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WASTE WATER TREATMENT

TREATED WATER MUST MEET QUALITY STADARDS

Process for Solid, Pollutants and Sludge Removal

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Editor - Anil Shiv Raj Chopra

TREATED WATER MUST MEET QUALITY STANDARDS

Process for Solid, Pollutants and Sludge Removal

Wastewater treatment plants: Remove solids, everything from rags and plastics to sand and B smaller particles found in wastewater; Reduce organic and inorganic matter and pollutantsnaturally occurring helpful bacteria and other microorganisms consume organic matter in wastewater and are then separated from the water; and, Restore oxygen the treatment process ensures that the water put back into our streams has enough oxygen to support life.

• Where does wastewater come from?

Homes--human and household wastes from toilets, sinks, baths, dishwashers, garbage grinders, clothes washers and drains.
Industry, Schools, and Business--chemical and other wastes

Angela Freeman, Chemist, completes testing daily to keep us in compliance with the EPA & ADEQ

from factories, food-service operations, school activities, hospitals, shopping centers, etc.
On the average, each person in the U.S. contributes 100 gallons of wastewater every day. If you include industrial and commercial water uses, the per person usage of water is as high as 150 gallons per day.

Wastewater treatment basically takes
place in three stages:Primary treatment, which removes 40-60% of the solids.
Secondary treatment, which removes about 90% of the pollutants and completes the process for the liquid portion of the separated wastewater.
Sludge (bio-solids) treatment and disposal.

• Preliminary Wastewater Issues

STEP 1 - Sanitary sewers carry wastewater from homes and businesses to the raw wastewater pumping station at the treatment plant. The wastewater flows by gravity most of the time in the sanitary sewer pipes. Routine cleaning and closed circuit television inspection of Benton's sanitary sewer lines helps keep the sewer collection system in good shape.

STEP 2 - Fine Screens let water pass, but not trash (such as rags, diapers, etc.). There are four screens located at the plant. he trash from these screens is collected and properly compacted by two of the newer bar screens and disposed of at the landfill. The screened wastewater ispumped to the two aeration basins.

• Primary Treatment

STEP 1 - The Aeration Basin supplies adequate amounts of air to the mixture of primary wastewater with the help of natural occurring bacteria and the other microorganisms that consume the organic matter. The growth of the helpful bacteria and microorganisms is speeded up by vigorously mixing air (aeration) with the concentrated microorganisms in the activated sludge and the wastewater. Adequate oxygen is supplied to support the biological process at a very active level.

The ratio of food to micro-organisms is continually monitored and adjusted to meet daily variations in the wastewater.

STEP 2 - Four Secondary Clarifiers allow the bio-solids of biological mass (the microorganisms) to settle from the water by gravity. 90-95% of this mixture, called "activated sludge," is returned to the aeration basins to help maintain the needed amount of microorganisms. The remaining 5-10 % is pumped to the aerobic digester.

STEP 3 - Three Decanters provide the final step for the bio-solids before removal from the system. They are very slow turning clarifiers. These bio-solids are then removed from the system either by pumping them through a filtered belt press or by liquid removal hauling them to a permitted disposal site.

Filtered Belt Press - the bio-solids removed from the filtered belt press are then transferred

STEP 4 - The final effluent (liquid portion from Step 2) travels through the Trojan Ultra Violet Disinfection, and it is a physical process that instantaneously neutralizes microorganisms as they pass by ultraviolet lamps submerged in the effluent. The process adds nothing to the water but UV light, and therefore, has no impact on the chemical composi

tion or the dissolved oxygen con-

tent of the water. In that respect, it ensures compliance with ever-tightening wastewater effluent discharge regulations.
All effluent returned to natural bodies of water must meet National Pollutant Discharge Elimination System (NPDES) criteria. The final effluent is monitored daily. In-house laboratory staff perform sampling and analysis for process control and NPDES compliance.

The bio-solids are utilized in an environmentally acceptable manner as a beneficial soil conditioner. The bio-solids applied to all sites are monitored for nutrients, metals, other compounds and pathogens.
The permitted liquid application sites are tested by an independent laboratory to assure that nothing harmful is being placed into the soil annually. Soil testing is performed at all sites prior to bio-solids application. The bio-solids that are being placed on the permitted fields are tested four times per year.

Equalization Basin

The 57 million gallon Equalization Basin is adequate to contain the diverted flow from the Wastewater Treatment Plant. This basin should have storage capability to contain approximately eight days worth of inflow. This would also allow us to manage the waste water plants daily flow which will give this facility better treatment control. The Equalization Basin has a generator for back up power should it lose commercial power.

Benton Utilities was mandated by the Arkansas Department of Environmental Quality (ADEQ) in April of 2005 by a Consent Order (CAO LIS No 05-158) mandating the City build an equalization basin due to high inflow and infiltration at the Wastewater Treatment Plant. The basin is sized to control the peak flows that occur during wet periods of the year. These flows can increase as much as three times the design flow of the Wastewater Treatment Plant which is currently 8.3 million gallons per day.
This basin was completed a year early and was put in service in October 2007. In cooperation with the Wastewater Collections dept., we have worked to reduce the amount of Inflow and infiltration into our system by continuing an aggressive pipe bursting program which replaces bad sewer pipe with new and upsized piping.

• Treating wastewater wastes energy, but it doesn't have to.

Wastewater treatment plants are energy hogs. A 2013 study by the Electric Power Research Institute and Water Research Foundation reported that they consumed about 30 billion kilowatt-hours of electricity per year, or about 0.8 percent of the total electricity used in the United States.

Wastewater treatment's high energy footprint is ironic because the organic matter in wastewater contains up to five times as much energy as the treatment plants use, according to the American Biogas Council (PDF). Reducing treatment plants' energy footprints through energy efficiency and using the currently wasted energy could save money and reduce greenhouse gas emissions.

Despite all that energy seemingly there for the taking, reducing the fossil fuel demand of treatment plants is challenging and requires myriad approaches. Around the world, the industry is experimenting with new technologies, evaluating them for not just energy benefits but also cost and unintended consequences, such as additional waste streams to be managed.

The Metropolitan Water Reclamation District of Greater Chicago (MWRD) has set a target to be energy-neutral by 2023, following the lead of plants in the United Kingdom, Denmark and the East Bay Municipal Utility District in Oakland, California, which has moved beyond net-zero energy to actually selling energy back to the grid. These innovators are using a variety of technologies to reduce the electricity they use through energy efficiency and to generate electricity onsite to offset what they do use. Bring the bubblesWastewater treatment in developed countries often involves four main steps: primary treatment, which separates solids from liquid waste; secondary treatment, in which bacteria break down dissolved waste that contains ammonia and other pollutants and remaining solids are separated from the treated liquid; an anaerobic step, in which solids from the primary and secondary steps are digested by microorganisms in a sealed tank without oxygen; and finally, a disinfection phase.

Getting bacteria the oxygen they need accounts for one-quarter to more than half of the energy used by a wastewater treatment plant. Bacteria play a key role in breaking down our sewage and industrial wastewater by consuming organic pollutants and inorganic nutrients such as ammonia. But keeping

them happy isn't easy. They require particular conditions to thrive: optimal temperature; food; and oxygen. Getting bacteria the oxygen they need accounts for one-quarter to more than half of the energy used by a wastewater treatment plant. So plant operators are focused on reducing energy use in this step to boost energy efficiency.

Reusing Wastewater through Sludge-to-Energy Plants

Sludge-to-energy systems can make the dream of a circular economy a reality by turning waste into an input, instead of just an output. These systems can be developed as independent, decentralized units that require minimal outside energy for operations. From raw sewage, they generate three useful products: energy, digestate and water that can be reused for agriculture, industry and even domestic uses such as watering gardens and flushing toilets.

