The only way to do a great job is to love what you do.
As we begin to look back and summarise TYPSA Group’s progress in 2019, the current SARS-CoV-2 coronavirus health crisis inevitably invades our thoughts. I would therefore like to begin this letter by remembering all those who have suffered the impact of this terrible disease close to home, sending them my support and solidarity.

The figures for 2019 are an improvement on 2018 and consolidate our steady growth for the third consecutive year. Revenue of 219.4 million euros was 3% higher than the previous year. Total consolidated order intake increased 9% to 250.6 million euros, and TYPSA Group ended the year with a 316.9 million-euro backlog, which was 12% up from the previous December. Group earnings before taxes of 16.04 million euros represent 1% growth on the prior year. Our balance sheet and financial soundness continue to go from strength to strength and our equity has once again enabled us to operate without debt. Overall, 2019 was a very positive year for TYPSA and has allowed our Group to cope with the difficulties of 2020 with confidence.

In 2019, we consolidated and boosted our activity in regions with substantial growth potential, such as India and Bangladesh. We also broke into new markets, overcoming important barriers to entry and winning thanks to our investments in digital transformation and collaborative working, we were perfectly prepared to address the challenges of the 2020 pandemic.
impressive contracts, such as the water engineering projects awarded in Turkmenistan, where we are designing the world’s largest desalination plant, which will be built in the Caspian Sea.

Group growth in Europe continues to be significant, with new renewable energy and transport infrastructure contracts in Sweden and Ireland. We are further strengthening our position as a world leader in railway engineering through our participation in major projects such as high speed rail in the UK and the Stockholm metro. New contracts include Sydney metro, high speed in California, and the Toronto subway.

The Middle East market is still in decline, with a significant drop in tenders and delays in payments. Nevertheless, we have remained active in certain niches, keeping particularly alert to our clients’ financial soundness and to payment guarantees.

Spain’s incipient public procurement revival was not consolidated at the beginning of this new year and has remained below previous levels. Most public authorities in Spain continue to use procurement methods that are not appropriate for consulting engineering and that are certainly not aligned with international standards. These procurement methods and the valuation criteria applied do not foster quality-based competition, and financial offers continue to be the deciding factor when awarding contracts.

We continued to invest heavily in R&D throughout 2019, focusing on projects tackling digital transformation and collaborative environments. All these investments have proved tremendously effective in meeting the challenges of the 2020 pandemic, preparing us perfectly for unexpected hurdles. We remain at the technological forefront of our industry, as acknowledged by FIDIC’s ‘Outstanding Project of the Year’ award for the design and supervision of the Rande Bridge widening works, a project developed by our subsidiary MC2. This was one of this year’s many awards that reflect the international community’s recognition of quality and excellence in our work.

Our UN Global Compact signatory status continues to drive our commitment to Agenda 2030 Sustainable Development Goals (SDGs), and this important organisation has recognised our engagement with 5 SDGs. Our integrity management system has been audited and is now ISO 37001: 2016 certified. This certification is an important milestone, TYPSA being the first Spanish engineering firm to achieve it.

We have now begun what has transpired to be a complicated year. In addition to the usual challenges arising from political crises, legal insecurity, tariffs, entry barriers and bureaucracy, we all now face the enormous global economic uncertainty caused by the health crisis. Last year, 2019, provides a solid foundation on which to build to overcome these challenges, underpinned not only by the strength of our company, but also by our professionals’ attitude, commitment and ability to excel.

I wish everyone the very best for what I am sure will be certain success!

Pablo Bueno Tomás
TYPSA Group Chairman
Highlights of the year

MARKET ACTIVITY
International contracts represent:

- **78%** of the Group’s Revenue
- **76%** of the Group’s Order Intake
- **78%** of the Group’s Backlog

*Continued investment in improving our Integrated Management System keeps us together wherever we are in the world.*

### UNITED STATES AND CANADA

New infrastructure is slow to materialise, while Design Build and PPP tenders are increasing.

- **10%** of the Group’s Revenue
- 148 people
- 7 offices in USA
- 1 office in Canada

Significant growth in photovoltaic energy projects and the Group continues to expand in California.

### SPANISH-SPEAKING LATIN AMERICA

New rail development plans in Mexico, public-private investment opportunities in Peru. Political instability in some countries in the region.

- **19%** of the Group’s Revenue
- 692 people
- 10 offices
- 1 laboratory (in Peru)

Our new office in Panama enhanced our presence in Central America.
**BRAZIL**

Market stabilisation and promotion of a major infrastructure concession programme.

<table>
<thead>
<tr>
<th>% of the Group's Revenue</th>
<th>People</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>206</td>
<td>1</td>
</tr>
</tbody>
</table>

Short- and medium-term prospects are improving for Engecorps, the Group’s subsidiary operating in Brazil.

**SPAIN**

Private client demand for technical services continues to recover and public procurement saw an upturn on the previous year.

<table>
<thead>
<tr>
<th>% of the Group’s Revenue</th>
<th>People</th>
<th>Offices</th>
<th>Environmental Laboratories</th>
<th>Materials Laboratory</th>
<th>Harbour Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>1,178</td>
<td>14</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Revenue and backlog increased on last year.

**REST OF EUROPE**

Transport infrastructure in the United Kingdom and Northern European countries continues to gather momentum.

<table>
<thead>
<tr>
<th>% of the Group’s Revenue</th>
<th>People</th>
<th>Offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>110</td>
<td>6</td>
</tr>
</tbody>
</table>

New contracts in Ireland.

**AFRICA**

Significant European Union commitment to the continent’s development.

<table>
<thead>
<tr>
<th>% of the Group’s Revenue</th>
<th>People</th>
<th>Offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>82</td>
<td>10</td>
</tr>
</tbody>
</table>

Our projects in Africa continue and the number of private clients is increasing.

**MIDDLE EAST**

Vision 2030 is evolving with the launch of PPP programmes in water, renewable energy and transport. Market competition is strong and some planned investments have been reprogrammed.

<table>
<thead>
<tr>
<th>% of the Group’s Revenue</th>
<th>People</th>
<th>Offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>316</td>
<td>5</td>
</tr>
</tbody>
</table>

Decline of the market’s relative importance for the Group.

**ASIA AND AUSTRALASIA**

Boom in transport and water infrastructure projects.

<table>
<thead>
<tr>
<th>% of the Group’s Revenue</th>
<th>People</th>
<th>Offices</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>32</td>
<td>6</td>
</tr>
</tbody>
</table>

