Steam Turbines,
9M'19 Report

The "Report"

November 26, 2019

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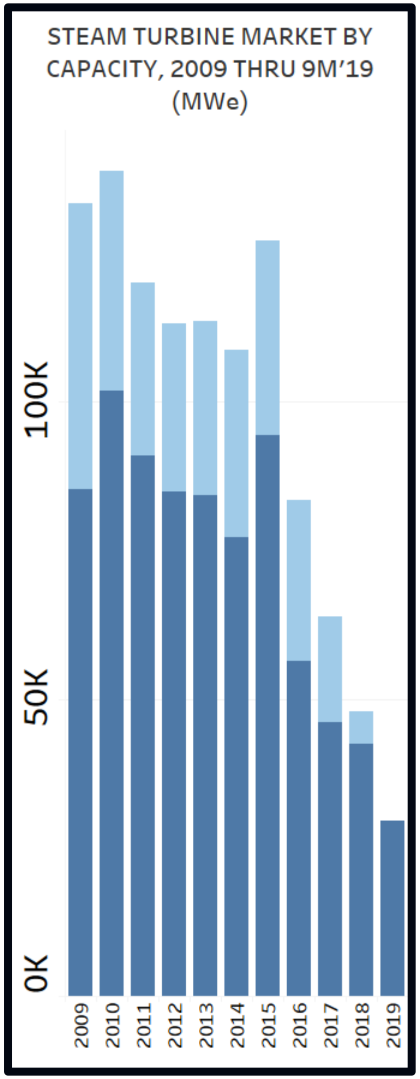
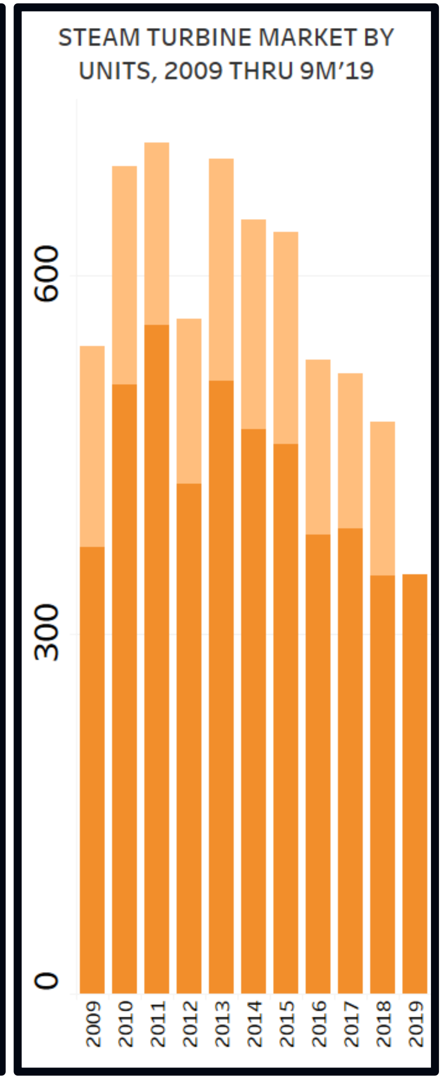
Global Market Summary

Global original equipment steam turbine (ST) markets amounted to 29.5 GWe and 350 units during the 9M'19 period.

While unit volume increased by a single unit on-year, capacity volume was the most subdued since 9M'99. (images right).

On the pages that follow, we segment the market by unit capacity, technology and world region; we present market share analyses; and we provide on-grid performance for ST technologies among the USA and European markets.





4Q PERIODS
1Q-3Q PERIODS
4Q PERIODS
1Q-3Q PERIODS

ST units of 5 MWe and up; sources: McCoy surveys and publicly available information.

