



**Market Research Exercise for
Competition Tracking and Consumer
Behaviour Mapping for a Leading Steam
Turbine Manufacturer in India**



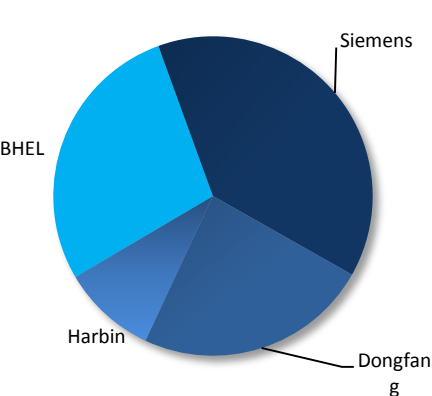
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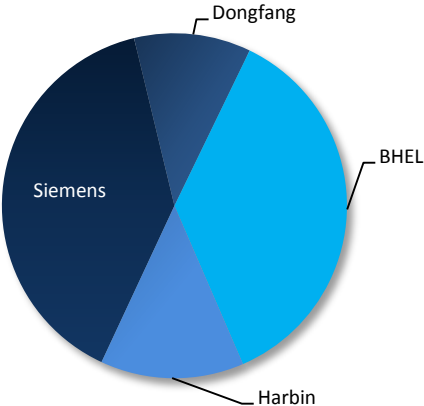
Small/Mid Size Fossil

Market Size and Main Players 2007-11 (MW)

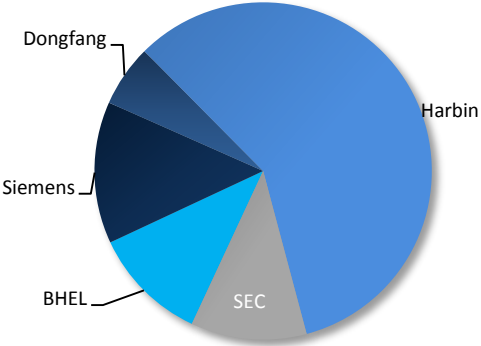
50– 120 MW (X MW)



120-250 MW (Y MW)



250 – 350 MW (Z MW)

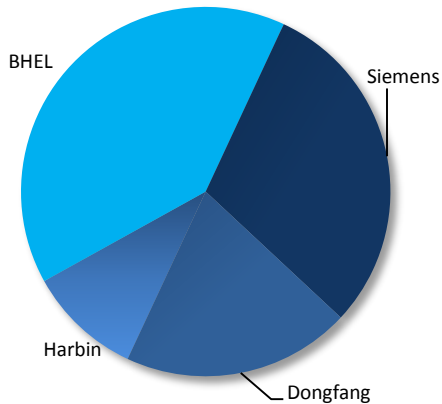


Total ~ X MW* (including projects that may not have been captured in survey)

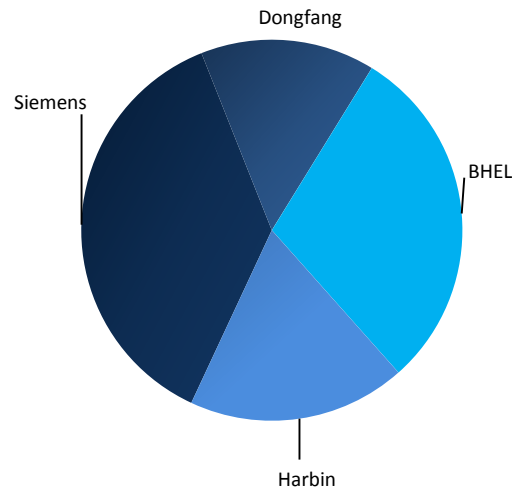
BHEL and Seimens dominates in 50-120 MW and 120-250 MW range, whereas Harbin dominates in 250-350 MW range.