New contracts in Bangladesh and Australia, and significant growth expectations in India.
Key figures
Consolidated data and Group figures (in € million). Exchange rate December 31 2019: 1 € = 1.1234 USD.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>235.17</td>
<td>230.07</td>
<td>215.99</td>
<td>213.82</td>
<td>219.40</td>
<td>246.47</td>
</tr>
<tr>
<td>USA and Canada</td>
<td>29.43</td>
<td>19.01</td>
<td>28.45</td>
<td>26.30</td>
<td>21.11</td>
<td>23.71</td>
</tr>
<tr>
<td>Spanish-speaking Latin America</td>
<td>40.42</td>
<td>34.18</td>
<td>40.39</td>
<td>37.33</td>
<td>41.20</td>
<td>46.28</td>
</tr>
<tr>
<td>Brazil</td>
<td>18.23</td>
<td>15.56</td>
<td>13.29</td>
<td>10.30</td>
<td>11.68</td>
<td>13.12</td>
</tr>
<tr>
<td>Spain</td>
<td>27.84</td>
<td>26.72</td>
<td>29.77</td>
<td>42.63</td>
<td>47.03</td>
<td>52.83</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td>14.75</td>
<td>16.08</td>
<td>18.38</td>
<td>25.85</td>
<td>29.48</td>
<td>33.12</td>
</tr>
<tr>
<td>Africa</td>
<td>8.82</td>
<td>10.90</td>
<td>15.47</td>
<td>15.14</td>
<td>15.48</td>
<td>17.39</td>
</tr>
<tr>
<td>Middle East</td>
<td>94.85</td>
<td>106.52</td>
<td>67.49</td>
<td>50.80</td>
<td>37.65</td>
<td>42.30</td>
</tr>
<tr>
<td>Asia and Australasia</td>
<td>0.83</td>
<td>1.10</td>
<td>2.75</td>
<td>5.47</td>
<td>15.77</td>
<td>17.72</td>
</tr>
<tr>
<td>Order intake</td>
<td>230.73</td>
<td>198.52</td>
<td>211.98</td>
<td>230.11</td>
<td>250.62</td>
<td>281.55</td>
</tr>
<tr>
<td>USA and Canada</td>
<td>27.48</td>
<td>12.20</td>
<td>33.90</td>
<td>23.18</td>
<td>18.90</td>
<td>21.23</td>
</tr>
<tr>
<td>Spanish-speaking Latin America</td>
<td>31.90</td>
<td>64.03</td>
<td>20.94</td>
<td>45.03</td>
<td>36.03</td>
<td>40.48</td>
</tr>
<tr>
<td>Brazil</td>
<td>17.48</td>
<td>12.22</td>
<td>19.36</td>
<td>29.00</td>
<td>16.71</td>
<td>18.77</td>
</tr>
<tr>
<td>Spain</td>
<td>20.70</td>
<td>23.09</td>
<td>38.84</td>
<td>59.52</td>
<td>59.78</td>
<td>67.16</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td>10.26</td>
<td>4.29</td>
<td>26.41</td>
<td>18.94</td>
<td>28.74</td>
<td>32.29</td>
</tr>
<tr>
<td>Africa</td>
<td>7.07</td>
<td>16.97</td>
<td>20.44</td>
<td>17.93</td>
<td>17.82</td>
<td>20.02</td>
</tr>
<tr>
<td>Middle East</td>
<td>113.01</td>
<td>64.32</td>
<td>45.16</td>
<td>17.91</td>
<td>34.42</td>
<td>38.67</td>
</tr>
<tr>
<td>Asia and Australasia</td>
<td>2.83</td>
<td>1.40</td>
<td>6.93</td>
<td>18.60</td>
<td>38.22</td>
<td>42.94</td>
</tr>
<tr>
<td>Backlog</td>
<td>335.25</td>
<td>306.47</td>
<td>264.64</td>
<td>283.71</td>
<td>316.86</td>
<td>355.96</td>
</tr>
<tr>
<td>USA and Canada</td>
<td>15.74</td>
<td>9.53</td>
<td>13.83</td>
<td>11.40</td>
<td>8.54</td>
<td>9.59</td>
</tr>
<tr>
<td>Spanish-speaking Latin America</td>
<td>39.69</td>
<td>68.35</td>
<td>39.01</td>
<td>47.23</td>
<td>43.67</td>
<td>49.06</td>
</tr>
<tr>
<td>Brazil</td>
<td>30.17</td>
<td>34.18</td>
<td>28.48</td>
<td>38.23</td>
<td>42.36</td>
<td>47.59</td>
</tr>
<tr>
<td>Spain</td>
<td>26.04</td>
<td>22.37</td>
<td>31.41</td>
<td>55.83</td>
<td>68.53</td>
<td>76.99</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td>32.50</td>
<td>19.74</td>
<td>27.78</td>
<td>20.77</td>
<td>17.28</td>
<td>19.41</td>
</tr>
<tr>
<td>Africa</td>
<td>23.22</td>
<td>31.49</td>
<td>32.19</td>
<td>37.93</td>
<td>40.33</td>
<td>45.31</td>
</tr>
<tr>
<td>Middle East</td>
<td>165.14</td>
<td>120.04</td>
<td>83.17</td>
<td>53.11</td>
<td>53.58</td>
<td>60.19</td>
</tr>
<tr>
<td>Asia and Australasia</td>
<td>2.75</td>
<td>0.77</td>
<td>8.77</td>
<td>19.21</td>
<td>42.57</td>
<td>47.82</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>Equity</td>
<td>85.19</td>
<td>93.02</td>
<td>101.09</td>
<td>106.25</td>
<td>112.07</td>
<td>125.90</td>
</tr>
<tr>
<td>Total Equity</td>
<td>85.12</td>
<td>94.52</td>
<td>97.80</td>
<td>105.19</td>
<td>110.30</td>
<td>123.91</td>
</tr>
<tr>
<td>Earnings before taxes</td>
<td>17.80</td>
<td>17.25</td>
<td>16.92</td>
<td>15.90</td>
<td>16.04</td>
<td>18.02</td>
</tr>
<tr>
<td>Earnings after taxes*</td>
<td>11.16</td>
<td>10.79</td>
<td>10.98</td>
<td>10.97</td>
<td>11.07</td>
<td>12.44</td>
</tr>
<tr>
<td>People</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of people (at December 31)</td>
<td>2,501</td>
<td>2,440</td>
<td>2,445</td>
<td>2,562</td>
<td>2,818</td>
<td></td>
</tr>
<tr>
<td>Number of people (yearly average)</td>
<td>2,502</td>
<td>2,454</td>
<td>2,450</td>
<td>2,504</td>
<td>2,670</td>
<td></td>
</tr>
</tbody>
</table>

*Attributed to the parent company

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity / Total assets</td>
<td>0.50</td>
<td>0.54</td>
<td>0.61</td>
<td>0.59</td>
<td>0.61</td>
</tr>
<tr>
<td>Current assets / Current liabilities</td>
<td>1.71</td>
<td>2.06</td>
<td>2.30</td>
<td>2.46</td>
<td>2.58</td>
</tr>
<tr>
<td>% Earnings after taxes / Initial net equity</td>
<td>14.2%</td>
<td>14.2%</td>
<td>12.0%</td>
<td>11.9%</td>
<td>10.8%</td>
</tr>
<tr>
<td>% Earnings before taxes / Revenue</td>
<td>7.6%</td>
<td>7.5%</td>
<td>7.8%</td>
<td>7.4%</td>
<td>7.3%</td>
</tr>
<tr>
<td>% Earnings after taxes / Revenue</td>
<td>4.9%</td>
<td>5.3%</td>
<td>5.3%</td>
<td>5.4%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Revenue per person (in € thousand)</td>
<td>93.99</td>
<td>93.75</td>
<td>88.16</td>
<td>85.39</td>
<td>82.17</td>
</tr>
</tbody>
</table>
## Financial review

### CONSOLIDATED ASSETS (€)

<table>
<thead>
<tr>
<th>A) Non-Current Assets</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Intangible assets</td>
<td>6,641,963.78</td>
<td>7,766,561.79</td>
</tr>
<tr>
<td>II. Plant &amp; equipment</td>
<td>14,811,149.78</td>
<td>13,770,244.48</td>
</tr>
<tr>
<td>III. Long-term investments in subsidiaries</td>
<td>1,696.80</td>
<td>50,624.16</td>
</tr>
<tr>
<td>IV. Long-term financial investments</td>
<td>4,138,314.06</td>
<td>5,207,763.21</td>
</tr>
<tr>
<td>V. Deferred tax assets</td>
<td>3,837,818.82</td>
<td>3,007,345.91</td>
</tr>
<tr>
<td><strong>B) Current Assets</strong></td>
<td><strong>153,871,647.58</strong></td>
<td><strong>151,284,143.97</strong></td>
</tr>
<tr>
<td>I. Non-current assets held for sale</td>
<td>68,822.27</td>
<td>68,822.27</td>
</tr>
<tr>
<td>II. Inventories</td>
<td>101,073.16</td>
<td>123,071.36</td>
</tr>
<tr>
<td>III. Accounts receivable, work in progress and others</td>
<td>103,808,576.62</td>
<td>101,245,451.59</td>
</tr>
<tr>
<td>IV. Short-term investments</td>
<td>1,921,340.49</td>
<td>1,480,656.82</td>
</tr>
<tr>
<td>V. Prepaid expenses and other current assets</td>
<td>1,476,500.17</td>
<td>940,533.04</td>
</tr>
<tr>
<td>VI. Cash and cash equivalents</td>
<td>46,495,334.87</td>
<td>47,425,608.89</td>
</tr>
<tr>
<td><strong>TOTAL ASSETS (A+B)</strong></td>
<td><strong>183,302,590.82</strong></td>
<td><strong>181,086,683.52</strong></td>
</tr>
</tbody>
</table>

