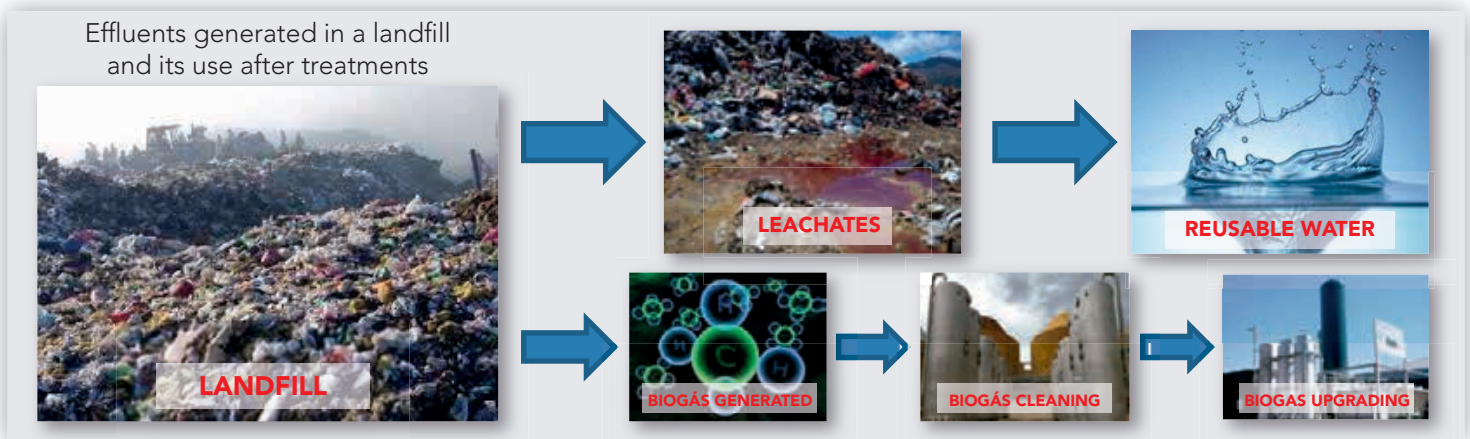


Integral solution for landfills

We are specialists in Environmental Audits, Leachate and Biogas Treatments

We supply novel systems for **waste recovery in landfills**: leachate purification, biogas cleaning and enrichment treatments.

In addition, our **extensive experience** in these facilities accredits us to perform a **complete audit** of the landfill. With our study, we detect errors and propose the necessary **solutions to move from an economic and environmental problem to a resource**. Of the leachates we can obtain reusable water for processes, and of the biogas a biofuel on the rise.



Environmental Audits of Landfills



We have been studying the state of production and storage of liquid and gaseous effluents in **landfills all over the world to improve their management**. They have requested our services from Spain, Chile, Brazil, Argentina...

With the **aim of minimizing leachate production and maximizing biogas production**, we analyze waste management as well as rainwater management. As a result of the audit, a **report** will be generated which will reflect the actual situation and provide the **solutions** we deem appropriate, in order to achieve the objectives set.

WORKS INCLUDED IN THE AUDIT

Field visits for the general inspection of the landfill: waste disposal area, rainwater network, degassing network and measurement, leachate collection network and accumulation pond area...

Technical meetings with personnel: meetings with waste managers, collection and management lines for biogas and leachate, and maintenance of the landfill...

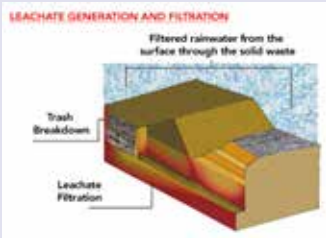
Documentary control: review of waste entry histories (typology and control of the discharge zone), pluviometry, levels of leachate accumulation ponds and the influence of their evaporation, water balance and future projections, biogas production, complete analytical...

Leachates treatment

Leachates are liquids that form as a result of passing through a solid. This fluid, which **is not combustible**, is dragging different particles from the organic remains it crosses, so leachate from the landfills is one of the most polluted and complicated water to deal with that we can find, mainly due to its high saline component and high organic load.

In DimWater Engineering we have created **special membrane modules** to treat leachate and purify contaminated water, starting from the premise of using the **open channel modules** for such treatment.

Negative impacts of leachate



If the waste is not well managed, the leachate and the bacteria that cause the diseases that can contain, can be filtered in the soil, ending in underground currents, lakes, rivers or swamps.

It would cause its contamination in the long term, threatening its purity and assuming a serious risk for the ecosystem.

Advantages of treating leachates

- Increase of landfill volume, being able to fill with more waste.
- It favors the compaction and prevents its instability.
- More capacity to generate biogas.
- We obtain water suitable for new uses.
- Avoid high fines for non-compliance with environmental regulations.



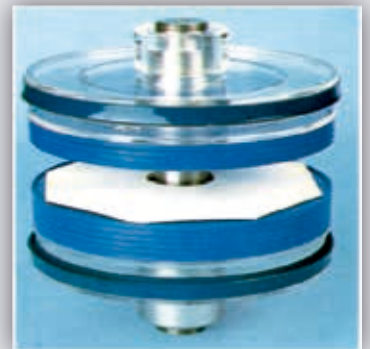
SPM MODULES SYSTEM

Mounted in a **horizontal position**, a fluid dynamics has been created that reduces the incrustations on the membrane and facilitates cleaning tasks. The SPM module **combines the advantages of the spiral module (larger membrane surface) and the disc module (open channel for cleaning)**. This is due to the use of a dynamic separator in parallel between the different layers of membranes (flexible open channel separator). In addition, the SPM module has other improvements, such as the use of a membrane that offers **superior permeability (25%)** to conventional membranes, and allows cleaning at temperatures above 40°, making them more effective. All this allows you to offer low load losses and low differential pressures.



