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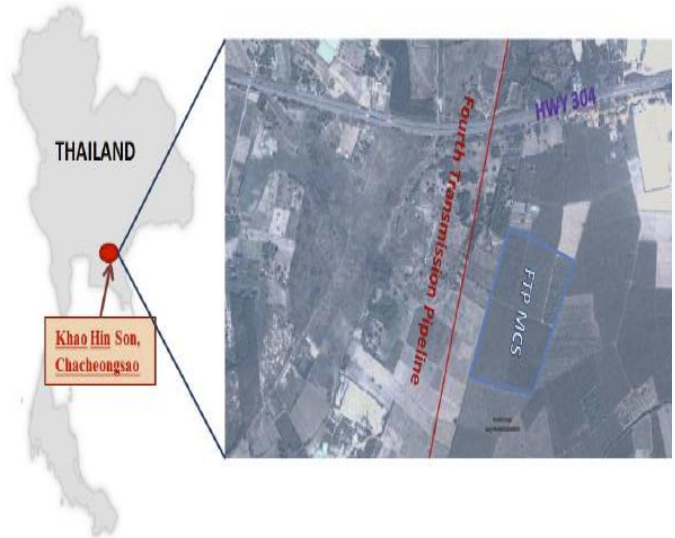
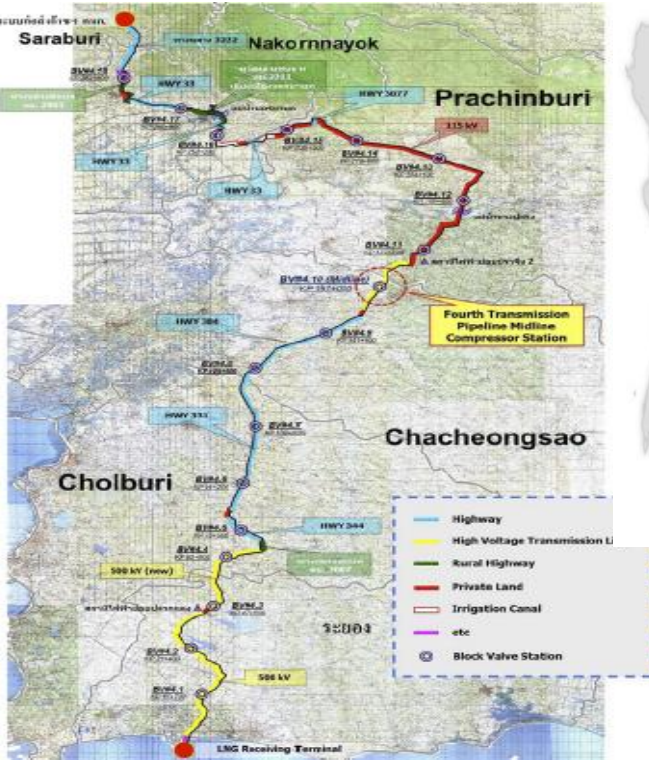
Leading in Safe, Smart, and Green Technological Innovation

Case Study

“Thailand Forth Transmission Pipeline Midline Compressor Station Project ”



China Petroleum Pipeline Engineering Co.,Ltd



Station Operating Inlet Pressure : 525-990 PSIG

Station Operating Outlet Pressure : 990-1265 PSIG

Compressor Train : 4X30MW

Station Operating Capacity 1300-1700 MMSCFD

The FTPMCS is the **BIGGEST** compressor station of Thailand which is located at Khao Hin Son, Chacheongsao



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Client Project Target :

Leading in Safe, Smart, and Green Technological Innovation

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中国石油管道局工程有限公司

CHINA PETROLEUM PIPELINE ENGINEERING CO., LTD.

WE DELIVER CLEAN ENERGY

TO PROTECT OUR PLANET EARTH



**A WORLD-CLASS INTEGRATED OIL AND GAS SERVICE PROVIDER FOR STORAGE AND
TRANSPORTATION FACILITIES**

100,000+ KM LARGE-SCALE LONG-DISTANCE PIPELINE BUILT

ONSHORE/OFFSHORE FACILITIES, OILFIELD SURFACE FACILITIES, LNG TERMINALS, REFINERY FACILITIES, ETC.