### CONSOLIDATED EQUITY AND LIABILITIES (€)

<table>
<thead>
<tr>
<th>A) Total Equity</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A-1) Equity</strong></td>
<td><strong>110,295,194.86</strong></td>
<td><strong>105,188,218.83</strong></td>
</tr>
<tr>
<td>I. Share capital</td>
<td>2,400,000.00</td>
<td>2,400,000.00</td>
</tr>
<tr>
<td>II. Retained earnings</td>
<td>79,199,909.34</td>
<td>77,883,202.35</td>
</tr>
<tr>
<td>III. Retained earnings in other companies in the group</td>
<td>23,689,833.39</td>
<td>17,983,813.53</td>
</tr>
<tr>
<td>IV. Retained earnings at companies accounted for using the equity method</td>
<td>15,456.44</td>
<td>9,860.41</td>
</tr>
<tr>
<td>V. (Treasury stock)</td>
<td>(1,343,000.58)</td>
<td>(466,577.50)</td>
</tr>
<tr>
<td>VI. Net income attributable to the parent company</td>
<td>11,067,697.24</td>
<td>10,035,585.61</td>
</tr>
<tr>
<td>VII. (Interim dividend)</td>
<td>(2,960,220.00)</td>
<td>(1,592,192.00)</td>
</tr>
<tr>
<td><strong>A-2) Currency translation adjustments</strong></td>
<td><strong>(2,774,880.83)</strong></td>
<td><strong>(3,243,525.65)</strong></td>
</tr>
<tr>
<td>I. Translations differences</td>
<td>(2,774,880.83)</td>
<td>(3,243,525.65)</td>
</tr>
<tr>
<td><strong>A-3) Minority interests</strong></td>
<td><strong>1,000,399.86</strong></td>
<td><strong>2,178,052.08</strong></td>
</tr>
<tr>
<td><strong>B) Non-Current Liabilities</strong></td>
<td><strong>13,251,919.59</strong></td>
<td><strong>14,381,296.97</strong></td>
</tr>
<tr>
<td>I. Long-term provisions</td>
<td>5,549,276.97</td>
<td>4,314,057.58</td>
</tr>
<tr>
<td>II. Long-term debt</td>
<td>7,426,145.28</td>
<td>9,831,750.63</td>
</tr>
<tr>
<td>III. Deferred tax liability</td>
<td>276,497.34</td>
<td>235,488.76</td>
</tr>
<tr>
<td><strong>C) Current Liabilities</strong></td>
<td><strong>59,755,476.37</strong></td>
<td><strong>61,517,167.72</strong></td>
</tr>
<tr>
<td>I. Short-term provisions</td>
<td>2,377,702.45</td>
<td>2,562,921.03</td>
</tr>
<tr>
<td>II. Short-term debt</td>
<td>448,211.07</td>
<td>2,842,631.68</td>
</tr>
<tr>
<td>III. Billing in excess of cost</td>
<td>26,280,402.52</td>
<td>25,145,002.17</td>
</tr>
<tr>
<td>IV. Trade accounts payable and advanced billing</td>
<td>30,205,162.08</td>
<td>30,733,381.34</td>
</tr>
<tr>
<td>V. Accrued expenses and other current liabilities</td>
<td>443,998.25</td>
<td>233,231.50</td>
</tr>
<tr>
<td><strong>TOTAL EQUITY AND LIABILITIES (A+B+C)</strong></td>
<td><strong>183,302,590.82</strong></td>
<td><strong>181,086,683.52</strong></td>
</tr>
</tbody>
</table>

* Does not include INTEMAC’s earnings (subsidiary acquired by TYPSA Group in December 2018)
## CONSOLIDATED PROFIT AND LOSS ACCOUNT (€)

<table>
<thead>
<tr>
<th>A) CONTINUING OPERATIONS</th>
<th>2019</th>
<th>2018*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating revenue</td>
<td>219,400,078.08</td>
<td>213,823,596.78</td>
</tr>
<tr>
<td>Capitalised in-house work on fixed assets</td>
<td>84,003.17</td>
<td>162,633.53</td>
</tr>
<tr>
<td>Materials, services of third parties and subcontractors</td>
<td>(43,771,976.95)</td>
<td>(43,390,841.38)</td>
</tr>
<tr>
<td>Other operating revenues</td>
<td>1,353,531.90</td>
<td>1,629,060.02</td>
</tr>
<tr>
<td>Personnel costs</td>
<td>(115,727,448.92)</td>
<td>(112,765,254.68)</td>
</tr>
<tr>
<td>Other operating costs</td>
<td>(42,640,638.05)</td>
<td>(40,220,909.73)</td>
</tr>
<tr>
<td>Depreciation and amortisation</td>
<td>(3,410,829.65)</td>
<td>(3,373,241.10)</td>
</tr>
<tr>
<td>Surplus</td>
<td>18,856.98</td>
<td>-</td>
</tr>
<tr>
<td>Income from sale of assets</td>
<td>21,649.16</td>
<td>(6,350.07)</td>
</tr>
<tr>
<td>Other income</td>
<td>(63,423.40)</td>
<td>-</td>
</tr>
</tbody>
</table>

**A-1) OPERATING INCOME**  
15,263,802.32  15,858,693.37

**A-2) FINANCIAL INCOME**  
826,511.86  39,811.86

**Share in the profits (losses) of companies accounted for using the equity method**  
(50,078.92)  -

**A-3) EARNINGS BEFORE TAXES**  
16,040,235.26  15,898,505.23

**Income taxes**  
(4,657,137.76)  (4,296,109.67)

**A-4) NET INCOME FROM CONTINUING OPERATIONS**  
11,383,097.50  11,602,395.56

**A-5) CONSOLIDATED NET INCOME FOR THE YEAR**  
11,383,097.50  11,602,395.56

**NET INCOME ATTRIBUTABLE TO NON-CONTROLLING INTERESTS**  
315,400.26  629,458.90

**NET INCOME FOR THE PERIOD ATTRIBUTABLE TO THE PARENT COMPANY**  
11,067,697.24  10,972,936.66

*The 2018 profit and loss account includes INTEMAC (subsidiary acquired by TYPSA Group in December 2018)*
Responsibility, integrity and sustainability

**OUR TEAM**

Our People: *Our most valuable asset*

We attract and retain the industry’s top people. Our strategy is based on making our employees feel comfortable and engaged with the company, paying special attention to career development.

**ANALYSIS AND INDICATORS**

People by region:

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>1,178</td>
<td>42%</td>
</tr>
<tr>
<td>South America</td>
<td>450</td>
<td>16%</td>
</tr>
<tr>
<td>Middle East</td>
<td>316</td>
<td>11%</td>
</tr>
<tr>
<td>Brazil</td>
<td>260</td>
<td>9%</td>
</tr>
<tr>
<td>Mexico and Central America</td>
<td>242</td>
<td>9%</td>
</tr>
<tr>
<td>USA and Canada</td>
<td>148</td>
<td>5%</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td>110</td>
<td>4%</td>
</tr>
<tr>
<td>Africa</td>
<td>82</td>
<td>3%</td>
</tr>
<tr>
<td>Asia and Australasia</td>
<td>32</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Type of employment contract**

- **81%** Permanent
- **19%** Temporary

**People turnover in 2019**

*still a low percentage*

- **8.8%**

**Board of Directors**

- **7** Men
- **4** Women
Number of people

<table>
<thead>
<tr>
<th>Year</th>
<th>Spain</th>
<th>International</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>974</td>
<td>1,471</td>
<td>2,445</td>
</tr>
<tr>
<td>2018</td>
<td>1,101</td>
<td>1,461</td>
<td>2,562</td>
</tr>
<tr>
<td>2019</td>
<td>1,178</td>
<td>1,640</td>
<td>2,818</td>
</tr>
</tbody>
</table>

Gender ratio

- **Men:** 69%
- **Women:** 31%

**OUR PEOPLE BENEFITS**

**Flexible Benefit Plan**

An opportunity for benefits other than salary (dining cards, childcare vouchers, private health insurance, travel cards and training). Benefits can be adapted to suit personal requirements, generating significant savings.

People across the entire Group can enjoy the same compensation and benefit scheme in each of the countries where we operate, without discrimination or limitations and regardless of gender.

*TYPSA Benefits: We lead the field in remuneration packages*

**PEOPLE MANAGEMENT**

**Relocation Policies**

Providing competitive packages for expats:
- In line with market practices in the sector.
- In line with local costs of living.
- In accordance with the conditions at our offices abroad.
We manage the paperwork (including visas, flights and tax exemptions).

**OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM (OHSM)**

**In-house Health and Safety Service**

Safety at work, ergonomics and psycho-sociology. Industrial hygiene and health monitoring are provided through an external provider.

**System Improvements**

- More offices and subsidiaries are certified to OHSAS 18.001: TYPSA Pty (Australia), TYPSA UK (United Kingdom), TYPSA AB (Sweden), INTEMAC (Spain) and the Laboratory in Murcia.
- Our online platform for Occupational Health and Safety management was set up as the principle means of providing training, circulating information and managing H&S activities.
- H&S Portal through SharePoint to work from anywhere in the world.
- Process underway to migrate to the new international ISO 45001 Occupational Health and Safety standard.
Accident Rate Statistics

Accident Frequency Rate (AFR) for work-related accidents

\[
AFR = \left( \frac{\text{No of accidents}}{\text{No of hours worked}} \right) \times 10^6
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>AFR</th>
<th>Year</th>
<th>AFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>1.16</td>
<td>2017</td>
<td>0.03</td>
</tr>
<tr>
<td>2018</td>
<td>1.75</td>
<td>2018</td>
<td>0.02</td>
</tr>
<tr>
<td>2019</td>
<td>1.64</td>
<td>2019</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Accident Severity Rate (ASR)

\[
\text{ASR} = \left( \frac{\text{Number of days lost}}{\text{Number of hours worked}} \right) \times 10^3
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>ASR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>0.03</td>
</tr>
<tr>
<td>2018</td>
<td>0.02</td>
</tr>
<tr>
<td>2019</td>
<td>0.02</td>
</tr>
</tbody>
</table>

TRAINING

Strengthening our Intellectual Capital
- One of the Group’s firmest commitments to its people.
- Essential for career progression and motivation.
- Annual and specific training plans.
- More training opportunities every year.

