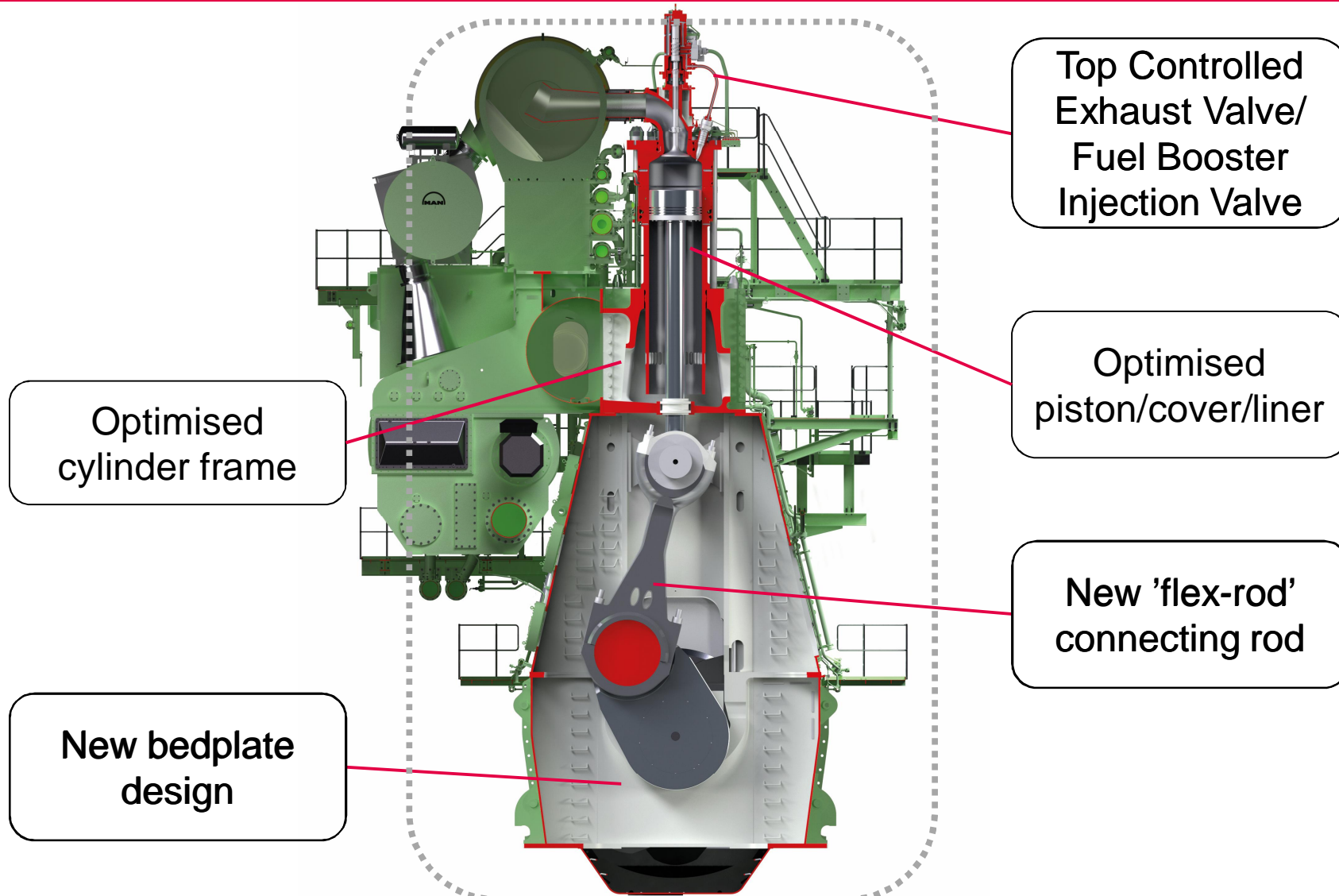


MAN B&W two stroke engines in China



**The road to 100 %
Local Production in China of
Environmental Friendly Engines**

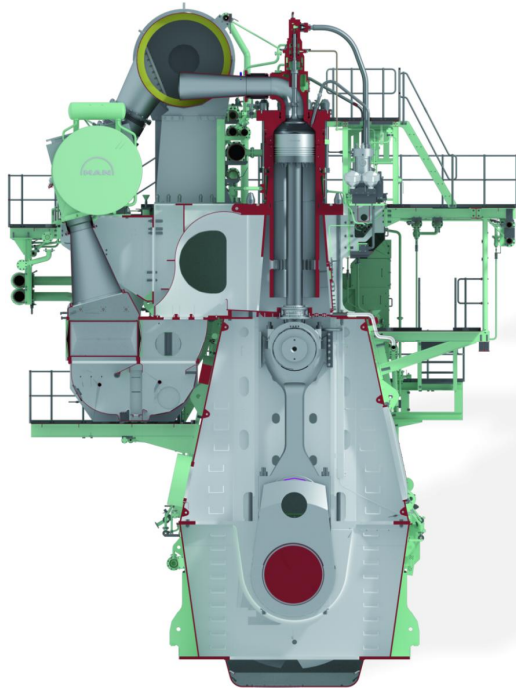
New ME-C Mk. 10 Design Platform



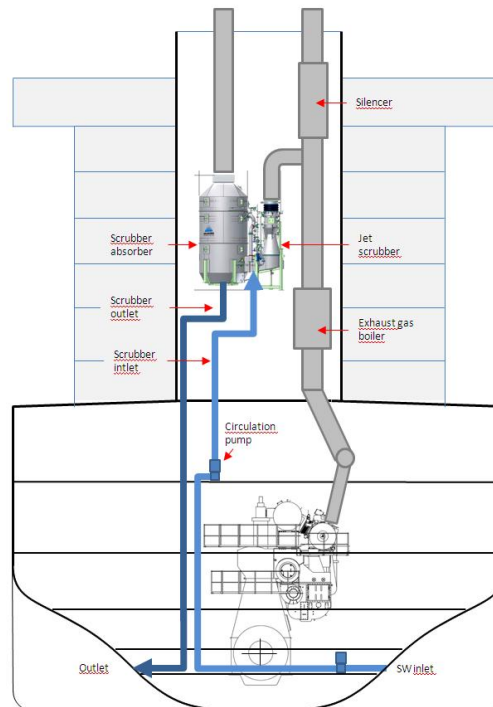
Meeting IMO Global 0.5 % Sulphur Cap



