

A 3 One of the best I've seen.

B 3 Excellent variety

C 2 Some weakness in application
for RQ, but still good

D 5 Strong

E 2 Substantiation is weak, but
skill in 2 bnd

F 2

G 2 } Structure/pres/n excellent.

H 2

I 1 } Superficial Tot. 22/25

**What is Cummins doing to address the challenge of future
electric engine sales in small trucks and urban vehicles
which currently use diesel and natural gas engines largely
supplied by Cummins?**

INTERNAL ASSESSMENT

BUSINESS AND MANAGEMENT HL

SESSION MAY 2019

(Word count: 2,000)

Word count?

RESEARCH PROPOSAL

Research Question:

What is Cummins doing to address the challenge of future electric engine sales in small trucks and urban vehicles which currently use diesel and natural gas engines largely supplied by Cummins?

1. Methodology

For this research project, I will be doing primary as well as secondary research, but focusing on primary as a higher level student. For the primary research, I will be reviewing press releases by Cummins from their websites. These reports will include information on my topic and how the company is going about electrification. Also, I will be reviewing the annual report, and the report that they file with the SEC (security and exchange commission). The SEC is a government agency wherein all of the companies that have shares sold on the stock exchange have to report to the SEC. As for interviews, I will first identify Cummins persons to be interviewed who can discuss the challenge of electrification in urban markets. The best way to get an interview is to discuss their strategy on electrification. Moreover, I will identify how to get an interview with the people working in electrification. Next, I will write questions to ask in the interview, and finally interview Cummins managers. As for secondary research, I will be reading analysts reports on Cummins, as well as interviewing stockbrokers and analysts regarding Cummins' challenge. Lastly, I will research Cummins' competitors by reading books, articles, and press releases about the companies.

1. Anticipated difficulties

Some anticipated difficulties I have may have during this project could include identifying the key Cummins managers who have the knowledge and are the best to interview. The way to get over this difficulty is looking at press releases, and doing internet research to find who is responsible for electrification in Cummins. A public company like Cummins has a public relations person who is available to answer questions from the public. That person's name is available on the web site and press releases. I will be in touch with that person to help me. If that does not work, I will try to identify Cummins employees in Columbus who can help me. I will check with my parents' friends and my friends' parents to identify the Cummins employees who can help me. Another difficulty could be getting an interview as the managers whom I need to interview have very busy schedules. This is a difficulty because I am in Indianapolis, and Cummins is based in Columbus, which is one hour away. This creates an issue in setting a time that is convenient for both parties. I can suggest that we meet on a Saturday or in the evening, or possibly conduct an interview over the phone or by email. Because Cummins is a public company, it has to give reports to the SEC about

Lol

Arguable. Depends on
 nature
 of info,
 company
 policy

challenges such as electrification. Cummins cannot give me any confidential information that they have not reported to the SEC. However, I will have access to all information that is public. Lastly, identifying which secondary resources to use could be difficult. To get over this, I can go online and see who are the analysts who are writing on Cummins, and email or call them to schedule an interview. These analysts recommend stock purchases and sales. They are always willing to talk to whoever is interested in the company. If I have a problem with the analysts, I will visit the brokerage companies in Columbus and ask for help. These companies follow Cummins stock and recommend their sale or purchase, so they are knowledgeable about Cummins. To avoid procrastination with my project, I have set deadlines for myself and these deadlines are in my calendar.

1. Action plan

Excellent.

Deadline Dates	Primary Research	Secondary Research	Draft
OCT 15	Identify Cummins managers for interview		
OCT 19	Go to cummins.com and read press releases and any other information on Cummins electrification in the urban market		
OCT 22		Identify secondary sources online	
NOV 16	Schedule interviews		
NOV 23	Follow up on info received from interviews if necessary	Follow up on secondary sources	
NOV 30			Writing draft
DEC 7			Receive input
DEC 17			Rough draft
FEB 5			Final draft

ACKNOWLEDGMENTS

I want to thank Julie Furber for helping me understand what Cummins is doing in the area of electrification and how electrification is one option in a full range of power options to be offered by Cummins to reduce pollution.

Thanks to Premlata Poonia for explaining the technical aspects of what makes a vehicle run and how important the natural gas option is in the waste refuse market.

