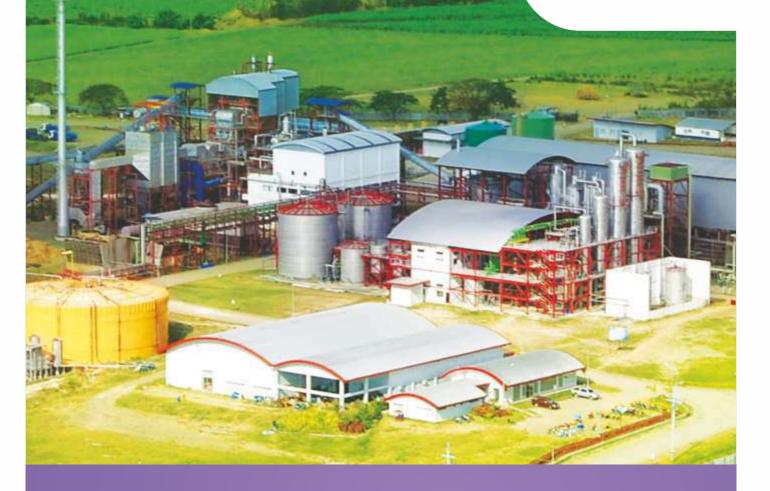
Innovative Technological Solutions, Global Partnerships ...





## **REGREEN EXCEL EPC INDIA PVT. LTD.**

## VISION

To become a Global Leader in sustainable and environment friendly technologies with high energy efficiency, low water footprints and achieve net carbon zero emissions for Ethanol, Biofrel, Distillary and other process industries for a greener and cleaner world.

## INNOVATIVE TECHNOLOGIES FOR MULTIFEEDSTOCK CONVERSION WITH MAXIMIZED EFFICIENCY??



## Key Highlights of "E-max" Installations

| India's Largest<br>Molasses Distillery –<br>800 KL   | India's Largest Grain<br>Distillery – 450 KL                                      |  | India's Largest<br>Ethanol Dehydration<br>Plant- 275 KL              |
|--|---|--|--|
| India's Lowest Steam<br>Grain distillery (+Dryer)<br>at 3.75 kg/litre  | India's Lowest Steam<br>Molasses distillery<br>(+Evaporation) at 2.75<br>kg/litre |  | India's only DDGS Dryer<br>Vapor Integrated MEE<br>Evaporator (DVI). |
| India's Only Direct PRC<br>Vapor Driven MSDH<br>Ethanol Plant  | India's Single Largest<br>DDGS Dryer- 1600 m2                                     |  | India's Largest spent<br>wash Evaporator with<br>1500 m2 HTA.        |
| Efficient EPC project execution as single<br>point responsibility including process plant<br>utilities like boiler TG and balance<br>of plants and civil works |   | Efficient Water Recycle System<br>with Biological, RO and<br>Waste Heat Evaporation Technology |  |



LERY

LIQUID DISCHARGE

& COGENERATION

**& WASTE WATER** 

RENEWABLE ENERGY

WASTE

RECOVERY

BIOMASS





Our innovative *"E-max"* versions of technologies, vast know how & experience and commitment to continuously innovate will help improve profitability and growth of all your endeavours

### **Our Expertise & Offerings**

- Project Feasibility and Technical Consultancy
- Process Technology Solutions and Technology Upgradation ("E-max" versions of technology)
- Basic and Detailed Engineering Services
- Project Management Services
- Turnkey Plants and EPC Projects
- Retrofitting of Plants and Equipment
- Troubleshooting, O & M Services and Operator Training

And whatever you would expect from A Global Technology Partner ...





## **Corporate Profile**

A right technology partner is a backbone of any project and we at Regreen Excel are committed to play an exact role to make your project technically feasible and also viable financially.

