ARCELORMITTAL PROJECT

EDSGN 100

Section 016

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Abstract

The production of steel is very important considering the fact that is a material commonly used in our society. The problem is that the process the steel has to go through in order to be used leaves waste behind. Companies all around the world are aware of the damage that the waste they are producing can cause to the environment. Everyday big piles of waste leave factories ending up on fields and because the waste doesn’t have use the only thing that does is create garbage. For this is imperative to find a way to reuse or recycle the waste that the steel process is leaving behind

Customer needs

The customer needs of the company ArcelorMittal is to reduce waste products at one of its facilities. The reduction of the waste products came about through finding an innovative way to reuse and recycle the source of refuse. Our design project satisfies the customer needs of the company in that it creates useful end result products that can be used by the company in its production processes.

What are we recycling?

Our design project is created to recycle plastic totes, steel drums, wood pallets, and lumber. The steel drums are not going to be recycled, but they are going to be reused to store the recycled materials produced by the KDV which is the diesel. Plastic totes, wood pallets, and lumber are going to be the materials going into the KDV, and producing the end product diesel.

Mission Statement
Find a way to reuse or recycle waste materials. Design an idea that will help reduce ArcelorMittal’s waste footprint

**KDV Technology**

The KDV process (catalytic low pressure depolymerisation) converts input material containing hydrocarbons (for example all kinds of waste, plastics, biomass etc.) into high quality synthetic fuels such as diesel, petrol and jet fuel. The KDV technology is environmentally friendly and economic.

**KDV Process**
For the KDV to work efficiently catalysts are used in order to fasten the reaction the
catalyst used is crystalline sodium aluminum silicate. The composition of the catalyst 1st
worldwide patented.

The turbine used is also worldwide patented and it looks like as followed.

The turbine is used to generate heat required for the reaction.

**Advantages of the KDV process**

- The highest energy efficiency (up to 80%) No gas emissions
- Neutral CO2 balance by using of biomass
• Low process temperatures (about 350 °C)
• No dioxins and furans
• Significant reduction in volume of waste
• High safety of the production process
• Scalable plant size

Diesel Production

The KDV-150 can produce about 279,720.27 gallons of diesel per year. At that rate, the cost of the diesel it produces is about $0.95 per gallon. The current cost of diesel is $2.87 per gallon. In a year, cost of diesel produced is $264,615.38 while the retail diesel is $778,741.23. This is a savings of $514,125.87 per year. Since the KDV-150 costs about $6 million, the investment can be returned in about six or seven years. The diesel produce is of high quality (cetane 60), and is great for the engines in trucks and trains that are used in ArcelorMittal’s fleet.
Results

Results of this process are the high quality fuel and diesel that is the most valued resource in today's world.

As the company uses diesel for a lot of things in their day to day work such as for machines like trains, trucks, digging machines etc. instead of buying the diesel from outside company they can buy the KDV and make their own diesel. And this is profitable as explained in the report.
Equipment

Auger Compactor- $8,000

In order to start the KDV process, the waste has to go first through an Auger Compactor. What this machine does is shreds the waste and prepares it to fit on the KDV without damaging the machine or slowing the process of elaboration of diesel. The Auger compactor works with all sorts of materials in the case of our project it will work perfectly with lumber, wood and plastic. This machine is well known in different industries and also liked for its different features, one of them and the one that called our attention the most is that it is green to the extreme, and it reduces carbon footprints up to 400%. The Auger Compactor doesn’t create a mess and it does not cause oil spills.

Conclusion

The KDV system will uses waste of the steel mill to create an eco-friendly fuel source. This will lower the need to throw away a large quantity of waste products, while saving money for the company in the long run. This process meets the needs of ArcelorMittal by reuse and recycle what is piling up in their mills, while lowering their operation costs. The KDV system is a clean process, so it will satisfy ArcelorMittal’s goal of being environmentally sustainable.
References

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