**Ranking NO. 88 in The Top 250 International Contractors published
by 2017 Engineering News-Record(ENR).**

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**BUSINESS
CATEGORIES**

ONSHORE PIPELINE

OFFSHORE FACILITIES

OIL & GAS STORAGE

OPERATION AND
MAINTENANCE

TELECOMMUNICATIONS
AND POWER

OIL & GAS FIELD
FACILITIES

LNG PROCESSING AND
RECEIVING TERMINALS

REFINERIES

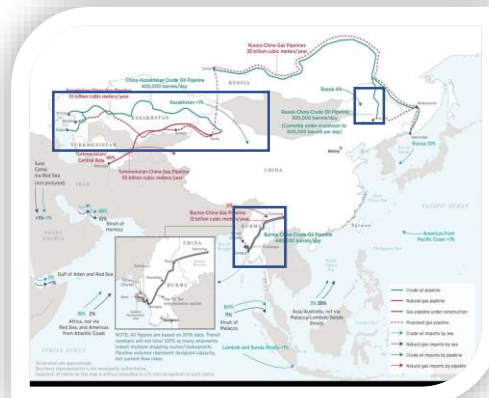
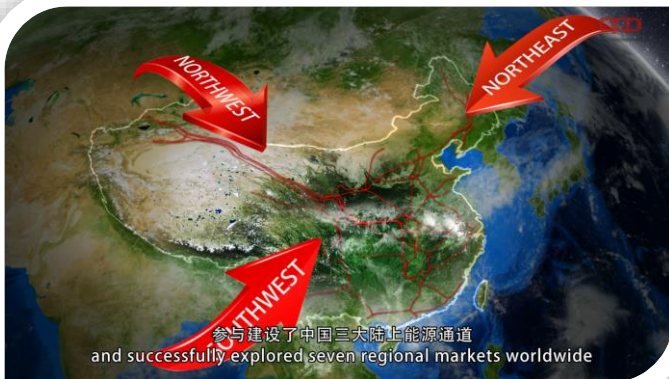


CPP's business covers onshore pipelines, offshore facilities, oil & gas storage, operation and maintenance, telecommunications and power, oil & gas field facilities, LNG processing and receiving terminals, refineries and etc.



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80% domestic pipeline,

3 main Channels for Oil&Gas Import



Global achievement (>40 countries)

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Experience in Thailand



In Thailand

> 10 projects

> 1 billion USD

> 30 million
manhours without
lost time injury

> 20 provinces



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How to achieve the client project target?

SAFE+SMART+GREEN

5 Practices

Standardized
design

+

Workshop
prefabrication

+

Mechanized
installation

+

Modularized
erection

+

Informationized
management



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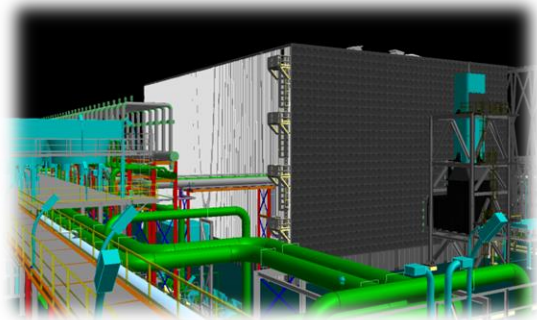
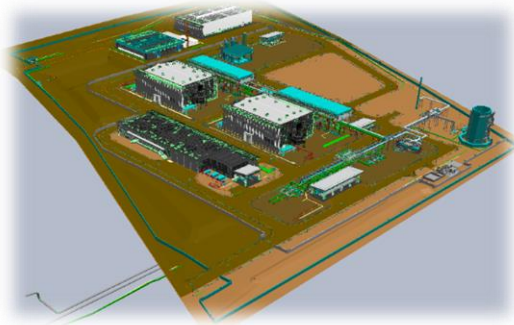