Regreen Excel EPC India Pvt. Ltd., Pune INDIA is a technocrat driven organization having more than 3 decades of proven background as a technology solution provider and having a cumulative team experience of more than 250 projects in the field of Distillery, BioFuel, Sugar, Cogeneration, Waste water and Renewable Energy industry. Conceived as a small seed with a clear vision of Mr. Sanjay Desai, a Chemical Engineer to provide ultramodern & state of art energy efficient and sustainable futuristic technologies to the industry, with its consistent performance and honest approach, "Regreen Excel" has grown to be a huge tree offering innovative technology solutions under one roof.

The Promoters / Directors are a team of dedicated technocrats who are successful professionals with proven track records in their chosen fields. One common factor running amongst

them is their indomitable spirit and a determination to succeed. "Regreen Excel" is recognized as an imminently leading Technology provider with EPC capability. The company established itself working off the success of their management with the vision to offer an expanded line of process industry capital equipment products both in domestic as well as international markets. The company is headquartered in Pune INDIA.

Regreen Excel is a leading "Concept to Commissioning Company" in the field of Distillery, BioFuels, Zero Liquid Discharge Systems, Sugar & Cogeneration and Renewable Energy. We are aggressively marking our presence in turnkey zero effluent discharge distillery projects, ultra-modern grain and molasses distilleries with unmatched efficiencies and steam consumption, full proof zero



liquid discharge effluent treatment plants, equipment manufacture and supply, distillery modernization and troubleshooting services, environment compliance and consultancy services, third party and project management consultancy to many esteemed organizations in India and abroad.



With "Excellence" as a vision statement, a mission statement and our quality policy, we have become the best alternative & fastest growing technology company in the industry. We have already completed many such modern plants and also executing more than a dozen of complete ethanol / distillery projects using Grain as well as Molasses as feedstock with scope including mash preparation, fermentation, distillation, evaporation, dryers, effluent treatment etc. We are bound to deliver world class services to ensure growth and prosperity of our esteemed worldwide clientele.

Most of these projects demand EPC scope and services including basic & detailed engineering of balance of plant including civil works, boiler & turbine and utilities on a single point guarantee and project management basis.

With our persistent innovation, concern for quality and strong resources, we have transformed to a reliable EPC company in a short span of time. We have mastered to deliver proactive and futuristic technology solutions by partnering with our worldwide clientele.

## **End to End Solutions - World Class Technology**



Desire to innovate. The will to succeed. And commitment to deliver nothing but the best. These are the three qualities that together make Regreen Excel EPC India Pvt. Ltd. a frontrunner among other service providers in the process and engineering industry. "Regreen Excel" is an innovation-led company that consistently excels in delivering pioneering, flexible and customer-centric technology solutions to domestic as well as international markets. Within a short span of time, we have earned us a strong reputation in the industry with our proactive approach to achieve customer satisfaction along with the ability and expertise in partnering with clients to attain their objectives collectively.

Our team of engineers, bio-technologist, chemists and experienced professionals are working every hour to simplify and modernize process solutions to bring value additions in the industry. With flexible end to end scope options right from civil foundations to commissioning for production of superior quality

product with low energy costs, we even assist you in achieving a practical zero liquid effluent discharge.

Our Promotors, design and project management team are technocrats and professionals from process industry. With a cumulative experience of more than 250 projects in India and abroad, we have expertise and experience to deliver our best in process engineering, bio-technology, mechanical engineering, civil, electrical and instrumentation.

With our core strength and world class technology, we are creating marvels and setting bench marks in terms of high efficiencies, high yields, low steam consumptions, low power consumption and extra value for your money.





#### State of Art Infrastructure

Regreen Excel has invested well into infrastructure development with state-of-the-art engineering office, R&D center, modern manufacturing unit which are key facilities for any technology and EPC company.

#### **Inhouse Research & Development**

Regreen Excel believes in growth through innovation & technological advancement & has a full-fledged in-house R & D set up having world-class facility including testing equipment, Prototype, Pilot plants & Shop floor plant installations in order to validate product performances.

