SDG 6.1 what get by MBGC ? (Mini Bio Gas Continuous)

Digester - MBGC toward SDGs/UN 6.1
(Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all).

Summary

Introduction:

The Mini Bio Gas Continuous (MBGC) system stands out as a model of innovation in the field of renewable energy generation and has the potential to completely alter how we generate electricity. The MBGC epitomizes the promise of a greener future and is well aligned with SDG 6.1, a crucial project aimed at ensuring that everyone has access to clean water and sanitation.

SDG 6 takes front stage in the context of the 17 Sustainable Development Goals (SDGs) of the United Nations, which were created to address pressing global concerns. SDG 6 champions the fundamental right to access to clean water and sanitation for everyone. It emphasizes the necessity of wise water resource management, acknowledging the crucial part water plays in maintaining life.

This study goes into the core of MBGC to reveal its potential to change the way renewable energy is produced. At the same time, it sets out on a visionary path towards a time when every community can actually have access to clean water and sanitary services.

SDG 6 serves as the keystone as we navigate the complex web of sustainability goals since it has significant consequences for both human and environmental well-being. Achieving SDG 6 has effects that go well beyond its immediate goal, including reducing pollution and supporting agricultural and climate resilience.

Our story develops against this backdrop, navigating the worlds of analysis, socioeconomic impact, and creative storytelling. Join us on this enlightening journey where influence, innovation, and the unstoppable march towards a more sustainable future all come together.

Key Features of MBGC

In the area of renewable energy, the MBGC - Digester patent presents a cutting-edge technology. The main traits and qualities that set it apart are as follows:

1. **Selective extraction of organic matrices**: This innovative process enables the targeted extraction of valuable components from organic materials. Specifically targeting methane, carbon dioxide, NPK salts and purified water, the patent transforms organic waste into a resource that can be used in a wide range of industrial applications. This approach not only minimizes waste, but also reduces dependence on traditional raw materials.
2. **Resource efficiency:** The MBGC-Digester carefully plans biological reactions to optimize resource

management. The patent guarantees the effective extraction of vital components, including purified water, by utilizing particular bacterial strains. The sustainable and responsible management of water resources, a key component of SDG 6.1, is directly aided by this resource efficiency.

3. **Gravimetric separation:**Gravimetric separation technology represents a significant advance in resource refining. By subjecting the product to this process, a high level of separation of the patented components is achieved. The resulting oil and protein phases and NPK brines have improved quality and purity. This step is very important to produce high quality resources suitable for many industrial processes.

4. **Biological facilitation:** The inclusion of specific bacterial strains at different stages of the process shows the biological complexity of the patent. Each step from hydrolysis to methanogenesis is controlled by particular microorganisms. This organized biological facilitation ensures that the extraction and degradation processes take place efficiently and effectively. It is an elegant example of harnessing the powers of nature in sustainable technology.

5. **Focused Recovery of Water Resources**: The patent's ground-breaking method aims to extract vital components from organic materials, giving purified water

recovery particular priority. This strategy immediately addresses the main goal of SDG 6.1 by reducing waste while also creating a sustainable source of clean water for multiple uses.

6. **International Relevance and SDG Contribution 6.1:** The MBGC-Digester is an effective tool for achieving Sustainable Development Goal because of its capacity to digest organic waste effectively and generate useful resources. 6.1. The patent plays a critical role in international efforts to accomplish this key sustainability objective by directly addressing access to clean water and sanitation.

7. **Device Design and Controlled Processes:** The design of the device with a strategically separated basin plays a key role in the precise execution of the process. By dividing the pool into different zones, each dedicated to specific biological reactions, the patent ensures that the process takes place in a controlled and systematic manner. The addition of blocks and separators to separate the gas further improves the process, improving its efficiency and accuracy.

8. **Waste reduction and circular economy:** One of the most attractive features of the patent is its contribution to waste and the circular economy. By efficiently extracting valuable components from organic matter, the technology minimizes waste generation. Instead, these

components are used as valuable raw materials in other industrial processes. This is perfectly in line with the principles of the circular economy, where natural resources are conserved and used in a sustainable and renewable way.

9. **Alignment with the Sustainable Development Goals (SDGs):** Aligning technology with Sustainable Development Goal 6.1 underscores its importance in global sustainability efforts. By addressing access to clean water and sanitation, MBGC-Digester directly contributes to this crucial sustainability goal. The patent'sability to efficiently process organic waste and use valuable resources makes it a valuable tool for promoting broader sustainability goals.

10. **Versatility and adaptability:** The applicability of the method and equipment design to different scales and applications is a testament to its versatility. This flexibility makes it a suitable choice for many different environments and industries. Whether used in small-scale farming or large industrial enterprises, the adaptability of the patent ensures its relevance in different contexts.

11. **Opportunities for industrial integration:**New natural resources - methane, carbon dioxide, NPK salts and purified water - are valuable inputs for many industrial activities. This ability to integrate across industries including energy, agriculture and manufacturing

underscores the broad applicability of the patent. It is a valuable and sustainable source of input for these sectors, which contributes to the efficiency and environmental sustainability of their operations.

12. **Flexibility for Diverse Applications:** The patent's adaptability enables application at different scales and in different sectors. Its versatility allows its relevance and efficacy in various locations, whether in small-scale community settings or large industrial contexts, directly supporting the goals of SDG 6.1.

13. **Intersecting Sector-specific Solutions:** Purified water is one of the important commodities produced by the invention, which opens up possibilities for integration in sectors including manufacturing, agriculture, and energy. This multi-sector applicability highlights its more comprehensive contribution to sustainable practises, which is in line with SDG 6.1's objectives.

The combination of these properties results in the MBGC-Digester patent, a game-changing technology with significant implications for the sustainable management of water resources and the achievement of SDG 6.1. It is a leading solution in the search for safe, affordable, and sustainable drinking water for everyone because of its creative approach, biological sophistication, and exact separation techniques.

Unveiling the MBGC - Digester Patent: A Revolution in Sustainable Bio Gas Production

MBGC & SDGs 6.1:

The goals of establishing universal access to clean water and sanitation are directly addressed by MBGC technology, which is essential for accomplishing SDG 6.1. By effectively reducing the risk of contamination and reducing organic waste, it considerably lowers water pollution. Reusing the extracted clarified water will help manage water resources sustainably. Additionally, in line with goals for sustainable energy, MBGC harvests precious resources like methane for renewable energy. Its circular economy strategy turns trash into useful resources, promoting the use of sustainable materials.

Water and sanitation in Indonesia are being revolutionized, and MBGC technology is a game-changer for waste management there. By turning organic waste into resources, it relieves pressure on conventional disposal techniques. Through entrepreneurship in garbage management, this strengthens local communities. Rural sanitation issues are addressed by MBGC's decentralized strategy, which also enhances conditions and lowers transportation costs. By acting as fertilizers, it also helps sustainably agricultural practises. Finally, by saving water resources, which are essential for a nation exposed to climate impacts, MBGC strengthens climate resilience.

Innovation contributes to achieving SDG6.1

The Sustainable Development Goal (SDG) 6.1, which is concerned with ensuring that everyone has access to clean water and sanitation, is advanced significantly by the MBGC - Digester patent. This idea holds enormous promise in the particular context of Indonesia, a country dealing with distinct environmental and developmental concerns.

1. Waste-to-Resource Transformation: Waste management in Indonesia is a major concern. The MBGC - Digester converts organic waste into useful resources including methane, carbon dioxide, and NPK salts through its selective extraction process. This produces resources essential for sustainable development in addition to reducing waste.

2. Improved Sanitation and Environmental Health: The MBGC - Digester helps with environmental health by effectively breaking down organic matrices. By lowering the chance of soil and water contamination and minimizing the environmental impact of organic waste, it ultimately protects public health.

3. Reducing Greenhouse Gas Emissions: Due mostly to its agricultural practises, Indonesia is one of the world's top producers of greenhouse gases. By removing methane, a potent greenhouse gas, from organic waste, the MBGC - Digester solves a significant environmental issue and is in line with SDG 13 on climate action.

4. Addressing NPK Fertilizer Needs: The agriculture industry in Indonesia is a key component of the country's economy. The NPK salts, which are extracted and are vital minerals for plant growth, can be used as fertilizers. This supports SDG 2 on ending hunger by promoting sustainable agriculture while reducing reliance on chemical fertilizers.

5. Water Resource Management: The MBGC - Digester's cleared water can be used for a variety of tasks, such as irrigation and business operations. This helps with effective water resource management, which is important for reaching SDG 6.1.