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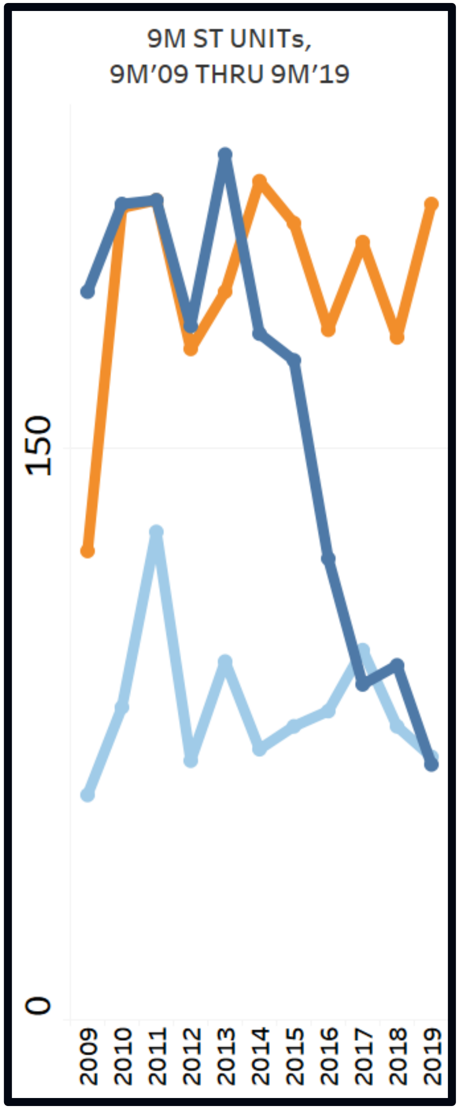
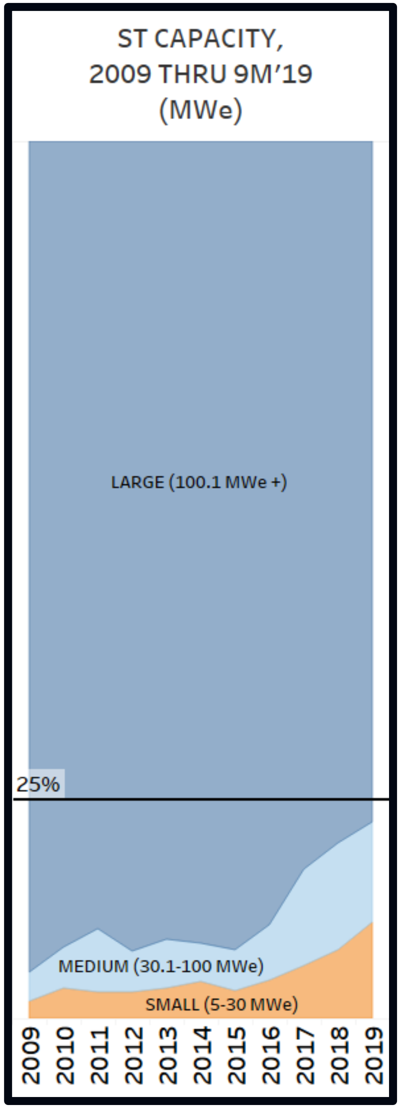
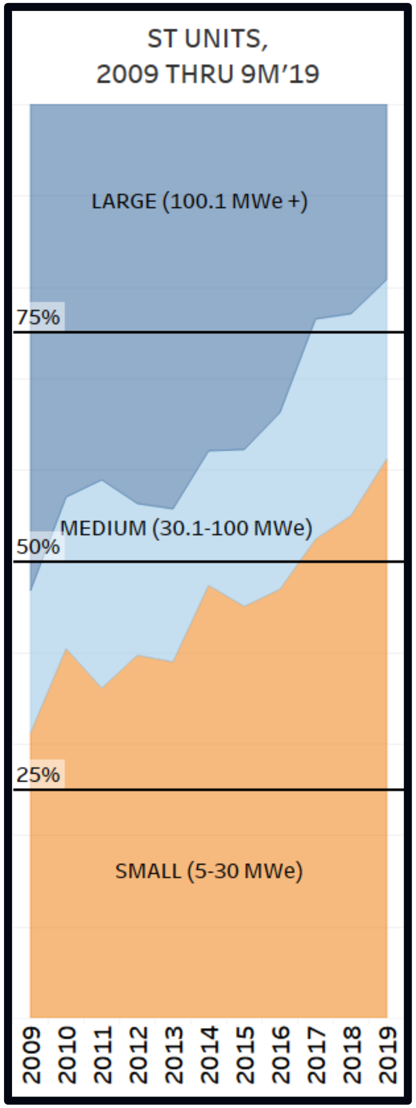
Segment Analysis: Unit Capacity

Unit capacity segmentation shows the continued Large unit under-performance; just 67 units cleared the market during 9M'19. Conversely, Small unit flow was near an all-time high while Medium units were at the low end of its recent range (image near right).

Large STs declined to 78% of capacity volume and 19% of unit volume in 9M'19; Small units rose to all-time highs by both capacity and units (images middle and far right).







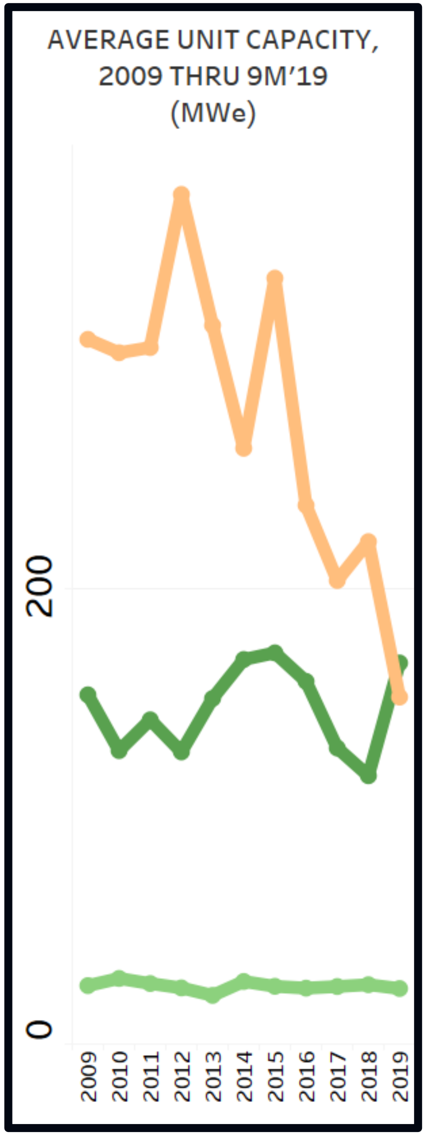
LARGE (100.1 MWe +)
MEDIUM (30.1-100 MWe)
SMALL (5-30 MWe)