Here's how it works: Wastewater treatment plants first separate sewage into solid "sludge" and liquid water. This methane-rich sludge then undergoes two processes—thermal hydrolysis and anaerobic digestion—to quickly and efficiently remove pathogens and harness biogas. The resulting biogas can then be used as on-site energy to power the wastewater treatment plant, or can be purified further and sold as natural gas. In addition, the solid digestate left over after anaerobic digestion can be used to enhance

soil. (However, the presence of certain heavy metals in the digestate, can make it unsuitable for land applications.)Wastewater treatment plants are energy hogs.

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The health connection

Emphasising how managing human waste is beneficial for public health and environment, the report

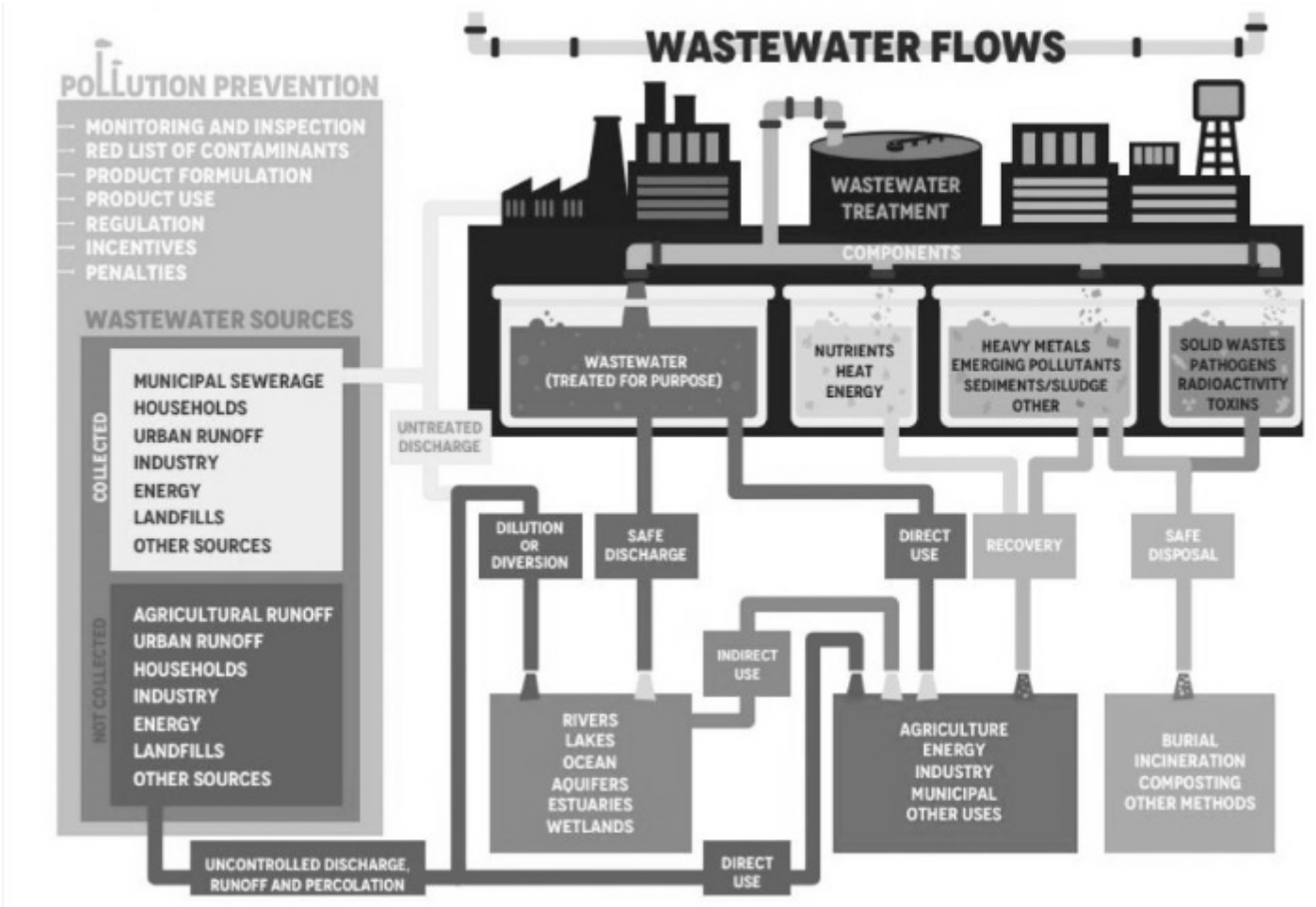
claims that for every US$1 spent on sanitation, the estimated return to society is $5.5.
Given that improved sanitation services can contribute towards reduction of health risks, the report says that health gains may be realised through improved wastewater treatment. However, improved sanitation coverage cannot be equated with improved wastewater management.
Only 26 per cent of urban and 34 per cent of rural sanitation and wastewater services effectively prevent human contact with excreta, and therefore, can be considered safely managed.

The extremely low level of wastewater treatment in low-income and lower-middle-income countries reveals an urgent need for implementing low-cost solutions and safe water reuse options.Wastewater is roughly composed of 99 per cent water and one per cent suspended, colloidal and dissolved solids.

To prevent pollution at source, local authorities can prohibit or control the use of certain contaminants. It will eliminate or limit their entry into wastewater streams through regulatory and technical means.

Stating that large-scale centralised wastewater treatment systems are no longer the most viable option for urban water management, the report called for decentralised wastewater treatment systems that serve small groups of people or properties. Such a system allows recovery of nutrients and energy and ensures access to water in times of scarcity.

Management of wastewater



To involve citizens in deciding types of sanitation facilities desirable, the report calls for reaching out to marginalised groups, ethnic minorities and people living in extreme poverty in remote rural areas or informal urban settlements. It also calls for engaging with women who bear the brunt of health consequences stemming from unsafe management of human waste. According to estimates, investment costs for these treatment facilities are only 20–50 per cent of conventional treatment plants.

Region-wise scenario

In Africa, the main challenge related to wastewater treatment is the lack of infrastructure for collection and treatment, resulting in pollution of surface and groundwater resources that are already limited.

In several Arab states, use of safely treated wastewater has become a means of increasing water and it is a main component of water resources management plans. In 2013, about 71 per cent of the wastewater collected in Arab States was safely treated, out of which 21 per cent was used for irrigation and groundwater recharge.

In Asia and the Pacific region, the municipalities and local governments often lack human and financial resources necessary to enforce environmental regulations. As a result, maintenance of water treatment infrastructure and services is a problem. In India, 78 per cent of sewage remains untreated. The report recommends more support to municipal and local governments in managing urban wastewater and capturing its resource benefits.

1. The Town of Gander has submitted a proposal for a new wastewater treatment plant with the Department of Municipal Affairs and Environment.

The facility would be located north of the Town of Gander and south of Whitman's Pond, according to an environmental assessment bulletin released by the department Tuesday.
"The new treatment plant is proposed as a replacement for the existing wastewater treatment facilities that do not meet the current Federal Wastewater Systems Effluent Regulations," the bulletin stated.

"The new treatment plant will include preliminary, primary, and secondary levels of treatment, as well as effluent disinfection to mitigate the effect of the effluent discharge on the receiving water."
The project is scheduled to start by June.

The deadline for public comments is May 30. Municipal Affairs and Environment Minister Eddie Joyce's decision is due by June 4.

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2. Priority one, wastewater treatment plant.

The ongoing discussion about the much needed wastewater treatment plant continued at Monday's city council meeting as the city identified two projects for the Provincial-Territorial Infrastructure Component (PTIC) Grant.

Flagged were the wastewater treatment plant and the Hwy. 17 north-south corridor, however, the city of Lloydminster must identify one as it's top priority.
"The challenge we have is we are dealing with multiple governments in this application process," Mayor Gerald Aalbers said.
The mayor made note the north-south corridor was applied for under the previous city council and had good uptake from the Saskatchewan government, whereas Alberta saw the wastewater facility as a higher priority.
"So when you have the differences of government it gets very difficult in our position, being in the middle," he said.

