





BillionGroup Technologies Ltd.
兆豐科技設備有限公司

Your Professional Energy Consultant

OUR VISION & MISSION

“We shape Energy for a better World”

Since 1991

*“To foster technology innovation with the express
Provision of happiness for all people around the world”*

BILLIONGROUP

CONSULTANT SERVICES



Waste Management,
Waste Recycling,
Waste to Energy

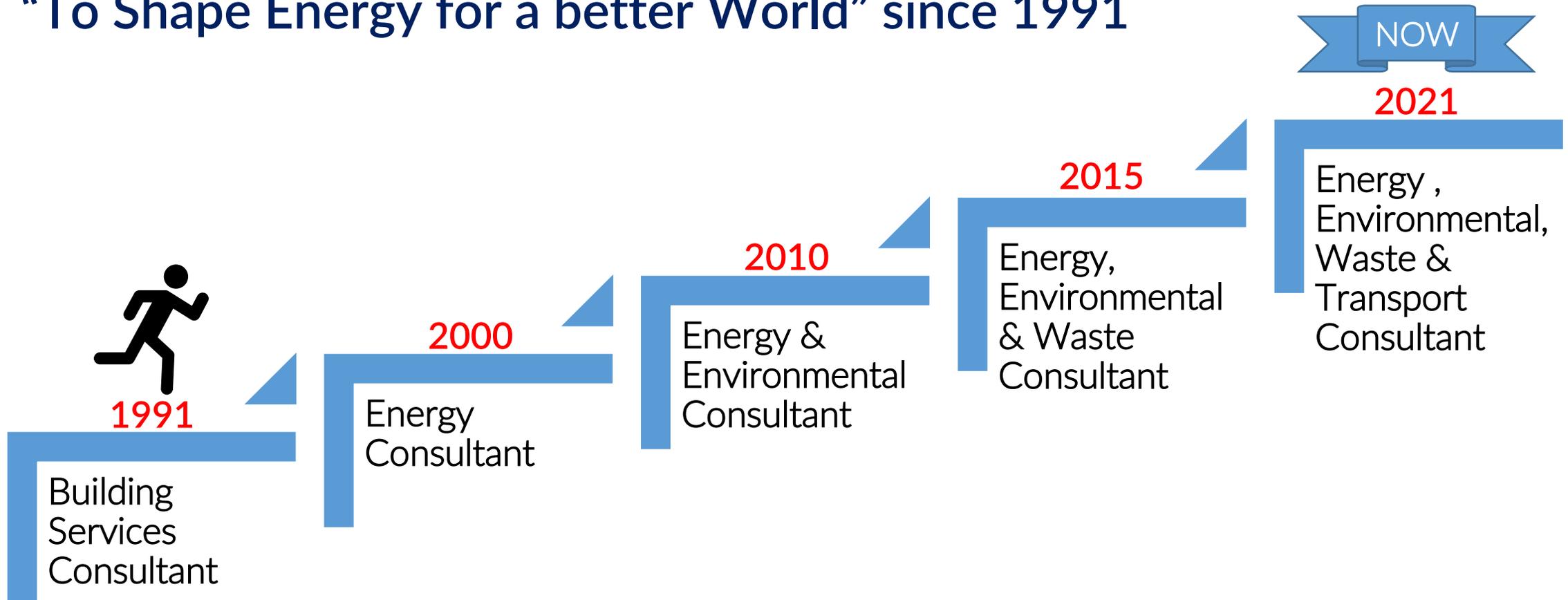


Energy &
Environmental

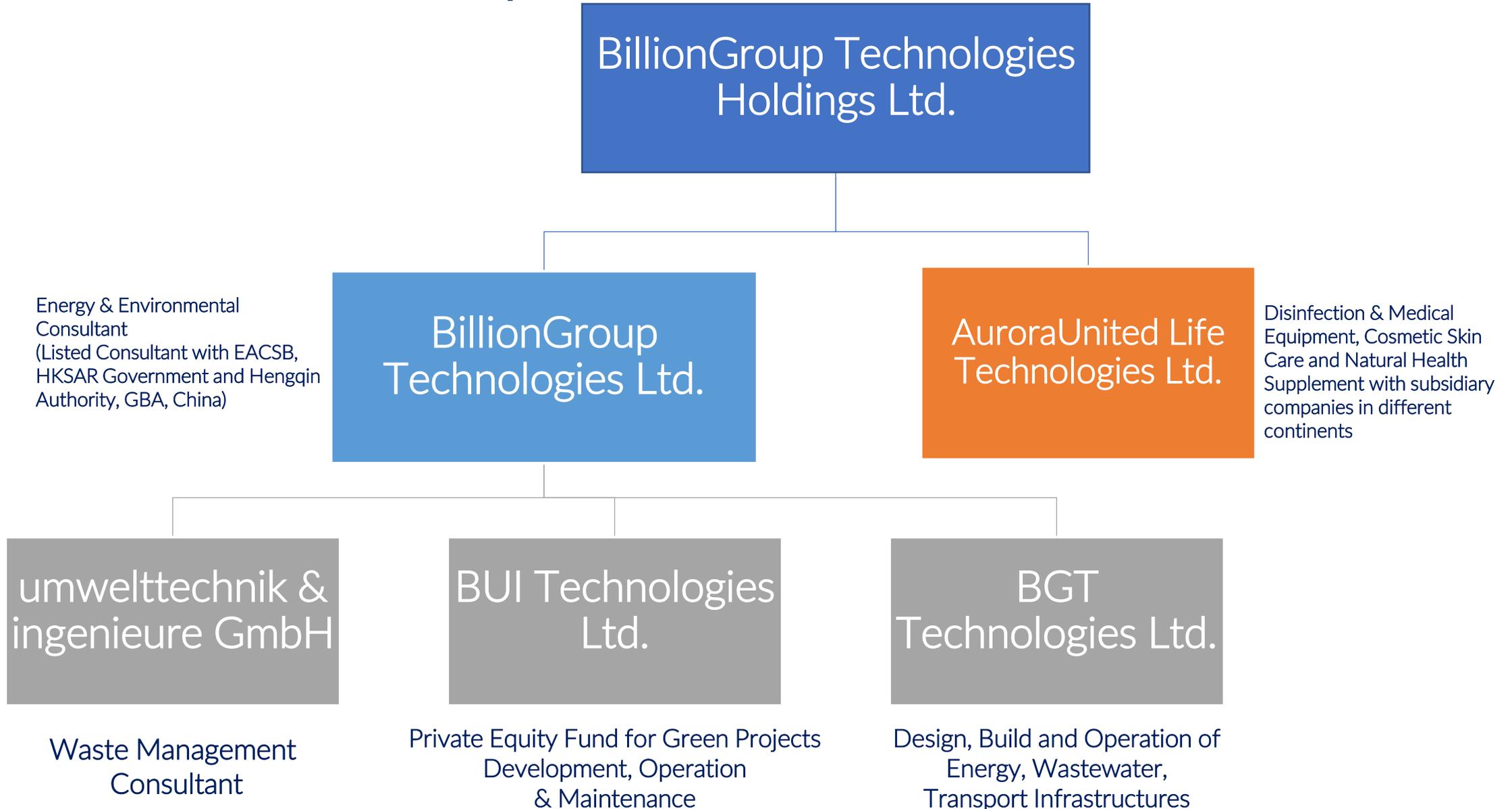


Green
Transportation

The Development of BillionGroup with the Vision “To Shape Energy for a better World” since 1991



Portfolio of BillionGroup



BillionGroup Technologies Ltd.

Hong Kong Office, BillionGroup

Managing Director

Prof. Ir Steve S.F. WONG

Director

Ms. Susan S.M. CHENG

Director of Marine Science

Prof. K.C. HO, BBS, JP

Director of Environment & Sustainability

Prof. K.L. TSANG, BBS, JP

Director of E&M System

Ir. Anthony W.S. YU

Director of Development

Ir. Y.B. WAI

Director of Infrastructure

Ir K.P. YIM, JP

Director of Building Services

Ir. Dicky K.F. LAI

Director of Logistics & Supply Chain

Prof. Ken CHUNG

Director of Air and Noise Control

Dr Ir. Peter Y.H. YAU

Director of Carbon and Environmental Management

Dr Ir. Shelley W.W. ZHOU

Energy & Environmental Manager

Mr. Billy T. L. WONG, MSc (Energy & Environment), BEng (Hons)

Wastewater System Manager

Dr. Benjamin CHOW

Building Services Manager

Mr. Derek LO, BEng (BSE), REW (BO)

Project Officer

Mr. Kenneth Y.L. KWOK, B.Soc.Sc.(Hons)

Ms. Mariana P.C. LAW, MSc (Social Science), B.S.W. (Hons)

Energy & Environmental Officer

Ms. Fanny T. T. LEE, BSc (Hons)

Germany Office, u&i

Chief Executive Officers and Representatives

Dipl.-Ing. Thomas Schücke

Dipl.-Ing. Nils Oldhafer

Power Engineering / Plant Construction

Dipl.-Ing. Bernd Dibke

(Operations and Supply Engineering)

Head of the Commercial Department Business Management

Cornelia Schücke

(Business Management)

Project Team

Dipl.-Ing. Yvonne Bönner (Process Engineering); Dipl.-Ing. Ralph Bürgel (Civil Engineering); Dipl.-Ing. Jörg Doltze (Civil Engineering/Environmental Technology); Dipl.-Wirt.-Ing. Morgan Düren (Engineer For Energy And Process Technology); Dipl.-Ing. Henning Feldmann (Mechanical Engineering); Dipl.-Chem. Britta Filus; Dipl.-Ing. Oliver Güthenke (Engineering Environmental Protection); B. Eng. Marcel Homburg (Electrical Engineering); Dipl.-Ing. Christian Junge (Graduate Industrial Engineer); M. Sc. Carsten Meyer (Sustainable Energy Systems); Dipl.-Wirt.-Ing. Fabian Klonk-Markowis (Engineer For Energy And Process Technology); Miapl.-Ing. Oleksiy Kolchak (Process Engineering); Dr. rer. nat. Tammo Rebling (Environmental Science); M. Sc. Brian (Tin Pui) Wong (Architecture); Dipl.-Ing. Thorsten Rogge (Engineering Environmental Protection); Dipl.-Ing. Margret Rauschnabel (Landscape Architecture); Dipl.-Ing. Dennis Rukavina (Civil Engineering); Sven Wildschütz (Certified Building Technician); Torben Gründken (Civil Engineering Technician); Stefan Ehmki (Certified Building Technician); Heino Kis (Certified Electrical Engineering Technician); Dipl.-Ing. Andreas Schumacher (Civil Engineering); Dipl.-Ing. Dirk Selle (Civil Engineering With Fire Protection); M. Sc. Shivali Sugandh (Environmental Studies And Resource Management) ; M. Sc. Ralf Stiehler (Civil Engineering, Road Construction, Water Management); Sven Fietz (Technical Draughtsman); Julia Hempel (Architectural Draughtsperson); Christian König (Architectural Draughtsperson); Zurab Inasaridze (Architectural Draughtsperson); B. Sc. Mirella Dominika Kahn (Business Administration); Chevon Lee Harding (Secretary)

BillionGroup Consultant Services

Energy and Environmental

ENERGY EFFICIENCY IMPROVEMENT FIELDS

- ✓ Cities
- ✓ Buildings
- ✓ Manufacturing
- ✓ Airport & Transportation
- ✓ Electrical
- ✓ Air-conditioning
- ✓ Lighting
- ✓ All energy systems

SERVICES INCLUDED BUT NOT LIMIT TO :

1. Air Neutralization & Purification
2. Water Management
3. Energy, Carbon & Environmental Management
4. Lighting
5. Air-Conditioning System
6. Thermal Management Product
7. Renewable Energy
8. Others

ENERGY, CARBON & ENVIRONMENTAL MANAGEMENT



- ✓ ISO 50001 Energy Management System
- ✓ ISO 14001 Environmental Management System
- ✓ Education Programmes and Projects
- ✓ Seminars and Forums

Energy Efficiency & Environmental Friendly



ADVANCED DIGITAL LIGHTING SYSTEM

Key to Solution:

Provide **INTEGRATION OF INTELLIGENCE** –
Sensing, Controls and Wireless Networking
Into well-designed high bay luminaries.

Regularly **saving** customers up to **95%** on
their lighting energy costs.



ADVANTAGES FROM ADVANCED DIGITAL LIGHTING SYSTEM



ENERGY SAVINGS

Energy Efficiency Enhancement
Maximize and validate energy savings.



PRODUCTIVITY

Operational Efficiency Improvement
Increase productivity with operational insight.
Further energy saving.