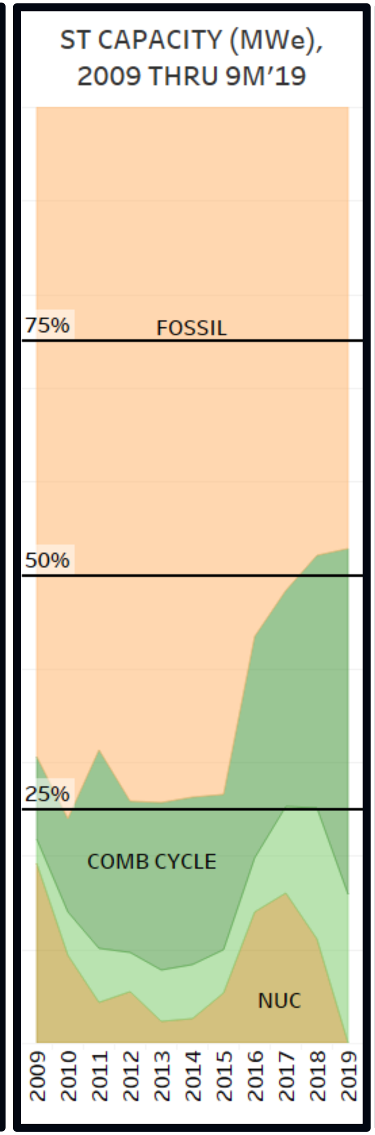
ST units of 5 MWe and up; sources: McCoy surveys and publicly available information. For far left image, 9M periods presented only. For other images, 12M periods presented except 9M'19.

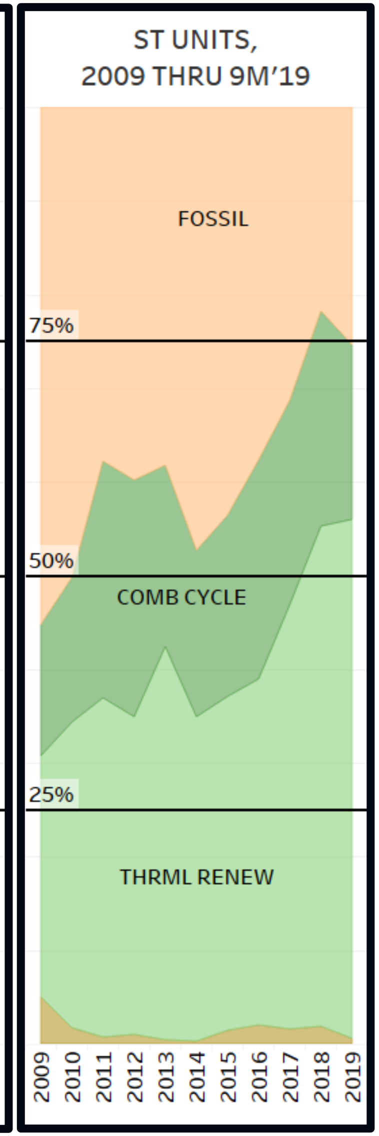
Segment Analysis: Technology

Technology segmentation shows the average capacity of a Fossil unit fell to 152.5 MWe in 9M’19, down 60% or 220 MWe since the recent peak of 12M’12. The average unit capacity for Combined Cycle units spiked to 168 MWe in 9M’19 while Thermal Renewables rose to 35 MWe (image near right).

The Combined Cycle portion of 9M’19 capacity volume rose to 37% (image middle right), while Thermal Renewables rose to 55% of 9M’19 unit volume (image far right).







FOSSIL
COMB CYCLE
THRML RENEW
NUC

ST units of 5 MWe and up; Thermal Renewables include geothermal, solar thermal, WTE, biomass and waste heat technologies; sources: McCoy surveys and publicly available information. For all images, 12M periods presented except 9M’19. Average unit capacity for Nuc units not presented in far left image.

