POWERGRID
Delivering Smart Grid/ Distribution Solutions
Press & Analysts’ Meet 06 November, 2012
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- Annual Accounts for FY2011-12 have been approved by the shareholders.
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GRID DISTURBANCE

JULY 2012
Grid Disturbance

• Two major Grid disturbances:
  • 30 July 2012: Northern Grid
  • 31 July 2012: Northern, Eastern & North-Eastern Grids

• Restoration work taken up immediately and essential services like Railways, Metro Rail, Mines and Airports restored within 3 to 4 hours.

• The Government appointed an independent committee to examine the reasons for the grid disturbances and the remedial actions to be taken to secure safe and sustainable operation of the grid.

• The Committee concluded that disturbances caused by combination of factors, such as weak inter-regional corridors due to multiple outages, high loading of some links, overdrawl by some of the NR utilities, inadequate response by SLDCs to the instructions of RLDCs to reduce overdrawl etc.
The Committee made a number of recommendations both long-term and short-term to avoid recurrence of such incidents, such as,

- Review and audit of the protection systems
- Frequency control through generation reserves
- Review of present UI mechanism
- Ensuring primary response from generators and operation of defence mechanisms, like under frequency and rate of frequency based relays & special protection schemes
- Coordinated outage planning of transmission elements
- Deploying Synchrophasor based Wide Area Monitoring Systems (WAMS)
- Formulation and deployment of Islanding schemes so as to ensure power supply to essential services and faster recovery in case of grid disruptions etc.
Grid Disturbance - Actions Taken

• Tightening of frequency:
  ➢ From 49.5Hz to 50.2Hz to 49.7Hz to 50.2Hz and;
  ➢ Petition filed in CERC for further tightening to 49.9Hz-50.1Hz.

• Independent Third Party Audit & Inspection of Protection Systems by RPCs - about 80% completed in Northern Region & report submitted to CERC.

• Restriction imposed on unscheduled drawl

• Islanding Schemes:
  ➢ Scheme finalised for Delhi.
  ➢ Proposals received from UP, Punjab, J&K and Haryana
  ➢ Other states being followed up.

• Process Started for:
  ➢ Installation of advanced telemetry based communication systems
  ➢ Setting up of one real-time security desk in all shifts in NLDC / RLDCs etc.
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## Financial Performance: Q2 FY12-13

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<th>Quarter ended</th>
<th>Half year ended</th>
<th>FY 2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmission Charges</td>
<td>2960</td>
<td>2145</td>
<td>5734</td>
</tr>
<tr>
<td>Consultancy</td>
<td>68</td>
<td>70</td>
<td>128</td>
</tr>
<tr>
<td>Telecom</td>
<td>58</td>
<td>50</td>
<td>112</td>
</tr>
<tr>
<td>Other Income</td>
<td>157</td>
<td>194</td>
<td>249</td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td>3243</td>
<td>2459</td>
<td>6223</td>
</tr>
<tr>
<td><strong>Operating Expenses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(including prior period adjustment)</td>
<td>403</td>
<td>392</td>
<td>826</td>
</tr>
<tr>
<td><strong>EBITDA-Gross Margin</strong></td>
<td>2840</td>
<td>2067</td>
<td>5397</td>
</tr>
<tr>
<td>Depreciation</td>
<td>825</td>
<td>597</td>
<td>1582</td>
</tr>
<tr>
<td>Interest</td>
<td>634</td>
<td>459</td>
<td>1245</td>
</tr>
<tr>
<td>FERV : Loss / (Gain)</td>
<td>(105)</td>
<td>69</td>
<td>(69)</td>
</tr>
<tr>
<td>Tax</td>
<td>360</td>
<td>233</td>
<td>643</td>
</tr>
<tr>
<td><strong>Profit after Tax</strong></td>
<td>1126</td>
<td>709</td>
<td>1996</td>
</tr>
</tbody>
</table>

**Income up in Q2 by 32%**

**PAT up in Q2 by 59%**

*Income up in Q2 by 32%*  
*PAT up in Q2 by 59%*
## Financial Performance: Q2 FY 12-13

**H1: FY13**

- **Assets commissioned**: ₹6766 crore
- **Capex**: ₹7177 crore
- **No significant increase in Capital Work-in-Progress**