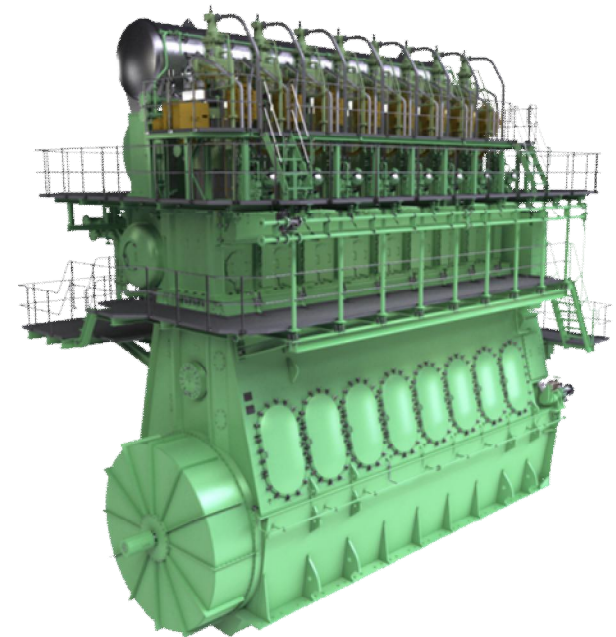
**MC/ME/-C engine
Single Fuel:
MGO /VLSFO**



**MC/ME/-C engine
Diesel fuels:
HFO/MDO + Scrubber**



**ME-GI / ME-LGI engine
Dual Fuel:
LNG/Ethan and MGO
LPG / Methanol..**



Three basic options available for different levels of fuel flexibility.