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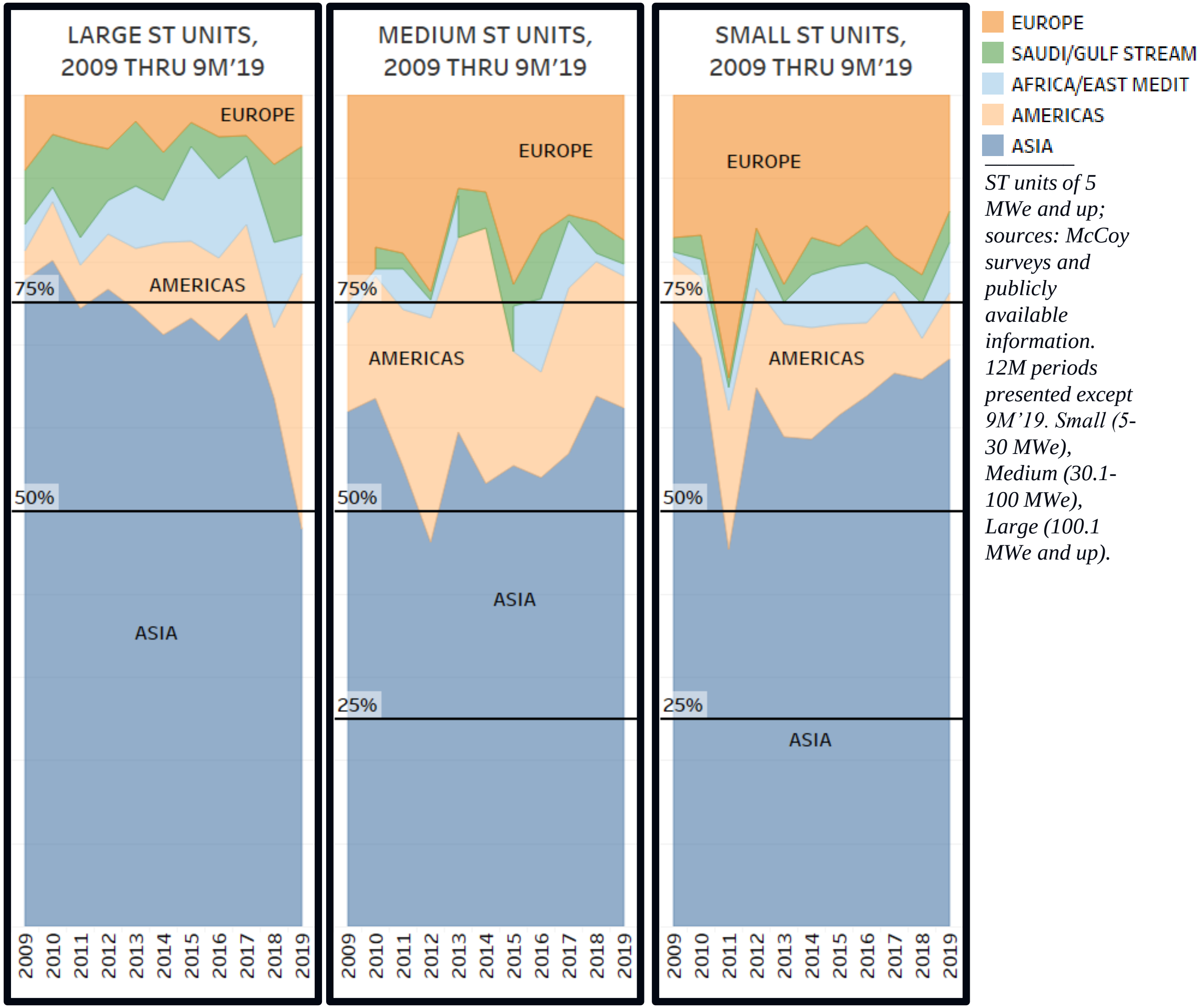
Segment Analysis: World Region

Geographic segmentation shows Asia at the center of all ST activity across all three size categories; Asia's shift toward Medium and Small units is also evident (images right).

Large ST demand in the America's spiked to its highest level since 12M'01 which was the last year of the peak gas turbine epoch. Europe's appetite for Medium units remains steady.



ST units of 5 MWe and up; sources: McCoy surveys and publicly available information. 12M periods presented except 9M'19. Small (5-30 MWe), Medium (30.1-100 MWe), Large (100.1 MWe and up).