Thank you to Scott DeDomenic for his unbiased big picture view of the truck industry and how Cummins fits in to it.

TABLE OF CONTENTS

	Page
1. Executive Summary	3
2. Introduction	4
3. Methodology	5
4. Findings	7
5. Analysis	8
6. Conclusion	12
7. Recommendations	13
Appendices	15
Works Cited	26

Internal Assessment

1. Executive Summary

Cummins provides diesel and natural gas engines in the urban markets for vehicles such as delivery trucks, buses, and garbage (refuse) collection trucks. It has 80% of the urban truck market¹ and 90% of the urban bus market². As electric power technology develops, urban centers will move to electrification to reduce pollution. Over the years, Cummins' business in this market will have to change to keep up with the new technology available to reduce pollution in this market.

My research question is: What is Cummins doing to address the challenge of future electric engine sales in small trucks and urban vehicles which currently use diesel and natural gas engines largely supplied by Cummins?

(Three primary and several secondary sources were used for the research.)

Very
shorty
research!

Major findings:

- Cummins sells only diesel and natural gas engines, and relies on customers to ask for its engine when purchasing a truck.
- It has invested in research and development to produce cleaner engines and a distribution system to provide excellent service to stay ahead of its competition.

¹ See Appendix 1

² See Appendix 11

- Cummins is already working with customers in urban markets to provide little or no emission diesel/natural gas engines. It has a major share in this market.
- Cummins has devoted financial and personnel resources for electrification. Its strategy for the future is to offer electrification as one choice in a full range of options from all diesel/natural gas to all electric with combinations in between depending on the needs of each customer. If and when customers demand electric engines, Cummins will be ready to meet the need.
- A weakness in the Cummins strategy is that it has a 100-year history of providing the best diesel and natural gas engines in the industry. It may be a challenge for Cummins to be accepted as a company providing new electrification options. Also, there is no assurance that the new technologies will be commercially successful.
- Another challenge for Cummins will be to train employees/service technicians as it transitions from a diesel company to one offering many more options.

One limitation of the research is the lack of information about and evaluation of Cummins' competitors.

2. Introduction

Cummins was founded in 1919 as a small machine shop in Indiana³. Today it is the largest manufacturer of diesel and natural gas engines in the world. In 2017, Cummins had sales of \$20 billion, and cash flow from operations of \$2.3 billion⁴. Cummins operates in 190 countries and has 7,400 dealers all over the world⁵. Cummins makes diesel and natural gas engines for on highway and off highway markets. It also provides back up electrical generator power for hospitals, defense, data centers, etc. An important business for Cummins is providing diesel and natural gas engines in the urban markets for short haul vehicles like delivery trucks, buses, garbage trucks, etc. Cummins' strategies is to develop electrical power options in all of its markets. My research involved using primary and secondary sources to understand how Cummins will meet the future electrification needs of its urban customers and continue to maintain its major market share in this market.

For this project, the Business Management book was helpful⁶. The relevant sections were: Entrepreneurship, Corporate Social Responsibility, SWOT Analysis, Joint Ventures, Strategic Alliances, Corporate Culture, Profitability Analysis, Market Segmentation, International Marketing and the 7Ps.

3. Methodology

³ See Works Cited 1

⁴ See Appendix 5

⁵ See Appendix 9

⁶ See Works Cited 2

Maybe a
bit much -
better to
fully exploit
3 or 4
than three
in the "kitchen
sink".

Reading several secondary sources started the research. This helped identify the right person at Cummins to interview. They were Julie Furber and Premlata Poonia. Both were contacted and they agreed to be interviewed⁷. Scott DeDomenic from Hilliard Lyons, a brokerage company in Columbus, Indiana agreed to an interview⁸. These interviews helped confirm the information from the secondary sources about Cummins' competitive advantage with current and future technologies. The secondary sources were critical in understanding the company. This helped with framing better questions in the interviews. The book, *The Engine That Could*, explained how a small Indiana company became one of the largest companies in the country⁹. However, without talking to customers and competitors, the research may not present the total picture of the Cummins story.