NOx Control Proven Technologies

MDT two-stroke



Low-sulphur fuel design: Max. 0.10%S

High-sulphur fuel design: Max. 3.5%S

**EGR
On-Engine**

Status Nov. 2017

§ 68 ordered,

§ 5 in service



**SCR
High-Pressure**

Status Nov. 2017

§ 124 ordered,

§ 9 in service



**SCR
Low-Pressure**



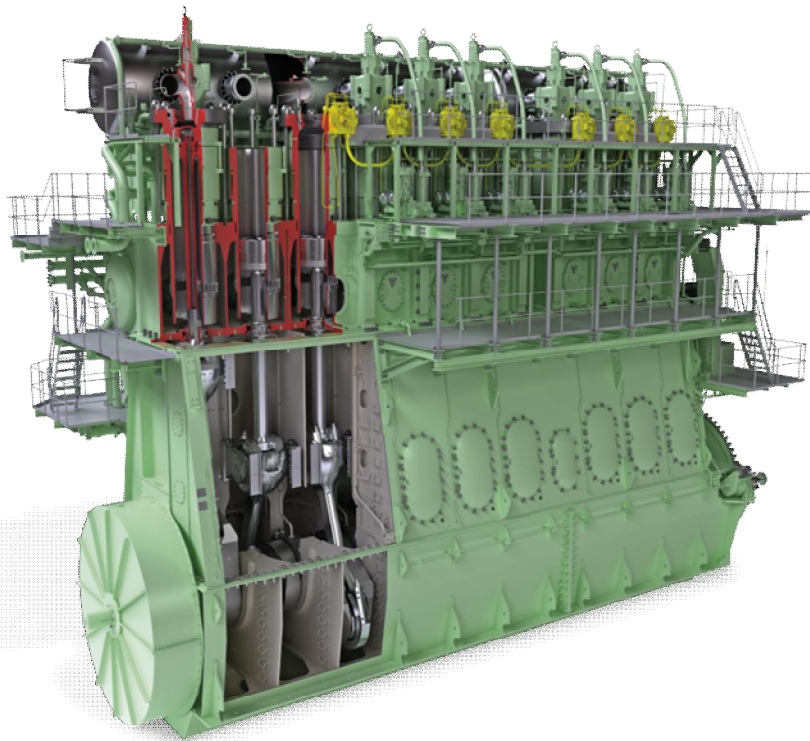
Eco EGR Concept

SFOC > < NOx trade off



Performance matching	SFOC Level [g/kWh]	Trade Off	NOx Level [g/kWh]	NOx Technology
Fuel nozzles	Fuel optimized		2000-2011 TIER I 17.0	None
Miller timing, TC matching, Pcomp., Pmax., Vcomp.,	NOx optimized +2 to +6		2011-2016 Tier II 14.4	None
	NOx optimized +3 to +5		2016-202? Tier III 3.4	EGR, HP SCR, LP SCR
Inj. press., etc.	Fuel optimized -3 to -6		2018-202? Tier II 14.4	Eco EGR at 10-15 %

Reference List - MAN B&W Dual Fuel 2 stroke Diesel Engines



173 x ME-GI, LNG
10 x ME-LGI Methanol
8 x ME-GI Ethane

**ME-GI (Gas Injection) &
ME-LGI (Liquid Gas Injection)**
ME-GI = Dual Fuel Done Right

Vendor Control



Cooperation with Vendors, meaning:

- Ensure new vendors are qualified for producing Controlled Components
- Control of Quality and Work Environment at Vendors
- Continuous monitoring of vendor performance and ensure action if performance decline is observed
- Assist engine producers to develop new suppliers



Controlled Components if....



- If important and critical for the safe and reliable operation of the engine.
- If demanding production process requiring a high level of technological know-how and/or production facilities.
- If production processes cannot be verified at final inspection but instead must be verified through validation of the production process.
- If we design components with special design features



Production Support documents A must have.....



Each type of documents has its own colour as illustrated below

-  Quality Control
-  Quality Specification
-  Production Specification
-  Production Recommendation
-  Rectification Procedure
-  Safety Regulation

Main Bearing Support


Cast Steel Main Bearing Support; First-Time Appr

Casting

General Information regarding Repair of Cast Iron

Working in Engine Room

Safety Precautions while Working in an Engine Room

MAN B&W
MAN Diesel & Turbo 

Page 1 of 9

Machining

Drilling of Oil Cooling Holes in Piston Crown

This document is valid for existing engine types on order as of the date of this document:

Engine types:
All two-stroke engine types

Scope and Field of Application
This Production Recommendation should be regarded as a guide line.

Component design details are to be achieved from the actual drawing.

Production Recommendation


0743153-0.1

November 2015

Info No: 391410

Structure No: 21-2202

Replaces:



Document history

Date	Designer	Checked	AC	Revision change	Revision
2003-04-01	CAJ				0
2015-11-19	KSPE	KIM	Z3	Updated to new layout	1
					2
					3

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The original English language document may have been replaced by a later version, in which case only such later version shall be valid.