Small/ Mid Sized Fossil- Market Size and Main Players 2007-2011 (No. of Units)

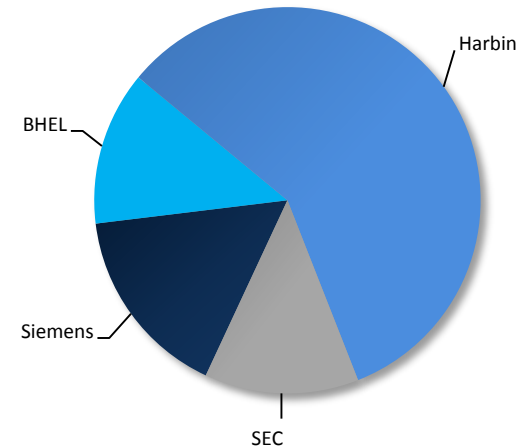
50– 120 MW (2565 MW – X Units)



120-250 MW (4585 MW – Y Units)



250 – 350 MW (10811 MW – Z Units)



Total ~ X MW – X Units (including projects that may not have been captured in survey)

BHEL and Siemens dominates in 50-120 MW and 120-250 MW range, whereas Harbin dominates in 250-350 MW range.

Small/Mid Sized Fossil – Market Trends / Environment & Legislations

- Investors in this segment are increasingly smaller IPPs and to some extent SEBs
- Market perspective regarding Chinese equipment performance is growing on negative side, with probability of increased participation from better quality equipment suppliers in 13th FYP
- With more than 20 percent of projects commissioned in 2007-12, market has evident shift towards technology offering fuel flexibility and controlled Sox/ Nox emission without any add on equipments
- The market is expected to shift towards CFBC boiler technology with increasing coal constraints and growing environmental concerns
- For CDM benefits Biomass & Bagasse Cogeneration Projects should confirm to the following standards of steam turbine equipment
 - IEC 60045
 - DIN** 1943
 - CSN* 080030
 - ASME PTC 6.2 (Steam turbine in combined cycle) or conforming to these standards.
- No major shift towards pet coke has been evident due to price concerns

Small/Medium Size Fossil – Trends in Competitive Landscaping

- Siemens started to offer 300 MW; this model may also be localized
- BHEL offering upgraded 270 MW model for 300 MW projects, strives to regain lost market share to Chinese
- Chinese continue to establish price floors, but probably lost some credibility
- Maximum capacity likely to be added in higher unit size of 250-350 MW
- 120-250 MW range also indicates substantial market size for coming FYP

Small/ Mid Sized Fossil – Market Trends / Drivers and Constraints

Drivers



- “Power for All” plan of MoP & Ambitious 100GW Capacity Addition Plan of GoI in 12th FYP
- Increasing per-capita energy consumption in India and latent electricity requirement from rural electrification (RGGVY)
- Decreasing dominance of Chinese players due to increasing skepticism among consumers related to equipment performances

Constraints



- High competition from players having local manufacturing base, sales and service offices such as Siemens in 50- 250 MW, Triveni in < 30 MW, Shin Nippon in < 150 MW
- Presence of low priced Chinese manufacturers such as Harbin, Nanjing, Dongfang and Shanghai Electric in 50- 250 MW

Small/ Mid Sized Fossil – Procurement Model , Critical Success Factors

| | Customers* | Procurement Model | CSF | Normally Required Unit Size (MW) |
|------------|-----------------|--|--|----------------------------------|
| 50-120 MW | ⑩ List Attached | <ul style="list-style-type: none"> ⑩ STG ⑩ Extended STG | XXXXXXXXXXXXXXXXXX | ⑩ XXXX |
| 120-250 MW | ⑩ List Attached | <ul style="list-style-type: none"> ⑩ STG ⑩ Extended STG ⑩ Machine hall ⑩ BTG | <ul style="list-style-type: none"> ⑩ Price ⑩ Performance ⑩ Delivery Time ⑩ Local Service ⑩ Right partner in case of BTG | ⑩ 135-150-250 |
| 250-350 MW | ⑩ List Attached | <ul style="list-style-type: none"> ⑩ BTG ⑩ EPC | ⑩ XXXXXXXXXXXXXXXXXXXXX | ⑩ XXXXXX |