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Standardized design





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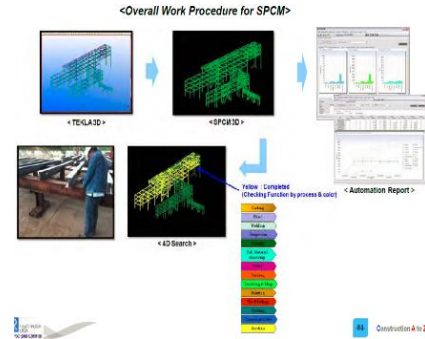
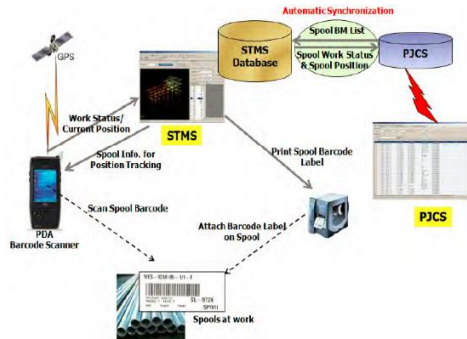
Workshop prefabrication + Mechanized installation



Modularized erection



Informationized management



Finally What We Deliver?





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SAFE



Fourth Transmission Pipeline Midline Compressor Station Project



This Certificate Appreciation is Awarded to

CHINA PETROLEUM PIPELINE BUREAU

For your excellent and continued contribution in the achievement of
4,494,750 Man-Hours without loss time injury

12 August, 2017

Mr. Chuanak Cheunhom
P.T.T. Project Director

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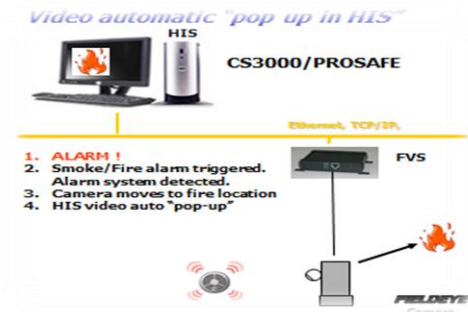


Safety Life Cycle

1	HAZOP Report	18	SIS Hardware Specification
2	HAZOP Actions close-out Report	19	SIS I/O Assignment
3	SIL Determination Report	20	SIS Functional Design Specification - HW
4	Functional Safety Management Plan	21	SIS Functional Design Specification - SW
5	Functional Safety Management Procedure	22	SIS FAT Planning Procedure
6	Safety Life Cycle Verification Procedure	23	SIS FAT Plan
7	Safety Requirement Specification	24	SIS FAT Report
8	SIS Concept Design	25	SIS Installation & Commissioning Planning Procedure
9	Safety Life Cycle Verification Plan	26	SIS Installation & Commissioning Plan
10	Safety Life Cycle Verification Report	27	SIS Installation & Commissioning Report
11	Functional Safety Assessment Planning Procedure	28	Instruction for Operation and Maintenance
12	Functional Safety Assessment Plan	29	SIS Validation Planning Procedure
13	SIL Determination Procedure	30	SIS Validation Plan
14	Safety Requirement Specification Procedure	31	Safety Validation Plan
15	SIS Engineering Design Procedure	32	SIS Work-pack for each SIF
16	SIL Verification Procedure	33	SIS Validation Report
17	SIL Verification Report	34	Functional Safety Assessment Report

**Total 13 steps from start to completed commissioning
Including 34 related documents**

Advanced Monitoring And Emergency System



**Fire Alarm,IG541,integrated with CCTV and HVAC system
Inside building**



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Fire Gas System Integrated With Fire Fighting Water System



