

#### Related SDGs



## 4.4 Environmental protection

Salini Impregilo's track record attests to the Group's commitment to reducing environmental impacts resulting from construction activities and offering maximum transparency to its stakeholders regarding environmental issues, mitigation activities, and the achieved performance.

In 2016, the Group was entered in the Climate "A List" of the CDP (Carbon Disclosure Project), a rating assigned to the world's leading companies in terms of fighting climate change.

The Award, which recognizes the Group's constant attention to Sustainability in the projects it implements worldwide, is yet another important international recognition received in this period.

The most recent ones include the 2016 Global Best Project Award, awarded by ENR (Engineering News-Record) to the Stavros Niarchos Cultural Center in

Athens, which had already been awarded a LEED Platinum certification, and the “Leading” Infrastructure Sustainability Design awarded by ISCA (Infrastructure Sustainability Council of Australia) to the Sydney Metro Northwest project for its innovative design solutions developed to address climate change.

## Ecological footprint

The main environmental data for 2016 is shown below. For more details, please refer to section 6.2.

<b>Inputs</b>	<b>Raw materials used</b>	<b>27,000,759 t</b>			
	Aggregate and sand	68%			
	Ready-mixed concrete	14%			
	Metallic materials	11%			
	Cement	4%			
	Other	3%			
	<b>Water withdrawals</b>	<b>33,262,962 m<sup>3</sup></b>	}	<b>-17%</b> Water intensity rate <sup>47</sup>	
	From rivers	89%			
	From other sources	11%		<b>-12%</b> Energy intensity rate	
	<b>Energy use</b>	<b>10,166,890 GJ</b>			
	Diesel	69%			
	Natural gas	19%			
	Other sources	12%			
<b>Construction activity</b>	Concrete	5,150,442 m <sup>3</sup>	}	<b>+1%</b> Recycled and reused excavated material	
	Asphalt	1,227,232 t			
	Earth moving	11,783,842 m <sup>3</sup>			
<b>Production facilities*</b>	Asphalt	<b>5,845,797 t</b>	}	<b>+2%</b> , Asphalt produced in WMA mode <sup>48</sup>	
	Aggregate	1,119,256 t			
<b>Outputs</b>	<b>Waste</b>	<b>5,959,241 t</b>		<b>-19%</b> Waste intensity rate <sup>49</sup>	
	Non-hazardous	99.5%			
	Hazardous	0.5%			
	<b>Greenhouse gas emissions</b>	<b>728,179 t</b>	}	<b>-18%</b> Greenhouse gas emissions intensity rate <sup>50</sup>	
	Scope 1	73%			
	Scope 2	6%			
Scope 3	21%				

\* Data related to Lane Industries (USA)

47 The normalization factor used for the intensity rates is represented by the revenues for the year.

48 The increase in the share of asphalt produced in WMA mode (Warm Mix Asphalt), i.e. with a lower than conventional temperature, refers to the production facilities of the subsidiary Lane Industries (USA). This production method makes it possible to achieve energy savings and consequent reductions in atmospheric emissions.

49 The calculation of the waste intensity rate does not include excavation waste, since it is closely related to the design choices defined by the clients, and can scarcely be influenced during construction.

50 The intensity index is calculated without taking into account all of the Scope 3 emissions, but only those generated from the Group's projects (i.e. arising from the activities of subcontractors), thus excluding those resulting from freight forwarding and staff travel.

## Environmental management systems

Salini Impregilo manages the environmental aspects of its activities through an Environmental Management System certified in accordance with ISO 14001 standards.

The following table summarizes the main activities carried out at each stage of the system, based on the Life Cycle approach.

<p><b>Assessment and mitigation of risks</b></p>	<p>During the start-up phase of each contract, the Environment team undertakes a detailed evaluation of the potential environmental risks posed by the construction activities according to the impacts identified in the Social and Environmental Impact Evaluation, in accordance with the applicable regulations and the tendering contract. Following the assessment, each significant environmental aspect (eg. water, soil, waste) is the subject of a specific Management Plan, which regulates the management activities (to prevent and mitigate the impacts) and monitoring measures (aimed at verifying their effectiveness).</p>	<p><b>&gt; 13,000</b> Completed environmental monitoring activities</p>
<p><b>Training and awareness-raising</b></p>	<p>In order to ensure the correct implementation of the Environmental Management Plans, each worksite plans and implements training activities for all staff involved in operations with potential environmental impacts, including any subcontractor staff. In addition, upon recruitment, all staff receive an initial training (Induction) regarding the Group's environmental policies and procedures, and awareness-raising campaigns on specific topics (eg. waste, spills, chemicals, etc.) are carried out regularly, also involving subcontractors.</p>	<p><b>&gt; 84,000</b> Hours of environmental training provided to the workforce</p>
<p><b>Monitoring environmental issues</b></p>	<p>Our project environmental departments, supported by the Corporate QEHS Department, perform monitoring activities provided by the Environmental Management Plans, through programmes of periodic control and audit on the direct activities and on those carried out by subcontractors. In case of non-compliance, the project's environmental departments coordinate with the other departments concerned to define specific corrective actions, as well as any plans improve processes and/or performance. Our project environmental departments are also involved in qualifying suppliers, to verify that the environmental requirements are met by subcontractors and suppliers of certain materials (eg. hazardous materials or materials used in projects subject to certifications such as LEED).</p>	<p><b>97</b> Completed audits</p> <p><b>&gt; 380</b> New supplier analysed on environmental aspects</p>
<p><b>Review of the management systems</b></p>	<p>For each project, the management periodically reviews the achieved environmental performance, the management system's strengths and weaknesses, setting targets for the next period in order to ensure continuous performance improvement. At the Group level too, Salini Impregilo management, with support from the QEHS Department, regularly reviews performance and sets new environmental targets.</p>	<p><b>9</b> Revisions to the environmental management system carried out at the Group's worksites</p>