Small/ Mid Sized Fossil- Competition & Competition Scenario

| | Competition | Expected Market Price (INR) | Expected Schedule (Months) | Expected Key Commercial Terms |
|------------|--|-----------------------------|----------------------------|--|
| 50-120 MW | <ul style="list-style-type: none"> ¹⁰ BHEL ¹⁰ X ¹⁰ Y ¹⁰ Z | | ¹⁰ 15-24 Months | ¹⁰ Chinese players likely to continue with higher credit period |
| 120-250 MW | <ul style="list-style-type: none"> ¹⁰ X ¹⁰ Siemens ¹⁰ Y ¹⁰ Z | | ¹⁰ XXXXX | <ul style="list-style-type: none"> ¹⁰ XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX XXX |
| 250-350 MW | <ul style="list-style-type: none"> ¹⁰ X ¹⁰ Y ¹⁰ Dongfang | | ¹⁰ XXXXX | <ul style="list-style-type: none"> ¹⁰ XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXX XXXX |

Benchmarking Competition

| Competition | Perceived Quality | Pricing | Performance | Commercial Risk Averseness | Delivery Time | Extended Scope Capability | Local Presence | | | | | | |
|---------------------------------------|-------------------|---------|-------------|----------------------------|---------------|---------------------------|----------------|--------------------|---------------|------------------|--------------------|----------|--|
| | | | | | | | Sales | Project Management | Product Engg. | Integration Engg | Manufacturing Unit | Services | |
| X-Y MW Small/ Mid Sized Fossil | | | | | | | | | | | | | |
| BHEL | | | | | | | | | | | | | |
| GE-Triveni | | | | | | | | | | | | | |
| Harbin | | | | | | | | | | | | | |
| Siemens | | | | | | | | | | | | | |

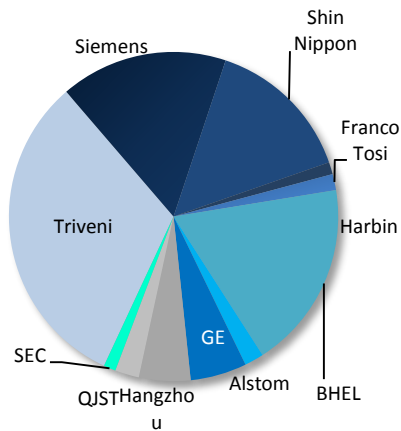
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| Siemens | | | | | | | | | | | | | |

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| Harbin | | | | | | | | | | | | | |
| Dongfang | | | | | | | | | | | | | |

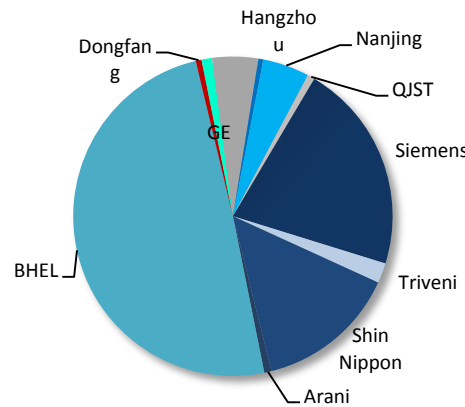
Very High
 High
 Medium
 Low

Process Industries/ Captive Power Plants- Market Size and Main Players 2007-2011 (Market Share in Percentage)

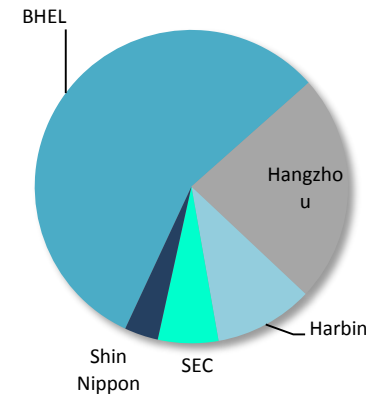
4 – 15 MW (X MW)



