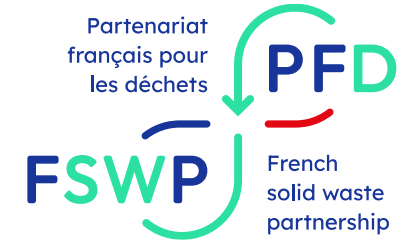




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**93% of waste in low-income countries goes to uncontrolled dumping**

source: World bank, What a Waste 2.0

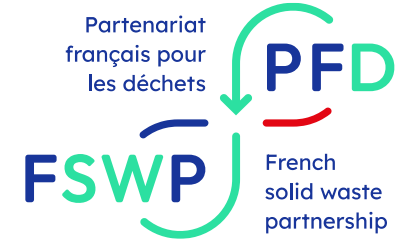




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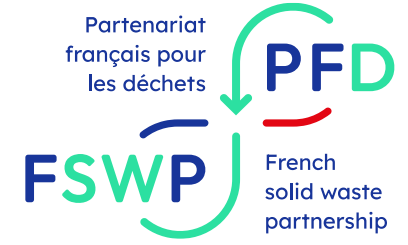


**Waste in low-income  
countries contains  
50 to 80% organic waste**





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Mismanaged organic waste  
emits :  
20% of global methane

Source: Global Methane Hub



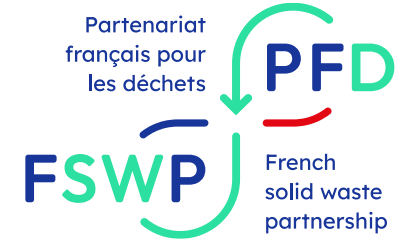


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# Taking action now to reduce methane emissions is 3 times more effective\*

\*to reduce short term global warming than reducing CO<sub>2</sub> emissions





WASTE FOR ALL  
SDG

HOLISTIC WASTE  
MANAGEMENT/  
METHANE REDUCTION

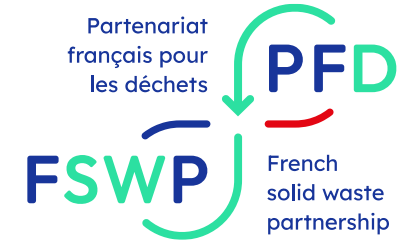


CHINA - Shaoyang



# Restaurant food waste recovery

Reducing sanitary health risks, promoting waste to energy



Diverting restaurant food waste from animal farms use, through dedicated collection and treatment systems:



- Introduction of a dedicated collection system for restaurant food waste
- Collection and pre-treatment of used food oils
- Anaerobic digestion facility producing biogas for heat and power co-generation
- Financial viability of the operations through:
  - Waste collection tax
  - Sales of oil, electricity and heat

## CLIMATE BENEFIT:

- > 70 kTonCO<sub>2</sub>eq/y **avoided** compared to former situation (methane emissions from biowaste)
- > Green energy production

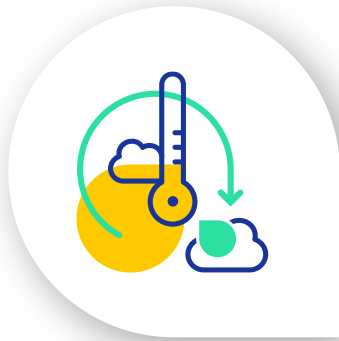
## CO-BENEFIT:

- > Reducing major public health risks through proper management of biowaste
- > 174 jobs created

➔ [FOCUS | La gestion des déchets solides | AFD - Agence Française de Développement](#)



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WASTE & CLIMATE  
CHANGE

WASTE TO  
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FRANCE – Greater Paris



# Organic waste recovery

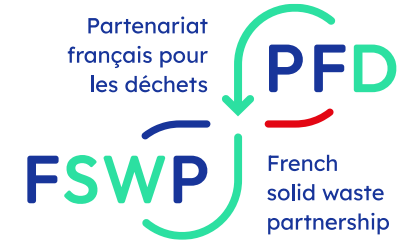
Supporting local authorities to sort, collect and treat domestic food waste



**Mandatory source separation of organic waste as of January 2024:**

- Collection schemes : on-site composting, door to door collection, voluntary deposit
- Targeting 100 kTon/year of biowaste collected in the service area
- Construction of a methanizer on the river port of Gennevilliers by 2026 to produce biomethane and organic fertilizers

➔ [Plan Biodéchets : améliorer le tri et la valorisation des déchets alimentaires - Sycotom \(sycotom-paris.fr\)](#)



## CLIMATE BENEFIT:

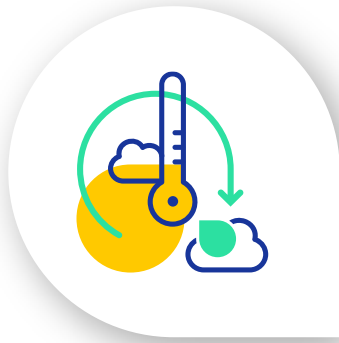
- > Biogas production
- > Organic fertilizer use, to avoid GHG emissions from chemical fertilizer production

## CO-BENEFIT:

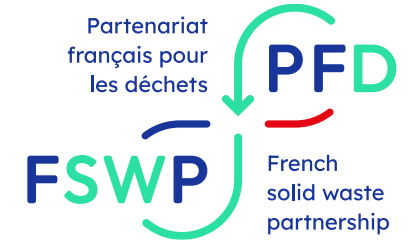
- > Citizens' awareness on reducing food waste and recovering the value of waste



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# CoMétha Pyrogazification Project



A disruptive technology opposing incineration and complementary with methanization

WASTE & CLIMATE CHANGE

WASTE TO RESOURCES



FRANCE - Paris



## From R&D to a full-scale pilot

- Treat a mix of organic waste, including food waste and sewage sludge
- Maximize the transformation of organic matter into syngas
- Minimize the volume of solid residues (ashes)
- Recover nutrients (nitrogen and phosphorus)

## CLIMATE BENEFIT:

- > Renewable energy production
- > Phosphorus recovery, to avoid GHG emissions from phosphorus mining

