



东方电气
DONGFANG ELECTRIC

**Active Participant in Boosting Sino-Arab
Energy & Power Cooperation:
Vision of Dongfang Electric Corporation**

**The 6th Sino-Arab Energy & Power Forum
Cairo, Nov. 5, 2018**



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DEC

Overview

东方电气概况



东方电气
DONGFANG ELECTRIC



- Foundation: Since 1958
- Main business: Power equipment manufacturing and EPC Contracting Service
- China national R&D Center for machinery manufacturing
- Listed enterprise in HKSE(Code: 1072) and Shanghai Stock Exchange (Code: 600875)

DEC In Data

(2017)

Revenue:

4.7

Billion USD

Orders in hand:

13.1

Billion USD

Total assets:

15.8

Billion USD

ENR Ranking:

107

Annual Capacity:

30.7

GW

Overseas Capacity:

84⁺

GW

Total Capacity:

500⁺

GW

Employees:

20,600

DEC 中国东方电气集团有限公司

Deyang, Sichuan

Dongfang Electric Machinery Co., Ltd.
Dongfang Turbine Co., Ltd.
Framatome Dongfang Reactor Coolant
Pumps Co., Ltd.
Dongfang Electric Wind Power Co., Ltd

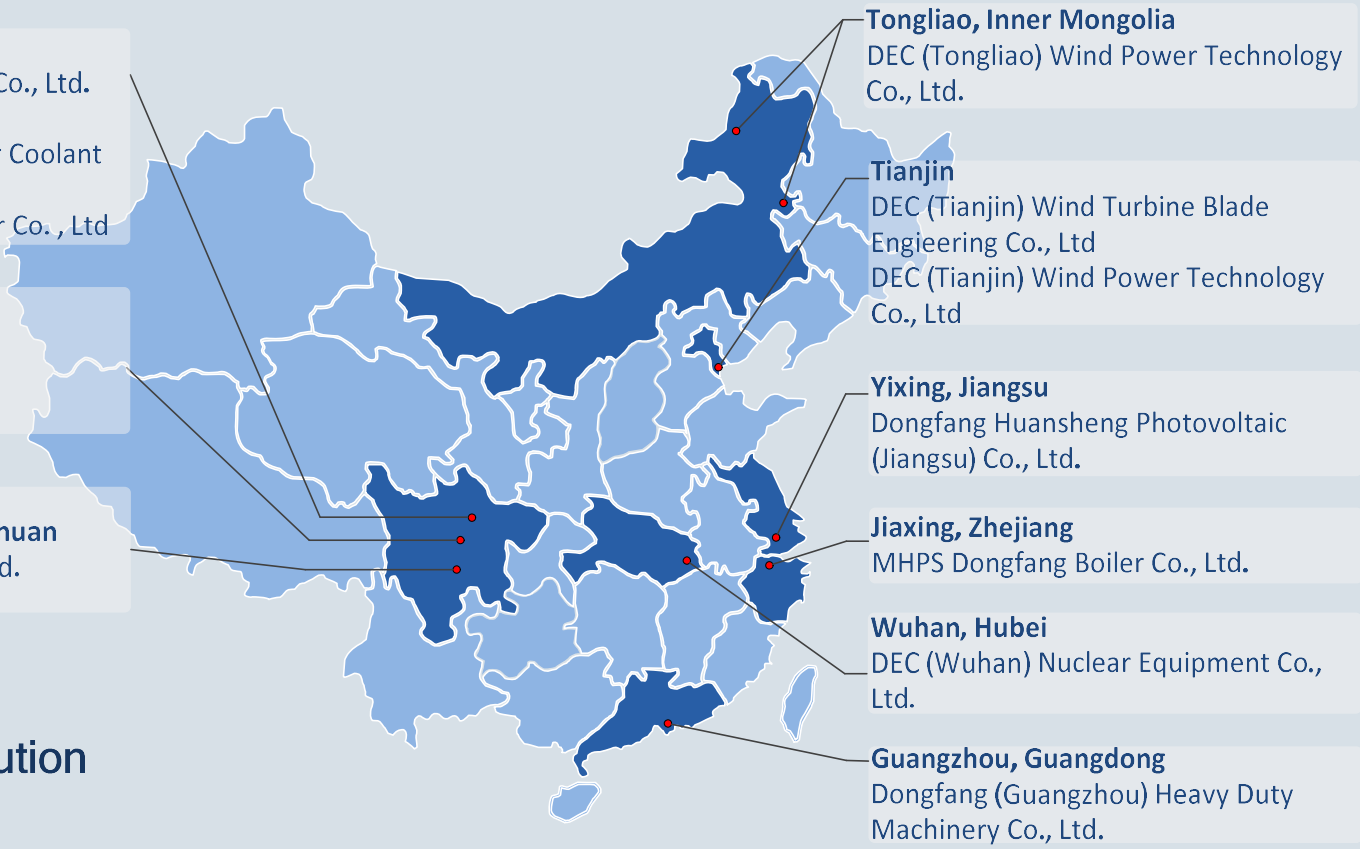
Chengdu, Sichuan

Headquarter of DEC

Zigong/Deyang/Chengdu, Sichuan

Dongfang Boiler Group Co., Ltd.

