



CONTRIBUTION TO THE TALANOA DIALOGUE



1. THE STRATEGY OF SUEZ TO FIGHT CLIMATE CHANGE

SUEZ is a global utility business that specializes in waste management, drinking water and wastewater treatment across the 5 continents. In recent years, the Group has led the transition towards circular economy by supporting its clients in switching from a resource consumption approach to a use-and-recover approach, by innovating to develop energy recovery and recycling solutions from waste and wastewater, and by offering integrated solutions for cities and the industry.

Climate commitments of SUEZ

- Reduce by 30% the Group's greenhouse gases emissions on all its scope of activity in 2030 compared with 2014 (validated by the Science-Based Target Committee)
- Contribute to avoid more than 60 million tonnes of greenhouse gases emissions for the Group's customers through material and energy recovery by 2021
- Save the equivalent of the water consumption of a city of 2 million by 2021 and promote different uses of water by multiplying by 3 the Group's production capacity of alternative water by 2030 compared with 2014
- Adopt an internal price of carbon and introduce it in 60% of the annual expenditure committed to new projects by 2021
- Increase by 12% the Group's investments and expenses in research and development dedicated to low-carbon technologies and climate-responsible projects in 2020 compared to 2015.



Contribution to the Global Climate Action Agenda

During COP21, SUEZ launched the Business Alliance for Water and Climate (BAFWAC) together with the UN Global Compact's CEO Water Mandate, CDP and WBCSD. The Alliance is now the focal point of business within the Water Thematic Focus Area of the Marrakesh Partnership for Global Climate Action.

More than 50 companies have joined the coalition since its creation. By doing so, they have committed to analyze and share water-related risks in order to implement collaborative response strategies, to measure and report water use data, and to reduce impacts on water in operations and throughout their value chain. In 2017, BAFWAC launched a web platform (www.bafwac.org) to compile best practices of endorsing companies.

SUEZ supports the Talanoa Dialogue as a virtuous process to achieve the Paris Agreement's ambition. The Group participated to the May 2018 session of the Talanoa Dialogue in Bonn on behalf of the Business Alliance for Water and Climate to respond to the question "Where do we want to go?".

SUEZ has committed to several cooperative actions within the NAZCA program, that are:

- o **Put a Price on Carbon** – Business Leadership Criteria on Carbon Pricing: set an internal carbon price, publicly advocate and communicate on progress
- o **Responsible Corporate Engagement in Climate Policy**: adopt responsible corporate engagement in climate policy
- o **Science Based Target Initiative**: adopt a science-based GHG emissions reduction target
- o **Improve Water Security** – Business Alliance for Water and Climate: measure and minimize risks and impacts related to water and climate change

The Group is a patron sponsor of the UN Global Compact's "Pathways to low-carbon and resilient development" platform and participates each year to the Climate Week in New York as well as to the Conference of Parties to the UNFCCC and other major climate events with the objective to bring forward its scientific expertise and innovation knowledge to the negotiators to the UNFCCC.

SUEZ participated to the Business Dialogues held in Paris, New York and Tokyo in the lead up to COP21 to inform countries in the process of defining the terms of the Paris Agreement, particularly in the fields of carbon pricing, innovation and public-private partnerships.

We are supporting the Marrakesh Partnership process and we believe it could be further strengthened to play a key role in the dialogue between Parties and non-Party stakeholders in the process of reviewing NDCs by 2020.



2. WHERE ARE WE?

Global warming

- The world's current global warming trajectory is not consistent with the Paris Agreement's objective to keep the increase in global average temperature to well below 2°C above pre-industrial levels and to limit the increase to 1.5°C, which would reduce the exposure of the most vulnerable countries from climate threats. According to the latest IPCC report from October 2018, 810 million people could be living in water-scarce areas in 2050 with a global warming of 2°C and down to 540 million in a 1.5°C scenario.

- The report claims that limiting global warming to 1.5°C will require rapid, far reaching and unprecedented changes in all aspects of society but that it will bring clear benefits to people, ecosystems, and Sustainable Development Goals. For instance, it could limit impacts for populations exposed to drought phenomena by 39% compared to the 2°C trajectory.

- In the water sector, we are already observing the consequences of the modification of physical parameters of climate. For instance, the heightening of the 0°C isotherm in mountainous river basins can provoke heavy rains and river floods which can interfere in the drinking water and wastewater treatment processes. Also, repeated or extended droughts can have significant impacts on the long-term availability of water resources for agricultural, industrial and domestic usages.