#### Process Design & Engineering set up

Custom designs and state of the art process engineering are hallmark of Regreen Excel's references engaging chemical, mechanical, automation, civil & structural engineers with latest software's and design tools.

#### **State of the Art Fabrication Facility**

Along with the customised design solutions, Regreen Excel has fabrication facilities PAN India to deliver custom built products and plant equipment with best quality standards and with quick delivery cycle.

#### **Project Management & EPC Projects**

Vast Experienced project and construction team with heavy machinery and tools, will assist clients in smooth execution and commissioning of the modern facilities as per standard designs and specifications in quick project period on EPC basis.















## **EPC Capability**

"Regreen Excel" is a house for single window innovative technological solutions to most modern, energy efficient and fully automated distilleries and biofuel plants. We offer services right from concept to commissioning with modern plants custom build to meet individual client's requirements. Our highly professional project management team insures that projects are completed well ahead of the project schedules with highest engineering standards delivering the most superior international quality products and process efficiencies.

We are the only EPC Company which undertakes end to end scope of work – right from civil foundation work to process plant and cogeneration to zero liquid effluent discharge. This has transformed us to a single most trusted partner by our clients.

With our multiple modern manufacturing set ups in Pune, Kolhapur, Kanpur, Ghaziabad and Jamshedpur and our strong partnered manufacturing units, we can meet any project demand to ensure completion of the project within stipulated timeframe. Our workshops are fully equipped with most modern, state of art manufacturing equipment & machineries and trained manpower to meet delivery schedules complying stringent international quality norms & most precision fabrication requirements.

With a combined engineering, project & commissioning team consisting of process engineers, technologist, civil, mechanical, electrical, instrumentation engineers etc., we can promptly reach at any site location, carry out installation, conduct commissioning and troubleshoot process issue with a lightning speed.

Commitment to customer satisfaction and an innovative yet timely approach to work is what defines our work process where quality is omnipresent at all stages. With the best use of our unmatched expertise and experience, we contribute to our client's growth by prompt project implementation, budget restraints, optimizing system functionality and improving operational efficiency.



### **Trend Setting Achievements**

- Asia's single largest plants of capacity 800 KL using sugar cane and 450 KL using grain are being implemented along with another 28 plants of various types to be commissioned.
- Single largest plant of 400 KLPD Grain & 250 KLPD Molasses Distilleries built by only Indian company with 100 % make in India approach from concept & commissioning
- Successfully developed "E-max", "E-max2", and "E-max" Flexi technology for C molasses, BH molasses, Cane Juice, Grains, Millets with low energy and water foot prints
- Lowest steam usage @2.75 kg/litre in "E-max" Molasses Distillery including Fermentation, Distillation, Molecular Sieve Dehydration/ ENA with 60% solid evaporation
- Lowest steam usage @3.75 kg/litre E-max" Grain Distillery including Liquefaction, Fermentation, ENA Distillation, Evaporation and DDGS Dryer
- "E-max" Distillery plants resulted ENA from both Molasses and Grain Distilleries is accepted by all Domestic and International Bottlers/ Blenders.
- Most reliable DDGS Dryer utilizing 100% Evaporation Syrup and DDGS Dryer Vapor integrated "Zero Steam" evaporation plant with maximum energy recovery
- Zero Liquid discharge plants both for Molasses as well as Grain with truly 3R principle with option of Biological and RO system for process condensate and white water from Distillery
- 100% make in India plants consisting of Distillation columns, heat exchangers, Evaporators, Dryers, RO Systems with satellite manufacturing units across PAN India at Pune, Kolhapur, Ghaziabad, Kanpur and Jamshedpur
- Single point guarantee and Project Management responsibility of complete distillery with Civil, Structural, Process Plant, Slop Boiler, Turbine, Electrical, Utilities, Effluent Treatment and Safety etc.

And Many More to come...

