Steam Turbines, 2023 Report

The "Report"

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From the Editors

To our subscribers:

Since 1993, McCoy has measured the breadth, depth, and competitive elements of the power generation markets we serve. Our scope includes a clear mandate to judge market share.

Quarterly market performance updates provide transparency and insight, but the appropriate interval with which to assess OEM efficacy is annual.

All our best,
Bob McCoy
Dave Hetherington

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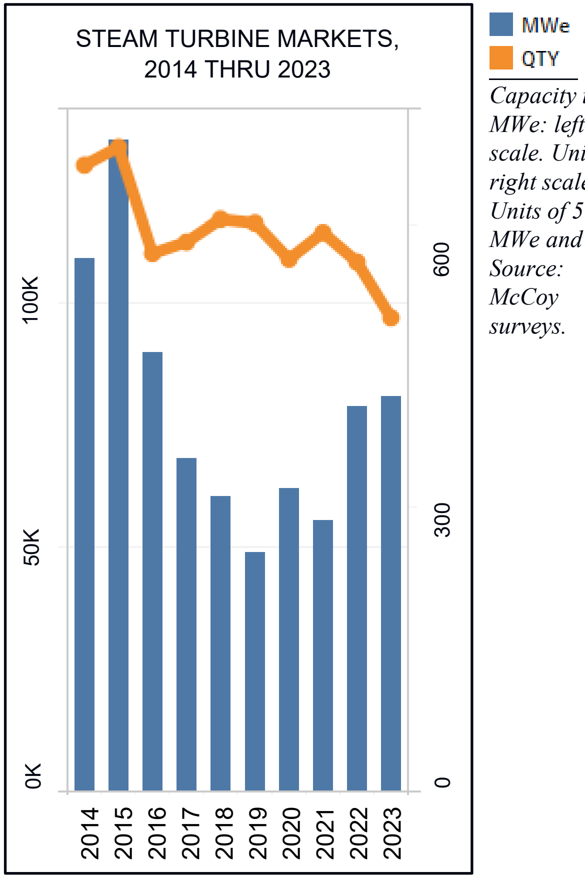
Summary