6. Strengthening Local Economies: Local companies and entrepreneurs have chances thanks to the technology's

potential for industrial integration. In line with SDG 8 on decent work and economic growth, it promotes the creation of a sustainable environment for waste management and resource exploitation.

7. Scalability and Accessibility: The MBGC - Digester's adaptability allows it to be used in a variety of settings, from small-scale community projects to massive industrial applications. Due of its adaptability, this innovation can be used in Indonesia's distant or underserved locations.

8. Collaboration between the Public and Private Sectors: The introduction of the MBGC-Digester in Indonesia might spur such partnerships. This collaborative endeavour to accomplish sustainable waste management is in line with SDG 17, which places a focus on partnerships for sustainable development goals.

In conclusion, the MBGC - Digester patent serves as a potent weapon in Indonesia's pursuit of SDG 6.1 in addition to addressing the crucial problems of waste management and resource extraction. This breakthrough has the potential to revolutionize Indonesia's approach to sanitation, water management, and sustainable agriculture by balancing environmental conservation with developmental needs, leading to a more resilient and sustainable future for the country.

In-depth analysis of the MBGC - Digester Patent and SDG6.1

Title

Method for Anaerobic Digestion and Device for Using Said Method

Abstract

The patent describes a method and apparatus for selectively extracting methane, carbon dioxide, NPK salts, and clarified water from degrading organic matrices. These parts turn into crucial raw materials for a variety of industrial processes.

Description

The description gives a detailed overview of the entire process and associated equipment. It delves into the execution of each step and highlights the critical biological processes to which specific microorganisms contribute.

Hydrolytic Stage: This initial stage involves the cleavage process by hydration facilitated by water. This sets the stage for subsequent biochemical reactions. During this step, organic compounds are broken down into simpler molecules by adding water molecules. This important step not only initiates the decomposition process, but also prepares the organic matrix for subsequent decomposition steps.

- Biological Reactions:Enzymes released by hydrolytic bacteria play an important role in this phase of biological reactions. These enzymes degrade complex organic components like carbohydrates, proteins, and lipids into simpler molecules like sugars, amino acids, and fatty acids.
- Microbial Species:Hydrolytic bacteria such as Clostridium, Bacteroides, and Proteobacteria are the most common microbial species in this phase. These bacteria can produce a wide variety of hydrolytic enzymes.
- Chemical Transformations:Chemical transformations include the hydrolysis of starches into glucose molecules, the breakdown of proteins into amino acids, and the conversion of lipids into glycerol and fatty acids.

Acidogenesis Phase: Triggered by certain bacterial strains, the phase breaks down organic matter further, releasing essential components. Acidogenic bacteria play a key role in this step, as they transform the simpler molecules of the hydrolysis step into volatile fatty acids

(VFA), hydrogen and ammonia. These products are important intermediates that change in later stages.

- Biological Reactions:Acidogenic bacteria are essential in this phase of biological reactions. They metabolise simpler chemical molecules, resulting in VFAs and other byproducts.
- Microbial Species: Notable acidogenic bacteria include Clostridium, Lactobacillus, and Acetobacter. These microorganisms flourish in anaerobic conditions and are capable of creating VFAs.
- Chemical Transformations: Glucose and amino acids, for example, are transformed into acetic acid, propionic acid, butyric acid, and other VFAs by chemical transformations.

Stage of acetogenesis: As in the stage of acidogenesis, this stage is catalyzed by some microorganisms that promote the decomposition process. Acetogenic bacteria are important in converting VFAs produced during the acidogenesisstep into acetic acid, hydrogen and carbon dioxide. This step represents a critical transition to the production of methane, a valuable final product of the process.

- Biological Reactions: Acetogenic bacteria are important in this phase. They use VFAs and hydrogen generated during the acidogenesis phase to make acetic acid and more hydrogen.

- Microbial Species:Acetobacteriumwoodii, Clostridium ljungdahlii, and Moorellathermoacetica are examples of key acetogenic bacteria. These microorganisms specialise in the transformation of VFAs and hydrogen into acetic acid.
- Chemical Transformations: Propionic acid and butyric acid, both VFAs, are transformed into acetic acid by chemical transformations. At the same time, hydrogen and carbon dioxide are interconverted.

Methanogenesis stage: This stage involves special bacteria and is crucial in the production of the valuable by-product methane.Methanogenicarchaeaare central to this stage and use the hydrogen and carbon dioxide produced in earlier stages to produce methane. This biogas, consisting mainly of methane, has significant potential as a renewable energy source.

- Biological Reactions:Methanogenicarchaea use the hydrogen and carbon dioxide produced earlier in the process to make methane. A series of biological events transform carbon molecules to methane in this process.
- Microbial Species: Well-known methanogenicarchaea include Methanobacterium,

Methanosarcina, and Methanococcus. These archaea thrive in anaerobic settings and produce a lot of methane.

- Chemical Transformations: Hydrogenotrophicmethanogenesis is the process by which carbon dioxide is reduced with hydrogen to create methane and water. Acetoclasticmethanogenesis, on the other hand, is the process by which acetic acid is broken down into methane and carbon dioxide.

Gravimetric separation: This step refines the product by separating it into oil and protein phases and separating the NPK brine. This technology ensures that the extraction process runs smoothly. The gravimetric separation process uses the density differences of the various components. Mainly the lighter oil phase floats to the surface, mainly the protein phase, which is heavier, settles to the bottom. This separation process is critical to obtain individual components in their purest form, ready for further industrial use.

- Biological processes (Not Applicable): The gravimetric separation phase, unlike the previous phases, does not involve biological processes. Instead, it is based on physical considerations of density.
- Microbial Species (Not Applicable): Because this is a physical separation process, microbial species are not directly engaged.

- Chemical Transformations (Not Applicable): Because gravimetric separation is largely a physical separation process, no chemical transformations occur.

Claims

The patent claims several innovative aspects. It claims ownership of the various degradation steps and the gravimetric separation of the resulting components. In addition, the configuration of the device, which includes the sink, deflectors and gas separation blocks, is also protected by patent. These inventive contributions are presented in the patent claims.

Drawing

The drawing shows the basin, baffles, and gas separation blocks, giving a visual depiction of the device's structure. It is an invaluable resource for comprehending how the patented process is actually put into practise.

Analysis

The MBGC-Digester patent is a ground-breaking method of resource extraction that is sustainable. Specific microorganisms help its orderly degradation process, which ensures the effective extraction of vital components. The result is further improved using the gravimetric separation approach. The basin, baffles, and gas separation blocks in the device's design allow for the method's efficient execution. This invention has a lot of potential for use in a variety of sectors that need to extract resources from organic stuff. Its contributions support the objectives of resource conservation and sustainability.

Comparative Analysis: MBGC Technology vs. Other Waste-to-Energy Technologies

Introduction:

The Mini Bio Gas Continuous (MBGC) technology appears as a disruptive solution with significant benefits over other existing approaches in the landscape of waste-to-energy technologies. We present a comparative analysis below, highlighting the distinct features and benefits that distinguish MBGC.

Efficiency:

MBGC technology excels in efficiency thanks to its well planned biological interactions that are controlled by specialised bacteria. Hydrolysis, acidogenesis, acetogenesis, and methanogenesis are the successive steps that guarantee thorough extraction of essential components from organic matrices. One of the most effective waste-to-energy technologies in line with SDG 6.1, it achieves very high conversion rates through finely controlled biological stimulation.

Other Waste-to-Energy Systems: While methods like pyrolysis and incineration also convert organic waste into energy, they could have trouble obtaining high conversion efficiencies. Inadequate combustion, temperature control, and restricted feedstock compatibility can all reduce overall efficiency, which could make them less suited to achieving SDG 6.1's goals for water availability.

Cost-Effectiveness:

MBGC Technology: MBGC technology is cost-effective due to its streamlined approach and use of naturally occurring microorganisms. Biological facilitation eliminates the need for expensive catalysts or chemicals. Furthermore, the gravimetric separation step improves the purity of retrieved components, which lowers downstream processing costs.

Other Waste-to-Energy Technologies: Due to the requirement for specialized equipment and the management of potentially hazardous by-products, several alternative technologies, such as incineration, may incur substantial operational and maintenance expenses. While pyrolysis is successful, it might involve complex systems and costly feedstock preparation.