Within **15 seconds** ,water shall
spray outside building



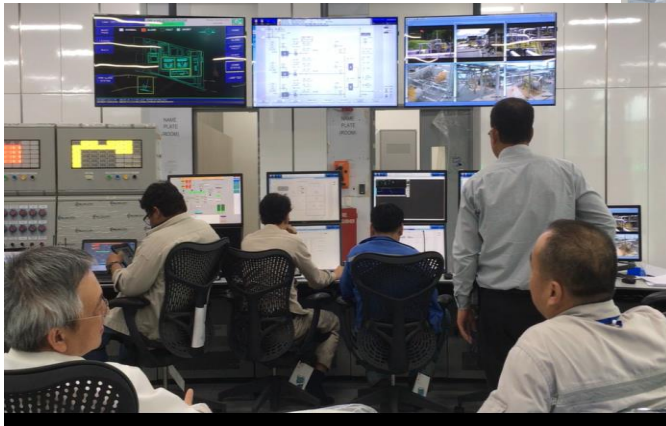


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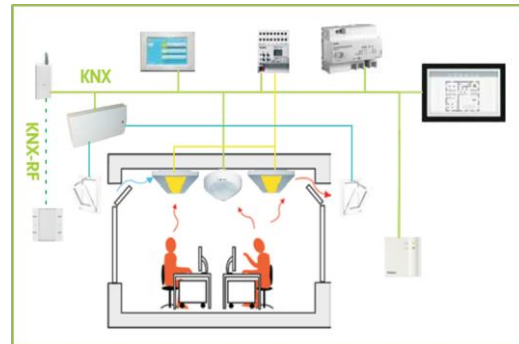
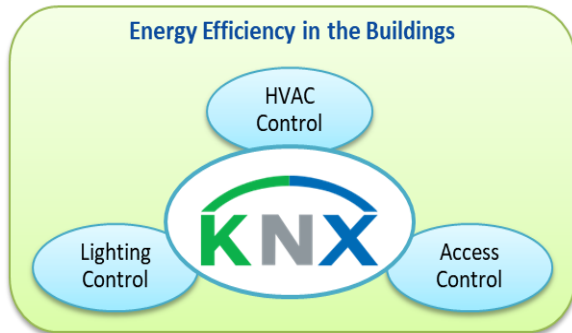


SMART



Control Intelligent System for Buildings and Plant Area (KNX System)

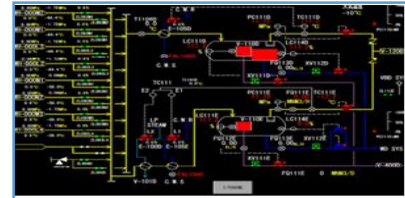
To manage and control energy use in the Access Control, HVAC Control and Lighting Control.



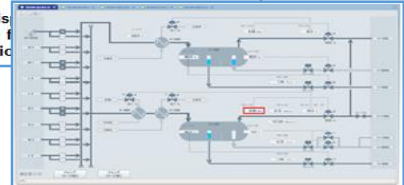
DCS

Operating Graphic Display

- Shortened operation monitoring cycle
- Timely identification of abnormal conditions
- Fewer operator errors
- Reduced operator workload / eye fatigue



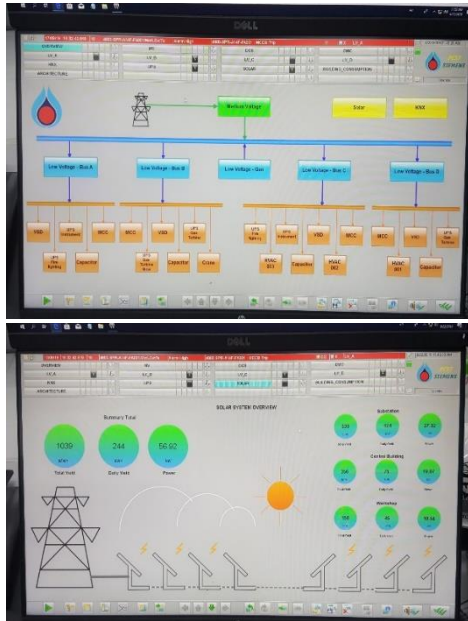
Before: A display with a dark background is difficult to read for long periods.



After: A display with a light gray background is easier to read/results in less eye fatigue.