The steam turbine (ST) markets for units of at least 5.0 MWe unit capacity amounted to 80.6 GWe and 501 units during 2023 (image right), 2% higher and 11% lower on-year respectively.

On the pages that follow, we present broad observations on the ST markets and detailed observations on each of the three unit-size segments: 5.0-30.0 MWe (Small), 30.1-100.0 MWe (Medium), and 100.1 MWe and up (Large).



Capacity in MWe: left scale. Units: right scale. Units of 5 MWe and up. Source: McCoy surveys.

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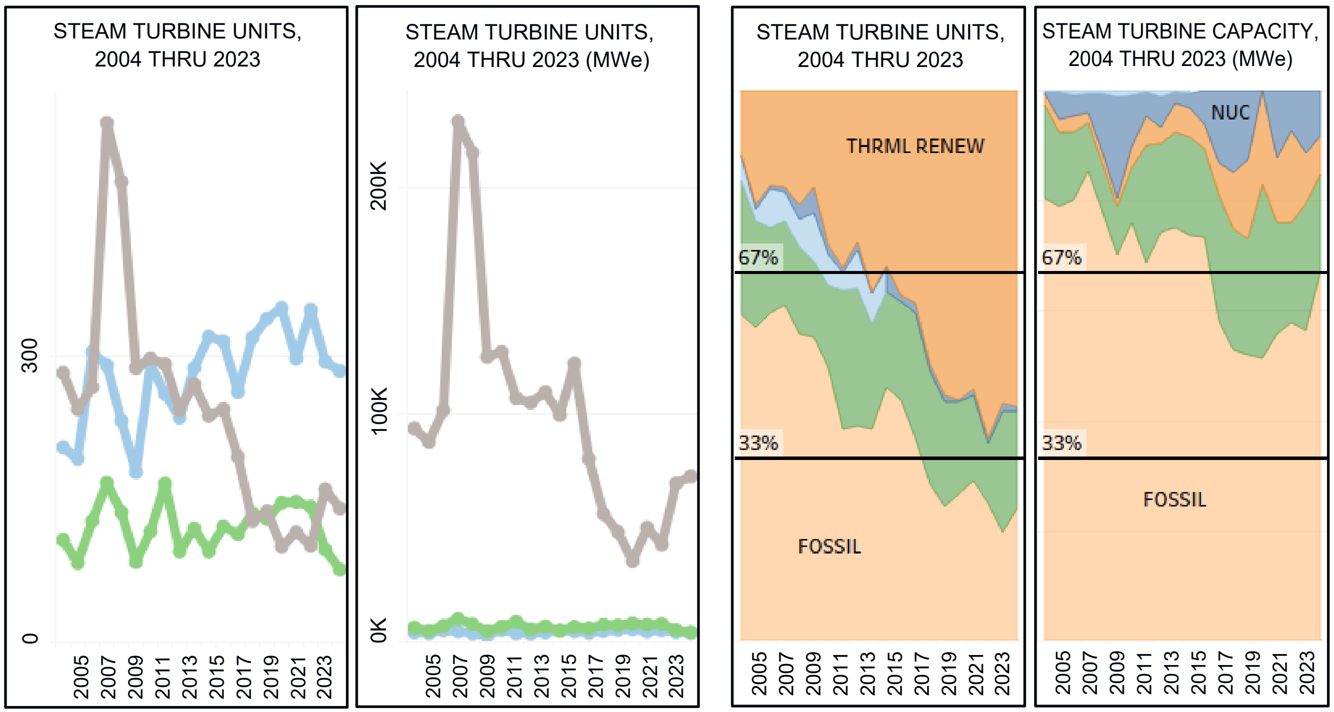
Observations: Unit Size and Technology Performances

