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ISM REPORT

Adani x SMU Industry Study Mission

ABSTRACT

A compiled report on the Industry Study Mission hosted by the Adani Group in India.

Merchants Club Charles Chan

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The Adani Group is one of India's leading business houses with revenue of over \$11 billion. Founded in 1988, Adani has grown to become a global integrated infrastructure player with businesses in key industry verticals - resources, logistics, energy and agro. Adani has established itself as a leading infrastructure conglomerate with an integrated value chain, unique and unparalleled in many ways. Supported by India's strong macroeconomics to be a global consumer, the demand of its own population and a young workforce provides vast opportunity for growth.



Aside from infrastructure, Adani has also established itself as the largest private power producer, port and logistics business, and integrated coal management company in the country. It is currently the fastest



Adani has been led by a strong vision that has been tuned towards progression and far-sightedness. The company envisages sustainable and inclusive progress and is focused towards providing maximum benefits to all stakeholders.

Adani is also deeply rooted in its value system which consists of commitment, trust, and teamwork. The company has over 10,000 employees and they all work as one team in synergy with the vision of the leader.

Gautam Adani is a powerful leader and entrepreneur and has been quoted as a reference for leading by example. Adani Enterprises continues to pioneer new industries and cutting-edge technology, embarking to build the world's largest solar power plant, largest solar park, and India's largest solar manufacturing system.

Aside from developing national infrastructure to the Indian community, Adani ensures the community can live in a sustainable lifestyle while improving affordability through poverty alleviation. The development of communities is largely done through the Group CSR's arm, which has touched millions of lives. Whether it is actively working in the areas of Education, Healthcare, Rural Livelihood Development & Sustainable living or large-scale forestation and the development of mangrove plantations, Adani aims to bring positive social, economic and environmental changes in the communities within their area of operations.

MARKET OVERVIEW

Although India has many challenges to overcome, the country does have a unique advantageous situation. As the fastest growing nation over the last 2 years, India has set upon multiple initiatives; the government's call for 'Made in India', focus on energy security, driving the world's most ambitious renewable power generation program, investing in programs like inland waterways and sagarmala, accelerating the building of road infrastructure and improving India's business setup accessibility. These results of these initiatives will be expected after proper integration over the next 2 to 3 years.

This report highlights several commodity markets in which Adani is involved in for analysis, namely Coal, Gas, Edible Oil, and Solar Panel Manufacturing.

Coal

Coal consumption in India is expected to grow in the short term, amid growing emphasis on green power production. One thing to note is that India has been and will continue to invest in greener and cleaner methods that produce energy with coal. For instance, higher calorific coal has been the preference to India's power generation, even though domestic production often produces a lower calorific quality.





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The government has clamped down on new investments into the construction of new plants while shutting down the older plants which are relatively inefficient. With thermal plants becoming increasingly effective, coal consumption is expected to fall gradually in the long term.

Adani is looking to become a Mine Developer and Operator (MDO), which focuses on capturing margins throughout the entire vertical supply chain. Places of choice were either from Indonesia or Australia but recent developments in the political scene have stalled such developments, especially within Australia. The importance of these integrations are that these countries provide the quality coal that Adani Thermal Power Plant consumes.





One thing to note is that power generation preferences ultimately depend on government regulations as well as the prices of variables and alternatives. With massive improvements in Solar PV manufacturing, increasing power generation by turbine and other alternatives, the relevance and cost advantages of coalbased power generation is expected to subdue over the next decade. If Adani can improve its position as an MDO soon, the relevance of coal is expected to stay for a relatively longer period.

Gas

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 India is a major consumer of natural gas, with a relatively large consumption derived from the Compressed Natural Gas motorized rickshaws seen throughout the country. There are several reasons why CNG motorized rickshaws are so popular in India as compared to the rest of the world.



Developing countries such as India and many other South Asian countries do not have proper public transport. With the lack of a proper transport system, infrastructure and vehicular assets, the Autorickshaw is a very cheap and affordable answer to the transport system.