### **REGREEN EXCEL EPC INDIA PVT. LTD.**



## **Grain Milling Systems**



Right particle size of flour is the bottom line of milling operation. We offer end to end scope right from Grain Receiving Station to Pre-Mashing. Our grain milling systems are complete with precleaning system and all other accessories required for various grain processing

- Grain Pre-cleaning include vibrating screen, sand removal system etc.
- Grain Cleaning vibrating screen, de-stoner, magnetic separator, dust extraction etc.
- Milling system Hammer mills, shifter, oversize particle recycling system, VFD etc.
- Dust extraction system chutes, blowers, bag filters connected to entire milling system
- Automatic weigher with high accuracy.
- Pre-Mashing-Ribbon blender

## **Salient Features:**

- •Higher throughput with consistent quality of flour with right particle size distribution
- •Complete end to end design to accept different grains and scope of work under one roof including structural building, ducting etc.
- •Absolutely Dust free environment in complete handling and milling system
- •Milling operation losses not more than 1% of the grain input excluding foreign particles
- •Noise levels less than 60 db well within MoEF permissible norms
- •Low power usage with right selection of hammer mills with VFDs wherever necessary
- •Rugged and proven mill type selection and delivery

## **Benefits:**

- •Right particle size in flour to maximize alcohol yield and smooth operation of DDGS plants.
- •High uptime with low maintenance costs.
- •Complete grain milling solution under one roof and performance guarantee.
- Power savings upto 30% compared to traditional Grain Handling and Milling Systems.

### **REGREEN EXCEL EPC INDIA PVT. LTD.**





## "E-max" Liquefaction Plants

Get maximum out of you Grain with our customized specially engineered Liquefaction Plants. Our Liquefaction plants are designed to effectively reduce mash viscosity, solubilize entire Starch into Dextrins and prepare a perfect substrate for fermentation.

High solids liquefaction with low requirement of steam, fresh water and optimum enzyme dosage is main design criteria for the modern liquefaction plants delivered by us.

## **Salient Features:**

- High yields compared to other cooking processes with Enzymatic conversion efficiencies as high a 99.9%. Total recovery from raw material.
- Technologies available for steam pressure as low as 3.5 Kg/cm2 (g) and 2.0 kg/cm2 (g)
- · Low steam consumption with or without the use of Jet Cooker
- Optimum enzyme dosage with use of commonly available enzymes
- Excellent process control with temperature and pressure controllers
- •Online Cleaning in Place (CIP) system for PHEs for non-stop operation
- Provision for recycle of thin slop, process condensate & spent lees to minimize fresh hot water requirement

## **Benefits**:

- •Highest yield with overall recovery of starch. High recovery ensures total utilization of raw material.
- •Low enzyme dosage and low cost of enzyme per litre of alcohol produced
- •Considerable saving in steam requirement
- •Low maintenance cost and easy to operate
- •Low slop generation with recycle and high DS cooking process.



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## "E-max" Highly Efficient Fermentation Plants



Be it a Sugary Feedstock, a Grain or a Tuber, we offer a wide range of highly efficient fermentation plants delivering maximum yields. Utilization of every molecule of your raw material to convert it into a valuable product is our aim. Our unmatched fermentation high efficiencies for all types of feedstock ensure best possible yields consistently. Module of Cellulosic feed stocks converter will also be added to our plants in future.

We also offer High gravity fermentation process targeting high alcohol percent in fermented wash to reduce on effluent spent wash generation and save on energy usage during distillation.