## Efficient use of resources

Salini Impregilo works constantly to improve its production processes in order to reduce natural resource consumption and waste production.

Whenever possible, the Group implements the principles of the circular economy, which consist in converting the processing waste into reusable or economically exploitable materials. In our worksites, this is done by careful selection and collection procedures (eg. for excavation materials, metals, wood, waste oils, tyres, batteries) or by adopting appropriate manufacturing processes (eg. for the treatment of contaminated water and land aimed at their reuse).

The following table summarizes the main operational activities carried out to reduce the ecological footprint of our projects.

<b>Raw materials</b>	<p>The Group's main strategies to improve efficiency in the use of raw materials are:</p> <ul style="list-style-type: none"> <li>- The inclusion of environmental issues at the design stage, to develop design solutions that promote reduced consumption of raw materials;</li> <li>- The use, where possible, of low environmental impact products and materials (eg. recycled, recyclable, non-hazardous materials);</li> <li>- The recovery, recycling and reuse of waste materials (eg. uncontaminated excavation soil, process water, metals, wood).</li> </ul>	<p><b>83%</b> Reused excavation materials</p> <p><b>23%</b> Recycled asphalt used in manufacturing plants<sup>51</sup></p>
<b>Energy and greenhouse gas emissions</b>	<p>Salini Impregilo implements a policy aimed at reducing energy consumption and associated greenhouse gas emissions through the development of many initiatives, including:</p> <ul style="list-style-type: none"> <li>- Connection of the worksite plants and facilities to local power grids in order to reduce the production of electricity using diesel generators;</li> <li>- Replacement of equipment and vehicles with more efficient models, both in terms of energy use (eg. substitution of diesel plants with gas plants) and in terms of specific consumption (eg. buying more efficient vehicles);</li> <li>- Careful planning of the vehicle fleet's periodic maintenance;</li> <li>- Development of systems for recovering energy from production plants and installation of energy-saving lighting systems;</li> <li>- Awareness-raising and training of employees on behaviours and procedures aimed at saving energy.</li> </ul> <p>The subsidiary Lane Industries (USA) follows a policy aimed at increasing the environmental efficiency of</p>	<p><b>-18%</b> Greenhouse gas emissions intensity rate compared to 2015</p> <p><b>39%</b> Asphalt produced in WMA mode</p> <p><b>97%</b> Goods shipped by sea</p>

<sup>51</sup> Data referring to the Lane Industries (USA) plants

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its asphalt production facilities by using recycled asphalt in the production cycle, as well as increasing the share of asphalt produced in WMA mode (Warm Mix Asphalt), i.e. with a lower than conventional temperature, thus reducing energy consumption and associated emissions.

In addition to direct consumption and emissions, the Group is also committed to reducing, wherever possible, indirect emissions arising from its ancillary activities, such as transport and staff travel.

In this regard, when certain goods are not available on the local market, the Group prefers shipments by sea for the transport of materials and machinery, as it is the means of transport with the lowest associated emissions.

The central offices in Italy reimburse staff for local public transport passes, in order to encourage their use. In recent years, the Group has equipped its offices and worksites with video conferencing systems that have limited the number of business trips to those made for strictly operational reasons. Corporate travel policies also favour rail travel over air travel, and public transport over taxis. For information about car pooling and public transport policies at worksites, see the following section "Mitigation of inconveniences arising from worksites" ("Traffic and Transportation").

The targets in this field and the associated results are reported annually with the CDP (Carbon Disclosure Project) questionnaire, which can be referenced for further information.

