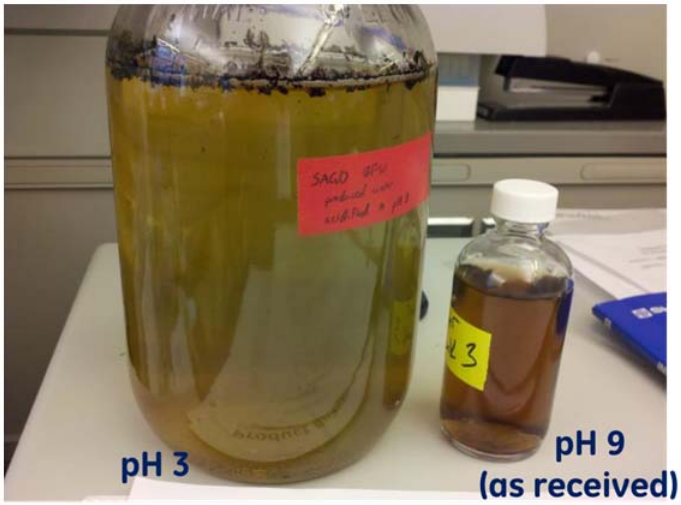


We are validating and demonstrating this technology with several beverage manufacturers, all of whom use brackish water sources and require high water recoveries because of water scarcity and water cost in their regions.

Maximizing Oil Recovery and Water Recycling

Much has been made in recent years of the energy-water nexus. One example of this is the use of increasing amounts of water in the production of oil. In many of today's producing oil fields, water or steam must be used to force the oil through the field so that it can be extracted. When oil is recovered this way, much more water than oil is produced -- as much as 10 times more water than oil. Once out of the ground, the oil is separated from the water and the oil is sent to a refinery. The so-called 'produced water' remains. It is very dirty, containing small amounts of oil that could not be separated, as well as dissolved salts and a host of other impurities. Figure 2 shows a sample of produced water recovered from a Canadian oil sands site which uses steam to extract the oil. Cleaning this water is a tremendous challenge.

Figure 2...Produced water from Canadian Oil Sands



We are working with our customers to improve methodologies for treating this water so that it can be safely recycled back into the field to further facilitate oil recovery. We are establishing demonstration facilities for new de-oiling technology followed by more robust membrane devices that, if successful, will allow water recycling in equipment that will require about 20% less capital investment than current state-of-the-art technologies, and run with 30% less operating cost due to improved energy efficiency. In addition it may be possible to recycle more of the produced water back into the field. These are very significant improvements in capability and efficiency.

Managing Mercury Emissions in Water

Here is a last example of new technologies we are developing, and this is another example where water is tied closely to energy production. Water is used to scrub the emissions from coal fired power plants to capture impurities. The effluent from the scrubbers goes to a wastewater treatment plant where it is treated before discharge. Often times, this wastewater contains trace quantities of mercury originally coming from the coal. Regulations on mercury emissions in water are increasingly tight, in many cases limited to less than 10 parts per trillion, an exceedingly low concentration. Conventional wastewater treatment technology cannot meet these requirements.

We have designed specialty polymers which dissolve in the wastewater and selectively adsorb mercury. These polymers can be used in conjunction with conventional wastewater treatment methodologies to improve mercury removal. In addition we can use very fine filters, called ultra-filters, to recover tiny particulates containing mercury. We are working now with a number of U.S.-based power companies to optimize these technologies, used alone or in tandem as required for their operating conditions, to meet these challenging mercury emissions targets.

In Conclusion

Today, I've discussed just three examples of new technologies that GE Water and Process Technologies is developing that illustrate how we help customers solve water challenges related to higher water recovery; increased water recycling; lower cost and more energy efficient processes; and adherence to regulatory requirements.

At GE, we're working closely with our customers and global thought leaders to ensure that advanced technology development continues so that together we can overcome water quality and scarcity challenges.

There is also an important role for Federal funding for water R&D to leverage the investments of key stakeholders, including foundations, universities, communities, and industry, in addressing water scarcity and quality issues.

Chairman Shaheen and members of the Subcommittee, thank you for your time and the opportunity to provide our comments on these important issues.