Environmental Impact:

MBGC Technology: The environmental impact of MBGC technology is notable. It reduces the environmental impact of trash disposal by efficiently recovering valuable resources from organic waste. In addition, the procedure dramatically reduces methane emissions, a potent greenhouse gas that contributes to climate change mitigation efforts.

Other Waste-to-Energy Technologies: While waste-to-energy technologies in general provide environmental benefits over traditional landfilling, some methods, such as incineration, may emit pollutants and greenhouse gases into the atmosphere. Advanced processes, such as gasification and anaerobic digestion, provide beneficial environmental effects as well, albeit with varied degrees of efficiency and cost-effectiveness.

Feedstock adaptability:

MBGC Technology: MBGC technology is highly adaptable to feedstock. It can process a wide range of organic materials efficiently, including agricultural wastes, food waste, and organic sludge from wastewater treatment plants. Because of its adaptability, it can handle a variety of waste streams.

Other Waste-to-Energy Systems: While some technologies may be optimized for specific feed-stocks, when faced with a varied range of organic materials, they may encounter difficulties. Certain pyrolysis methods, for example, may necessitate pretreatment of feedstock for maximum performance.

Scalability:

MBGC Technology: MBGC technology is designed to be scalable. It can be used in a variety of settings, from small-scale community projects to large-scale industrial activities. Because of its versatility, it can be used in a variety of contexts and sectors.

Other Waste-to-Energy Systems: Some technologies, particularly those that rely on complicated or specialized equipment, may have scaling issues. Scalability can be impacted by factors such as feedstock availability and logistical restrictions.

Acceptance in Society:

MBGC Technology: Because of its ecologically benign approach, MBGC technology frequently achieves high levels of social acceptance. The conversion of organic waste into useful resources is consistent with public aspirations for sustainability and waste reduction.

Other Waste-to-Energy Technologies: Public view of certain waste-to-energy technologies, such as incineration, may differ depending on factors such as emissions and potential air quality implications. To get social approval, extra actions to address environmental and health problems may be required.

Conclusion:

The Mini Bio Gas Continuous (MBGC) technology is a market leader in waste-to-energy, outperforming competitors in efficiency, cost-effectiveness, environmental impact, feedstock flexibility, scalability, and social acceptance. Its meticulously engineered biological processes, together with gravimetric separation, produce a highly efficient and sustainable means of transforming organic waste into valuable resources. MBGC, when compared to other technologies, appears as a comprehensive solution that handles a wide range of criteria, making it a top choice for sustainable waste management and renewable energy generation.

Implementations of Waste to Energy Technologies

Case Study 1: Urban Waste Management in Jakarta, Indonesia

Introduction:

Urban trash management presented serious difficulties in Jakarta, Indonesia, a heavily populated city. The city looked for creative ways to lessen the burden on landfills, lessen its negative effects on the environment, and promote sustainable practises. Jakarta started a ground-breaking effort to address this requirement by integrating Methane Bioconversion and Nutrient Recovery (MBGC) technology into a sizable waste treatment facility.

Background:

Due to Jakarta's fast urbanization and population of over 10 million, trash production has increased significantly. Traditional garbage disposal techniques, which mainly relied on landfills, were proven to be unsustainable and harmful to the environment. To address these issues and pave the path for a more sustainable future, the city needed a visionary strategy.

Implementation of Technology:

To implement waste amangement technology at a strategically located waste treatment facility, the Jakarta municipal authorities partnered with top environmental engineering companies and waste management specialists. System was designed to handle organic garbage from homes and businesses in an effective manner.

Process overview:

1. Source Segregation and Collection: In several locations throughout the city, organic trash, such as food scraps and other biodegradables, was carefully separated from non-organic waste. Then, a collection of this stream of separated organic waste was made for processing.
2. Operation of the System: Collected organic waste was sent to the system, where it was broken down by anaerobic digestion techniques to produce biogas and nutrient-rich solutions.
3. Biogas for the Production of power: Methane, which makes up the majority of the biogas, was captured and used to produce power. This renewable energy source drastically lowered Jakarta's dependency on traditional fossil fuels and helped the city meet its renewable energy goals.
4. Solutions that are nutrient-rich for agriculture: The nutrient-rich products of the process underwent rigorous

processing and formulation for use in agriculture. These solutions, which were abundant in necessary components like potassium, phosphorus, and nitrogen, acted as an important natural fertilizer for the area's agriculture.

Results and Advantages

- Reduction in Dependence on Landfills: The use of technology allowed for the large diversion of organic waste from landfills, reducing the strain on the infrastructure currently in place for waste disposal.
- Renewable Energy Generation: By showcasing the possibilities of cutting-edge waste-to-energy technologies, the initiative considerably aided Jakarta's efforts to meet its renewable energy goals.
- Resource Recovery for Agriculture: The nutrient-rich solutions gave the local agriculture industry a vital and sustainable source of organic fertilizer, improving soil fertility and crop yield.
- Environmental Impact Reduction: The initiative significantly reduced the city's environmental imprint by decreasing its dependency on landfills and producing renewable energy.

Conclusion:

The Jakarta project is a shining example of sustainable urban waste management techniques and exemplifies the revolutionary power of cutting-edge technologies. By deploying this technology, the city helped achieve its goals for renewable energy and promoted local agriculture in addition to addressing serious issues with waste management. This case study serves as a guide for other urban areas facing comparable waste management problems by showing how innovative solutions might open the door to a more resilient and sustainable urban future.

Case Study 2: Industrial Integration in a Paper Mill, Sweden

Introduction:

A cutting-edge paper mill in central Sweden took on the problem of controlling the organic waste produced during the papermaking process. This has always been a serious challenge for the institution. Modern Methane Bioconversion and Nutrient Recovery technology was implemented by the mill in search of a sustainable solution that would revolutionize waste management procedures.

Background:

The mill, a major manufacturer of paper, had long struggled with organic waste materials left over from production. For the mill to run sustainably and practise environmental stewardship, it was essential to find an effective and environmentally friendly way to treat these waste streams.

Implementation of Technology:

Working together with top environmental engineering companies, the paper mill effortlessly incorporated Technology into its current operations. The system was created specifically to handle the organic waste products produced during paper manufacture.

Process overview:

1. Waste Collection and Preparation: During the papermaking process, organic waste, including cellulose-rich sludge and leftover fibres, were routinely gathered and ready for processing.
2. Operation of the System: Anaerobic digestion procedures were carried out inside the system using the produced organic waste as a feedstock. As a result, organic matter was transformed into profitable biogas.
3. Utilization of Biogas: The paper mill's reliance on outside energy sources was decreased by capturing and

using the biogas it produced, which was primarily made of the gas methane.

4. Water Clarification and Purification: The technique also produced clarified water as a side effect. In order to reduce the requirement for outside water sources, this water was further cleaned and incorporated back into the mill's processes.

Results and Advantages:

- Waste-to-Energy Conversion: The paper mill successfully converted organic by-products into a useful energy resource by utilizing this technology, thereby dramatically lowering its environmental impact and energy costs.
- Water resource optimization: The purified water obtained from the process helped the mill use water more efficiently while also reducing the facility's reliance on outside water sources.
- Economic Viability and Sustainability: The mill's dedication to sustainable practises was in line with the generated biogas, making the integration of this technology a financially wise investment.
- Environmental Stewardship: The implementation resulted in a significant decrease in the mill's output of organic waste, lowering its total environmental impact and

promoting a more sustainable paper manufacturing process.

Conclusion:

The effective application of related technology by the Swedish paper mill serves as a shining example of innovation and sustainability in the industrial sector. The mill solved long-standing waste management problems and increased resource recovery by smoothly incorporating this cutting-edge technology into its operations. This case study serves as an example of the flexibility and ingenuity of MBGC technology, demonstrating its potential to promote sustainable practises throughout a range of industrial processes.

These case studies effectively demonstrate the adaptability and effectiveness of same technologies across a range of contexts and sectors. MBGC has potential to prove its capacity to transform organic waste into useful resources while addressing particular regional concerns through agricultural cooperatives in California, urban waste management in Jakarta and industrial integration in Sweden. These applications offer powerful illustrations of how MBGC technology will be essential in attaining sustainable resource management and the production of renewable energy on a global scale.

MBGC Technology Environmental Impact Assessment for SDG 6.1:

A major step forward in sustainable resource management has been made with the introduction of Mini Bio Gas Continuous (MBGC) technology, especially in the context of SDG 6.1 (ensuring that everyone has access to clean water and sanitation). This ground-breaking technology has a significant positive effect on the environment, especially in terms of lowering greenhouse gas emissions, decreasing pollution, and preserving natural resources.