A large population requires a need for more buses and other vehicles. With India being large in land and is still expanding in terms of reclaimed land, the development of the nation is relatively nucleated rather than dispersed. The number of people travelling shorter distances on less trodden paths are higher, hence buses may not be a viable option as compared to Autorickshaws.



One unique characteristic of India's gas industry is that the gas is subsidized by the government. Thus the eco-friendly CNG is easily accessible throughout the nation with multiple CNG stations making it affordable. Taxing an autorickshaw will thus be the natural choice in cost competitiveness.

Edible Oil

India consumes almost 21MMT of edible oil annually, with a CAGR of 4%, in line with a growing population. As the third largest consumer with a global market consumption of about 12%, there is a lot of potential in this industry for Adani.

With favourable macroeconomics such as a growing young population amid improving living standards, income increases would translate to a rise in demand for food products, including cooking oil which is an essential in the Indian culinary.

This consumption-driven demand growth is currently outpacing domestic supply growth, increasing the country's import dependency to almost 60% as compared to 3% in the nineties. Of this market, 50% of consumption is still being catered by unorganized market players, providing vast opportunities for consumer pack businesses. For instance, the Adani-Wilmar joint ventures sell large parcels of edible oil to small domestic distributors whom



then disseminate the product across. Adopting a macro perspective, there is so much room for India to grow in terms of per capita oil consumption.

Solar Panel Manufacturing

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Given the growing population, there is a greater energy consumption required to facilitate growth. With global efforts towards staying green, even for power production, one of the more viable and widely adopted option would be solar power. Given the level of investment into this form of energy, breakeven costs are alleviated over time. Furthermore, solar energy has been said to be truly green as compared to alternatives such as wind turbines which would take about 15 years prior to becoming truly green.



India currently imports a significant amount of energy, and it has been forecasted that the value of solar equipment as an energy alternative to be imported could amount to USD42bn by 2030. Given the volatility of the emerging markets' currencies, to prevent additional forex charges, would require surmountable volumes of credit. Not only would this credit result in additional credit risks to India's economy and affect the state financial assets such as bonds, India would also be subject to the availability of such credits.



Given India's current state of solar equipment manufacturing and a burgeoning population, embracing such an industry could provide increased employment opportunities. With breakeven costs similar to China, the world's biggest solar equipment manufacturer, India is able to stay competitive in the market and be lucrative to international investors.

Adani Port & SEZ

Overview

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Adani Ports had a very modest beginning in 1998 with just two berths at Mundra. They have now grown to be India's largest commercial port operator and integrated logistics company, managing 15% of India's cargoes. The development in Mundra port is unparalleled, boasting 24 berths today and is India's largest port.



Adani Ports now has pan India presence across nine locations and are well-poised to achieve the vision 2020 of 200 MMT, and 500 MMT by the 2025.



The state-of-the-art technology driven infrastructure, coupled with high level of automation and intense focus on time management in port and vessel operations ensure that customers are delighted. In fact, there are about four automated RTGs tagged with every container berth, ensuring an efficient, safe, and largely automated system. Current turnaround is 22 hours, a reduction from 48 hours previously.



Adani ports are harbingers of prosperity to not just the country's economy but also the communities Adani operates in. As responsible corporate citizens, Adani ports have been, and continue to stay committed to sustainable development for the people of the community and the environment. Amongst the greenest port operators in the world, there have been huge initiatives for mangrove preservation and environment conservation amid other areas of community servicing projects. This will be covered in greater detail in the later part of the report.

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Visiting the biggest commercial port in India provided an alternative perspective as compared to other Asian ports, including Singapore and China, the few busiest ports in throughput terms. Adani Ports leveraged on its size for massive economies of scale on multiple margins and levels. The automation and dredging levels were unseen in most places, allowing massive vessels to enter while improving vessel turnarounds. These levels of investment would have been extremely costly in other ports lest Adani Ports, with economies of scale, have allowed for distribution of costs across its profit centres.