**DEC
Industrial Distribution
(Domestic)**





东方锅炉

DONGFANG BOILER



东方重机

DONGFANG HEAVY
MACHINERY





东方电机

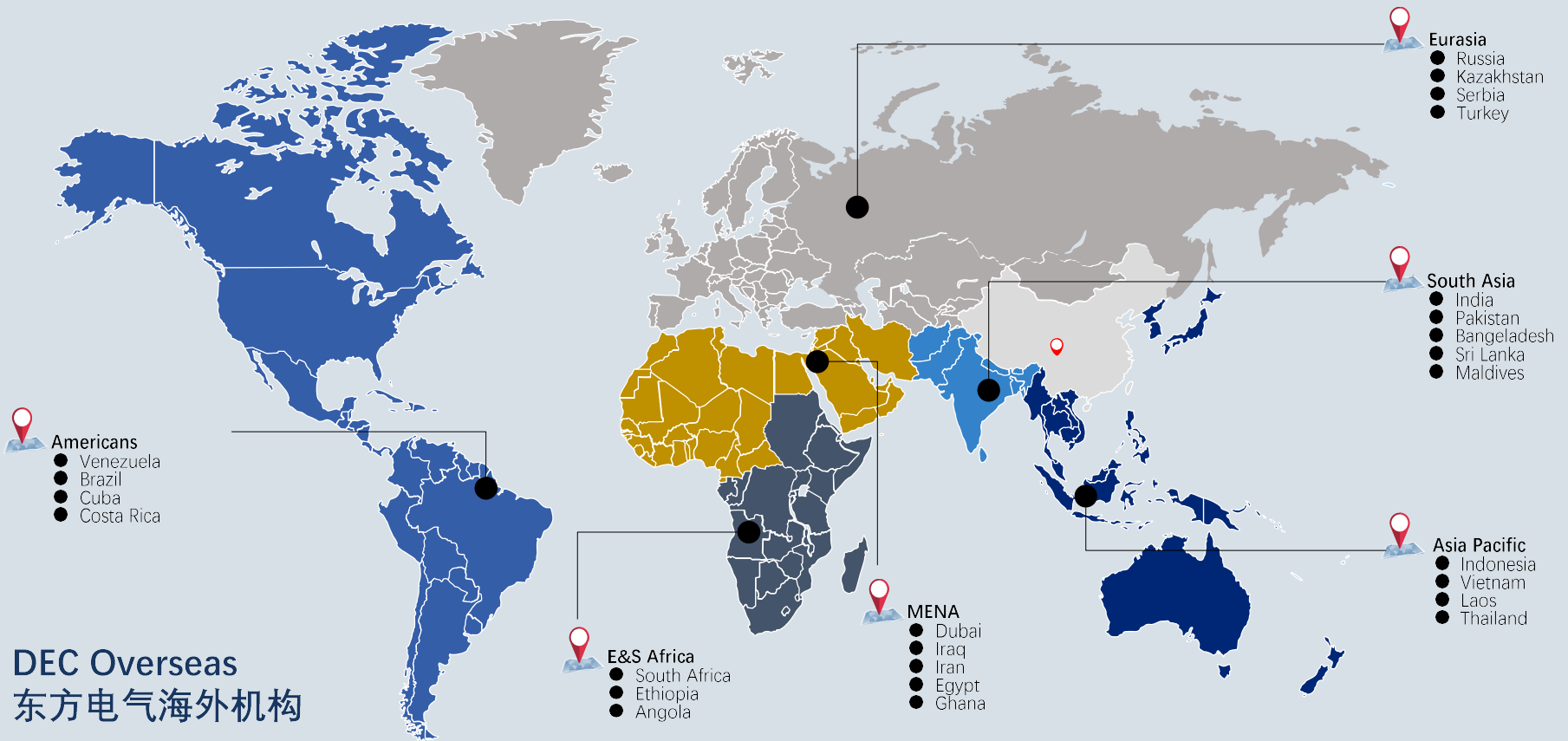
DONGFANG ELECTRIC
MACHINERY



东方汽轮机

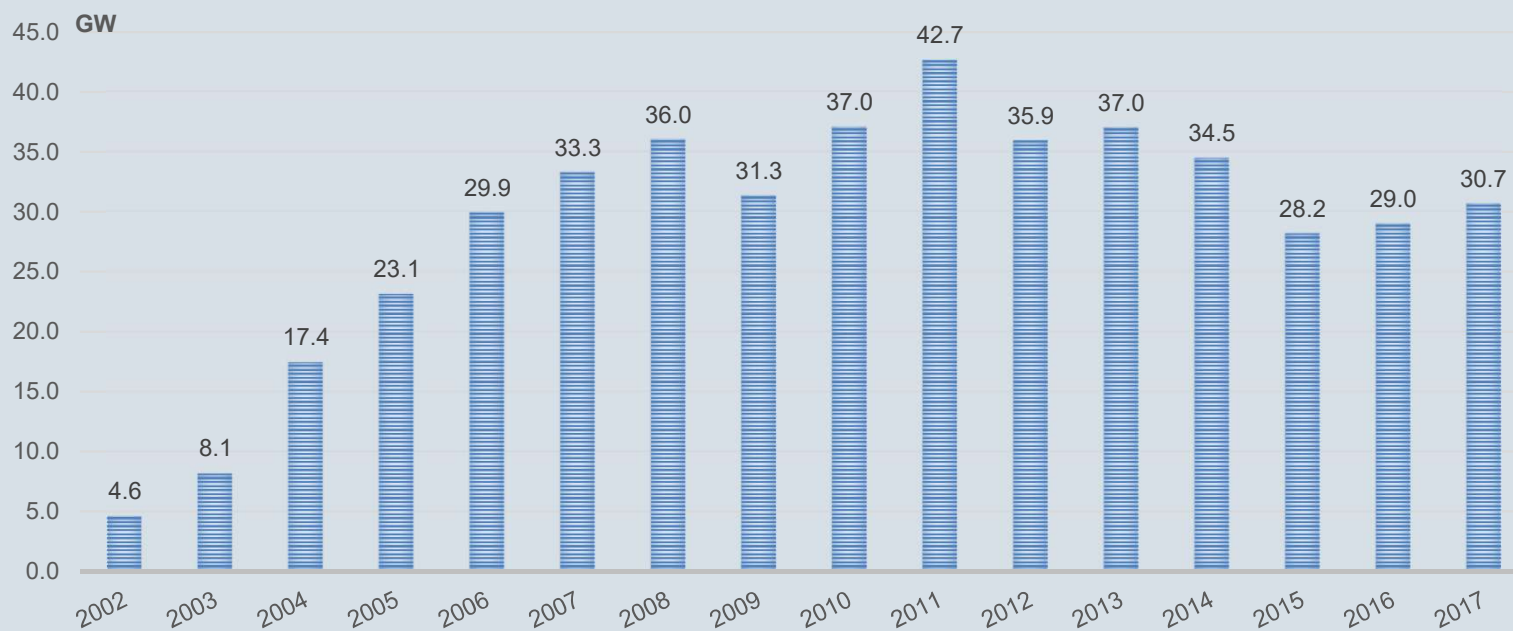
DONGFANG TURBINE

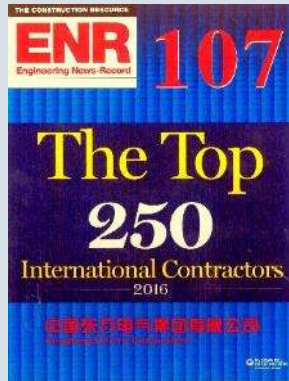




DEC Overseas
东方电气海外机构

Annual Delivery World Largest Continuously





**ENR Top 250
International Contractors**



**ENR Top 80
Chinese Contractors**



ISO 9001



ISO 14001



ISO 18001



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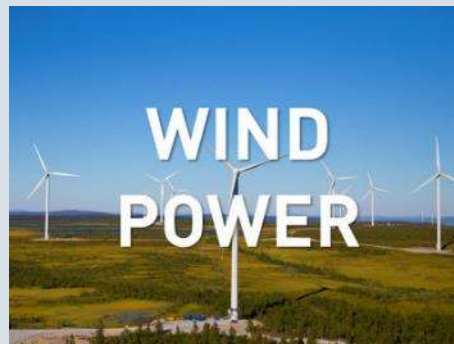
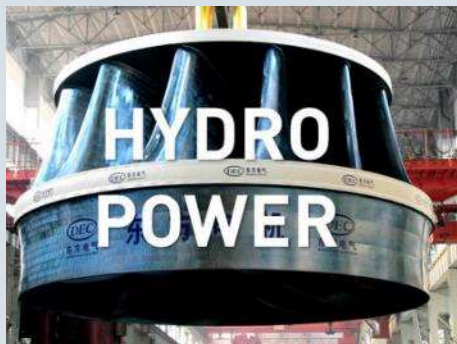
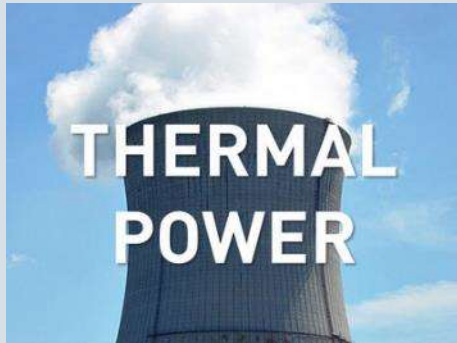
DEC

Main Products

装备制造实力



东方电气
DONGFANG ELECTRIC



THERMAL POWER



▶ Boiler

PC Boiler Sub-critical, Supercritical, Ultra-supercritical: 25MW~1000MW
CFB Super-critical, sub-critical: 50MW~600MW



▶ Steam Turbine

Sub-critical, Supercritical, Ultra-supercritical: 25MW~1000MW



▶ Generator

Sub-critical, Supercritical, Ultra-supercritical: 25MW~1000MW

Reference*: 1000MW: Over 70 Units;
300MW: Over 440 Units;

600MW/660MW: Over 280 Units
200MW and below: Over 680 Units



Zouxian TPP Project, China

4x300MW + 2x600MW + 2x1000MW

- DEC's 1st 300MW unit, COD in 1985
- DEC's 1st 600MW unit, COD in 1997
- DEC's 1st 1000MW unit, COD in 2006



Baima CFB Demonstration TPP Project, China

- 1x300MW CFB + 1x600MW CFB
- China First 300MW CFB unit, COD in 2006
- World First 600MW super-critical CFB unit, COD in 2013

HYDRO POWER



Francis Type

1MW ~ 1000MW(World's largest)



Kaplan Type

1MW ~ 200MW



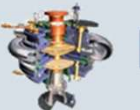
Bulb Type

1MW ~ 75MW



Pelton Type

1MW ~ 200MW



Pump Storage Type

50MW ~ 300MW

Reference:

Francis Type: 91GW, 359 units

Kaplan Type: 7GW, 129 units

Bulb Type: 5GW, 149 units

Pelton Type:

0.8GW, 11 units

Pump Storage Type:

16GW, 56 units