Council resolved Monday the wastewater treatment plant would take hold as the number one infrastructure priority for the grant and the Hwy. 17 north-south corridor application would be withdrawn
"I believe, after speaking with all the players — both regionally, provincially and federally — we can accept that and understand that, and they believe it's a great application," Aalbers said.
Added Coun. Jonathan Torresan: "We're going to push our chips to the middle and are going to say 'Yeah, we're going all in on the wastewater treatment plant, please we would like funding for that.'"
With the way the numbers are playing out, there was no question the priority was towards the plant.
"We have $39-million in debt at the end of this year. We have a $120-million debt limit, and we're looking at possibly having to build a facility on our own that costs $80-million," explained Torresan, noting even with funding for the north-south corridor they wouldn't be able to build because of the debt capacity.

The north-south corridor is estimated to cost $29-million, so if the application was not withdrawn there was a potential of funding going towards that because it was the cheaper option.
"In this case, the wastewater treatment plant is the No. 1 project and we will continue to carry that message forward to every government we talk to," the mayor said.

Mayor Gerald Aalbers

"I'm in contact with the ministries on a regular basis and we will continue to pursue this application."
The Government of Alberta did approve a grant application, which was matched by the federal government, for $6-million under a previous grant application."It's in limbo, and we discussed that with the minister of municipal infrastructure in Edmonton, and he understood why we have not signed off on that because we fear we won't get more money because they already attributed," the mayor said.

3. City delays vote on waste water treatment plant expansion.

Discussions got tense during the work session at Franklin's City Hall on Tuesday, particularly over how to handle the city's waste water treatment plant behind Franklin High School.

With the situation far from being resolved, the board voted to defer the matter for two weeks during the voting session later in the evening.In February 2016, the Chestnut Bend Home Owners Association issued a "Statement of Intent" opposing Franklin's plan to expand the waste water treatment plant. The HOA was concerned over the plant's environmental impact, as well as its potential to impact property values and how it could possibly affect the Harpeth River. Franklin High School, First Methodist Church, Battle Ground Academy, Cheekwood Golf, Rebel Meadows, the Williamson County Recreation Center and several other institutions also voiced their concern about the expansion of the waste water plant.An excerpt from the HOA's Statement of Intent, (read to the Board of Mayor and Aldermen during the work session), states the following:"The HOA understands that issues of growth within the city require the expansion of utility services. However, a lack of communication and what appears to be a fast-track agenda by the city are of concern."It continued, "In November 2016, Franklin's Board of Mayor and Alderman agreed there is a need to issue a Request for Proposals to open up competition and ensure the best decision is made for the sake of all stakeholders. To-date no such effort has been done to follow what is well known and considered as best management practice in these types of undertakings and the city has not issued a Request for Proposal."

Throughout the work session, Alderman Dana McClendon was at odds with most of the board, expressing concerns about the budget for the plant expansion project.

"We're talking about a small portion of the project. But we can't compare (proposals) side by side yet. The question at the moment is do we spend the time and money to create a side-by-side comparison if the regulators are committed to this proposition, and I don't know that they are?"

Last year, Lystek International, a waste water processing company, estimated that the costs for the expansion would be around $25 million.

After the work session was over, former Homeowners Association President Mike Vaughn expressed frustration over the city's lack of enthusiasm to handle the situation."The city got the memo in December but didn't get it to us until April. When we met with them, they said that because of that memo they were not going to be able to consider Lystek."We're not trying to be antagonists," Vaughn continued. "You can't ask for a loan without it being tied to something. The real number is not $4 million. It's actually $64 million. The memo said in February that we asked for specific things to be changed, but we still have not received any information."

McClendon said he wants to make the right move. "Either way we're borrowing money. I don't want to give the appearance that we're playing footsies with these decisions."McClendon will seek re-election in October 2017, and properly handling the waste water crisis is one of his biggest goals.

"In the next year, this city will make decisions that chart our course for decades to come, including funding and selecting a process and contractor for the waste water treatment plant renovation, a project that will cost tens of millions of dollars and most directly impact the residents of Ward 2. We must make good decisions."

"We will not allow something to be built there that compromises our way of life," Vaughn said of the plant. "So we will go through every step possible to make sure that our needs and concerns are met. We've got no other choice."

4. Element ix onsite wastewater treatment technology wins gold at 2017 edison awards.

SANTA CLARA, CA, APRIL 25, 2017 -- Element Six, a world leader in synthetic diamond super materials and member of The De Beers Group of Companies, announced today that its DIAMOX™ wastewater treatment technology earned top honors in the Edison Awards, winning the gold prize in the environmental quality category. Winners were announced at the 30th annual Edison Awards ceremony held in New York on April 20, 2017. The Edison Award is one of the most prestigious accolades for innovation and recognizes excellence in new product and service development, marketing, human-centered design and innovation.

Designed to treat highly contaminated industrial wastewater, DIAMOX is an electrochemical cell that utilizes synthetic industrial diamond electrodes to mineralize dissolved pollutants in the water. Previous methods for cleaning such contaminated wastewater have typically involved using electrochemical cells, with additional UV and strong bleach-like chemicals in a multi-step process. DIAMOX enables this process to become purely electrochemical, which is simpler and safer to operate, cost effective and more environmentally sustainable. Pilot studies of DIAMOX have demonstrated that this single step process can treat the water to a degree that it is safe to put back into the environment. It is successful in treating even the most formidable industrial wastewaters that are difficult or impossible to treat by conventional means.

"DIAMOX was born from more than 20 years of research into electrochemical oxidation and Element Six's expertise in manufacturing and engineering synthetic diamond supermaterials," said Daniel Twitchen, head of CVD business development at Element Six. "We are honored to receive this prestigious accolade for DIAMOX, a versatile technology that is effective on most types of effluent—offering multiple industries a new and relatively simple on-site solution to treat their highly contaminated wastewaters without additional chemical dosing with hazardous materials."

To date, DIAMOX technology has been successfully used for the

treatment of pharmaceutical wastewater, textile dye house wastewater treatments, and refinery spent caustics treatment.China, Germany, Ireland, South Africa, the UK and US. Element Six supermaterial solutions are used in About Element Six

To reduce energy costs, water and wastewater treatment plants must understand their electric utility rates and rate structures. For example, maximizing off-peak demand to reduce costs, plus load monitoring and shifting opportunities could provide needed funds for additional energy management. Investigating utility rebates as well as federal and state grants for energy efficient operations or use of alternative energy sources also may gain the facility additional funds.

At the same time, water and wastewater facilities must establish a baseline of energy usage. This is accomplished with an energy audit and establishes where and how much energy a plant is using. The next step in the cycle is implementation of passive and active energy efficiency measures.

Element Six, part of the De Beers Group of Companies, designs, develops and produces synthetic diamond and other super materials, and operates worldwide with primary manufacturing facilities in applications such as cutting, grinding, drilling, shearing and polishing, while the extreme properties of,synthetic diamond beyond hardness are opening up new applications in a wide array of industries such as optics, power transmission, water treatment, semiconductors and sensors.

BEAVER DAM, WI & PITTSBURGH, APRIL 24, 2017 --Evoqua today announced its ETS-UV™ line installation is complete and commissioned at the Monticello Wastewater Treatment Plant in southwest Indiana, approximately halfway between Lafayette and South Bend, Indiana. Wastewater and water treatment plants need a substantial amount of electrical energy to conduct unit processes and operations. Aeration and pumping for wastewater treatment and pumping for water treatment are the main electrical energy users. The US Environmental Protection Agency (EPA) has estimated that 3% of the power generated in the US is for water and wastewater treatment. The usage equates to 56 billion kilowatt hours (kWh), $4 billion and 45 million tons of greenhouse gas (GHG) production.

5.Few takers for treated effluent from Muttathara.

THIRUVANANTHAPURAM: Despite directions by water resources minister Mathew T Thomas, district collector Venkatesapathy and KWA managing director A Shainamol, there are not many takers for treated effluent from sewage treatment plant (STP) at Muttathara, which continues to be released into Parvathy Puthanar.The treated effluent from the Muttathara plant, which can be used for construction purposes and irrigation, could have served the city at the time of drought. However, the society's inhibition in using treated sewage left the STP authorities with no other choice but to release it into Parvathy Puthanar.