### Key Financial Ratios

*Not Annualized*

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<thead>
<tr>
<th>(₹ in crore)</th>
<th>As on 31.03.2012</th>
<th>As on 30.06.2012</th>
<th>As on 30.09.2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Fixed Assets</td>
<td>63387</td>
<td>68876</td>
<td>72598</td>
</tr>
<tr>
<td>Capital Work-in-Progress</td>
<td>33275</td>
<td>32218</td>
<td>33533</td>
</tr>
<tr>
<td>Debt</td>
<td>51752</td>
<td>57987</td>
<td>58158</td>
</tr>
<tr>
<td>Net Worth</td>
<td>23487</td>
<td>24358</td>
<td>25483</td>
</tr>
<tr>
<td>Earning Per Share (₹)</td>
<td>7.03</td>
<td>1.88*</td>
<td>4.31*</td>
</tr>
<tr>
<td>Book Value per Share (₹)</td>
<td>50.73</td>
<td>52.61</td>
<td>55.04</td>
</tr>
<tr>
<td><strong>Debt : Equity</strong></td>
<td>69:31</td>
<td>70:30</td>
<td>70:30</td>
</tr>
<tr>
<td><strong>Return on Net Worth</strong></td>
<td>13.86%</td>
<td>3.57%*</td>
<td>7.83%*</td>
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- Q2 & H1 FY 12-13 - Performance Highlights - Other Segments & Investment Programme
- Smart Grid - A Reality
- New Business Initiatives - Updates

One Nation, One Grid
Project Execution: H1 FY 12-13

Transmission Lines (GW-ckm)
- H1FY12: 2351
- H1FY13: 3124

Sub- Stations (Nos.)
- H1FY12: 4
- H1FY13: 8

X-formation Capacity (MVA)
- H1FY12: 3300
- H1FY13: 26778

FY12
- GW-ckm: • 7927
- S/S: • 15
- MVA Capacity: • 31475

One Nation, One Grid
Project Execution: H1 FY12-13

Capex

<table>
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<tr>
<th></th>
<th>FY12</th>
<th>FY13 (Till Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1FY12</td>
<td>4611</td>
<td></td>
</tr>
<tr>
<td>H1FY13</td>
<td>7177</td>
<td></td>
</tr>
<tr>
<td>FY12</td>
<td>17814</td>
<td></td>
</tr>
<tr>
<td>FY13</td>
<td>8750</td>
<td></td>
</tr>
</tbody>
</table>

Commissioning

<table>
<thead>
<tr>
<th></th>
<th>FY12</th>
<th>FY13 (Till Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1FY12</td>
<td>4057</td>
<td></td>
</tr>
<tr>
<td>H1FY13</td>
<td>6766</td>
<td></td>
</tr>
<tr>
<td>FY12</td>
<td>14100</td>
<td></td>
</tr>
<tr>
<td>FY13 (Till date)</td>
<td>7165</td>
<td></td>
</tr>
</tbody>
</table>
Major Projects to be Commissioned during balance period of FY 12-13

UMPP
- Sasan
- Mundra (Last leg)

Generation Linked
- DVC & Maithon Right Bank
- Pallatana GBPP
- Chamera-III HEP
- Parbati-III HEP

System Strengthening
- In Western Region
- 765kV System for National Capital Region
- In Northern Region for Mundra & Sasan
- Krishnapatnam

Tr. Line: 7000 ckm
Transformation Capacity: 15,000 MVA
Sub-Stations: New (5) & Augmentation (3)
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<td>&amp; Investment Programme</td>
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<tr>
<td>Updates</td>
<td>New Business Initiatives</td>
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*One Nation, One Grid*
Operations

Asset Management

Lines
- 754 Nos.
- 96,216 ckm

Sub-Stations
- 158 Nos.
- 151,303 MVA
- ~ 1100 Nos. Transformers & Reactors

Availability 99.92%
Reliability 0.32 trippings/line

Grid Management¹ (POSOCO)

Consistent increase in STOA Transactions and Inter-Regional Energy Transfer

<table>
<thead>
<tr>
<th></th>
<th>H1FY12</th>
<th>H1FY13</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOA (,000 Transactions)</td>
<td>11.40</td>
<td>15.30</td>
</tr>
<tr>
<td>IR Energy Trf (BU)</td>
<td>30.01</td>
<td>31.76</td>
</tr>
</tbody>
</table>