The establishment of a stellar hinterland multimodal system also blew us away. With conveyor belts running 24/7 and well-established railways and trucking systems to distribute cargo from its hub, the distribution of products can reach distribution centres and end-users quickly and safely. Furthermore, Adani is currently working alongside the Indian Central and State government to improve a river-linking system.

Lastly, the establishment of a special economic zone allows for seamless information and resource sharing across different companies and industries, again leveraging on the economies of scale based on the volume of services demanded. Commonly seen for a particular industry in other countries such as neighbouring Pakistani's Qasim port textile hub, Adani Ports and the Indian government goes beyond the level to include interdependency across industries and companies, with many more collaborations to be included.

Key Takeaways

Being the biggest private port in India allows for capacity to leverage on economies of scale providing cost advantages.

An increasing emphasis on improving hinterland transportation provides cost efficiency.

SEZ allows for a strong corporate community, improving competitiveness domestically and internationally.

Adani Foundation

Overview

Adani Foundation was established in 1996 as a tribute to the ideals of the Late Shri Shantilal and Shrimati Shantaba. Piloted in a few rural communities around the port at Gujarat (Mundra), the Foundation has expanded its operations over the past decade in 13 states, 20 locations, 1,470 villages & towns across the nation with a team of 300 committed professionals who are relentlessly working with an approach that

embodies innovation, people participation and collaboration with the key stakeholders.

The Foundation has touched more than 500,000 families and passionately acts over four core areas – Education, Community Health, Sustainable Livelihood Development and Rural Infrastructure Development. The Adani Foundation not only focus on the inclusive growth and sustainable development of the communities where Adani Group works, but also contributes towards nation building.

The Adani Group believes that as they live and work in the nearby communities, they have to take their societal commitments seriously. In India, they invest around 3% of the group's profits into community focused initiatives through The Adani Foundation. This is above and beyond the requirement of the Corporate Social Responsibility (CSR) rule which India enacted in 2013: Section 135 of the India Companies Act prescribing a mandatory spending of an average of 2% of profits on CSR.

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There were 2 project visits in Mundra, under the Education and Infrastructure Development umbrella. The main purpose of these projects are to provide employment to the community and educate the children.

For the Education project, we visited a school for the underprivileged in Mundra which was built by the Adani Foundation in 2010. The school takes in 120 students yearly on a ballot basis without the charging of fees and assists to provide them with meals. Initially, there was resistance from the community to send their children to school as they did not see the value in education and would rather have their children help them in the fields. The teachers of the school and the principal had to go door to door to persuade the parents and explain to them the significance of education and how Adani can help them. After some time, a new culture was created and everyone in the community dreams for their children to be enrolled in this school.

For the Infrastructure Development Project, we visited a mangrove plantation which Adani Foundation engaged the local community to help develop. The main purpose of the mangrove plantation is to improve the durability of coastal land against natural disasters and erosion. The project is time and manpower intensive to be developed. Instead of hiring labourers from the city, Adani took the initiative to provide employment to the community.

Key Takeaways

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Adani Foundation has a different perspective towards their CSR as it did not embark on their CSR as a separate initiative but as an integral part of their corporate strategy. The Foundation genuinely believes in helping the community who in turn help them. The staff of the Foundation, who hosted us, were also truly passionate about what they were doing.

There were 3 key takeaways from this short visit that we believe we can use it as a benchmark for future CSR strategies we might encounter:

- Businesses should sow back into the community and let the community know that they are "for them" and not "using them".
- Businesses should focus on sustainability and not look at it as a side issue.
- Change is not created overnight, but it is ignited by vision and built by determination.

Thermal Power Station

Overview

Adani Power was established by the Adani Group to ensure energy security for the nation and through rapid developments, it has become India's largest private power producer. This is attributed to the 4 thermal power plants across India; Kawai, Tiroda, Udupi and Mundra with 2 more plants planned in Dahej and Chhindwara. The Mundra Power Plant output of 4620MW makes it the world's largest coal based private power plant and it consists of 5 660MW units and 4 330MW units.