Three Gorges HPP Project, China

- 32×700MW in which 9 units provided by DEC

Xiluodu HPP Project, China

- 18×770MW in which 9 units provided by DEC



NUCLEAR POWER

Nuclear Product Range



Small Module Reactor

25MW



CFR600



Generation II+



AP1000



HPR



CAP1400



EPR

1750MW

Market share for Conventional Island in China



Market share for Nuclear Island In China



**Taishan Nuclear
Power Plant, Phase I**
2x1750MW in Guangdong, China


GAS POWER

	Open Cycle	Combined Cycle*
M701D	144MW	213MW
M701F3	270MW	398MW
M701F4	324MW	478MW
M701F5	359MW	525MW
M701J	445MW	650MW

*ISO condition, 1GT+1ST, standard natural gas



Reference: M701F: 17 (F3) + 46 (F4) + 2 (F5) = 65 Sets
M701DA: 2 Sets



Huaneng Beijing #3 Thermal Power Project, China

- M701F5, 525MW, 2 on 1
- COD in 2017

WIND POWER
WIND POWER

Unit Type	Capacity	Double Fed	Direct Drive
常规型 Conventional Type	1.0 MW	FD60 FD64	
	1.5 MW	FD77 FD82	DF77 DF82 DF87
	2.0 MW	FD93	
	2.5 MW	FD110	DF103 DF110
	3.0 MW	FD119	
弱风型 Weak Wind Type	1.5 MW	FD89 FD93	DF93
	2.0 MW	FD108 FD116	
	2.5 MW		DF121
高原型 Plateau Type	1.5 MW	FD87 FD93	DF87 DF93
	2.0 MW	FD108 FD116	
	2.5 MW		DF110 DF121
海上型 Off-shore Type	3.0 MW	FD119	
抗台风型 Typhoon Resistance Type	5.0 MW	FD140	
	1.5 MW	FD87	
	2.0 MW	FD87	
	2.5 MW		DF103
	5.0 MW	FD140	

Reference*:

- More than 8,100 units supplied
- Oversea: more than 200 Units
- SKAB Blaiken Project, Sweden, (30+9) × 2.5MW, First time Chinese wind equipment enter into European market.

A photograph of the Zhaojue Wind Yard in Sichuan, China. The scene is dominated by a vast field of purple flowers in the foreground, leading up to a hill where several white wind turbines are situated. The sky is a mix of blue and orange, suggesting a sunset or sunrise. The wind turbines are of the FD93 type, and the project has a capacity of 33x1.5MW. The Commissioning Date (COD) is 2013.