CSCS (Computer-based Substation Control System)



Monitor and control the equipment status



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GREEN



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LEED Certified for Central Control Building

- Design: Increase Indoor Air Quality, Onsite Renewal Energy
- Construction: Construction Site Management
- Long Term Operation: Building Energy Management System



LEED: Leadership in Energy and Environmental Design

LEED Target : Certified

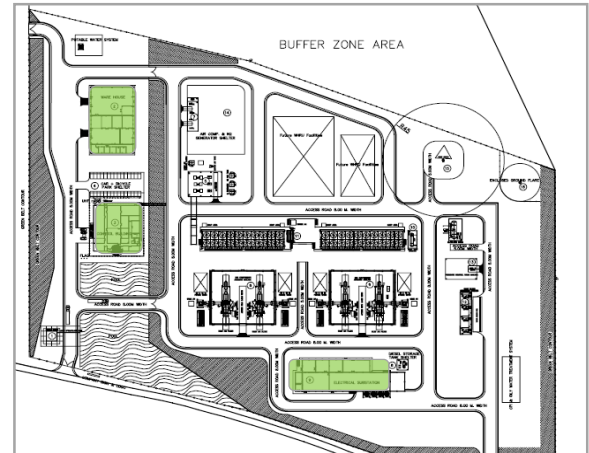
LEED Platinum	80 – 110 points
LEED Gold	60 – 79 points
LEED Silver	50 – 59 points
LEED Certified	40 - 49 points



Control Building Achieved GOLD Certificate

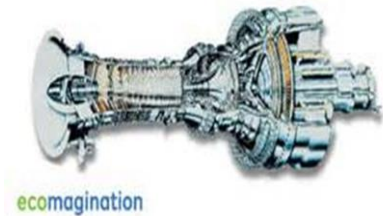
Solar Cell - Roof Top System

Control Building; Substation; Warehouse



In daytime, the solar system generates 60% power consumption for HVAC and 100% for indoor lighting.

Gas Turbine Compressor With High Efficiency

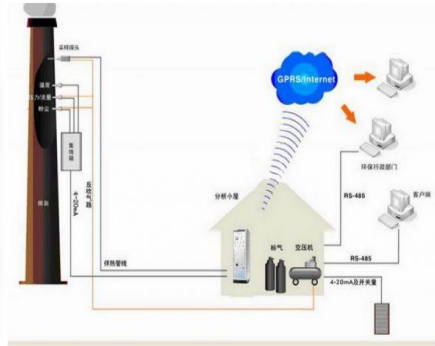


4 Trains of GE PGT25+ Gas Turbine driving BCL606/N Centrifugal Compressor

DLE (Dry Low Emission) gas turbine engine

Compressor Polytropic Efficiency at the design point: 87.6%

CEMS (Continuous Emissions Monitoring System)



CEMS are used to monitor the emission from exhaust stacks
The information from CEMS shall be transferred to the DCS and required government agencies online real-timely.

Enclosed Ground Flare System



VS



Normal Flare Stack

To eliminate unpleasant odor, light and noise from flaring waste gases

Noise Mitigation



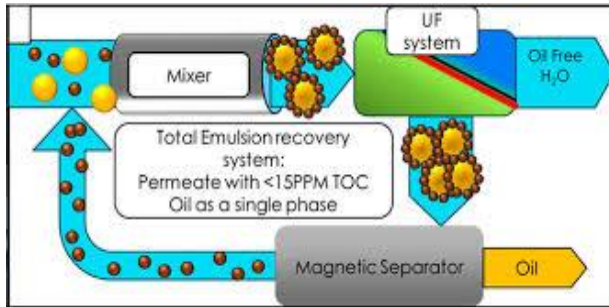
Noise Source Analysis



Acoustic Shelter For Compressors

the sound pressure level 1 meter outside shelter is less than 75 dBA when the compressor runs at maximum load

Oily Water Treatment System



The waste water shall be managed, treated and tested properly to ensure that only qualified treated water can be released into public drainage system.



Landscape





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Healthier

Easier

Friendly





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THANK YOU!



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