We are at the forefront of new technologies

Training hours in 2019

- 44,894 hours
- 560 training activities for 2,213 attendees

Learning for the digital workplace - digital transformation and collaborative working environments
- 65.1%

Learning for resilient and sustainable cities and infrastructure - Climate change, renewable energy, lifecycle, circular economy
- 15.3%

Engineering excellence
- 19.6%
2. THE FIGHT AGAINST CORRUPTION

Integrity Management System

We ensure that everything we do is ethical, legally valid, transparent and desirable for society.

Commitment to Ethics and Integrity

Supported by our:
- Integrity Management Manual.
- Compliance Committee, working independently and reporting directly to the Board of Directors.
- Code of Ethics containing the basic principles for all our managers and people to follow.
- Integrity Policy.

System Improvements

- Integrity Management System now fully implemented.
- 85% of our people have received Integrity Management System training.
- Monthly Compliance Committee meetings.
- Implementation of various protocols: confidentiality commitment for new recruits, statement of conflict of interest for the management team.
- Signatory to the United Nations Global Compact.
- ISO 37001 Anti-Bribery certification - AENOR.

1st Spanish engineering firm to obtain ISO 37001 certification

3. CLIENTS

Service excellence

We aim to be a trusted partner.

Commitment to Service Excellence

- We identify client requirements and needs.
- Our service goes beyond initial expectations.

Improvement Tools

- Client satisfaction surveys.
- Interactive client communication channels to keep track of projects.
CLIENT MANAGEMENT

Client satisfaction survey score

<table>
<thead>
<tr>
<th>Year</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>8.0</td>
</tr>
<tr>
<td>2018</td>
<td>8.6</td>
</tr>
<tr>
<td>2019</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Number of clients who will, or who are very likely to, work with the Group again

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>88.0%</td>
<td>97.8%</td>
<td>97.6%</td>
</tr>
</tbody>
</table>

Clients who rated the Group’s work as good or very good

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>82.0%</td>
<td>87.4%</td>
<td>92.2%</td>
</tr>
</tbody>
</table>

OUR MANAGEMENT SYSTEM CERTIFICATIONS

We operate as One Company anywhere in the World

TYPSA’s ISO 9001 certified quality system has been in place for 24 years and is a common reference for all branches and subsidiaries.

Our ISO 14001 certified Management System has assured correct environmental performance for over 15 years.

Systems and Procedures

A legislation database on the corporate intranet gives our people access to up-to-date environmental laws and legal requirements applicable to the work they are doing.

Our Environmental Legislation Alert System notifies us the moment environmental regulations are published.

System Improvements

- TYPSA Mexico is now ISO 14001:2015 certified.
- New edition of Design Control and Quality Plan procedures adapted to BIM and the Common Data Environment (CDE) (ISO 19650).
- More than 70% of the Group’s output has been audited.

Number of internal Quality and Environmental audits

2017 2018 2019

138 148 134

Internal Quality and Environmental audit scores

2017 2018 2019

8.1 8.0 8.2

Out of 10

Our designs are based on sustainability criteria
4. SUPPLIERS

Approval system

We guarantee that collaborators and subcontractors work to our standards.

Systems and Procedures

All TYPSA subcontractors are evaluated on the work they do. Time and quality aspects are evaluated when a job is completed. Unsatisfactory results lead to a supplier veto. This final evaluation is in each supplier’s records for consultation by the entire organisation.

System Improvements

New automated order and invoice management model for better control of outsourced activities and final job evaluation.

Supplier and subcontractor evaluation scores

<table>
<thead>
<tr>
<th>Year</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>3.9</td>
</tr>
<tr>
<td>2018</td>
<td>3.9</td>
</tr>
<tr>
<td>2019</td>
<td>3.9</td>
</tr>
</tbody>
</table>

5. THE COMMUNITY

Our commitment to society

Acting responsibly and playing our part in improving society wherever we are.

OUR PRESENCE IN THE INDUSTRY

Involvement in business and professional organisations

- We continue to occupy top positions in major European, Spanish and international industry organisations (FIDIC, EFCA, TECNIBERIA, FIDEX, CEOE, MAFEX). Pablo Bueno Tomás, new President of Tecniberia, Spanish Association of Engineering Consultancy and Technological Services.
- We are active in Spain’s Professional Associations (Caminos Foundation; Spanish Institution of Civil Engineers, Agustín de Betancourt Foundation and the Engineering Institute of Spain).
- We are present in Spain’s leading industry-related technical organisations (Spanish and International Commissions on Large Dams, AEDIP, AETOS, PIARC).

Our inputs help to improve and share new technologies,

promoting industry best practices

WORKING WITH UNIVERSITIES

- TYPSA Awards reward academic achievement at the Madrid School of Civil Engineering.
- Miguel Mondría, TYPSA’s CTO, is a member of the School of Civil Engineering Advisory Board at the Polytechnic University of Valencia.
- Collaboration with almost all the universities in Spain offering technical courses; 67 interns during the year.
- Our Agreement with the Madrid School of Civil Engineering Harbour Laboratory is still in place, continuing the 12 years of support to teaching and innovation through the TYPSA - Pablo Bueno Maritime Engineering Research Unit. This agreement has made it possible to reinforce the improvement and modernisation plans for the School’s Harbour Laboratory, which more than 200 students visited during the year.

**We work in permanent and close collaboration with the academic world**

**New Contributions**
Collaboration on postgraduate training courses, publications in technical journals, participation in workshops and seminars, including:
- Collaboration on the Madrid School of Architecture Master in BIM Methodology and Management applied to Designs, Construction and Assets.
- Scientific production and outreach; students used the Harbour Laboratory to develop 13 PhD theses and 21 research projects, and 40 papers were presented at national and international conferences.
- Participation in the Santander School of Engineering IDEaS 2.0 programme bringing engineering firms closer to education.
- Collaboration with the National College in Birmingham to train railway engineers.
- Seminar on Hydroelectricity in a Renewable Energy framework at the Abdelmalek Essaâdi University in Morocco.
- Organisation of the RedSuds 2019 workshop on Sustainable Urban Drainage Systems with the Institute of Water and Environment at the Polytechnic University of Valencia.

**AWARDS**

**2019: the Group celebrated a record year for awards and recognition**

TYPSA Group’s Honorary Chairman, Pablo Bueno Sainz, named **Honorary Member** of the Engineering Institute of Spain

- **1st Prize in the European Commission international architectural competition.**
  New LOI 130 EC offices in Brussels (Belgium).
  TYPSA and its subsidiary MC2 were part of the team that won first prize for the design of the new European Commission headquarters in Brussels, based on sustainability and energy efficiency.

- **FIDIC Outstanding Project of the Year.**
  Widening of the Rande Bridge in Galicia (Spain).
  Our subsidiary MC2 provided the structural design and construction management support for this award-winning project.
- Outstanding Structure Awards 2019 (finalist), awarded by the International Association for Bridge and Structural Engineering (IABSE). Widening of the Rande Bridge in Galicia (Spain). Our subsidiary MC2 provided the structural design and construction management support for this award-winning project.

- Ground Engineering Awards 2019 UK. Category: International Project of the Year. Trujillo Bridge Underpass, Lima (Peru).

- Ground Engineering Awards 2019 UK. Category: Ground Investigation Project (below GBP 2 M). El Carrizal Hydroelectric Project (Bolivia).

- 2019 METIS Sustainable Infrastructure awarded by Arizona State University. PVGRAd Software. Awarded to our subsidiary AZTEC Engineering for 3D simulation software for structural optimisation and ground works for solar PV plants.

- 2019 National Project of the Year over $20 M – American Society of Highway Engineers (ASHE). I-10/State Route Loop 303 - Phase II (USA). Award given to our subsidiary AZTEC for the final design.

- Health, Safety, Security & Environment (HSSE) Award – awarded by the United Kingdom Association of Project Management, (APM). Healthy by Design in HS2 – Phase 2b. TYPSA is a joint winner as co-author of the project.

- 2019 Honor Award – ACEC Arizona Engineering Excellence Award. City of Scottsdale Crosscut Canal (Culvert Street to McDowell Road) USA. Award given to our subsidiary AZTEC for the final design.

- Region of Murcia Civil Works Award from the Murcia Regional Ministry of Public Works and Infrastructure and the Murcia chapter of the Institution of Civil Engineers. Eastern extension of the Port of Cartagena Cruise Ship Terminal in Murcia (Spain).

- Runner-up to the CICCP Carlos Fernández Casado Public Works National Heritage Award. Rehabilitation of Pedrido Bridge on the Betanzos River, A Coruña (Spain). Our subsidiary INTEMAC was runner-up to this national award.

- Federal Transport Authority (FTA) of the United Arab Emirates Honorary Award 2019. Feasibility study for the implementation of a Road Freight Toll System in the United Arab Emirates.

- AEDIP Appreciation 2019. For TYPSA’s 21 years as an active and loyal member of the Association.