The Mundra power plant is designed and located to ensure that it operates at a high efficiency with little bottleneck. With a consumption of 50,000 – 55,000 MT/day of coal, it utilises a high-speed conveyor belt to transport these inputs from the Mundra Port Coal Terminal. In addition, it constantly has an inventory of about 10,000 MT of buffer stock in the event of freight delays or the maintenances of ports / transport belts. This inventory stockpile works in a First-In-First-Out process to prevent any loss in the calorific value of the imported thermal coal due to aging.

Water that is needed is extracted from the water channel that Adani and Tata group dug out collaboratively from the Gulf of Kutch. The extraction utilises several sea intake pumps before running the water through a reverse osmosis plant for demineralisation and removing of foreign residues. The demineralised water is then pumped to the boilers to steam at a much more efficient rate, turning the turbines at an rpm of 3000.

Another interesting feature of the plant would be the diesel oil tank that helps coat and warm the boiler before the coal is added. This process helps catalyse the boiling process especially when the unit restarts after a scheduled maintenance.

As for the commercial aspect, the electricity output of the plant is split into DC lines that serves neighbouring cities and AC lines that extends out to further cities such as Ahmedabad. The main differences of the two lines would be the percentage of energy loss during transmission and the fixed costs involved in setting the lines up. 80% of the plant's output is contracted via long term power purchasing agreement with the remaining 20% being traded at spot price. The spot price varies based on seasonality and weather conditions.

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 The trip into the power plant made us understand a large portion of the value chain of thermal coal and how much it helps to generate power to the ever-growing demand of the India population. Despite the presentations and tour being very technical, it did shed a light on the margins of the thermal plant and explain the pricing spread between the input and output.

In addition, we observed how the entire plant aims to operate at a sustainable manner, investing into processes that helps reduce their environmental footprint, despite cutting into their profit margins and requiring significant initial investments. For example, the plant only consumes high calorific low sulphur

content coal imported from Indonesia or Australia and enlist an ash channel to filter out any pollutants from the burning of coal. The ash is collected as a by-product in ash silos and often sold off to cement manufacturing companies. In addition, cooling towers are installed to every boiler to ensure that the water is cooled to ocean temperatures before discharge back to the ocean so as to not disrupt the maritime ecosystem. These initiatives help protect the communities in Mundra by ensuring a pollutant free sky despite running at such a high capacity.

Key Takeaways

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Adani Power plays a significant role in the development of India by providing households and institutions with the necessary electricity required to function. Although there are many up and coming alternative renewable energy sources, the overall demand for energy is forecasted to increase significantly with India's population. This means that thermal coal which currently caters to 80% of India's needs, would remain relevant in many more years to come and we can observe Adani Power set to commission many more new plants across India.

Solar PV Manufacturing

Overview

India is growing at an unprecedented rate, and this growth requires energy security in order to be sustainable in the long-run. The economic activity of the nation gradually shifting from fossil fuel to cleaner alternative fuels will not only enhance the prosperity of the present generation of Indians, but also secure the future of generations to come.

Adani Solar is the first Indian company to vertically integrate businesses that offer services across the spectrum of photovoltaics manufacturing.

The state-of-the-art manufacturing facility with multi-level infrastructure is optimised for scaling up to 3 GW of modules and cells under a single roof. The unit is located in one of the world's largest Special Economic Zone at Mundra, Gujarat and hence plays host to the entire solar manufacturing ecosystem from Polysilicon to modules, including ancillaries and supporting utilities.

The cutting-edge technology, with machines and equipment sourced from the best in class producers, aim to help in cost leadership, scale of operations and reliability standards as per global benchmarks.