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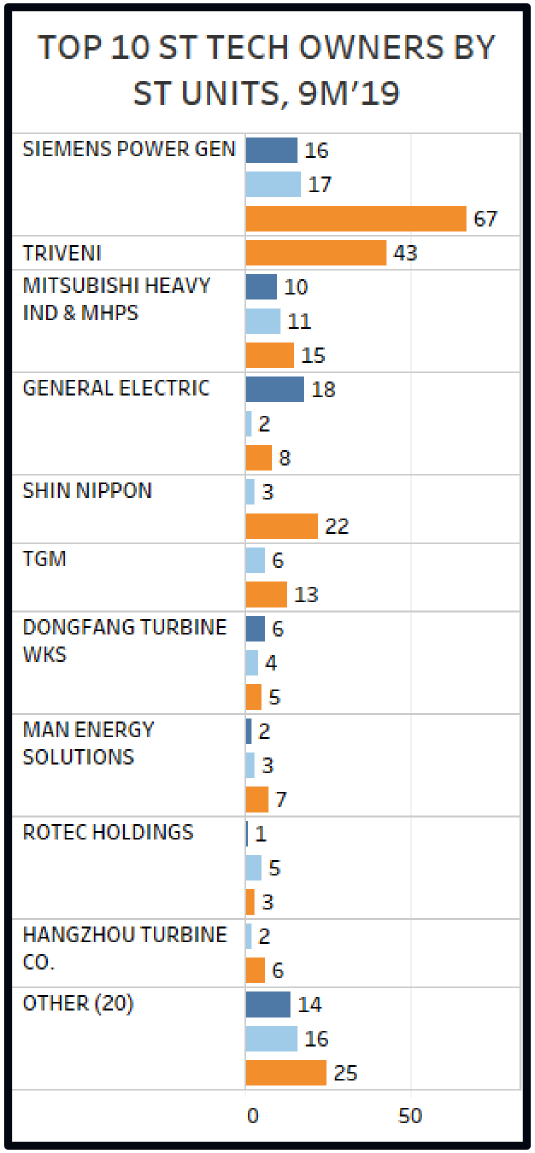
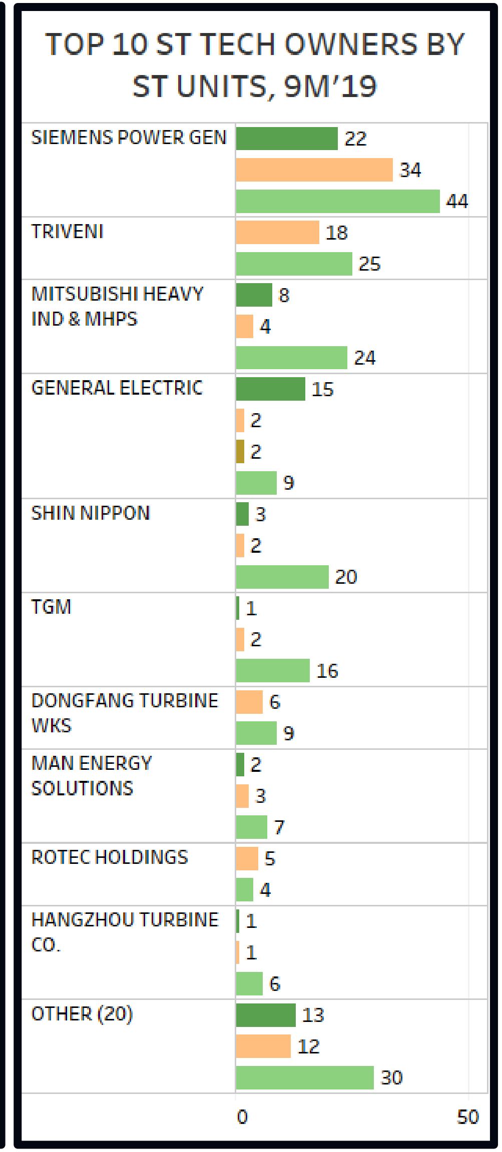
Market Share Discussion

Turning to market share, we present 9M'19 unit volume by unit capacity and technology.

Siemens led the units market with 100 which was share of 29%. Siemens led the Small, Medium, Combined Cycle, Thermal Renewables and Fossil segments. Triveni finished second overall with second place finishes in Small, Fossil and Thermal Renewables. MHPS & MHI finished third overall with 36 units.





LARGE (100.1 MWe +)
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ST units of 5 MWe and up; Thermal Renewables include geothermal, solar thermal, WTE, biomass and waste heat technologies; sources: McCoy surveys and publicly available information.