- Madrid chapter of the Spanish Institution of Civil Engineers Best Infrastructure award 2019. Wanda Metropolitano Stadium environment in Madrid (Spain). Our subsidiary GEBM was part of the award-winning team for its role in designing the drainage strategy and preparing the calculations for the rainwater networks in the stadium’s surrounding area using SUDS (Sustainable Urban Drainage System).
FORUMS

As consulting engineering experts, we actively participate in forums, conferences and seminars to raise our voice on the new challenges we face in our fields.

New Contributions

TYPSA’s prestigious industry professionals took part in the following events.

- VII Road Tunnels Symposium
  Spanish Technical Road Association - February 2019
- Saudi Water and Environment Forum
  Saudi Arabian Ministry of Water, Environment and Agriculture - March 2019
- Multilateral Development Partnerships in Dakar, Quito and Dhaka
  ICEX and Commercial Offices in Senegal, Ecuador and Bangladesh - April 2019
- Water Fair: Global water challenges with Multilateral Financial Institutions
  ICEX and Commercial Office in Washington DC - May 2019
- First UN Habitat General Assembly in Nairobi, Kenya
  UN Habitat - May 2019
- II International Symposium on Dam Safety
  Brazilian Committee on Dams (CBDB) - May 2019
- Seminar on Spanish Experience in Tunnel Construction and Maintenance
  ICEX Spain - June 2019
- 87 Large Dams Annual Meeting and Symposium in Ottawa
  ICOLD International Committee on Large Dams - June 2019
- ICEX Integra event, Water, Energy and Digitisation in the Persian Gulf
  ICEX and Commercial Office in the United Arab Emirates - October 2019
- II Spain-UK Transport Infrastructure Forum
  ICEX and Commercial Office in the United Kingdom - November 2019
- Bridge Inspection and Maintenance conference in São Paulo
  ABPE (Brazilian Association for Bridge and Structural Engineering) - November 2019
- COP25 Climate Summit in Madrid
  Government of Spain - December 2019

ENVIRONMENT

Environmental Management System

Committed to minimising environmental impacts generated directly or indirectly by civil works.

Lines of Action

- Priority to all environmental aspects in the course of our work.
- Responsible use of resources.
- Proper waste management.
- Staff and supplier compliance with appropriate environmental codes of practice.
EMISSIONS CONTROL

Different ways of reducing our carbon footprint are under constant scrutiny through careful monitoring for optimum use. Control extends to our buildings’ energy performance, more efficient use of lighting and computers, site-vehicle fuel consumption, project-related travel and the daily commute.

We have been calculating our carbon footprint since 2010, and since 2013 our it has been verified in accordance with ISO 14064 parts 1, 2 and 3. In 2019, all TYPSA carbon footprints were registered in the Ministry for Ecological Transition’s National Carbon Footprint Register.

Our carbon footprint in Spain (tCO₂ equiv.)

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>2,779</td>
<td>2,341</td>
<td>2,896</td>
</tr>
</tbody>
</table>

WASTE

Selective collection of hazardous and non-hazardous waste is a priority at all our offices, to ensure all waste is treated appropriately. Authorised managers deal with hazardous waste safely, while authorised recycling managers take charge of non-hazardous waste, such as paper.

RESOURCE CONSUMPTION

Continuous resource consumption monitoring and annual improvement targets are instrumental in achieving significant savings. In some cases, however, consumption increases in line with the number of employees and production or new offices as they are opened.

<table>
<thead>
<tr>
<th></th>
<th>Water (m³)</th>
<th>Paper (kg)</th>
<th>Electricity (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>3,983</td>
<td>3,698</td>
<td>3,763</td>
</tr>
<tr>
<td>Peru</td>
<td>1,223</td>
<td>1,761</td>
<td>2,294</td>
</tr>
<tr>
<td>UAE</td>
<td>231</td>
<td>183</td>
<td>156</td>
</tr>
<tr>
<td>Mexico</td>
<td>1,334</td>
<td>1,321</td>
<td>1,344</td>
</tr>
</tbody>
</table>

Increases in consumption in Peru are due to increased laboratory activity and office expansion. Our headquarters in Madrid hold the Guarantee of Origin Certificate, a renewable energy certificate issued by the Spanish National Commission on Markets and Competition (CNMC).
7. INNOVATION
A core management value

We base our services on knowledge and prioritise being at the forefront at all times.

MANAGEMENT SYSTEM

The R&D Management System (in place since 2009) has been updated by improving procedures and adapting them to the latest standards.

AENOR has confirmed the effectiveness of the system as well as its ability to meet applicable requirements by highlighting the following strengths:
- Document traceability between risks/opportunities and action plan.
- Regular R&D Committee project monitoring.
- Virtual libraries.
- A deep-rooted R&D culture within the organisation.
- TYPSA Innovation Awards to encourage a culture of continuous progress.

STRATEGIC RESEARCH

Sustainable and Resilient Cities and Infrastructure

LIFE-CERSUDS
Ceramic Paving to achieve Sustainable Urban Drainage Systems.

Waste products from the Castellón ceramics industry have been used to create permeable pavements that facilitate street drainage.

An award-winning project recognised by the European Union as an example of an innovatory strategy to improve urban climate change resilience.

SUSTAINABILITY-TY
Sustainability capacity-building.

A new incentive to fine-tune the incorporation of cross-cutting sustainability aspects in all areas of work.

NUMSIMHUMOS
CFD tools for smoke analysis.

Computational fluid dynamics (CFD) tools for smoke and fire management in large confined spaces such as atria, stations and tunnels, for more resilient designs.
# Digital Transformation and Collaborative Environment

**TYPSA-BIM-PM 2020**
Our proprietary support platform for project and construction management.
Approval of an ambitious improvement plan with new features and capabilities for use from mobile devices.

**LODSTY**
TYPSA Catalogue of Level of Development (LOD) data sheets for structural elements.
Precise BIM project scope definition, containing the main structural elements of buildings, roads, railways, metros and civil works in general. This project facilitates project coordination and helps to avoid the risk of misunderstanding in a contractual relationship.

# Circular Economy

**ZERO-BRINE**
A circular economy approach for the recovery of resources from brine generated by process industries.
Design of a pilot plant for the treatment of silica effluents at an Industrias Quimicas del Ebro (IQE) chemical plant in Zaragoza. The aim is to achieve zero-liquid discharge by extracting water and valuable inorganic compounds that can be used in other industries.

*Project funded by the European Union’s H2020 research and innovation programme and developed in collaboration with 21 partners from 10 countries.*

**LIFE-SOLIEVA**
Sustainable treatment of wastewater from the table olive industry.
The project aims to demonstrate the feasibility of a treatment technology for the wastewater from table olive production, for the recovery and reuse of polyphenols, high-value organic compounds used in the food and pharmaceutical industries.

# Consulting, Engineering and Architectural Excellence

**PVGRAd**
A 3D simulation software for solar plant optimisation.
Software for the design of ground-based photovoltaic solar power systems. The algorithm developed is based on cost function optimisation.

*METIS Center 2019 Sustainable Infrastructure Award from Arizona State University. Developed by our North American subsidiary Aztec.*

**CFD-COMFORT**
CFD algorithms for HVAC studies.
Design and application of a working methodology for advanced computational fluid simulation (CFD) for air conditioning (thermal comfort) and ventilation (integration in civil works).

**LEAN TYPSA**
A production management model to achieve maximum value with the least resources.
Collection of experiences to review and improve TYPSA’s main system procedures for a LEAN growth strategy.

**HYPERLOOP-CIVIL**
Very high-speed transit systems.
Conceptual study of sidings, or exits from the mainline, for Hyperloop transport system operation, in collaboration with Zeleros, to move forward in the design of the civil works components of the project.
SDG 3 - GOOD HEALTH AND WELL-BEING

**Our Commitment:** Ensure our people in Spain and abroad are safe, healthy and continue to work during health crises such as the one caused by the COVID-19 virus.

**Our Focus:** Strengthen our in-house OHS service and develop technology modernisation plans that provide security and privacy guarantees for digital transformation.

**Our Resources:** The in-house OHS service and the Information and Communications Technology (ICT) Department. Since 2016, the ICT department has implemented two technology modernisation plans to drive the company’s digital transformation process.

**Targets:** Implement a telework action plan during the state of alarm lockdown measures and phased de-escalation plan to gradually adapt to the new situation.

- Deploy the technological systems, material resources and training necessary to organise work from home and provide an immediate response to the lockdown rules and mobility restrictions imposed by the authorities during the health crisis.

**Achievements:** 91% of the workforce in Spain was working from home within 48 hours of lockdown being announced. The measures introduced in the offices in Spain were applied at international offices, offering distance training and support. Crisis management experiences were shared through multicentre coordination, promoting preventive measures in all offices.

SDG 4 - QUALITY EDUCATION

**Our Commitment:** Promote technical education in developing countries.

**Our Focus:** Construction of the Lac Albert University (UNILAC) in Mahagi, Democratic Republic of the Congo, for civil engineering and agricultural engineering studies.

