

CORPORATE PRESENTATION

THERMO DESIGN ENGINEERING LTD.

OUR WORLD YOUR VISION

INTEGRATED SERVICES FOR THE ENERGY INDUSTRY





Thermo Design Engineering Corporate Presentation



PROVIDING **INNOVATIVE**
CANADIAN ENERGY SERVICES
TO THE WORLD SINCE **1979**



OUTLINE

- OUR VISION
- TDE SAFETY & QUALITY
- TDE'S INTEGRATED PROJECT SERVICES
- TDE ENGINEERING & MANUFACTURING
- TDE'S AREA OF EXPERTISE



41+ YEARS OF EXCELLENCE



THE FUTURE OF ENERGY



OUR VISION

TO BE RECOGNIZED GLOBALLY AS THE
“SERVICE PROVIDER OF CHOICE”
OF SAFE AND INNOVATIVE ENERGY
PROCESSING SOLUTIONS.



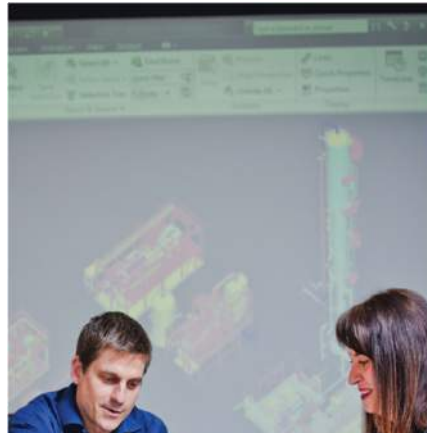
WHO WE ARE

INTEGRATED SERVICES FOR THE ENERGY INDUSTRY



CANADIAN OWNED

Incorporated in 1979



INTEGRATED SERVICES

Engineering & Design,
Manufacturing, Procurement,
Construction



PROJECTS

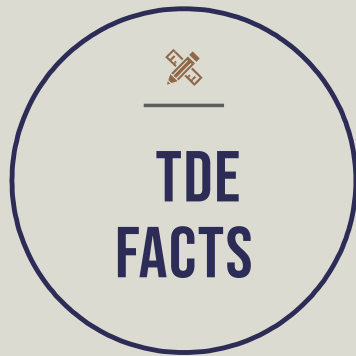
In over 40 Countries
On 6 Continents



TDENVIRO LTD.

Founded in 1993

41+YEARS OF FACTS



4,583 ORDERS

42 COUNTRIES

WE ARE A RECOGNIZED LEADER IN ENGINEERING, MANUFACTURING & CONSTRUCTION AROUND THE WORLD



ALL ENERGY SECTORS SERVICED

Over the years, TDE has expanded services from Oil and Gas to Green Energy Sectors.

OVER 4000+ PROJECTS



ISO9001:2015 & ISO45001:2018

International Organization for Standardization Certified.

QUALITY MANAGEMENT STANDARDS



LARGE STAFFING CAPACITIES

Over 450 employees with 50 site services staff.

LOCATED ALL OVER THE WORLD



INTEGRATED SERVICE PROVIDERS

Specializing in the design, engineering, manufacturing, and installation of custom facilities.