4. Findings

Cummins started off as a small company. When the application of diesel engines was found (for the truck market) in 1919, Cummins started selling its engines to truck manufacturers that made their own gas engines¹⁰. Cummins does not produce trucks in which engines are used. Unless a customer asked for a Cummins engine, the truck manufacturer would install its own engine in the truck. Cummins' product had to be superior so that the truck user would ask for a Cummins engine in the trucks.

⁷ See Appendix 1 and 2

⁸ See Appendix 3

⁹ See Works Cited 1

¹⁰ See Works Cited 1

Over its 100-year history, Cummins has succeeded as a disrupter of technology by developing state of the art technology. Cummins has always tried to stay ahead of the competition, and made substantial investments in research and development so that its customers will continue to demand its engines. Cummins has invested in research in its core business of diesel technology to make “clean” engines. Cummins is now the largest manufacturer of natural gas engines which have “near zero” emissions. Ninety percent of buses in North American urban markets have Cummins natural gas and diesel engines. Cummins is also investing in other technologies, such as electrification. It has been working on electrification for over 10 years now. Three years ago, Cummins set up a separate division to work on electrification with Julie Furber heading this division. Cummins plans to spend \$500 million in the period 2018 to 2020 for the electrification option¹¹. In 2017, Cummins purchased Brammo, which designs and develops battery packs for energy storage¹². In 2018, it purchased Johnson Matthey's battery system division¹³. In July 2018, Cummins purchased California based Efficient Drive Inc (EDI) with expertise in hybrid power trains¹⁴. By purchasing these companies, Cummins gets faster access to proven technology for the electrification option. As Julie Furber states, batteries and power train are critical parts of the truck electrification option and Cummins' purchase of these

¹¹ See Appendix 1

¹² See Appendix 14

¹³ See Appendix 16

¹⁴ See Appendix 17

companies shows its commitment to having the best electrification components. That way the product will be more reliable¹⁵.

Cummins has developed an excellent distribution network to service its engines when needed. It has also worked closely with suppliers to get the best quality materials so that the engine does not breakdown due to inferior engine components. It has a 100-year history of working closely with customers, distributors, and suppliers.

As Julie Furber has stated, Cummins' strategy is to offer a full range of power options in the urban market from all diesel/natural gas to all electrification and combinations in between depending on customer needs¹⁶. Cummins is confident that it will be ready to meet the future demand of customers in the urban market.

Cummins faces challenges in the electrification option. It does not have a proven history in electrification and there are risks of failure with new technologies. Also, Cummins has to transition from a diesel/natural gas company to a company offering a full range of power options. Cummins is aware of this challenge and is training personnel for this transition.

5. Analysis

¹⁵ See Appendix 1

¹⁶ See Appendix 1

Since its founding, Cummins had to convince customers to purchase its diesel engine for the truck that the customer bought from the truck manufacturer¹⁷. Cummins does not produce trucks. The truck manufacturer also sold its own brand of engines, but because the purchaser of the truck wanted a Cummins engine, the truck manufacturer had to offer a Cummins diesel engine instead of its own engine. Cummins' largest competitors are also its largest customers. The customer has been an important stakeholder for Cummins since its very early years of existence. Cummins' strategy in its markets is geared to meeting the individual needs of customers in its different markets. As Premlata Poonia states, fleets in the residential waste collection market have invested in the natural gas option. Cummins' "NearZero" natural gas engine is the cleanest engine in the market. Investing in electrification will require new investments. These fleets will have to weigh the benefits of cleaner electrical options versus the investments required for this option¹⁸. Cummins' strategy is to provide a full range of power options depending on where the customer is in updating its needs, the infrastructure available in that market and cost. It will offer a full diesel/natural gas option at one end of the spectrum, and a full electric on the other with several combinations in between. Cummins' focus for a hundred years has been providing power options for trucks and equipment. Cummins is the only company with this experience, which is an advantage over competitors like Tesla¹⁹.

¹⁷ See Appendix 3

¹⁸ See Appendix 2

¹⁹ See Appendix 1

) Good point

Cummins is also working closely with suppliers and distributors to prepare for the changes ahead. For about 50 years, Cummins has been working with bus suppliers GILLIG that is a leading bus manufacturer in the US. In addition to the Cummins diesel and natural gas options, GILLIG will offer Cummins electric option in 2019.