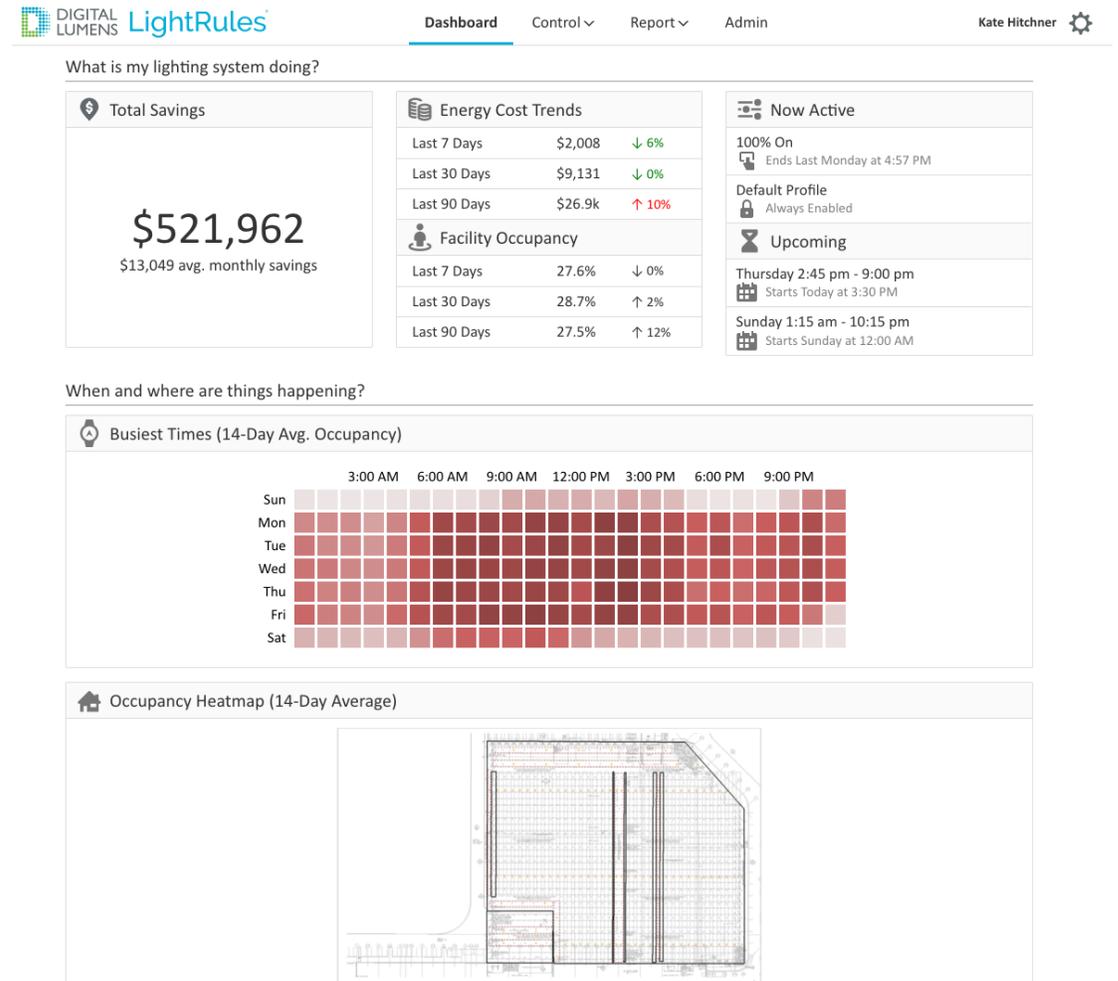


SAFETY

Security Advancement
Improve employee safety and comfort.

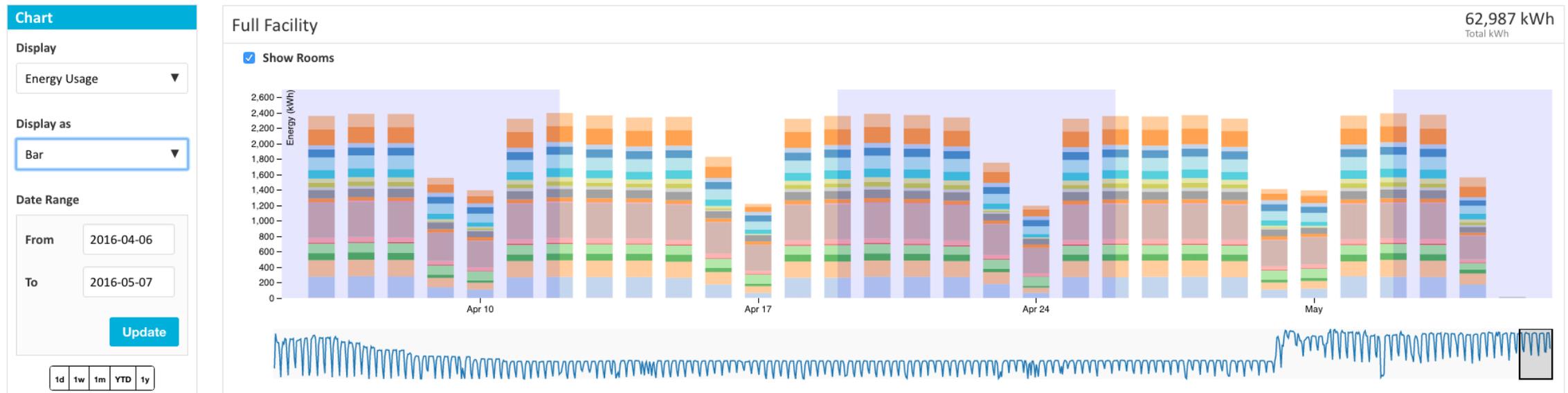
ADVANTAGES FROM ADVANCED DIGITAL LIGHTING SYSTEM: *LIGHTRULES*

- **Automatically** collects usage data
- Able to **Show & Control** on your Computer, IOS/Android Smart Phone
- ✓ Energy Reports
- ✓ Advanced charting engine
- ✓ Email reports & exports



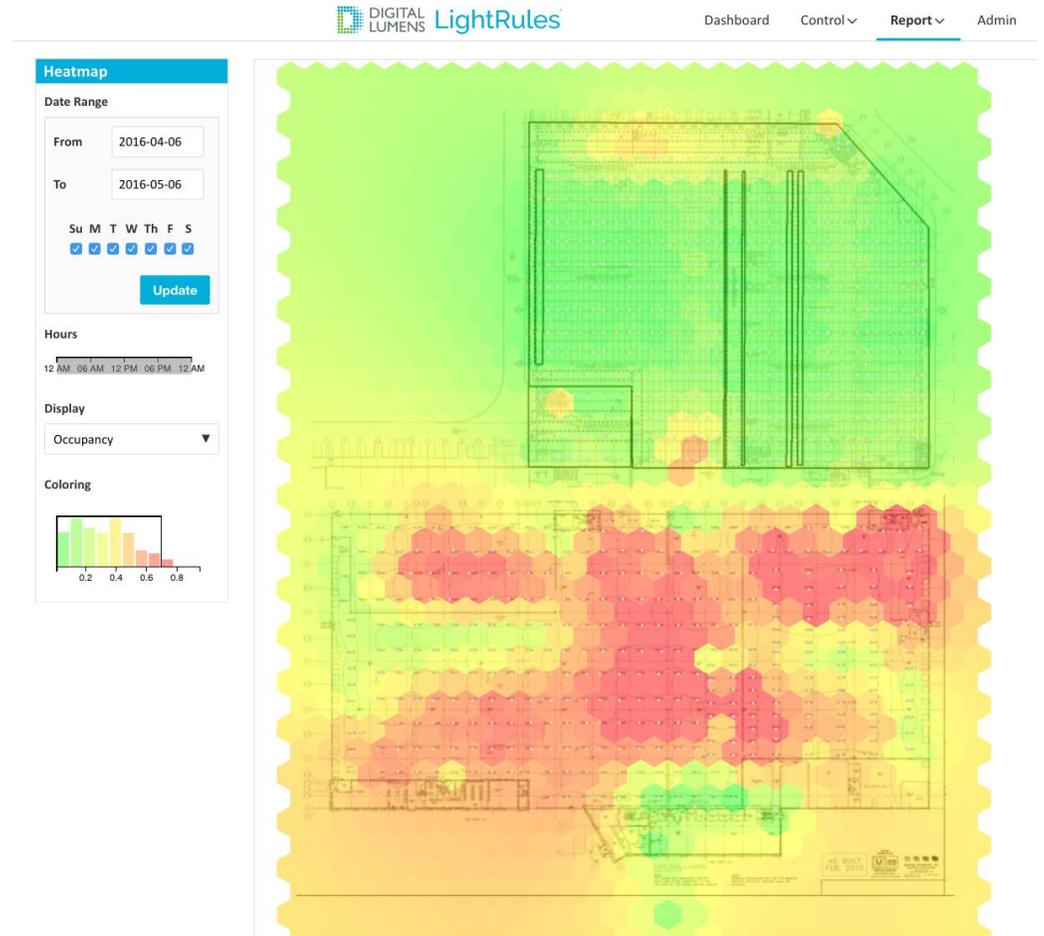
ADVANTAGES FROM ADVANCED DIGITAL LIGHTING SYSTEM: *LIGHTRULES*

- **Visibility** into usage patterns



ADVANTAGES FROM ADVANCED DIGITAL LIGHTING SYSTEM: *LIGHTRULES*

- Heat Map
Further Energy Saving!



JOB REFERENCE FOR ADVANCED DIGITAL LIGHTING SYSTEM

Ace Hardware Corporation

- World's largest hardware cooperative
- Facility Location: Rocklin, CA
- Application: Distribution Center
- Environment: Ambient
- Operating Schedule: 24 x 7

Installation Type:
Installation Size:
Lighting Choice:

Retrofit of T5 HIF & 400-Watt Metal Halides
1,000,000 ft²
Digital Lumens Intelligent Lighting System



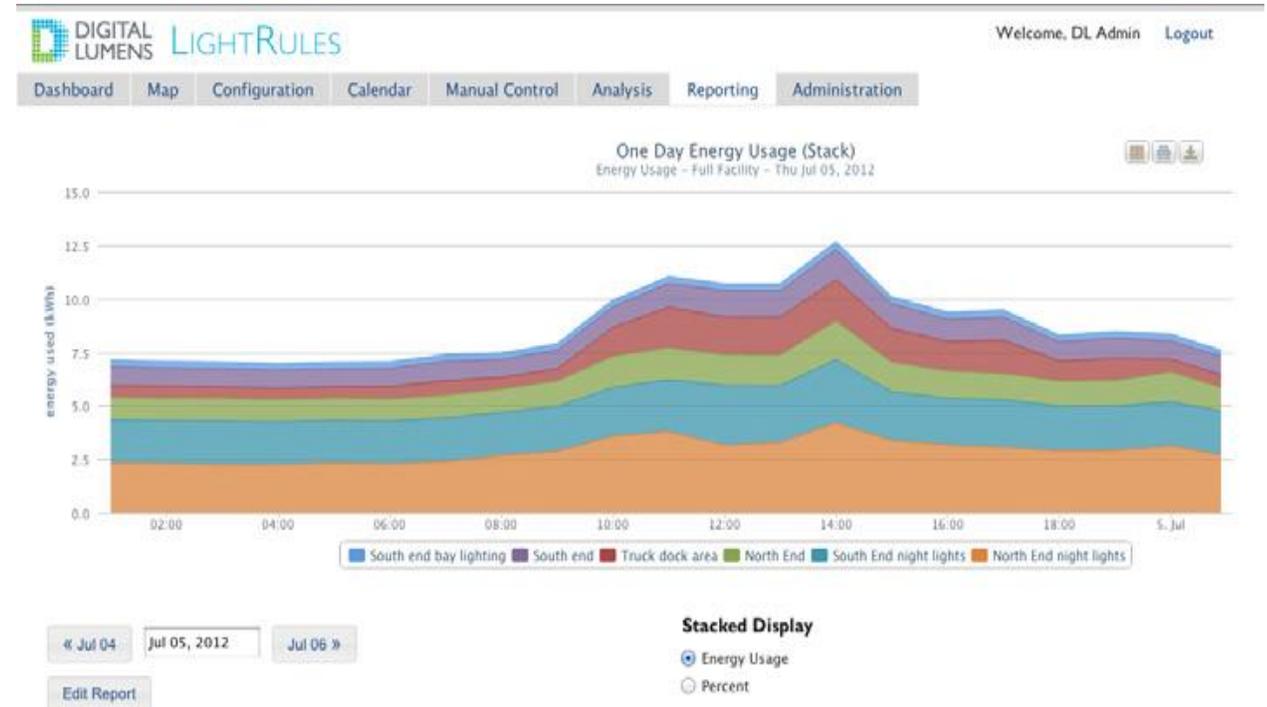
Lighting Energy Savings: 81%

JOB REFERENCE FOR ADVANCED DIGITAL LIGHTING SYSTEM

Creed Monarch

- Specializes in the contract manufacturing of precision machined ferrous and non-ferrous alloy components
- Facility Location: New Britain, CT
- Application: Manufacturing
- Environment: Ambient (up to 100°F at roof)
- Operating Schedule: Up to 12 x 6

Installation Type: Retrofit of T5 HO Fluorescents
 Installation Size: 140,000 ft²
 Lighting Choice: Digital Lumens Intelligent Lighting System
 Annual Cost Savings: \$108,436 at \$0.1046/kWh
 Annual kWh Savings: 1,036,669 kWh



Lighting Energy Savings: 90%

JOB REFERENCE FOR ADVANCED DIGITAL LIGHTING SYSTEM

Associated Grocers of New England

- One of the nation's largest retailer-owned purchasing and distribution cooperatives
- Facility Location: Pembroke, NH
- Application: Cold Storage
- Environment: Refrigerated (-15°F)
- Operating Schedule: 24 x 6

Installation Type: Retrofit of T5 HO Fluorescents
Installation Size: 56,600 ft²
Lighting Choice: Digital Lumens Intelligent Lighting System
Annual kWh Savings: 482,000 kWh