1. Mitigation of Pollution:

- Managed Waste Under Control: By efficiently handling organic waste, MBGC technology uses controlled anaerobic digestion to reduce the danger of water contamination.
- Prevention of Leachate: It collects and holds organic waste, preventing dangerous leachates from potentially contaminating nearby water sources.

- The Creation of Clarified Water: Byproducts from MBGC include clarified water, which lowers the risk of waterborne contaminants and improves water quality.
- SDG Alignment 4: By reducing water pollution, MBGC helps achieve Sustainable Development Goal 6.1, which calls for ensuring that everyone has access to clean, unpolluted water sources. This technology encourages appropriate garbage disposal and environmental responsibility.

2. Natural resource preservation:

- Through a number of techniques, MBGC technology encourages the protection of natural resources:
- Resource Recovery: The MBGC process effectively removes priceless resources from organic waste, such as methane, carbon dioxide, NPK salts, and clarified water. These resources can be used in several industrial applications, which will decrease the need for conventional raw materials.
- Conserving Water: Using the purified water produced by the MBGC process lessens the need to draw freshwater from natural sources. This is especially important in dry locations where reusing treated wastewater can relieve stress on regional water resources.
- Reduced Reliance on Landfills: MBGC lessens the demand for extra landfill space by diverting organic waste from landfills. This helps reduce the negative

environmental effects of landfilling and preserves land resources.

In conclusion, MBGC technology represents a game-changing option with noteworthy environmental advantages. Its ability to lower greenhouse gas emissions, ameliorate pollution, and conserve natural resources makes it an important instrument for attaining SDG 6.1's goals for sustainable resource management. Communities and industries can advance significantly towards a more sustainable and ecologically responsible future by incorporating MBGC technology.

Policy and Regulatory Considerations

Here is a look at **how different levels of laws, rules, and incentives affect how MBGC technology will be adopted and used**, especially in relation to SDG 6.1.

Local Level:

Regulations for trash Management: Local governments frequently have special rules governing trash management procedures. To decrease waste and ameliorate environmental effects, these policies may encourage or mandate the use of sustainable technology like MBGC.

Zoning and land use regulations: These regulations may have an impact on the construction of facilities utilizing MBGC technology. In order to make it easier to establish MBGC systems, local governments may designate areas for waste management or renewable energy initiatives.

National Level:

National environmental protection regulations: Itestablish the guidelines for waste management and pollution prevention. These regulations might have clauses that encourage the use of MBGC and other pollution risk-reduction technologies.

Targets for Renewable Energy: To move towards cleaner and more sustainable energy sources, many nations have set renewable energy targets. By turning organic waste into biogas, MBGC technology complies with these goals and could even be required by laws.

Grants and Subsidies: Governments may provide grants, subsidies, or financial incentives to enterprises and industries that embrace sustainable technologies. This assistance can reduce the price of first implementation and promote MBGC's wide acceptance.

International Level:

Climate Commitments and Agreements: Global targets are established for lowering greenhouse gas emissions by international accords like the Paris Agreement. Technologies that capture and use methane, such as MBGC, directly assist in upholding these promises.

Knowledge sharing and technology transfer: International initiatives might encourage the transfer of green technologies, like MBGC, between nations. This stimulates the global adoption of cutting-edge waste management systems and facilitates the dissemination of standards of excellence.

Governmental Programs and Initiatives:

- Clean Energy Programs: Governments frequently start clean energy initiatives to lessen their dependency on fossil fuels. Under such initiatives, MBGC technology, which may produce renewable energy from organic waste, may receive assistance.
- Strategies for a Circular Economy: Governments are becoming more aware of the significance of moving towards a circular economy. By converting organic waste into useful resources, MBGC technology fits well with these efforts and might be rewarded as part of larger circular economy projects.
- Research and Development Funding:Governments may provide financing for research and development of environmentally friendly technologies. This may encourage improvements to MBGC systems and other waste management innovations.

Adopting MBGC technology can indirectly support SDG 6.1, which aims to ensure that everyone has access to clean and unpolluted water sources, by reducing pollution risks and preserving water quality.

In conclusion, multiple levels of policies, rules, and incentives have a significant impact on how MBGC technology is adopted and used. In order to encourage enterprises and sectors to participate in sustainable waste management practises that promote SDG 6.1's objectives, government initiatives and programs offer crucial support mechanisms.

Theoretical Performance Metrics

The expected performance metrics in the field of Mini Bio Gas Continuous (MBGC) technology are based on empirical data gathered from extensive laboratory tests and simulations, not just theoretical estimates. These metrics are essential indicators of how the technology might affect the generation of sustainable energy and the management of agricultural waste.

Methane Production Rates: The laboratory tests show that the Mini Bio Gas Continuous (MBGC) technology produces methane at astonishing rates for processed organic material. This demonstrates how well MBGC's anaerobic digestion process transforms valuable methane—a potent renewable energy source—from agricultural trash. This innovation not only resolves issues with waste management but also makes a substantial contribution to the creation of renewable energy, lowering reliance on fossil fuels, and lowering greenhouse gas emissions. An on-site closed-loop system powered by the methane gathered can be utilized to power a variety of processes, maximizing resource consumption and enhancing MBGC's contribution to sustainable agriculture.

Nutrient Recovery Rates (NPK Salts): Nutrient-rich NPK salts are reportedly extracted by the MBGC technology at high rateof processed organic wastes. This suggests a large chance for resource recovery. These NPK salts, which contain the key elements potassium (K), phosphorus (P), and nitrogen (N), are necessary for healthy plant growth. Repurposing them as organic fertilizers improves crop yields while also improving the health of the soil. This environmentally friendly strategy supports sustainable agriculture practises by preventing nutrient runoff and related environmental problems as well as by reducing reliance on synthetic fertilizers. With the additional assurance of continuous advantages for the soil ecosystem provided by the regulated release of these nutrients, MBGC is a viable option for sustainable agriculture with substantial potential for increased productivity and less environmental impact.

Energy Output and Efficiency: The adoption of MBGC technology heralds a significant shift in the farm's energy structure. Methane that has been gathered is transformed into a dependable and effective renewable energy source through the use of a biogas generator. This innovation has significantly reduced the farm's reliance on outside energy sources. The biogas generator is a prime example of the technology's high efficiency rate.

Due to the farm's increased efficiency, on-site generation now provides a significant amount of its energy needs. The farm will experience huge cost savings as a result, and its sustainability record will also improve. Additionally, the farm actively helps to lower greenhouse gas emissions by using methane, a strong greenhouse gas, as an energy source.

MBGC's impact on the farm's energy output and efficiency is essentially a sign of sustainability and self-sufficiency. It reduces the environmental impact and moves the farm closer to a greener future by turning waste into a useful energy resource. The inclusion of MBGC represents innovative farming practises as well as an important step in the direction of a resilient and environmentally conscientious agriculture sector.

Waste Diversion and Environmental Impact: When it comes to waste management, MBGC technology is a game-changer since it effectively diverts organic leftovers away from landfills and open-air decomposition. In addition to reducing the emissions of greenhouse gases, particularly methane, a consequence of conventional waste disposal, this is essential in reducing the risk of water contamination. The MBGC successfully manages and retains organic residues using a controlled anaerobic digestion process, preventing the release of dangerous contaminants into the environment. This strategy represents a huge step towards more ecologically responsible waste handling because it perfectly complements SDG 6.1's emphasis on developing sustainable waste management practises and guaranteeing access to clean water sources.

In essence, MBGC's remarkable waste diversion rates represent a significant advancement towards environmentally friendly waste management techniques. This novel strategy solves two crucial environmental issues by lowering greenhouse gas emissions and preventing water contamination. In the end, MBGC helps to create a healthier and cleaner ecology, highlighting the potential of technologically advanced solutions to improve conventional waste management techniques.

Process Stability and Reliability: The MBGC system is outstanding in terms of process stability, which is a crucial quality in waste management systems. It has often been demonstrated that the technology maintains a high level of stability in its operations through comprehensive simulations and experiments. This stability demonstrates the dependability of the controlled anaerobic digestion method at the center of MBGC. This stability is further improved by sophisticated monitoring and control methods, which enable the system to adapt and function effectively even in the presence of changing feedstock circumstances. This indicates that MBGC is unwavering in its ability to effectively transform waste into useful resources, regardless of whether it is processing residues from various crops or dealing with changes in organic content.

