

Sustainable Projects Engineering



Waste Water re-Purification

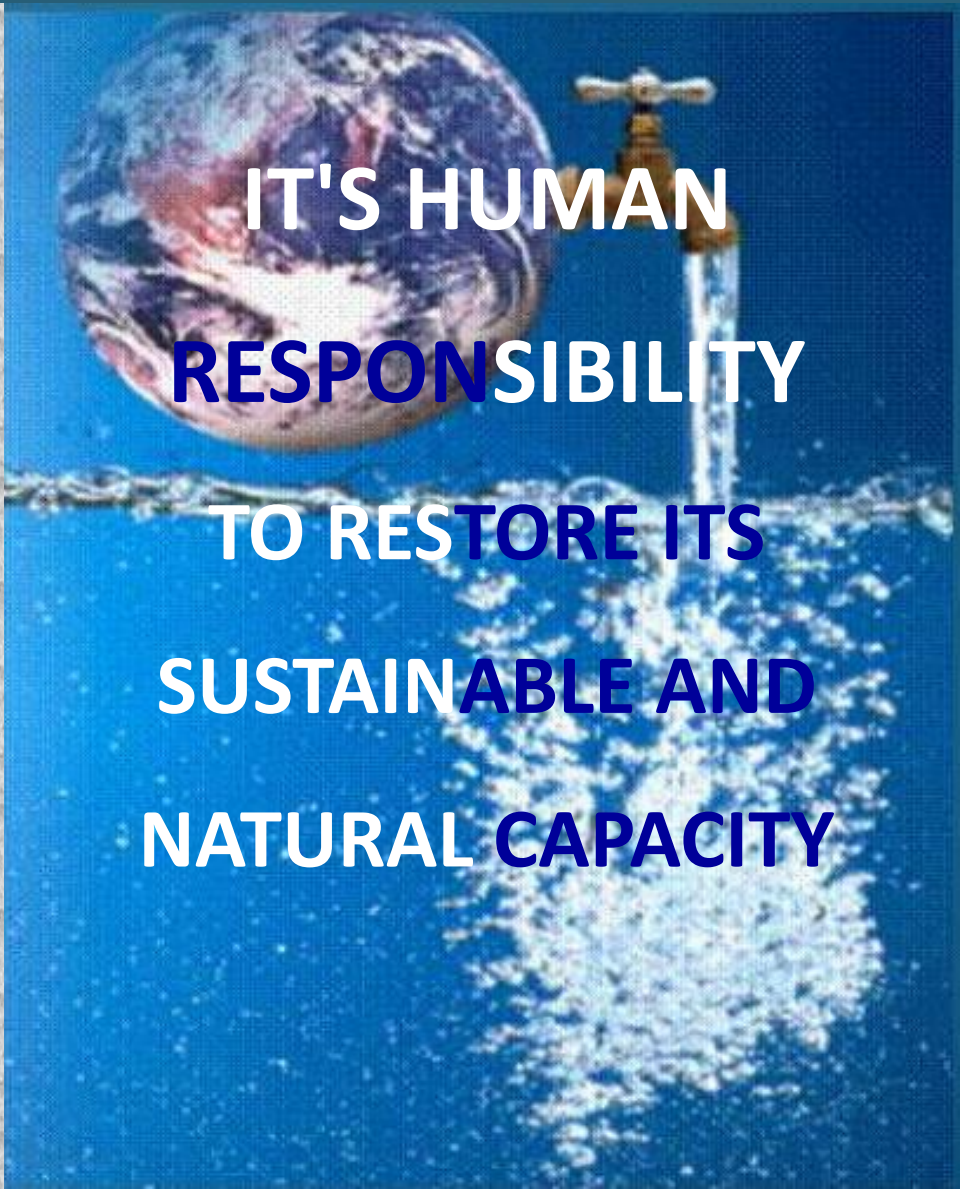
Arturo Constante

Zero Emission Technologies

Paradigm Shift



**HUMAN WASTEWATER
PRODUCTION HAS
EXCEED THE EARTH'S
NATURAL CAPABILITY
TO RESTORE
DRINKING WATER**



**IT'S HUMAN
RESPONSIBILITY
TO RESTORE ITS
SUSTAINABLE AND
NATURAL CAPACITY**

Technological Principle