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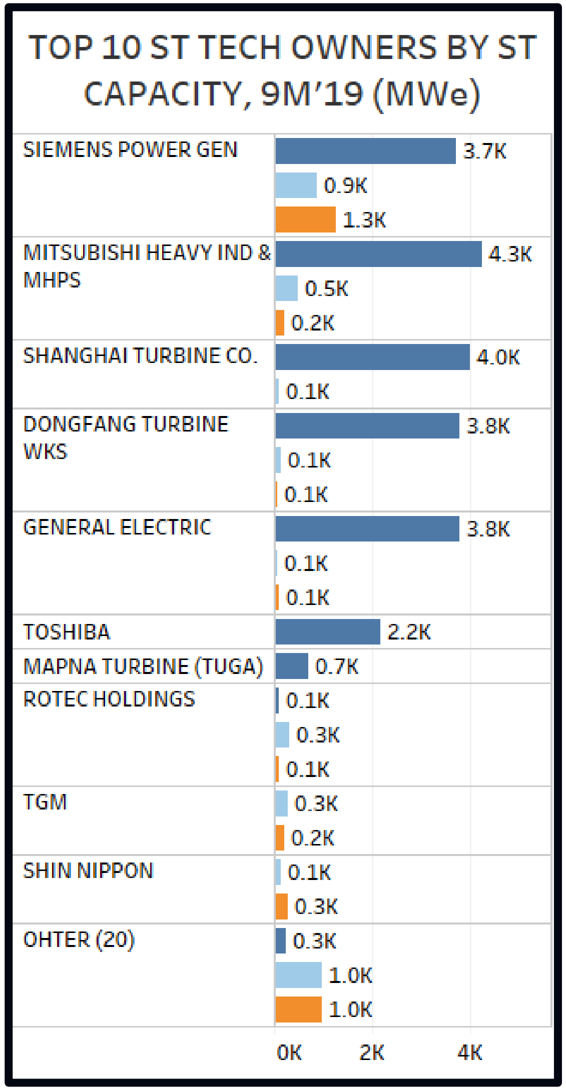
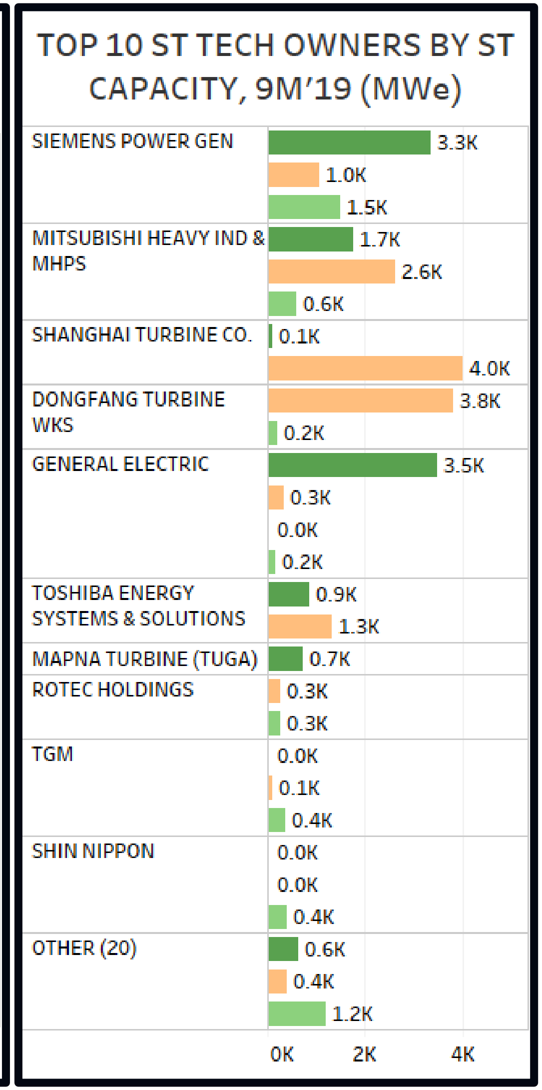
Market Share Discussion

Siemens also led the capacity market during 9M'19 with overall market share of 20%. Siemens finished first in Medium, Small and Thermal Renewables categories. MHPS & MHI finished first in Large, third in Fossil and second overall with share of 15%.

Shanghai Turbine was third overall with a strong Fossil technology performance.





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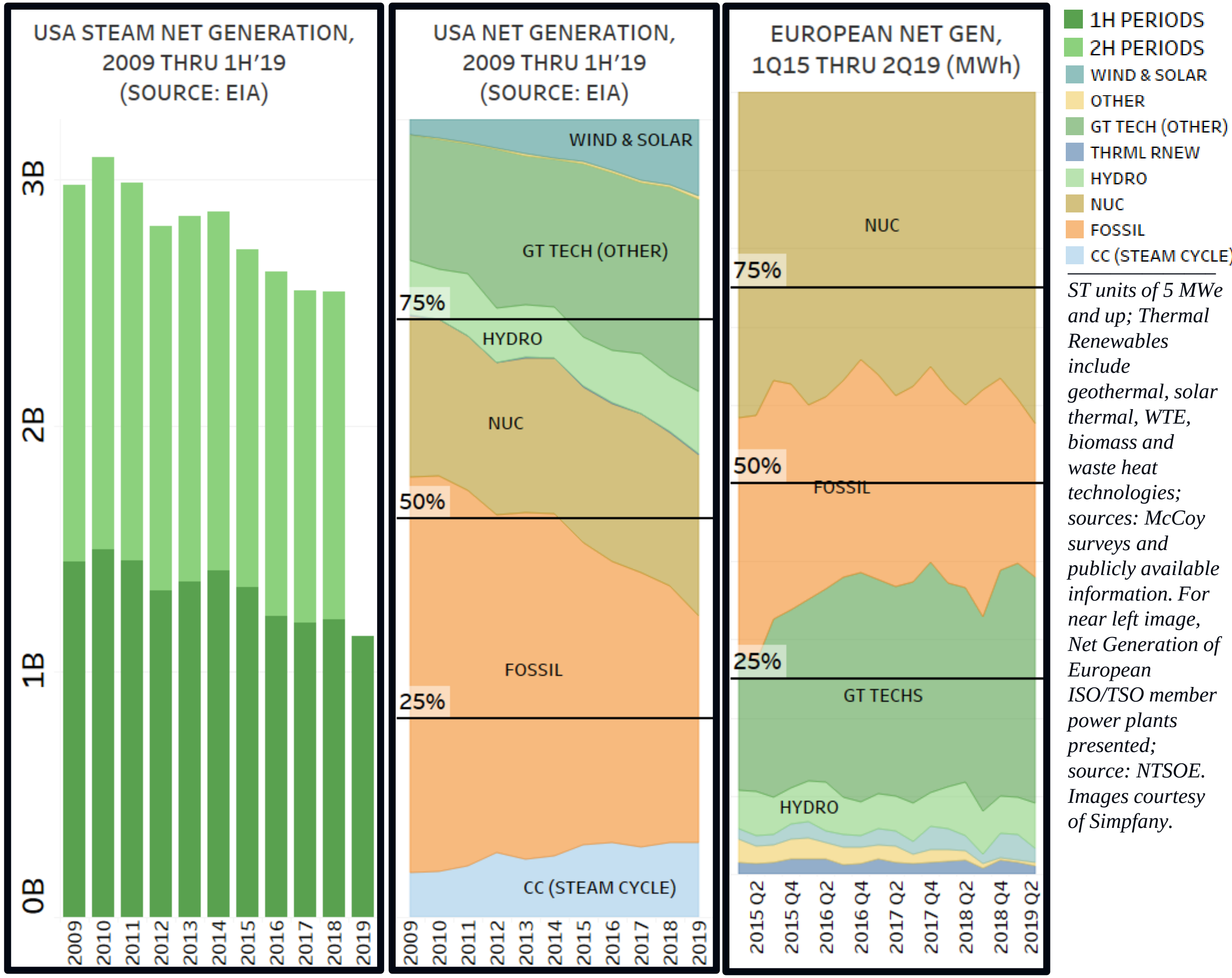
On-Grid Utilization: USA and Europe