Engineering Support in China



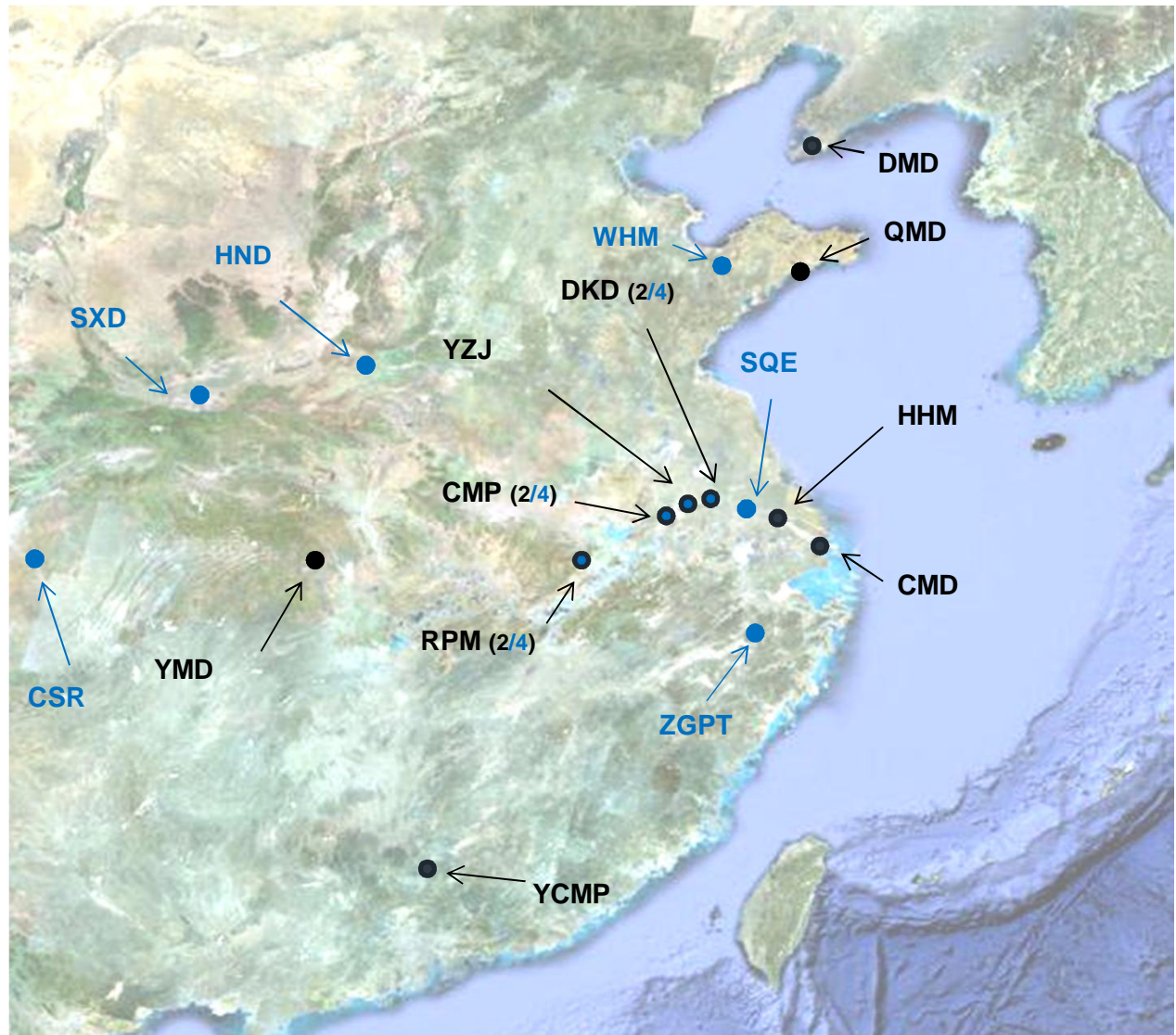
2-stroke :

- YMD: Yichang Marine Diesel
- RPM: Hefei Rong An Power
- CMP: CSSC Marine Power Co.
- DKD: Jingjiang Dakai Heavy Machinery
- HHM: Hudong Heavy Machinery
- CMD: CSSC-MES Diesel Co.,Ltd
- DMD: Dalian Marine Diesel
- YZJ: YangZiJiang Shipbuilding
- QMD: Qingdao Haixi Diesel
- YCMP: Yuchai Marine Power