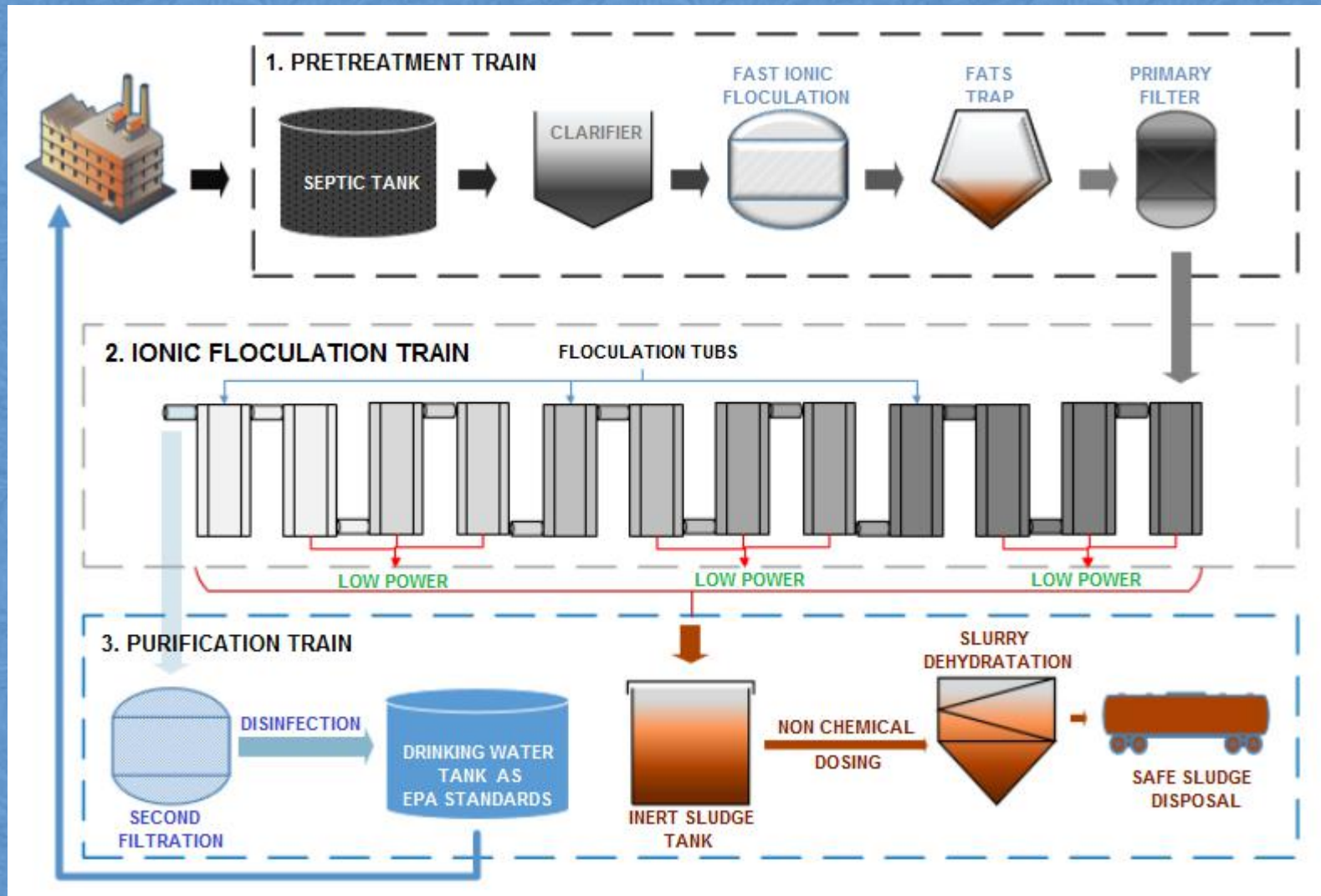
By an Electro-Ionic process without any chemical dosing, the contaminating molecules are dissociated into their basic compounds and allowing their easy removal throughout precipitation and filtration.



Re Purification WW 100 m³/d to Drinking Water
Influent - Mall; Power consumption 4.25 kW-hr
Located in Mexico City