Climate action

- The climate action of cities and private companies is accelerating.

- For instance, nearly 500 companies have committed to set science-based greenhouse gases emission reduction targets that align with the Paris Agreement's goals, and an additional 800 have indicated that they plan to make such commitments by 2019.

- Companies which have joined the Business Alliance for Water and Climate are working to scale-up their solutions in the following 3 innovation areas:

o **Climate resilient agriculture supply chains:**

water-efficient conveyance infrastructures, water reuse systems, or upgraded in-field water irrigation systems (geospatial imagery, soil captors, drip and remote irrigation).

o **Circular water management:** wastewater reuse technologies to move from a "use and throw away" model towards a "circular" model in which water can be subsequently reused for different purposes (domestic, agricultural, industrial) and energy from wastewater recovered.

o **Natural infrastructure:** quarry rehabilitation or wetland construction, alternative water production units, like rainwater capture for drinking water or reforestation to replenish groundwater.

- During the 2018 United Nations' General Assembly week in New York, the Bloomberg Global Business Forum and the One Planet Summit demonstrated that the finance sector was committed to support the low-carbon transition by unlocking investments towards innovative business models contributing to the Paris Agreement and the 2030 Agenda.

3. WHERE DO WE WANT TO GO?

The model we pursue : circularity

-Reaching the Paris Agreement's objectives will need that we achieve collectively a system transformation.

-We want to go further, faster and to think bigger. We believe that by going from a linear to a circular model of growth, we can already achieve a balance between emissions and removals in the EU by 2050. In 2017, the French Association of Private Companies published 100 circular economy commitments of 33 large companies, including a number of climate-related waste and material efficiency commitments with trajectories or horizons specific to each sector of activity.

- According to the World Bank report "What a waste 2.0", greenhouse gases emissions from solid waste management accounted for five percent of global emissions in 2016 (1.6 billion tonnes of carbon dioxide equivalent). Without improvements in the sector, solid waste related emissions are anticipated to increase to 2.6 billion tonnes of CO₂ equivalent by 2050, meaning that effective waste management techniques have a significant potential in terms of greenhouse gases emission mitigation in the future. According to a study published by the Coalition for Urban Transitions in 2018 (1), investments in recycling programmes and landfill gas capture could save up to US\$665 million in 2030 and US\$2.6 billion in 2050, and reach a CO₂ abatement potential of 0.6 GT per year by 2050 (equal to the GHG emissions of Australia in 2012).

- Moreover, alternative waste management could contribute to avoiding greenhouse gases emissions for society as a whole by contributing to the circular economy. Indeed, recycling can have cascading effects at value chain level by reducing the use of fossil-based resources or fossil-intensive production and consumption schemes. The Coalition for Urban Transitions found that recycling four of the most carbon intensive materials of the European Union (iron, plastic, aluminum and cement) could reduce GHG emissions of those industries by 56 percent—or 0.3 GT of CO₂ per year—by 2050. The mitigation potential could reach 3.6 GT per year globally (1) .

- SUEZ also contributes to countries' climate goals through its impulse towards circularity in the water sector which can represent locally between 10 and 15% of total emissions from energy consumption.

- Generally, we believe that improving waste and water management is one important way of contributing to the Paris Agreement's efforts. That is why we see a clear business opportunity for investing in countries' that outline quantitative or qualitative waste and water targets (either in the field of waste collection and planning, energy-from-waste, recycling, wastewater reuse, desalination, or environmental awareness raising). These clearly articulated targets are very useful for the Group in driving the choice between different environmental solutions at city-level.

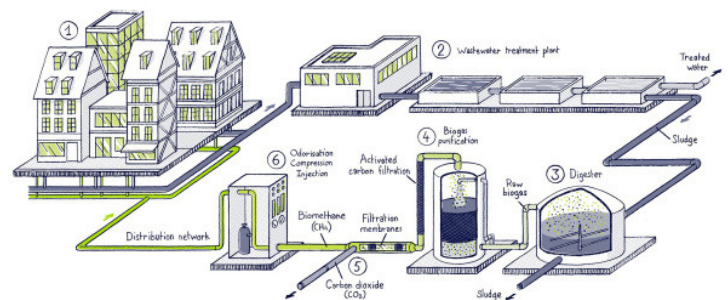
(1) Gouldson, Andy, Andrew Sudmant, Haneen Khreis, and Effie Papargyropoulou. "The Economic and Social Benefits of Low-Carbon Cities: A Systematic Review of the Evidence." Coalition for Urban Transitions, 2018.