Zhaojue Wind Yard, Sichuan, China

- FD93 type, project capacity 33x1.5MW
- COD in 2013

SOLAR POWER (PV)



“东方环晟” or “DZS Solar”

东方环晟光伏(江苏)有限公司
Dongfang Huansheng Photovoltaic (Jiangsu) Co., Ltd



Establish
August, 2015



Capital
USD160m



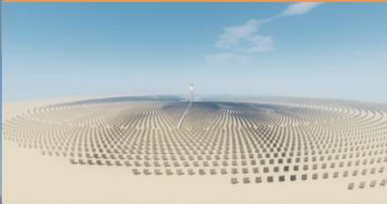
Solar cell production
1.2GW/a, conversion
efficiency $\geq 21.5\%$



Solar modular
production 5GW/a,
conversion efficiency
 $\geq 19\%$

SOLAR POWER (CSP)

D&M of Heliostats field



- Arrangement and integration design
- Heliostat design
- Heliostats operation monitoring
- Dispatch and control

D&M of Receiver



- Water receiver
- Molten salt receiver
- Coupling of receiver and HF
- Design, manufacture & operation

D&M of Heat exchange and storage system



- Solar tower (molten salt/water)
- Solar trough (oil/water)
- Solar trough (oil/molten salt)
- Molten salt tanks D&M
- Heat exchangers D&M

Solar boost system integration



- Integration design research of solar boost system
- Equipment research of solar boost system
- Integration design and operation of receiver and HF

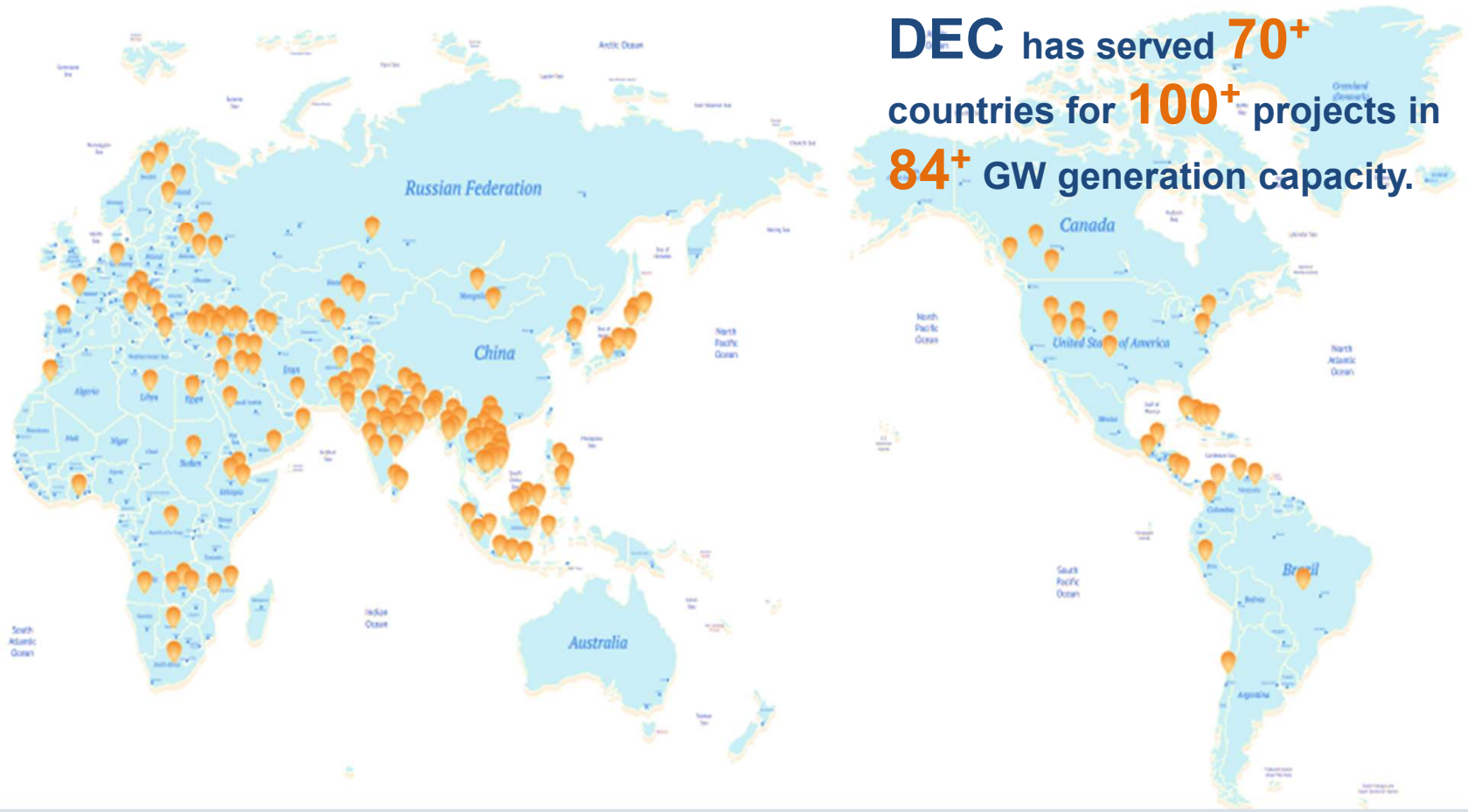
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DEC Oversea Projects 海外项目业绩



东方电气
DONGFANG ELECTRIC

Global
Footprints



DEC has served **70+**
countries for **100+** projects in
84+ GW generation capacity.