Every plant is designed considering available feedstocks and we offer a wide range of fermentation plants for

- Sugary feedstock including sugar cane juice, syrup and various grades of molasses
- Grains including corn, rice, sorghum, wheat, rye, triticale, oats and barley
- Tubers including cassava / tapioca, potato and sweet potato

### **Equipment Design Features**



ls Our Vision, Mission

And Quality Policy,,



## "E-max" Highly Efficient Fermentation Plants



## **Salient Features:**

- •Multi feedstock design options depending upon client's requirements & feed stock scenario
- •Rugged fully automated Feb Batch fermentation plants for better flexibility in operation
- •The process / technology provides flexibility to use either culture yeast slants or Commercially available Active Dry Yeast
- •High Fermentation efficiencies adopting high gravity fermentation technology.
- •Recycle of spent wash to minimize effluent generation and process water consumption

## **Benefits**:

- •Maximum yield extraction from raw material with extra value for money
- •Minimum spent wash generation & Low process water consumption due to high gravity operation
- •Lower energy requirements by 10%
- •No dependency on culture yeast. Assurance of Higher Efficiency due to minimum use of sugar for yeast growth



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## *"E-max"* Custom Made Energy Efficient Superfine Grade Spirit Distillation Plants

At Regreen Excel, we feel that standardization of technical process scheme restricts the innovation. And that is why; we consistently evolve with betterment in technology, designs and schemes.

Hence; undoubtedly, our distillation process technologies are most advanced considering site conditions, raw material variations, energy integration and product quality. Our application engineers & designers undertake design of unique distillation plants suitable for individual client requirements & this has given us a technological edge and most satisfied clients in last one decade.

## **Salient Features:**

- •State of art designs with Utilization of design and simulation software like ChemCad, Aspen HYSYS, ProPipe and Computational Fluid Dynamics for guaranteed plant performance.
- •Specially designed distillation columns with modern tray internals for better life & efficiency at minimum capital cost without any compromise in equipment mechanical designs.
- •Distillation plants with flexibility to produce various grades of spirits like RS, ENA and Ethanol with various ratios with each plant is designed to accept multi feed stocks without variation in operating efficiencies and utilities.
- •With high distillation tray efficiencies and higher level heat integration, our distillation plants results in lowest steam usage.
- •Product quality norms for RS, ENA and Ethanol supersede present industry standards and also meet international quality specifications at all the time.

## **Benefits**:

- •Extra value for money resulting into a net saving of 15 to 20% in operating cost of the product produced compared to present distillation plants
- •Product superfine grade ENA acceptance with ease by all domestic & international bottlers
- •Trouble-free plant operation with guaranteed performance and Extended plant life with low maintenance cost
- •Flexible distillation plants to produce products by using various feed stocks taking care of market demands & variations



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## "E-max" Dehydration Units for Absolute Alcohol



Eliminate that last drop of water from spirit with our Absolute Alcohol Plants employing Molecular Sieve Dehydration Technology. Our fuel Ethanol Plants work on Pressure Swing Adsorption technique and employ crystalline, hydrated metal aluminosilicate adsorbent material with uniform pore diameter which is thermally stable at higher temperatures.

We offer various customized and cost effective options depending upon available steam pressures, waste energy integration, space availability and project schedules.

## **Salient Features:**

- -Design of molecular sieve drums and sieves quantity to produce Fuel Ethanol / Pharma Grade with 99.9% v/v purity
- •Schemes available for operating on low input Spirit Strengths as low as 90% v/v
- •Specially designed Absolute Alcohol Plants suitable to produce Pharma Grade Spirit
- •Low steam consumption with higher heat integration and low pressure steam
- •Options for standalone and integrated units with distillation plants
- •Pre-assembled Skid Mounted Fuel Ethanol Plants also available

## **Benefits**:

- •Production of High strength Fuel Ethanol with minimum
- •99.9% v/v concentration
- •Easy acceptance by oil companies and pharmaceutical industry due to less moisture
- •Low operating costs by 10% lower than present schemes
- •Quick project implementation and possibility of plant relocation with our skid mounted units

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## "E-max" Multi Effect Evaporation (MEE) Plants

With the aim to reduce effluent quantity, to increase solid concentration in stream and ultimately stepping towards achievement of Zero Liquid Effluent Discharge, "Regreen Excel" has come up with a wide range of evaporation technologies and equipment designs.