In 2023, unit volumes of all the three segments declined on-year; Medium unit volume fell to a 22-year low (image left). Capacity attributable to Large units rose in 2023 to a seven-year high (image middle left). Thermal Renewables and Fossil shares of overall unit volume ticked higher in 2023 (image middle right) while Fossil's share of capacity grew to 67%, the highest level since 2015 (image left).



LARGE (100.1 MWe+)
MED (30.1-100.0 MWe)
SMALL (5-30.0 MWe)

For far and middle left images.

MISC
NUC
THRML RENEW
COMB CYCLE
FOSSIL

For middle right and near left images. Thermal Renewables are WTE, Waste Heat, Biomass, Geothermal and Solar Thermal.

For all images, ST units of 5 MWe and up; source: McCoy surveys.

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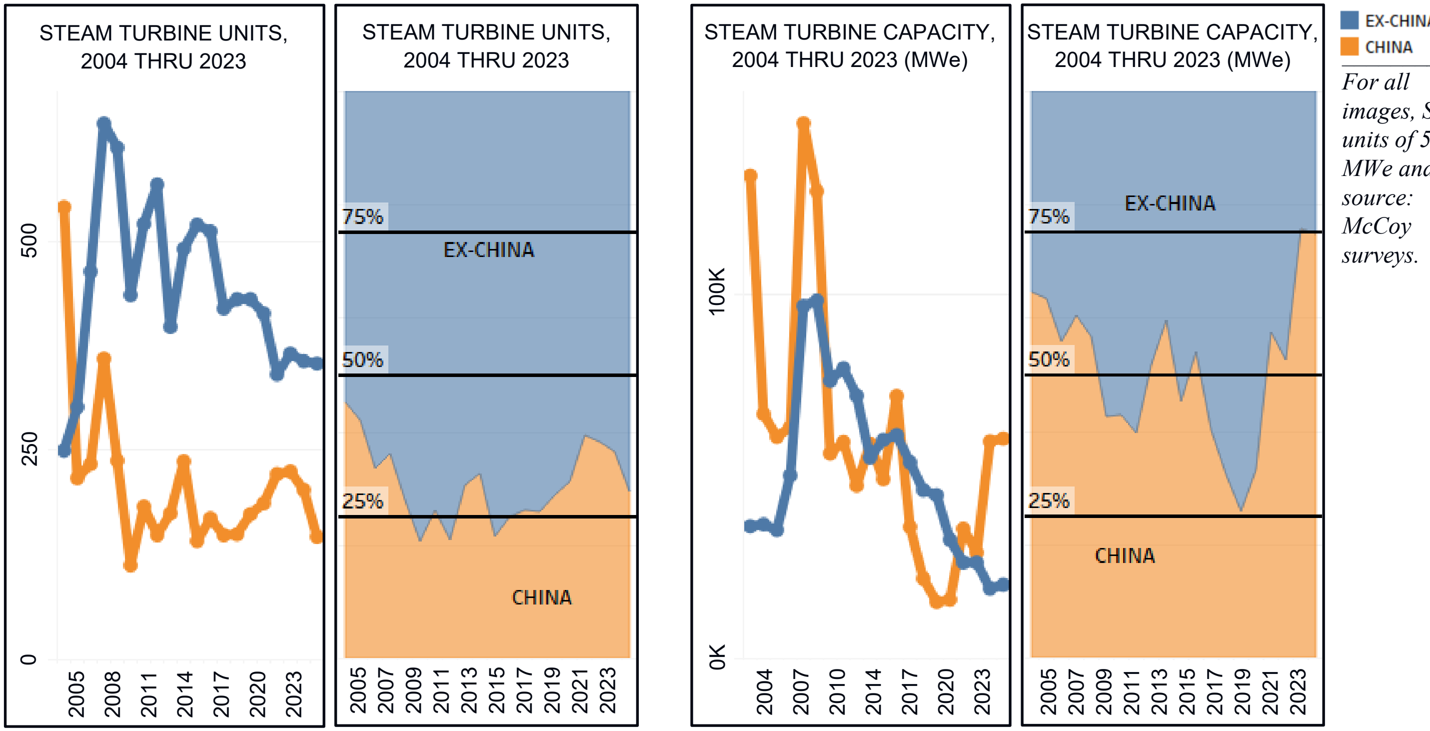
In 2023, unit volumes inside China and Ex-China both fell on-year by 28% and 1% to 147 and 354 respectively (image left), pushing China's share down to 29% of the market (image middle left). Capacity demand in China and Ex-China grew 1% and 6% to 60.3 GWe and 20.3 GWe respectively (image middle right), pushing China's capacity share down marginally to 75% (image right).



For all images, ST units of 5 MWe and up; source: McCoy surveys.

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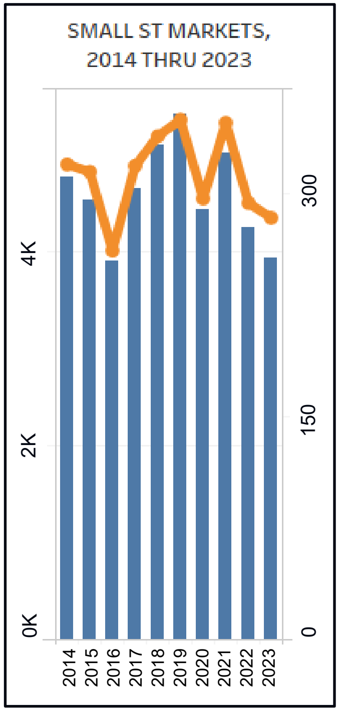
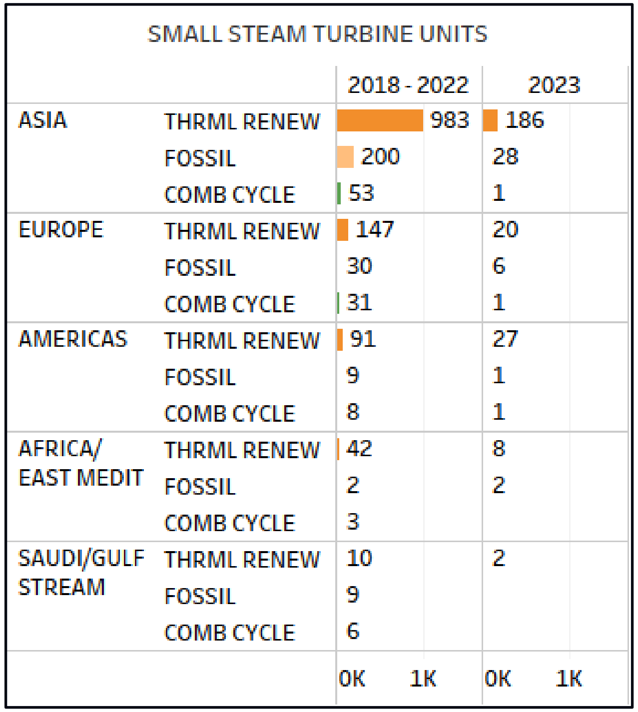
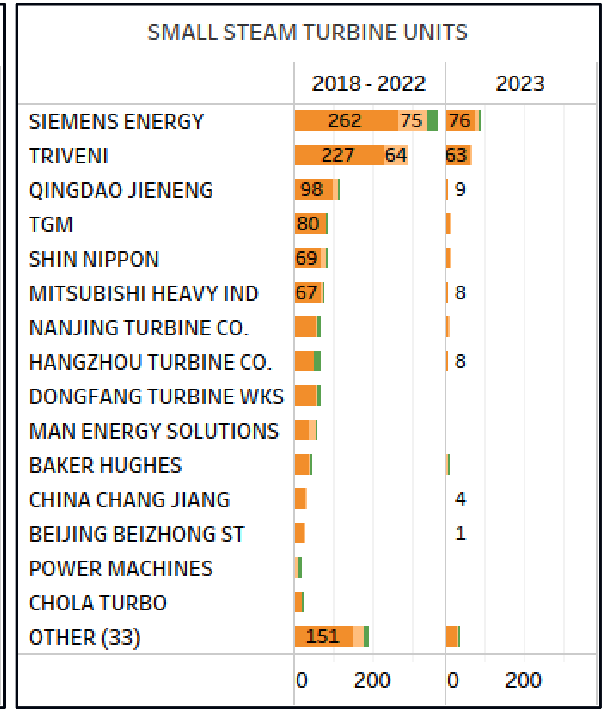
Segment Analyses: Small Units (5.0-30.0 MWe)