Cummins has been training its own employees as well as staff in its distributor network to provide quality service in the additional technologies as it introduces new products. As power options change in the future, Cummins recognizes the importance of training of all its employees and service providers.

Cummins' financials are strong. It can continue to invest in future technologies including electrification without hurting its balance sheet. In a presentation to shareholders in 2017, Rich Freeland, the COO of Cummins, provided charts that showed the strength of Cummins' financials²⁰. As the charts show, Cummins Return on Invested Capital (ROIC) is in the top quartile when compared with its peers. Its revenues have increased from \$19.1 Billion to \$20 Billion in 2017. Return on equity has increased from 17% in 2015 to 21% in 2017. If profits decline, Cummins can defer its investments without hurting its electrification strategy. As Scott Dedominic of Hilliard Lyons states, Cummins can also reallocate its net cash flow to continue investing in new technologies²¹.

²⁰ See Appendix 5

²¹ See Appendix 3

The following chart summarizes my analysis of Cummins' strengths, weaknesses, opportunities and challenges.

Internal	<p>Strengths</p> <ul style="list-style-type: none"> • Only company focused solely on power options for vehicles for 100 years. Understands customer needs • Leader in technology • Strong urban presence – already working in urban markets to reduce pollution • 100 years of close working experience/good relationships with customers, distributors, and suppliers • Only company offering full range of power options in urban markets • Strong balance sheet 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Customers may view Cummins as a “diesel company” • New technologies may take longer to develop • Profits could decline putting pressure on future investments in new technology • Training is needed for employees and distributors as it transitions to offering additional power options
External	<p>Opportunities</p> <ul style="list-style-type: none"> • Strategic alliance with suppliers of electrification technology for urban markets • Take market share from competitors not offering as many power options in urban markets • New markets for 	<p>Threats</p> <ul style="list-style-type: none"> • Doesn't produce vehicles for urban markets • Customer/competitor could refuse to use Cummins' power option • New competition like Tesla may emerge in urban markets

	new technologies in urban markets	
--	-----------------------------------	--

(avoid splitting table between pages)

6. Conclusion

Cummins has a proven history of meeting technology challenges. Initially, the assumption was that diesel engines polluted the environment and that electrical engines would have to replace diesel engines in the urban market. It was quickly discovered that Cummins is making "clean" diesel and natural gas engines that are already being used in urban markets and are helping urban market with reduced pollution²². Cummins has stayed ahead of its competition by developing technology for the future. For the past 10 years, Cummins has been working to meet the electrification challenge. In the last 3 years, it has invested heavily in electrification technology and personnel.

Cummins recognizes that each customer in the urban market has unique needs. It is committed to helping the customer evaluate its needs and offer a solution from a full range of pollution reducing options. Cummins appears to be the only company that can offer a full range of options in the urban market. This is a competitive advantage for Cummins. With a strong balance sheet, and strong financials, Cummins has the financial resources to meet the challenge of electrification and accomplish its objective of staying the market leader in the urban market.

²² See Appendix 10

Cummins' weakness is that its previous experience has been in a different technology i.e., diesel and natural gas engine. Cummins has stated that the electrification products have to be of the highest quality before their introduction in the market²³. Investment analysts who follow Cummins and its competitors give Cummins excellent reviews²⁴ and are confident about Cummins' future in the urban markets.

7. Recommendations

I recommend that Cummins continue its aggressive investment in electrification technologies. → never address financial ROI on electric vs. Improved NG/Diesel.

Cummins needs to bring all its employees along to become excited about working with new products. This will require a lot of training and reeducation. As Cummins acquires companies with new technologies, it needs to make sure that the corporate culture and values are the same. The distributors need to be included in the critical decisions and training for new products.

In the past, Cummins has done an excellent job with suppliers. Cummins should continue to work closely with its new suppliers to make sure that the quality of the final product lives up to its reputation.

²³ See Appendix 1

²⁴ See Appendix 3

Cummins should do a better job of educating the public about its success in reducing pollution. With the US withdrawing from the Paris Agreement, young people like me should be informed about the work that companies like Cummins are doing to reduce pollution. Perhaps telling the Cummins story in universities would be a good place to start. Some of these students could one day be Cummins employees, customers, suppliers, community members, shareholders or regulators.