DFC MODULES SYSTEM

Element in spiral, formed by a pressure tube and hydraulic discs, mounted **in vertical position**. This module uses the concept of spiral membrane but with a significant improvement in the high flow, **since 45° open channels have been incorporated that allow efficient cleanings and with low fouling**. Inclusion of the anti-telescopic device (ATD) of mechanical safety lock. The entrance and exit of hydraulic flanges (POM) allow the proper distribution of the flow.



Advantages and benefits of our modules

Easy maintenance. It does not require periodic analytical controls. Quick installation and commissioning. They allow treating low, medium and high load leachates, retaining all salts and contaminants, and resulting in high purity water. Prevents rapid soiling and reduces the risk of clogging membranes and their constant washing cycles. Longer life of the membrane module. Saves time, energy and water between washing and washing.

Cleaning and Conditioning of Biogas

Biogas is a combustible gas that is generated by the **microbiological decomposition** of organic matter (residues) under **anaerobic conditions** (absence of oxygen) due to the sealing of the landfill. Our cleaning and conditioning plants **remove unwanted compounds** from the biogas stream as they are mainly: water vapor, foams, particles, H₂S, siloxanes and VOCs.

DimWater Engineering has developed a biogas cleaning technology that **reduces operating costs** (increases up to 3 times the duration of activated carbon) by ensuring a suitable gas for use in the generation of electricity and/or heat and **extending the life of the engines that consume this biogas**.



Stages of our novel system:

- Cooling up to 2-4 °C for the reduction of moisture level, part of siloxanes and VOC's.
- Washing the gas for the reduction of acid gases (H₂S) and ammonia (NH₃).
- Post-cooling of the biogas to condition it for its use.
- Activated carbon absorption for the complete elimination of siloxanes and halogen compounds.

Advantages of our treatment:

- Easy installation, operation and maintenance.
- Compact and high technology equipment.
- Modular system based on needs.
- Continuous operation since commissioning.
- Possibility of work in aspiration or drive.
- Integrated particle and droplet separation system.

Great International References:



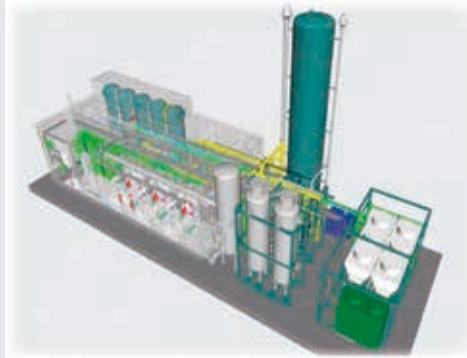
In Mexico we manufacture **the world's largest biogas cleaning plant in a WWTP**, with a throughput of 14,000 Nm³/h. This work was the winner of the 3rd edition of the IDB's Infrastructure 360° Award.

In a landfill in Chile we have delivered our **integrated technology in a 40-foot container**, with a treatment capacity of 1,000 Nm³/h, which generates 2 MW/h of electrical power.

Biogas Enrichment (Upgrading)

DimWater Engineering supplies a special technology that allows the **purification of biogas to transform it into biomethane, increasing its quality to 98% purity** (like Natural Gas), which is an attractive alternative to fossil fuels. It can be injected directly into the conventional gas pipelines, or used as **biofuel for means of transport**.

Our upgrading plants are capable of handling high gas flows, consuming on average only 0.01 €/kWh, and complying with the International Standards for Environmental Regulation.



Phases of the biogas enrichment process:

- 1. COMPRESSION:** The raw biogas is first compressed.
- 2. CONDENSATION:** Thereafter condensation of the contents in the exchange system occurs.
- 3. ELIMINATION:** Subsequently the contaminants are eliminated through a specific adsorbent material: hydrogen sulfide (H₂S), CO₂, H₂O, and Siloxanes. And finally the NH₃ and the odors are eliminated. It also partially removes oxygen and nitrogen, thus obtaining the biomethane gas.

Biofuel for Automotive:

Environmental Benefits: Emissions of nitrogen oxides (NO_x) and more than 95% of the particulate matter are reduced by up to 85%. It does not emit sulfur dioxide (SO₂). Does not contain lead or traces of heavy metals. The carbon dioxide (CO₂) emissions are reduced by up to 30%.

Acoustic Benefits: CNG engines produce up to 50% less noise emission and vibration.

Economic Benefits: Between 25% and 50% savings compared to a conventional vehicle.

Benefits

- **It does not contaminate the environment or generate additional costs**, as it does not generate wastewater or chemicals in the process.
- Movable units of **easy transport and assembly**, which reduce their maintenance.
- **Mounting in modules** (container).
- **Quick installation and commissioning.**

TYPES OF PLANT

| | PSA250 | PSA500 | PSA750 | PSA1000 | PSA1200 | PSA1400 |
|---------------------------------|--------|--------|--------|---------|---------|---------|
| Biogas Flow | 250 | 500 | 750 | 1000 | 1200 | 1400 |
| Biomethane flow produced | 125 | 260 | 390 | 520 | 624 | 728 |
| Power Consumption | 60 | 120 | 180 | 240 | 290 | 340 |
| Dimensions | 21x6 | 21x6 | 24x6 | 24x6 | 24x6 | 24x6 |