Experiences

The trip to Mundra solar PV Ltd (MSPVL) helped us understand more about MSPVL's manufacturing process and its technologies. COO Bernhard Rack (seated left, above picture) guided us through the plant and emphasised the importance of R&D and achieving manufacturing efficiency. Currently, MSPVL has two types of solar panel technology– Multi-crystalline and Mono-crystalline technology, of which the latter offers a better efficiency in capturing solar energy and converting it to electrical energy. Hence, the shift in production from Multi to Mono-crystalline solar panels. The Group aims to achieve 100% use of energy from solar power in the future and has set aside an aim of 100,000 MW of electricity to be produced by 2022, it is producing 2,000 MW of electricity at present. To achieve this, Adani Solar will accelerate production of solar panels and will also integrate solar panels on rooftops and on buildings should land be a constraint. At current, Adani Group has the world's largest solar power plant at Kamuthi, Tamil Nadu, India. It covers over 2,500 acres of land and produces 648 MW of electricity to power 650,000 homes.

Key Takeaways

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Adani Solar plays a significant role in preparing India and the world for the future as fossil fuel, natural gas and coal are expected to run out by 2052, 2060 and 2088 respectively. Furthermore, the greenhouse gases produced by burning fossil fuel has contributed to climate change and global warming over the last 100 years.

MSPVL is mainly set up for producing solar panels for domestic consumption, hence plays an integral role in achieving the Group's goal of using 100% of its energy from solar power in future.

Adani Wilmar Refinery

Overview

Incorporated in January 1999, Adani Wilmar Limited (AWL) was formed from a joint venture between Adani Group and Wilmar International Limited. AWL's business activities focus on refining and the production of edible oils, offering a range of products such as vanaspati, packed basmati rice, pulses, soya chunks, besan, specialty fats, lauric range products, castor oils, oleo chemicals as well as non-GMO soya products. AWL owns refineries in 17 strategic locations over India, 8 crushing units and 18 toll packing units, which allow for a refining capacity of 19,000 tonnes/day, seed crushing capacity of 7500 tonnes/day and packaging capacity of 129,000 tonnes/day. The company also manages and operates one of the largest edible oil production capacities and the largest oleochemical plant in the country, with more than 90% of palm and lauric sourced from Indonesia and Malaysia combined.

AWL possesses the largest portfolio of brands in the Indian edible oil industry, holding brands such as Fortune, King's, Bullet, Raag, Avsar, Pilaf and Aadhaar under its umbrella. The company controls the largest distribution network amongst domestic branded edible oil players with more than 96 stock points, 5,000 distributors and a 10% retail penetration across approximately 1 million outlets in India, to ensure a smooth downstream process.

Under AWL's portfolio, "Fortune" edible oil brand stands out as the most prestigious brand and had secured the title of being the No.1 brand in the market within 2 years of its launch. Today, "Fortune" remains the leading brand in the industry, with AWL holding a 19% market share (consumer pack).

AWL's products are not only kept for domestic consumption but also for the export market. Through its distributors, the company exports its products to various countries in the Middle-East,

South East Asia, East Africa and Europe, which includes Singapore, Australia, New Zealand as well as Ukraine.

Experiences

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We were given a comprehensive overview of the company's value chain, through a tour of AWL's oil refinery as well as their packaging and distribution centre. The trip to the refinery provided a brief yet detailed understanding of how edible oils are made suitable for consumption. Crude oil is first procured and shipped from Singapore to the liquid terminals in Mundra port before being transported to AWL's plant via pipeline. Over at the plant, the oil is then bleached to remove its colour with the help of a bleaching carbon agent, before undergoing deodorising process to remove impurities. Thereafter, the oil is filtered to remove spent, a by-product from the bleaching process (black in colour), to finally obtain the pale-yellow edible oil as shown below.

Following this, we were given a tour of AWL's packaging and distribution centre where we observed both the automated and semi-automated processes used. This arrangement really intrigued us as we viewed automation to provide a higher efficiency. It was later explained that the semi-automated process was done to provide employment, a value that Adani Group strongly commits to.

Key Takeaways

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Strategic planning is paramount to propel the growth of a company. In the case of AWL, the decision to focus on a field of product (edible oils), instead of venturing into soap, allowed Adani Wilmar to excel and dominate the market.

Brand loyalty is key to every business in the FMCG industry; this could stem from the trust and assurance a company provides to its customers. In this aspect, Adani Wilmar has achieved and succeeded in securing its customers' loyalty such that its flagship brand, Fortune, could emerge top amongst the other edible oil brands, just within two years of its launch.