For my future research, I would like to do research on a Cummins' competitor.

APPENDICES

1. Interview with Julie Furber of Cummins

INTERVIEW WITH JULIE FURBER
EXECUTIVE DIRECTOR, ELECTRIFICATION, CUMMINS, INC
COLUMBUS, INDIANA EXECUTIVE OFFICES
OCTOBER 18, 2018

ELECTRIFICATION OF URBAN MARKETS

Urban centers are focusing on reducing pollution from cars and trucks. Cummins press releases indicate that Cummins diesel engines are 80% of the urban truck/bus market.

As urban centers move towards electrification to reduce air pollution, Cummins sales of diesel engines in this market will be affected.

1. What are the different vehicles in the urban market that currently use diesel engines?

ANSWER: The urban market uses any truck type applications, refuse trucks, pick up and delivery trucks, buses (school and transit) class 6 trucks and above. Class 6 and 7 are medium duty trucks and class 8 are heavy duty on-highway trucks, construction equipment, mobile cranes, material-handling equipment, emergency vehicles.

2. Are the vehicles in the urban market moving towards total electrification or hybrid?

ANSWER: There is a variety—on the whole the trend is towards total electrification. However, hybrid – diesel/electric – has a place because it offers flexibility and it can be cheaper overall.

3. It appears that Cummins is serious about addressing this challenge. A new department has been created headed by you, Ms Furber. What is Cummins strategy to maintain its market share in each of these areas?

ANSWER: Cummins wants to be a leader in electrified power and in all markets, with engines having the best in class products. Cummins will offer the best in class service and support. Just like now we will look after our customers and they have our trust. We will offer power solutions to customers and they can select electric power, although in the past it has been diesel power.

4. How much is Cummins investing in the new electric technology and what is the timeline for implementation?

ANSWER: We will spend 500 million dollars over the next 3 years (2018-20). We now have a fully developed school bus product. This urban/transit bus will be launched at the end of next year (2019)

5. Why is Cummins buying battery companies instead of purchasing batteries from suppliers? Recently, Cummins has also bought EDI which makes electric and hybrid drivetrains.

ANSWER: When Cummins started looking into the strategy, we looked at both options. Currently all of our major customers make engines, but Cummins has deeper engine capabilities than anyone else. We make and design filters, turbos, etc. engines are truly designed to be the best in class. As batteries are a core component of the electric power system, and have a larger influence on how it works in the urban environment and in what configuration, Cummins wanted to develop their own packs. Cummins went out and bought two battery companies to get that capability. The ability to have best in class components and sub-systems is part of the strategy. That way the product is more reliable.

6. Who are Cummins competitors in this market and what is their strategy?

ANSWER: Our competitors are original equipment manufacturers (OEMs) who make trucks, buses, etc. We sell to OEMs. Our other competitors are Tesla, Proterra (electric buses), smaller companies like EDI who develop electric power trains. Where they fall short is mass production, Tesla is struggling with this even though it is not such a small company. Other competitors are: Bosch, Maritere, battery suppliers, and axle suppliers.

7. What are Cummins advantages and disadvantages compared with the competition?

ANSWER:

Advantages-

- Products will be better as Cummins knows the market and has electric technology.
- Note the following:
 - Our only focus has been on powertrain for 100 years. We know the market.
 - We understand the power application for vehicles better than anybody
 - We know how an excavator needs to work, how buses need to work, etc.
 - We know how people want to use them
 - We offer the powertrain of choice:
 - People are going to need all sorts of solutions whether its diesel, electric, etc.
 - Cummins will offer a wide variety of power solutions
 - Scale

) Food
Question

- Scale of development: we can develop a product that is ideal for different markets
- Scale of production: we know how to produce thousands of high quality engines every day
- Security of business
 - We have been doing this for 100 years
 - If there is an issue, we will stand behind the customer and help
 - Wherever the customers are in the world, we can get support for them
 - We have great relationships with customers

Disadvantages- breaking away from the reputation as a diesel engine company

EFFECT ON DISTRIBUTION SYSTEM

Cummins has built up a reputation as leader in the truck power business. One of its greatest assets is its world-wide distribution network that services its products all over the world.