6.Indiana Wastewater Treatment Plant Installs Evoqua Uv System.

At Monticello WWTP, resource recovery and energy reduction is a high priority. ETS-UV systems were selected because they perform efficiently and offer design and operational advantages to achieve these initiatives. The ETS-UV SW series are designed in a small footprint with an access hatch to eliminate flow disruptions and air pockets. This feature makes it easier for routine maintenance of the chamber without the removal of the end flanges. The systems also have low voltage automatic wipers to keep quartz sleeves clean to prevent fouling.

UV disinfection is efficient, low cost and an environmentally friendly way to disinfect water. The process is safer for operators and the community; UV is a chemical free process that adds nothing to the water. Unlike chlorine, UV disinfection is able to inactivate pathogens such as Giardia and Cryptosporidium. Discharged wastewater with these pathogens can be dangerous for drinking

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Jon McClean, VP of Research, Development and Engineering, Aquatics and Disinfection stated, "Utilities are challenged to treat water smarter, in a reduced footprint, conserve energy and add advanced processes. Evoqua has a full portfolio of solutions to solve the next-generation demands." Learn more at http://www.evoqua.com/en/brands/ETS_UV.

About ETS-UV, now an Evoqua brand, encompasses industry leading ultraviolet (UV) disinfection systems. ETS-UV™ systems are highly efficient, easy to maintain and have been validated for performance per rigorous industry standards for drinking water, water reuse and recreational water applications.

About Evoqua

Evoqua Water Technologies is the global leader in helping municipalities and industrial customers protect and improve the world's most fundamental natural resource: water. Evoqua has a more than 100-year heritage of transforming water and wastewater through innovation and industry firsts, market-leading expertise, and unmatched customer service. Its cost-effective and reliable treatment systems and services ensure uninterrupted quantity and quality of water, enable regulatory and environmental compliance, increase efficiency through water reuse, and prepare customers for next-generation demands.

7. Blob Substance Attacks Wastewater Treatment Plant.

Earlier this month, a strange substance started growing out of the wastewater treatment plant in Butte, MT. The slime-like material forced the county to send 550,000 gallons of partially treated wastewater into Silver Bow Creek.

Officials told The Missoulian, that the "brown, sponge-like material, which looks like froth on a root beer, is a normal part of the system that treats the county's wastewater before it enters Silver Bow Creek."

It's bacteria that the wastewater comes into contact with inside a vat in the plant, however, "the bacteria grew out of the vat, engulfed the plant's entire floor, growing a couple of inches tall, and began oozing out of the building."

"It rolled out the doors," said treatment plant operator Matt Moore. "We had to open the garage doors to make room for it. It grew very quickly."

Kristi Ponozzo, Department of Environmental Quality (DEQ) spokesperson, said that the wastewater continued to be treated by the county, which was "screening out both large and fine material and then sending the dirty water into a tank where ultraviolet light kills E. coli bacteria." Ponozzo added that "there are a lot of unknowns for DEQ at this point, but because of the high flows of the creek and the short duration of the partial shutdown, DEQ does not anticipate adverse health impacts from the incident."

Source: Zion Research Analysis 2016

However, the situation did cause the county to shut down treatment operations for a few hours. Dave Schultz, public works director, said that the county is not sure what exactly caused the problem.

"We're going to do a forensic analysis to see what we missed so we can interrupt this in the future," Schultz told the Missoulian. "We want to understand this better so it doesn't happen again."

Karen Sullivan, the county's public health director, added that she was "'very confident' the discharge into the creek would not affect people. Sullivan said E. coli would have been the health department's main concern."Sullivan also told the Missoulian "that no one gets drinking water from Silver Bow Creek.

Butte gets its drinking water from the Big Hole River and Basin Creek, both south of town and Moulton Reservoir, north of town."

8. Water and Waste Water Treatment and Management Market worth $1,966.6 Million by 2021.

Zion Market Research has published a new report titled "Water and Waste Water Treatment and Management Market by Chemical (Coagulants and flocculants, Anti-foamants and Defoamers, Corrosion and Scale Inhibitors, Activated carbon, Biocides and Others), by Pumping Systems (Pumps, Valves & Controls and Automation Systems) for Industrial and Municipal Applications: India Industry Perspective, Comprehensive Analysis, and Forecast, 2015 – 2021". According to the report, India water and waste water treatment and management market was valued at USD 1,399.4 million in 2015 and is expected to reach USD 1,966.6 million in 2021, growing at a CAGR of 6.1% between 2016 and 2021.

Low wastewater treatment capacity and poor infrastructure are some of the major water problems faced by India. In few cities and towns, such as cities in Karnataka, Andhra Pradesh, and Gujarat wastewater treatment facilities have the capacity to handle less than 12% of wastewater discharged. The high amount of untreated discharged water may lead hygiene problems and constrain the economic growth in this country.

However, urbanization and economic development of India and continuous growth in power generation, manufacturing and refining sector are offering alluring opportunities to the Indian water and wastewater treatment market. Such opportunities would be created for wastewater treatment equipment and services providers.

Rising population and industrial growth are contributing towards escalated demand for water treatment products across the country. Indian water treatment and management market are driven by numerous factors such as stringent government policies, increasing population, and demand for fresh or clean water for different purposes and increasing industrialization. Some of the factors which are acting as challenges for the growth of the market include expensive nature of water treatment chemicals and technology and inadequate funding from the private as well as public sector. However, huge gap between wastewater generation and treatment, wastewater treatment offers potential growth prospects to this market in near future.

9.Shale Gas Wastewater TreatmentTechnology Inventor Chosen Inventor Of The Year.

The 34th Inventor of the Year award is awarded to a Pittsburgh-area inventor based upon PIPLA's review of the technical and economic significance of the invention and its specific contributions to society. "Dr.Dighe's contributions in helping make the extraction of natural gas from shale a more environmentally friendly endeavor tipped the scales in his favor for the Committee," according to Carl Ronald, chairperson of the PIPLA committee that selected Dr. Dighe.

Dr. Dighe founded ATC in 2011 and has been designing a treatment system utilizing his patent-protected plasma technology for use in cleaning and commercializing water that is not fit for human consumption. The end products of the treatment system are distilled water and salt with no residue that requires further disposal. This technology is particularly suited to the shale gas industry as a substitute for deep well injection of produced or 'end-of-life' wastewater. ATC is presently conducting demonstration testing of its treatment system on shale gas wastewater at one of the largest wastewater treatment facilities in Southwestern Pennsylvania."I have been fortunate to work in the field of high temperature plasma arc technology," says Dr. Dighe.

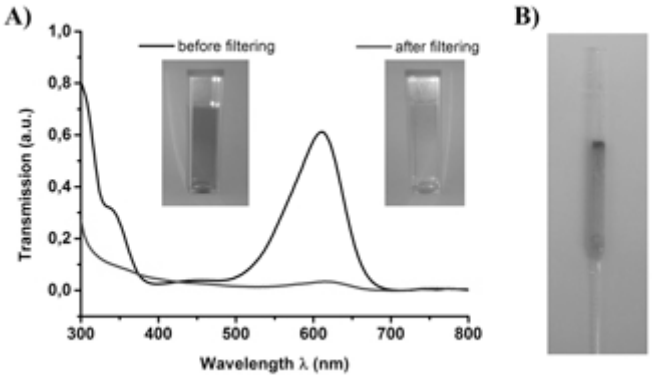
"It is technology capable of producing primordial forces of nature that created life. With plasma technology, you can create substances like diamonds that nature takes millions of years to create while, at the same time, you can also destroy substances like toxic and hazardous chemicals which take a severe toll on nature."

10. Wastewater Treatment Gets a New Spin.

The quest to optimize water re-use and anticipate regulatory pressures is driving many plants to give increasing attention to their wastewater. To help meet the challenges, wastewater treatment specialists such as Dow Water & Process Solutions and Microdyn-Nadir are introducing new technologies. Meanwhile, researchers at universities in Germany, Spain and Singapore are working on potential future options, scaling up separation techniques based on ionic solutions and biomimetic membranes.