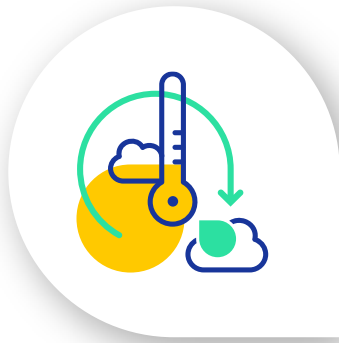
## CO-BENEFIT:

- > Synergies between organic waste producers
- > New type of contracting models to support innovation
- > Nutrient recovery

➔ [Cométha \(cometha.fr\)](http://Cométha.com)

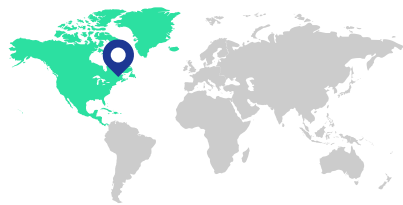


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CARBON SINK



CANADA - Quebec



# Biochar to regenerate soil health

## Pyrolysis conversion of unused biomass into biochar and bioenergy



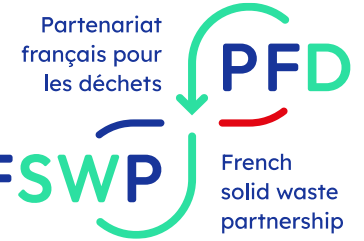
Biochar application in soil stores carbon while improving soil health and productivity.

The first of its kind plant is set up in Quebec:

- Phase 1: 10 kT biochar/y by end 2024
- Phase 2: ramp-up capacity up to 30 kT biochar/y

SUEZ has the ambition to sequester 800 kTon CO<sub>2</sub>eq/y by 2035.

→ [Carbonity - Décarboner grâce au pouvoir du biochar](#)



### CLIMATE BENEFIT:

- > 1 ton of biochar produced  
~ 2.7 ton of net CO<sub>2</sub> sequestered

- > Green energy production  
~ 50 GWh/y of bioenergy surplus for a 20kt/y biochar plant

### CO-BENEFIT:

- > Regenerate soil biodiversity and productivity
- > Improve and sustain soil health







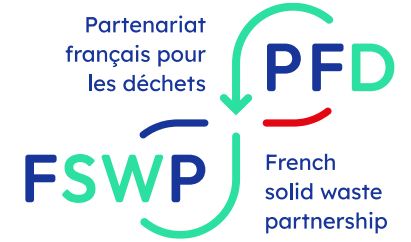
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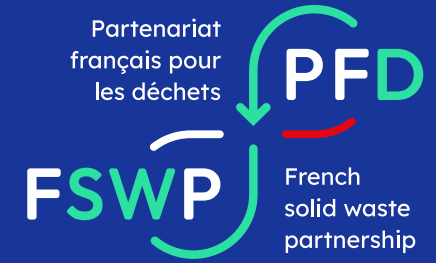


**Municipal waste is expected to rise  
to ~ 4 B Ton /y by 2050  
a 73% increase\* compared to 2020**

**\* with high variability between geographic zones.**

Source: *What a waste, World Bank*





**Waste sector = 5% of global emissions in 2016  
(1.6 Billion Tons CO<sub>2eq</sub>/year)**

**Business as Usual  
= 2.6 Billion Tons CO<sub>2eq</sub>/year by 2050**



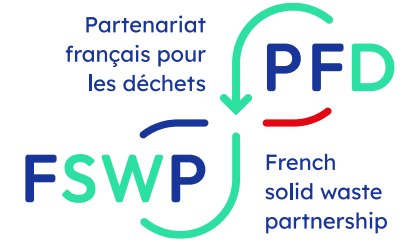
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## Pathways for waste to address the climate urgency :

### # 1 - Reduce waste volumes\*

\* reduces emissions associated to production of goods, transport and treatment





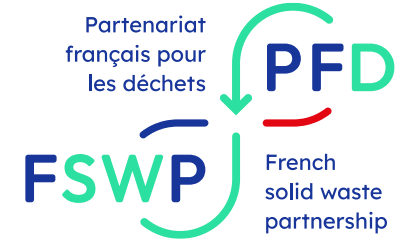
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Pathways for waste to address the climate urgency :

# 2 - Improve waste collection to reduce flooding risks\* & pollution

\* prevents drainage blockages



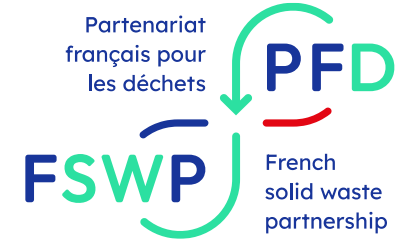


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**Pathways for waste to address the climate urgency :**

**# 3 - Improve waste collection routes to reduce transport emissions**





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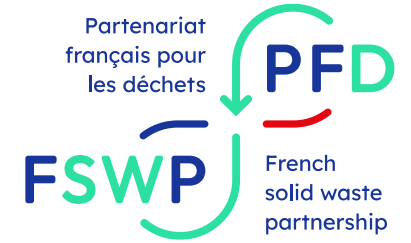


Pathways for waste to address the climate urgency :

# 4 – Reuse\* and recycle\*\*

\*reduces production of goods

\*\*low-carbon raw materials





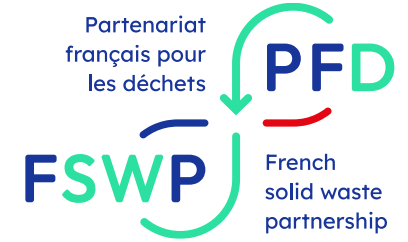
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**Pathways for waste to address the climate urgency :**

## **# 5 – Transition\* to engineered landfills with methane recovery**

**\* Rehabilitate dumpsites and controlled landfills**





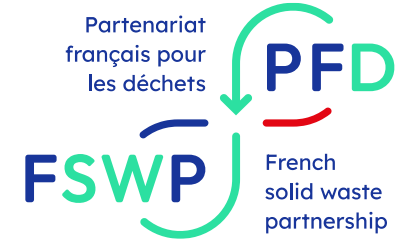
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Pathways for waste to address the climate urgency :