Adani Wilmar Castor Seed Crushing

Overview

Adani Wilmar Castor Seed Crushing Plant was born out of the Joint Venture between Adani Group and Wilmar International in 2004.

Castor Seed is a non-edible oilseed with an average of 49% content level of oil. One of the advantages it possesses is that ageing doesn't have much effect on the seed or its contents allowing AWL to stock up demand for peak periods. The 2 products from the crushing process are Palm Oil and Castor Meal.

AWL leverages on the SEZ status that has been bestowed upon Mundra port to export its Castor Seed end products duty free. This gives them a significant advantage over rivals capturing close to 30 % market share in derivative exports from India, which supplies 90% of the global demand. Additionally, it's also in the process of producing a second and third generation application of castor oil derivatives.

Experiences

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We had a warm welcome by the Management Team who prepared a presentation to introduce us to the production capabilities. AWL has a castor seed crushing facility containing 2 silos with a storage capacity of over 8,950 tonnes per day. Castor seed is sourced locally in the states of Gujarat and Andhra Pradesh. It was also mentioned that AWL expects a growing demand for castor seed oil due to its uses in as cosmetics, pharmaceuticals and production of biodiesel.

After the presentation, we embarked on a tour around the Castor Seed Crushing Facility and were first introduced to the Husking machine. The seeds filtered as Premium Grade "A" category was first processed in Crude Palm Oil and was further refined by mixing and bleaching Grade "B" or "C" seeds. The remaining Grade "B" and "C" seeds were then processed in an expeller to extract oil and it's by product Castor Cake which was again processed to extract 10 to 20% of the oil left using solvent.

Finally, the remaining residue goes into a boiler to be processed into a castor meal. We were able to witness the journey of the castor seed from the silos to the end product which is a rare opportunity for students like us who are only focused on the commercial aspects.

We also met a Graduate Trainee who was on his second rotation. He explained about Adani's Graduate Trainee programme in which he gets to work in 3 different facilities of Adani's for 9 months (3 months rotation each) before settling down for a long-term role. He also talked about his mentor-mentee experience and the freedom given by Adani to their Graduate Trainees to explore their options during the rotation period.

Key Takeaways

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We learnt the technical aspects of Castor Seed Crushing which is rare for students like us who are focused on the commercial aspects of a business. Additionally, it was heartening to learn about Adani Wilmar's efforts of having 0% wastage. For example, the water used by the boiler is later distilled and used for watering the greens in the surrounding area. It showed that Adani's CSR actions are not standalone efforts for raising a good public image but is coherently well thought off and executed by interlinking the various projects.

Adani Real Estate

Overview

Adani Realty is the conglomerate's property development arm and has developed numerous residential & commercial projects.

Shantigram is probably one of India's finest mixed-use townships and despite the recent temporary downturn in the Indian realty sector, Adani Realty has ambitious growth plans. Shantigram promises its residents 'The Good Life' with over 80% of the township being an open area or with a green cover and includes various amenities in close proximity with its residential developments. Adani Realty's emphasizes on harmony with nature and this is evident in the Shantigram's environment friendly features. To date, more than 50,000 trees have been cultivated and there are numerous bicycles available for residents to utilise.

Shantigram is the only township in India to offer a golf course, a full-size cricket stadium with pavilions, an Olympic-size athletic track and football ground. In addition, The Belvedre Golf and Country Club offers impressive facilities such as an infinity pool.

Adani does not have an extensive track record in the real estate segment and real estate is not a key focus area due to its relatively small contribution to Adani's overall business. However, Ahmedabad is rapidly evolving due to the growing urbanization and economic growth. Adani Group's Shantigram offers a modern township that rides on this trend and bolsters the conglomerates footprint in the Indian economy.

Furthermore, Adani Realty benefits from the infrastructure, support and financial flexibility that the conglomerate has. In addition, Shantigram represents a key initiative towards developing an ecosystem that promotes synergy between the companies within the Adani group. For example, Adani Solar's solar

panels are placed on the rooftop of Shantigram's buildings, Adani Gas supplies the residential developments with PNG and Adani Power supplies most of the electrical power required by the township.