TURN-KEY SOLUTIONS

INTERNATIONAL INTEGRATED SERVICES



TDE HAS COMPLETED PROJECTS IN OVER 40 COUNTRIES, WITH OFFICES ALL OVER THE WORLD



HEAD OFFICE & FABRICATION



FABRICATION FACILITIES

LOCATED IN EDMONTON, ALBERTA
NISKU, ALBERTA

>125,000 sq. ft. of under roof fabrication

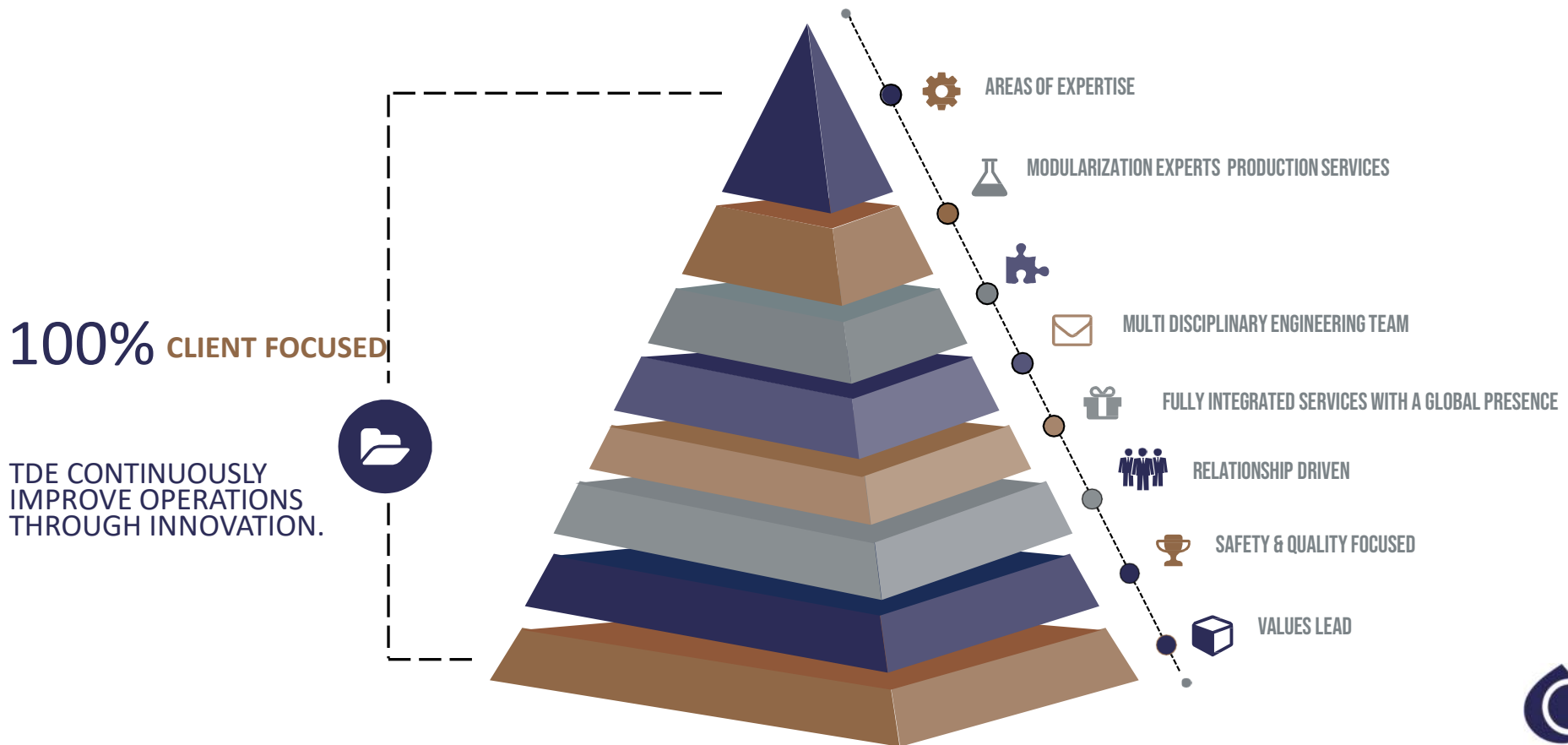


HEAD OFFICE

LOCATED IN EDMONTON, ALBERTA



TDE'S FOUNDATION = SUSTAINABLE GROWTH



A VALUE DRIVEN COMPANY

TDE VALUES

SAFETY

IN ALL ASPECTS OF OUR WORK.

INTEGRITY

IN ALL ASPECTS OF OUR CONDUCT.

QUALITY

EXCEED EXPECTATIONS.

RELIABILITY

PERFORM TO YOUR COMMITMENTS.

COMMUNICATION

EFFECTIVE COMMUNICATION WITH ALL STAKEHOLDERS.

STRONG WORK ETHIC

DO YOUR BEST, EVERYDAY.

INNOVATION

INNOVATION CREATIVE SOLUTIONS THAT PRODUCE RESULTS

PROVIDING INNOVATIVE CANADIAN SOLUTIONS TO THE WORLD SINCE 1979.

MORE THAN A COMPANY, WE ARE PEOPLE TOO.



