switching on the biogas resource

a new source of renewable energy
Increasingly, industries have to face difficult environmental and social challenges while improving their bottom line.

Companies can meet both objectives with our biogas solutions.
increase revenues and reduce costs

generate renewable energy from waste and by-products

improve your social and environmental performance
### Increase Revenues and Reduce Costs

<table>
<thead>
<tr>
<th>Revenue</th>
<th>Waste Savings</th>
<th>Energy Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,500 kWh</td>
<td>50% Reduction of sludge production by more than half leads to waste management savings</td>
<td>20% Reduction of your entire plant’s energy consumption by more than 20%</td>
</tr>
</tbody>
</table>

1 ton of COD* generates 3,500 kWh of biogas energy that can be resold to local businesses and households. For example, in France, a dairy with 1,500 tons/year of COD can make as much as 800,000 €.

*Chemical Oxygen Demand: measures the amount of organic compounds in wastewater

### Generate Renewable Energy from Waste and By-products

<table>
<thead>
<tr>
<th>Meat &amp; Dairy</th>
<th>Fruit</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 kWh</td>
<td>500 kWh</td>
<td>115 kWh</td>
</tr>
</tbody>
</table>

1 ton of animal fat can generate 600 kWh of usable energy.
1 ton of apple pomace can produce 500 kWh of usable energy.
Waste generated by the production of 1 ton of paper leads to 115 kWh of usable energy.

### Improve Your Social and Environmental Performance

<table>
<thead>
<tr>
<th>Public Health</th>
<th>Carbon Footprint</th>
<th>Community Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>90% Using biofuel instead of fossil fuel reduces CO₂ emissions from transport fleet by up to 90%</td>
<td>35 m² 1 m³ of biomethane reinjected in the grid meets the daily heating needs of a 35 m² apartment in your local community</td>
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Biofuels reject 80% less nitrogen oxide (NOₓ) than fossil fuels and zero carcinogenic fine particles.

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unlocking a new source of renewable energy
improve your bottom line with biogas

enhance your social, environmental and financial bottom lines

YOUR RESOURCE
- by-product
- effluents
- sludge

OUR EXPERTISE
- electricity
- fuel
- heat
- plants
- fleet
- local community

YOUR BENEFITS
- save energy
- improve your reputation
- earn direct revenue
we let you focus on your core business by managing every step of your biogas project

**consulting & project conception**
- Optimization of your biogas production
- Identification of the best recycling applications

**engineering & construction**
- Compliance with health, safety and environmental standards
- Investment cost savings

**operation & maintenance**
- Enhanced lifespan of equipment
- Operational cost savings

**biogas as a resource**
- Provide electricity and heat for your plant (boiler and cogeneration)
- Provide fuel for your fleet
- Sell biomethane to your community

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understanding the biogas loop

SUEZ is the only actor to master the entire value chain

biogas is a powerful source of renewable energy

1. Anaerobic digestion and biogas production
   - Collection of Food & Beverage and Pulp & Paper industries, and agriculture wastes

2. Municipal Organic Waste
   - Selective collection of municipal waste (food wastes, kitchen, canteen, green wastes)

3. Municipal Wastewater
   - Treatment of Municipal wastewater and sewage sludge

4. Multi feed-stock anaerobic digestion and biogas production
   - Bio-deconditioning, homogenisation, sanitation
   - Reduction of sludge and waste volume by anaerobic digestion
   - Production of a green gas

5. Cogeneration
   - Energy self-sufficient wastewater treatment plants
   - Production of electricity and heat for homes and businesses
6. Biogas upgrading and biomethane
- Production of biomethane which is the first step to generate biofuel and green gas
- 99% of energy recovery

7. Injection into the natural gas network
- Reduced onsite biogas storage
- Energy storage into the network
- Production of green gas

8. BioCNG/BioLNG and CO₂
- Local, green and renewable fuel sources
- Significant savings over fossil fuel
- Recovery in industries (cold chain, agricultural, chemical)

9. Valorization of digestates
- Land spreading
- Composting
- Organic fertilizers
- Waste to energy

10. Nitrogen and phosphorus recovery
- Agriculture reuse
- Substitution to commercial fertilizers
SUEZ is at the cutting edge of biogas recovery

- 1 laboratory
- 19 dedicated patents
- 1 TWh produced/ year
- 170 biogas plants across the world
- more than 10 M€ invested by SUEZ in R&D
ZUVAMESA
Zumos Valencianos del Mediterraneo (Zuvamesa) produces juices in Puerto de Sagunto close to Valencia in Spain. Its facility is one of the biggest not-from-concentrate juice plants in Europe.

Client expectations
- Increase effluent treatment capacity without expanding current facilities
- Reduce the average cost for wastewater treatment
- Reduce impact on the environment

Solution
- Design, construction, operation and maintenance of an anaerobic digestor integrated in the existing infrastructure.
- The biogas generated was then used as fuel for boilers and other processes.

Value
- 40% increase in the total treatment capacity
- 20% reduction in operating costs
- 40% reduction in energy consumption
- 80% reduction in sludge production
- 50% reduction in chemical consumption

Heineken
Heineken is the 3rd largest brewer in the world. In the United Kingdom, the company operates the emblematic John Smith’s brewery, one of the largest in the country.

Client expectations
- Avoid weekly environmental breaches caused by abnormal ammonia and hydrogen sulfide emissions
- Maximize green energy potential to improve sustainability

Solution
- Energy efficiency audit
- Installation and maintenance of a new bioreactor tailored to the site’s needs and a gas scrubber to remove pollutant
- On-site laboratory support
- The biogas generated is redirected to on-site boilers to produce steam or converted in electricity to power plants

Value
- Reduced costs
- Full environmental compliance
- 6 MWh of sustainable energy produced per day

“SUEZ has clearly improved the management and control of the plant. It has succeeded in implementing a solution that no one had thought of before!”

UK Environmental Agency