Hydro Power



**Thermal, Biomass,
Waste to Energy**



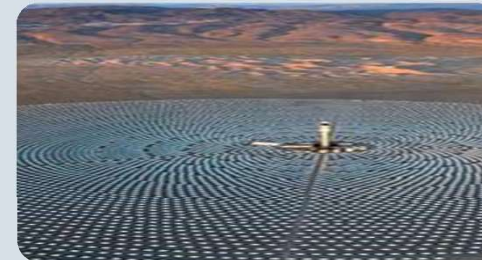
Seawater Desalination



PV Solar



Transmission Line



CSP



Wind Power



Gas/Oil Power Projects



Hybrid Energy Solution



Engineering

- Survey
- Design
- consulting
- supervision

INTEGRATED ENERGY SOLUTIONS PROVIDER

Manufacturing



ment
ent
eland

Financing

- Project financing
- ECA financing
- Export Credit
- Equity Investment

O&M

- O&M service
- Spare parts
- Training
- Overhauling
- and rehabilitation

INTEGRATED ENERGY SOLUTIONS PROVIDER



Engineering

- Survey
- Design
- consulting
- supervision

Financing

- Project financing
- ECA financing
- Export Credit
- Equity Investment

Manufacturing

- Power equipment manufacturing

O&M

- O&M service
- Spare parts
- Training
- Overhauling
- and rehabilitation

Contracting

- EPC
- BTG equipment
- BTG Island

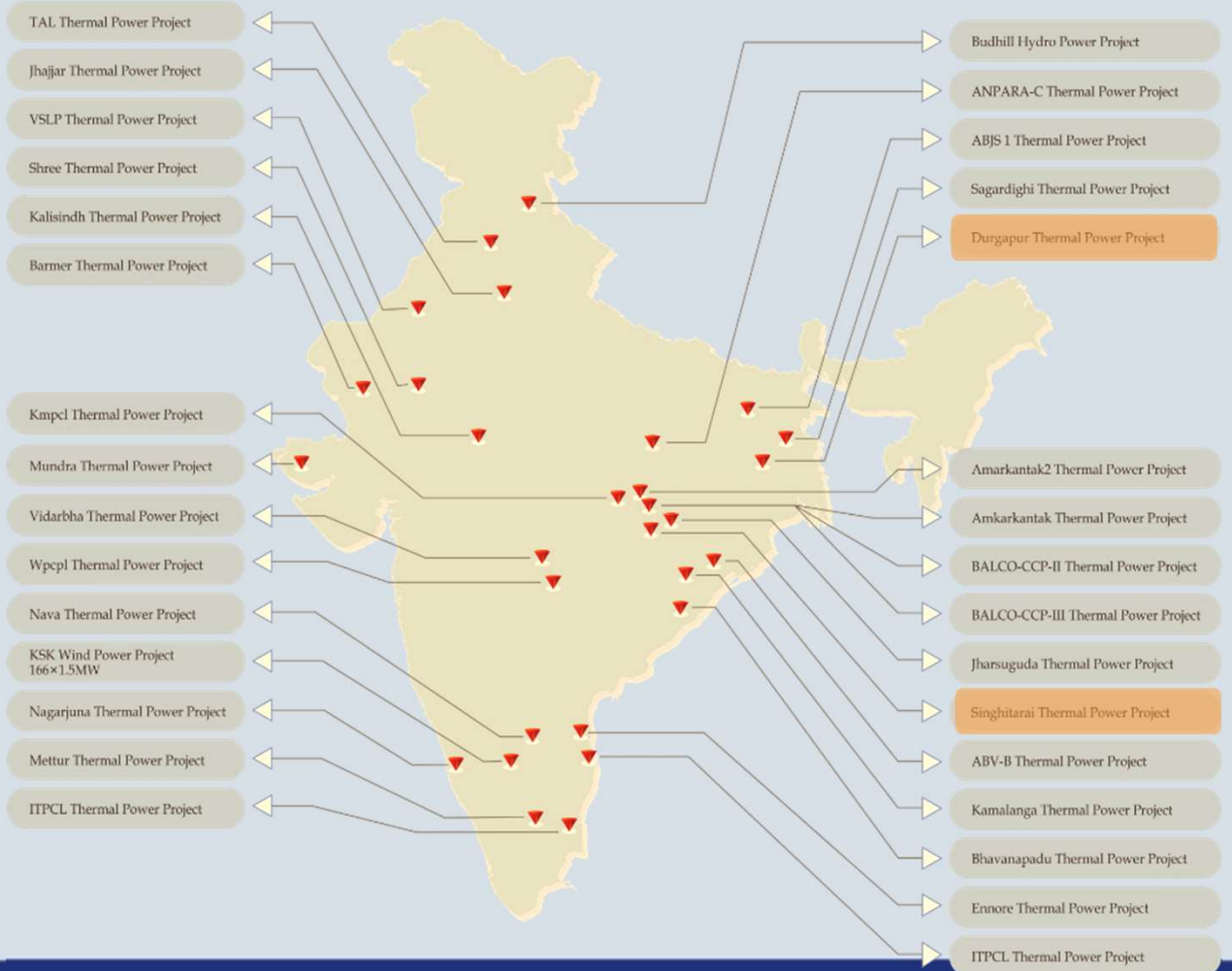


DEC PRESENTS IN ASIA



EPC	900MW
BTG supply	28,760MW
Total	29,660MW

- 660MW: 17 Units
- 600MW: 19 Units
- 300MW: 12 Units
- 135MW: 20 Units





INDIA

Sagardighi TPP Project

- Project capacity 2x300 MW
- EPC (Engineering, Procurement and Construction)
- COD in 2008





INDIA

Durgapur TPP Project

- Project capacity 1x300 MW
- EPC (Engineering, Procurement and Construction)
- COD in 2008





Krishnapatnam 2x660MW TPP Project



Barmer 8x135MW TPP Project (CFB)