SAFETY & QUALITY FOCUSED

INTERNATIONALLY
ACCREDITED



**CERTIFIED
HEALTH &
SAFETY**



**CLIENT
COMPLIANT**



**GOSGORTECHNADZOR
AND GOST STANDARD
OF THE RUSSIAN
FEDERATION**



**CERTIFIED
QUALITY
PROGRAM**



**MANUFACTURERS
HEALTH AND
SAFETY**



**ASSOCIATION OF
PROFESSIONAL
ENGINEERS AND
GEOSCIENTISTS
OF ALBERTA**



ACCREDITED

- SAFETY QUALITY LICENCE FROM THE CHINESE BUREAU OF PRESSURE VESSEL IMPORT POLISH
- UDT LICENCE UC-29113, FOR THE IMPORT OF PRESSURE VESSELS

DON'T SEE IT? JUST ASK.. WE ARE CERTIFIED INTERNATIONALLY



PRODUCTION

0.0

TRIF TOTAL RECORDABLE
INCIDENTS REPORT FOR 2021



SAFETY &
QUALITY

<2%
WELD REPAIR
RATIO



PRODUCTION SAFETY

Direct access to the high load corridor and rail
facilities





CORPORATE RESPONSIBILITY



INVESTMENT INTO
OUR **COMMUNITIES**
PAY IMMEASURABLE
DIVIDENDS.



SUPPORTING OUR COMMUNITY
MEANS SHARING OUR TIME
AND OUR RESOURCES

THERMO DESIGN ENGINEERING LTD.

WE SUPPORT LOCAL.

Supporting our communities also means hiring local and purchasing local products to strengthen local economies!



TDE EDUCATES AND EMPLOYS
LOCAL WORKERS ALL OVER
THE WORLD

HIRING LOCAL WORK FORCES

Working with the community is key to a successful project



TDE EXAMPLE

WEST AFRICAN GAS PLANT - 2014

COMPLETED THE FIRST GAS INFRASTRUCTURE PROJECT IN THE COUNTRY.



SUBSEQUENTLY, SKILLED LABOR WAS NOT AVAILABLE LOCALLY.

TDE UNDERTOOK THE TRAINING OF LOCAL POPULATION OPERATORS, MAINTENANCE STAFF, AND OTHER SKILLED LABOUR. DURING THIS PERIOD, TDE PROVIDED A STOP GAP ON SITE FOR 2 YEARS UNTIL LOCAL COMPETENCY WAS DEVELOPED.



INTEGRATED PROJECT DELIVERY





PROFESSIONAL SERVICES

INTEGRATED SERVICES FOR THE ENERGY SECTOR

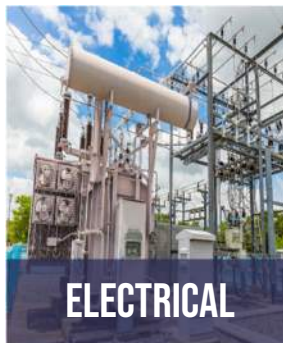
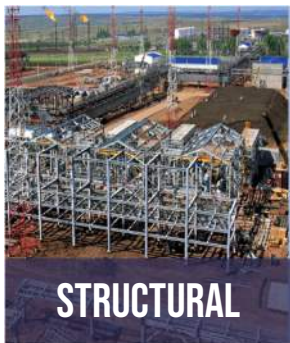
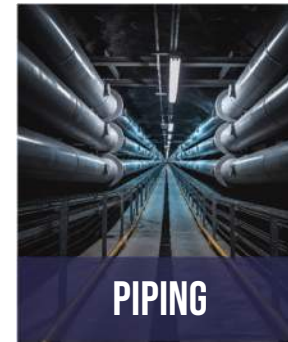
ENGINEERING DISCIPLINES



PROCESS SAFETY



STATIC & ROTATING EQUIPMENT



ENGINEERING SERVICES



01 CONCEPT/FEASIBILITY STUDIES

02 FEED ENGINEERING

03 BASIC ENGINEERING

04 DETAILED ENGINEERING

05 DYNAMIC SIMULATION

06 DE-BOTTLENECKING AND OPTIMIZATION

07 HSE ENGINEERING



ENGINEERING DESIGN STANDARDS



- 1 OVER 50 ENGINEERING SPECIFICATIONS INCLUDING:**
 - ESQUIPMENT DESIGN & ELECTION
 - PIPING & VALVING
 - STRUCTURAL & FOUNDATIONS
 - INSTRUMENTATION
 - CONTROL SYSTEMS
- 2 SCRUTINIZED TO ENSURE QUALITY PRODUCTS WITH COST-EFFECTIVE DESIGNS.**
- 3 CODE COMPLIANT**
- 4 CREATED BY WORKING CLOSELY WITH CLIENTS, SUPPLIERS, AND OVER 40 YEARS OF INDUSTRY EXPERIENCE**