# 6 – Recover\* the energy from waste

\*while avoiding methane leakage







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WASTE TO  
RESOURCES



FRANCE - Limay



# Recycled PET production

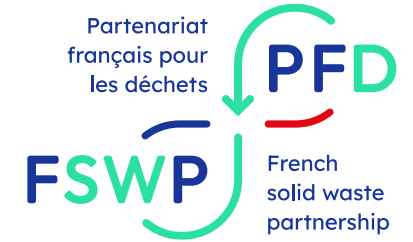
France Plastique Recyclage



Production of recycled plastic (rPET) as a substitute for primary PET

- 45,000 t/year of PET bottles from selective collection processed
- 41,000 t/year rPET produced

→ [France Plastiques Recyclage : dernière ligne droite pour les travaux d'extrusion - Paprec](#)



## CLIMATE BENEFIT:

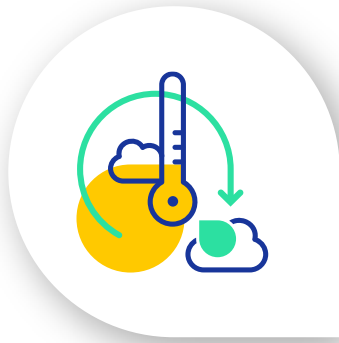
- > rPET generates 70% less CO<sub>2</sub> than primary PET
- > 50 kTon CO<sub>2</sub>eq avoided by 2022 by using rPET in place of primary PET

## CO-BENEFIT:

- > Increases the sustainability of the bottled water industry.

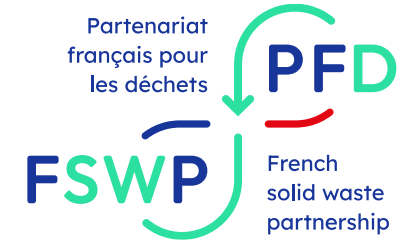


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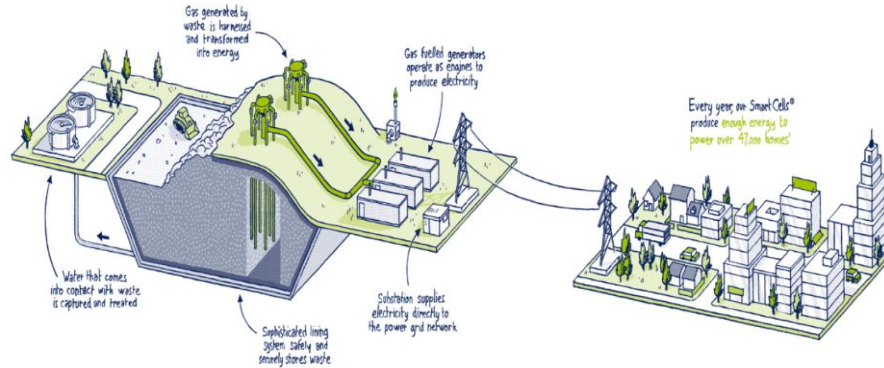
# Green landfill to energy

## Integrated infrastructure to replace dumpsites



WASTE & CLIMATE CHANGE

WASTE TO ENERGY/  
METHANE REDUCTION



### An innovative financing model for waste treatment in developing economies

- Produce biomethane, produce electricity
- Improve waste management from open dumpsites to environmentally controlled landfills
- The case of Meknes, Morocco:
  - 200 kTon/ y of waste safely managed
  - 70% reduction in emissions by 2033
  - 5,500 MWh/y production capacity

### CLIMATE BENEFIT:

- > Methane capture
- > Production of renewable energy

### CO-BENEFIT:

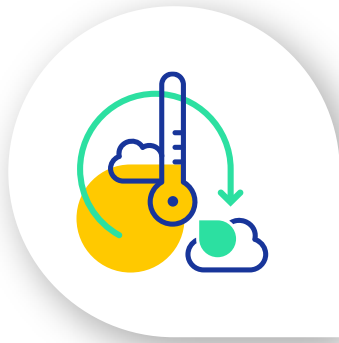
- > Land value enhancement
- > Reduced pollution through leachate treatment
- > Improved energy autonomy



➔ [A waste recovery centre in Meknes combines the fight against global warming with social innovation - SUEZ Group](#)

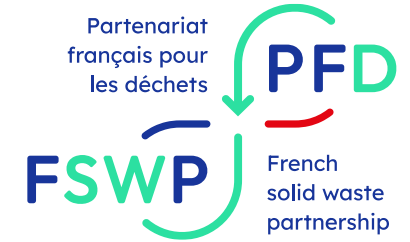


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# WAGABOX<sup>®</sup> technology

A benchmark solution for landfill gas purification for recovery



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CHANGE

WASTE TO ENERGY/  
METHANE REDUCTION



EUROPE AND NORTH  
AMERICA



**Coupling membrane filtration and cryogenic distillation to upgrade landfill gas into grid compliant biomethane**

- Improvement in energy yield compared with cogeneration
- Optimized methane capture as there is no limitation in air concentration in landfill gas
- Example: WAGABOX<sup>®</sup> in Claye-Souilly, France
  - Capacity: 130 GWh/y
  - 21,000 kg CO<sub>2</sub>eq avoided/y
  - 20,000 households supplied with biomethane

## CLIMATE BENEFIT:

- > 142 kTon CO<sub>2</sub>eq avoided (since 2017) compared to former landfill operation scenario
- > Green fuel for transport and industry
- > Methane emissions reduction

## CO-BENEFIT:

- > Improving landfill operation



➔ [Technologie - Waga Energy \(waga-energy.com\)](https://waga-energy.com)



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SDG

HOLISTIC WASTE  
MANAGEMENT



OMAN - Muscat



# Barka Landfill

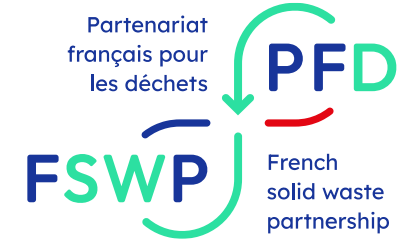
A landmark of the Omani journey from open dumpsites to 100% controlled solid waste treatment



BARKA LANDFILL

2,500 t/day are highly compacted and readily covered with soil to reduce emissions

- Biogas is recovered; the installation of a gas engine is in planning; the capture of biogas from open cells is evaluated
- Leachate is treated; the permeate reused to cover the landfill operation needs; no discharge
- Tyres are processed in chips to fuel a nearby cement plant