The markets for Small STs amounted to 3.9 GWe and 284 units in 2023, on-year declines of 7% and 3% respectively (image left). During the five years through 2022, Asia represented 76% of Small ST demand (image middle), Thermal Renewables 78%, and Siemens led all OEMs on unit volume of 361, share of 22% (image right). In 2023, Asia represented 76% of demand, Thermal Renewables 86%, and Siemens led on unit volume of 88, share of 31%. Triveni was second on share of 25%.







MWe
QTY

For far left image. Capacity in MWe: left scale. Units: right scale.

THRML RENEW
FOSSIL
COMB CYCLE
MISC

For middle and near image Therma Renewables are WTE Waste Heat, Biomass, Geotherma and Sola Thermal.

For all images, ST units of 5–30.0 MWe; source: McCoy surveys.

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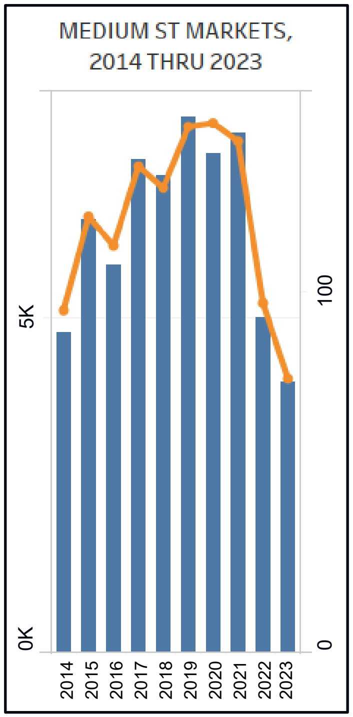
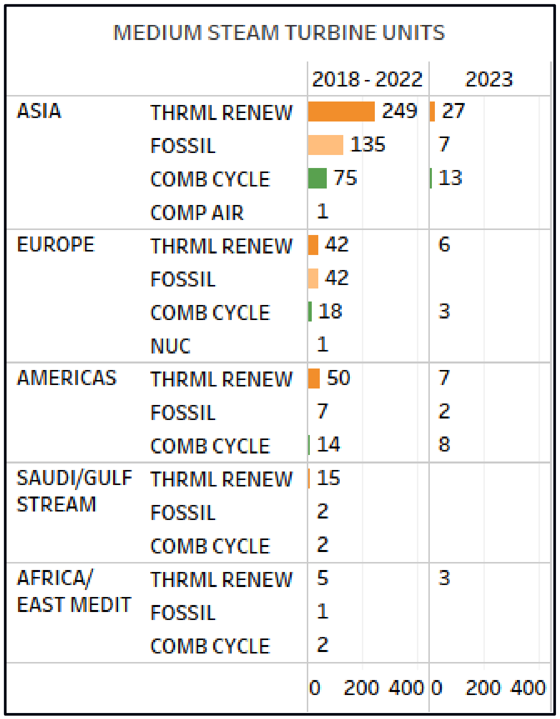
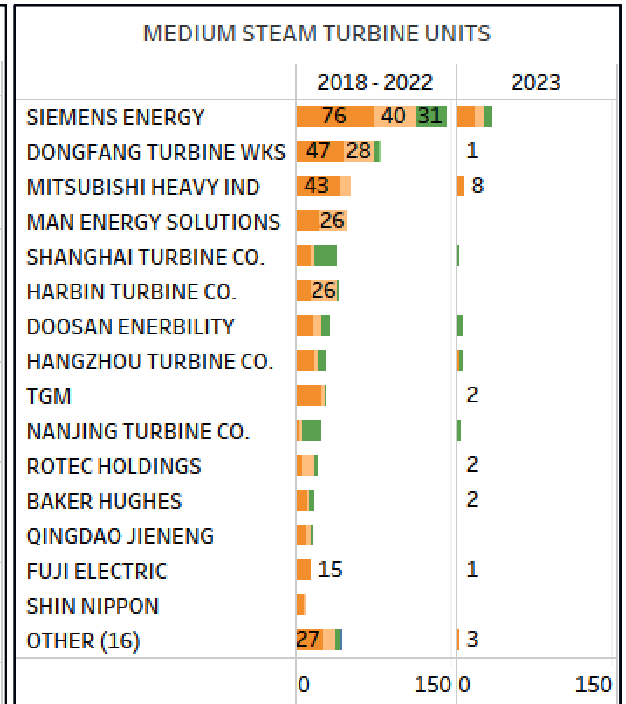
Segment Analyses: Medium Units (30.1-100.0 MWe)

The markets for Medium STs amounted to 4.0 GWe and 76 units in 2023 (image left), on-year declines of 19% and 22% respectively. During the five years through 2022, Asia represented 70% of Medium ST demand (image middle), Thermal Renewables 55%, and Siemens led all OEMS on volume of 147, share of 22% (image right). In 2023, Asia represented 62% of Medium ST demand, Thermal Renewables 57%, and Siemens led on volume of 35 units, share of 46%. Mitsubishi Heavy was second on share of 11% (image right).







MWe
QTY

For far left image. Capacity in MWe: left scale. Units: right scale.

THRML RENEW
FOSSIL
COMB CYCLE
MISC

For middle left and near left images. Thermal Renewables are WTE, Waste Heat, Biomass, Geothermal and Solar Thermal.

For all images, ST units of 30.1-100.0 MWe; source: McCoy surveys.