¹ carried out through Power System Operation Corporation Limited, a wholly owned subsidiary of POWERGRID.
Operations (REC Mechanism\(^1\))

## REC Mechanism: Highlights

<table>
<thead>
<tr>
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<th>H1FY12</th>
<th>H1FY13</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Capacity (MW)</td>
<td>900</td>
<td>934</td>
<td>4%</td>
</tr>
<tr>
<td>REC Issued (Nos.)</td>
<td>1,96,512</td>
<td>20,39,254</td>
<td>~10x</td>
</tr>
<tr>
<td>REC Traded (₹ in crore)</td>
<td>23.31</td>
<td>230.91</td>
<td>~10x</td>
</tr>
</tbody>
</table>

Cumulative RECs traded: ₹ 517 crore

### Electricity Mix

- **56.93%** Aggregate Registered Capacity 3151 MW
- **20.92%** Wind
- **16.64%** Others
- **4.88%** Bio-fuel cogeneration
- **0.58%** Biomass
- **0.05%** Small Hydro
- **Solar PV**

- **Solar RECs worth ₹ 2.18 crore traded in 5 sessions**

---

\(^1\) carried out through Power System Operation Corporation Limited, a wholly owned subsidiary of POWERGRID
Telecom

Highlights

National Knowledge Network (NKN)

- Allocation received for connectivity to additional 70 Nos. of DHQs (Value for 7 years as ~ ₹ 100 crore)
- Total value of allocations received for NKN ~ ₹ 900 crore for 10 year period starting Oct, 2010.

National Optic Fiber Backbone (NOFN)

- POWERGRID Share: ₹ 4000 crore to connect 50,000 GPs out of total 2,50,000 GPs
- Received ‘Allotment Letter’ for NOFN network in 4 States viz. AP, HP, Jharkhand & Orissa for 36,000 GPs.
  - 89 districts covering 1769 blocks
  - Estimated cost: ~ ₹ 3000 crore
- Pilot Project of 15 Gram Panchayats in Parvada Block at Vizag Dist. successfully implemented
- Tri-partite MOU between DoT, BBNL and State Govts. signed with 16 states.
- Commercial MoU being finalised by BBNL

Q2: New Clients

3
Consultancy
Domestic

Q2 Orders

12 assignments:
Govt-5 & Private-7

Under execution
• 116 Assignments
• Projects worth ₹12,400 crore (Balance Cost)

Jobs under consideration
• 19 assignments
• Projects worth ₹6300 crore

New Clients
11 Nos. in Q2

One Nation, One Grid
Consultancy: International

Focus Geographies
- SAARC
- Africa
- Gulf countries

Footprints in 11 countries

Focus Businesses
- Consultancy
- Asset Management
- EPC
- JV/ Acquisition

Q2 Orders
- 2 Nos. (Nepal & Bhutan)

Under execution
- 17 Assignments
- Projects worth ₹ 2,600 crore (Balance Cost)

Shortlisted for:
- Owner’s Engineer, Tanzania
- Detail Engg. & Supervision of Construction for HVDC Interconnection between Kenya & Ethiopia

Proposals/ EOI submitted
- 11 assignments
- 5 new countries

Consultant finalized to advise on setting up of a separate company for overseas operations

One Nation, One Grid
Revenue Collection Efficiency

Outstanding as on date

<table>
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<tr>
<th>Monthly Billing</th>
<th>₹ 940</th>
</tr>
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<tbody>
<tr>
<td>Outstanding &gt; 60 days</td>
<td>₹ 478</td>
</tr>
<tr>
<td>Being paid in installments</td>
<td>₹ 162</td>
</tr>
<tr>
<td>Balance Outstanding &gt; 60 days</td>
<td>₹ 316</td>
</tr>
</tbody>
</table>

Equivalent to 10 days of billing

Stranded Assets: Nil
<table>
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<tr>
<th>Methods for pursuing better implementation of Debtor Recovery Measures</th>
<th>Rigorous follow-Up with Designated ISTS Customers (DICs) to make timely payment</th>
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<tr>
<td></td>
<td>Regulation of Power Supply of defaulting entities as per CERC Regulations</td>
</tr>
<tr>
<td></td>
<td>Denial of Short Term Open Access to consistent defaulting entities being pursued with CERC</td>
</tr>
<tr>
<td></td>
<td>Notice to CEOs of defaulting entities by CERC under section 142 of Electricity Act-2003</td>
</tr>
<tr>
<td></td>
<td>Disconnection of feeders being contemplated for the entities who neglect to pay the transmission charges (under Section 56 of Electricity Act-2003)</td>
</tr>
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Investment Programme