BEFORE

AFTER

Lighting Energy Savings: 90%

JOB REFERENCE FOR ADVANCED DIGITAL LIGHTING SYSTEM

Ben E. Keith Foods

- Nation's eighth largest broad line foodservice distributor and one of the world's largest independent distributors of Anheuser-Busch products
- Facility Location: Missouri City, TX
- Application: Warehouse / Cold Storage
- Environment: Ambient / Refrigerated (-40°F)
- Operating Schedule: 24 x 7



Installation Types: New Construction
Installation Size: 475,000 ft²
Lighting Choice: Digital Lumens Intelligent Lighting System

Lighting Energy Savings: 90%

PROJECT REFERENCES

Top Customers – North America

- Schneider Electric
- Coca Cola
- John Deere
- General Motors
- Heinz
- Unilever
- Nestle
- P&G
- Johnson & Johnson

Top Customers – Europe

- Carrefour
- L'oreal
- Bosch
- Mondelez
- SAS
- Krauss Maffei
- Coca Cola
- Bayer
- Schneider Electric

Top Customers – Asia

- DCH Logistics
- 7-11
- Swire
- Woolworth
- Nestle
- Wyeth
- BMW
- Adidas
- Havi / McDonalds
- Mondelez

PROJECT REFERENCES (1)

- Bakery factory - Australia
- Product: ILE-3-18
- Installation timing: 2016
- 86% savings versus T8 luminaires

PROJECT REFERENCES (1)



PROJECT REFERENCES (1)



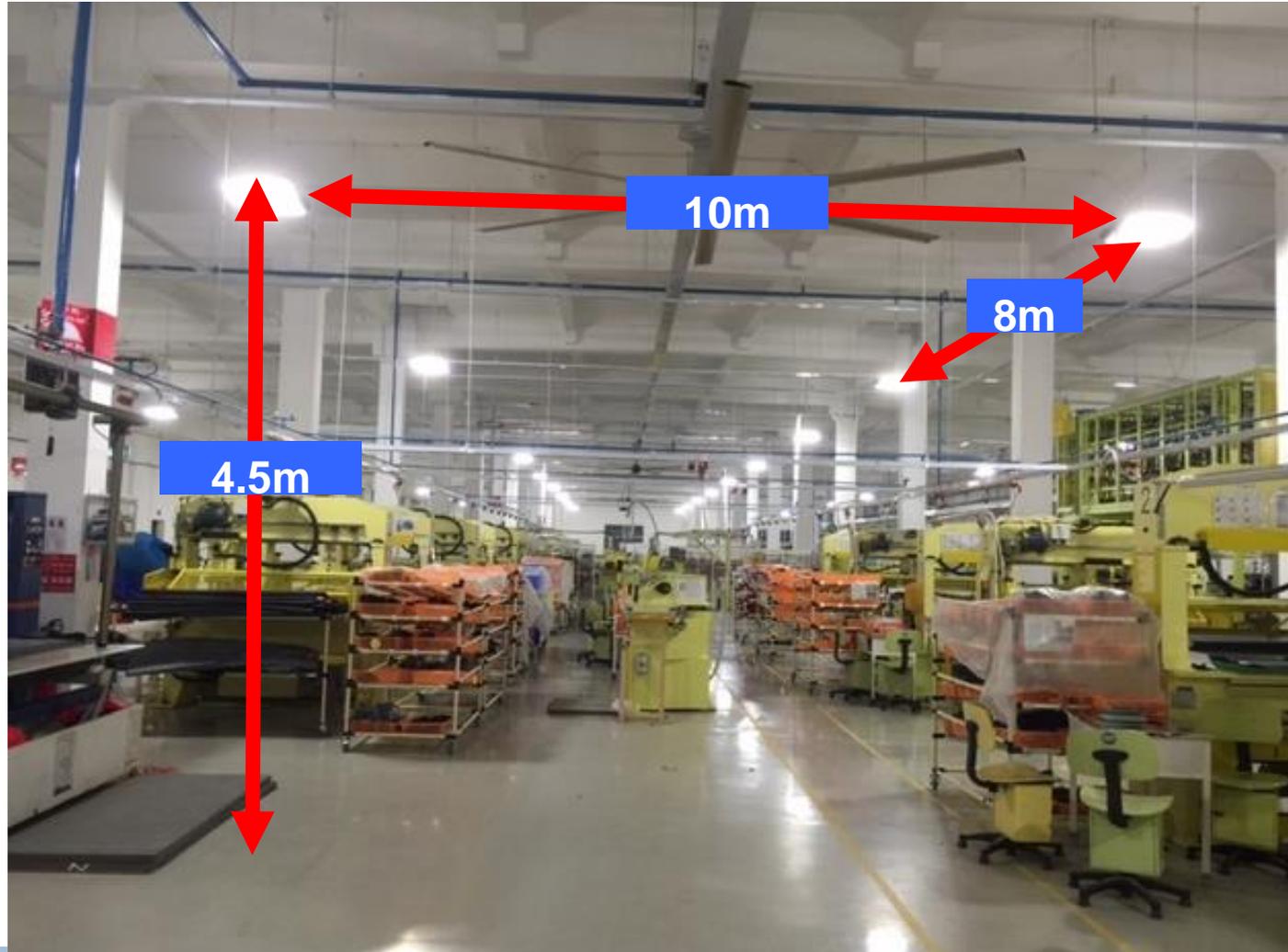
PROJECT REFERENCES (1)



PROJECT REFERENCES (2)

- Shoes manufacturing - Vietnam
- Product: DLE-18
- Installation timing: Dec 2015
- 92% savings versus T8 luminaires

PROJECT REFERENCES (2)



PROJECT REFERENCES (2)

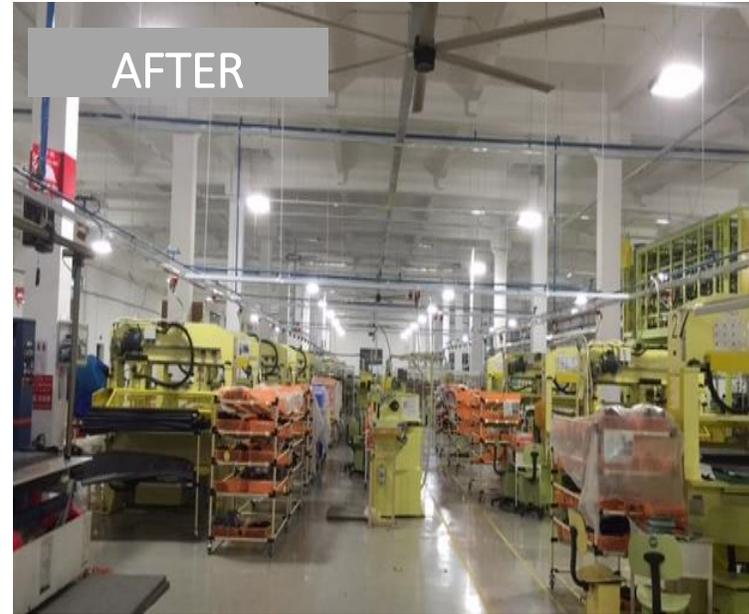


Energy and Environmental

PROJECT REFERENCES (2)



- 900 tubes x 20W
- Electricity cost: 247,104,000 VND / year
- 160 lux (night time)
- Warranty 3 years
- Maintenance down time: 15-20%
- Lights directly above → glare & heat → low productivity
- Must manually turn light off



- 44 fixtures 54W (effective) → 95% reduction
- Electricity cost: 27 million VND / year → 92% saving
- 350 lux (night time) → 2x increase
- Warranty 10 years
- Maintenance down time: 0%
- Only lights in ceiling → no glare & heat → improved productivity
- Automatically turned off when no people
- Reports, scheduling, task tuning

PROJECT REFERENCES (3)

- Distribution Center - Large convenience store chain – Thailand
- Product: DLE-18
- Installation timing: April 2016
- 88% savings versus T8 luminaires

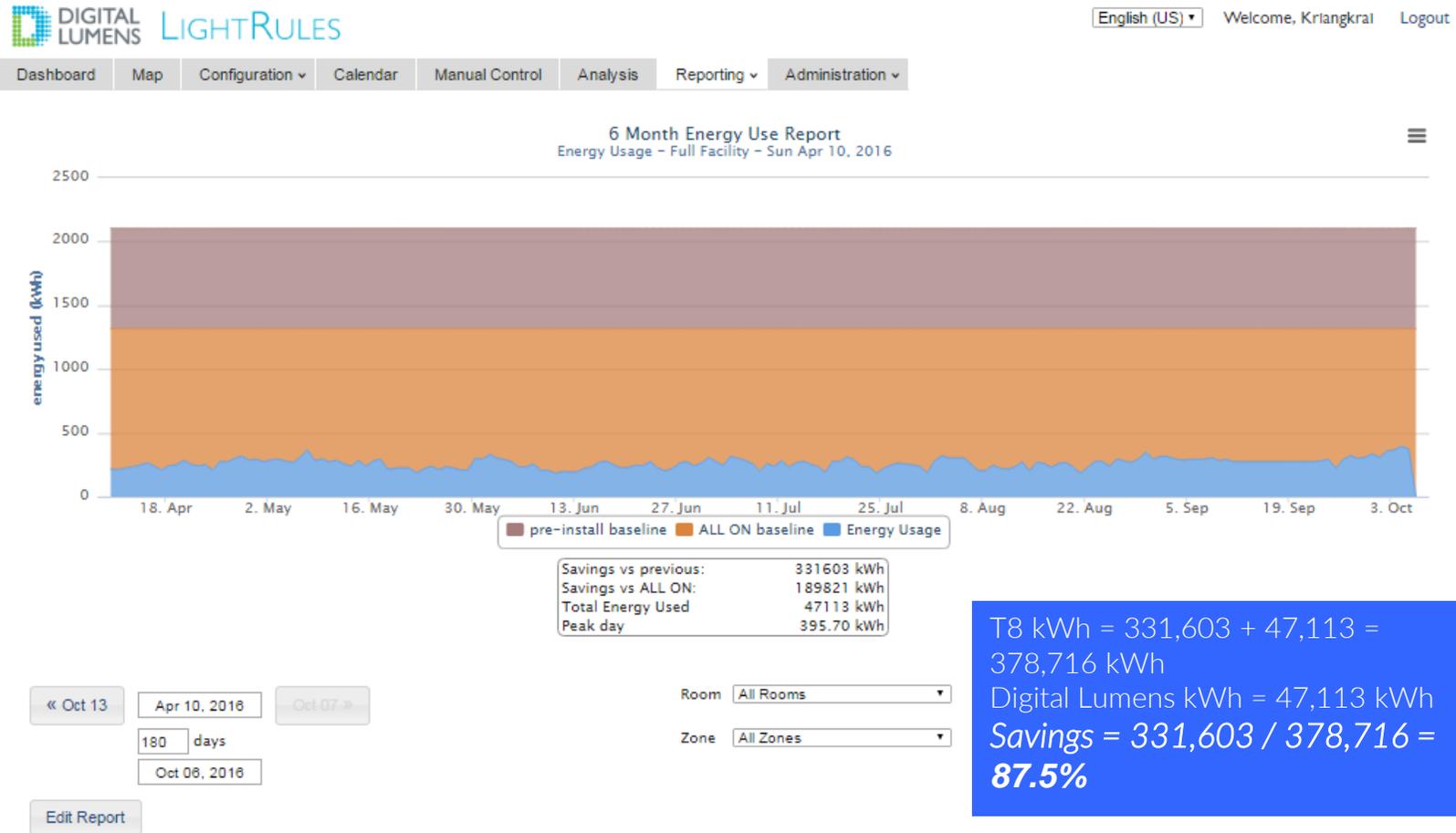
PROJECT REFERENCES (3)



PROJECT REFERENCES (3)



PROJECT REFERENCES (3) – LightRules Energy Report



PROJECT REFERENCES (3) – LightRules Calender Schedule



English (US) Welcome, Kriangkral Logout

Dashboard Map Configuration Calendar Manual Control Analysis Reporting Administration

Lighting Schedule for week starting October 02, 2016

Today « Sep 25 Oct 09 »

	Sun Oct 2	Mon Oct 3	Tue Oct 4	Wed Oct 5	Thu Oct 6	Fri Oct 7	Sat Oct 8
12am	วันหยุด	วันหยุด	วันหยุด	วันหยุด	วันหยุด	วันหยุด	วันหยุด
2am							
4am							
6am	Day Shift	Day Shift					
8am							
10am							
12pm							
2pm							
4pm							
6pm	วันหยุด	วันหยุด	วันหยุด	วันหยุด	วันหยุด	วันหยุด	วันหยุด
8pm	Night Shift 20.00-24.00						
10pm							

PROJECT REFERENCES (3) – *LightRules Traffic/Occupancy Report*



English (US) Welcome, Kriangkral Logout

- Dashboard
- Map
- Configuration
- Calendar
- Manual Control
- Analysis
- Reporting
- Administration

Facility Map - Occupancy 6 Month

Occupancy (180 day average)