**Our Resources:** The TYPSA Foundation for Development, created 12 years ago. Financed by monetary and other donations from TYPSA Group which together amount to 0.7% of the profit. TYPSA group employees and other institutions also donate to the Foundation. A collaboration agreement with the Polytechnic University of Madrid (UPM) has been in place since 2018 to enhance economic and educational aspects.

**Targets:** Train young people in engineering.

- Provide tools for business start-ups that favour economic growth in the region and discourage talent emigration.

**Achievements:** A substantial increase in the number of students enrolled in UNILAC’s technical faculties, from 29 in 2017/2018, to 115 in 2018/2019, and to 147 in 2019/2020. This was thanks to TYPSA Foundation’s contribution of 50% of the tuition fees and to improvements in teaching quality at UNILAC through incentive programmes for teaching staff.

- Permanent UNILAC internet access via satellite.

- UPM launched the Student and Teacher Mobility Programme, enabling lecturers and students to travel to Mahagi over the next three years for academic purposes within the framework of the Erasmus+ Programme financed by the European Union.
**SDG 6 - CLEAN WATER AND SANITATION**

**Our Commitment:** Improve quality of life through our services in the ‘Water’ sector. Water engineering is one of TYPSA’s 4 business areas and generates 20% of our annual revenue.

**Our Focus:** Support national and local authorities, both in Spain and internationally, in integrated water resources management to ensure appropriate water quantity, quality, access and availability.

**Our Resources:** Our highly qualified staff, and the resources required to identify needs and provide the best services. We are developing innovative in-house methodologies, introducing climate change forecasts to mitigate the risks associated with extreme weather events.

**Targets:** Strengthen our teams, technologies and partnerships to respond to the main challenges of drinking water supply and sanitation, with a special focus on Brazil and Peru.

**Achievements:** ALF. An app developed for the Local Analysis of Precipitation Frequencies (ALF initials in Spanish). The app enhances rainfall analysis for plans and designs, particularly during extreme episodes, and makes calculations in accordance with World Meteorological Organisation guidelines and recommendations from the U.S. Army Corps of Engineers and other international organisations.

**SDG 7 - AFFORDABLE AND CLEAN ENERGY**

**Our Commitment:** Renewable energy only as our energy generation business line.

**Our Focus:** Action in emerging markets or developing countries where there is a huge need and growth potential.

**Our Resources:** Our specialist wind, solar, hydroelectric, and marine energy teams.

**Targets:** Develop major projects that contribute to the technological development of renewable energy in countries in Africa, the Americas and Asia.

**Achievements:** PVGRAd technology. A novel software for grading and structural optimisation of photovoltaic solar power plants to increase resilience to extreme phenomena. This technology is replicable in environments that are highly vulnerable to natural disasters. In 2019 PVGRAd was awarded one of the Arizona State University Sustainable Infrastructure Awards.

We have introduced a new innovation line to contribute to the development of renewable marine energy. TYPSA is participating in the MAESTRALE project, co-financed by the European Interreg MED Programme and coordinated by the Ecodynamics Group of the University of Siena (Italy). The project studies the possible implementation of marine renewable energy technologies in the Mediterranean.

**SDG 9 - INDUSTRY, INNOVATION AND INFRASTRUCTURE**

**Our Commitment:** Achieve sustainable, resilient and quality infrastructure.

**Our Focus:** Constantly improve methodologies, applications and tools, fostering technology, innovation and research.

**Our Resources:** Our position as a leading engineering firm in infrastructure development. Our systems and teams.
SDG 9 - INDUSTRY, INNOVATION AND INFRASTRUCTURE

**Targets:** Every year the R&D Committee analyses proposals, negotiates agreements and determines which actions to develop.

**Achievements:** The TYPSA Catalogue of structural element LOD (Level of Development) data sheets with written descriptions and images to define the scope of BIM projects. This project introduces a new focus on the structural elements of road, railway and metro infrastructure and civil works in general, helping to reduce the uncertainty, errors and misunderstandings that arise when the scope of engineering services is not properly defined. The results can be seen in cost and time savings, as well as more efficient investment in these types of infrastructure.

SDG 11 - SUSTAINABLE CITIES AND COMMUNITIES

**Our Commitment:** Make cities and human settlements inclusive, safe, resilient and sustainable.

**Our Focus:** Support local councils, municipalities and public companies to plan cities with an integrated and holistic approach, based on four main drivers: mobility and transport, water and sanitation, renewable and efficient energy, and buildings.

**Our Resources:** We help create and transform urban space through three specific business areas: Buildings and Cities, Water and Sanitation, and Transport Planning.

**Targets:** Ensure our teams have the necessary technical skills to be able to apply sustainability values to each of these drivers, introducing environmental, social and economic considerations in our solutions.

**Achievements:** Virtual reality consolidated as a commonly used tool in urban infrastructure and building design, focusing on demonstration applications that aim to improve sustainability and resilience. For example, in metro stations, we analysed functional aspects in ordinary situations and fire evacuation processes.

SDG 13 - CLIMATE ACTION

**Our Commitment:** Improve decision-making on infrastructure development in the planning phase, introducing climate change resilience and adaptation.

**Our Focus:** Support water resource planning and infrastructure decisions to manage the Whole Water Cycle.

**Our Resources:** Our Water Engineering department provides planning and design solutions in the various countries where we work, incorporating global knowledge and adapting it to local conditions.

**Targets:** Incorporate a Decision Tree Framework (DTF) when planning climate change resilient water infrastructure.

**Achievements:** The methodology introduces model uncertainty into climate statistics to enable public water authorities to make decisions with a bottom-up approach. Decisions are made in phases and are accompanied by public participation processes to validate the alternatives proposed with the stakeholders. This methodology has been successfully used in the water sector in Peru and has been transferred to flood prevention studies in Spain.
SDG 16 - PEACE, JUSTICE AND STRONG INSTITUTIONS

**Our Commitment:** Lead the way in integrity and the fight against corruption in the engineering and construction industry.

**Our Focus:** Steer our activity toward markets where tender documents include integrity criteria and transparency as a requirement or a positively valued practice.

**Our Resources:** Our Integrity Management System implemented in Spain and in subsidiaries and branches in more than 30 countries.

**Targets:** Certify our Integrity Management Systems.

**Achievements:** AENOR Certification of our Anti-Bribery System in accordance with ISO 37001:2016. This certification is an important milestone in Integrity Management System implementation, as it ensures all management areas are informed and committed to the prevention of such criminal practices.

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SDG 17 - PARTNERSHIPS FOR THE GOALS

**Our Commitment:** Collaborate with other stakeholders to make progress in sustainable development.

**Our Focus:** Collaborate with universities and research centres to progress in technological innovation in business areas related to Sustainable Development Goals.

**Our Resources:** The R&D Management System procedures and resources, and in general the capabilities acquired for collaborative work.

**Targets:** Strengthen our strategic partnership with EURECAT, the major Technology Centre of Catalonia, in Spain, to develop circular economy, water treatment and waste management R&D projects together.

**Achievements:** TYPSA and EURECAT consolidated a strong partnership in 2019, as a result of significant progress in two multi-year European circular economy research projects: ZERO BRINE (Horizon 2020 Programme) to facilitate the implementation of the circular economy package and the SPIRE Roadmap in various process industries; and SOLIEVA (LIFE+ Programme) to demonstrate the technical, environmental and economic feasibility of membrane technology, to meet the environmental wastewater treatment challenges of the table olive industry.

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“Contributing to Sustainable Development is a challenge for all. The UN has recognised the fundamental role of business; we are firmly committed through our work, the solutions we develop and the corporate practices we adopt”
Transport planning and mobility


- Demand study and economic-financial evaluation for the feasibility study of the Belabo-Ngoundéré railway line renewal project in Cameroon.

- Demand study and economic-financial evaluation for the Dakar-Bamako railway rehabilitation project in Senegal and Mali.

- Traffic study for the 57 km Zeway – Arsi Negele section of the Modjo – Hawassa Expressway in Ethiopia.

- Traffic study for the Doha airport expansion in Qatar.

- Traffic study for the ‘Sports Boulevard Urban Axis’, comprising the urban renewal of 9 km of one of Riyadh’s major avenues, and a 30.5 km green axis in the west of the city, Saudi Arabia.

- Transport study for coastal city links in the Eastern Province in Saudi Arabia.

- Demand study for the subway network in Dhaka, Bangladesh.

- Demand study for the implementation of central bus corridors in Dublin, Ireland.

- Demand study and cost-benefit analysis for the Selo – Novska Dugo railway project in Croatia.


- Traffic study for public transport accessibility improvements on the A-4 Autovía del Sur motorway in Madrid, Spain.

- Demand study for the proposal submitted for ADIF rail service deregulation measures in Spain.

- Transport master plan in Málaga and its metropolitan area in Spain.

- Transport master plan in Campo de Gibraltar, Spain.

- Demand study and economic-financial evaluation for the Alcalá de Guadaira tramway, Spain.