"As part of Dow's reduce, reuse and reclaim circular economy approach we are really focused on the finite water supply. So we want to squeeze as much as possible from all the water used by industry, including the chemical industry," says George Barclay, global R&D director at Dow Water & Process Solutions, Edina, Minn.

One way that Dow is helping here is with its minimal liquid discharge approach, which focuses on reducing the cost of brine concentration and maximizing water recovery. This is especially important in China, where much of the chemical industry operates in the more arid north and pressure to use water as sparingly as possible is great. So there, brine concentration before crystallization of the salt commonly relies on mechanical vapor recompression and evaporators.



"The addition of ultra-high-pressure (UHP) RO to the membrane filtration process can reduce the water going to the evaporation step by 50%. So that saves on energy use and we can squeeze another 5% of water out of the process," explains Barclay.

Another example is a new UF module for particle removal (IntegraFlux SFP-2880XP) that is based on novel hollow-fiber technology made by a diffusion-induced phase separation process. That process enables accurately controlling the pore structure of the fiber down to 30 nm, allowing for consistent removal of bacteria, viruses and turbidity. Moreover, increased flux, achieved by modifying the internal structures of the fibers, decreases pressure and associated energy costs.

To cut water hardness and chemical oxygen demand (COD), plants typically turn to IX resins. Here, Dow has used new monomers to develop a resin (Amberlite IRC) that it says has both a higher throughput (48%) and greater stability than existing IX options. "As a result, there are fewer regeneration cycles, which saves energy and reduces chemical use, plus you can handle tougher waters," notes Barclay.

The company also offers new ion separation membranes (Filmtec Fortilife XC-N) for NF. These convert a large fraction of RO concentrate waste into purified salt solutions that are easier to crystallize or re-use. The membranes reportedly boast high permeability and ion selectivity; they provide high sodium chloride passage and very high di-valents and COD rejection. The salt then can be re-used.

In addition, this fall Dow plans to launch software that will ease choosing the most appropriate treatment technologies. "At the moment, there are multiple software options for modeling each component, for example IX, UF, RO, NF, etc. For the first time, we have combined them all in one solution. So the company inputs what its water stream contains and then selects what they want to achieve. The software gives the best technologies and processes for achieving this. It's been beta tested by 300 companies with very positive results," Barclay says.

11.IMMT shows green way for wastewater treatment IMMT shows green way for wastewater treatment

BHUBANESWAR: A team of City-based CSIR-Institute of Minerals and Materials Technology (IMMT) has developed a wastewater treatment technology which can be set up with a minimum capital and run without electricity, chemicals or machineries. The technology named 'Constructed Wetlands for treating wastewater' is ideal for treatment of domestic and municipal wastewater in cities.

The technology involves a multi-layered process of adsorption, filtration, sedimentation, biological uptake, degradation, plant uptake, natural aeration and valorisation. During the course of treatment, the constructed wetlands produce oxygen and absorb carbon dioxide from atmosphere, senior scientist, IMMT Dr Asheesh Kumar Yadav said.
The BMC will be making a case study on setting up such plants in areas like Salia Sahi and Jadupur on a pilot basis AN Jena, Mayor

''Constructed wetlands are a sustainable wastewater treatment processes for mildly polluted water like sewage. It is one of the technologies which is appropriate for Indian situation and has the potential of replacing costly conventional treatment plants," Yadav said.
The basin for a Wetland can be constructed with locally available soil and seepage of wastewater into the ground can be prevented by a barrier made of clay or polythene. Suitable aquatic vegetation can be planted to sustain the wetland, he said.

The team has already installed constructed wetlands on the premises of CRPF Campus and IMMT here. Being a multi-mechanism based process, wetlands are robust compared to other water treatment systems. An additional advantage is that the treated water can be used for agriculture, gardening or groundwater recharge purpose, sources in IMMT said.

12.India wastewater treatment plant to be delivered

MUMBAI, India, October 24th, 2016 – Xylem has secured a US$1 million order to supply advanced wastewater treatment technology to a sewage treatment plant in the state of Madhya Pradesh in central India.

The new plant is being developed to accommodate rapid industrial growth in the city of Sehore.

Xylem will provide wastewater treatment expertise and technology, including a Sanitaire ICEAS advanced Sequential Batch Reactor (SBR) system, which will support the treatment of 12,000 m3/day of wastewater and meet wastewater discharge quality standards set by the Madhya Pradesh Pollution Control Board.

The Municipal Corporation of Sehore appointed Ankita Construction to manage the build of what will be the first sewage treatment plant in the city.

A long-term assessment of water quality data carried out by India's Central Pollution Control Board (CPCB) in 2015 found that the majority of polluted river stretches were found in the Maharashtra, Assam and Madhya Pradesh regions.

Aravind Andani, managing director, Ankita Construction, said: "This new treatment facility will improve general hygiene and health in the city as well as enhancing the water quality of the River Siven and the surrounding environment."

Raveendra Bhat, director treatment and dewatering, Xylem India, said: "Approximately 100,000 people in the city of Sehore will benefit from this new plant which will enrich the quality of life in the region."

Xylem's contract includes designing the treatment process, supplying and installing all treatment technology (including Sanitaire ICEAS SBR system, diffusers, decanters, control and instrumentation technology) and commissioning the plant.

said John Waller, Grovetown City Administrator.

Right now, the rest of that wastewater goes to Columbia and Richmond County.

"We're trying to manage growth and have smart growth as best as we can," said Waller.

That means, planning ahead. The new facility comes at a hefty price tag of $23 million dollars, but treats twice the amount of wastewater than the current system.

"They can't grow unless they expand that facility because they can't keep paying Richmond and Columbia County to treat their water," said Wilson.

But if you live in the city limits of Grovetown, in addition to your regular water and storm water fee, you'll also start seeing a construction fee starting at 5 dollars and going up to 20 dollar per month per customer.The project is coming in four phases and it is expected to finish in 2019.

13. Oil Contaminates Rochester Wastewater Treatment Facility

In recent weeks, nearly 100 gallons of oil has contaminated the wastewater treatment facility serving Rochester, NH. The oil is thought to be hydraulic fluid or used motor oil

that entered into the plant's system over the course of three days.

According to Fosters.com, Director of City Services John Storer, "estimated the total quantity of oil to be between 50 and 100 gallons." The contamination is considered

to be somewhat of a critical issue since the facility treats Rochester's wastewater using natural bacteria, "which are killed if oils, paint thinners, and other synthetic materials and industrial waste are introduced into the system and its holding tanks.""It creates all kinds of issues," said City Manager Dan Fitzpatrick. "I've had this issue in all the cities I've worked. This is not unique to Rochester. Sometimes they're accidental spills, sometimes they're illegal spills ... What we have to do now is figure out what's disrupting the process, where it's coming from and when those dumpings are."

The city sent samples from the three contamination incidents to be profiled at a local lab. All three contaminations were traced back to the same oil, making officials optimistic that they could trace the source.

"There are no secrets in the sewers," Storer told Fosters.com. "We will find it. It'll just take us some time."

Fitzpatrick added that "it was too early to say whether the city will seek criminal or civil action to recoup the costs to remediate the oil, which to date has been done by skimming the oil off the top of the water at the plant."

14.Prineville's wastewater facility combines trails, sanitation.

Plenty of people in Central Oregon are participating in Earth Day activities this week, but only the city of Prineville celebrated by moving 400,000 tons of dirt to create an educational nature trail that meanders around a series of environmentally friendly, sewage-filtering ponds.

Nearly a year to the day after the city broke ground on its long-planned wetland project, the 120-acre aquatic ecosystem that doubles as a municipal wastewater-treatment facility is complete. And even though the $7.7 million project has been partially operational as a treatment plant since late last year, City Engineer Eric Klann said the riverside facility is now open for the public to explore.