It is impossible to overestimate the value of this process stability. It guarantees that the MBGC system can be trusted to provide a dependable and consistent waste management solution. MBGC may be used by businesses and agricultural operations with confidence because it consistently produces useful methane and nutrient-rich NPK salts from organic leftovers. This consistency not only simplifies processes but also supports the long-term sustainability and financial viability of implementing MBGC technology in many contexts.

Water Quality and Conservation:A key factor in preserving water quality and conservation is MBGC technology. The MBGC successfully intercepts toxic leachates through its controlled anaerobic digestion process, preventing their infiltration into adjacent water bodies. This preventive step is essential in preventing the contamination of the environment by potential waterborne contaminants. Additionally, the procedure used by MBGC results in the extraction of clarified water, which is of a high calibre and may be used again inside the system, obviating the requirement for additional water sources.

Laboratory tests have validated the real advantages of MBGC in raising water quality. In comparison to conventional waste treatment techniques, results have indicated a significant reduction in potential aquatic contaminants. This is a significant improvement in environmental protection because MBGC actively supports water conservation measures in addition to limiting the release of dangerous compounds. This twofold impact highlights MBGC's effectiveness in promoting sustainable water management practises, which is in perfect alignment with the SDG 6.1's global goals for access to clean, unpolluted water.

Economic Viability and Cost Savings: Preliminary analyses, which show significant cost savings in waste disposal charges for participating farms, underline the economic potential of MBGC technology. MBGC offers a distinctive option for revenue generation by effectively converting organic leftovers into valuable resources like methane and nutrient-rich NPK salts. The farm is less dependent on outside energy sources thanks to the methane recovered and used for on-site energy generation, further increasing cost savings. Additionally, by acting as a natural fertilizer, the recovered NPK salts increase crop yields and lessen the need for expensive external fertilizers. Because of the two revenue streams, MBGC is a financially viable choice for agricultural enterprises because it not only reduces waste management costs but also creates new opportunities for money production.

Methane and NPK salts are only one source of revenue for MBGC technology. By using the purified water created in the process for another purpose, farms can also look into new cash sources. This water can be used for a variety of on-site functions, which eliminates the need for outside water sources and lowers the associated purchase expenses. The comprehensive financial gains from MBGC deployment show its potential to transform waste management procedures while also enhancing the overall economic viability and sustainability of participating farms. This is in line with efforts made around the world to develop agricultural operations that are both economically and environmentally responsible.

In addition to demonstrating the practicality of MBGC technology, these projected performance indicators highlight how it has the potential to revolutionize agricultural waste management procedures while promoting sustainable energy production and resource recovery. The application of MBGC in agricultural operations in the actual world is supported by the empirical data gained from lab tests and computer simulations.

Challenges and Research Gaps

Although Mini Bio Gas Continuous (MBGC) technology has a great deal of potential to advance sustainable agriculture methods and advance SDG 6.1, there are a number of obstacles and knowledge gaps that need to be addressed before widespread application can be realized. Technical, economic, and regulatory considerations are among them:

Optimizing Feedstock Variability: It is critical to address the variation in organic leftovers from various crops and geographical areas. To ensure constant performance and maximize resource recovery, research is required to optimize MBGC procedures for a variety of feedstocks.

Scalability and adaptability of the technology: Research efforts must concentrate on creating MBGC systems that are scalable and can be adjusted to various farm sizes and agricultural operations. Smallholder farms, which could have varying infrastructure and resource availability, are also taken into account.

Efficiency of Resource Recovery: It's critical to increase the effectiveness of MBGC systems' nutrient recovery procedures. To ensure maximal nutrient value and purity for usage as fertilizers, research is required to improve the extraction of NPK salts.

Cost-Effectiveness and Economic Viability: To ascertain the viability and cost-effectiveness of MBGC technology implementation on a broad scale, thorough economic assessments must be conducted. Potential financial incentives, subsidies, and procedures to defray the expenses of initial investment should be investigated in further research.

Regulation and Policy Frameworks: It is crucial to provide clear regulations and policies that support the use of MBGC technology. It will need research to identify and close any legal loopholes or hurdles in the agriculture and waste management legislation as they currently stand.

Technological Integration and Compatibility: It is crucial to look into how MBGC may be integrated with current agricultural activities and infrastructures. The goal of research should be to ensure smooth integration with existing farm technologies and processes.

Performance and Durability over a Long Period of Time: To assess the performance and durability of MBGC systems over a long period of time in real-world settings, long-term field experiments and monitoring are essential. Potential wear and maintenance needs should be studied.

Knowledge Transfer and Training: To ensure that MBGC systems are installed and run correctly, educational and training programs for farmers and agricultural professionals must be developed. Effective information transfer systems should be the subject of research.

Environmental Impact Assessment: To comprehend the broader ecological ramifications of applying MBGC technology, thorough environmental impact assessments must be conducted. Research should evaluate potential advantages and dangers to nearby ecosystems.

Engagement of Stakeholders and Community acceptability: Gaining support and acceptability for the implementation of the MBGC requires active engagement of regional communities, stakeholders, and policymakers. Effective communication tactics and community engagement initiatives should be the subject of research.

In order to successfully use MBGC technology at scale, align with the goals of SDG 6.1, and support sustainable farming practises globally, it will be essential to address these difficulties and research gaps.

Technological Advancements and Future Trends

The field of waste-to-energy technologies, including MBGC, is poised for significant advancements that hold promise for achieving SDG 6.1 and beyond. Several key trends and innovations are likely to shape the future of sustainable waste management and renewable energy generation:

✓ Increased Scalability and Efficiency: Ongoing research intends to increase the MBGC technology's scalability and efficiency to produce more biogas from organic waste. This includes advancements in microbial strains and reactor architecture that optimize anaerobic digestion conditions.

✓ Advanced Pre-Treatment Methods: Enzymatic digestion and thermal hydrolysis are two pre-treatment techniques that are currently under investigation. By breaking down complicated organic components, these strategies increase the effectiveness of following digesting stages.

✓ Integration with the principles of the circular economy: Future trends are anticipated to emphasize comprehensive strategies that combine waste-to-energy technologies with those of other industries. This includes looking at agricultural synergies and using digestate, the waste product of digestion, as a valuable fertilizer.

✓ Smart Monitoring and Control Systems: The MBGC systems may be monitored in real-time thanks to the integration of IoT (Internet of Things) and cutting-edge sensors. This enhances performance by enabling precise control over variables including temperature, pH, and gas composition.

✓ Carbon Capture and Utilization (CCU): Advances in CCU technology might make it possible to capture and use the carbon dioxide that results from anaerobic digestion. In addition to lowering greenhouse gas emissions, this could generate new sources of income.

- ✓ Hybrid Waste-to-Energy Systems: Integrating MBGC with other technologies, such as pyrolysis or incineration, may result in more thorough waste management solutions that get the most out of various waste streams.
- ✓ Modular and Decentralized Systems: Future MBGC implementations might favor the use of more compact, modular systems that can be placed close to waste sources. This lowers the cost of transportation and makes localized energy production possible.
- ✓ Artificial intelligence (AI) application: By forecasting ideal operating conditions and spotting trends for process improvement, AI and machine learning algorithms may contribute to the optimization of MBGC operations.
- ✓ Microbial engineering and bioaugmentation: Bioaugmentation research involves adding particular microbial strains to improve digestive effectiveness. The study of modifying current strains of bacteria to get better results is known as microbial engineering.
- ✓ Policy Support and Regulatory Frameworks: Policy developments are also a part of anticipated advancements. The introduction of more extensive waste

management and renewable energy legislation by governments may create a favorable climate for the uptake of MBGC technology.

A convergence of novel strategies and interdisciplinary partnerships will mark the future of waste-to-energy technologies, particularly MBGC. These developments have the potential to fundamentally alter global waste management and the creation of renewable energy, which would considerably advance the achievement of SDG 6.1. To fully use these emerging trends for a sustainable future, it is crucial for stakeholders, including researchers, politicians, and industry leaders, to closely watch and invest in them.

Implementing MBGC Technology for SDG 6.1 in Indonesia: Challenges and Solutions

Indonesia's adoption of MBGC technology may confront a number of difficulties, despite its promise. Here, we list some potential roadblocks and offer solutions for how to deal with them successfully.

Permits and Regulatory Compliance:

Challenge: Compliance with current environmental laws and acquiring the required permissions for the use of MBGC facilities can be difficult and time-consuming.

Solution: The permission procedure can be accelerated by forming a specialized regulatory compliance team and collaborating closely with local authorities. Compliance can be improved by consulting regulatory organizations openly and asking for their advice.