PRODUCTION SERVICES





OUR SHOPS



EXTENSIVE MANUFACTURING FACILITIES

53 acres (215,000 m2)*
143,000 ft2 under roof



FABRICATION CAPACITY OF UP TO:

(Based on single 10 hrs/5 day)

Structural Steel: 3000 MT/year
Pipe Spooling: 300,000 FDI/year
Overall: 910,000 man hours/year



OVER 300 PROCESS PLANTS

12 LPG/NGL facilities processing in excess of 1.5 BCF/D since 2009
10 Oil facilities processing in excess of 200,000 BPD since 2009

273,629 HRS

TRACKED IN 2020

24/7

SHOP AND SITE SUPPORT

53 ACRES

EDMONTON AND NISKU



MANUFACTURING CAPABILITIES

- ≡ Versatile, Non-Union Work Force
- ≡ 100 Ton Maximum Overhead Crane Capacity
- ≡ 30-190 Ton Mobile Crane Capacity
- ≡ 40-WPS's (SMAW, GTAW, GMAW, SAW and FCAW)
- ≡ 250-AC/DC welding machines
- ≡ Fabrication capacity of up to (Based on single 10 hrs/5 day shift):
- ≡ Structural Steel: 3000 MT/year
- ≡ Pipe Spooling: 300,000 in.dia/year
- ≡ Overall: 910,000 man hours/year
- ≡ Cross trained work force



MANUFACTURING CAPABILITIES

- Pressure Vessels & Heat Exchangers
- Piping
- In situ heat treating routinely carried out in the yard
- Structural
- Sand-Blasting & Painting
- Insulation
- Scaffolding
- NDE
- Pipe Fitting & Assembly
- Modularization
- Instrumentation & Automation
- Electrical
- Logistical Crating & Packaging



PRODUCTION

TDE SERVICES

INTEGRATED SERVICES FOR THE ENERGY INDUSTRY



MANUFACTURING CAPABILITIES

PRESSURE VESSELS

UP TO 20 FT. (6 M) IN DIAMETER, UP TO
8 IN. (20 CM) IN THICKNESS, AND UP TO
250 T (227,000 KG) IN WEIGHT

CARBON STEEL, STAINLESS STEEL,
INCONEL, MONEL, AND OTHER ALLOYS

ASME CODE SECTION VIII, DIVISION 1
AND 2

SEPARATORS, SCRUBBERS, FILTERS,
TOWERS, COLUMNS, ETC.