"It's been a long time coming; we've been doing research and design for over eight years," he said. "As an engineer it's not hard to get excited about a wastewater treatment plant, but I'm happy to say this is a system that the public can get excited about, too."

The new wetland expands o the city's older facility — a series of lagoons that filter wastewater later used for irrigation. The new facility is expected to meet the city's needs for the next 30 years, when the population of Prineville will go from 9,500 people to about 23,000 people.

For folks who are doubtful that they can get a kick out of a multi-level system of 15 environmentally friendly wastewater-treatment ponds, then a ceremony scheduled for 11 a.m. Friday aims to convince them otherwise. That's when Prineville officials and local students will show off the 13 informational kiosks and 5.5 miles of trails a Vancouver-based contractor has been busy prepping since last year. Klann said the 400,000 tons of dirt were moved to create the ponds and trails,which were then enhanced with kiosks that students packed with information about the wetland ecosystem.

Now that the educational and recreational features are finished, people can walk the wetland trails while learning about local birds, the Crooked River watershed and the macroinvertebrates — flatworms,

crawfish, snails and aquatic insects such as dragonflies — that call the ecosystem home.

"We've been working on these kiosks with local school groups over the last couple years," Klann said. "The different classes will be there (today) explaining the kiosks they helped design."And the amenities are worth more than what they offer for exercise and information, Klann added. Without these educational elements, the city wouldn't have qualified for some of the grants that funded about half the project.

It was the $3 million in grants from various agencies and groups that made the wetland system possible, Klann said.And considering the city's wastewater-treatment alternatives, that's a positive thing.

The city opted to move forward with the wetland wastewater system — officially called the Crooked River Wetlands Complex — to avoid having to build a new mechanical treatment plant a decade ago, which Klann said would have cost more than $60 million. "By utilizing and constructing the wetland, it dropped the price way down," he said, noting that there were other benefits, too.

For example, the wetland system is expandable, Klann said. New ponds can be dug to keep up with Prineville's population growth. Also, the system is safer for the environment than a traditional plant. The multilevel ponds use gravity and a series of mechanical gates to transport wastewater, Klann explained, filtering it with bacteria and aerators along the way.

The process takes a long time, but eventually some of the water is returned to the Crooked River and some is used for irrigation. The city's Meadow Lakes Golf

Course keeps its fairways green this way, billing itself as not only a fully functional 18-hole championship course but also a wastewater disposal site. The water hazards are part of the treatment process.

15.Treating wastewater with the help of modern technology.

With the rapid urbanisation in the country, there has been a commensurate increase in the need for and the use of water, one of life's most essential necessities. Almost 80 percent of the water supplied for domestic use, comes out as wastewater. In most of the cases wastewater is let out untreated and it either sinks into the ground as a potential pollutant of ground water or is discharged into the natural drainage system causing pollution in downstream areas.

So, there is an urgent need for treating wastewater using modern technology and recover as much usable water as possible. But the fact is a majority of towns and cities in India have either no sewerage and sewage treatment facilities or the treatment facilities are highlyiquate.

Sources of wastewater include homes, farms, factories, hospitals and businesses. Faeces and urine from both humans and animals carry many disease-causing organisms. Wastewater may also contain harmful chemicals and heavy metals known to cause a variety of health problems. Disease-causing organisms (pathogens) from patients at hospitals can enter wastewater.

Wastewater may also carry carcinogens increasing the risk of cancers among vulnerable people who could directly or indirectly come in contact with such wastewater. When untreated wastewater mixes with groundwater it can create significant health risks to people who have suppressed immune systems. Children, the elderly, and the poor are also significantly more at risk than the general population. So, it is pertinent to properly treat wastewater before it runs down the water stream.

According to a report, the estimated sewage generation from Class I cities and Class II towns (as per estimation made for the year 2008) is 38,254 million litres per day (MLD). Against this, there exists only 11,787 MLD treatment capacity. Therefore, existing treatment capacity is just 30 percent of present sewage generation. Similarly, about 13,468 MLD of wastewater is generated by industries of which only 60 percent is treated. Thus, there is a huge gap between wastewater generation and its treatment in India. Even the existing treatment capacity is also not effectively utilized due to inefficient operation and maintenance of existing plants and sewage pumping stations. There are 269 sewage treatment plants (STPs) in India, of which only 231 are operational. Further, nearly 39 percent of the STPs are not conforming to the general standards prescribed under the Environmental (Protection) Rules for discharge into streams. In a number of cities,

the existing treatment capacity remains underutilized while a lot of sewage is discharged without treatment in the same city.

It is estimated that the projected wastewater from urban centres may cross 120,000 MLD by 2051 and that rural India will also generate not less than 50,000 MLD. However, wastewater management plans do not address this increasing pace of wastewater generation. A 2007 report by the government had pointed out that water resource management is going to be the most serious problem of the 21st century.

According to researchers, industrial and municipal segments account for almost 90 percent of $2000-2100 million water treatment market in India.

The conventional wastewater treatment processes are expensive and require complex operations and maintenance.

The sludge removal, treatment and handling have been the most neglected areas in the operation of the STPs in India. Due to improper design, poor maintenance, frequent electricity break downs and lack of technical manpower, the facilities constructed to treat wastewater do not function properly and remain closed most of the time. Utilization of biogas generated from UASB (Upflow Anaerobic Sludge Blanket) reactors or sludge digesters is also not adequate in most of the cases.

One of the major problems with wastewater treatment methods is that none of the available technologies has a direct economic return.

Due to no economic return, local authorities are generally not interested in taking up wastewater treatment. It has also been observed that some STPs do not meet prescribed standards in respect to BOD (biochemical oxygen demand) thereby rendering the treated water unsuitable for household purpose. As a result, though the wastewater treatment capacity in the country has increased by about 2.5 times since 197879 yet hardly 10 percent of the sewage generated is treated effectively, while the rest finds its way into the natural ecosystems and is responsible for largescale pollution of rivers and ground water.

Conventional wastewater treatment consists of a combination of physical, chemical, and biological processes and operations to remove solids, organic matter, and sometimes, nutrients from wastewater. New generation of sewage treatment technologies such as membrane bioreactor (MBR) can treat the wastewater almost to the quality of river water.

Wastewater while undergoing treatment goes through the following processes preliminary treatment (removal of coarse solids and other large materials often found in raw wastewater), primary treatment (removal of settleable organic and inorganic solids by sedimentation, and the removal of materials that will float by skimming), secondary treatment (removal of biodegradable dissolved and colloidal organic matter using aerobic biological treatment processes), and tertiary treatment (removal of nitrogen, phosphorus,additional suspended solids, refractory organics, heavy metals, and dissolved solids).

In Class I cities, oxidation pond or activated sludge process is the most commonly employed technology for wastewater treatment,covering 59.5 percent of total installed capacity. This is followed by UASB technology, covering 26percent of total installed capacity. A series of Waste Stabilization Ponds technology is also employed in 28 percent of the plants, though its combined capacity is only 5.6 percent. A recent World Bank Report came out strongly in favour of stabilization ponds as the most suitable wastewater treatment system in developing countries, where land is often available at reasonable opportunity cost and skilled labour is in short supply.

The treatment methods adapted to treat industrial wastewater are dissolved air floatation, dual media filter, activated carbon filter, sandfiltration and tank stabilization, flash mixer, clariflocculator, secondary clarifiers and sludge drying beds, etc. Coarse material and settable solids are removed during primary treatments by screening, grit removal and sedimentation.

In developing countries like India, the problems associated with wastewater reuse arise from its lack of treatment. There cannot be a one size fit all solution. Each pocket has its own unique set of challenges and hence identifying the real problem and creatingcustomizable solutions to tackle it should be the need of the hour. Besides, wetlands may work in a few rural pockets but in Tier 1 cities where real estate is a luxury, it neither seems feasible, nor a part of the solution. Modern science and technology is here to helped pull us out of the mess that we have created for ourselves. The focus first should be on adaptive modern technologies that not only treats wastewater, but are also easily addedin to the existing infrastructure thereby having a lower cost implication.