Projects/ Schemes

Investment Approved - ₹ 88,000 crore
Contracts awarded for Project Cost: ₹ 73,000 crore

Capital Outlay

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<tr>
<th>Fiscal Year</th>
<th>Capital Outlay (₹ in crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY12-13</td>
<td>19,000</td>
</tr>
<tr>
<td>FY13-14</td>
<td>20,000</td>
</tr>
<tr>
<td>FY14-15</td>
<td>20,000</td>
</tr>
<tr>
<td>FY15-16</td>
<td>20,000</td>
</tr>
<tr>
<td>FY16-17</td>
<td>21,000</td>
</tr>
</tbody>
</table>

Additional projects

- Tariff Based Competitive Bidding
- Consultancy assignment/ Sub-Transmission
- Transnational interconnections
- Projects assigned by GoI
- Green Energy Corridors
- Additional projects
Investment planned in Debt-Equity ratio of 70:30

**Requirement**

- **Equity**: ₹ 28,000-30,000 crore through Internal Accruals
- **Debt**: ₹ 26,350 crore tied up. ₹ 43,650 – 45,650 crore to be raised

**Sources**

- **Domestic Market**
  - Bonds
  - Line of Credit from SBI

- **Foreign Currency**
  - Govt. guaranteed funds from IFIs like World Bank & ADB
  - ECB including loans from ADB, IFC, Supplier’s Credit, Foreign Currency Bonds

**Total Investment Programme of ₹ 100,000 crore**

**Mobilized during FY13**

- Bonds from Domestic Market: ₹ 6,850 crore
  (Jul-12: ₹ 4,000 crore @9.3%; Oct-12: ₹ 2,850 crore @ 8.85%)
- Foreign Currency Commercial Loan from IFC: US$ 270 million
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Puducherry Pilot Smart Grid / City

Attributes
- Advanced Metering Infrastructure (AMI)
- Outage Management System (OMS)
- Power Quality Management (PQM)
- Integration of Renewables, Micro Grid
- Energy Storage, Electric Vehicles

AMI Functionality - Operational
- Smart Meter Deployed For 195 Consumers
- Data Concentrators Unit (DCU), Meter Data Acquisition System (MDAS), and Meter Data Management System (MDM) deployed
- Smart Grid Control Center inaugurated by Chief Minister, Puducherry on 19th Oct., 2012

DPR on Smart Grid Solutions submitted
Katra Gulmarg Kanpur Firozabad Bidhuna Shikohabad Muzaffarpur Puri
Green Energy Corridors

• Green Energy Corridors Report jointly released by Hon’ble Union Minister of Power and Minister of New and Renewable Energy on 14 Sept’2012

• Investment of ₹ 43,000 crore envisaged in development of Green Corridors for 42GW RE Generation (₹ 20,600 crore for intra-state and ₹22,400 crore for inter-state)

• Investment includes other associated works like Dynamic Reactive Compensation, Energy Storage, Establishment of RE Management Centres, forecasting tools etc.

• Approval process in progress
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</tbody>
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New Business Initiatives

- JV with States
- Backward Integration
- Energy Efficiency
- Distribution (Wire Business)
One Nation, One Grid

New Business Initiatives: Updates

JV with States
- XII Plan - intra-State Transmission: ₹ 55,000 crore
- Agreements with Bihar & Odisha finalized
- Discussions under way with Jharkhand, UP, J&K, Haryana, Manipur

Backward Integration
- DPR for conductor/ tower parts manufacturing under finalization stage
- JV for manufacturing transformer and insulators being pursued
New Business Initiatives: Updates

Energy Efficiency
- Utilizing existing pool of Qualified EA & EMs
- Offers received for auditing Sub-stations, Steel Mills & Office Buildings

Distribution (Wire Business)
- Applied for Wire Business license for identified Districts in Odisha
Thank You
The Electricity Act, 2003

company or other association or any other person who is responsible for its default.