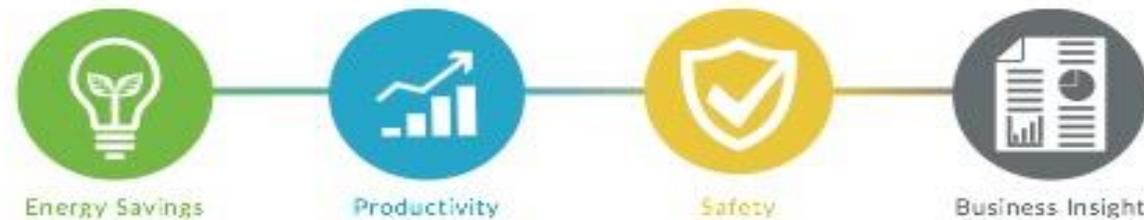


PROJECT REFERENCES (3) – LightRules Profiles/Settings

Dock D110		0		80	30	-	<input type="checkbox"/>
Dock D19		80		80	30	-	<input type="checkbox"/>
Dock D210		0		80	30	-	<input type="checkbox"/>
Dock D29		80		80	30	-	<input type="checkbox"/>
Dock D310		10		80	30	-	<input type="checkbox"/>
Zone	Gang	Inactive	Active	Delay (sec)	Disable CC / DH		
Dock D38		10		80	30	-	<input type="checkbox"/>
Dock D39		10		80	30	-	<input type="checkbox"/>
Dock E14		0		80	30	-	<input type="checkbox"/>
Dock E15		0		80	30	-	<input type="checkbox"/>
Dock E16		0		80	30	-	<input type="checkbox"/>
Dock E17		10		80	300	-	<input type="checkbox"/>
Dock E24		0		80	30	-	<input type="checkbox"/>
Dock E25		0		80	30	-	<input type="checkbox"/>
Dock E26		0		80	30	-	<input type="checkbox"/>
Dock E27		10		80	300	-	<input type="checkbox"/>
Zone	Gang	Inactive	Active	Delay (sec)	Disable CC / DH		

PROJECT REFERENCES (3) – *Summary/Conclusions*

- Savings of almost 88% versus T8 lamps - as expected
- Lighting levels (both vertical and horizontal) meeting stringent CP All Standards
- User is able to continuously fine-tune and maximize savings by optimizing Profiles/Settings
- A safe, comfortable & productive workplace



PROJECT REFERENCES (4)

- Cold storage - Japan
- Product: DLE-24
- Installation timing: March 2016
- 94% savings versus MH luminaires

PROJECT REFERENCES (4)



PROJECT REFERENCES (4)



Energy and Environmental

PROJECT REFERENCES (4)



PROJECT REFERENCES (5)

- Airplane hangar - Denmark
- DLE-48
- Installation timing: March 2016
- 87% savings versus MH luminaires

PROJECT REFERENCES (5)



Energy and Environmental

PROJECT REFERENCES (5)



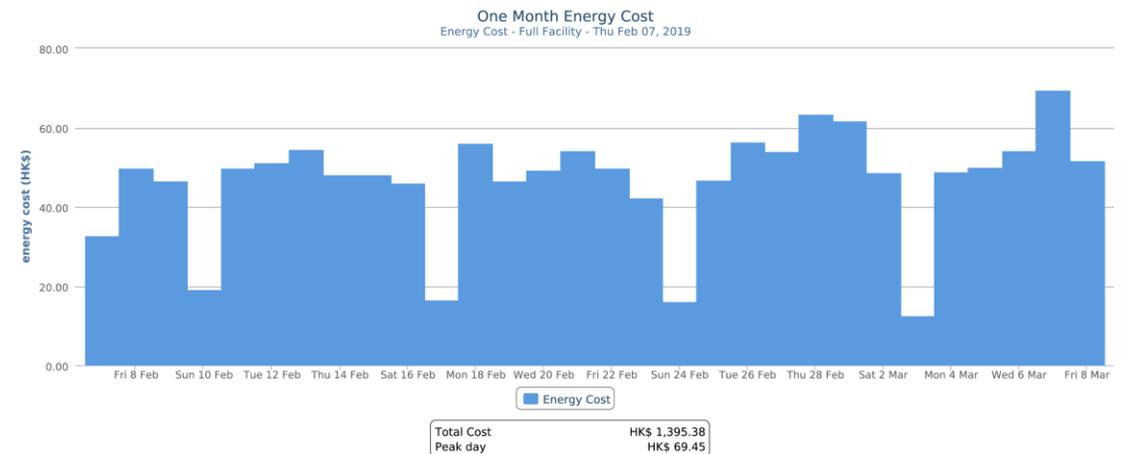
Energy and Environmental

OTHER JOB REFERENCES OF ENERGY AND ENVIRONMENTAL CONSULTANT

JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

Dah Chong Hong Group

- Provided energy efficiency improvement services for Dah Chong Hong Logistics Limited's cold storage in Yuen Long and Kwai Chung, Hong Kong

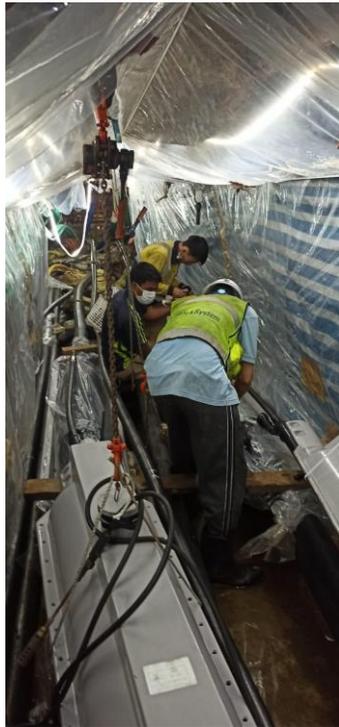


Save about 80% of energy costs for the lighting system of the cold storage!

JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

The Hongkong Electric Company Limited (Hongkong Electric)

- Advising the Hongkong Electric Co., Ltd. (HK Electric) on the laying of high-voltage cables in Hong Kong West



JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

Wong's Electronics Co., Ltd.

- Provided consultancy services on energy, environment and waste management for Wong's Electronics (Shenzhen) Co., Ltd.
- Provided energy, environment and waste management consulting services to Wong's Electronics (Suzhou) Co., Ltd.

WONG'S 王氏



JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

Hong Kong Ferry (Group) Co., Ltd.

- Provided energy and environmental consulting services for Hong Kong Ferry (Group) Co., Ltd.



Elevator energy audit



Rainwater collection system



Solar renewable energy system on the roof of the headquarters



Lighting system improvements

JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

K. Wah Asphalt Limited

- Variable-frequency technology for asphalt heating system
- **Cleaner Production Partnership Programme**
- **Carbon Smart Project**
- **Annual Reduction of Fuel Consumption:** around 212,578 L (equal to HKD1,615,593)
- **Annual Energy Cost Saving:** HKD150,000
- **Project Investment:** HKD 164,400
- **ROI:** around 1.2 months
- **Carbon Footprint Reduction:** around 556 tons CO₂



*Variable-frequency Drive of
Asphalt Heating Furnace*

JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

K.Wah Concrete Co Limited

Cleaner Production Partnership Programme
Carbon Smart Project



- Air output to chimney
- Estimated average flow rate: 60,000m³/Hr
- Temperature: 80°C

- 55KW Fresh air blower inside cladding.
- Estimated air flow rate 18,000m³/Hr (after install inverter to slow down)



JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

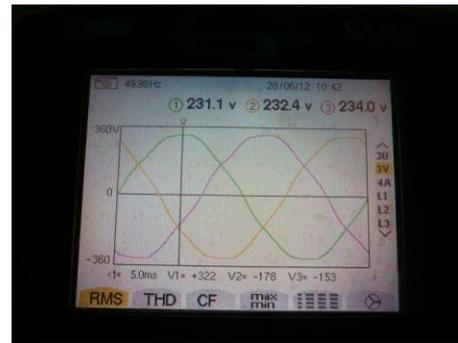


Hop Lun (Hong Kong) Limited's Manufacturing Facilities in Bangladesh

- Energy Consultant for 1 Year



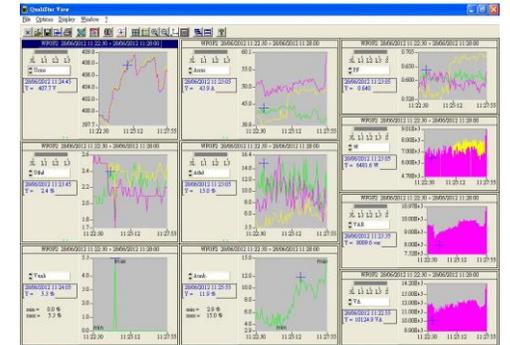
Emergency Generator



Electrical System



Lighting System



Power Supply Monitoring System

JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

Surface Mount Technology (Holdings) Limited



- Air compressor system and electrical system improvement
- Energy consultant over 4 years
- **Annual Energy Cost Saving: Over HKD30,000,000**



JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT



A-Fontane Company Limited

- Design checker to checking the facilities, operation mode and management
- Provide reasonable alternatives in design, selection and connection of variable-frequency drives for circulating pumps and furnaces
- **Annual Energy Cost Saving: Over HKD10,000,000**





INDUSTRIAL PROCESS MANAGEMENT

Energy Audit, Process Optimization and Cost Saving Study for top 22 Sewage Treatment Facilities,

DRAINAGE SERVICES DEPARTMENT, HKSAR GOVERNMENT

(contributed 80% of total annual electricity consumption and over 70% of total operating expenses among all DSD operated facilities)

PROCESS MANAGEMENT

Top 22 DSD Facilities



Shatin Sewage Treatment Works



Stonecutters Island Sewage Treatment Works



Tai Po Sewage Treatment Works



Shek Wu Hui Sewage Treatment Works



Pillar Point Sewage Treatment Works

PROCESS MANAGEMENT

Top 22 DSD Facilities



Wan Chai East Preliminary Treatment Works



Siu Ho Wan Sewage Treatment Works



Yuen Long Sewage Treatment Works



Kwun Tong Preliminary Treatment Works



Tseung Kwan O Preliminary Treatment Works

PROCESS MANAGEMENT

Top 22 DSD Facilities



Kwai Chung Preliminary Treatment Works



Stanley Sewage Treatment Works



Cheung Sha Wan Sewage Pumping Station



Sham Tseng Sewage Treatment Works



Sai Kung Sewage Treatment Works

PROCESS MANAGEMENT

Top 22 DSD Facilities

- To Kwa Wan Sewage Treatment Works
- North Point Preliminary Treatment Works
- Shatin Effluent PS
- Shatin Main Sewage Pumping Station
- Ha Tsuen Sewage Pumping Station
- North West Kowloon Preliminary Treatment Works
- Central Preliminary Treatment Works

JOB REFERENCES FOR ENERGY EFFICIENCY IMPROVEMENT

Trinseo (Hong Kong) Limited.

Improving Energy Efficiency in Manufacturing Systems

- Upgrade the plastic production system from DCS to ABB system
- Carry out Alterations and Additions Works for the system upgrade



JOB REFERENCES FOR ENVIRONMENTAL FACILITIES

STF Group

Installation of STF Equipment for New Life Plastic, Eco Park, Tuen Mun, Hong Kong

- Installing the STF Plastics Recycling facilities in Tuen Mun Eco Park for NLP to process HK's soft drink bottles (PET) and HK's food and cleaning products bottles (largely HDPE) and produce food-grade quality rPET flake and high-quality HDPE pellet. These will be used in the re-manufacturing of PET and HDPE products.