- Passenger demand study for the Cantabrian – Mediterranean Railway Corridor (Cantabria, Basque Country, La Rioja, Navarre, Aragon and Valencia) and the Atlantic Axis (Galicia), Spain.
The promotion of sustainable mobility plays a crucial role when deploying and fostering European Commission transport policies. The effective application of these policies invariably comes up against problems such as the diversity of EU member countries, multiple types of city and the transport infrastructure and services available in each specific case. This variability of scenarios conflicts with replicated measures for promoting sustainable mobility, which must generally be individually adapted as appropriate. As a result, the European Commission’s actions to promote sustainable mobility often fail to deliver the expected results and, consequently, municipalities, metropolitan areas and regions are not able to optimise the Community resources available.

Seeking to alleviate this problem, the European Commission’s Directorate General for Mobility and Transport launched the ‘Pilot Project - Raising Awareness of Alternatives to Private Car’. The objective is to implement 5 pilot actions for the promotion of sustainable mobility in different European Union cities and develop guidance for application. The success of TYPSA’s comprehensive methodology was cemented by an exhaustive analysis of the current situation and the main shortfalls of actions previously implemented in the last 10 years, and by maximum representation in cities and metropolitan areas.

In a first phase, 24 actions to promote sustainable mobility in different European Union cities were analysed as paradigmatic case studies to identify those that had been most successful.

This analysis enabled TYPSA to define 5 pilot actions in consensus with the European Commission’s Directorate General for Mobility and Transport, for the promotion of sustainable transport in 5 different cities, considering transferability potential according to each city’s urban characteristics:

- ‘Personal mobility trainers for switching from car to sustainable modes’ Marseille Metropolitan Area, France.
- ‘Educational Kiss & Ride to school for parents and pupils’ Braga, Portugal.
- ‘Encouraging the use of PT among potential users in disperse cities’ (Súbete a Granada) Granada, Spain.
- ‘Promotion of cycling through the demonstration of economic and health benefits involving the competent authorities’ Valencia, Spain.
- ‘Experiencing public space without traffic’ Prague, Czech Republic.

On the basis of the results of all the analyses performed, guidelines were drawn up for application in future actions.

The project development as a whole therefore provides a reference tool that public and private bodies can apply in future actions, campaigns and policies to promote sustainable mobility throughout the European Union.

E-bikes and public transport for mobility in Berlin
**Roads**

- Geotechnical design for 17 new structures, and structural and geotechnical design for 19 retaining walls on two new additional toll lanes per direction, along 35 km between I-495 and US-29 on the Interstate I-66 in Virginia (Maryland), USA.
- Final design of an additional lane in the I-15 median near Hidden Valley Parkway in USA.
- Final design for the new Mount Tabor Highway Bridge over Bean Blossom Creek in Monroe County, Indiana, USA. The 70 m long project entails designing bridge approaches to avoid overtopping and preparing the corresponding environmental approvals.
- Preliminary design and environmental impact study in an I-10 Interstate Highway corridor in Phoenix, Arizona, USA. Design of interchanges and structures to increase traffic capacity on a 10 km section.
- Detailed design for the widening of the Saltillo - Monterrey highway in Mexico; a 23 km section with 21 bridges in the state of Coahuila de Zaragoza.
- Construction engineering services for the Los Gallos and Cahuacán tunnels, 208 m and 115 m long respectively, on the Atizapán-Atiacomulco motorway in Mexico.
- Road projects in Paraguay. Feasibility studies and detailed designs for the rehabilitation and upgrade of 1,000 km of rural roads in the departments of Concepción, San Pedro, Canindeyú, Caazapá and Paraguarí.
- Studies and analysis for the rehabilitation of 5 bridges on the Local Road Network in Arequipa, in Peru. Bridge lengths range from 20 to 120 m.
- Preliminary and detailed designs for rehabilitation works on four sections of road totalling 43 km and including 6 bridges, on the East Coast of the island of Dominica.
- Detailed design of 91.4 km of roads in mountainous, scarped terrain in the province of Imbabura, Ecuador.
- Detailed design to widen the SP-333 road into a dual carriageway in the state of São Paulo in Brazil; section 4 is 19.6 km long, and section 2 is 17.4 km long.
- Detailed design to upgrade 10 km of the SP -255 road to dual carriageway in the state of São Paulo, Brazil. The project includes 7 new and 3 remodelled interchanges.
- Concept design for upgrade works on various roads under concession in the State of São Paulo in Brazil, extending along a total length of 423 km.
- Detailed design of the Vespucio Norte urban motorway expansion in Santiago, Chile. Widening to four lanes and connectivity improvements on a 6 km section in the north-west access area of the capital city.
- Detailed design of the new Modjo - Hawassa highway; a 57 km section from Batu (Zeway) - Arsi Negele, in Ethiopia.
Dublin BusConnects

The urban configuration known today as the Greater Dublin Area, is the result of multiple municipal mergers around the city’s central core. The inhabited areas of the resulting expanded urban scheme are widely spread around the mouth of the River Liffey and the city centre. Studies forecast that by 2040 the suburban population will increase by more than 25% with a significant corresponding increase in trips to workplaces in the metropolitan area.

In order to improve the public transport service, and to respond to current and future demands, the Irish government has pushed to implement the BusConnects Corridors project to develop 16 dedicated bus corridors totalling 230 km with 200 km of bike lanes along the road corridors.

TYPSA is working in partnership on Project D, to develop 4 of these corridors: 6 km from Ballymun to the City Centre, 4 km from Finglas to Phibsborough, 5 km from Kimmage to the City Centre and 4 km from Ringsend to the City Centre. These corridors cross both urban and interurban areas ranging from new developments to historic areas in the heart of Dublin.

The project will be completed in 4 phases, progressing from the initial state, with public consultations and social information, to conceptual designs, and finally a Specimen Design as a reference for the bidding documents required for the subsequent design and construction of the corridors.

TYPSA, as a recognised knowledge and experience provider, is managing BIM tool implementation across the entire BusConnects Corridors project, leading other first class international companies involved in the National Transport Authority (NTA) programme.

- Construction supervision of rehabilitation and modernisation works on national roads RN-6 and RN-13 in Madagascar. A total of 343 km in two sections; Port d’Antsiranana - Ambanja (233 km from the RN-6) and Taolagnaro - Ambovomb (110 km from the RN-13).

- Detailed design of Väg 261 Ekerövägen E1 motorway in Sweden. The project includes the widening of 2.3 km of road between the towns of Ekerö and Lindö, the demolition of a 160 m long concrete bridge and the construction of a new 120 m moveable bridge with four spans, one of which will be a steel pivoting span to allow river traffic through on the River Tappström.

- Detailed design of the new Macroom bypass comprising 22 km of dual carriageway with 2 lanes in each direction of the N-22 in Ireland (in partnership).

- Detailed design for the widening of the IP-3 road in Portugal (in partnership). The carriageway will be widened, and alignment conditions improved on 90 km, between the interchanges at the towns of Souselas and Viseu.

- Construction supervision, BIM management and health and safety coordination of the works for the new branch off the C-32 Blanes-Lloret motorway, (in partnership) in Spain. This 6.7 km section of express lane will run between Tordera and Lloret de Mar.

- Detailed design for the widening of the A-7 Valencia bypass in Spain. The 23 km section comprises two new carriageways with three lanes in each direction on either side of the current motorway.

- Preliminary design for the A-127 road dualling project in Spain. The 38 km section between Gallur and Ejea comprises three town bypasses and a bridge over the River Ebro.

- Construction supervision of the Plaça de les Glòries road tunnels in Barcelona, Spain. The works involve a tunnel for the Gran Via de les Corts Catalanes under the Plaça de les Glories Interchange, completing two 1km stretches of twin-tube tunnel.

- Construction engineering services for the Nokian Tyres Technology Centre in Santa Cruz de la Zarza, Toledo, Spain. This specialised tyre testing centre has several tracks with different road surfaces.

- Construction supervision of the works to widen the V-21 road to three lanes in each direction on the 4.3 km Carraixet-Valencia section, Spain.