## CLIMATE BENEFIT:

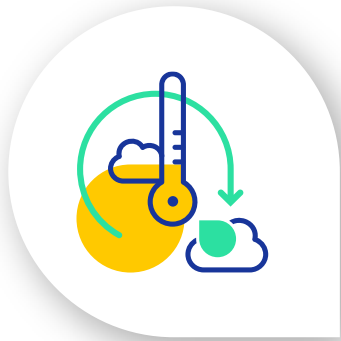
- > Methane emissions are significantly reduced
- > Green energy from biogas about to be harnessed

## CO-BENEFIT:

- > More than 1M people benefit of an improved environment
- > Water and soil pollution from open dumps is avoided
- > Multiple use of fossil carbon: from tyres to energy

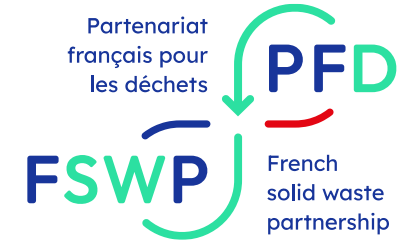


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# Non-recyclable waste into green energy

Heat and power production as an alternative to landfilling



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WASTE TO ENERGY



The Sète waste-to-energy plant:

- 55,000 t/y of non-recyclable waste processed in an 18.1 MW oscillating furnace to produce
  - 15.7 GWh of electricity
  - 23 GW of steam

**CLIMATE BENEFIT:**

- > Energy production

**CO-BENEFIT:**

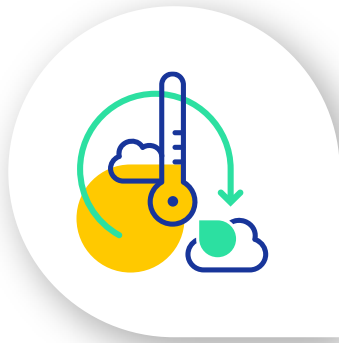
Energy autonomy :

- > Produces electricity for 4,000 to 6,000 households
- > Produces steam for an oil seed industry

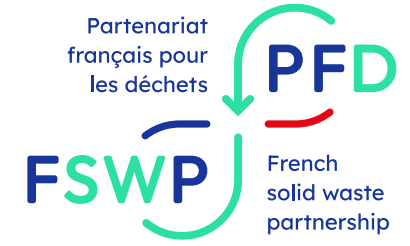


→ [L'éco-centre Ikos Fresnoy-Folny, pionnier de la méthanisation \(paprec.com\)](https://www.paprec.com)





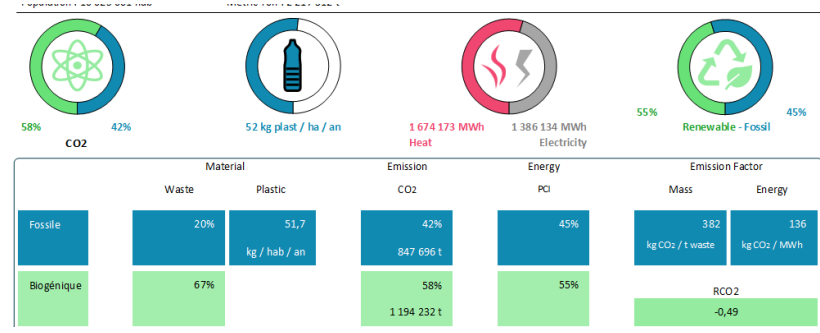
# MASSBIO<sub>2</sub> the CO<sub>2</sub> Dashboard



Assessing biogenic and fossil carbon fractions in incineration flue gas, waste and energy



From flue gas to waste composition... by measuring the origin of CO<sub>2</sub> (<sup>14</sup>C analysis)  
An algorithm assesses biogenic and fossil CO<sub>2</sub>, the waste composition, and the renewable energy fraction.



## CLIMATE BENEFIT:

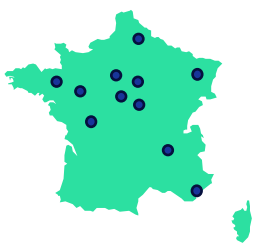
> Measure CO<sub>2</sub> emissions to understand waste composition and identify levers driving mitigation actions.

## CO-BENEFIT:

> Citizens and decision-makers awareness to reduce waste production  
> Metrics on waste composition to drive action

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WASTE TO ENERGY

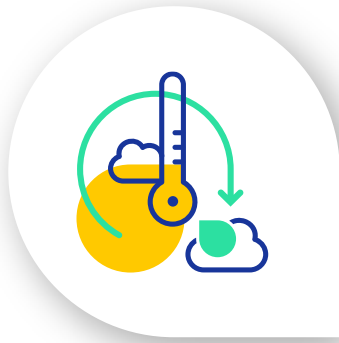


FRANCE - 11 locations



➔ [Nos innovations -R&D | Groupe Merlin \(cabinet-merlin.fr\)](https://cabinet-merlin.fr)





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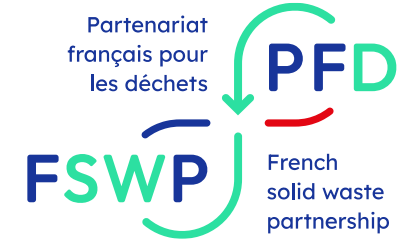
WASTE TO  
ENERGY



TÜRKIYE- Istanbul

# Istanbul Waste-to-Energy Plant

Istanbul Metropolitan Municipality - İSTAÇ A.Ş



Treatment capacity of 1.1 M/t waste per year

- Europe's largest waste to energy facility
- Electricity production by an 85 MW turbine = meets the needs of 1.4 million inhabitants
- Objective of carbon neutrality by 2053

→ [Décarbonation: Veolia devient l'opérateur du 1er site de production d'énergies à partir de déchets de Turquie | Veolia](#)

## CLIMATE BENEFIT:

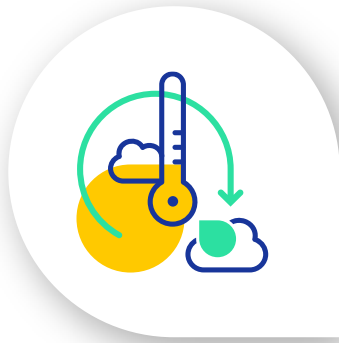
- > 1,4 M Ton CO<sub>2</sub>eq/y of carbon emissions are reduced (through reduced landfilling and transportation)
- > Green electricity production