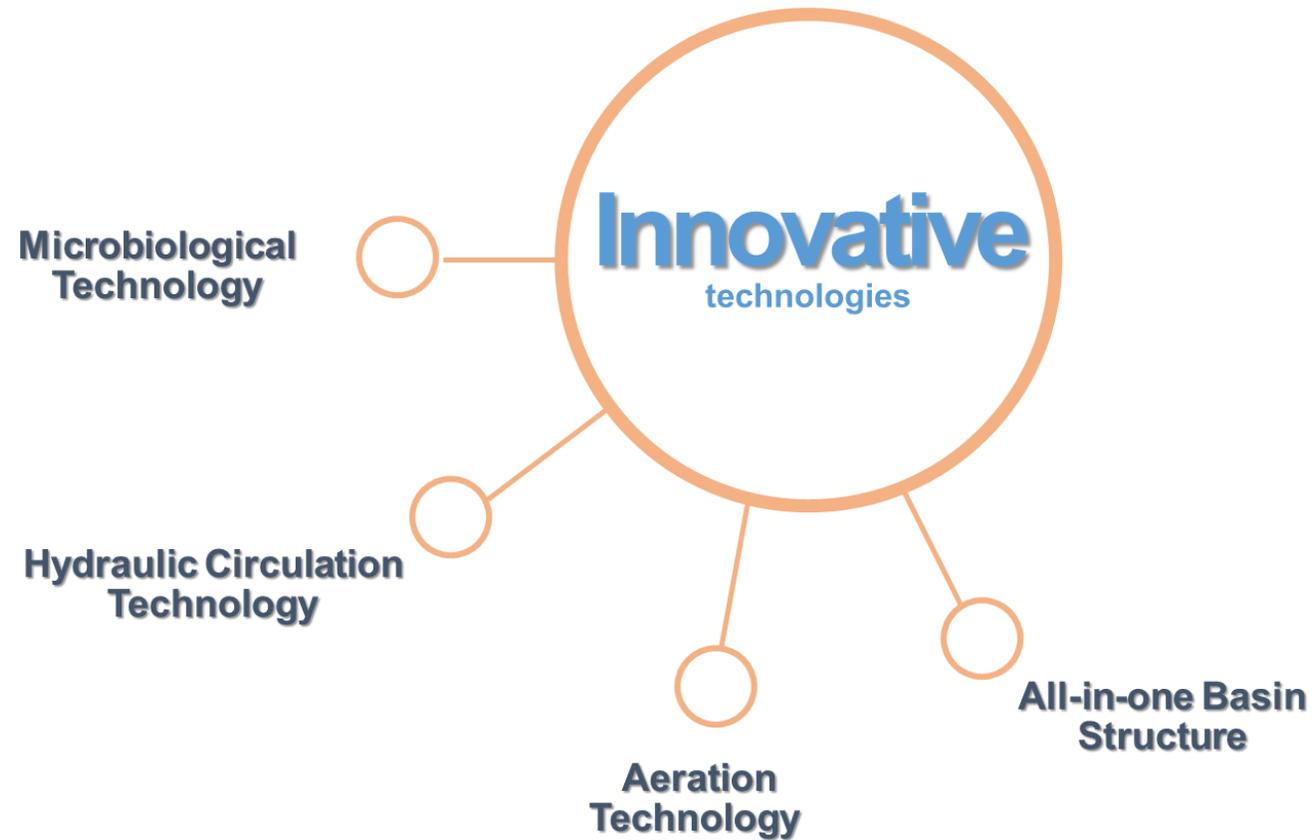


WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

WATER MANAGEMENT

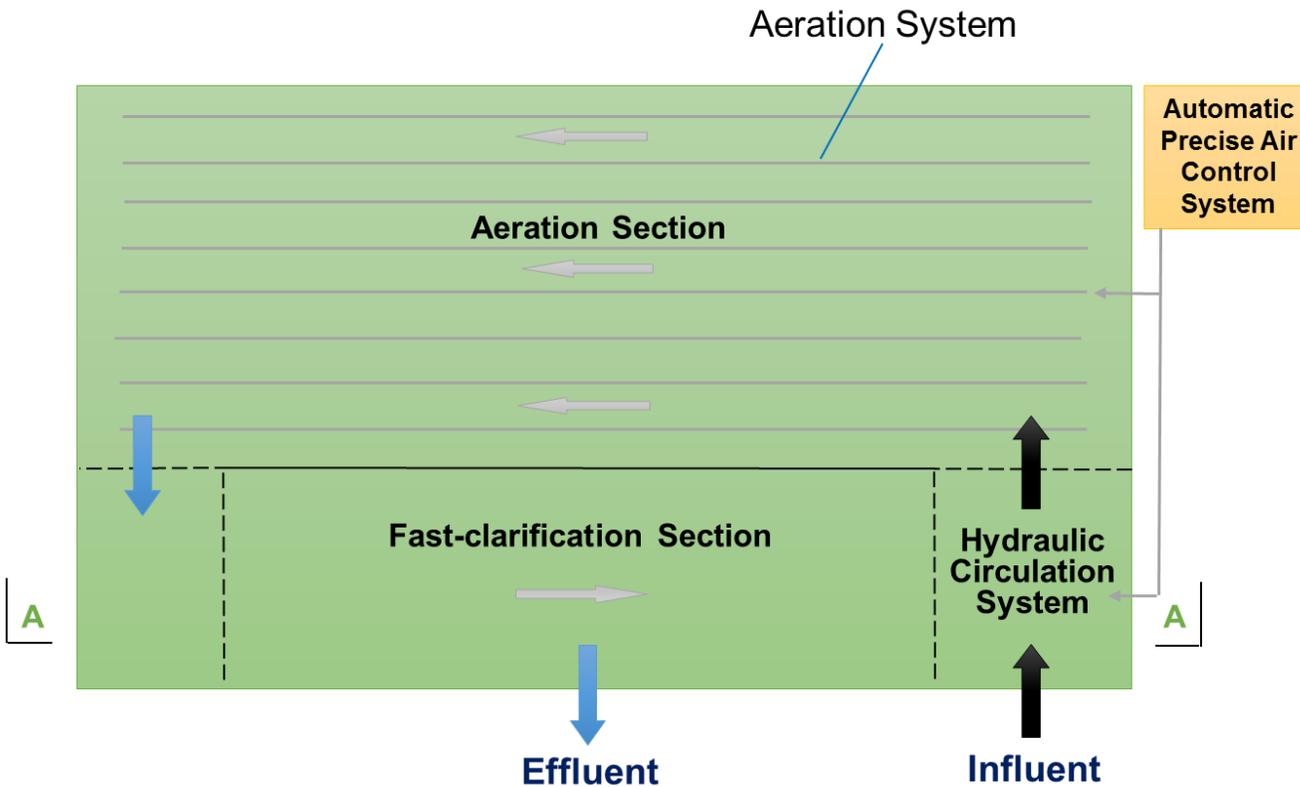
Revolutionary Biological Wastewater Treatment Process Technology



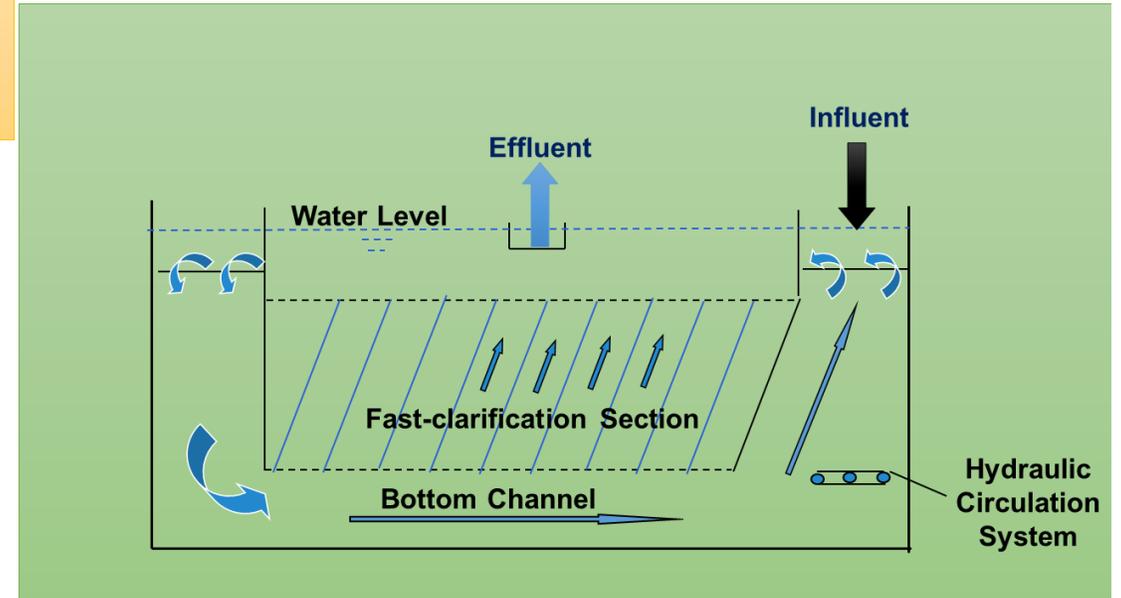
WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

➤ All-in-one Basin Structure



A Section Profile Chart



WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

➤ Aeration Technology



Target of
Conventional Aeration



Actual Effect of
Conventional Aeration



Actual Effect of
Our Aeration

	A/O, SBR, OD Process	Our Process
Up-flow velocity	1.0 m/s	0.4 m/s
Aerated amount	3.5-5.0 m ³ /m·h	0.5-0.7 m ³ /m·h
SOTE	20%	48%

Fine Bubble Micro-mixing with Bacteria

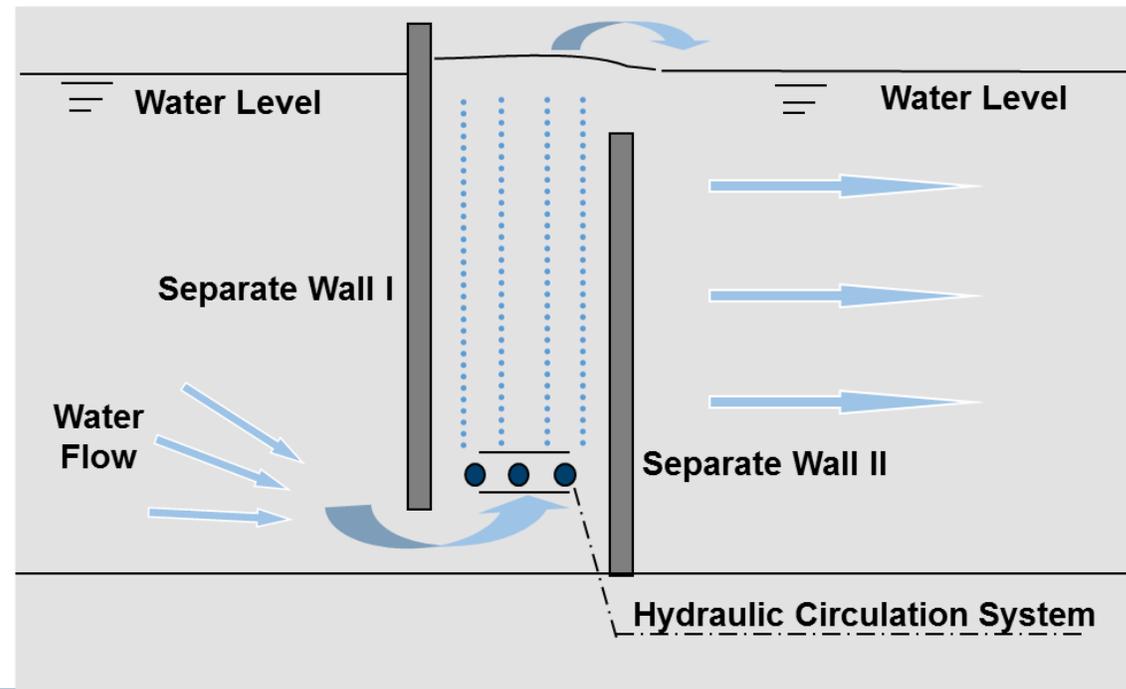
Energy and Environmental

WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

➤ Hydraulic Circulation Technology : Airlift Circulation System

- ✓ High influent diluting ratio
- ✓ Increase impact resistance
- ✓ Fine living environment for bacteria
- ✓ Low air volume needed, 5% blower capacity



WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

➤ Microbiological Environment

Low DO (0.3 mg/L)

- ✓ **Double efficiency** of pollutant removal
- ✓ Simultaneous nitrification and de-nitrification
- ✓ **Energy reduction**

High MLSS (8 g/L)

- ✓ Reach a **high volume** of microorganisms environment, improve removal efficiency, **save basin volume**
- ✓ Prolong the sludge age, reduce surplus sludge, **save expenses on sludge treatment**
- ✓ Improve the overload **impact-resistance capability**



WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

Comparison of Our Process and Conventional Processes on Municipal Sewage Treatment

	Conventional Processes (CASS、AAO、OD)	Our Process 
Blueprint Area (m ² /m ³)	0.7 ~ 0.9	0.4 ~ 0.5
Operating Cost (RMB/m ³)	0.22 ~ 0.25	0.12 ~ 0.17
DO (mg/L)	2~4	0.3
MLSS (mg/L)	2,000~4,000	6,000~8,000
Gas-Water Ratio	6 ~ 8	3 ~ 4
Effective Depth of Water (m)	4 ~ 5	5.5 ~ 6
Minimum Operating Temperature (°C)	10 °C	7 °C

Prominent Advantage:

- ✓ **Low Construction Cost and Less Land Footprint**
 - Integrated All-in-One Structure
- ✓ **Excellent Performance**
 - High biomass concentration (8 g/L)
 - Mainstream SND
 - High impact resistance
- ✓ **Energy Saving**
 - Reduced power consumption for aeration and hydraulic circulation
- ✓ **Low operation maintenance cost**
 - Non-stop self-cleaning mechanism
 - Low excess sludge

WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

- Reference: Shaoxing Dyestuff Industrial Park



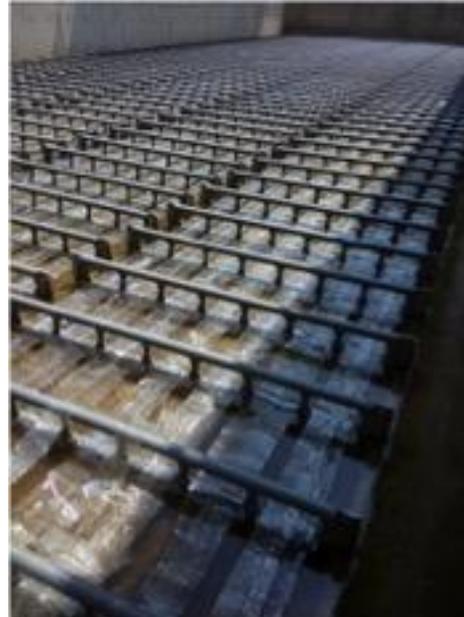
- Reference: CNPC Group Acrylonitrile Plant WWTP