Turning to on-grid performance of ST technologies to assess their health and well being, we see divergent trends between the USA and Europeam markets.

USA net generation from ST technologies which includes Fossil, Geothermal, Nuc, and the steam cycle portion of Combined Cycle units declined over the past decade (image near right) and lost significant share of net generation (image middle right). In Europe, ST technologies are in a much stronger position: 91% of net generation during 1H’19 (image far right; caveat: Europe source data does not parse out the steam cycle of Combined Cycle units).



ST units of 5 MWe and up; Thermal Renewables include geothermal, solar thermal, WTE, biomass and waste heat technologies; sources: McCoy surveys and publicly available information. For near left image, Net Generation of European ISO/TSO member power plants presented; source: NTSOE. Images courtesy of Simpfany.

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9M'19 Official League Tables – Technology Owner (i)

TECHNOLOGY OWNER	MWe 9M'19	MARKET SHARE
SIEMENS POWER GEN	5,868	19.9%
MITSUBISHI HITACHI PR SYS (MHPS)	4,369	14.8%
SHANGHAI TURBINE CO.	4,100	13.9%
DONGFANG TURBINE WKS	4,002	13.6%
GENERAL ELECTRIC	3,979	13.5%
TOSHIBA	2,175	7.4%
MAPNA TURBINE (TUGA)	720	2.4%
MITSUBISHI HEAVY IND	589	2.0%
ROTEC HOLDINGS	536	1.8%
TGM	472	1.6%
SHIN NIPPON	422	1.4%
TRIVENI	420	1.4%
ANSALDO ENERGIA	260	0.9%
MAN ENERGY SOLUTIONS	258	0.9%
QINGDAO JIENENG	210	0.7%
NANJING TURBINE CO.	195	0.7%
HANGZHOU TURBINE CO.	190	0.6%
DOOSAN HEAVY IND	161	0.5%
ORMAT TECHNOLOGIES	135	0.5%
HARBIN TURBINE CO.	90	0.3%
BEIJING BEIZHONG ST	72	0.2%
DONG QI TURBINE	55	0.2%
CHOLA TURBO	36	0.1%
EKOL ENERGO SHAANGU	32	0.1%
FUJI ELECTRIC	30	0.1%
FRANCO TOSI	29	0.1%
FINCANTIERI	23	0.1%
KAWASAKI HEAVY IND	18	0.1%
COMTEC	6	0.0%
SHINKO	6	0.0%
EBARA	6	0.0%
TOTAL AWARDED CAPACITY	29,462	100.0%