MANUFACTURING CAPABILITIES

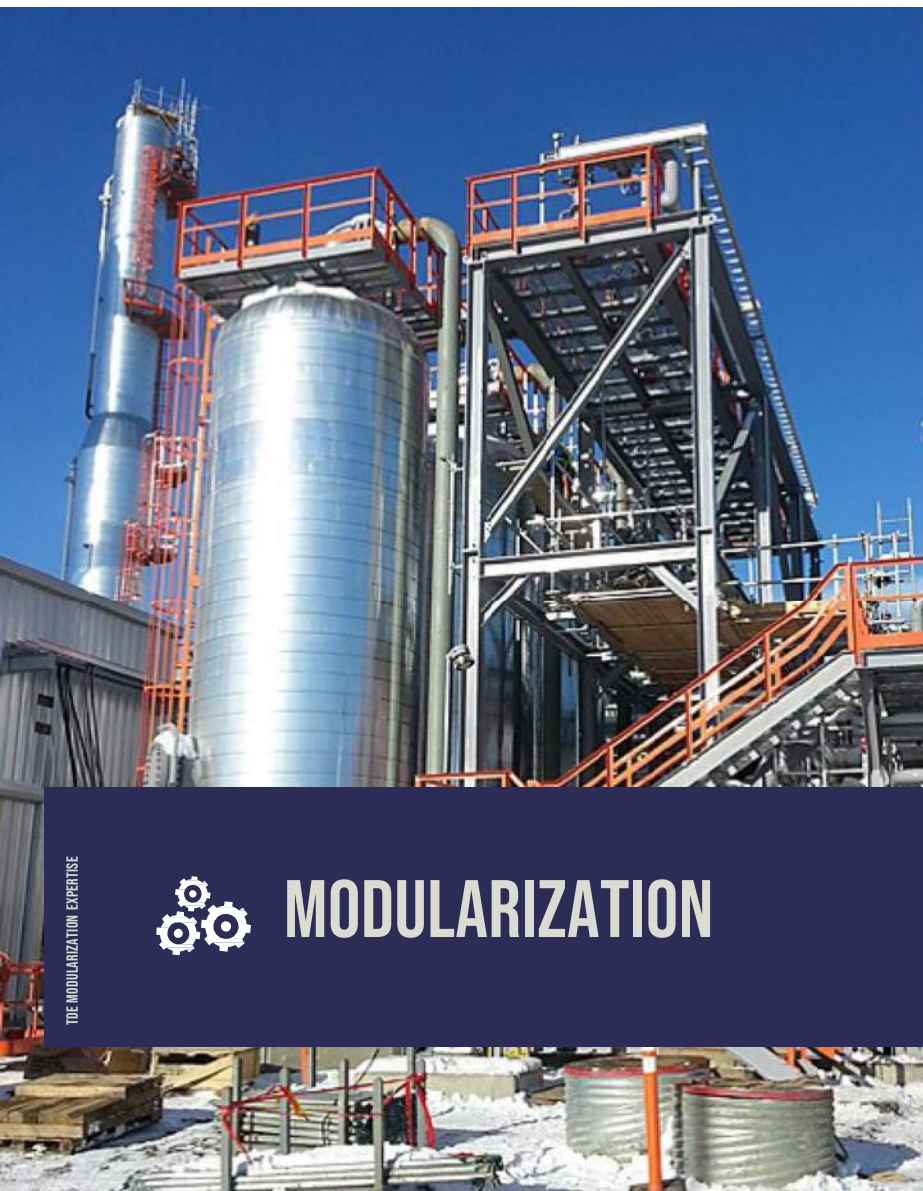
HEAT EXCHANGERS

ASME CODE SECTION VIII,
DIVISION 1 AND 2, AND
TEMA

SHELL & TUBE HEAT
EXCHANGERS

CARBON STEEL,
STAINLESS STEEL, AND
OTHER ALLOYS





TDE MODULARIZATION EXPERTISE



MODULARIZATION



TDE EXPERTISE



THE FUTURE OF ENERGY
PROCESSING

- Ease of Constructability (Lego Blocks)
- Trial fit-up
- Controlled fabrication conditions
- Rapid installation at site
- Reduced plant foot print
- Reduced site construction costs
- Shorter commissioning time
- Reduced overall project delivery

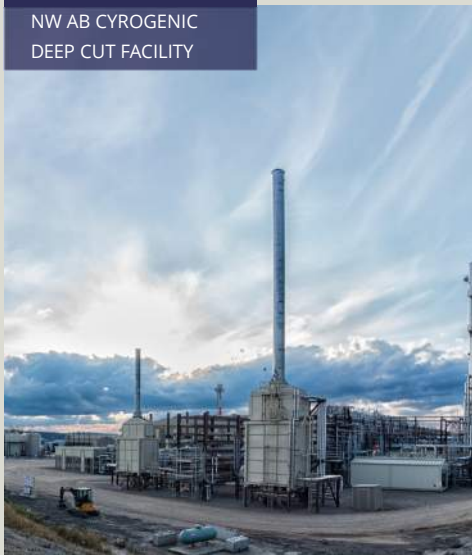


AREAS OF EXPERTISE

INTEGRATED SERVICES FOR THE ENERGY SECTOR

TDE EXPERTISE

NW AB CYROGENIC
DEEP CUT FACILITY



40+ YEARS OF GAS PROCESSING
FACILITIES EXPERIENCE

GAS PROCESSING



NATURAL GAS IS ONE OF THE CLEANEST, SAFEST, AND MOST USEFUL OF ALL ENERGY SOURCES.