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## Water

We are committed to ensuring that each worksite enacts strict water management in all phases of the water cycle, from identifying needs and sources of supply to creating treatment networks for water flowing in and flowing out, including control plans and emergency response procedures. Closed-circuit water systems are built whenever possible, so as to recycle and reuse industrial waters, eg. at crushing plants, concrete mixing plants, and machinery washing stations. The wastewater is collected in treatment plants, and before being released into the environment, it is subjected to quality controls, ensuring compliance with local laws and other applicable standards.

**5%**

Recycled and reused water

**> 1,700**

Completed water analysis campaigns

**Waste**

Salini Impregilo adopts the following strategy on waste:

- Prevention, i.e. the analysis of the activities that generate waste in order to identify improvements to the processes capable of eliminating or reducing the generated waste;
- Reuse, i.e. the reutilization of waste materials in their original state for other project needs (eg. use of excavated soil for environmental restoration);
- Recycling and recovery, i.e. the conversion of waste materials into energy or other materials that can be used both in the worksite (eg. excavation rocks transformed into aggregates) and outside (eg. recycling of tyres, oils and batteries by specialized entities);
- Responsible treatment and disposal, i.e. neutralizing and destroying waste, also by specialized external parties.

This strategy is applied in each project by preparing specific management plans. Particular attention is paid to building adequate waste storage areas, verifying the qualifications of external entities involved in its transportation and disposal, and the training of employees and subcontractors involved in waste management.

Of the approximately 5.9 million cubic metres of waste produced by the Group in 2016, 95% of it consists of excavation materials, which depend on the characteristics of the projects, and given that these are defined by the clients, they cannot be influenced by the Group. However, Salini Impregilo adopts a strategy aimed at reusing as much waste as possible (which in most cases is inert) in the projects themselves, as embankments or aggregate (compatibly with the project's requirements).

**-19%**

Waste intensity rate

**99.5%**

Non-hazardous waste

**55%**

Waste diverted from landfill

**Soil**

Salini Impregilo closely monitors and protects its worksites in order to prevent potential damage to the soil and subsoil. Special containment tanks, water collection networks and waterproofing systems are created when the worksite is established, while carrying out specific evaluations of the environmental risk arising from the use of chemical products, oils, fuels, and hazardous materials which may come into contact with soil and groundwater. Our worksites have active environmental emergency plans in place, which allow employees to address and manage effectively cases of environmental accidents and soil pollution.

Construction activities also entail significant earth-moving operations (eg. excavation, earthworks) that involve erosion risks caused by weather conditions (eg. rain, wind). In order to mitigate these risks, we develop specific soil protection plans, involving the creation of soil consolidation and rainwater conveyance systems, coupled with covering land affected by the works (eg. embankments) and planting trees at the end of the operation.

**6.7 Million m<sup>2</sup>**

Land affected by erosion protection activities

## Focus: Innovation for the environment

Once complete, the 64 km of the new Brenner railway connecting Munich to Verona will be the longest underground rail link in the world. The “Isarco underpass” construction lot, awarded to a consortium led by Salini Impregilo, is the far southern part of the Brenner Base Tunnel, the central element of the works.

The construction of some of the tunnel’s sections involves soil consolidation by means of jet grouting technology. The process consists in creating columns of consolidated soil using a high-pressure jet of a mixture of water and cement, injected once the ground has been drilled. This jet causes the disintegration, fracturing and simultaneous mixing of the soil, and results in the drilling wastewater leaking at the surface, from the drilling hole. This wastewater consists mostly of the injected cement mixture itself.

With the methods traditionally used for this type of process, the wastewater is collected in tanks and, after it has solidified naturally, it is removed and managed as waste.

In order to reduce the amount of waste generated from jet grouting activities, an alternative management drilling wastewater system has been developed at the “Isarco underpass” worksite, which consists in subjecting the material to mechanical dehydration by means of a plate filter press. This method involves sending the drilling effluent to the mechanical pressing system as soon as it is produced, separating the solid portion of the sludge from the liquid. The liquid part is reused in the production process to prepare the jet grouting cement mixtures, while the solid part is a residue of the production cycle.

This method provides a more effective separation of the liquid part contained in the drilling mud compared to what can be achieved with the traditional technique, thereby reducing the amount of waste. In addition to reducing the quantity of waste produced by the process, reusing the recovered water also reduces water consumption.

### Mitigation of inconveniences arising from the worksites

Infrastructure improves people’s daily lives, but the construction phase may create some inconveniences, especially if the worksites are located in urban areas.

Salini Impregilo is committed to minimizing the inconveniences caused to local communities, particularly in terms of noise, dust and traffic. It is also committed to taking every precaution to protect natural habitats, in terms of biodiversity and environmental restoration at the end of construction.