## CO-BENEFIT:

- > Improve the environment for citizens
- > Improved energy autonomy

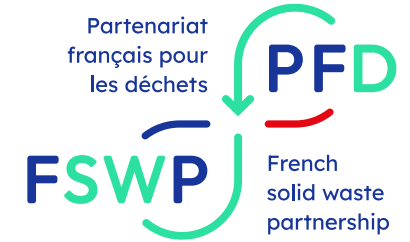


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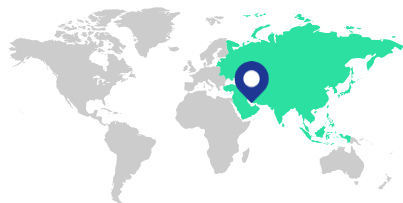
# Oil & Gas Waste Recovery

## The ecological transformation of the oil industry in the Middle East



WASTE & CLIMATE CHANGE

WASTE TO RESOURCES



United Arab Emirates- Abu Dhabi



### Hazardous waste treatment at Al Ruways: the largest oil refinery in the Middle East

- Maximize resource recovery (water and oil) from oil and gas industrial waste, for reuse on nearby OpCo's (ADNOC Operational subsidiaries) industrial sites (recovery and reuse of petroleum resources).
- Increase the green energy production capacity through an upcoming solar power plant

→ [Magma Corporate presentation](#)

### CLIMATE BENEFIT:

- > Reduced consumption of petroleum raw materials
- > Promoting a green economy

### CO-BENEFIT:

- > Reducing the environmental impact of industrial activities
- > Meet people's energy needs

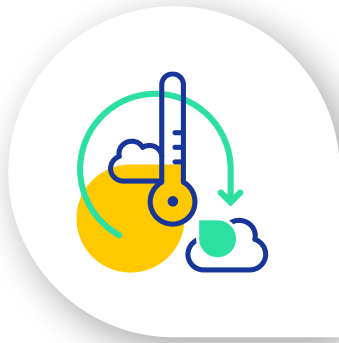


MAGMA  
ENVIRONMENTAL SERVICES  
operated by VEOLIA



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# Geothermal CO<sub>2</sub> capture

Leveraging CO<sub>2</sub> dissolution capacity in cold versus hot water

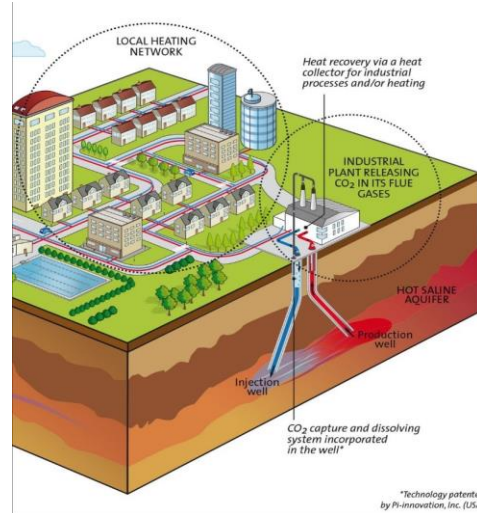
WASTE & CLIMATE CHANGE

CARBON SINK



FRANCE – Greater Paris

R&D project to combine a deep geothermal plant with permanent CO<sub>2</sub> storage of incineration flue gases.



The project aims to:

- Store 300,000 tons of CO<sub>2</sub> (40% fossil) in a deep aquifer
- Recover heat from the geothermal aquifer to supply district heating
- Reduce the amount of the future European tax on waste-to-energy emissions.

## CLIMATE BENEFIT:

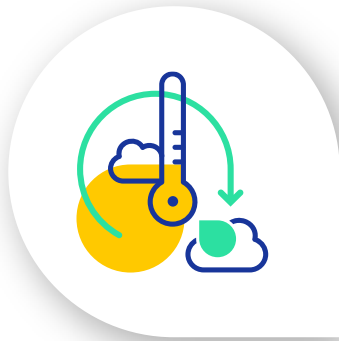
- > 300 kTon CO<sub>2</sub> to be captured
- > Harnessing renewable energy (heat)

## CO-BENEFIT:

- > Research partnership
- > Innovation can benefit others

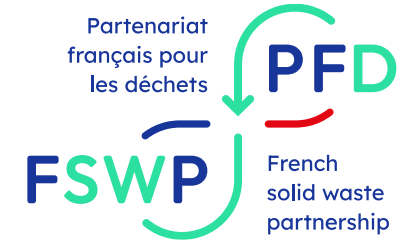


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# Ecocombust II

## Black pellets from wood waste as a substitute for coal



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CHANGE

WASTE TO  
ENERGY



FRANCE - Cordemais



### Wood waste conversion into black pellets to fuel the Cordemais coal-fired power plant

- Transformation of wood waste by steam cracking to produce 160,000 t of black pellets/year as an alternative fuel to coal.
- The plant uses 250,000 t/year of B-wood and 40,000 t/year of Solid Recovered Fuels.

### CLIMATE BENEFIT:

- > 6 million Ton CO<sub>2</sub>eq avoided over 20 years compared to fossil fuel
- > Fossil fuel substitution by renewable energy

### CO-BENEFIT:

- > Energy autonomy
- > Existing coal-fired power plant infrastructure can be leveraged to produce green energy

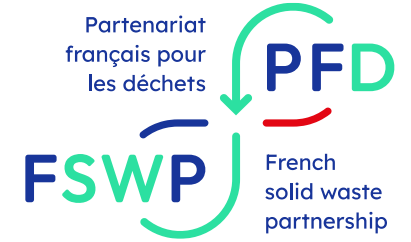




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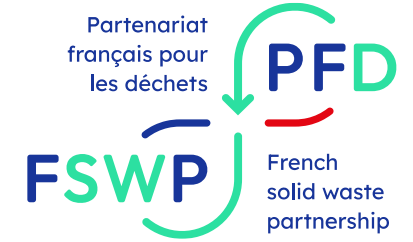


**Success factors to  
gradually improve a  
holistic, locally adapted  
waste management...**





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## Success Factors for holistic waste management:

# 1 – Decision making capacity  
through a governance  
framework





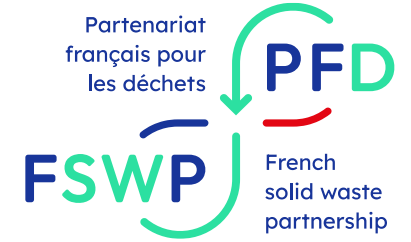
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**Success Factors for  
holistic waste management:**