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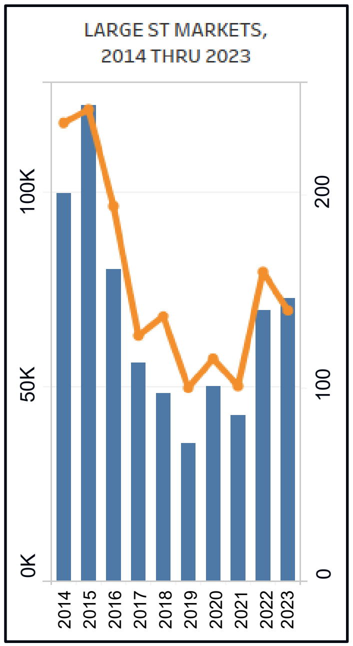
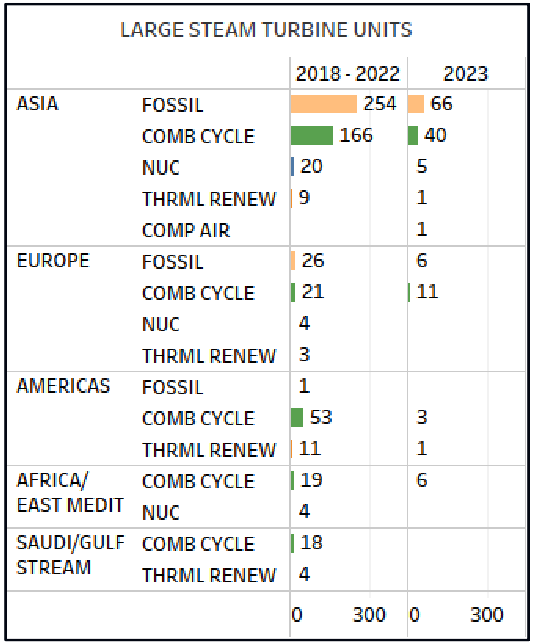
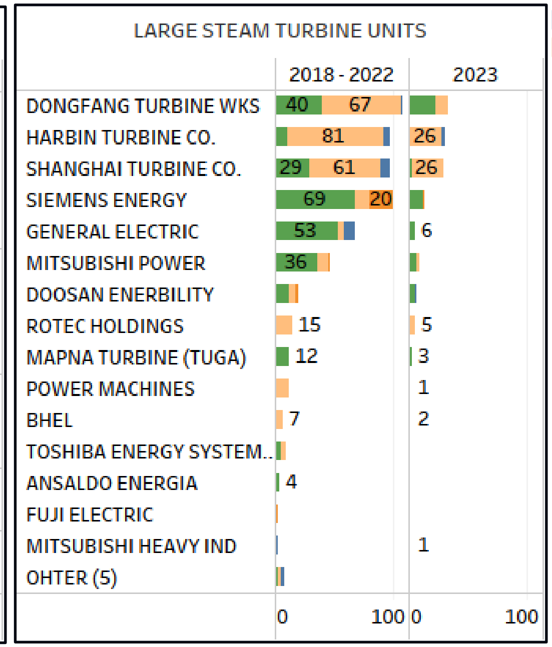
Segment Analyses: Large Units (100.1 MWe+)

The markets for Large STs amounted to 72.7 GWe and 140 units in 2023 (image left), up 4% and down 13% on-year respectively. During the five years through 2022, Asia represented 73% of Large ST demand (image middle), Fossil 46%, and Dongfang led all OEMs on volume of 108, share of 18% (image right). In 2023, Asia represented 81% of Large ST demand, Fossil 51%, and Dongfang led the segment on 33 units (image right). Harbin was second on 31 units.







MWe
QTY

For far left image. Capacity in MWe: left scale. Units: right scale.

THRML RENEW
FOSSIL
COMB CYCLE
MISC

For middle left and near left images. Thermal Renewables are WTE, Waste Heat, Biomass, Geothermal and Solar Thermal.

ST units of at least 100.1 MWe; source: McCoy surveys.