- Acid Gas Injection
- Compression
- Dehydration
- Gas Sweetening
- Liquids Fractionation
- LPG Extraction
- Mechanical Refrigeration
- Metering
- NGL Recovery
- Pigging Systems
- Separation and Filtration
- Sulphur Recovery

GAS PROCESSING FACILITIES RESUME



65+ FACILITIES

Gas Processing Facilities from
Pre-FEED to Commissioning



COST CERTAINTY

TDE is proud to offer competitive rates



95% ON SCHEDULE

Experience allows for TDE to apply prior knowledge
to hit or beat the expected timeline.

OIL PROCESSING & REFINING

TDE EXPERTISE

- **REFINING AND FUELS**

- Crude Topping
- Marine Diesel
- Ultra Low Sulphur Diesel
- Aviation Fuel

- **CRUDE STABILIZATION**

- **CRUDE FRACTIONATION**

- **HYDROTREATING**

- **DILUENT RECOVERY**

- **SEPARATION**

- Conventional
- High Efficiency

- **TREATERS**

- Heater Treater
- Mechanical
- Electrostatic

- **DESALTERS**

- 1,2 or 3 Stage

WHETHER YOU REQUIRE HEAVY OR LIGHT, SOUR OR SWEET OIL PROCESSING, YOU CAN COUNT ON TDE'S EXPERTISE.

TDE IS COMMITTED TO SUPPLYING COMPREHENSIVE OIL PROCESSING PRODUCTS WITH THE BEST TECHNOLOGY AVAILABLE.



FIRED EQUIPMENT

TDE EXPERTISE



DIRECT FIRED

API-560
VERTICAL CYLINDRICAL
CABIN
HELICAL COIL
REGENERATORS
REBOILERS



INDIRECT FIRED

WATER/GLYCOL BATH
LINE HEATERS

OFFSHORE PROCESSING

PROCESSING EQUIPMENT FOR:

- **FIXED PLATFORMS**
- **SEMI-SUBMERSIBLE**
- **FPSO'S**
- **FLNG**

TDE
EXPERTISE

WE CREATE TOPSIDE PROCESS SYSTEMS FOR FLOATING PRODUCTION, STORAGE, AND OFFLOADING (FPSO), FIXED PLATFORMS, AND SUBMERSIBLE PLATFORMS. OUR CUSTOMIZED PROCESS ALSO ACCOUNTS FOR THE SALT AND HUMIDITY ISSUES THAT ARISE IN OFFSHORE PROJECTS.



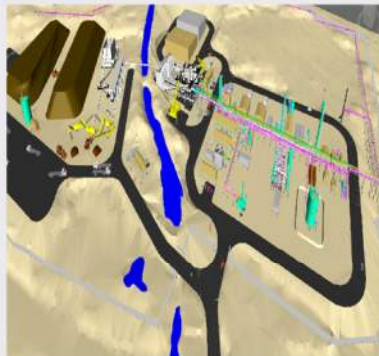
ENVIRONMENTAL STEWARDSHIP

SELECT SUSTAINABLE ENERGY PROJECTS

TDEnviro Inc. (TDV) was founded to develop and provide waste remediation technology, equipment and services to all sectors of industry.

Since its formation in 1993 as a wholly owned subsidiary of Thermo Design Engineering Ltd. (TDE), the company has successfully researched, utilized, developed and deployed commercialized technologies for environmental waste treatment.

The foundation of TDV's treatment processes are exclusive and patented technology that was developed for specific industrial applications.



RENEWABLE NATURAL GAS FACILITY
FRUITVALE, BC, CANADA



MODULAR FLARE GAS RECOVERY
EGYPT



HYDRAULIC ENERGY STORAGE
NEW YORK STATE

50%

OF TDE PROJECTS TO BE
SUSTAINABLE
ENERGY PROJECTS

BY 2025

TDE'S COMMITMENT TO THE ENVIRONMENT

Staying current and innovative is a primary focus of TDE. Our focus is the future and providing solutions for sustainable projects.