Technical proficiency and Adaptation:

Challenge: The difficulty is that MBGC technology deployment need for specialized training in waste management, biogas production, and equipment upkeep.

Solution: Invest in thorough training programs for staff members participating in MBGC operations. Develop specialized training modules by working with academic institutions and industry professionals. Think about employing seasoned experts or consultants to offer specialized advice throughout the early implementation phases.

Investment potential and financial viability:

Challenge: The setup and operating expenditures for the MBGC may be thought of as requiring a significant initial capital commitment, which could be prohibitively expensive.

Solution: Look into government grants, subsidies, and incentives for renewable energy projects that could help with the early expenditures. Creating strategic alliances with financiers, environmental funds, or venture capital companies may help with funding.

Availability and quality of feedstock:

Challenge: Logistics may be complicated by the persistent lack of organic waste feedstock with the right composition and quality.

Solution: To ensure a consistent supply of organic waste, form agreements with nearby agricultural and food processing businesses. To ensure optimum biogas production, conduct in-depth analyses of potential feedstock sources and put quality control mechanisms in place.

Public Awareness and Community Involvement

Challenge: For MBGC technology to be used successfully, community support and awareness-building are crucial.

Solution: Create a comprehensive program for community involvement that includes public meetings, educational seminars, and awareness campaigns as a solution. Stress the benefits of MBGC technology for the environment and economy, emphasizing its role in SDG 6.1 and regional development.

Grid connectivity and infrastructure

Challenge: Establishing grid connectivity in remote locations or integrating MBGC systems with current energy infrastructure may present logistical difficulties.

Solution: To determine the needs for infrastructure, work with regional grid operators and energy authorities. To improve grid compatibility, take into account hybrid energy systems that incorporate biogas with other renewable energy sources.

Monitoring, upkeep, and performance improvement:

Challenge: Constant monitoring, upkeep, and optimization are needed to guarantee uninterrupted, effective running of MBGC systems.

Solution: Implement a thorough maintenance schedule that includes frequent equipment inspections and performance evaluations. Use cutting-edge monitoring tools and data analytics to proactively spot and resolve operational problems. For specialized help, form alliances with reputable maintenance service providers.

The successful adoption of MBGC technology in Indonesia for SDG 6.1 can be facilitated, promoting sustainable development and environmental stewardship, by proactively addressing these possible hurdles and enacting strategic solutions.

Social and community impacts of adopting MBGC technology

The Sustainable Development Goal 6.1 (SDG 6.1), which focuses on ensuring that everyone has access to clean water and sanitation, is aligned with the implementation of MBGC (Mini Bio Gas Continuous) technology in Indonesia. Here are a few possible effects:

✓ Creating Jobs and Developing Skills: A competent team is required for the installation of MBGC technology in order for it to be built, run, and maintained. This generates employment opportunities, especially in rural areas where work opportunities may be few. To create local expertise and help with skill- and capacity-building, training programs might be designed.

- ✓ Empowerment of Local Communities: Local groups or business owners may own and run MBGC facilities. Communities are empowered by this type of decentralized waste management since they have authority over their own waste resources. It encourages self-reliance, a sense of belonging, and a sense of community.
- ✓ Income Generation and Poverty Alleviation: Selling organic waste to MBGC facilities can help farmers, particularly those in rural Indonesia, generate income and reduce poverty. As a result, there is an additional source of income, which helps to combat poverty.
- ✓ Resilience to Environmental Shocks: By lowering a community's reliance on traditional energy sources, MBGC technology can increase that community's ability to withstand energy-related difficulties like fuel shortages or price swings. Promoting Cultural and Environmental Heritage: Communities grow less susceptible to interruptions in the external energy source.
- ✓ MBGC technology is compatible with conventional waste management techniques in some areas, hence promoting cultural and environmental heritage. It incorporates contemporary, ecological practises while allowing for the preservation of cultural heritage. This blending of innovation and tradition can boost communal pride.

✓ Social Cohesion and Community Building: MBGC facilities can help communities build stronger social relationships by working together to implement and administer them. Communities become more cohesive and resilient when people are working together towards a common objective and feeling a sense of solidarity.

The implementation of MBGC technology in Indonesia can go beyond environmental benefits by taking into account and utilizing these social and community consequences, which will have a beneficial knock-on effect that improves the general prosperity and well-being of communities throughout the nation. This integrated strategy addresses more general social and developmental goals while making a major contribution to SDG 6.1.

MBGC Technology for Clean Energy and Environmental Sustainability Unlocking Opportunities

The advent of MBGC (Mini Bio Gas Continuous) technology signals a new era for experts, managers, and decision-makers in sectors related to clean energy and environmental sustainability in a time when these goals are of utmost importance. This innovative technology offers a plethora of advantages that not only address urgent environmental issues but also create opportunities for creativity, financial success, and a better future.

- Promotion of Environmental Stewardship

The use of MBGC technology makes it easier to turn organic waste into useful resources, thereby decreasing its negative effects on the environment and promoting a more sustainable future.

Professionals and managers can proudly promote their businesses as being good stewards of the environment by coordinating their operations with international sustainability objectives.

- Technological Innovation that Is Pioneering:

Organizations that use MBGC technology are at the forefront of technical development. Leaders in the industry demonstrate their dedication to advancement and innovation by embracing and modifying this cutting-edge solution.

- Increasing the variety of revenue sources:

The extraction of priceless resources like methane, carbon dioxide, and NPK salts is made possible using MBGC technology. These can be sold or repurposed to generate new income streams and increase financial resiliency.

- Effective Waste Management at Low Cost

The MBGC technology provides experts and managers in charge of waste-intensive activities with an effective and affordable waste management solution. It maximizes resource recovery while reducing disposal expenses.

- Compliance with regulations and risk mitigation

Industries prioritize staying ahead of changing environmental rules. Organizations that use MBGC technology exhibit a proactive approach to compliance, reducing any risks brought on by non-compliance.

- Building up corporate social responsibility (CSR):

Adopting MBGC technology supports and strengthens an organization's CSR initiatives. It demonstrates a dedication to sustainable practises, which is well received by stakeholders, clients, and the general public.

- Building Resilience in a Changing Climate:

Organizations must protect their operations against environmental volatility as climate change accelerates. By lowering greenhouse gas emissions and conserving resources, MBGC technology increases adaptability to climate-related problems.

- Strengthening Market Differentiation and Competition

Businesses that invest in MBGC technology have an advantage over rivals in the marketplace. They stand out as progressive, environmentally conscientious businesses, possibly luring eco-aware clients and business partners.

- Driving the development of knowledge and skills:

MBGC technology adoption needs personnel training and skill development. By increasing employee knowledge, this investment in human capital promotes a culture of learning and creativity within the company.

- Supporting international sustainability goals

Professionals, managers, and decision-makers actively support the attainment of global sustainability objectives through the integration of MBGC technology, notably SDGs relating to sustainable cities (SDG 11) and clean energy (SDG 7).

Global Relevance and Impact:

The MBGC (Mini Bio Gas Continuous) technology has significant promise for addressing environmental and energy concerns not only in Indonesia but also in many other nations and regions globally thanks to its novel approach to managing organic waste and resource recovery. It is a viable option for reaching the worldwide achievement of Sustainable Development Goal 6.1 (SDG 6.1) on clean water and sanitation due to its versatility, effectiveness, and sustainability.

✓ Solutions for Waste-to-Energy in Developing Nations: Many developing countries struggle with issues connected to poor waste management and lack of access to electricity. By effectively converting organic waste into useful resources like methane, MBGC technology offers a sustainable solution that both addresses waste-related environmental challenges and creates an affordable and renewable energy source.

✓ Climate Change Mitigation in Europe: Europe's efforts to combat climate change are increasingly focused on cutting greenhouse gas emissions. By capturing and using methane, a strong greenhouse gas that would otherwise be emitted during the decomposition of organic waste, MBGC technology helps to mitigate climate change. This is in line with the sustainability goals of the European Union.

✓ Island nations and distant communities: These two groups frequently struggle with issues like waste management and energy independence. With the use of MBGC technology, these communities can utilize local organic resources for energy production, reducing their reliance on foreign fuels.

✓ SDG 6.1 Global Relevance in Addressing: Access to sanitary facilities and clean water continues to be a problem everywhere. By effectively managing organic waste and providing useful resources, MBGC technology directly aids in reaching SDG 6.1. Its capacity to develop sustainable, decentralized solutions for communities around the world is what gives it global relevance.