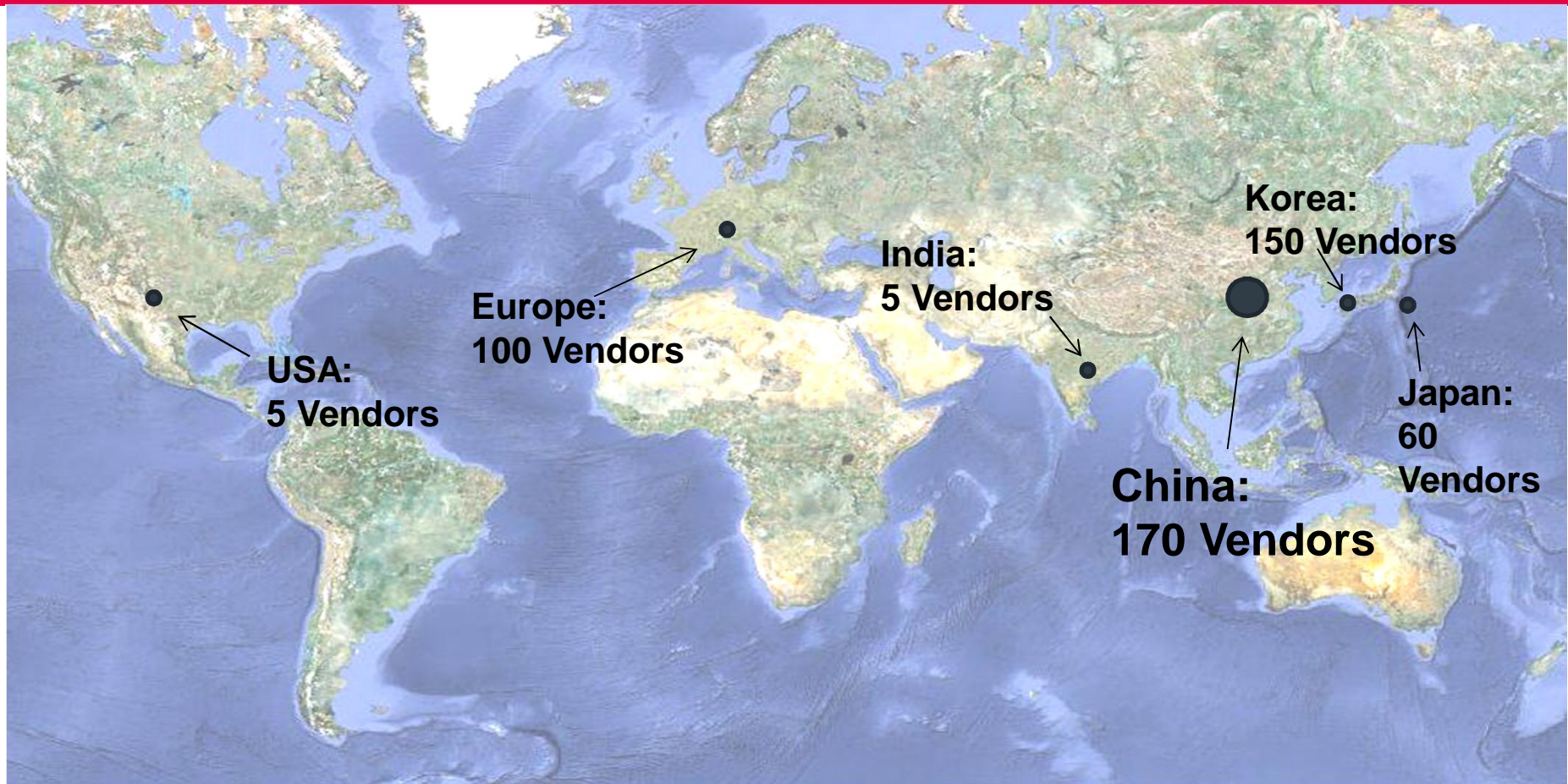
4-stroke :

- SQE: Shanghai Qi Yao Engine
- RPM: Hefei Rong An Power
- DKD: Jingjiang Dakai Heavy Machinery
- CMP: CSSC Maring Power Co., Ltd
- SXD: Shaanxi Diesel
- HND: Henan Diesel Engine
- ZGPT: ZGPT Diesel Heavy Industry
- CSR: CSR ZiYang Locomotive
- WHM: Weichai Heavy Industry

total: 30 – 40 people



Vendor Control world wide



**China has a higher degree of localization than other mega-centres
Very close to 100% Local production in China**

Disclaimer



All data provided in this document is non-binding.

This data serves informational purposes only and is especially not guaranteed in any way. Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.