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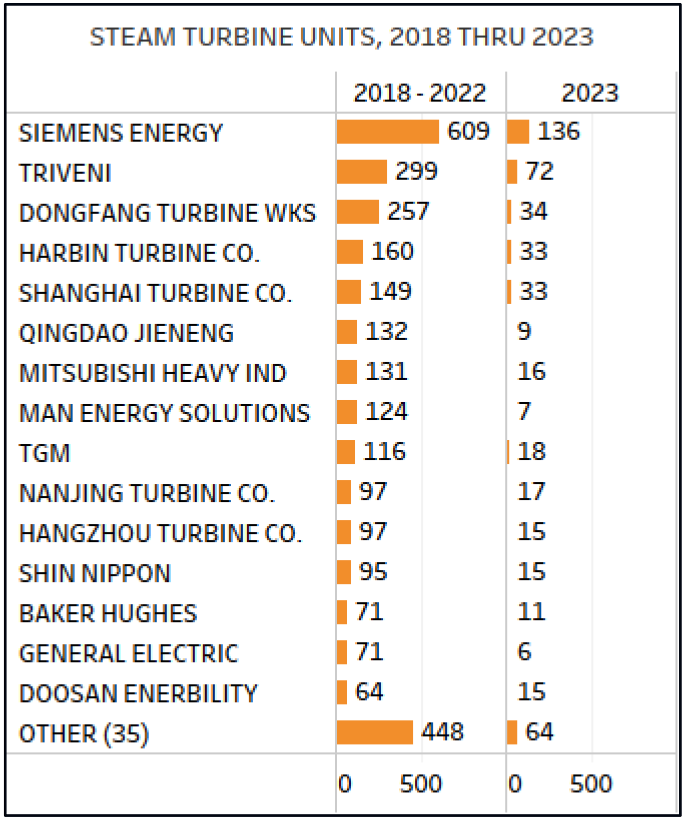
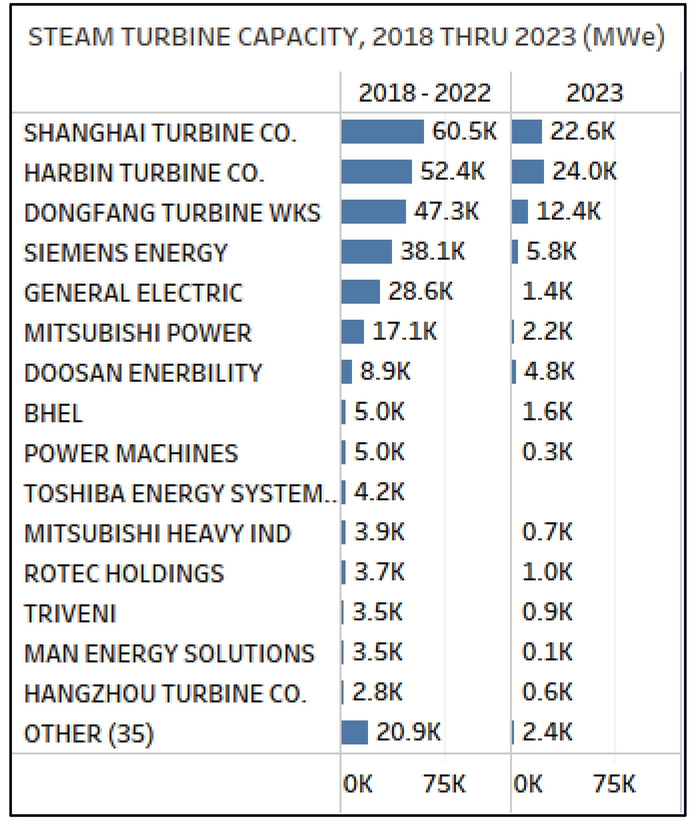
Overall Market Share Performance

For the five years through 2022, Siemens led the units market on share of 21% followed by Triveni on share of 10% (image left); Shanghai and Harbin were the capacity leaders on shares of 20% and 17% respectively (image right). For 2023, Siemens captured 27% of units, Triveni 14%, and by capacity, Harbin and Shanghai led on shares of 30% and 28% respectively.





(i) ST units of 5 MWe and up; source: McCoy surveys.

2023 Official League Tables – Technology Owner [(i)]

TOP 25 TECHNOLOGY OWNER	UNITS 2023	MARKET SHARE
SIEMENS ENERGY	136	27.1%
TRIVENI	72	14.4%
DONGFANG TURBINE WKS	34	6.8%
HARBIN TURBINE CO.	33	6.6%
SHANGHAI TURBINE CO.	33	6.6%
TGM	18	3.6%
MITSUBISHI HEAVY IND	17	3.4%
NANJING TURBINE CO.	17	3.4%
DOOSAN ENERBILITY	15	3.0%
HANGZHOU TURBINE CO.	15	3.0%
SHIN NIPPON	15	3.0%
BAKER HUGHES	11	2.2%
MITSUBISHI POWER	10	2.0%
ORMAT TECHNOLOGIES	10	2.0%
QINGDAO JIENENG	9	1.8%
MAN ENERGY SOLUTIONS	7	1.4%
ROTEC HOLDINGS	7	1.4%
GENERAL ELECTRIC	6	1.2%
KAWASAKI HEAVY IND	5	1.0%
CHINA CHANG JIANG	4	0.8%
DE PRETTO INDUSTRIE	4	0.8%
POWER MACHINES	4	0.8%
FINCANTIERI	3	0.6%
JFE ENGINEERING	3	0.6%
MAPNA TURBINE (TUGA)	3	0.6%
OTHER (5)	10	2.0%
TOTAL	501	100.0%