The solutions we implement

1) Low-carbon energy: The waste and wastewater sectors are valuable contributors to the low-carbon energy transition since they provide local and cost-effective solutions for cities and the industry. In 2017, the Group produced 6.7 TWh of energy from waste, which contributed to avoid more than 2 million tonnes of CO₂ equivalent for our customers.

o The **As Samra plant**, design, built and operated by SUEZ in Jordan, treats more than 70% of the total wastewater treated in Jordan. The plant produces reusable treated wastewater for agriculture which represents approximately 10% of the water consumption in Jordan, freeing up fresh water for more valuable uses. Through hydro energy and biogas production, the wastewater treatment plant has an energy generation potential covering 80% of its needs. Through self-generation of energy, the plant saves 300 000 tons of CO₂ per year.

o In line with the Urban Community of Strasbourg's objectives, the **Biovalsan pilot project** was launched in 2011 to produce more than 1.6 million cubic meters of methane per year from the wastewater of the urban community of Strasbourg. This new source of renewable energy will help to ensure the transition to a new sustainable, low-carbon energy model at a local scale.



o Since 2010, the **wastewater treatment plant of Granada Sur** in Spain, operated by Emasagra, a mixed company jointly managed by SUEZ and the City of Granada has set-up an ambitious environmental strategy in order to become the European reference of circular economy in the field of sanitation. Its 2020 roadmap "Zero Energy, Zero Waste" aims at making the plant entirely energy self-sufficient by 2020 thanks to the recovery of its effluents, and the generation of a surplus of energy that will be injected into the local grid. In 2016, the wastewater treatment plant reached an energy self-supply rate of 73%, compared with 34% in 2010. Among other undergoing projects, it is planned to build a 100kWh solar power generation park and to integrate the energy recovery of greases within the biogas production process.



o In 2017, SUEZ inaugurated with Waga Energy a **Wagabox** in the Hauts-de-France region. This project will enable Suez to recover biomethane from the city landfill and to inject it in the local gas network to provide 3000 households with renewable gas. This is a breakthrough innovation since it is the first time that landfill gas is injected in the network instead of being converted into electricity, which generates losses due to the energy transformation yield.

o SUEZ produces **by-products from waste treatment activities that can be used as energy sources, replacing carbon-intensive fuels** in cement kilns, thermal power plants or steam generation plants. In the city of Rugby in the United Kingdom, the Group produces yearly 200 000 tonnes of solid-recovered fuels (called Climafuel) as well as 100 000 tonnes of by-products: metals, plastics and paper. The plant provides the biggest cement factory in the United Kingdom with over 50 % of its energy needs, representing about a third of its costs.

2) Secondary raw materials: SUEZ has developed different material recovery channels including: plastics, ferrous and non-ferrous, metals, glass, paper and cardboard, wood and food and drink cartons. Sorting and recycling contribute to avoiding greenhouse gases for the industry by reducing the consumption of virgin materials and/or the consumption of energy for processing materials. For instance, it is considered that recycling 1 tonne of PET plastic allows to reduce 1.6 tCO₂e emissions and recycling 1 tonne of HDPE plastic allows to reduce 0.49 tCO₂e. In 2017, material recovery from waste contributed to avoid more than 5.4 million tonnes of CO₂ equivalent for the Group's customers. Hence, in line with its circular economy strategy, SUEZ committed in its new 2017-2021 Roadmap to promote material recycling, recovery and reuse. Specifically, the Group aims at increasing the production of secondary raw materials by 20% in 2021. To do so, the main challenges consist in increasing the selectiveness in the sourcing of waste flows, the modernization of sorting centers, and the development of sophisticated technologies to accelerate the reintegration of recycled products; SUEZ is willing to unlock these barriers by innovating continuously, as shown by the below examples:

o In 2016, Procter & Gamble, joined up with SUEZ and Terracycle to create **the first "circular" shampoo bottle**: 25% of its composition is coming from plastic waste collected on beaches by volunteers and NGOs. SUEZ committed to prepare 2 600 tons of recycled plastic to be supplied each year to P&G. This new recyclable packaging was available in France from summer 2017.