With the greater awareness of the need and importance of wastewater treatment among the general public, authorities and policy makers, it is hoped that soon a larger share of wastewater would start getting proper treatment with the help of latest technologies and not just a new source of usable water would be seen on the horizon but also the rivers and lakes in the country would continue to not just support but also help enrich a varied aquatic

16. State of wastewater treatment in india

A government report on Urban and Industrial Water Supply and Sanitation for the Twelfth Five - Year Plan (2012-2017) highlights the following points about wastewater in India:

• Urban and industrial India will have huge implications on the use of water and discharge of waste

• Cities worry about water, but not the waste this water will generate

• The challenge of sewage collection and treatment has not received adequate attention

• No Indian city is in a position to boast of a complete sewerage system, which can keep up with the sanitation and pollution challenge

• The capital intensity of the current waste system results in the fact that cities can only provide for a few and not for all

• If sewage systems are not comprehensive – spread across the city to collect, convey and intercept waste of all – then pollution will not be under control The above observations made in the report go on to show that not all is well as far as sewage treatment in India is concerned.

Factors that hinder wastewater treatment.The government report says, "The cost of a wastewater treatment plant depends on two key factors -- the quality of raw influent and the quality of the receiving medium." It adds that most cities in India do not have facilities to treat human excreta or chemical industrial waste.

Furthermore, these plants are tech nologically backward and were built at times when the nature of waste was biological and not chemical.

With time, the quantity and characteristic of wastewater discharge has drastically changed. In their current state, most wastewater treatment plants are obsolete and are in need of newer technology and capacity expansion.

An important factor that hinders wastewater treatment is unavailability of land for building new plants. Land is in short supply in urban India and also a very expensive commodity. As a result, cities and towns

are finding it difficult to manage and treat the huge quantities of waste generated on a daily basis.

Construction and maintenance costs are major deterrents too. According to the government

report, in the mid-1990s, when the first-generation sewage treatment plants were

built, they cost Rs 20 lakh to Rs 30 lakh per MLD (million litres per day).

Today, the same plants cost close to Rs 1 crore per MLD to build. India's deficit of sewage treatment would require huge investment, if only greenfield options are considered.

Retrofitting -- A viable option

'Retrofit' or upgradation of existing wastewater treatment plants can solve problems of increased capacity as well as need for improved quality. Retrofitting can be defined as addition of new technology or features to older systems.

Retrofitting is less capital-intensive than building a new plant, optimizes the working of the existing plant while also increasing its lifespan. Membrane technology plays a vital role in retrofits.

Low-pressure ultrafiltration membranes that can be fitted downstream of aeration systems of existing plants offer multiple benefits of capacity expansion and improved effluent quality.

Few advantages of retrofitting with membrane technology include:

• Improved productivity of wastewater treatment plants

• Reduction in per unit operating costs • Significant improvement in quality that can make effluent reusable in non-potable applications.

Treatment plants that used to discharge effluent could be upgraded and treated effluent could serve as a revenue generator.

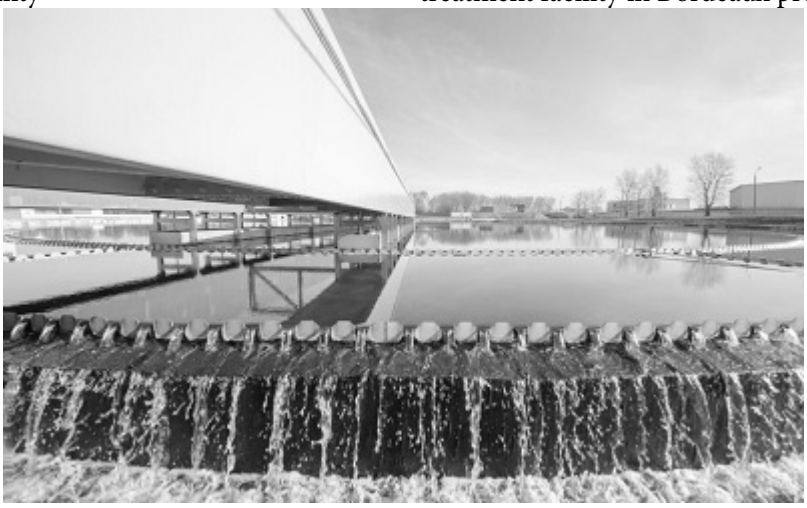
Examples of retrofits in India can be seen in the industrial sector,

where plants have seen increase in capacity by > 80% and improvement in effluent standards to reuse levels. This has been archieved with minimal investment in land and civil works. Such practices need to be translated in the Municipal segment as well, thus reducing the investment burden for new plants.

17.Emefcy Group secur00000000000000000pproval for wastewater treat-

The company is accelerating sales into U.S., China and Latin America.

Emefcy Group secures U.S. approval for wastewater treatment facility



MABR-based treatment solutions in China.

Serving a rural community of 200 homes, Emefcy's MABR wastewater treatment facility in Bordeaux pro

underground water resources are fast drying up. Untreated waste water is contaminated with pollutants. Such water when used for agricultural crops, is often polluted with urban waste containing not only a mix of chemical and biological pollutants, but also high levels of pathogens from excreta. This generally impacts human health. Therefore, in this case, waste water should be treated, or WHO guidelines should be followed for restricted use of 'untreated water'.

For example, these guidelines prescribe discontinuation of irrigation with untreated waste water for a few days before harvesting of crops in order to allow pathogens to die in

The approval will significantly enhance the acceptance of Emefcy's solutions.Emefcy Group's (ASX-:EMC) wastewater treatment facility in Bordeaux, U.S. Virgin Islands has been approved by the U.S. Environmental Protection Agency (EPA).

The company will deploy its unique Membrane Aerated Biofilm Reactor-based (MABR) wastewatetreatment solution in Bordeaux. With EPA approval, Emefcy expectsto accelerate MABR sales into the U.S., Latin American and Caribbemarkets.

The approval may also significantly enhance the acceptance of

serve the rapidly dwindling water resources as massive amounts of water are exhausted every year due to unsustainable farming practices and lack of technology to recycle effluent for farming.

According to statistics, Iran's water recycling in agriculture is below 50%. Almost 90% of the scarce water resources is consumed by the agriculture sector.

Iran is situated in an arid and semi-arid region and average precipitation rate has fallen to levels way below the global average while

sunlight.Development strategies

The river Ganga, for example, receives, in its journey, roughly 500 million litres per day (MLD) of partly treated or untreated industrial effluents from over 700 grossly polluting industries, and about 3,000 MLD waste water from urban bodies, thus exerting a huge organic load. Unless the waste water is treated and discharged, our rivers, like the Ganga, will continue to be conveyors of contaminants, quite contrary to the public perception or aspiration of their being pristine, life giving streams.

18.NIB finances wastewater treatment capacity increase on Swedish west coast.

The FINANCIAL -- NIB and Varberg Municipality in Sweden have signed a loan agreement of SEK 100 million (EUR 10.4 million) to centralise and improve wastewater treatment in the region.

The five-year maturity loan is funded with the proceeds of NIB Environmental Bonds.

he project to be financed is an 18-kilometre wastewater pipeline, which will be constructed by Varberg's subsidiary Vivab. The pipeline will run along the coast and connect the village of Bua to Varberg's central wastewater treatment plant. The wastewater treatment plant currently in use in Bua will be closed. The project also includes the installation of seven pumping stations as well as smaller sewage system extensions, according to NIB.

The new pipeline will significantly increase the efficiency of wastewater treatment without adding to the operational costs of Varberg's central wastewater treatment plant, which has sufficient capacity for the greater treatment volume. Centralising the system will also lead to fewer cases of wastewater overflow, strengthening a vital public service and supporting regional growth.

NIB will finance half of the total project costs, which are estimated to be SEK 200 million. Construction is underway and scheduled to be completed in June 2017. Varberg is located in the county of Halland on the west coast of Sweden and has a population of 61,868. n March 22, we will celebrate the 24th World Water Day. The theme this year is 'Waste Water'. This day is generally observed to spread awareness among the general public and focus on its importance in sustainable development.