**# 2 – A dedicated fiscal  
environment\***

**\*that allows the financing of prevention,  
eco-conception, collection and treatment**





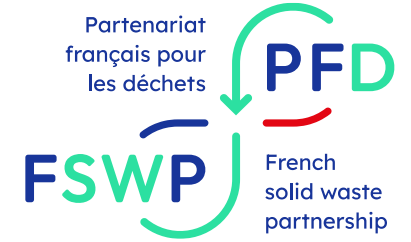
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## Success Factors for holistic waste management:

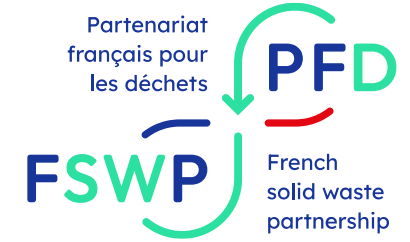
### # 3 – Adequate financial and human resources for local authorities in charge\* of waste

\*with the necessary leeway to experiment with solutions





**COP28**  
UAE



## Success Factors for holistic waste management:

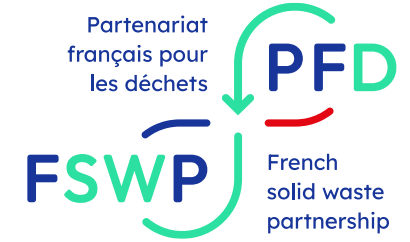
### # 4 – A legal framework that clearly defines roles and responsibilities\*

\*for all stakeholders' regarding prevention, collection and treatment.





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**Success Factors for  
holistic waste management:**

**# 5 – Regulation\* and control\* of  
waste management activities**

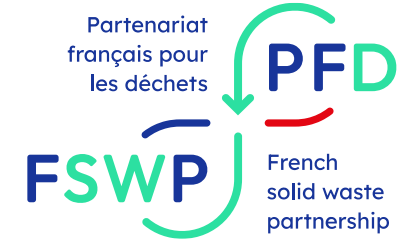
\* By independent and public authorities







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Success Factors for waste management **solutions:**

# 1 – Systemic approaches





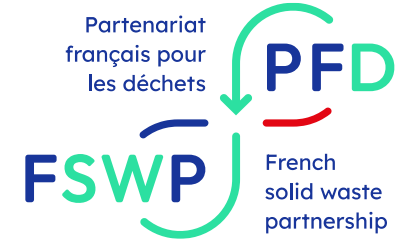
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Success Factors for waste management **solutions**:

**# 2 – co-construction\* with the local authorities & population**

\*acknowledging the local context and capacities





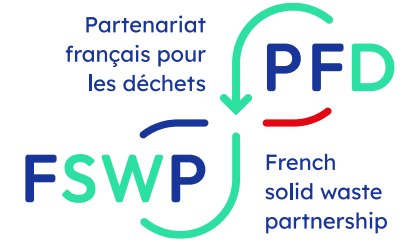
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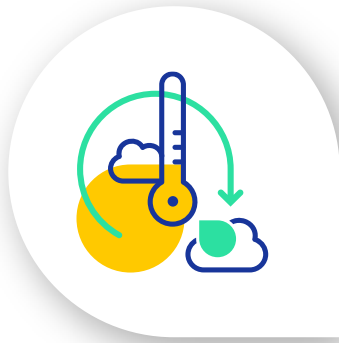


## Success Factors for waste management **solutions**:

### # 3 – clear & ambitious targets for

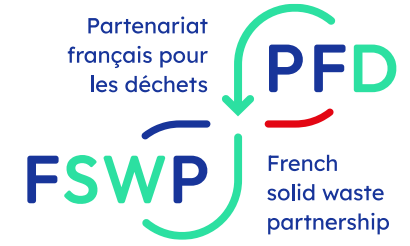
- prevention
- collection
- treatment
- resource recovery





# A waste to resources industrial system

A systemic approach to reduce landfilling, recycle materials, and produce energy



WASTE & CLIMATE CHANGE

WASTE TO RESOURCES



A municipal solid waste plant to valorize 80% of waste into new raw materials, solid fuels and biomethane

- Materials Balance : for 100,000 t/y of waste
  - Biomethane = 62 GWh/y
  - New raw materials = 6,000 t/y
  - Fertilising products = 12,000 t/y
  - Refuse Derived Fuel (RDF) = 150 GWh/y

## CLIMATE BENEFIT:

- > 23 % reduction of CO<sub>2</sub>eq emissions compared to baseline

## CO-BENEFIT:

- > Increased income allows to stabilise waste treatment cost
- > Landfill diversion
- > Scalable and adaptable to various waste streams & energy needs

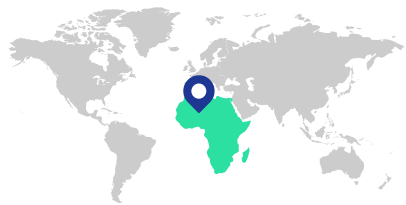
→ [Un projet d'économie circulaire | Trifyl](#)





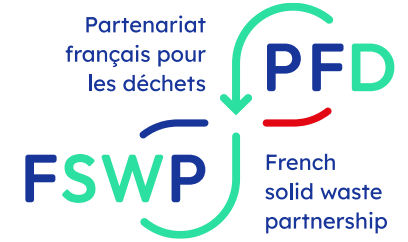
WASTE FOR ALL  
SDG

HOLISTIC WASTE  
MANAGEMENT



# Improving household waste management

## Towards a sustainable urban transition in Lomé



Holistic domestic waste management system in the Grand Lomé: 1.8M people, 300 kTon/y of solid waste.