Typical Wastewater Purification Process

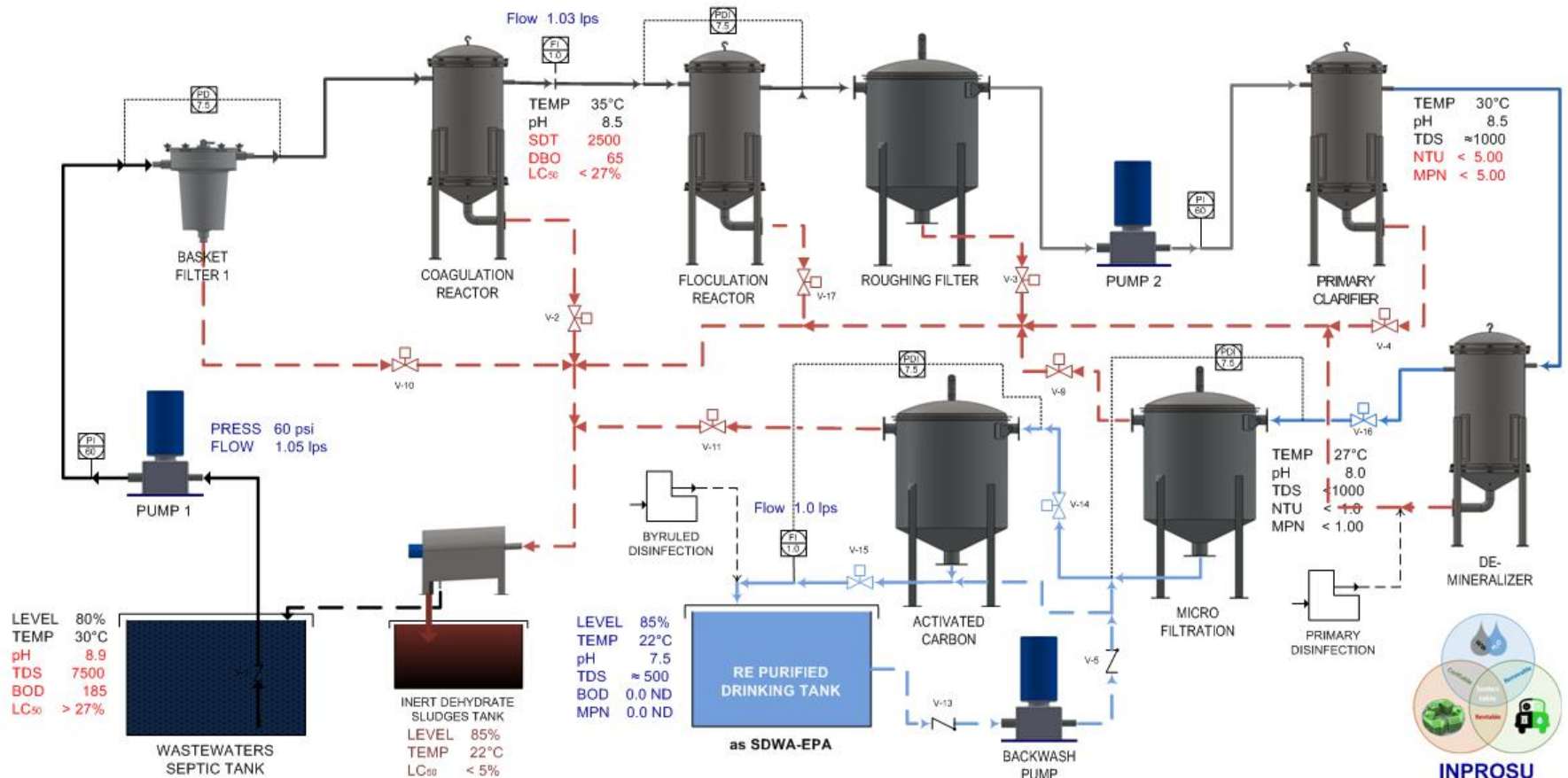


WW Treatment 75 m³/d to sewer disposal
Influent - TV studio; Power consumption 3.25 kW-hr
Located in Mexico City