1. What are the challenges in maintaining its current reputation for quality and service?

ANSWER: The electric power products are new, fairly unknown and immature. People ask: "Aren't you being slow?". No.

- When Cummins electric power product launches it will be of the best quality
- We have to continue to not being pushed into producing a product too soon before its ready
- Product dependability is critical, going through the right cycles and processes to make sure it is the best quality product

2. How does Cummins plan to maintain its reputation in this new business?

ANSWER:

- We don't have to do things in a hurry. We will make sure we have standard ways of working
- We will leverage speed and agility without losing the core values of high-quality products

3. Will Cummins use the same distribution network for its electric power products?

ANSWER: Yes, we will retrain technicians and customers will like having the one stop shop to get service for diesels and electrics.

4. Since batteries do not require regular service like diesel engines do, will Cummins distributors make enough money from electric power products?

ANSWER: Services will be different -

- How will I charge my buses, etc.

- Cummins will be helping with infrastructure to charge trucks, buses, etc.
- Things can go wrong mechanically. Maintenance will be less but customers will still need Cummins to help keep the equipment running

IMPACT ON REVENUES & PROFITS

As Cummins sells electric power products, Cummins revenues and profit will be affected.

1. What is the effect of electrification on future product mix?

ANSWER: Adoption will vary in different sectors, and bus market will be fastest growing market. We expect 10% of bus market will be electric. Delivery trucks and medium duty trucks will be slower in adoption. Less than 1% of the market will be heavy duty truck. 5-6% of medium duty trucks.

The upfront cost is very different. Buying an electric powertrain is very different from diesel engines.

Upfront revenues will be higher per electric power unit. We will maintain profitability level and over time it will increase.

2. How much do the sales from the vehicles affected contribute to total Cummins revenues now? Will the revenues from electrification of this market increase as a percent of total Cummins revenues or decrease?

ANSWER: Market pricing for electric power isn't established yet – we are still trying to establish that.

The revenues are so tiny now that they do not even register – \$10million.

We don't have any sales today, but revenues will grow quickly.

3. As Cummins is transitioning from diesel power to electric power, will Cummins profits be affected?

ANSWER: Don't think so. In these early days market pricing hasn't been established. Hopefully we will improve margins which is why Cummins has invested in a large part of the powertrain.

We will get the returns that are proportional to the value we are adding to the customer's business. Also, significant parts will enable us to achieve higher profits.

2. Interview Premlata Poonia of Cummins

INTERVIEW WITH PREMLATA POONIA*
VOCATIONAL SEGMENT MANAGER, ENGINE BUSINESS, CUMMINS, INC
NOVEMBER 4, 2018

1. My understanding is that your area of responsibility is marketing and selling in the waste truck engine market. What % of this total market has diesel engines? What % is electric and/ or hybrid?

ANSWER: Yes, refuse market is one of our Vocational markets. Currently, for the residential waste collection market, 50-60% engines are diesel and rest 40%+ are natural gas.

2. What is Cummins' share of this (waste truck engine) market?

ANSWER: For residential waste collection, we look at the market in terms of heavy duty and medium duty engines. For medium duty, we have 80%+ share and for heavy duty its below 50%.

3. Who are Cummins competitors in this market?

- 4.

ANSWER: The other engine manufacturers for this market are Mack, Paccar, and Detroit Diesel.

5. What do you hear from your customers regarding their plans for electrification? What is driving electrification?

ANSWER: The residential waste collection market is unique in the way that it has been an active adopter of Natural Gas. The big fleets in this market invested heavily into building the natural gas infrastructure. Some of the landfills feed back into the fueling process. The current version of NearZero NOx Natural Gas engines is the cleanest engine available anywhere. Hence the industry is cautiously watching electric adoption and the battery cost involved. There is an interest in the technology but fleets would be cautious to see the delta of cleaner electric vs the new investment required. Heavy government incentive or regulation may push for a faster adoption.

6. Does Cummins have an electric option in this market?

ANSWER: We have some battery offerings that truck manufacturers could utilize if they plan to integrate electric for the market in short term.