Kalisindh 2x600MW TPP Project



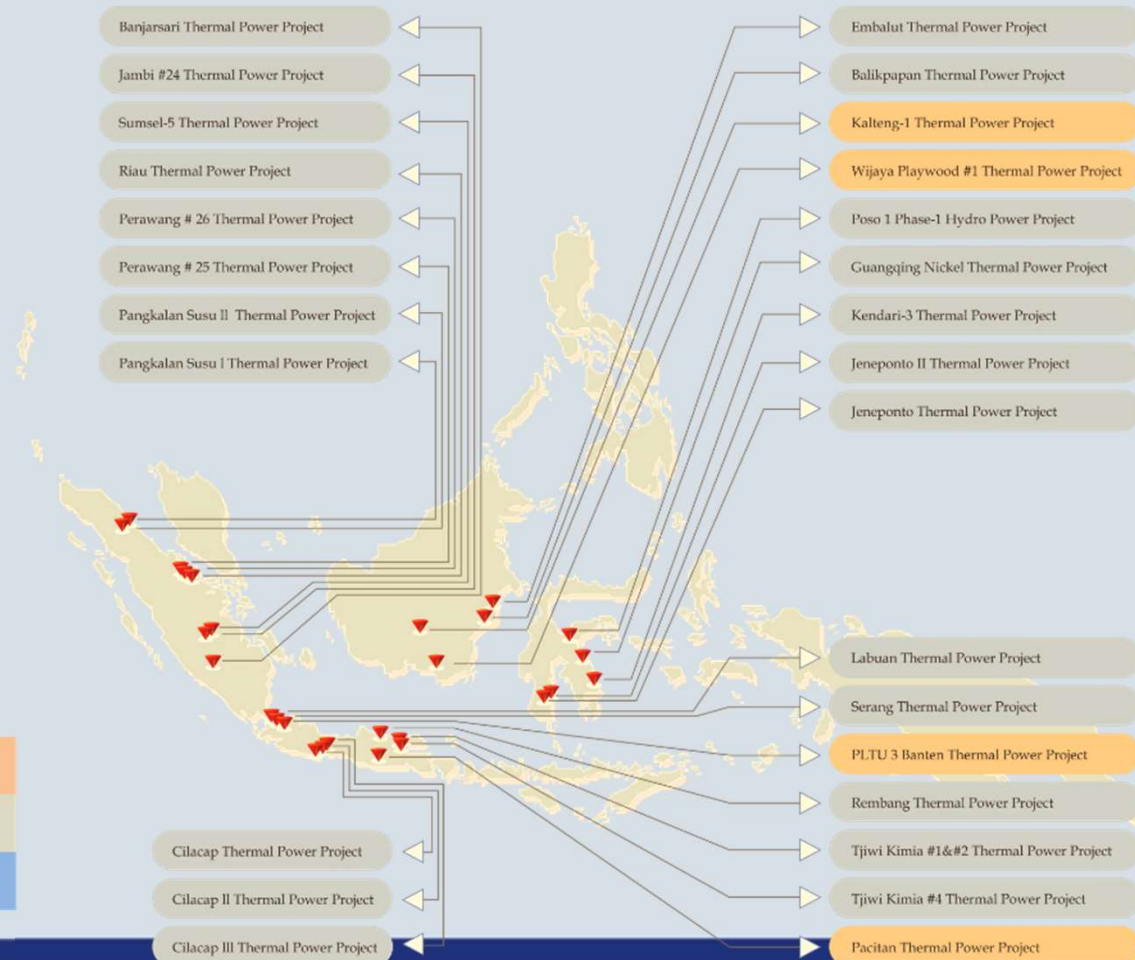
Amarkantak Phase 1 2x300MW TPP Project



Singhitarai 2x600MW TPP Project



INDONESIA



EPC	1,811MW
BTG supply	8,915MW
Total	10,726MW



INDONESIA

PLTU3 Banten TPP Project

- Project capacity 3x315 MW
- EPC (Engineering, Procurement and Construction)
- COD in 2012

PLTU3 Banten TPP, Indonesia



INDONESIA

PLTU1 Jawa Timur TPP Project

- Project capacity 2x315 MW
- EPC (Engineering, Procurement and Construction)
- COD in 2013

PLTU1 Jawa Timur TPP, Indonesia

Kalteng-1 TPP Project

- Project capacity 2x115 MW
- EPC (Engineering, Procurement and Construction)
- Contract signed in 2016



