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DEPARTMENT OF PETROLEUM AND NATURAL GAS ENGINEERING

PETROLEUM INDUSTRIAL UNIT

FROM WASTE TO WATTS: TRANSFORMING FLARED ISOPENTANE AT ATUABO GAS
PROCESSING PLANT INTO CLEAN POWER GENERATION FOR GHANA

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PROJECT PROPOSAL: From Waste to Watts: Transforming Flared Isopentane at Atuabo Gas Processing Plant into Clean Power Generation for Ghana.

INTRODUCTION

Atuabo Gas Processing Plant (GPP) plays a crucial role in supplying natural gas for various applications. However, during this process, a valuable hydrocarbon gas, isopentane, is often flared, representing a significant waste of resources and a negative environmental impact. This research project proposes to investigate the feasibility of capturing and utilizing this flared isopentane for power generation. This approach has the potential to:

- **Reduce environmental impact:** Eliminate harmful emissions associated with flaring, contributing to improved air quality and climate change mitigation.
- **Optimize resource utilization:** Effectively utilize a currently wasted resource, promoting sustainable energy practices.
- **Generate clean power:** Introduce a cleaner-burning alternative fuel source for power generation, contributing to a more sustainable energy mix for Ghana

Objectives:

- Design and optimize a power plant configuration suitable for utilizing captured isopentane, considering factors like fuel properties, efficiency, emissions, and scalability
- Evaluate different technical options for capturing, storing, and transporting isopentane to the power plant, ensuring safety, efficiency, and cost-effectiveness.
- Analyze the integration of the power plant with the existing Atuabo Gas Processing Plant infrastructure or propose modifications for optimal efficiency and operation

Methodology:

Conduct a feasibility study to assess the current process and identify the challenges associated with Isopentane

Research and identify best practices for harnessing of Isopentane for power generation

Design a power plant that will convert the Isopentane into electricity

Determine the desired electricity output of the power plant based on Ghana's energy demand and grid integration needs.

Conduct regular monitoring and optimization to ensure the effectiveness of the power generation process

BENEFITS

Environmental Benefits:

- **Reduced Greenhouse Gas Emissions:** Replacing flared isopentane with a cleaner-burning power generation source can significantly reduce greenhouse gas emissions, mitigating climate change impacts.
- **Improved Air Quality:** Eliminating harmful air pollutants released through flaring will contribute to cleaner air and improved public health in Ghana.
- **Resource Conservation:** Utilizing currently wasted isopentane promotes efficient resource utilization and reduces reliance on fossil fuels.

Economic Benefits:

- **Enhanced Energy Security:** Diversifying Ghana's energy mix with a stable and domestic fuel source like isopentane can reduce dependence on imported fuels and price fluctuations.
- **Job Creation:** Development and operation of the power plant can create jobs in construction, engineering, and energy production, boosting the local economy.
- **Economic Value Generation:** Electricity generated from isopentane can be sold to the grid, generating revenue and contributing to economic growth.

Social Benefits:

- **Improved Public Health:** By reducing air pollution, the project can positively impact the health and well-being of local communities.
- **Community Development:** Engaging communities in the project through benefit-sharing initiatives can empower them and contribute to their development.
- **Sustainable Energy Future:** Demonstrating the feasibility of utilizing flared gas for power generation can set a precedent for other countries facing similar challenges, promoting a more sustainable energy future globally.

Timeline:

- Feasibility Study: 1 months
- Research and Development: 1 months
- Implementation: 1 months
- Monitoring and Optimization:

Budget:

- Feasibility Study:
- Research and Development:
- Implementation:
- Monitoring and Optimization

Conclusion

Harnessing Atuabo's flared isopentane for clean power tackles Ghana's energy inefficiency, pollution, and sustainability challenges. This innovative project, leveraging wasted resources and technology, can significantly reduce emissions, enhance energy security, and drive economic growth.

Comprehensive analysis outlines a roadmap for success, while stakeholder engagement and best practices unlock isopentane's full potential as a clean energy source. By transforming waste into watts through transparency, accountability, and inclusivity, we empower lives, protect our planet, and build a brighter, more sustainable future for all.

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