WATER MANAGEMENT

Revolutionary Biological Wastewater Treatment Process Technology

➤ Reference: BP/SECCO WWTP



ENVIRONMENTAL MANAGEMENT

Marine Algal Bloom Management

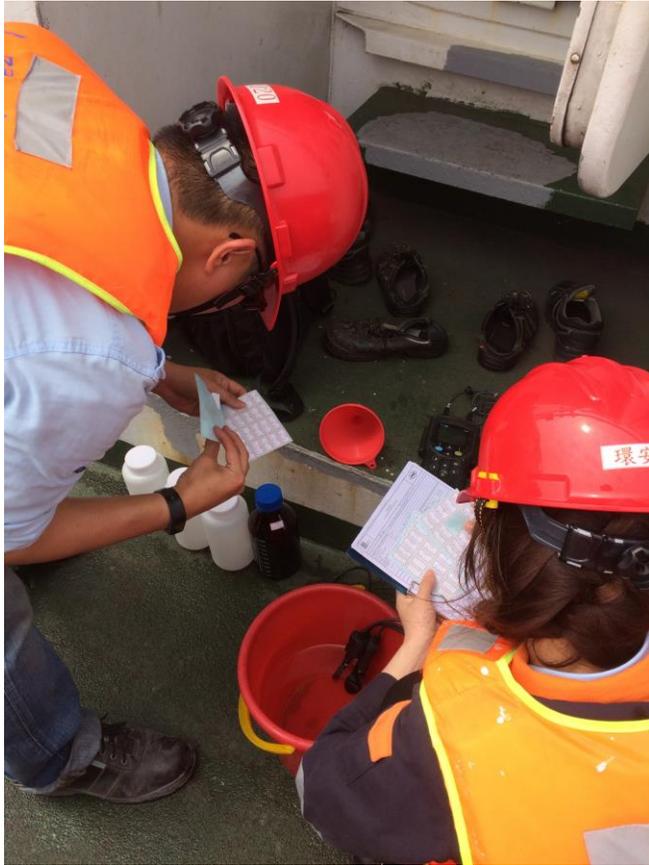
ENVIRONMENTAL MANAGEMENT

- Marine Algal Bloom Management
 - Assist a steel factory in Vietnam to
 1. Investigate the **cause of water pollution**
 2. Carry out the **water quality monitoring plan**
 3. Set up the **mitigation measure**



ENVIRONMENTAL MANAGEMENT

- Photo of Site Inspection in Vietnam



ENVIRONMENTAL MANAGEMENT

- Photo of Site Inspection in Vietnam



RENEWABLE ENERGY

SOLAR AND WIND



Waste Management, Waste Recycling, Waste to Energy

SERVICES INCLUDED BUT NOT LIMIT TO :

1. Landfilled Mining
2. Waste to Energy Solutions
3. Refuse Derived Fuel (RDF)
4. Waste Heat Recovery System
5. Others

LANDFILLED MINING

- Contaminated Sites and Landfills
- Evaluation & Remediation
- Climate Change Adaptation
- D4-Services
- Environmental Management Consulting
- Planning & Permitting
- Renewable Energy Solutions
- Sustainable Environmental Services
- Waste Management
- Risk Management

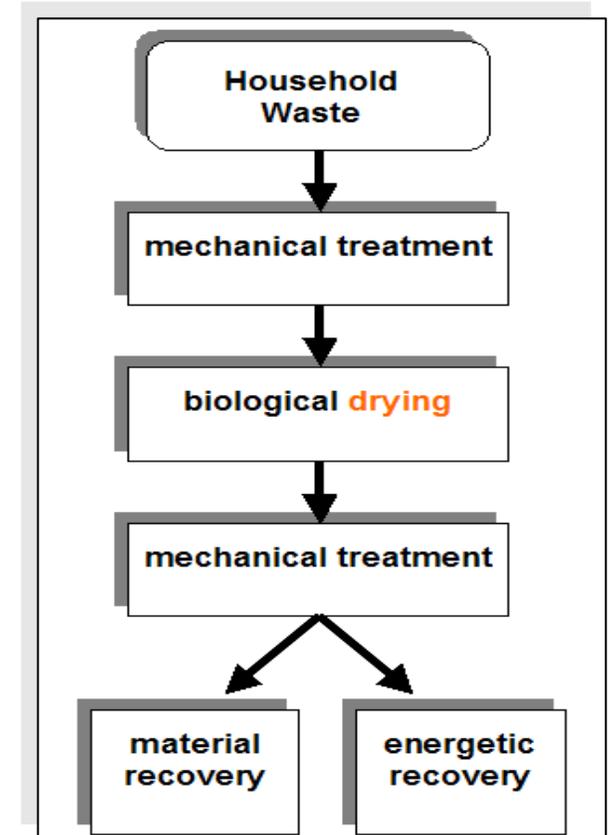


REFUSED DERIVED FUEL (RDF)

- **Recovery** of the heating value of wastes in combustion processes (not thermal treatment in WTE only!)
- **Minimization** of disposal quantities
- **Substitution** (+saving!) of fossil fuels, minimization of greenhouse-effect

1. Biological Drying

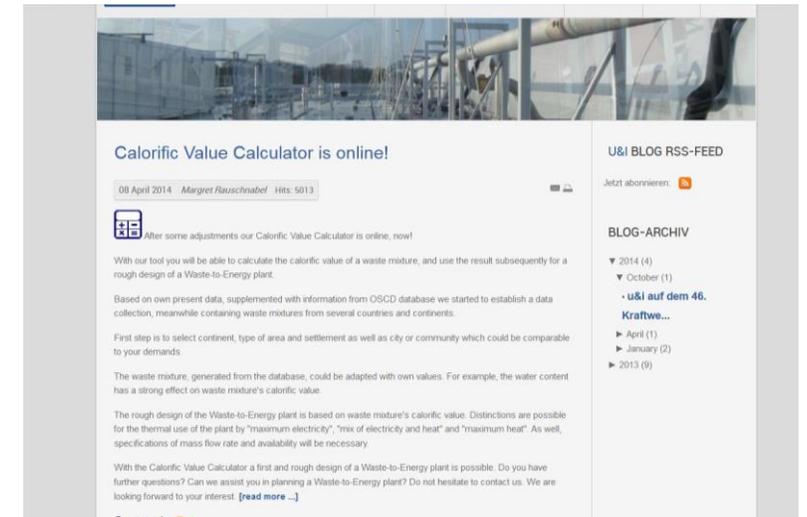
2. Mechanical Treatment



ONLINE-TOOLS – CALORIFIC VALUE CALCULATOR FOR STEP 1 BIOLOGICAL DRYING

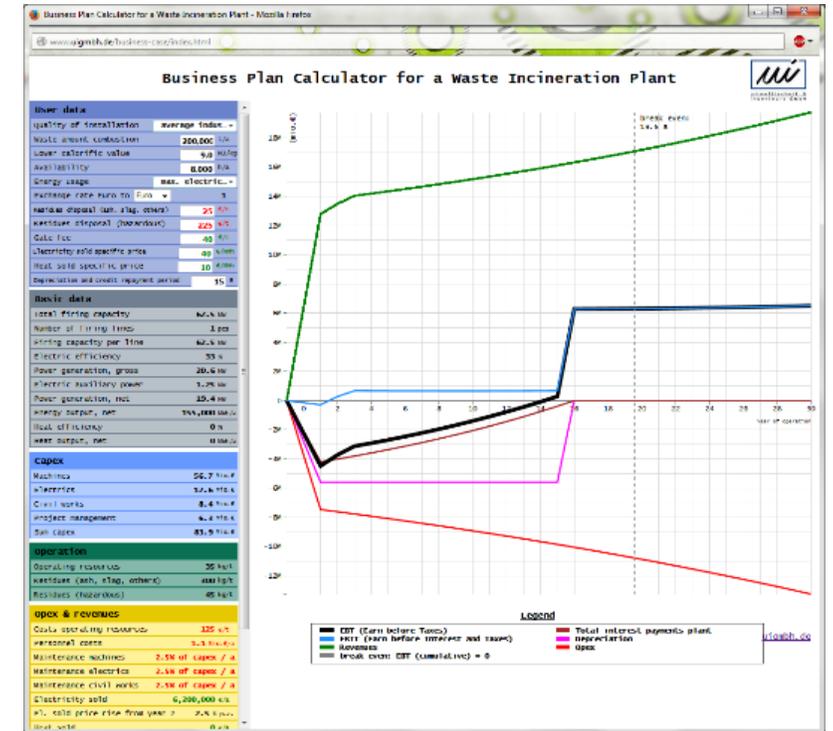
With our tool on <http://www.uigmbh.de/cvc.html> it is possible to calculate the calorific value of a waste mixture, and use the result subsequently for a rough design of a Waste-to-Energy plant.

- Based on own present data, supplemented with data from OSCD database we started to establish a data collection, meanwhile containing waste mixtures from several countries and continents.
- First step is to select continent, type of area and settlement as well as city or community which could be comparable to your demands OR to use preselected waste mixtures.
- The waste mixture, generated from the database, could be adapted with own values..
- With the Calorific Value Calculator a first and rough design of a Waste-to-Energy plant is possible. 0.54



ONLINE-TOOLS – BUSINESS CALCULATOR FOR STEP 1 BIOLOGICAL DRYING

- By using the Business Case Calculator it is possible to generate a rough assessment of a business case for a waste-fired incineration or RDF fired Power Plant. With several parameters it is possible to estimate whether a plant will be refunded by the gate fee of the delivered waste or due to high energy rates by using a smaller gate fee.
- The values of the top table are individually adjustable resp. valuable. In the following tables calculated values and other fixed values are only being listed. All assumptions and dependencies used for calculation are based on our experiences.
- Results of the calculation with your data and basis values will be presented in a diagram. It shows course of revenues, OPEX (operational expenditure), depreciation, EBIT (earnings before interest and taxes), total interest payments plant und EBT (earnings before taxes).
- With the Business Case Calculator a rough estimate of the feasibility of a waste incineration plant is possible.



JOB REFERENCES FOR WASTE MANAGEMENT

- Reference: Integrated Waste Management Facilities in Hong Kong



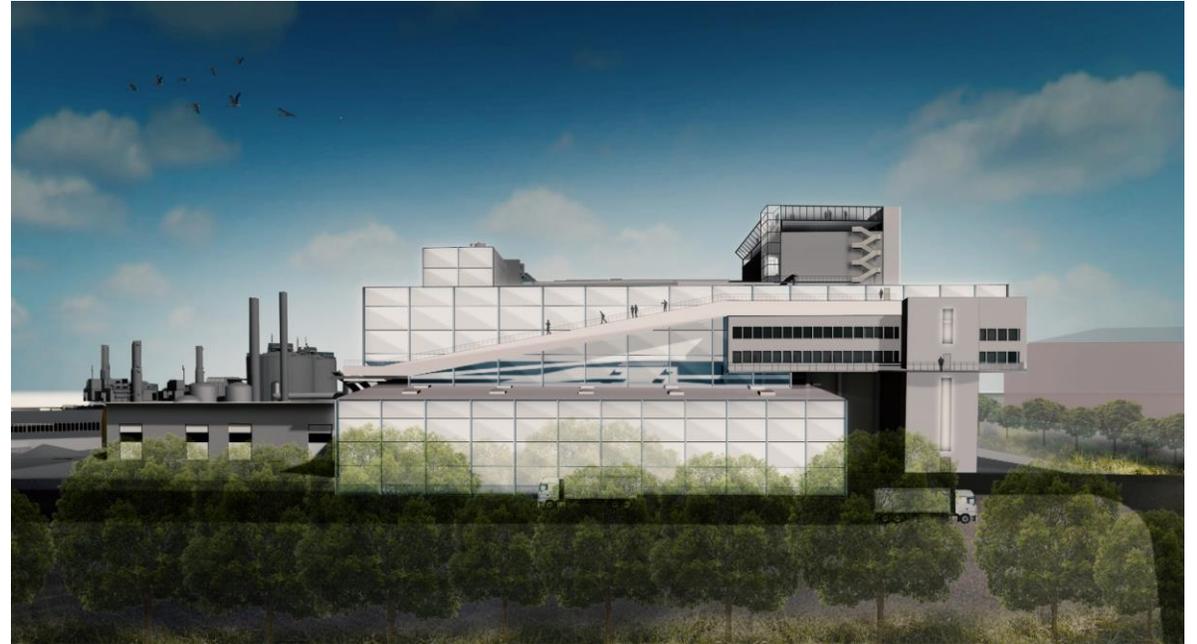
EPD, 2018



EPD, 2018

JOB REFERENCES FOR WASTE MANAGEMENT

- Reference: Hamburg's Centre for Resources and Energy in Germany



JOB REFERENCES FOR WASTE MANAGEMENT

- Reference: Hamburg's Centre for Resources and Energy in Germany

Background

- Design and Build of **Hamburg's Centre for Resources and Energy** in Germany
- Current Status:

The completion of all plant sections will be in 2023

Client: Stadtreinigung Hamburg (SRH)