### Dust and air quality

The construction sector, unlike other industrial sectors, does not produce significant air pollution. The main sources of air emissions are linked to the dispersion of dust produced by different activities: excavation, earthworks, movement of heavy vehicles on unpaved roads, crushing of excavated rocks and demolitions. Additional sources of air pollution are attributable to the emissions of worksite vehicles. Salini Impregilo adopts management methods to minimize:

- The dispersion of dust by constantly wetting any unpaved roads, creating systems that dampen the aggregates at the crushing plants, using special air filters at the cement storage silos and at the asphalt production plants, and covering trucks transporting powdery materials;
- The emissions from worksite vehicles through periodic maintenance schedules, the installation of filters, and the use of environmentally friendly vehicles.

**> 195,000**

Pollution controls carried out on plants and equipment

### Noise and vibrations

Before starting any new activity, we assess the potential impacts of noise and vibrations, determining what steps to take to safeguard the health and safety of workers (eg. through the use of personal protective equipment) and the surrounding environment (eg. consolidating the structures and using soundproofing systems).

The areas with the greatest noise impact are then screened with sound barriers, both fixed and mobile, made of artificial or natural materials (rows of trees), capable of absorbing noise. Especially in areas with high population densities, we perform specific geomorphological studies of the soil before starting any activity, to understand how vibrations could reverberate in the ground, in order to identify the best operational technologies to use.

Furthermore, noise and vibration levels are constantly measured during the activity, by means of suitable instruments installed near sensitive areas (eg. buildings, urban parks, offices), in order to verify the effectiveness of the mitigation measures, and intervene where necessary.

**> 970**

Completed noise and vibration measurement campaigns

### Traffic and transportation

Each project develops and implements a dedicated Traffic Management Plan. Based on the specific risks due to the location of the worksite and to sensitive receptors (eg. The presence of residential areas, schools, hospitals, etc.), the Plan defines the vehicle traffic rules both inside and outside the worksite, as well as the measures to reduce any inconvenience to local traffic and protect the safety of pedestrians.

**> 7.8 Million**

Hours worked by worksite vehicles

**> 370,000**

Routine maintenance carried out on the vehicles

The staff operating the work equipment and the vehicles transporting goods and passengers are carefully selected and undergo special training on safety procedures, as well as being subject to periodic alcohol and drug testing. Vehicle traffic is monitored by special worksite Transportation Department teams, assisted in some projects by GPS tracking systems that monitor speed, fuel consumption, and abnormal behaviour by drivers. To reduce vehicle traffic and the associated emissions, our worksites also adopt staff mobility management programmes, in order to optimize transfers between work areas, canteens, and accommodations. These include the use of collective transport (buses) for workers and carpooling for the staff employed at the worksite offices. For more information about the policies on transporting goods to the worksites and staff transportation, see the previous section “Efficient use of resources” (Energy and greenhouse gas emissions).

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## Biodiversity

The Environmental Management Plans developed by our projects mitigate the impact of our projects on the environment, protecting the flora and fauna through careful management of the water, work areas, quarries, and the areas for the storage and disposal of the excavation waste materials. In the case of worksites located in protected or high biodiversity areas, Salini Impregilo complements the monitoring and mitigation procedures with specific analyses of the risks of interference between the construction activity and any protected species. Because construction activities have a limited duration, any impacts on biodiversity are temporary. For this reason, the goal of a responsible biodiversity management is to protect any plant species that are protected or have a high biodiversity value, and momentarily remove the fauna at risk during the works, in order to avoid the risk of injury. To this end, special worksite Environmental Department teams inspect the affected areas before starting any new activities, cataloguing any protected species. The wildlife is then removed by specialized veterinarians or transferred to safe or protected areas (eg. natural parks), with which the Group concludes appropriate agreements. All staff additionally receive special training on the procedures to follow in case of any protected species sightings and on the prohibitions to be respected (relating to hunting, capture, disturbance or damage, including nests and eggs). Finally, the staff of the worksite Environmental Department monitor the works and restore the pre-existing conditions at the end of activities. The local flora (endemic and/or protected) is also protected by means of suitable management protocols. In addition to protecting these species during the works, particular attention is paid during worksite decommissioning and environmental restoration (see below).

**2%**  
Project areas located in protected areas

**> 570,000 m<sup>2</sup>**  
Areas restored with topsoil

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**Environmental  
remediations  
and  
reclamations**

Once construction is completed, Salini Impregilo handles the restoration of all the areas affected by plants, installations, quarries and landfill sites, in order to bring them back to their original conditions. The restoration also facilitates natural revegetation, preventing soil erosion and improving land stability. Any soil remediation required by contract or necessary due to finding previous contamination are agreed with the clients and carried out according to the requirements established by the local authorities. Finally, the Group also carries out reforestation after completing the construction works, typically using native species grown in nurseries specially created at the project locations or purchased locally.

**> 490,000 m<sup>2</sup>**

Areas affected  
by reforestation

**> 32,000**

Trees planted

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