Section 56. (Disconnection of supply in default of payment): -- (1) Where any person neglects to pay any charge for electricity or any sum other than a charge for electricity due from him to a licensee or the generating company in respect of supply, transmission or distribution or wheeling of electricity to him, the licensee or the generating company may, after giving not less than fifteen clear days’ notice in writing, to such person and without prejudice to his rights to recover such charge or other sum by suit, cut off the supply of electricity and for that purpose cut or disconnect any electric supply line or other works being the property of such licensee or the generating company through which electricity may have been supplied, transmitted, distributed or wheeled and may discontinue the supply until such charge or other sum, together with any expenses incurred by him in cutting off and reconnecting the supply, are paid, but no longer:
Energy Efficiency

Energy Efficiency – Need of Hour

Global Energy Shortage

Coal will not last more than 120 Years
Oil will not last more than 40 Years
Gas will not last more than 60 Years

Will we allow our next generation to blame us for the wastage?

“Each unit of Electricity saved is \approx to generation of 2 units”

“Energy Efficiency is the fifth fuel, which is not a hardware fuel in the conventional sense”
Dr. APJ Abdul Kalam

Government of India launched Perform Achieve and Trade (PAT) scheme to promote Energy Efficiency

- 478 Energy Intensive units identified in Phase-I
- Target and evaluation based on Energy Audit
- Incentive for achievement
- Penalty for Wastage of Energy

One Nation, One Grid
Energy Efficiency

Energy Efficiency Initiatives by POWERGRID

- Consultancy in Energy Efficiency
- Systematic Energy Audit by Experts
- Cost effective solutions for Energy Saving
- Development of green building
- Water and Paper Recycling
- Payback period calculations for the investments

Intend to set up Energy Efficiency Service Company (ESCO) to provide energy efficiency solutions from concept to commissioning including financing

Exploring Collaboration with Technology Innovators in manufacturing State-of-the-art quality product to provide total Smart Grid solutions including Energy Efficiency
Wire Business: Power Supply Delivery Chain
Power Supply Management
- Long term power purchase to meet base load demands
- Medium and short term power purchase to meet short term demands
- Power sale during surplus periods
- Management of renewable power purchase
- Regulatory and tariff filing

Network Management
- Optimal operation of distribution system
- Loss reduction strategies
- Maintenance of existing network (substation, transformer and lines)
- Network strengthening and network addition (Capex)

Customer Management
- New connection and disconnection
- Fault response and coordination
- Meter reading and billing
- Collection of bills
- Customer Relationship Management

Separation of wheeling and retail is an internationally tested methodology of introducing competition at the retail end of the power sector value chain
Wire Business: Improvement in Distribution

- “Wire business” needs to be separated from “Supply”

- System Strengthening shall be ensured with separate wire business

- Enable reliable distribution network
  - Risk Sharing and bringing commercial viability of both the segments
  - Make Open Access in Distribution a reality

- Model shall ensure the system development, Smart Grid implementation and bringing efficiency in distribution sector

- Investment planned in Electricity Sector: ₹ 13.72 lakh crore (XII Plan)
  - Investment in Distribution: ₹3.06 lakh crore
Smart Grid Control Center at Puducherry

One Nation, One Grid
Location of Smart Meters Installations at Puducherry
Real Time Smart Meter Data-
Instant/ Hourly/ Weekly/ Monthly
## Smart Meter Parameters

<table>
<thead>
<tr>
<th>Meter Serial Number</th>
<th>Actual Energy (kWh)</th>
<th>Apparent Energy (kVAh)</th>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>Load (kW)</th>
<th>Power Factor</th>
<th>Frequency (Hz)</th>
<th>% Variation from Avg</th>
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# Details of Real Time Alarms of the Consumer Meters

## Billing Summary

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<td>74</td>
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## Work Order

| Total | Open | In Progress | Resolved ||
|-------|------|-------------|----------|-
| 86    | 3    | 82          | 1        |-

## Alarms

<table>
<thead>
<tr>
<th>Total</th>
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<th>Resolved</th>
<th>Service Order</th>
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</thead>
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## AMI

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## Demand Response

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<tbody>
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</tbody>
</table>

## Outage

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</tr>
</thead>
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Active Real Time Control of Smart Meters

One Nation, One Grid