TOP 25 TECHNOLOGY OWNER	MWe 2023	MARKET SHARE
HARBIN TURBINE CO.	23,995	29.8%
SHANGHAI TURBINE CO.	22,570	28.0%
DONGFANG TURBINE WKS	12,352	15.3%
SIEMENS ENERGY	5,813	7.2%
DOOSAN ENERBILITY	4,782	5.9%
MITSUBISHI POWER	2,228	2.8%
BHEL	1,600	2.0%
GENERAL ELECTRIC	1,356	1.7%
ROTEC HOLDINGS	955	1.2%
TRIVENI	902	1.1%
MITSUBISHI HEAVY IND	689	0.9%
HANGZHOU TURBINE CO.	637	0.8%
MAPNA TURBINE (TUGA)	495	0.6%
NANJING TURBINE CO.	456	0.6%
TGM	395	0.5%
POWER MACHINES	331	0.4%
BAKER HUGHES	227	0.3%
SHIN NIPPON	168	0.2%
ORMAT TECHNOLOGIES	111	0.1%
KAWASAKI HEAVY IND	108	0.1%
QINGDAO JIENENG	103	0.1%
MAN ENERGY SOLUTIONS	73	0.1%
DE PRETTO INDUSTRIE	65	0.1%
FUJI ELECTRIC	64	0.1%
CHINA CHANG JIANG	49	0.1%
OTHER (5)	120	0.1%
TOTAL	80,643	100.0%

(i) ST units of 5 MWe and up; source: McCoy surveys.

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2023 Official League Tables – Manufacturer[(i)]

TOP 25 'MANUFACTURER	UNITS 2023	MARKET SHARE	TOP 25 'MANUFACTURER	MWe 2023	MARKET SHARE
SIEMENS ENERGY	136	27.1%	HARBIN TURBINE CO.	23,995	29.8%
TRIVENI	72	14.4%	SHANGHAI TURBINE CO.	22,570	28.0%
DONGFANG TURBINE WKS	34	6.8%	DONGFANG TURBINE WKS	12,352	15.3%
SHANGHAI TURBINE CO.	33	6.6%	SIEMENS ENERGY	5,813	7.2%
HARBIN TURBINE CO.	33	6.6%	DOOSAN ENERBILITY	4,034	5.0%
NANJING TURBINE CO.	17	3.4%	MITSUBISHI POWER	2,228	2.8%
TGM TURBINAS	16	3.2%	BHEL	1,600	2.0%
MHI COMPRESSOR (MCO)	16	3.2%	GE POWER	1,356	1.7%
SHIN NIPPON	15	3.0%	URAL TURBINE WORKS (UTW)	955	1.2%
HANGZHOU TURBINE CO.	15	3.0%	TRIVENI	902	1.1%
BAKER HUGHES	11	2.2%	DOOSAN SKODA POWER	748	0.9%
ORMAT TECHNOLOGIES	10	2.0%	MHI COMPRESSOR (MCO)	674	0.8%
MITSUBISHI POWER	10	2.0%	HANGZHOU TURBINE CO.	637	0.8%
DOOSAN SKODA POWER	10	2.0%	MAPNA TURBINE (TUGA)	495	0.6%
QINGDAO JIENENG	9	1.8%	NANJING TURBINE CO.	456	0.6%
URAL TURBINE WORKS (UTW)	7	1.4%	TGM TURBINAS	358	0.4%
MAN ENERGY SOLUTIONS	6	1.2%	POWER MACHINES	319	0.4%
GE POWER	6	1.2%	BAKER HUGHES	227	0.3%
KAWASAKI HEAVY IND	5	1.0%	SHIN NIPPON	168	0.2%
DOOSAN ENERBILITY	5	1.0%	ORMAT TECHNOLOGIES	111	0.1%
DE PRETTO INDUSTRIE	4	0.8%	KAWASAKI HEAVY IND	108	0.1%
CHINA CHANG JIANG	4	0.8%	QINGDAO JIENENG	103	0.1%
TURBIMAQ	3	0.6%	DE PRETTO INDUSTRIE	65	0.1%
POWER MACHINES	3	0.6%	FUJI ELECTRIC	64	0.1%
MAPNA TURBINE (TUGA)	3	0.6%	MAN ENERGY SOLUTIONS	57	0.1%
0THER (10)	18	3.6%	0THER (10)	249	0.3%
TOTAL	501	100.0%	TOTAL	80,643	70.2%

(i) ST units of 5 MWe and up; source: McCoy surveys.

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