Industrial Wastewater Purification

ADVANCED WASTEWATER REPURIFICATION SYSTEM TYPICAL INDUSTRIAL UNITARY PROCESS



Executed Projects by 2014

Total Flow	77.1 lps	EXECUTED WASTEWATERS RE-PURIFICATION PROJECTS UNTIL 2014									
No.	FLOW M3/D	WW QUALITY	INFLUENT DBO	WW SOURCE	EFLUENT QUALITY	RE USE	POWER kW/h/m3	PLANT AREA M2	CLIENT	HANDOVER DATE	LOCATION
1	48	Residual doméstica		Residential	NOM-003	Irrigation	2.80	26	Church	Dec/2003	Mexico State
2	6	Residual Biotóxica		Antirrabic	NOM-127	Human Use	3.50	10	Municipality Institution	Aug/2004	Mexico City
3	100	Residual Comercial		Mall	NOM-127	Drinking Water	4.25	36	Retail Chain	Mar/2006	Mexico City
4	120	Residual Biotóxica		Farm	NOM-003	Irrigation	3.25	28	Farming Community	Feb/2008	Mexico City
5	120	Residual Municipal		Farm	NOM-003	Irrigation	3.25	28	Farming Community	Mar/2008	Mexico City
6	110	Residual Municipal		Municipality	NOM-003	Irrigation	3.75	225	Municipality Government	Oct/2009	Chiapas State
7	28	Residual doméstica		Offices	NOM-002	Sew er Disposal	0.85	15	Firm	Feb/2010	Mexico City
8	24	Residual Industrial		Mechanical Workshop	NOM-002	Sew er Disposal	0.45	32	Government	Jan/2011	Mexico City
9	24	Residual Industrial		Mechanical Workshop	NOM-002	Sew er Disposal	0.45	32	Government	Jan/2011	Mexico City
10	100	Residual Biotóxica		Municipality	Agua		2.00	40	Municipality Government	Dec/2010	Cancún City
11	24	Residual Municipal		Municipality	NOM-003	Irrigation	0.90	15	Construction Firm	Feb/2011	Queretaro State
12	5,184	Industrial Textil		Textile Industry	NOM-001	Aquifer Disposal	0.40	390	Industrial Firm	Apr/2001	Sonora State
13	24	Residual Municipal		Oil&Gas	NOM-001	Aquifer Disposal	1.00	15	Refinery Project	May/2011	Puebla State
14	380	Salmuera Marina		Seaw ater	NOM-001	Aquifer Disposal	missing	missing	Exportadora de Sal Gro	Jun/2012	Queretaro State
15	60	Residual Municipal		Municipality	NOM-002	Sew er Disposal	missing	missing	missing	2013	missing
16	312	Residual Industrial		Industry	NOM-003 y NOM-127	Irrigation & Human Use	missing	missing	Industrial Firm	2014	SLP State

WW Big Chanel Purification Results

RE-PURIFIED WATER OF BIG WASTEWATER CHANEL OF MEXICO CITY			
COMPARISON OF RESULTS VS OFFICIAL STANDARDS 041 AND 127			
DRINKING WATER PARAMETER	WASTEWATER PURIFICATION RESULTS	NOM-041-SSA1-2003 Bottle Water	NOM-127-SSA1-1994:2005 Drinking Water
ODOR	NOT ODOR	ODORLESS	ODORLESS
COLOR (U PI-Co)	2.5	15	20
FLAVOR	NOT TASTE	TASTELESS	TASTELESS
TURBIDITY (NTU)	0.8	5	5
RESIDUAL CHLORIDE (ppm)	0	0.1	0.2 – 1.5
ALCALINITY (mg/l)	102.78	300	—
CHLORIDES (mg/l)	88.04	250	250
TOTAL HARDNESS (mg/l)	15.53	200	200
NITRITE (mg/l)	0.121	0.05	1
NITRATE (mg/l)	0.27	10	10
SULFATE (mg/l)	46.28	250	400
PHENOL (mg/l)	NOT DETECTED	0.001	0.3
FLUOR (mg/l)	0.58	0.7	1.5
pH	7.91	6.5 – 8.5	6.5 – 8.5
CIANUROS (mg/l)	NOT DETECTED	0.05	0.07
OZONO (mg/l)	NOT DETECTED	0.4	—
FREE OXIGEN	NOT DETECTED	2	—
CONLIFORM ORGANIS	NOT DETECTED	0	—

Drinking Water Certificate by accredite Lab

REF : 336-01 06 Abril 2001 O. T. B19226		REPORTE DE ANALISIS BACTERIOLOGICO DE AGUA	
MUESTRA RECIBIDA DE :			
DIRECCION:			
FECHA DE RECEPCION DE LA MUESTRA:		03 DE ABRIL DEL 2001	
MUESTREADA POR :		PERSONAL TECNICO DE ESTE CENTRO	
MUESTRA No.		LUGAR DE MUESTREO	
1589		AGUA PURIFICADA AL FINAL DEL PROCESO	
CUENTA DE MESOFILICOS AEROBIOS		92	UFC/ml
ORGANISMOS COLIFORMES TOTALES		Menos de 1.1	NMP/100ml
ORGANISMOS COLIFORMES FECALES		NO DETECTABLE	NMP/100ml
CLORO RESIDUAL TOTAL		0.0	ppm
		APTA PARA CONSUMO HUMANO SI	
Limites sanitarios. NOM-127-SSA1-1994		NOM-041-SSA1-1993	
Cuenta de mesofílicos aerobios	2 NMP/100ml	Cuenta de mesofílicos aerobios	100 UFC/ml
Organismos coliformes totales	2 UFC/100ml	Organismos coliformes totales	No detectable NMP/100
Organismos coliformes fecales	No detectable NMP/100ml	Organismos coliformes fecales	Cero UFC/100ml
Cero UFC/100ml			
ATENTAMENTE CENTRO DE CONTROL			
			