We offer various combinations of Natural (thermosiphon), Falling Film and Forced Circulation Evaporation Plants. The flexibility of integrating our Evaporation Plants with Distillation and Dryers to save on steam consumption is the hall mark of our modern designs. The evaporation plants are specially designed to handle molasses raw spent wash, bio-methanated spent wash and grain thin slop to achieve desired solid concentration with clear process condensate without any entrainment and longer cycle time.



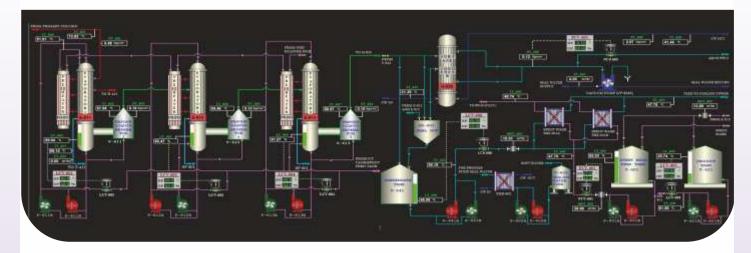


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## "E-max" Multi Effect Evaporation (MEE) Plants



## **Salient Features:**

- •Very low specific steam consumption for solid concentration up to 60% w/w in case of molasses plants and beyond 40% w/w in case of grain plants
- Careful selection of material of construction for calendria shell, tubes and vapor separators
- Evaporation Plants suitable for Raw Spent Wash as well as Bio-methanated Spent Wash
- •Online Cleaning In Place (CIP) system ensures non-stop operation and Standby pumps and bypass to control valves for non-stop operation
- •Flexible options for energy integration with distillation plant and dryer to save on steam
- •Spent wash evaporation technology to concentrate up to 90% solid concentration

## **Benefits**:

- •Low downtime of plants for want of CIP and scaling / corrosion problems.
- •Net saving of 25% in operating costs due to low steam and less power
- Extended plant life with low maintenance cost
- Achievement of practically Zero Liquid Effluent Discharge plants for grain and molasses
- •Clear process condensate which is easy to treat and recycle



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## "E-max" Dryer & DDGS Plants

We are proud to state that with supply of more than 50% of dryers to large scale distilleries in last couple of years, we became the most successful technology provider for Dryer and DDGS Plants. We offer an end to end solution for DDGS plants with complete scope including DWGS Feeding System, Dryer, DDGS Cooler, Vapour Handling System, DDGS Handling System, Civil, Structural, Electrical and Instrumentation. Our Dryers are capable of working with full stream of concentrated syrup from thin slop evaporation plants mixed with wet cake from decanters for all feed stock options.

On achieving this, we never limited our innovation and now we integrate evaporation plants to operate on Dryer Vapours to make them steam free.



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## "E-max" Dryer & DDGS Plants



## **Salient Features:**

- •Product quality is the best in the industry and accepted with ease in export markets
- •Steady operation on full stream of concentrated syrup mixed with wet cake with various feed stocks
- •High uptime of the DDGS pant with consistent and trouble free operation with low maintenance cost
- •Approximately 60% dryer vapor utilization to drive evaporation plant, saving in steam requirement up to 1 Kg/litre of ENA / Ethanol production
- •End to End solution for DDGS Plant with complete scope including DWGS Feeding System, Dryer, DDGS Cooler, Vapour Handling System, DDGS Handling System, Civil, Structural, Electrical and Instrumentation

## **Benefits**:

- Added protein value to product as concentrated syrup from evaporation plant is converted to DDGS along with wet cake
- •Net saving of 25% in steam costs in ENA / Ethanol production with dryer vapor heat utilization in evaporation plant
- •Hassle free operation to produce good quality DDGS and consistent DDGS revenue



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## Reliable Waste Water Management Solutions & Zero Liquid Discharge Plants

Regreen Excel offers a comprehensive range of technologies to address Water and Waste Water Management issues in line with the specific treatment and recycle needs including "Zero Liquid Effluent Discharge Plants" for the process industries such as:

- •Sugar and Distilleries
- •Textile and dyeing industry
- •Pharmaceuticals and Chemicals

•Paper and Pulp

- •Petrochemicals and refining
- Other process and heavy industries and desalination plants

Dairy and Food Industry

Our custom built solutions are purely based on scientifically designed unit operations & processes, robust design conforming to international standards and optimized instrumentations & controls for trouble free and safe operations.