An ongoing multi-tranch project since 2006:



- Improvement of the holistic solid waste management system and capacity building support
- Implementation of engineered landfills with long term biogas and leachate management
- Strengthening recovery & recycling initiatives,
- Improvement of the sector financial resources
- Gradual increase of performance requirements

### CLIMATE BENEFIT:

- > Reduced GHG emissions through improved collection and landfill operation conditions

### CO-BENEFIT:

- > Improved hygiene
- > Reduced pollution and drainage blockages causing chronic flooding
- > Capacity building

TOGO - Lomé



➔ [FOCUS | La gestion des déchets solides | AFD - Agence Française de Développement](#)

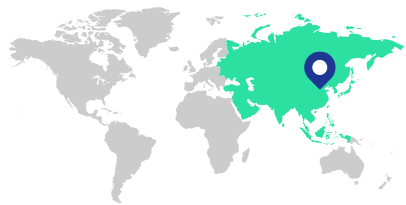


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WASTE FOR ALL  
SDG

BEHAVIORAL  
SCIENCE

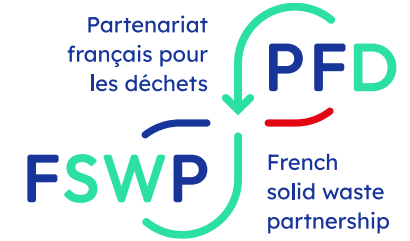


VIËT NAM - Hà Nội



# A women-led informal waste collection system in Hà Nội

Waste collection and recycling in a city overwhelmed by waste



Main highlights  
of this  
comprehensive  
study :



- 20% of urban waste is collected informally, mainly by women
- The informal sector is complex and composed of street collectors, waste deposit managers and recyclers
- Recycling practices are highly polluting for the environment and health

➔ [Collecter et recycler les déchets à Hà Nội - Acteurs, territoires et matériaux - \(EAN13 : 9782709929660\) | Un éditeur pour le développement \(ird.fr\)](#)

## CLIMATE BENEFIT:

Baselines for future policy development to

- > Reduce the pollution and emissions by improving the recycling techniques

## CO-BENEFIT:

Baselines for future policy development to

- > Improve working conditions of women collectors
- > Recognize and support the informal recycling system



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WASTE FOR ALL  
SDG

HOLISTIC WASTE  
MANAGEMENT

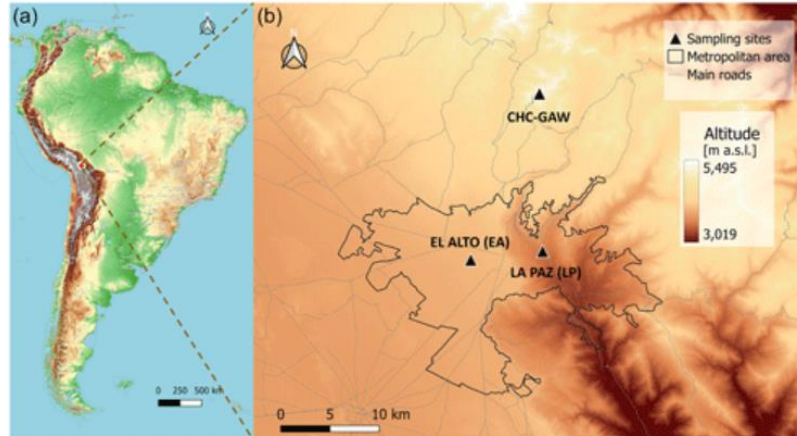


BOLIVIA - El Alto &  
La Paz



# Open-burning & Air quality

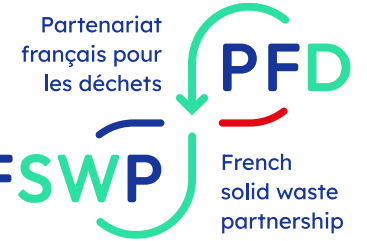
## El Alto and La Paz – evaluation of airborne particle pollution sources



This evaluation of airborne particle pollution sources in Bolivia show that:

- Local air pollution in La Paz is mainly due to road traffic but additional sources such as waste burning may have non-negligible impacts
- Waste burning contributes only 2 to 5 % of total PM10 but contains more than 50 % of the PAHs content which are carcinogenic components

➔ [Mardoñez, V. et al.: Source apportionment study on particulate air pollution in two high-altitude Bolivian cities: La Paz and El Alto, Atmos. Chem. Phys., 23, 10325–10347, https://doi.org/10.5194/acp-23-10325-2023, 2023.](https://doi.org/10.5194/acp-23-10325-2023)



### CLIMATE BENEFIT:

Baselines for future policy development to

- > Reduce the emissions of black carbon

### CO-BENEFIT:

Baselines for future policy development to

- > Improve air quality for citizens
- > Protect people's health



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WASTE FOR ALL  
SDG

HOLISTIC WASTE  
MANAGEMENT



South Pacific



# Strengthening national policies

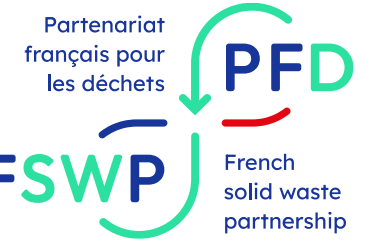
## Waste management and sustainable financing in insular territories

A regional initiative leveraging the cooperation between insular countries to prevent marine debris (plastic), used oil, post-disaster waste from degrading the environment :



- Support local authorities in drawing up comprehensive waste management policies
- Strengthen their capacity for action
- Improve existing infrastructures by setting up pilot projects
- Promoting sustainable financing

➔ [FOCUS | La gestion des déchets solides | AFD - Agence Française de Développement](#)



### CLIMATE BENEFIT:

- > Reduced GHG emissions from improved waste collection and treatment
- > Reducing drainage blockages and associated flood risks

### CO-BENEFIT:

- > Protecting ecosystems
- > 200,000 people with improved access to essential public services
- > Job creation

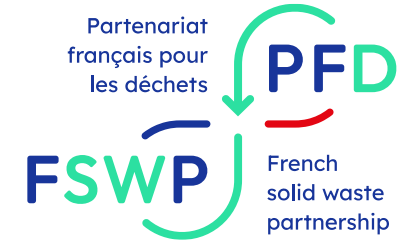






# Promoting integrated solid waste management in Senegal

PROMOGED



WASTE FOR ALL  
SDG

HOLISTIC WASTE  
MANAGEMENT/  
BEHAVIORAL SCIENCE



SENEGAL - Dakar &  
3 northern regions



Provide integrated solutions throughout the sector serving 6M people (2020-2026)

- Improve the regulatory, financial and fiscal framework of the sector
- Develop partnerships between the public authorities and private sector
- Rehabilitation of the Mbeubeuss Dakar dumpsite integrating the informal sector
- Foster a holistic waste management system