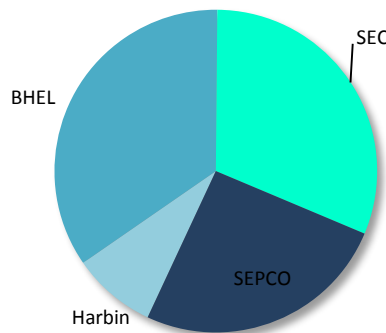
15- 50 MW (Y MW)



50-100 MW (Z MW)



100-250 MW (E MW)

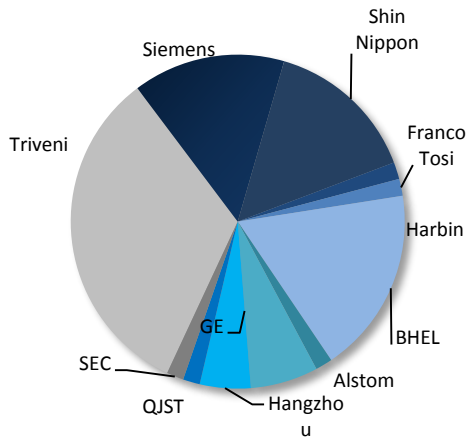


Total ~ X MW* CPP of which Y MW is Steam Turbine Capacity (Coal, Lignite, Biomass, Waste Heat)

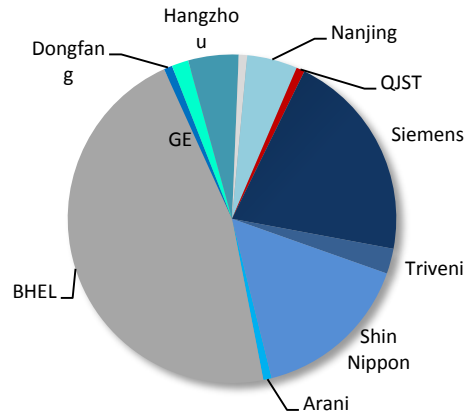
In 50-100 MW range BHEL indicates higher presence and in 100-250 MW range SEC indicates comparable presence with vis-à-vis BHEL. In 4-15 MW range Triveni indicates higher presence whereas BHEL dominates 15-50 MW range with nearly 50 % market share

Process Industries/ Captive Power Plants – Market Size and Main Players 2007-2011 (No. of Units)

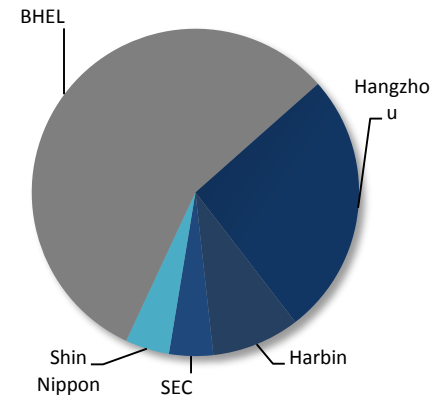
4 – 15 MW (634 MW) -X Units



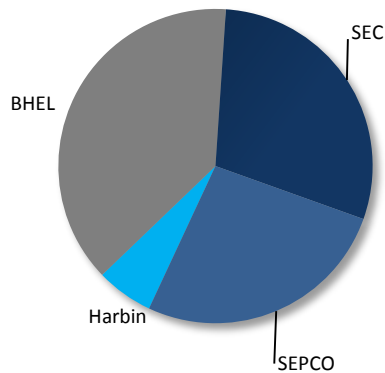
15- 50 MW (3395 MW) – Y Units



50–100 MW (1605 MW) – Z Units



100–250 MW (4745 MW) – 34 Units



Total ~ X MW* CPP of which X MW (239 Units) is Steam Turbine Capacity (Coal, Lignite, Biomass, Waste Heat)

In 50-100 MW range BHEL indicates higher presence and in 100-250 MW range SEC indicates comparable presence with vis-à-vis BHEL. In 4-15 MW range Triveni indicates higher presence whereas BHEL dominates 15-50 MW range with nearly 50 % market share