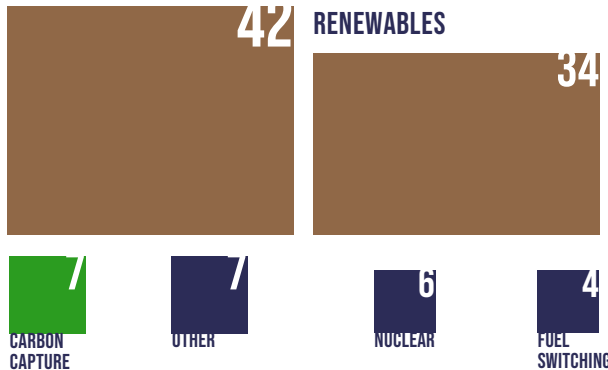
TDE EXPERTISE

CARBON CAPTURE UTILIZATION & STORAGE

EVERY ONE OF TDE'S DESIGNS ARE BUILT AROUND MINIMIZING EMISSIONS AND WHEN NECESSARY REMOVING CARBON FROM EXHAUST STREAMS.

ESTIMATED IMPACT OF CO2 REDUCTION METHODS BY 2040 UNDER THE IEA'S SUSTAINABLE DEVELOPMENT SCENARIO

ENERGY EFFICIENCY



SOURCE: INTERNATIONAL ENERGY AGENCY

TDE EXPERTISE



C

CARBON

CO₂, Methane, other greenhouse gases

C

CAPTURE

Precombustion CO₂ Removal, Post Combustion CO₂ Capture, Flare Gas Treatment and Utilization, Stranded Gas Liquefaction and Transportation

U

UTILIZATION

Enhanced Oil Recovery, Industrial, Medical, Food, Research, and other grades

S

STORAGE

Injected into depleted oil reserves for Enhanced Oil Recovery or CO₂ will dissolve in water contained in formation a portion of which will combine chemically with the rocks for more permanent storage

TDE EXPERTISE



POWER GENERATION

TDE HAS COMPLETED SMALL TO LARGE SCALE POWER GENERATION PROJECTS WITHIN PROCESSING FACILITIES.



2 X 15 MW GAS TURBINE GENERATORS
WITH WASTE HEAT RECOVERY FOR
FACILITY HEATING
NORTHWEST ALBERTA CANADA

01

RENEWABLES INSIDE THE FENCE, BEHIND
THE METER

02

WASTE HEAT RECOVERY

03

PEAKING

04

GENSET EMISSIONS CAPTURE

WASTE TO ENERGY

TDE EXPERTISE

ENERGY RECOVERY TECHNOLOGIES



RENEWABLE NATURAL GAS
RNG



**RENEWABLE PETROCHEMICAL
DERIVATIVES & BIO MATERIALS**



BIO DIESEL



MULTI FUEL BOILERS



SITE SERVICES



ONSITE SERVICES



**"A FISCALLY CONSCIOUS
AND PRACTICAL
APPROACH RESULTING
IN A POSITIVE
CUSTOMER ROI VIA BEST
IN CLASS INDUSTRY
PRACTICES"**



ONSITE SERVICES (CONT)



PRODUCTION DE-BOTTLENECKING



PLANT TROUBLE SHOOTING



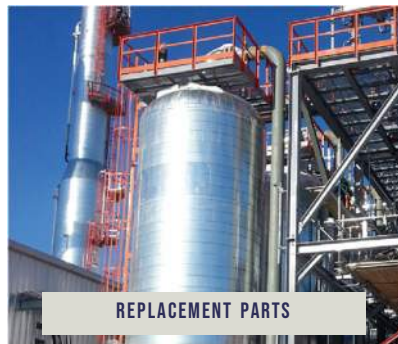
PLANT RESTORATIONS



PLANT STUDIES FOR GENERAL AND
SPECIFIC CUSTOMER SPECIFIED
IMPROVEMENT TARGETS



FEASIBILITY STUDIES



REPLACEMENT PARTS



START-UP AND OPERATIONAL SERVICES



GENERAL CONSULTING



TDE
ThermoDesign

THERMO DESIGN ENGINEERING LTD.

THANK YOU

CORPORATE PRESENTATION



WWW.THERMODESIGN.COM



WATER TREATMENT

TDE EXPERTISE



IN ALBERTA ALL SAGD PROJECTS MUST ↓

**90% WATER RECYCLING IN
SAGD EXTRACTION**



PROJECTS SOLUTIONS ↓

SOUR WATER STRIPPING



**ONLY NON-POTABLE WATER
CAN BE USED TO GENERATE
STEAM**



**PRODUCED WATER
TREATMENT**



Breakwater Energy Partners, 2020. <https://www.breakwaterenergy.com/newsroom/produced-water-recycling-facility-constructed-in-perman-basin/>