➔ [FOCUS | La gestion des déchets solides | AFD - Agence Française de Développement](#)

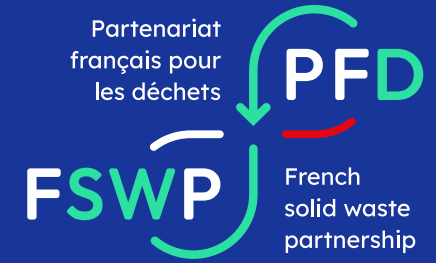
## CLIMATE BENEFIT:

- > 542 kTon CO<sub>2</sub>eq/y avoided compared to the uncontrolled dumpsite
- > Reducing drainage blockages and associated flood risks

## CO-BENEFIT:

- > 6 million people with improved quality of life
- > Reducing pollution
- > Job creation



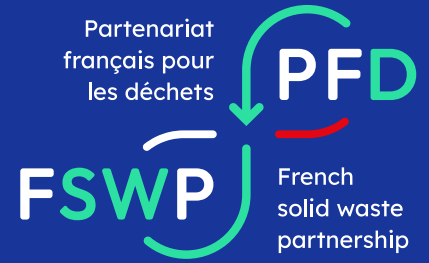


**Waste sector = 5% of global emissions in 2016  
(1.6 Billion Tons CO<sub>2eq</sub>/year)**

**Business as Usual  
= 2.6 Billion Tons CO<sub>2eq</sub>/year by 2050**



Case of France



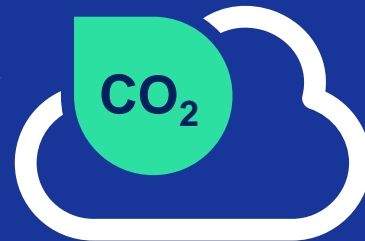
## Waste to energy (incineration)

~380 kg CO<sub>2eq</sub>/t of waste  
(from fossil-based products)

+

~550 kg CO<sub>2biogenic</sub>/t of waste  
(from organic content)

42%



58%



Case of France



Partenariat  
français pour  
les déchets

PFD

FSWP

French  
solid waste  
partnership

## Waste to energy (incineration)

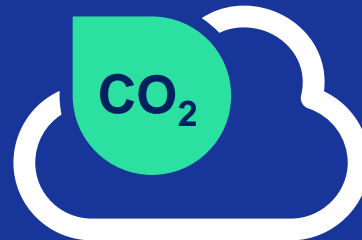
~ **0.3** MWh/ ton of  
waste 45% electricity  
55% heat

~ **140** kg CO<sub>2eq</sub> /MWh\*  
Emitted

\* Scope 1 & 2 emissions only,  
fossil emissions only.

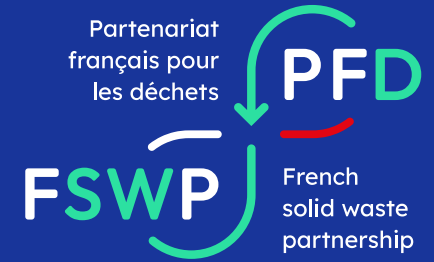
~ **180** kg CO<sub>2eq</sub> / MWh\*\*  
**Avoided**

\*\* Compared to the use of the  
French energy mix





Case of France



# Biowaste methanization

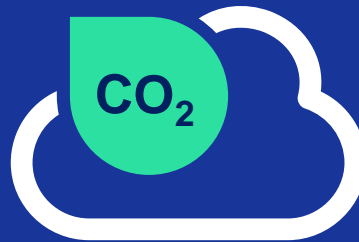
~ 1.1 MWh PCS  
biomethane / T biowaste

~ 45 kg CO<sub>2eq</sub>/MWh\*  
Emitted

\*Scope 1 & 2 of the energy  
production process only.

~ 240 CO<sub>2eq</sub>/MWh \*\*  
**Avoided**

\*\* Compared to the use of the  
French mix of natural gas





Case of  France

Partenariat  
français pour  
les déchets

PFD

FSWP

French  
solid waste  
partnership

# Biogas Recovery from Engineered Landfills

Operational  
practices:

**Good**

**Bad**

**Biomethane /t waste  
over the lifespan of the waste**

**~ 0.78 MWh/t\***

**~ 0.42 MWh/t\***

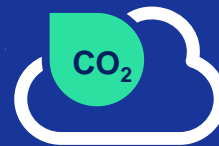
**CO<sub>2eq</sub> emitted /t waste  
over the lifespan of the waste**

**~ 300 kg CO<sub>2eq</sub>/t \***

**> 900 kg CO<sub>2eq</sub>/t \***

**By 2025 in France,  
landfill biomethane will**

**contribute  
6 TWh  
of renewable  
natural gas**



\* based on the French landfilled waste mix, accounting for organic fraction reduction trends as per EU Directive



Case of France



Partenariat  
français pour  
les déchets

PFD

FSWP

French  
solid waste  
partnership

## Biogas recovery from Engineered Landfills

Engineered landfill with  
Poor Practices

**> 900 kg CO<sub>2eq</sub>/t of  
waste\***

(over the lifespan of the waste)

Cost of  
improvement  
in France

**~ 2 to 4 €/t of waste**

Engineered landfill with  
Good Practices

**~ 300 kg CO<sub>2eq</sub>/t of  
waste\***

(over the lifespan of the waste)

\* based on the French landfilled waste mix, accounting for organic fraction reduction trends as per EU Directive



Case of France



Partenariat  
français pour  
les déchets

PFD



French  
solid waste  
partnership

# Biogas recovery from Engineered Landfills

## Poor Practices

- No capture during operation
- Delay in implementing the capture system post operation
  - Semi-permeable cover
    - No bioreactor
- Poor monitoring & maintenance
  - Flaring all the biogas
  - Leakages\*

\*non-optimized treatment of residual CH<sub>4</sub>  
& non-preservation of cover integrity

Abatement of  
>600 kg CO<sub>2eq</sub>/t  
of waste



## Good Practices

- Capture during operation\*
  - \*temporary cover
  - Impermeable cover
- Bioreactor with >60% waste kept humid
- Frequent monitoring & maintenance
  - Energy valorisation of biogas
    - Minimized leakages\*

\*optimized treatment of residual CH<sub>4</sub>  
& preservation of cover integrity