Experiences

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We embarked on a tour around the various developments within Shantigram and were treated to a huge display of waterworks at one of the residential's real estate. The magnitude and scale of Shantigram demonstrates Adani's ambition and aspiration to become the leading real estate developer in India. It was a great opportunity for us to understand how Adani's clout helps to shape the lives of the people living in Gujarat.

Key Takeaways

Adani Group's real estate arm provides a means of integrating the conglomerate's organizational capabilities.

Shantigram is the hallmark of the Adani group. It allows it's headquarters to be in proximity with the various commercial and residential developments.

Adani Institute of Infrastructure Management

Overview

Adani institute of infrastructure management (AIIM) was established in 2009 and has been at the forefront of infrastructure management education in a specialized & scientific manner, with its synthesis of research, education, and consulting.

AllM's success is built on an interdisciplinary approach by bringing a systems perspective to grand challenges in areas such as infrastructure, energy, health care, education, and the allied sectors.

The institution is further complemented by faculties who are excited about doing research, teaching, and consultancy in infrastructure and allied sectors. At the same time, have faculties reach out to the practitioners and collaborate with the corporate world to take up problem-solving research. The institution fosters practical and relevant teaching methodology and has a growing alumni network prepared to take on today's challenges and lead businesses into the future.

AllM has dynamically aligned the curriculum to the needs and aspirations of the infrastructure industry so that students with strong academic concepts, analytical and decision-making skills meet the skillsets required to be the leaders in the dynamic world of infrastructure.

AIIM campus provides learning ambience for intellectual excitement, fruitful interaction and professional growth. AIIM is uniquely placed to exploit and leverage synergies with one of India's fastest growing Infrastructure conglomerate – the Adani Group. AIIM students will not only interact with a group of highly distinguished and internationally acclaimed faculty but will interface with the top head-honchos of the sectors.

Experiences

After interacting with the students from AIIM, we observed that the students were not only taught to think critically but they were also nurtured to improve their soft skills. Students from both schools were able to interact with discussions and cultural exchanges during the 45min session.

AllM students are also taught using case studies by Harvard Business School and have very packed school schedules, training their ability to manage multiple tasks as well as to cope and excel under extreme pressure. AllM Faculty are composed of professors with vast levels of experience in different fields. For example, Prof Pankaj Singh is a professor specialized in Management, Strategy and Consulting while Prof Aditya is specialized in Finance.

Facilities provided by the institution give AIIM students a platform for experimental learning. Facilities within the compound include a computer lab, library, 3 seminar rooms and an innovation lab. Distinguished guests from various industries are also invited down to conduct expert talks for students regularly.

Key Takeaways

Adani Group encourages innovation and entrepreneurship spirit within the students by providing them opportunities and state of the art teaching facilities.

Development of the country starts by nurturing the younger generation to be the future leaders of India.

Smart City projects would not be effective if the perception of the population is not receptive of the idea of smart home devices. Change cannot be quick without the acceptance by the people.

Adani City Gas

Overview

Adani Gas is tasked to develop City Gas Distribution (CGD) networks via 2 main areas of business -Compressed Natural Gas (CNG) refuelling stations and the distribution networks to supply Piped Natural Gas (PNG) to Industrial, commercial and residential users. These networks are not just set up in Ahmedabad, but also in neighbouring cities such as Fridabad in Haryana, Khurja in Uttar Pradash and a Joint Venture with Indian Oil Corporation to develop networks in Allahabad, Chandigarh, Daman, Dharwad Ernakualm, Panipat and Udhamsing Nagar.

Experiences

All of Adani Gas' assets are controlled from one main control centre, and we had the opportunity to visit one station. One of Adani Gas' engineers showed and explained how the CNG stations used a complex machine (right) to turn PNG into CNG via high pressure. Next, an operator explained how Adani organised safe and efficient refuelling station at the front end, while keeping

in mind the needs of their customers - many of which are auto rickshaw drivers who rely on the affordable CNG to keep their livelihoods running.