Ing. José Carlos Álvarez Rivera O.A. Aida Hidalgo Arroyo			

Advantages of WWRPS vs WWTP

Parameter	RE-PURIFICATION	Conventional WWTP
Wastewater Quality	Any WW, including Lixivates, O&G, Radioactive	Constrained for high DBO and hazardous wastewaters
Effluent Quality	Drinking Water as EPA standard	Just to drain into sewer system
Energy Consumption	1 - 1.4 kW/m ³	10 - 12 kW/m ³
Chemical Dosing	NOT required	Chemical and Biologicals
Operating and Maintenance Costs	80% lower than WWTP	Too High
Sludges Quality & Treatment	Inert - just dewatering	Activated - chemical post-treatment
Required Area (m ² /lps)	16 - 30	typically 100 m ²
Operating Life Time	more than 50 years	usually no more than 30 y
Investment BPE (years)	Highly profitable 3 to 5	very long term or never

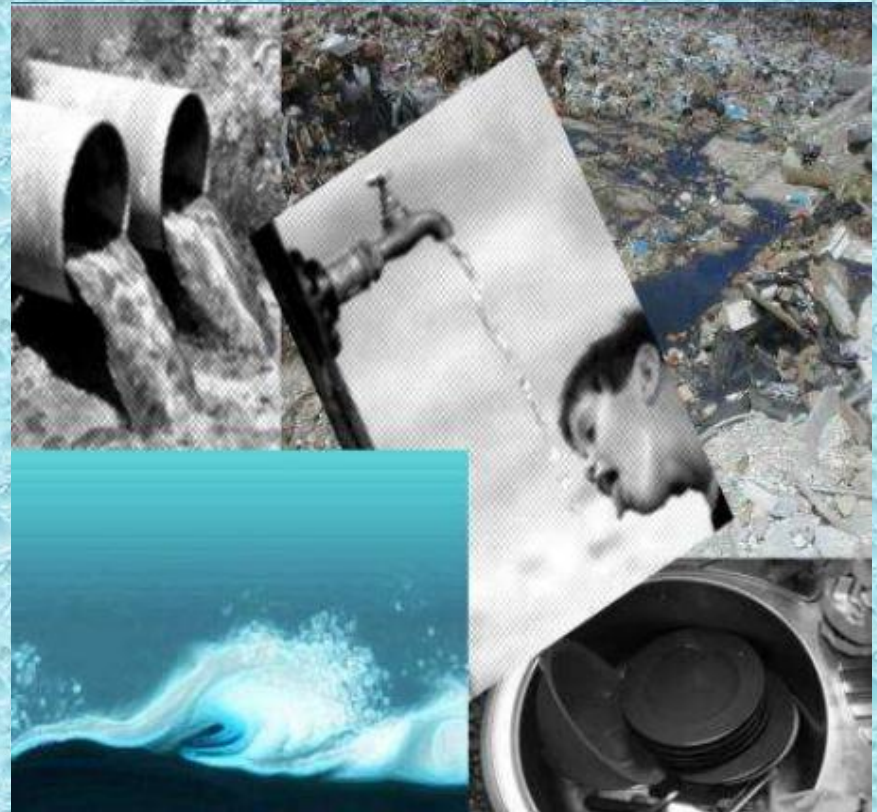
SOME OF OUR CLIENTS

- **PEMEX - GOVERNMENT MEXICAN O&G**
- **SEDENA - MEXICAN ARMY**
- **MUNICIPALITY OF HUIXTLA, CHIAPAS**
- **MEXICAN EPISCOPATE**
- **ANTIRABIC OF MILPA ALTA**
- **FARMING CUMMUNITY OF TLALTENANGO**
- **ABENGOA MEXICO (EPC)**
- **UNILEVER MEXICO (FOODS AND CARE)**
- **TEXTILE INDUSTRY**
- **OTHERS**

Installed capacity by 2014: 77 lps

Type of Treated Wastewaters

- ✓ **Municipal**
- ✓ **Industrial**
- ✓ **Sea Water**
- ✓ **Lixiviates**
- ✓ **Hexachlorines**
- ✓ **Lixivated Sludges**
- ✓ **Biotoxic**
- ✓ **Mining**
- ✓ **Radioactive**
- ✓ **O&G Slurry**
- ✓ **etc**



- **We develop Zero Emission Technologies**
- **We help our Clients to be Sustainable**
- **We are committed to help #SDG6 a reality**

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“Because the Responsible Use and Reuse of Natural Resources”