Time Period: Since February 2017

Investment: 280 Mio €

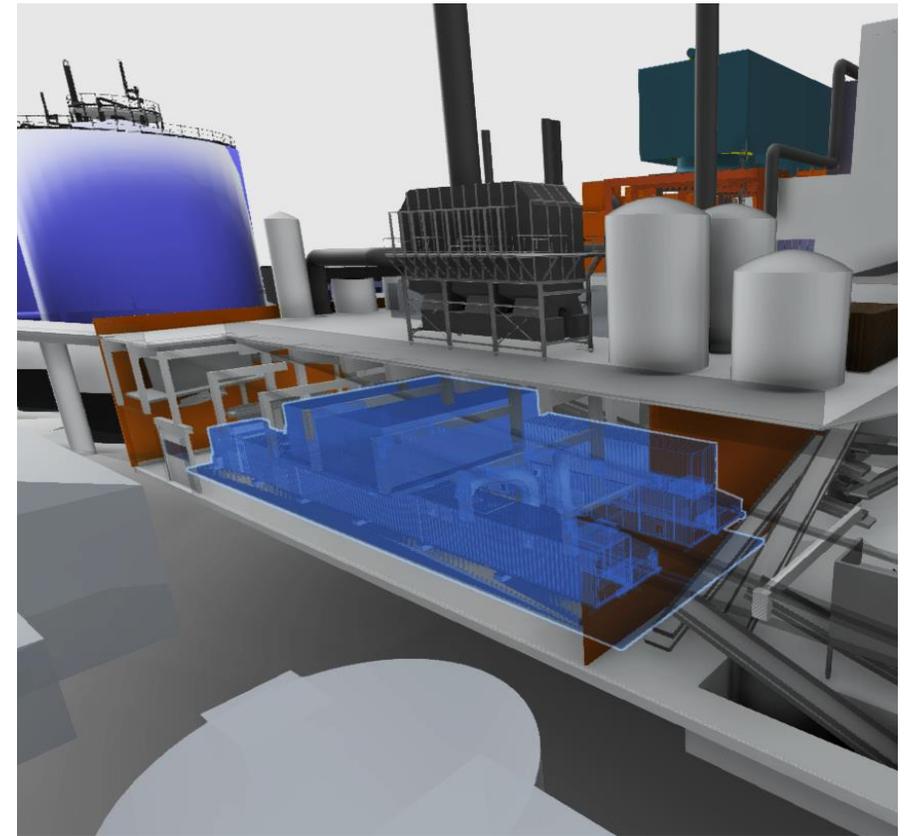


STADTREINIGUNG HAMBURG



JOB REFERENCES FOR WASTE MANAGEMENT

- Reference: Hamburg's Centre for Resources and Energy in Germany
- Technical Data/Plant Sections:
 - Plant section 1: Sorting of up to 140,000 Mg waste from household and public litter bins for production of recovered substitute fuels (RDF), fermentation of fine fraction and production of a bio-fuel and other biomasses
 - Plant section 2: Fermentation and composting of 22,000 Mg/a bio- and green waste
 - Plant section 3: Treatment of 8.5 mio m³/a biogas from plant sections 1 and 2 as well as optional further 4 mio m³/a from an existing fermentation plant (Biowerk)
 - Plant section 4: Biomass-heated power plant with a thermal capacity of 2 x 20 MW
 - Plant section 5: RDF-heated power plant with a thermal capacity of 1 x 48 MW



JOB REFERENCES FOR WASTE MANAGEMENT

- Reference: Hamburg's Centre for Resources and Energy in Germany

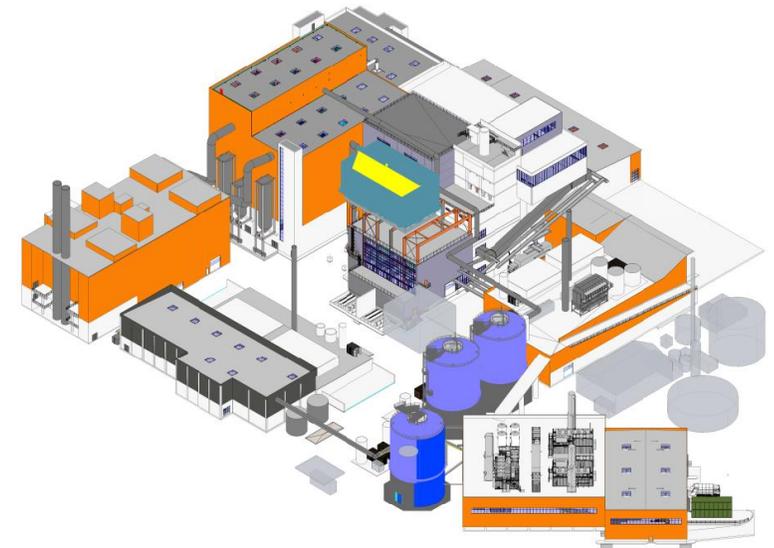
Services include:

Planning consortium BIEGE-ZRE consisting of following companies:

- umwelttechnik & ingenieure GmbH
- CONVIS Bau & Umwelt Ingenieurdienstleistungen GmbH, Berlin
- iba Ingenieurbüro für Abfallwirtschaft und Energietechnik GmbH, Hannover
- SEEGER ENGINEERING GMBH, Hessisch Lichtenau
- HTP GmbH & Co. KG, Aachen

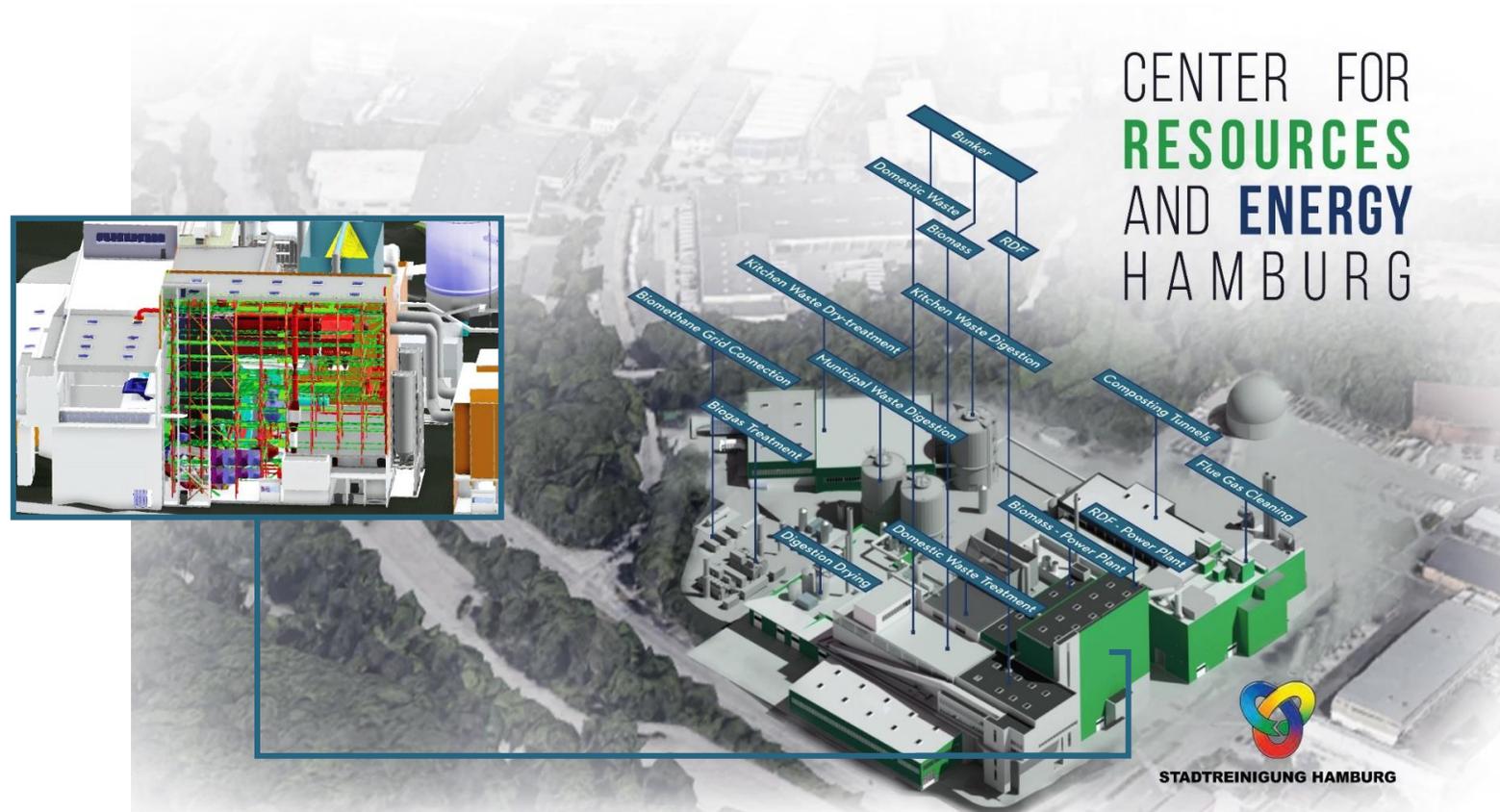
BIEGE-ZRE is assigned as General Planner for realization of the project

- Engineering services for the realization of ZRE
- Preparation of the bidding documents and assistance in contract award for construction services and construction supervision up to commissioning for all plant sections and ancillary systems of ZRE
- Planning and support of existing buildings and plants on the site
- Higher-level electrical and I&C system
- Planning of workshop, storage as well as administrative and social rooms
- Architectural concept for the complete plant



JOB REFERENCES FOR WASTE MANAGEMENT

- Reference: Hamburg's Centre for Resources and Energy in Germany



JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

Industrial Combined Heat and Power Plant Korbach

Client: MVV Energie AG

Time Period: 2006 - 2011

Invest: approx. 28 m €

Summary/Description:

Installation of a RDF-industrial cogeneration plant in Hesse on the location of Continental AG (Tyre factory).

Technical Data:

- Mono-line grate combustion for RDF with a performance of 36 MWth (75,000 t/a)
- Extraction condensation turbine Semi-dry flue-gas cleaning
- 2 * 20 MWth gas-fired standby-boiler



JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

Industrial Combined Heat and Power Plant Korbach



JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

Industrial Combined Heat and Power Plant Korbach



JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

Replacement Investment (ERIN) Combustion Line A at the Ruhleben Site



JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

Replacement Investment (ERIN) Combustion Line A at the Ruhleben Site

Client: BSR Berliner Stadtreinigungsbetriebe

Period: 2010 – 2014

Summary/Description:

BSR installed a new combustion line for municipal solid waste (MSW) to replace four existing combustion lines at MHKW Ruhleben. The new combustion line A at the site Ruhleben was installed while the existing plant was in operation. The integration in the existing plant took place at different locations during the gradual implementing. Thereby the secure disposal of MSW of the German Federal state of Berlin had to be ensured at any time. The commissioned main contractor was Fisia Babcock Environmental GmbH.

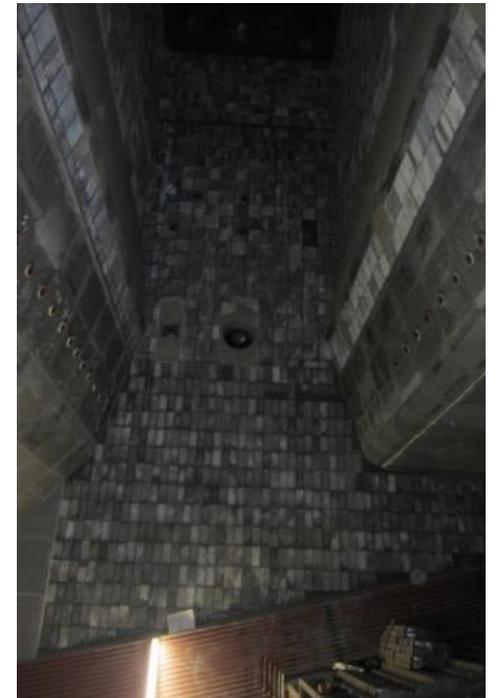
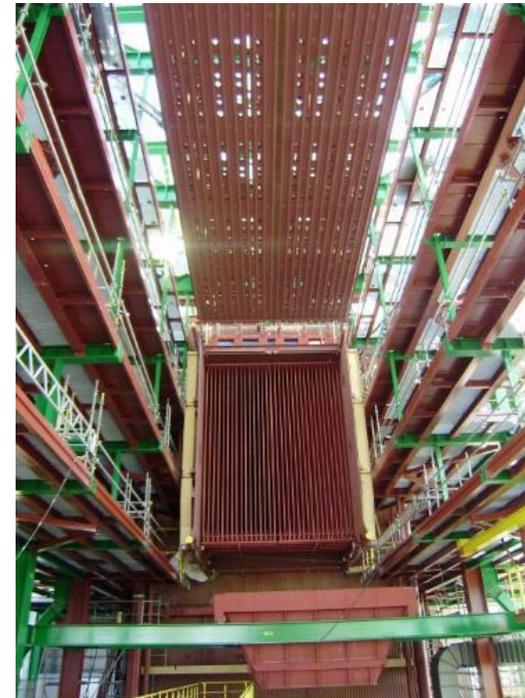


Technical Data:

- Thermal output 90 MW
- Caloric value from 6,000 kJ/kg up to 14,000 kJ/kg (dimensioning 9,000 kJ/kg)
- Quasi-dry flue gas cleaning
- Parameters of live steam 68 bar and minimum 460 °C

JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

Replacement Investment (ERIN) Combustion Line A
at the Ruhleben Site



JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

RDF Power Plant "ETN Heringen"

Client: E.ON Engineering GmbH/E.ON Energy from Waste Heringen GmbH
Period: 2007 to 2011
Investment: approx. 132 m €

General description:

Construction of a two-line incineration plant for RDF to supply an industrial area with a second external superheating system to increase steam parameters



JOB REFERENCES FOR RDF POWER PLANTS + STATE OF THE ART WTE

RDF Power Plant for Industrial Supply



JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

Biogas Park (anaerobic digestion) Grossenlueder

Client: Biothan GmbH

Period: 10/2010 - 02/2014

Description:

Biothan GmbH, a subsidiary of GWV Fulda, GWV Osthessen and the city of Fulda, has erected a high innovative plant for the production of bio natural gas at Finkenberg.

The facility includes two plants on one site.

First one is a wet fermentation for biogenic residues (organic wastes and slurry) and the second one is a dry fermentation plant for separate collected household waste.

The produced biogas will be upgraded and fed into the gas grid in natural gas quality. Hereby the valuable regenerative energy is produced from waste.



JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

Biogas Park (anaerobic digestion) Grossenlueder



JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

Biogas Park (anaerobic digestion) Grossenlueder



JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

Bio-Mechanical Treatment and Dry Fermentation Plant



JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

Dry Fermentation as Upstream Facility for the Composting Plant Bützberg



JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

**Dry Fermentation as Upstream Facility for
the Composting Plant Bützberg**



JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

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JOB REFERENCES FOR RENEWABLE ENERGY (WASTE TO ENERGY) PROJECTS

**Dry Fermentation as Upstream Facility for
the Composting Plant Bützberg**



WASTE HEAT RECOVERY SYSTEM

Boiler Wasteheat Recovery System

1. Boiler system for our corporate clients using the condensate water recovery system and flue gas heat recovery system, **saving fuel costs over 3 million dollars.** Meanwhile, we also re-engineer the boiler system fan frequency and the **annual electricity savings is more than 500k dollars.**
2. Another client's boiler system is also done the similar heat recovery system and they save the fuel costs **over 15%.**



WASTE HEAT RECOVERY SYSTEM

Wastewater Heat Recovery System

A textile plant used sewage heat recovery system and they **save fuel costs more than 3 million dollars yearly.**



BillionGroup Consultant Services

Green Transportation

SERVICES INCLUDED BUT NOT LIMIT TO :

Airport Facilities

1. Green-Airport Management
2. Security and Information Systems
 - Traffic Control Systems (TCS)
 - Automation Systems (Automation)
3. Aviation Control System
4. Airfield Lighting
5. Others

Transportation System

1. Electronic Road Pricing System
2. Anti-Earthquake Expressways
3. Others

Evolution Building Shift

SECURITY AND INFORMATION SYSTEMS

1. Traffic Control Systems (TCS)
2. Automation Systems (Automation)

SECURITY AND INFORMATION SYSTEMS

Traffic Control Systems (TCS)

1. Air Traffic Management Systems

- Integrated systems able to cover all the ATM requirements for en-route, approach and terminal areas.
- Full range of modular and integrated products to comply with the operational requirements to guarantee and increase the airport safety and resilience.

2. Maritime Management Systems

- Systems for maritime traffic control & management, as well for monitoring the marine environment and supporting rescue operations at sea.
- Multiple control layers (local, area and central) acting on different operational levels.
- Management of automated arrival and departure of ships in the port, along with the security solution.

SECURITY AND INFORMATION SYSTEMS

Traffic Control Systems (TCS)

3. Border Control Systems

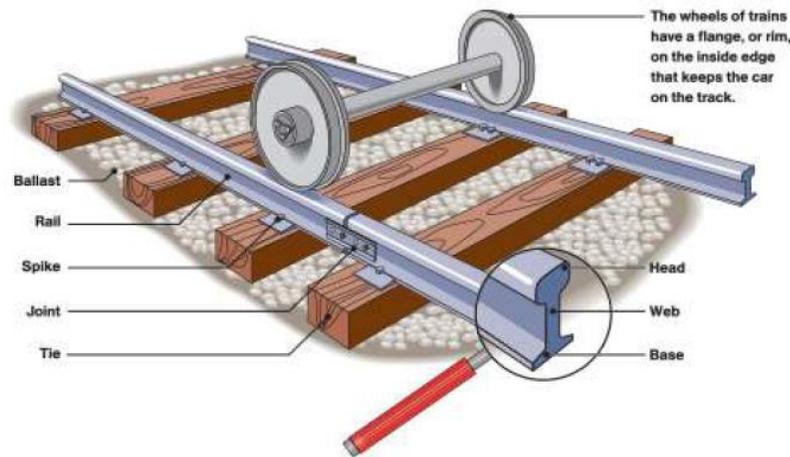
- Systems for national border security, land or coastal, through the use of sensors, radar systems, specialized optical , secure communication devices and UAVs
- Heterogeneous data and video streams for real-time identification of critical areas and potential threat scenarios.

4. Emergency Management Systems

- Support National and Local Authorities in decision marking or coordination of activities/resources.
- Network of weather radar systems for meteorological and aeronautical interest.

TRANSPORTATION INFRASTRUCTURE

- Recycled plastic railroad ties



- ✓ Long Lasting
- ✓ Compatibility
- ✓ Performance in Wet and Humid Climates
- ✓ Low Cost
- ✓ No harmful Chemicals
- ✓ 100% Recycled Plastics
- ✓ Versatility

STRUCTURAL REINFORCEMENT TECHNIQUE

- Bridge Pier Reinforcement
- Bridge Foundation Reinforcement
- Seismic Isolation Measures
- Beam Falling Prevention Measures
- Subgrade Strengthening
- Others

ANTI-EARTHQUAKE EXPRESSWAYS

SEISMIC RETROFITTING TECHNIQUES

Bridge Pier Reinforcement

- adopts the methods of enlarging section, outsourcing steel pipe or sticking fiber composite material.



1. Enlarging section method



2. Outsourcing steel pipe method



3. Sticking fiber composite material method

STRUCTURAL REINFORCEMENT TECHNIQUE

Bridge Foundation Reinforcement



Reinforced method of bending strength of pile caps



Vibroflotation reinforcement method



Vibro-squeezing sand pile reinforcement method



Dynamic consolidation method

STRUCTURAL REINFORCEMENT TECHNIQUE

Seismic Isolation Measures



Replacement of isolation bearings



Replacement lift of isolated bearings



Adding the damper

STRUCTURAL REINFORCEMENT TECHNIQUE

Beam Falling Prevention Measures



The Seismic Block of continuous beam



The Seismic Block of bent cap

STRUCTURAL REINFORCEMENT TECHNIQUE

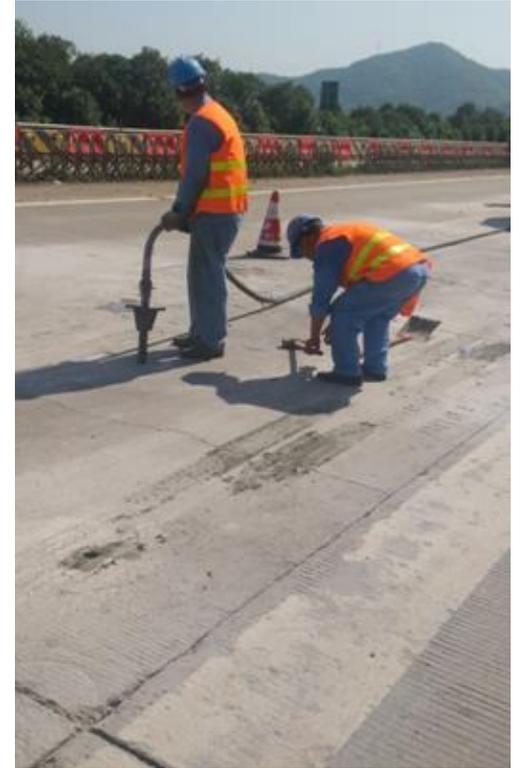
Subgrade Strengthening



Slope Protection of retaining wall



Geogrid Strengthening



Grouting Consolidation

STRUCTURAL REINFORCEMENT TECHNIQUE

Others



Stick Steel
Strengthening
Method



External Pre-stressing Method



Changing of the Mechanical System

ANTI-EARTHQUAKE EXPRESSWAYS STRENGTHENING OF THE LUOYANG PEONY BRIDGE



The Luoyang Peony Bridge is 1369.65m long with 34 width. **The earthquake fortification is lever B, and seismic fortification intensity grade is 8.** The peony bridge is composed of main bridge and approach. The main bridge across the Luohe River, and the approach is viaduct connecting Jiefang Road. **The reinforcement for the approach is the main part of this work.**

ANTI-EARTHQUAKE EXPRESSWAYS

PROJECT OF STRENGTHENING OF THE LUOYANG PEONY BRIDGE

Issues



Bearing slip and offset



Transverse crack



Beam and plate joint corrosion

ANTI-EARTHQUAKE EXPRESSWAYS

PROJECT OF STRENGTHENING OF THE LUOYANG PEONY BRIDGE

Solutions



Replace bearings



Bond steel plate at the top of all middle piers



Enlarge the section of V type pier

ANTI-EARTHQUAKE EXPRESSWAYS

PROJECT OF MAINTENANCE AND REINFORCEMENT OF BRIDGES IN G60 XIANGTAN-SHAOYANG HIGHWAY, HUNAN PROVINCE



G60 Highway is a main part of National Highway Project, its section in Hunan province is called Xiangtan-Shaoyang Highway (also Tan-Shao Highway), which links Xiangtan, Loudi and Shaoyang with a total length of 220.1 km. The Tan-Shao highway is **designed with four lanes, Seismic fortification Level B, Seismic fortification Intensity Grade 7**. It is **built with concrete surface, and the other 146.620km is bituminous concrete**.

ANTI-EARTHQUAKE EXPRESSWAYS MAINTENANCE AND REINFORCEMENT OF BRIDGES IN G60 XIANGTAN-SHAOYANG HIGHWAY, HUNAN PROVINCE

Solutions



Pier and pillar defects fixing



Hinge joints grouting sealing



Carbon fiber sheets affixing

ANTI-EARTHQUAKE EXPRESSWAYS MAINTENANCE AND REINFORCEMENT OF BRIDGES IN G60 XIANGTAN-SHAOYANG HIGHWAY, HUNAN PROVINCE

Solutions



Bearings replacing



Externally bonded steel plates



Subgrade compaction grouting

CLIENT REFERENCE



CLIENT REFERENCE

AECOM



Environmental Protection Department
The Government of the Hong Kong
Special Administrative Region

ALBA



eoetinger
aluminium



BiOTHAN[®]
Das GWV Bio-Erdgas

 **AVISTA OIL AG**

MARS
petcare



STADTREINIGUNG HAMBURG


eew



Koehler
PAPER GROUP



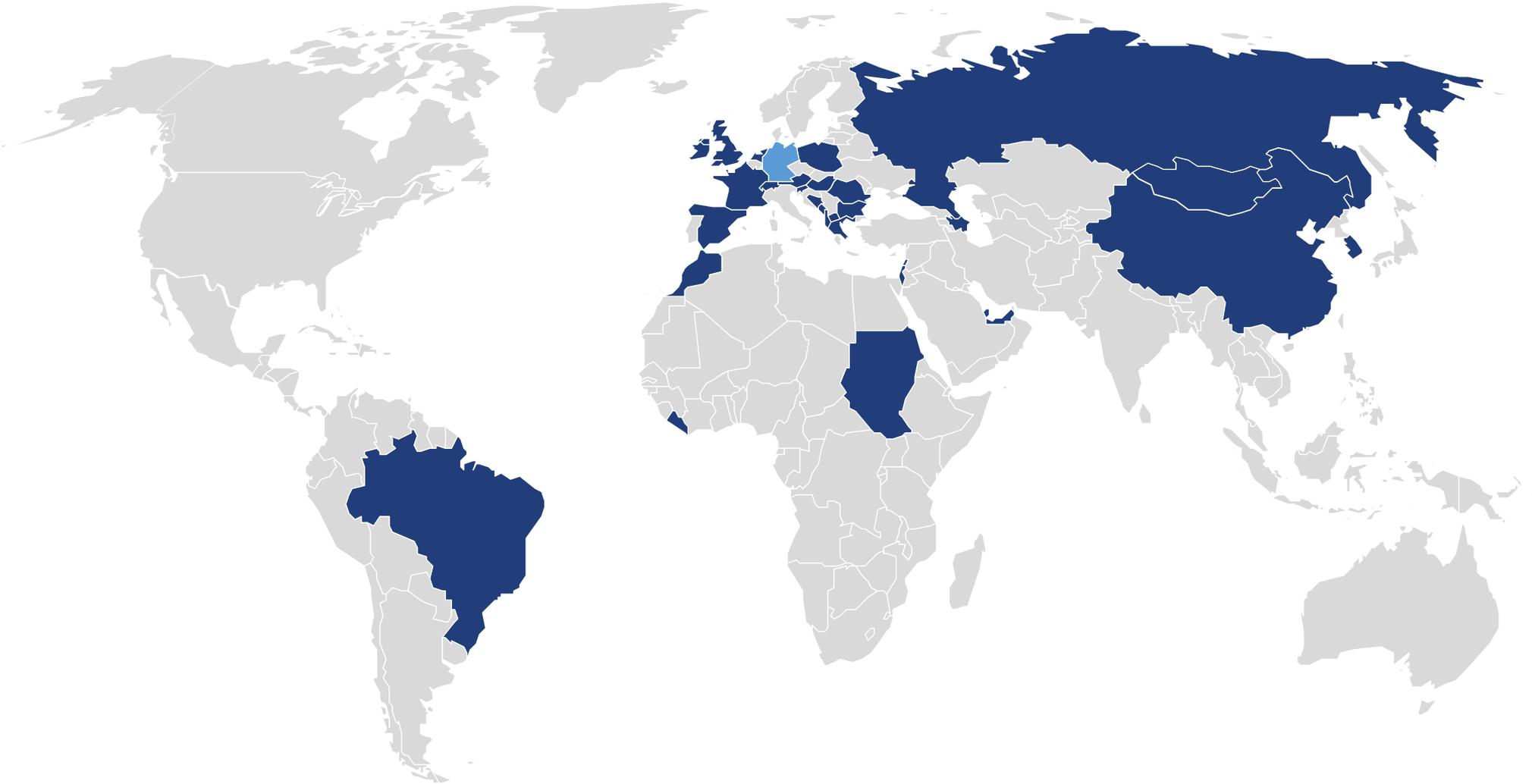
RETIM
Ecologic Service S.A.



VW Kraftwerk GmbH
KP/LM

 **MVV Energie**

MAP OF BUSINESS CONTACTS



Thank You

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