Kalteng-1 CFSP, Indonesia





南望電廠Rembang TPP
Project, 2x315MW



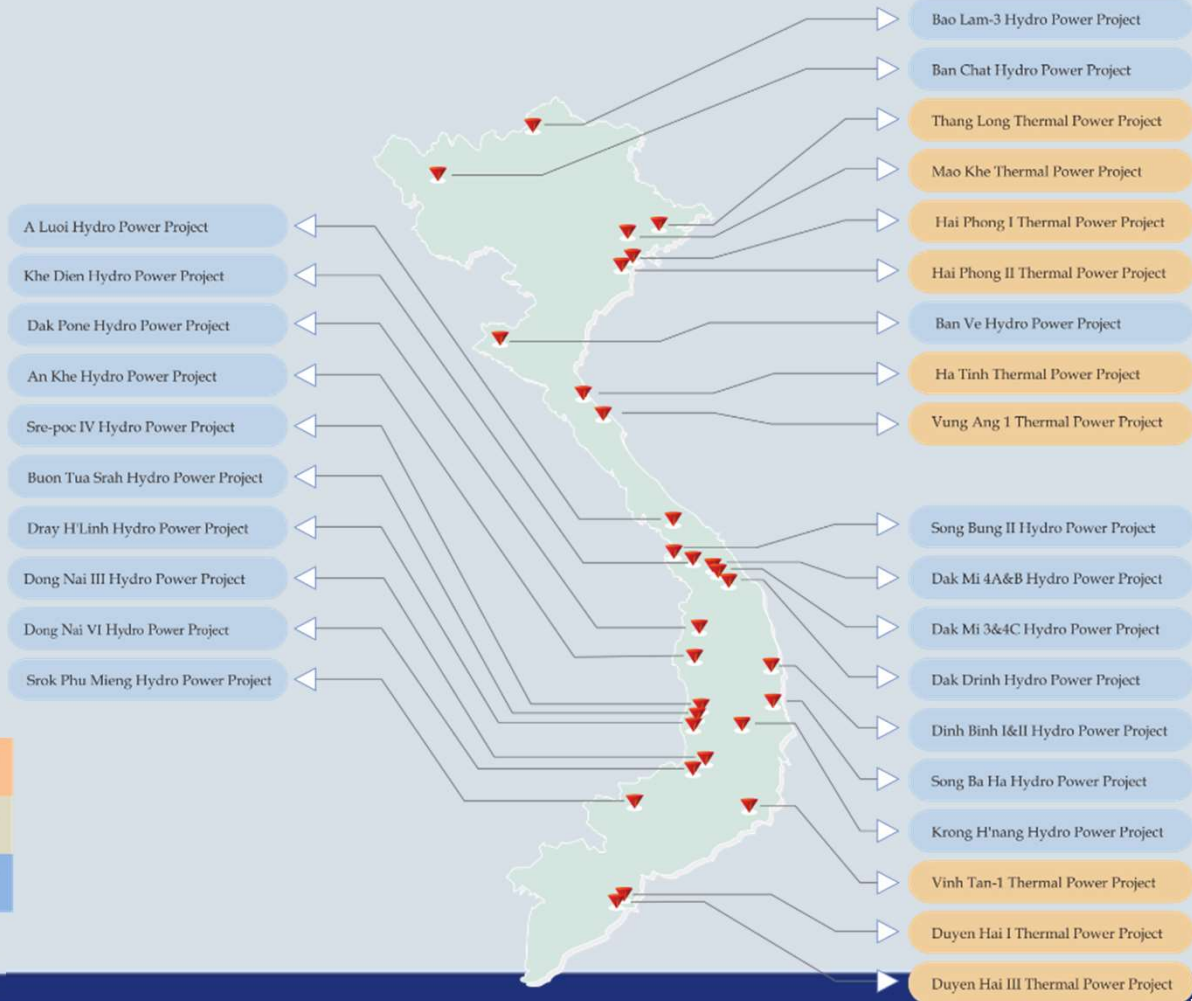
芝拉紮電廠Cilacap TPP
Project, 2x300MW



拉布灣電廠Labuan TPP
Project, 2x315MW



棉蘭電廠Medan TPP Project,
2x200MW



TPP Project	5,878MW
HPP Project	2,599MW
Total	8,477MW



VIETNAM

Hai Phong TPP Project Phase 1&2

- Project capacity 4×300MW
- EPC (Engineering, Procurement and Construction)
- Phase 1: COD in 2009; Phase 2: COD in 2014
- Winning Prize in 2014 by Vietnam MOIT

Hai Phong 1 TPP, Vietnam



VIETNAM

Duyen Hai TPP Phase 1&3 (4×622MW)

- EPC (Engineering, Procurement and Construction)
- Phase 1: COD in 2016; Phase 3: in commissioning

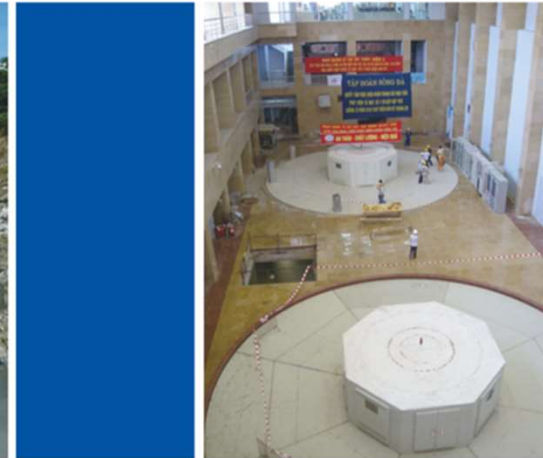
Duyen Hai 1&3 TPP, Vietnam



VIETNAM



Song Ba Ha 2x110MW HPP, Francis type



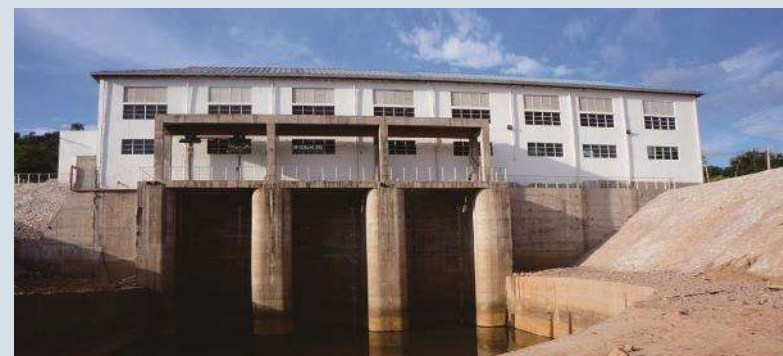
Ban Ve 2x160MW HPP, Francis type



Srok Phu Mient 2x25.5MW HPP, Kaplan type, the first project with Buyer's Credit from the EXIM Bank of China in Vietnam