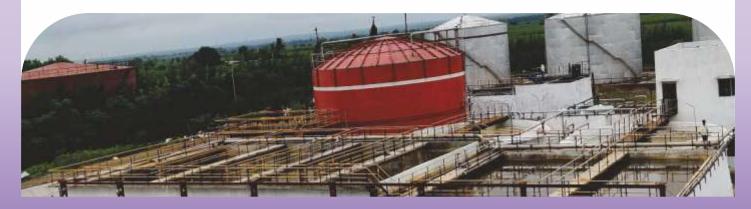
Your wastewater is the most reliable source of your fresh water !

## Water & Waste Water Management Solutions

- Raw Water Clarification and PreTreatment Plants
- Effluent Treatment, Recycle and Zero Liquid Effluent Discharge Systems
- Recycle and Zero Liquid Effluent Discharge Systems
- Filtration System
- Demineralization Plants

- Membrane Separation Systems
- Ultra Filtration Units
- •Desalination Plants
- Recycle System
- Condensate Polishing Units (CPU)
- Dissolved Air Floatation (DAF) Systems
- Aerobic and Anaerobic Systems

With our profound knowledge of process industry, our first step is to conduct a process audit and develop a template for mass balance of each unit process. Our offerings are purely based on study of process operation, minimizing effluent generation in process itself, reuse and recycle of process streams, trouble free operation, low operation and maintenance cost and finally minimizing the use of fresh water.



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## "E-max" Zero Liquid Effluent Discharge Plants

With an increasing demand on natural water resources, and unabated pollution posed by industrial discharges into the environment, it has become necessary to implement zero discharge systems in industrial waste water treatment plants. In a waste water treatment facility, zero discharge theoretically means no discharge of any kind of pollutants into the environment.

At "Regreen Excel", we believe in literal meaning of "Zero Liquid Effluent Discharge" and we endeavor to achieve it through our offerings. For us, concept of zero discharge necessarily means

- Minimization of waste streams in process operation
- Recovery of reusable water/other materials from waste water
- No discharge of polluting substances into the environment away from the waste water treatment facility
- The processes utilized for waste water treatment does not generate any additional pollutants
- Production of waste is minimized by suitable selection of unit processes and adjusting operating parameters
- As far as possible, pollutants in the wastewater are transferred to solid phase
- Recovery of reusable materials, especially water, is achieved

We have tailor-made industry specific solutions for High COD, High TDS and Difficult to Degrade Effluents. We offer a wide range of products for achieving "Zero Liquid Effluent Discharge"

- Aerobic and Anaerobic Systems
- •Centrifuges & Filtration Units
- Bio-Enzyme Treatment Systems and incineration based system
- Caustic recovery plants and chemical recovery evaporators
- •Membrane Separation and Ultra Filtration Units
- •Bio-Methanation Plants and Bio-Composting System
- •Multi Effect Evaporation Plants-Falling Film and Forced Circulation
- •Steam Tube Rotary Dryers, Agitated Thin Film Dryers, Spin Flash Dryers and Spray Dryers
- •Spent Wash Incineration Boilers



## REGREEN EXCEL EPC INDIA PVT. LTD.



Innovative Technological Solutions, Global Partnership...

> Low Energy

Reliable Zero

Liquid Discharge



# Make **Millions** With "E-max" Technology

### **REGREEN EXCEL EPC INDIA PVT. LTD.**