7. What are Cummins advantages and disadvantages as it moves to electrification in this market?

ANSWER:

The biggest Cummins advantage is that we understand the needs of this application in terms of duty cycle, usage, driver behavior. We have been serving the market for decades. This understanding of the application helps us provide a product that can succeed in the challenging duty cycle of refuse. That coupled with the wide service network should give customer more confidence in Cummins ability to support as we move into electrification.

The disadvantage is the unknown that comes with any new technology. There are multiple moving pieces such as the learning curve for Cummins, OEMs, customers, regulators, and the adoption process itself. We will have to move at a pace that rest of the eco-system is moving.

8. Cummins has been a leader in the diesel engine business for 100 years. What does Cummins need to do to become a leader in the electric option?

ANSWER: Cummins is already heavily investing into both organic and inorganic growth to be ready to serve markets through various technologies. Cummins has acquired various battery technology companies, and is investing in developing the talent base that can support the newer technology. That coupled with current business teams, processes, and understanding of global market/customer, Cummins is positioned well to serve customers as the electric gets adopted.

* In addition to interview, Ms. Poonia provided written answers.

3. Interview with Scott DeDomenic of Hilliard Lyons

INTERVIEW WITH SCOTT DEDOMENIC WEALTH ADVISOR, HILLIARD LYONS
STOCK BROKERS AND WEALTH MANAGERS
COLUMBUS, INDIANA OFFICE
NOVEMBER 28 2018

1. Cummins strategy is to provide the full range of options for powering from diesel to all electric, including hybrids. Is that a good strategy in your opinion?

ANSWER: Cummins has done this for years – been involved in things such as natural gas, and for years they were involved with electric/hybrid engines. It's a niche market – this trend of working on electrics and hybrids is a continuation of what they've done for 25 years. They tried hydrogen powered trucks, compressed natural gas trucks but these technologies never took off. So, Cummins has always been on the forefront of new technologies. They are not following one strategy; it's a continuation of being an innovator in their industry.

2. Is Cummins investing enough on electrification (\$500 million over 2018 – 2020)?

ANSWER: It depends. Cummins approach is if they see good results and they receive profits or anticipate profits in the future, the investment is adequate. In any case, they have more funds to invest in this area – they already invested \$600 million with Eaton company. We know diesels are currently on the road, and there is a demand for diesel power now. Cummins right now has a policy where they are paying out the majority of their free cash flow to their shareholders. In other words, they could invest more in new ventures and research if they needed to.

3. Who are Cummins competitors in the urban markets (buses, small and medium duty trucks, garbage trucks)? What is the strategy of Cummins competitors?

ANSWER: Today Cummins provides diesel engines of various horsepower sizes for all markets. The current urban market strategy is for Cummins to keep on providing the diesel engines into this market which is of the right horsepower. What would be different with electrification is that Cummins would be providing the truck and the engine which is a change in strategy for the company. Right now, they are competing against companies such as PACCAR which results in an odd relationship with Cummins as PACCAR makes Kenworth on-highway trucks powered by Cummins. In this case, Cummins provides engines for PACCAR in their larger on-highway trucks, but PACCAR also makes small trucks for the urban market with their own

smaller diesel engines in it. So, in this case, Cummins competitors are also their customers! It's not clear because of this case. It gets confusing where electrification requires a vehicle so Cummins provides the truck itself which is where there is a big change in their company because for years they have stayed away from making their own trucks. Cummins is focused on electrification and currently Tesla is their main competitor.

4. What are Cummins competitive advantages?

ANSWER: Cummins has been a leader in this market since the 1920s almost 100 years. Their experience, willingness to go out and try new technologies and have facilities to test technologies is their basic strength and results in competitive advantage.

5. What will be the effect on Cummins profits?

ANSWER: In the short-term, research and development expenditures are like losses. For example, Cummins power-train technology has a loss of \$30 million. But, long term it will recoup this investment and make profits on top of that.

6. Cummins has been a diesel engine company for almost 100 years (1919 – 2018). It has a reputation as a leader in diesel technology. Do you think it can successfully transition to a company that offers electric technology in addition to diesels? Will it be a leader in that field?