TECHNOLOGY OWNER	UNITS 9M'19	MARKET SHARE
SIEMENS POWER GEN	100	28.6%
TRIVENI	43	12.3%
GENERAL ELECTRIC	28	8.0%
SHIN NIPPON	25	7.1%
MITSUBISHI HEAVY IND	24	6.9%
TGM	19	5.4%
DONGFANG TURBINE WKS	15	4.3%
MAN ENERGY SOLUTIONS	12	3.4%
MITSUBISHI HITACHI PR SYS (MHPS)	12	3.4%
ROTEC HOLDINGS	9	2.6%
HANGZHOU TURBINE CO.	8	2.3%
CHOLA TURBO	6	1.7%
QINGDAO JIENENG	6	1.7%
SHANGHAI TURBINE CO.	5	1.4%
TOSHIBA	5	1.4%
MAPNA TURBINE (TUGA)	4	1.1%
ORMAT TECHNOLOGIES	4	1.1%
BEIJING BEIZHONG ST	3	0.9%
DOOSAN HEAVY IND	3	0.9%
HARBIN TURBINE CO.	3	0.9%
NANJING TURBINE CO.	3	0.9%
DONG QI TURBINE	2	0.6%
EKOL ENERGO SHAANGU	2	0.6%
FINCANTIERI	2	0.6%
ANSALDO ENERGIA	1	0.3%
COMTEC	1	0.3%
EBARA	1	0.3%
FRANCO TOSI	1	0.3%
FUJI ELECTRIC	1	0.3%
KAWASAKI HEAVY IND	1	0.3%
SHINKO	1	0.3%
TOTAL AWARDED UNITS	350	100.0%

(i) ST units of 5 MWe and up; sources: McCoy surveys and publicly available information.

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9M'19 Official League Tables – Manufacturer[(i)]

MANUFACTURER	MWe 9M'19	MARKET SHARE
MITSUBISHI HITACHI PR SYS (MHPS)	4,369	14.8%
SHANGHAI TURBINE CO.	4,100	13.9%
DONGFANG TURBINE WKS	4,002	13.6%
GE POWER	3,800	12.9%
SIEMENS INDUSTRIAL TURBOMACHINERY	3,200	10.9%
SIEMENS POWER GEN	2,668	9.1%
TOSHIBA ENERGY SYSTEMS & SOLUTIONS	2,175	7.4%
MAPNA TURBINE (TUGA)	720	2.4%
MHI COMPRESSOR (MCO)	561	1.9%
URAL TURBINE WORKS (UTW)	536	1.8%
SHIN NIPPON	422	1.4%
TRIVENI	420	1.4%
TGM TURBINAS	374	1.3%
ANSALDO ENERGIA	260	0.9%
MAN ENERGY SOLUTIONS	258	0.9%
QINGDAO JIENENG	210	0.7%
NANJING TURBINE CO.	195	0.7%
HANGZHOU TURBINE CO.	190	0.6%
BAKER HUGHES GE	179	0.6%
DOOSAN SKODA POWER	161	0.5%
ORMAT TECHNOLOGIES	135	0.5%
TGM KANIS TURBINEN	98	0.3%
HARBIN TURBINE CO.	90	0.3%
BEIJING BEIZHONG ST	72	0.2%
DONG QI TURBINE	55	0.2%
CHOLA TURBO	36	0.1%
EKOL ENERGO	32	0.1%
FUJI ELECTRIC	30	0.1%
FRANCO TOSI	29	0.1%
TURBODEN	28	0.1%
FINCANTIERI	23	0.1%
KAWASAKI HEAVY IND	18	0.1%
COMTEC ENERGOSERVICE	6	0.0%
SHINKO	6	0.0%
EBARA	6	0.0%
TOTAL AWARDED CAPACITY	29,462	100.0%

MANUFACTURER	UNITS 9M'19	MARKET SHARE
SIEMENS INDUSTRIAL TURBOMACHINERY	92	26.3%
TRIVENI	43	12.3%
SHIN NIPPON	25	7.1%
MHI COMPRESSOR (MCO)	21	6.0%
GE POWER	16	4.6%
DONGFANG TURBINE WKS	15	4.3%
TGM TURBINAS	13	3.7%
BAKER HUGHES GE	12	3.4%
MAN ENERGY SOLUTIONS	12	3.4%
MITSUBISHI HITACHI PR SYS (MHPS)	12	3.4%
URAL TURBINE WORKS (UTW)	9	2.6%
HANGZHOU TURBINE CO.	8	2.3%
SIEMENS POWER GEN	8	2.3%
CHOLA TURBO	6	1.7%
QINGDAO JIENENG	6	1.7%
TGM KANIS TURBINEN	6	1.7%
SHANGHAI TURBINE CO.	5	1.4%
TOSHIBA ENERGY SYSTEMS & SOLUTIONS	5	1.4%
MAPNA TURBINE (TUGA)	4	1.1%
ORMAT TECHNOLOGIES	4	1.1%
BEIJING BEIZHONG ST	3	0.9%
DOOSAN SKODA POWER	3	0.9%
HARBIN TURBINE CO.	3	0.9%
NANJING TURBINE CO.	3	0.9%
TURBODEN	3	0.9%
DONG QI TURBINE	2	0.6%
EKOL ENERGO	2	0.6%
FINCANTIERI	2	0.6%
ANSALDO ENERGIA	1	0.3%
COMTEC ENERGOSERVICE	1	0.3%
EBARA	1	0.3%
FRANCO TOSI	1	0.3%
FUJI ELECTRIC	1	0.3%
KAWASAKI HEAVY IND	1	0.3%
SHINKO	1	0.3%
TOTAL AWARDED UNITS	350	100.0%

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