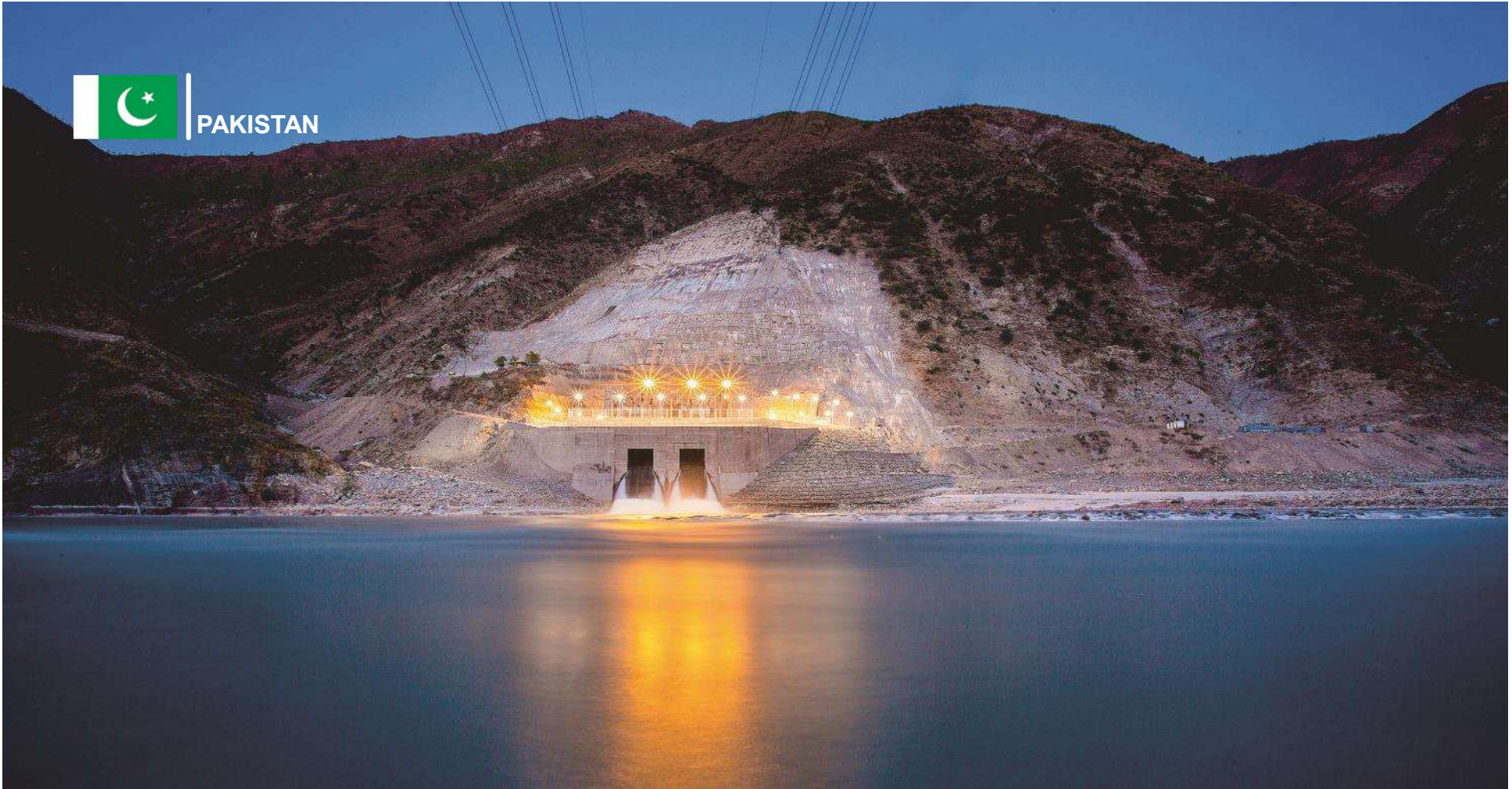




Nam Mang 1 3×21.33MW HPP Project, the first overseas BOT project of DEC



Nadipur 425MW CCPP Project, COD in 2016



Allai Khwar 2×60.5MW Hydro Power Project



MALAYSIA



Kuching 2x50MW Thermal Power Plant



ThaiCo Energy Solar Power Project

- Project capacity 23MWp
- EPC (Engineering, Procurement and Construction)
- COD in 2017





MALDIVES



Maldives Diesel Power and Seawater Desalination Project (50MW)

DEC PRESENTS IN GULF AREA AND MIDDLE EAST



SAUDI
ARABIA

Rabigh 2x660MW (60Hz) Oil Fired TPP

- Project capacity: 2x660MW
- EPC (Engineering, Procurement and Construction)
- COD in 2014
- 1st Chinese Contracted Power Plant in GCC Countries





Awarded of Top Quality Power Plant in Iran by Local Authority



Arak 4x325MW Gas/Oil fired power plant



Baghdad East 4×123MW Gas Turbine Power Plant, COD in 2002



TURKEY

- EPC Contracting: 1,320MW
- CFPP Equipment Supply: 3,450 MW



- Hema 2x660MW Coal Fired TPP
 - EPC Contracting
 - Contract Signed in 2016

- Biga Coal Fired TPP, (2x135MW CFB, 1x600MW)
 - Equipment Supply
 - COD in 2005/2009/2011



Obruk 4×59MW Hydro Power Project

GREEN SOLUTIONS IN EUROPE



BOSNIA I
HERZEGOVINA

Stanari TPP Project

- Project capacity 1x300 MW
- EPC (Engineering, Procurement and Construction)
- COD in 2016
- Circulating fluidized bed(CFB) boiler with subcritical steam parameters, Air Cooled Condenser

Stanari TPP, BiH



BOSNIA I
HERZEGOVINA



Banovici TPP Project

- Project capacity 1x350 MW
- EPC (Engineering, Procurement and Construction)
- Circulating fluidized bed(CFB) boiler with supercritical steam parameters, Natural draft cooling tower combined with flue gas chimney, circular closed coal storage yard



BELARUS



Minsk 400MW CCPP Project, COD in 2012



Blaiken (30+9)×2.5MW Wind Power Project

- Equipment Supply
- 30 units COD in 2015, 9 units COD in 2016





RUSSIA

Ulyanovsk Wind Power Project, Russia

- Project capacity 14x2.5 MW
- Wind turbine equipment supply
- COD in 2018



DEC PRESENTS IN AFRICA



EGYPT



Hamrawein 6000MW TPP Project, Egypt

- Project capacity 6x1000MW
- Ultra-supercritical technology, high-efficiency clean coal power
- Contract Award in 2018



GIBE III 10×187MW Hydro Power Project, COD in 2016



100MW Diesel Power & Solar Hybrid project



Aysha-II Wind Power Project, 48x2.5MW
Equipment under delivering

DEC PRESENTS IN SOUTH AMERICA



BRAZIL

Jirau HPP Project

- Project capacity 22x75MW
- Equipment supply
- COD in 2016
- The world's largest-capacity bulb type hydropower unit



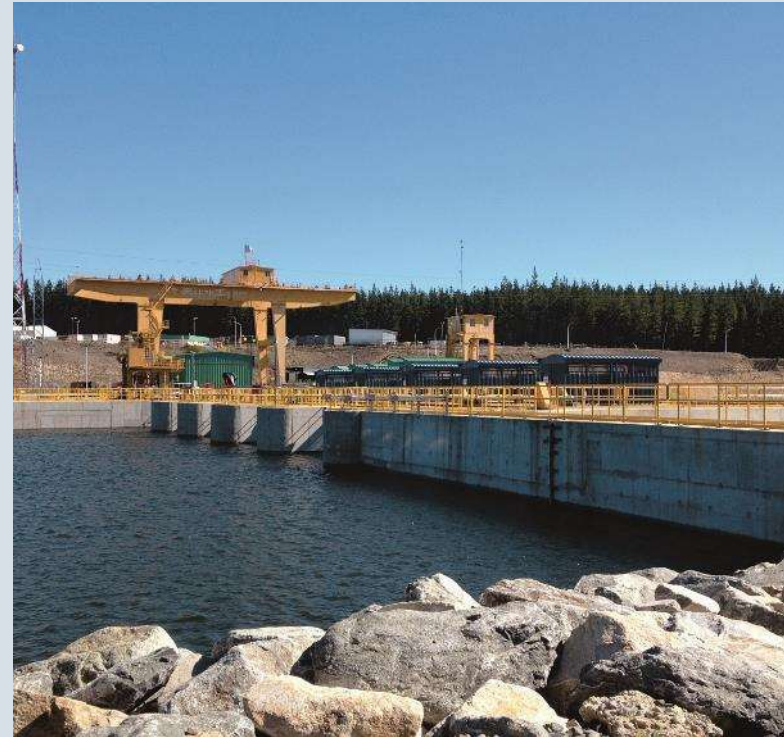
COSTA
RICA



Torito 2×30MW Hydro Power Project



CHILE



Laja 2×17.2MW Hydro Power Project,
DEC's first hydro power project in Chile

Thanks!

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