ANSWER: It can transition – Caterpillar company used to compete with Cummins. Caterpillar made diesel engines for their construction equipment, but they also sold engines for on-highway trucks. In 2008 Cummins put them out of business with their technological superiority where Caterpillar engines could not compete with Cummins. Cummins has a history of using technology to become the leader in the field and pushing companies out of the market. Even as a manufacturer of one component (i.e. diesel engine) of an equipment, Cummins has had a pattern of gaining market share.

4. Claire Martin, Which Major Cities are Leaders in Reducing Greenhouse Gas Emissions? Smithsonian.com magazine (March 7, 2013)
[https://www.smithsonianmag.com/science-nature/which-major-cities-are-leaders-in-reducing-greenhouse-gas-emissions-857410/.](https://www.smithsonianmag.com/science-nature/which-major-cities-are-leaders-in-reducing-greenhouse-gas-emissions-857410/)
5. Analyst Day Presentation by Cummins (Nov 16, 2017). <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9Njg0NjAwfENoaWxkSUQ9Mzk0NTMxfFR5cGU9MQ==&t=1>.
6. Janina Lazo-Cruz, Cummins Chooses India to Invest \$500 Million to Develop Electric Power Train Manufacturing, The Green Optimistic Magazine (Feb 20, 2018). [https://www.greenoptimistic.com/cummins-india-electric-powertrain-manufacturing-20180219/.](https://www.greenoptimistic.com/cummins-india-electric-powertrain-manufacturing-20180219/)
7. Fred Krupp, Cummins CEO Says Innovation, Sustainability and Regulations are Good for Business, Forbes Magazine (April 18, 2018)
[https://www.forbes.com/sites/edfenergyexchange/2018/04/18/cummins-ceo-says-innovation-sustainability-and-regulations-are-good-for-business/amp/.](https://www.forbes.com/sites/edfenergyexchange/2018/04/18/cummins-ceo-says-innovation-sustainability-and-regulations-are-good-for-business/amp/)
8. Charged EVS, Electric Vehicles Magazine (October 3, 2018)
[https://chargedevs.com/features/cummins-the-diesel-engine-powerhouse-has-had-a-busy-year-expanding-its-ev-systems-development/.](https://chargedevs.com/features/cummins-the-diesel-engine-powerhouse-has-had-a-busy-year-expanding-its-ev-systems-development/)
9. Cummins Press Release, Cummins Positioned for Growth and Leadership in New and Emerging Technologies, (June 15, 2017)
[http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2281146.](http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2281146)

10. Cummins Press Release (September 25, 2017): Cummins' Technological Leadership on Full Display at North American Commercial Vehicle Show:
<http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2302717>.
11. Cummins Press Release (September 27, 2017): Cummins Uses Clean Technologies to Help Major Global Cities Reduce Pollution and Improve the Environment: <http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2303119>.
12. Cummins Press Release (October 6, 2017): Cummins to Feature Electrified Power for Transit Bus for First Time at APTA:
<http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2305167>.
13. Cummins Press Release (October 9, 2017): Gillig and Cummins Announce Electrified Power Partnership at APTA:
<http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2305348>.
14. Cummins Press Release (October 16, 2017): Cummins Announces Acquisition of Energy Storage Technology:
<http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2308850>.
15. Cummins Press Release (November 20, 2017): Five Things About Electrification You'll Only Hear From Cummins:

<https://www.cummins.com/news/2017/11/20/five-things-about-electrification-youll-only-hear-cummins>.

16. Cummins Press Release (January 1, 2018): Cummins and Johnson Matthey
Expand Efforts in Electrification:

<http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2329395>.

17. Cummins Press Release (July 2, 2018): Cummins Announces Acquisition of
Electric and Hybrid Powertrain Provider:

<http://investor.cummins.com/phoenix.zhtml?c=112916&p=irol-newsArticle&ID=2356826>.

18. Tesla Press Release (December 1, 2018) Tesla Semi production to Earnestly
Begin by 2020: <https://www.teslarati.com/nasa-moon-to-mars-mission-2-6-billion-contract/>.

19. Morning Star Equity Analyst Cummins Report August 3, 2018.

WORKS CITED

1. Jeffrey Cruikshank & David Sicilia, The Engine That Could: Seventy-Five Years of Values Driven Change at Cummins Engine Company (1997).
2. Peter Stimpson & Alex Smith, Business Management for the IB Diploma (2015).