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Adani Electricity Mumbai Limited

Operational Excellence Showcase

March 2021



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01. Adani Group Overview

Adani Group: A world class infrastructure & utility portfolio



Adani

- Marked shift from B2B to B2C businesses –
 - ATGL Gas distribution network to serve key geographies across India
 - AEML Electricity distribution network that powers the financial capital of India
 - Adani Airports To operate, manage and develop eight airports in the country
- Locked in Growth 2025 -
 - Transport & Logistics -Airports and Roads
 - Energy & Utility Water and Data Centre (JV with EdgeConneX)

Opportunity identification, development and beneficiation is intrinsic to diversification and growth of the group

1. As on Feb 26, 2021, USD/INR – 72.6 | Note - Percentages denote promoter holding, 2. NQXT – North Queensland Export Terminal | Light blue color represent public traded listed verticals, 3. ATGL – Adani Total Gas Ltd, 4. AEL has announced JV with EdgeConneX, one of the largest datacenter operators in the world;

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Adani Group: Decades long track record of industry best growth rates across sectors



Transformative model driving scale, growth and free cashflow

Note: 1 Data for FY20; 2 Margin for ports business only, Excludes forex gains/losses; 3 EBITDA = PBT + Depreciation + Net Finance Costs – Other Income; 4 EBITDA Margin represents EBITDA earned from power sales 5. Operating EBITDA margin of transmission business only, does not include distribution business. 6. Contracted & awarded capacity 7. CGD – City Gas distribution GAs 8. Geographical Areas - Including JV | Industry data is from market intelligence

Adani Group: Repeatable, robust & proven transformative model of investment



| Phase | | Development | | . Operations | | Post Operations | |
|----------|---|--|---|---|---------------------|--|--|
| | Origination | Site Development | Construction | Operation | | Capital Mgmt | |
| Activity | Analysis & market intelligence Viability analysis Strategic value | Site acquisition Concessions and regulatory agreements Investment case development | Engineering & design Sourcing & quality levels Equity & debt funding at project | Life cycle O&M planning Technology enabled O&M SCADA based operations managing supply of 3 Mn. Households in city of Mumbai | | Redesigning the capital structure of the asset Operational phase funding consistent with asset life | |
| ance | India's Largest Commercial Port (at Mundra) | Longest Private HVDC Line in Asia (Mundra Mohindergarh) | 648MW Ultra Mega Solar Power Plant (at Kamuthi, Tamil Nadu) | World class state-of- the art SCADA,DMS,GIS, OMS & SAP integrated | i | In FY20 issued seven international bonds across the yield curve totalling~ USD4Bn | |
| Perform | Highest Margin among Peers | Highest line availability | Constructed and Commissioned in nine months | First in India to incorporate Auto restoration of 33KV feeders | | All listed entities maintain liquidity cover of 1.2x- 2x as a matter of policy. | |
| | A BARBARA STA | | | | 14% 31% March | 47% 33% 20% 20% 2016 March 2020 | |

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AEML: Implementing Groups transformative simple, repeatable business model

| Pha | ase De | Development | | Opera | ations | } ∢ | Post Operations |
|-------------|--|---|---|---|---|------------|---|
| | Construction | Reliability | | Operation | Consumer | | Capital Mgmt |
| Activity | Commissioned Versova connectivity in a ring mode fashion for grid strengthening 15Km Aarey-Borivali Connectivity-Comm in record time 100% AMR for Industrial Consumer Commissioning of 207MVA PT in Pandemic and target for 300MVA till Mar 21- highest in AEML's history | Islanding scheme Standby mechanism Rational mix of ST-PPA & LT-PPA Daily & seasonal load variation pattern 1964 MW Peak : 536 MW Off Peak | Prefecons Digit & GIS with Targetie COP2 achies sche | erred Supplier for umers cal Twin SCADA, DMS 5 real time integration SAP et renewable power Jp to 60% by 2025 21 target to be eved 5 years ahead of dule | Self help kiosk deployment Chatbot Implementation Promotion of digital payments Field force automation First & the only utility offering interaction on virtual basis | • | Redesigned Capital structure consistent with the underlying mature utility business model Raised USD 1,000 Million 10-year paper through 144A/ REG S issuance to replace amortizing bank debt USD 400 Mn. CAPEX revolver facility from 8 international banks to fully fund capex program |
| Performance | De-bottlenecking leads to supply reliability for 1mn consumers | Successfully operated Islanding Scheme on 12 th Oct 20 (refer case study 2 on slide 19) Highest Reliability amongst peers | Reduc throu Purch Smart consu | ction in ABR by 22% gh effective Power ase strategy metering- 25% mers in 1st phase | 100% collection efficiency Acquired -200 MU of premier consumer in Mumbai | | Qatar Investment Authority acquired 25% stake in AEML in 2020 Contemporaneous -ECB US\$ 1.80 billion settlement on single day Only Indian Discom with IG rating from all 3 major global rating agencies |