In any discourse about water, waste water is less talked about as against normal water supply. But waste water is a resource in a circular economy, and its safe management is an efficient investment in human health and the ecosystem. Although waste water is water that's generally wasted, in reality it is a resource.

Uses and abuses The sources of waste water are many: domestic, industrial, commercial, agricultural, surface run-off or storm water, and sewer inflow. Waste water, once treated, can be recycled and/or reused for drinking purposes, in industry, in the artificial recharge of aquifers, in agriculture, in the rehabilitation of natural ecosystems and so on.

Globally, 10 per cent of waste water is treated. About 69 per cent of India's water is untreated and 39 per cent of actual operating capacity does not meet the regulatory standards (CPCB 2009). Waste water is discharged directly into water bodies, overloaded rivers, lakes and the ground with toxic chemicals and wastes. This consequently poisons water resources and supplies. These toxins feed their way into plants and animals, causing severe ecological toxicity at various levels, including in the human food chain.

India's strategy for its new path of development also focuses sharply on the development of smart cities as drivers of GDP growth. Crucial to the growth of smart cities is the recycling of waste water.

Such recycling is happening in some of our proposed smart cities such as Bengaluru, where tertiary treatment of waste water enables the utility to supply water to airports, parks, industries, and construction sites at suitable user fees. One of the best international examples in urban water recycling is Yokohama in Japan. More than 99 per cent of Yokohama's population is connected to sewers; it's treated waste water is precious, and is being supplied to various locations of the city. Indian smart cities could take a lead from the Yokohama example for maximising their waste water management. Given the finiteness of fresh water supplies, the growing demand of fresh water, and depleting groundwater levels, the recycling and reuse of waste water opens up big business opportunities. Estimates vary on the size of business opportunities in India's water sector.

An estimate (Kotak Institutional Equities, 2012) puts the annual figure at $30 billion, of which waste water is emerging as a thrust area. With about 26 billion litres of water going untreated daily, the investment opportunities in this segment are estimated to be in the range of $400 million, assuming a four-year completion cycle of the operating system.However, the waste water treatment market is unorganised, and a sizeable portion is dominated by small and medium-sized domestic players. This market is mainly dominated by municipal segments.

The enforcement of regulatory standards for waste water from industries and municipalities is expected to enhance the size of the waste water market. Markets for waste water treatment are expected to grow in value and volume.

in many countries, including India. The National Water Mission of India has targeted improving efficiency by 20 per cent in all sectors.

19.Wastewater Treatment Plant Launched in Gachsaran.

A wastewater treatment plant in Dogonbadan, capital city of Gachsaran County in Kohgiluyeh and Boyer Ahmad Province, was inaugurated by Energy Minister Hamid Chitchian on Wednesday.

The facility has the capacity to treat 12,500 cubic meters of effluent a day and cost $4 million, IRNA reported.

According to reports, the plant's construction began in 2003, but it was plagued by financial constraints and made 10% physical progress by the end of former president Mahmoud Ahmadinejad's second term in office in 2013.

Referring to the government's water and wastewater measures in the southwest province, Chitchian said the ministry is taking steps to build four water and wastewater projects in the towns of Yasuj, Sisakht, Madavan Choram.

Mousa Khademi, governor general, who accompanied Chitchian at the inauguration ceremony, said the plant will help preserve the city's underground water reserves and people's health as well as optimize use of wastewater for agriculture.

The province's wastewater network stretches 46 kilometers. The wastewater plant in Dogonbadan will provide services to more than 130,000 households.

According to published reports, nearly 3,000 water and wastewater projects nationwide are incomplete due to a lack of funds. Officials say that power supply projects in rural areas alone need $3.3 billion for completion.

The new wastewater treatment projects are part of plans to preserve the rapidly dwindling water resources as massive amounts of water are exhausted every year due to unsustainable farming practices and lack of technology to recycle effluent for farming.

According to statistics, Iran's water recycling in agriculture is below 50%. Almost 90% of the scarce water resources is consumed by the agriculture sector.

Iran is situated in an arid and semi-arid region and average precipitation rate has fallen to levels way below the global average while underground water resources are fast drying up. The company is accelerating sales into U.S., China and Latin America.

Emefcy Group secures U.S. approval for wastewater treatment facility

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The approval may also significantly enhance the acceptance of MABR-based treatment solutions in China.

Serving a rural community of 200 homes, Emefcy's MABR wastewater treatment facility in Bordeaux produces a clean effluent that is safely discharged locally.

Receipt of the permit allows the Virgin Islands Wastewater Management Authority to decommission its old treatment plant following the success of Emefcy's installation.

MABR utilizes a spirally wound air sleeve submerged in a tank, through which wastewater is fed continuously and effluent is discharged by overflow.

Through Emefcy's patented passive aeration process, the MABR solution saves significant energy by eliminating the need to blow aeration under high pressure.

This solution is ideal for small- to medium-sized plants, providing quiet and odourless wastewater treatment to rural villages, hotels, resorts, golf courses and municipalities.

Last week, Emefcy completed the manufacturing and delivery of packaged demonstration plants to two of the company's Chinese strategic partners.

The company is well funded with cash and cash equivalents of US$19.8 million as at 31 March 2017.

Emefcy's shares were last trading 6.25% higher intra-day, at $0.85.

20.Treating Great Bay, one treatment plant at a time.

Wastewater entering Great Bay will soon be cleaner.Area legislators along with town officials toured the Durham and Newmarket wastewater treatment plants on Friday to review the efforts to reduce nitrogen in the Great Bay Estuary that

many believe is the cause for the dwindling eel grass.

Jeff Barnum, the Great Bay-Piscataqua waterkeeper of the Conservation Law Foundation organized the tour. In Durham, Rep. Michael Cahill, D-Newmarket, and Sen. Martha Fuller Clark, D-Portsmouth, toured the Durham facility with treatment plant Superintendent Dan Peterson, Town Engineer April Talon, Town Administrator Todd Selig and Tim Vadney, senior project manager for Wright-Pierce that is a consultant with many wastewater treatment plants. Barnum and the three legislators toured the new Newmarket plant after.

"The Durham plant has been a standard for some time," Barnum said at the beginning of the tour. Many area facilities that discharge into Great Bay were considered out of compliance with the federal Clean Water Act because it was allowing high levels of nitrogen into the estuary.

However, Durham was not one of those municipalities out of compliance with the Department of Environmental Services and the U.S. Environmetal Protection Agency orders earlier this decade. Selig cited the town's commitment to funding ongoing maintenance that kept the plant operating efficiently and under the mandated nitrogen discharges.

To become in compliance with regulations, there are new wastewater treatments in the works. Newmarket has a new $14 million wastewater treatment plant will come online in the coming months. Exeter has a $55 million facility coming online in 2018. Portsmouth's new plant is expected to be operational by the end of the decade. Dover and Rochester have made recent upgrades that have eliminated tons of nitrogen from entering into Great Bay, Barnu said.

"Great Bay is a tremendous asset that in our backyard," Barnum said. "It's an estuary of national significance." He called it a "nursery of the sea," but because of the pollution, "Eelgrass has taken it on the nose." Peterson brought the group around to the different stations at the Durham plant. One of the challenges for the plant is the fluctuating Durham population. It peaks at about 25,000 when the University of New Hampshire is in session but will drop to about 7,000 during the summer and major holidays, like Thanksgiving and Christmas.

Peterson said workers are well aware of the school calendar to prepare for changes in wastewater flows. Even days of the week can change flows. Selig said flows increase on Friday and Saturday nights during school when many students are partying. Because UNH provides about two-thirds of the wastewater load, it pays for two-thirds of the cost, Selig said.

Peterson spoke highly of the bacteria in the plant that helps break down the waste as it moves through different stages at the plant, calling the millions of bacteria his tiny friends. Workers monitor how the health of the bacteria, which is reused in the system. "When the bacteria is happy, I'm happy," he said. Their life span can average between 6 to 9 days, depending on the weather and other factors.

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