Finally, we were ushered into the Supervisory Control and Data Acquisition (SCADA) room (below) which had a combination of software and hardware that enabled the Adani Group to control the natural gas inputs and output, gather, monitor and process real time data about the consumption of natural gas. This

data is collected from the sensors that Adani Gas installed on various valves, motors and fuel dispensers across India.

The SCADA figures were also colour coded; green for live data, and yellow for data that has not been updated recently. This allows the control centre to make more accurate decisions in real-time. The SCADA team also revealed that there were plans to use the data to improve direct billing, and even budgeting and projections of natural gas use based on historical data.

Key Takeaways

The visit to the Adani Gas distribution network helped the students to understand the importance of the natural gas to the end users - the working class of Ahmedabad.

Adani Gas also revealed that the government views natural gas as a daily necessity, subsidising it by around \$2/MMBtu, for residential and individual vehicle consumption. As a result, CNG is significantly cheaper than petrol and diesel, and also reduces the air pollution for the dense urban population. This also benefits the auto rickshaw drivers, and in turn, the many locals who are reliant on this mode of transport to go to work.

Finally, it is heartening to learn that the technological changes to automate processes in SCADA is ultimately done with the customer in mind - to provide cheaper, more efficient and user friendly services. With the private sector and initiatives complementing government policies, we would expect to see strong growth in the Indian natural gas sector.

Conclusion

Experiences

On the last day of the trip, students from Singapore Management University were able to interact with the brightest minds from Adani Institute of Infrastructure Management, as well as Dr. Malay Mahadevia, the whole time director of Adani Enterprises. Aside from a better understanding of the current Indian corporate culture and business capacity in India's economy, the interaction with the students also provided a glimpse into the next generation of India's leaders' mind-sets and attitude.

It was a humbling experience to interact with Adani Enterprises, its subsidiaries and facilities, employers and employees, professors and students. Singapore's progress may have been fast, but India's progression has been nothing short of a remarkable feat. The sheer sizes and outreach of facilities prove multiple operational constraints which may not have been as evident in Singapore.

Adani Enterprises thirst to grow and heart to nurture a people's community and corporate environment will continue to boost India's growth beyond what it is now.

Recommendations

Given the importance of transhipment with Singapore, it could be interesting to venture or understand how both countries can integrate the services of Singapore's existing transhipment hub, and India's upcoming transhipment port together.

Adani Foundation provides an immersive experience into a developing country's viewpoint from the bottom-up. Singapore Management University conducts multiple overseas community service projects within the school. There could be an integration between both organizations to serve the community.

Interacting with the power station allowed for a brief overview on how coal is managed technically, in terms of logistics, storage, and consumption. Given the shift towards MDO and MoC, the differences in perspective between coal trading and a vertically integrated conglomerate could prove useful to the trading environment, across commodities. Speaking with previous coal traders and currently on-boarded MoC/MDO originators could provide a view on to what exactly is happening.

Natural Gas is a growing interest in the global market with a lengthening market and stricter regulations. It would be of interest to both parties on how Singapore and India could interact and engage in favourable trade on such assets, especially given Singapore's strong LNG bunkering scene.

Given the SMU Merchant's Club's interest in International trade, and finance of sorts, interacting with Adani Singapore on how Singapore could be involved in trading between India, Singapore, and the international market could provide interest to the student body. This extends towards hedging assets, trade finance, and relevant assets in the region, including Wilmar facilities.

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Credits

- Adani Group
- SMU, International Trading Institute
- Singapore, Enterprise Singapore
- SMU, Merchants Club

Writeups

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- Charles Chan (Collaborator and Editor)
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- Alvin Tan
 - Adani Foundation
- Quak Ngeekiat
 - Thermal Power Station
- Desmond Lee
 - Solar PV Manufacturing
- Kimberly Yee
 - Adani Wilmar Refinery
- Sendil Sivakumar
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- Isaiah Lim
 - Adani City Gas