AMR – Automatic Meter Reading, SCADA – Supervisory control and data acquisition, DMS – Distribution management system, GIS – Geographical information system; PT – Power transformer, MVA – Mega volte ampere, MU – Million unit, PPA – Power purchase agreement, LT – Long term, ST – Short term, ABR – Average billing rate, ECB External commercial borrowings, IG- Investment grade

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02. AEML – Integrated Utility

Adani Transmission: India's leading Transmission & Distribution portfolio



AEML: Stable and evolved regulatory framework offers predictable & robust returns



Tariff is based on rate of return approach on regulated asset base, pass-through of other costs and efficiency linked incentives



AEML: Century old utility serving the "Gateway" city of India, faces unique challenges



11





Key Challenges of Mumbai

- ightarrow Houses the worlds largest slum
- \rightarrow Highest population density
- \rightarrow Space Constraint
- → Peak : Off Peak ratio amongst the most challenging 536 MW : 1,964 MW
- → Monsoon & associated waterlogging, challenge in execution
- → Uninterrupted and Quality Supply and Zero Outages.

Servicing 85% of Mumbai's geography, touching 2 out of 3 households in Mumbai

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03. AEML Operating Philosophy – Reliability, Responsiveness and Sustainability

AEML responds to these Challenges with an O&M philosophy structured around the triad of Reliability, Responsiveness & Sustainability

Sustainability



Sustainability Reliability \mathcal{X} Responsiveness Pioneered adoption of advanced Consumer-centric service delivery technologies & state of the art model with wide spectrum of stainabilié integrated O&M systems consumer-focused initiatives 100% underground network to take Consumer feedback linked process MSO care of Zero fatality & Natural Philosophy improvements & quick turnaround of driven by Calamity consumer grievance Technology Mumbai is insulated from external Emerging as "supplier of choice"

grid disturbances

AEML's Robust and Reliable Infrastructure integrated through the **"Digital twin"**



- 100% Unmanned remote operated Stations with maintenance free Dry type Transformer & Switchgears, Ester Oil filled Transformer
- Installed capacity is twice of maximum demand
- Redundancy built at three levels (N-1 -1 Cluster wise)
- Mesh inter-connectivity and auto changeover facility
- DER enabled Roof top solar installations with net-metering
- Theft Proof Pillars (TPPs) & Theft Aversion Boxes (TABs)

- Auto Islanding schemes during grid disturbance
- Auto restoration scheme for 33 kV Feeders
- 100% AMR for High end customers with Time of Day (TOD) tariff
- Technology enabled avenues for **consumer interaction**
- Outage management through interchangeability
- Condition Based Maintenance
- Theft Aversion

AEML: Redundancy in Network design ensure minimal downtime



Network Design



33kV Feed

11kV Bus

11 kV Feeders to various CSS

20MVA

PT-1

Auto-restoration of 33 kV feeders - First in India



- Grid Islanding Mechanism
- Redundancy at all Voltage Level-Ring Network
- 33kV feeder from two EHV substations for redundancy
- Predefined logics designed for safe restoration
- Elimination of manual intervention during tripping
- Stand-by feeder for auto re-energization & supply
- MESH interconnectivity and Auto Changeover facility at customer place



11kV Bus

33kV Feed

20MVA

PT-2

different EHV Stations

11 kV Redundancy for

restoration of 11kv Bus/Feeders

2

AEML: Orbital Shift - Solution for Distribution Loss reduction



Reliability

System Highlights:

- Units comprising Load Break Switches, Small Capacity Transformers (50/100 KVA), LT Breakers and Smart Metering inside Natural ester oil filled tank Eliminating Low tension 420 V network and access to miscreants for electricity Theft
- Input at 3Ph 11 kV or 1Ph 6.6. kV and output shall be individual consumer load wire at 420 / 240 V Reduce Technical losses by improving HT/LT Ratio.
- Units will be installed in Consumer Premises / Street Light Poles Electricity Consumer information to Consumer using Mobile App
- Integrated to SCADA Control Centre Low TCO than Smart metering
- Unit Maintenance at Workshop Help to optimise the maintenance cost related to Meter Cabin, LT Pillars, Main Line and Service Cable Faults.

Notes: kV: Kilo Volt, V: Volt, LT- Low tension,, HT- High tension, U/G- Under ground, Ph- Phase, CSP- Completely self protected transformer, SCADA- Supervisory control & data acquisition, TCO-Total cost of ownership; CSS- Consumer substation

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Network Design

AEML: Smart Metering Ecosystem



Network Design



- Streetlight Portal
- Business process support
- Data analytics
- Business Dashboard
- Head End System
- Meter Data management



- Automatic Reading
- Remote Connect/ Discom.
- ToU Based Billing
- Peak Shaving
- Real Time Energy Audit
- Power Quality & Reliability

AEML is deploying one of the largest Smart Meter program – 12 Mn Consumers



Reduction in Carbon Footprint

AEML: Digital Enablers - SCADA, DMS, AMI



First Utility in India to implement SCADA / DMS, FPI for prompt fault identification & Supply restoration

SCADA- Supervisory Control and Data Acquisition, DMS – Distribution Management System, AMI- Advanced meter interface, DSS- Distribution substation, CSS- Consumer substation, OFC- Optical fiber cable, FPI- Fault passage indicator, KVA- Kilo Volt Ampere, MVA- Mega Volt Ampere, V- Volts, kV- Kilo Volts, NOP- Normally open points

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Digital

AEML: OMS Integration





CRM – Customer Relationship Management, IVR – Interactive Voice Response, OMS – Outage Management System, WMS – Work Management System, SAP – ERP, SCADA- Supervisory Control and Data Acquisition, GIS-Geographical Information System, DMS – Distribution Management System

AEML: Improvement in response time





Reliability

46% improvement in response time

Notes: GIS- Geographical Information System, OMS- Outage Management System, PDA- Personal device Assistance

3

Integrators

AEML: Operates at Industry standards beating reliability metrics



Reliability

Notes: # - Comparison against top performing DISCOM in INDIA, data as on 30th Mar 20, * - Excluding Slum Area; SAIDI - System Average Interruption Duration Index, SAIFI - System Average Interruption Frequency Index, CAIDI - Customer Average Interruption Duration Index, MU – Million Units, COP- Conference of parties, CO- Company, RMU- Ring main unit

AEML: Case Studies – Reliability Demonstrated

1

COVID Solidarity Event - 9 pm 9 minutes on 5th April 2020

Challenges

- Maintaining grid's stability within frequency
- Predicting accuracy as **power demand vs supply**
- Possibility of high voltage surge & line Tripping

Preparedness

- Existing Load Shedding schemes reviewed
- Resource arrangement i.e. DG sets, Back up system
- Simulation for Islanding scheme
- Operational Guidelines drafted for Back-up control team

AEML Strength Demonstration

9 PM 9 minutes was successfully managed the load variations while maintaining uninterrupted power supply with proper parameters



Grid Disturbance - 12 Oct'20 Grid Failure & successful Islanding

Sequence of Events

- Triggered by the tripping of 2 lines at the MSETCL in
 400 KV transmission system in Kalwa.
- **Manual tripped** by operator due to spark at CT, leads to outage
- Load affected in Maharashtra 3500 MW out of which
 2200 MW in Mumbai

Successful Islanding

- ADTPS supplied @ 340 MW 390 MW of critical / essential loads when no other power source was available due to the said Grid disturbance.
- ADTPS ensured supply to all essential services