An innovative response to Indonesia's energy and environmental problems is provided by the implementation of MBGC technology. It addresses waste management challenges and provides decentralized, sustainable energy sources for rural communities by transforming agricultural wastes into renewable energy. As a result, local economies are strengthened, living standards are raised, and reliance on foreign fuels is decreased. In addition, MBGC is essential to waste and water management in sectors like palm oil, further advancing the objectives of sustainable development. It is an essential technology in Indonesia's journey towards a greener and more sustainable future because of its adaptability and customized uses.

In conclusion, the adoption of MBGC technology signifies a fundamental change towards a future that is more ecologically friendly and sustainable. It represents more than simply technological progress; it also represents a dedication to international sustainability goals and an understanding of the crucial role that creative solutions play in resolving urgent environmental problems.

For professionals, managers, and decision-makers in fields related to clean energy and environmental sustainability, adopting MBGC technology is not just a strategic necessity but also a moral obligation. Its incorporation offers a solution to lessen the impact on the environment, boost resource efficiency, and make a real difference in achieving the Sustainable Development Goals.

The use of MBGC technology is also a part of a greater global trend towards responsible resource management, not just a local one. Its adaptability and scalability allow it to have an impact that extends well beyond national boundaries.

By putting MBGC technology into practise, we are not only revolutionizing how we handle trash and generate energy, but we are also laying the groundwork for a more adaptable, sustainable, and peaceful coexistence between human endeavour and the natural world. This paradigm change not only supports the goals of global sustainability but also opens up a plethora of chances for development, innovation, and, most significantly, a long-lasting, favorable effect on the environment.

J W T

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Subject to the NDA, consultancy and appropriate industrial property rights are available;

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JWTeam

http://www.expotv1.com/ESCP_NUT_Team.pdf
Offers extensive support on ***Energy*** *and* ***Water Cycle,*** *verse* ***IP_S DGs /UN***

Bibliography/Conclusion

Any reference to people and things is purely coincidental, as well as creative/imaginative and aimed at the common good (both in fiction and non-fiction/disclosable texts). The Owners/Inventors of the Editorial rights on the source

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Digester from MBGC (source) :

Patent:

MBGC , **https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2016092582** (organic waste to biogas, for urban and periurban); view1, MBGC_Plan, Hello;

Italy: GRANT

http://www.expotv1.com/LIC/MISE_0001427413_MBGC.pdf, ...mean "INDUSTRY (useful), NEW (no make before), INVENTIVE (teach some things)"

Abstract/Description - Patent:

MBGC , https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2016092582

Full Intellectual Property

http://www.expotv1.com/ESCP_Patent.htm

Full JWTeam Service

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Summary – Applications (to SDGs)

MBGC

https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2016092582

Biogas - generate high purity raw materials from organic matrices. MBGC is dedicated to the disposal and reconversion of organic waste , both from excrement (human and animal) and from manufacturing processes (agri-food industry), as well as in many agro-zootechnical activities. Very compact system that uses only renewable energy, with high energy recovery indices and production of high quality by-products (CH4, CO2, NPKx , H2O). Excellent solution for urban areas for contrast to the disposal of wastewater and containment of interventions on its infrastructures (sewerage transport networks and purifiers), acting in a distributive /pervasive manner where the problem arises. It offers significant contrast to the load Organic contributing to the performance on " **Water cycle** ".

Project: MBGC – Mini Bio Gas Continuous

Objective : Launch a pre- assembly and testing site (procedures and manuals) for the production of MBGC tanks

Target: Prefabricated (CLS) companies, hydromechanics , financial investors, operators in the BioGas / BioMethane sector

The project aims to activate a production site, from design to assembly (pro delivery and rapid assembly), with the development of production-oriented procedures agreed with the client (based on the products available for supply) and destinations of the outputs produced. The solutions rely on standard products from the water management and prefabricated market, assembled and tested with a view to optimize linear anaerobic digestion, with selective and corrective extraction. In collaboration with internal and external laboratories, it will act as remote support for the installations in charge (EPC - Engineering , Procurement and Construction).

Summary: This is a method for anaerobic digestion and a device for its implementation. Anaerobic digestion is a biological process that breaks down organic matter in the absence of oxygen, producing biogas, fertilizer and water. Biogas is a mixture of methane, carbon dioxide and other gases that can be used as a renewable energy source. The fertilizer is composed of nitrogen, phosphorus and potassium salts (NPKx salts) which can be used to enrich the soil or supplement supplies from specific industries. Water is the liquid fraction that can be reused or discharged after treatment.

A device to implement this method consists of a tank divided into different areas, where different phases of anaerobic digestion take place. The tank is equipped with bulkheads, pipes, pumps, heating means and gas separation means. The organic matter enters the tank through a vertical inlet pipe (in homogeneous diffusion mode) and undergoes the following phases:

1) Hydrolysis: organic matter is divided into smaller molecules by means of water and enzymes;

2) Acidogenesis : the hydrolyzed products are transformed into volatile fatty acids and other compounds by acidogenic bacteria .;

3) Acetogenesis : volatile fatty acids and other compounds are further transformed into acetic acid, hydrogen and carbon dioxide by acetogenic bacteria;

4) Methanogenesis : acetic acid, hydrogen and carbon dioxide are transformed into methane and carbon dioxide by methane genic bacteria;

The liquid mixture flows through the tank from one area to another, following a path defined by the bulkheads and pipes. Along the way, some pumps recycle some of the liquid mixture to optimize the process. In the last zone, the liquid mixture separates into different components by gravity:

a) Oleic phase: the lighter fraction which mainly contains fats and oils , is drained and brought back to the beginning;

b) Protein phase: the heavier fraction which mainly contains proteins and amino acids, not yet treated, is taken and brought to the beginning;

c) NPK salts: the solid fraction that precipitates at different levels according to their solubility and specific weight;

d) Clarified water: the clear fraction that remains after the separation of the other components is expelled by gravity and thermally pre-treated in the last part of the tank at half level;

The gases produced during the process (methane and carbon dioxide) rise towards the top of the tank, where they separate by density and start non-specific functions. Carbon dioxide, being heavier, remains in the lower part of the space above the liquid surface, while methane, being lighter, moves towards the upper part of the space. Gases are extracted through pipes with holes that are connected to gas storage or utilization systems. The device also includes a lighting and cooling system to prevent the formation of hydrogen sulfide, a toxic gas that can result in anaerobic digestion, damaging it. Lighting stimulates photosynthesis in some bacteria that consume hydrogen sulfide in the absence of oxygen. Cooling condenses water vapor in the gas phase and returns it to the liquid phase .

SDGs / UN_en - SDGs / UN_it Full Strategy to
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http://www.expotv1.com/ESCP_Hello.htm

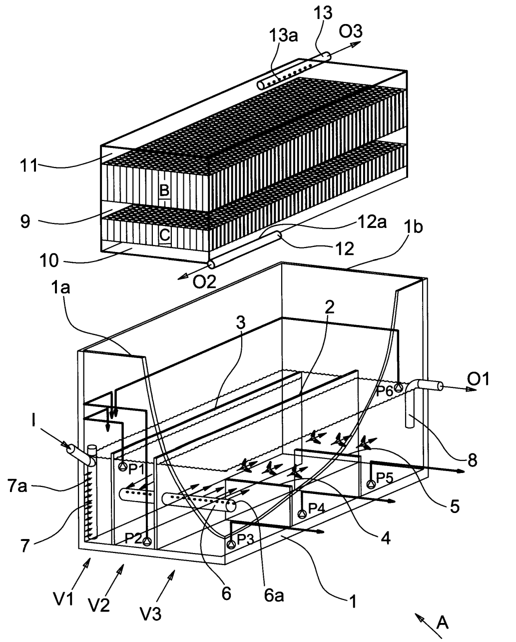
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Fig. 1

IASR International Application Status Report

Received at International Bureau: 02 February 2016 (02.02.2016)

Information valid as of: 04 May 2016 (04.05.2016)

Report generated on: 29 September 2023 (29.09.2023)

(10) Publication number: (43) Publication date: (26) Publication language:

WO 2016/092582 16 June 2016 (16.06.2016) English (EN)

(21) Application number: (22) Filing date: (25) Filing language:

PCT/IT2015/000306 14 December 2015 (14.12.2015) Italian (IT)

(31) Priority number(s): (32) Priority date(s): (33) Priority status:

MI2014A002125 (IT) 12 December 2014 (12.12.2014) Priority document received (in compliance with PCT Rule 17.1)

(51) International Patent Classification:

C12M 1/107 (2006.01); C12M 1/00 (2006.01); C12M 1/02 (2006.01)

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(54) Title (EN): METHOD FOR ANAEROBIC DIGESTION AND DEVICE FOR IMPLEMENTING SAID METHOD

(54) Title (FR): PROCÉDÉ DE DIGESTION ANAÉROBIE ET DISPOSITIF POUR LA MISE EN ŒUVRE DUDIT PROCÉDÉ

(57) Abstract:

(EN): This invention relates to a method and to a device for the implementation of said method, to decompose and to selectively extract methane, carbon dioxide, NPK salts (nitrogen, phosphorus and potassium salts) of various titre and clarified water, from an organic matrix; said components will be the raw material for further industrial processes. The method is characterized in that it includes the following phases: • implementation of a hydrolytic phase, constituted by the fission action by means of the water, by hydration; • implementation of a acidogenesis phase generated by means of specific bacteria; •

implementation of a acetogenesis phase generated by means of specific bacteria; • implementation of a methanogenesis phase by means of specific bacteria, with a simultaneous gravimetric separation of a mainly oleic phase, lighter and of a predominantly protein phase, heavier; • gravimetric separation of solutions of said NPK salts of different titres • taking of clarified water. The device is characterized in that it comprises a basin (1) divided into various zones (V1), (V2), (V3), in each of which biological reactions occur, in accordance with the claimed method, said zones being all communicating and identified by suitable separation baffles, in particular: • a first baffle (2) extended from a first end (1a) of the basin to a second end (1b) of said basin (1), dividing it into two parts; • a second baffle (3), of height equal to said first baffle that divides one of said parts in a first zone (V1) and in a second zone (V2) extending from said first end (1a) of the basin (1) until it reaches the vicinity of said second end of the basin (1), so that said two zones (V1) and (V2) are communicating through an opening, of substantially vertical development, between the end of said second baffle (3) and the second end (1b) of the basin (1); • a plurality of baffles (4) and (5) transversely arranged to said first baffle (2) and inside a third zone (V3), delimited by said first baffle (2), said third zone (V3) being placed in communication with said second zone (V2) through a transfer pipe (6), positioned at about half height of said first baffle (2); • two blocks (B) and (C), placed in the upper part of said basin (1) and provided by taking means (12, 12a, 13, 13a), each of said blocks (B) and (C) including a plurality of vertical pipes and being fitted to carry out a gravimetric separation of the gases that are generated during the treatment of said mixture; said baffles (2) and (3) and said transfer pipe (6), by identifying a path crossed by the liquid mixture to be treated, that runs into the beginning of said first zone (1) where it is placed an inlet pipe (7) of the liquid mixture to be treated and comes out from various points of said third zone (V3).

(FR): La présente invention concerne un procédé et un dispositif pour la mise en œuvre dudit procédé, pour décomposer et extraire sélectivement du méthane, du dioxyde de carbone, des sels de NPK (sels d'azote, de phosphore et de potassium) de titres divers et de l'eau clarifiée, à partir d'une matrice organique; lesdits composants constituant la matière première pour d'autres procédés industriels. Le procédé est caractérisé en ce qu'il comprend les phases suivantes : mise en œuvre d'une phase hydrolytique, constituée par l'action de fission au moyen de l'eau, par hydratation; mise en œuvre d'une phase d'acidogénèse au moyen de bactéries spécifiques; mise en œuvre d'une phase d'acétogénèse au moyen de bactéries spécifiques; mise en œuvre d'une phase de méthanogénèse, au moyen de bactéries spécifiques, avec séparation gravimétrique simultanée d'une phase principalement oléique, plus légère, et d'une phase principalement protéique, plus lourde; séparation gravimétrique de solutions desdits sels de NPK de titres différents; prélèvement de l'eau clarifiée. Le dispositif se caractérise en ce qu'il comprend un bassin (1) divisé en différentes zones (V1) (V2), (V3), dans chacune desquelles ont lieu des réactions biologiques, conformément au procédé de l'invention, lesdites zones étant toutes communicantes et identifiées par des chicanes de séparation appropriées, en particulier : une première chicane (2) s'étendant d'une première extrémité (1a) du bassin jusqu'à une deuxième extrémité (1b) dudit bassin (1), le divisant en deux parties; une deuxième chicane (3), de hauteur égale à celles de ladite première chicane qui divise l'une desdites parties en une première zone (V1) et en une deuxième zone (V2) s'étendant entre ladite première extrémité (1a) du bassin (1) et le voisinage de ladite seconde extrémité du bassin (1), de sorte que lesdites deux zones (V1) et (V2) communiquent par une ouverture, de développement sensiblement vertical, entre l'extrémité de ladite deuxième chicane (3) et la seconde extrémité (1b) du bassin (1); une pluralité de chicanes (4) et (5) placées transversalement par rapport à ladite première chicane (2) et à l'intérieur d'une troisième zone (V3), délimitée par ladite première chicane (2), ladite troisième zone (V3) étant mise en communication avec ladite deuxième zone (V2) par un tuyau de transfert (6), placé à environ la moitié de la hauteur de ladite première chicane (2); deux blocs (B) et (C), placés dans la partie supérieure dudit bassin (1) et munis de moyens de prélèvement (12, 12a, 13, 13a), chacun desdits blocs (B) et (C) comprenant une pluralité de tuyaux verticaux et étant conçu pour effectuer une séparation gravimétrique des gaz qui se dégagent pendant le traitement dudit mélange; lesdites chicanes (2) et (3) et ledit tuyau de transfert (6) délimitant un trajet emprunté par le mélange liquide à traiter, qui s'étend du début de ladite première zone (1) dans laquelle est placé un tuyau d'entrée (7) du mélange liquide à traiter et sort par différents points de ladite troisième zone (V3).

International search report:

Received at International Bureau: 02 May 2016 (02.05.2016) [EP]

International Report on Patentability (IPRP) Chapter II of the PCT:

Not available

(81) Designated States:

AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

European Patent Office (EPO) : AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR

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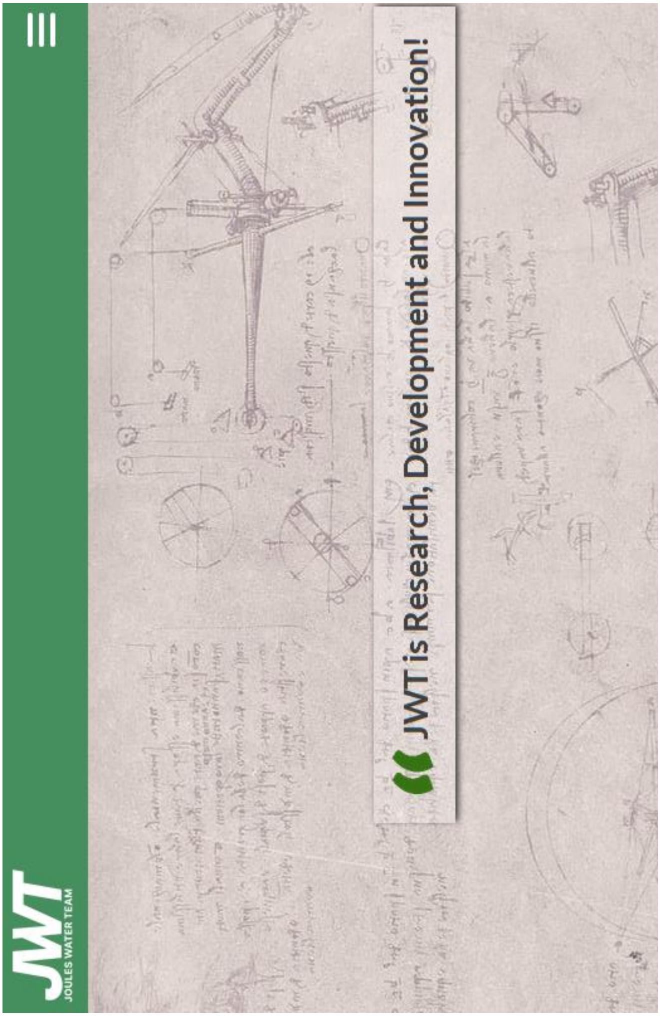
Declarations:

Declaration made as applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate

Declaration of inventorship (Rules 4.17(iv) and 51bis.1(a)(iv)) for the purposes of the designation of the United States of America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