o In 2015 at the **QCP (Quality Circular Polymers)** site in the Netherlands, SUEZ started the production of high quality Polypropylene and Polyethylene compounds, extruded from postconsumer plastic waste coming from the Group's sorting centers in Europe. These granulates of recycled plastic are sold to industrial manufacturers like Unilever or Lego, who reintroduce them within their production cycle. In 2017, SUEZ and LyondellBasell have launched a joint venture to upgrade the production of recycled polymers: SUEZ will supply post-consumer plastic waste and LyondellBasell will market the secondary raw materials produced by QCP. The expected growth in oil prices will reinforce the competitiveness of the sector since virgin plastic prices are indexed on the price of petroleum. This partnership marks a new stage in SUEZ's strategy, which aims to scale-up the reintroduction of recycled polymers into the value chain and help industrial producers to achieve their environmental targets.

o In 2018, SUEZ built the **first plant in Europe to recover non-ferrous metals from bottom ashes** produced by the waste-to-energy activities in the port of Ghent (Belgium). These materials are traditionally used for roads or runways or to produce stackable building blocks mixed with cement. The innovative process developed by the Group enables to recover fine non-ferrous metal particles of between 0 and 20 mm in size (aluminum, copper, lead, zinc, silver and gold). Its aims to process up to 12 000 tonnes of materials a year by 2019.

3) Digital platforms: SUEZ considers the new frontiers of the digital technology as a tool to optimize processes and reduce greenhouse gases emissions. Digitalization will also impact some of the business models of the Group's solutions, for instance:

o In 2017, SUEZ launched **Organix®**, the first digital marketplace in France for organic waste. This innovative platform can connect producers of organic waste (food industry manufacturers, cooperatives, etc.) and methanization unit operators, who transform waste into energy. They can manage the transaction in a simple and secure manner while SUEZ provides logistics and transportation. The Group also ensures the quality of the materials with an audit of the producers and a flows diagnosis.



o In 2017, SUEZ also launched **VaBene®**, a free and unique application in France designed to facilitate the management of dumpsters at construction sites. With VaBene®, construction professionals are able to order the delivery, removal or rotation of a dumpster via smartphone or tablet.

o In 2017, SUEZ invested in **Rubicon Global**, a cloud-based full service waste and recycling company which works with customers to find efficiencies and cost-savings in their waste streams and to develop new and innovative ways to reduce, reuse and recycle waste. Thanks to the technology of Rubicon, SUEZ will be able to optimize the collection of small quantities of waste produced by many customers who are geographically dispersed.

4) **Advanced Solutions in Water Business:** The Group's Advanced Solutions aim to develop, integrate, market and deliver, adapted and scalable services to help the Group's municipal and industrial clients as well as the farming industry to face their circular economy challenges, in particular in water management:

o **Smart networks:** SUEZ develops solutions that enable water operators to efficiently operate and maintain their assets, such as wells, distribution networks, & urban drainage networks. As part of SUEZ AQUADVANCED® solutions, the distribution networks soft suite offers different modules which contribute to optimize lifecycle costs, to better control water quality, and to save water and energy.



o **Smart metering:** The Group develops modular software solutions that use the data collected by sensors installed in the entire drinking water distribution network to measure flows, flow rates and pressure in order to identify and anticipate anomalies in the network, reduce failures and energy costs. The software also collates large volumes of data from various sources, such as the SCADA (Supervisor Control and Data Acquisition) system, the GIS (Geographical Information System) or remote metering. The Group has already implemented 6 million smart meters, and 22 % of its customers are equipped with smart meters. The Group also launched in 2016 the "On connect" long-range frequency communication system.

o **Asset performance management:** This line consists of predictive models, network preventive cleaning, leak detection solutions, and wells maintenance programmes. The WellWatch® offer developed by SUEZ as part of the AQUADVANCED® solution offers to the Group's customers a dashboard continuously monitoring and optimizing wells and their pumps, enabling a sustainable management of the water asset, extending the wells' life time, reducing loses and releasing the pressure on the resource. In 2017, SUEZ invested in an American- Australian start- up called Optimatics, a global leader in water and wastewater treatment plant optimization software, to strengthen its digital solutions offering and round out its AQUADVANCED® range via a service that optimizes the overall performance of water infrastructures throughout their life cycle.

o **Smart agriculture:** It gathers solutions for improving efficiency of wells and irrigation networks in agriculture. For instance, the RegControl®system developed by SUEZ can remotely and automatically deliver to the plant the right quantity of water and fertilizer needed. This auto-irrigation system reduces water and energy consumption and associated costs. In 2017, SUEZ started a joint-venture with Galpagro (agriculture services) to develop an offer including irrigation infrastructures and farm management.

o **Smart sensors:** These solutions provide the Group with data necessary to continuously manage water distribution through intelligent, reliable and low-energy-use sensors in cities' networks. SUEZ possesses the technological platform SENSOR lab, which has facilities outside of Paris at CIRSEE, the main R&D center of the Group. Its objective is to rate sensors on the market and to develop new ones. To achieve this, SUEZ is working in partnership with specialized actors from the digital sector..