AEML: Case Studies – Reliability Demonstrated

3 Demand Side Management



- Peak Off Peak Ratio ~ 3.5:1
- Lower demand on Sundays & Holidays

Challenges

- Demand varies based on holidays, seasonality, weather parameters, special events
- Planned outages, emergency shutdown, variation in generations
- Issue of Matching the Demand and Supply



Peak – Off Peak Ratio ~ 2:1

Predictable demand pattern

Mitigation

- Forecast and Decision-making through Artificial Intelligence tools of SAS
- To ensure reliability planning at day ahead, monthly, quarterly and annual basis
- Match demand-supply at every 15 min interval

AEML: Responsiveness aided by Technology-Transformation to Virtual Enterprise





AEML: Quality manpower for high reliability and responsiveness

Knowledge Enhancement

 60 Customized webinars in collaboration with 41 Reputed Vendors

Skill Development

- Electrical Workshop setup
- A model substation to deliver hands on technical training.

Creation of Training Facilities & Affiliation of Training Centers

• Affiliated Training Partners of Power Sector Skill Council (PSSC)

e-learning modules

- Awareness on Covid-19 related Information
- Monsoon Ailments during COVID-19 Times
- Online technical training to Engineers and Skilled staff

Enhance Digital Skills for Future ready Organization

Responsiveness

- WEBEX Course on Digital Transformation
- E-Learning Platform Coursera
- Office 365 End User Training
- MS Apps, MS Teams, Power BI Training
- Data Science Training
- In-house Videos of Technical Training

Focus on improving consumer connect

- **Sankalp** : Migration from conventional meter reading
- to mobile based
- **Mission Airlift** : Reverse migration from Competitors
- **9 As to recovery**: Meter Management, New connection
- Samarthya : Commercial Management

AEML: Case Studies - Responsiveness to consumer in extreme events





Proactive Actions

- Multi-locational SCADA center
- Auto work allocation through IoT
- Voltage management through SCADA
- One-day connectivity for new hospitals & quarantine facilities
- Setup mobile kiosks for bill payment
- Virtual connectivity with consumers

- DRT activated Setting of Disaster Control Center
- DSM/Voltage management through SCADA
- Deployment of DG set at critical locations
- Water level sensors in substation integrated with SCADA
- Dewatering pump & life saving boats were deployed
- Deployment of life saving squad

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AEML: Strong ESG Focus

Environmental The commitment to raise the share of renewable power procurement from the current Use of environment friendly dry and ester oil transformers Replaced oil type switch gears with dry type maintenance free switch gears

Social

• Reliable Electricity Supply is critical for the enterprise to operate and grow

- Reliability indices like SAIFI, SAIDI, CAIDI, and ASAI demonstrate our commitment
- Consumers is Mumbai remained largely unaffected from 23 instances of National/Regional Grid outages in the last 2 decades

Governance

- 50% non-executive, independent directors on the Board
- Rigorous audit & assurance process
- Strong governance framework with policies

AEML: Employees have proven capabilities for execution



Complemented by expertise of its parent company (Adani Transmission)

15,400 ckt km Network laid by Adani Transmission

Adani Transmission owns and operates India's 1st private HVDC line of 1,980 ckt km between Mundra (Gujarat) and Mohindergarh (Haryana). This was constructed within a record time of 24 months. adani

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AEML: ISO Journey - Contined Improvement



Notes: ISO- International organization for Standardization, Mgmt- Management

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4. Conclusion

AEML: Value accreditation to ATL and pathway towards future growth in distribution sector





- Cashflow profile of ATL has changed dramatically post acquisition of AEML
- Self-funded growth
- Onboarding of marquee investor - QIA
- Value creation for ATL

| | | Privatization | Managing largest slum with lowest distribution loss Effective outage management for quality supply Enhanced consumer experience – value added services | Future ready |
|-----------------------------------|---------|-------------------------------|---|--|
| Strategic Advantages to ATL | Carriag | Carriage and Content | Only Discom working in a competitive environment (new regulation on competition is already part-and- parcel of AEML business) 90% of competitor's consumers are on our network Historical trend of reduction in power purchase cost | to tap massive growth opportunities in Distribution sector |
| | | New business opportunities | Richest Counterparty – Mumbai Consumer 9 decades of consumer behavior history | |



Thank you

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