4. HOW DO WE GET THERE?

1) Aligning NDCs with climate-related national policies and instruments

- **Carbon pricing in waste and water management:** As a leader in waste and water management, SUEZ sees a clear business opportunity for investing in countries' whose NDCs outline quantitative or qualitative waste and water targets (either in the field of waste collection and planning, energy-from-waste, recycling, wastewater reuse, desalination, or environmental awareness raising). These clearly articulated targets are very useful for the Group in driving the choice towards the most carbon efficient options for cities, providing that climate policies and financing mechanisms are in place. As of today, existing carbon pricing mechanisms rarely include waste and water solutions in their scope while abatement costs are among the lowest of existing low-carbon technologies. For instance, the conversion of a dumpsite in the Middle-East into a bioenergy landfill with energy recovery can enable to reduce up to 80% of emissions for a relatively low greenhouse gases abatement cost (from 15 to 30 euros per ton of CO₂e reduced). More generally, avoided emissions through waste recovery could be further tapped in the context of market-based mechanisms under the form of certificates of carbon emission reduction. The plastic recycling sector could largely benefit from this type of schemes while about 1.6 tonne of CO₂ can be avoided for each tonne of plastic recycled.

- **Circular water management of water resources:**

In the water sector, Suez has committed to transform some of its main wastewater treatment plants into "biofactories" which convert sewage sludge into compost for agriculture, and energy for self-consumption or distribution to the grid. Moreover, treated wastewater can be reused directly or indirectly for agriculture and the industry to enhance the resilience of territories and to mitigate water scarcity risks coming from global warming. Furthermore, secondary raw materials like phosphate, cellulose or metals can be extracted from sewage sludge providing that adequate regulations are in place and sufficient funding are available. As an example, the biofactories of Aguas Andinas, a subsidiary of Suez in Chile, will reach carbon neutrality, positive energy and zero waste by 2022. They were announced on 27 September 2018 as winners of the United Nations 'Momentum for Change' climate action award.

In many countries, a lot of regulatory barriers remain to develop treated wastewater reuse. At the European Union level, we strongly advocate in favor of a more flexible legislation based on the Californian experience since reuse is vital for regions of Europe like Spain, Italy or Greece which are particularly vulnerable to water scarcity. We also believe that energy from wastewater should be further incentivized in many countries, for instance through feed-in tariffs, in order to increase the sector's contribution to the low-carbon energy transition.

- **Green Deals:** Industry stands ready to work alongside governments to go further and faster toward a fully circular economy. We advocate for "green deal" mechanisms based on the Dutch public-private approach to innovation in order to implement breakthrough technologies, in particular in the field of recycling and recovery. In December 2017 during the World Efficiency Congress in Paris, five major French industrial groups—Air France, Airbus, Safran, SUEZ and Total—signed a Green Growth Commitment ("Engagement pour la Croissance Verte") with the French government. This commitment will create the necessary conditions to study the economic and operational feasibility of a sustainable aviation biofuel industry in France.



2) Renewing the dialogue between non-Party stakeholders and Parties to the UNFCCC

- We have to create a stronger relationship amongst us ; it will help non-Party stakeholders contribute to countries' climate commitments, and it will incentivize national governments to put in place the adequate legal frameworks to scale-up climate solutions: that's why SUEZ calls for renewing the dialogue between the public and the private sector like for instance by organizing new thematic Business Dialogues at Minister and CEO level.

- This renewed dialogue will help countries and cities to reach more ambitious climate targets, and for the finance sector to commit to invest in climate solutions. Ambition loops between public and private actors are essential to deliver concrete results in the coming years, starting with the United Nations' Secretary General's Climate Summit that will be held in New York in 2019.

- SUEZ is willing to bring its expertise throughout the pre-2020 period to make sure that clear links are established between water, waste and climate targets and that appropriate national and local policies are set in view of implementing tangible solutions.