- Supervision of the A-68 motorway works, section Arrúbal-Navarrete in the province of La Rioja, Spain. The 29 km section constitutes the southern ring road round the city of Logroño where 24.5 km share the main carriageway of the current AP-68 toll road, while the rest has been newly built to connect with the N-232. Construction includes 8 interchanges.
Railway engineering

**METRO**
- Toronto Subway, Canada. Engineering services for new expansions, including layout alternatives, review of construction methods, station configuration and tunnel engineering.
- Lima Metro in Peru. Detailed design of lines 2 and 4, with 14.4 km of tunnel, 14 underground stations and a workshop.
- Dhaka Metro, Bangladesh. Feasibility study and preliminary designs for the metro network. Civil and systems engineering for the design of four 90 km long underground lines.
- Doha Metro in Qatar. Detailed design of three of the lines that will form the future metro network: Red Line South Elevated, Red Line North and Green Line. 20 km with 6 stations.
- Riyadh Metro, Saudi Arabia. Design of lines 4, 5 and 6. The section designed totals 65 km in length and features 26 km of tunnel, 29 km of viaduct, 25 stations, 2 workshop-depot complexes and 7 park-and-ride car parks.
- Stockholm Metro, Sweden. Preliminary and detailed design for the extension of the Blue Line from Kungsträdgården to Nacka and Gullmarsplan, an 11 km section of underground line through a rock tunnel under the Saltsjön sea, and 7 stations.
- Barcelona Metro, Spain. Construction supervision of architectural finishes and MEP engineering for the new Ernest Lluch metro station on L5.
- Valencia Metro, Spain. Construction supervision of the works to take line 1 underground in Burjassot, connecting a double-track underground section to the at-grade line currently in operation. The total length of the section is 800 m.
- Valencia Metro, Spain. Detailed design of Line 10, comprising a 2.1 km underground section with 3 stations, a 2.9 km at-grade section and 5 stops, a provisional workshop and newly built depots.
- Madrid Metro, Spain. Framework Agreement for engineering and construction services to support Metro de Madrid.

**TRAMS AND LIGHT METRO**
- Kista Tramway in Stockholm, Sweden. Design and build tender design for an 8 km tramway trackbed with 3 viaducts, an underpass, 8 stops and technical buildings.
- Vitoria Tramway, Spain. Construction supervision support for platform extensions on the Universidad de Vitoria-Gasteiz section, and expansion of depots.

**RAILWAYS**
- The Maya Train, Mexico. Technical advisory services for the entire project and supervision of the basic engineering for the 1,525 km of track in 7 sections through the Yucatan peninsula.
- Douala-Yaoundé-Ngaoundéré railway line in Cameroon. Rehabilitation design.
Sydney Metro Independent Certification Services

Sydney Metro is one of Australia’s largest infrastructure projects and is a key element in the New South Wales Government’s Future Transport 2056 Priorities plan. With the first stations in the northwest of the city already open, the next step is to develop the line through the city’s extensive metropolitan area. The new Sydney Metro City & Southwest project will extend the line from the end of the operative Northwest section in Chatswood, under Sydney Bay through the new Central and Southwest Financial District stations to Bankstown.

TYPSA is a member of the consortium that Sydney Metro engaged to provide Independent Certifier services for Sydney Metro City & Southwest, the second metro phase. With 15.5 km of track, this phase also comprises Martin Place, Victoria Cross, Crows Nest, Barangaroo, Pitt Street and Waterloo stations, as well as the Line-Wide (LW) rail systems package, and the operations, trains and systems (OTS2) contract.

Adopting a relatively new approach in the Australian infrastructure market, the role is described as Light Touch and Streamlined Certifier and is based on risk analysis. Working in a highly collaborative relationship with Sydney Metro to develop the project in two phases, the focus is on evaluating the design, with its characteristics and critical points, understanding the client’s priorities and relationships with the contractors, and jointly analysing the project and its requirements in detail.

TYPSA’s extensive international expertise brings considerable value when structuring risk assessment to prioritise high criticality items, while expediting items assessed as non-critical in order to meet the strict and ambitious deadlines of the project as a whole. The result of this process is a detailed analysis of the requirements and their risk levels for subsequent review.

We will continue to work closely with Sydney Metro during the project and construction phase to meet the target for the two new sections to be operational by 2024.

- Dakar-Bamako railway, West Africa/Senegal-Mali. Studies for the rehabilitation and modernisation of 1,286 km.
- Tororo-Gulu railway line, Uganda. Construction supervision for the rehabilitation of 375 km of line, with EU funding.
- Commuter rail network in Tunisia. Project management of a 17.9 km line, including civil works, stations, mechanical and electrical engineering and rolling stock.
- New Jubail-Damman line, Jubail interior network and North Border Line, Saudi Arabia. Supervision of both design and construction of the 280 km line for passenger and freight traffic.
- Bhaupur-Khurja and Khurja-Dadri freight corridors, India. Design supervision services and construction supervision and project management for the construction of an electrified double track.
- HSR Kuala Lumpur border with Singapore, Malaysia. Technical advisory for the 370 km track, 7 stations and 3 depots.
- Hamnbanan railway line, section Eniksberg-Pölsebo, Sweden. Tender design for the design-build project for the new 2 km long underground double track with alternate sections of rock tunnel and cut-and-cover.
- Ostlänken high speed line, Bäckeby-Tallboda section, Sweden. Feasibility study for a 17 km section. Railway systems and general network definition.
Airports

- Detailed designs of the airfields at Aguascalientes, Manzanillo and El Bajío international airports in Mexico, comprising rehabilitation, expansion and new construction of runways, taxiways and aprons.

- Civil works supervision at Capitán FAP José A. Quiñones de Chiclayo International Airport in Peru. Rehabilitation and improvement of the 2,500 m long runway, the apron, taxiways, and the entire perimeter fence.

- Capitan David Abensur Rengifo International Airport airside rehabilitation project, including resurfacing of the 2,800 m runway and the perimeter fence, in Pucallpa, Peru.

- Designs for the optimisation of electrical and sanitary systems in the passenger terminals at Anta, Chachapoyas, Chiclayo, Iquitos, Pisco, Pucallpa, Talara, Tarapoto and Tumbes regional airports in Peru.

- Tender design for the concession of Balmaceda and Punta Arenas, Chile’s southern airports. The works include airside and landside civil works, buildings and MEP.

- Design of the new international airport in Rwanda, including the airfield (runway, taxiways, parking aprons, drainage, airfield and navigational systems) and the baggage handling system for the new terminal building.

- Master plan for the private terminal at Jeddah airport in Saudi Arabia.


- Framework agreement for designs, construction management and supervision of airport facilities in the AENA network in Spain. The agreement entails providing on-call services within a framework contract (Córdoba, Badajoz, Valencia, Gerona, Zaragoza, Sabadell, Alicante, Málaga, Granada, Albacete and Ceuta).


- Detailed design of the expansion of Terminals T4 and T4S Satellite at Adolfo Suárez Madrid-Barajas airport in Spain. The passenger processing buildings, boarding docks and associated aircraft parking aprons will all be expanded at both terminals. The project also includes remodelling the taxiways and airfield components affected by the expansion.
Spain is famous worldwide for tourism and the country’s airports must constantly evolve and adapt to new requirements that seek to boost the sector.

Hence AENA’s 2018 - 2022 Investment Plan, for which TYPSA is providing both project management and construction management services for the expansion and remodelling of 5 airports in central Spain: Adolfo Suárez Madrid-Barajas, Cuatro Vientos, Burgos, Salamanca and Valladolid, over a period of 48 months.

Lines of action established for each of the airports translate into specific investment projects.

Our multidisciplinary team of more than 35 professionals manages each action technically, from the initial strategic phase of each project to on-site construction services, ensuring construction and subsequent commissioning are properly carried out, both airside and landside, keeping costs, deadlines and risks under control at all times.

The keys to successful project management were:

- Deploying a team of professionals with in-depth knowledge of the actions from kick-off to operation.
- Controlling the investments allocated to each airport by monitoring all the construction schedules and costs assigned to the lines of action in progress.
- Minimising the possible deadline and cost deviations in all actions.
- Rigorously complying with the DORA (Airport Regulation Document) requirements and commitments classified as strategic and important at each airport.
- Ensuring AENA’s annual target investments are met.

The team oversees 162 project lines at different stages, managing construction of 8 of them with a total construction cost of 17 million euros.

In addition, we provide support for 200 minor works, which the airports themselves carry out directly, without interrupting normal operation.
Ports and coasts

- Site supervision services for refurbishment of berth No 7 in the North terminal at Callao Port, Peru. Works include repairs, a new firefighting platform, a new fender system and berthing equipment.

- Tender design for the Aconcagua Project desalination plant marine works in the Bay of Quintero, Chile. Study of alternatives, development of the optimal solution and construction methodology for the intake tower, and intake and outfall structures for the 1000 l/s desalination plant.

- Preliminary transport study and study of alternatives for the construction of a new port area in the State of La Guajira, Colombia. Feasibility study and selection of the optimal location to develop a multi-purpose regional port area.

- Detailed design for the rehabilitation of the Puerto Caldera breakwater in Costa Rica. The breakwater is in a highly vulnerable condition after several failures since 1981.

- Preliminary design of new unloading berths for oil and gas at the REFIDOMSA facilities in Haina, in the Dominican Republic. Ships will be able to unload up to 500,000 barrels of refined oil products and LNG at the new pier.

- Detailed project report for the first development phase of Colachel Port in Tamil Nadu in India. Container transhipment hub with a long-term capacity of 16 million TEU.

- Study of alternatives and design of the foundations and walls of the ore concentrate unloading warehouse for Atlantic Copper in Huelva, Spain.

- Detailed design of the new commercial pier extension in the Port of Marin, in Pontevedra, Spain. Piled structure with a berthing length of 148 m and minimum depth of 11 m. Design constrained by the presence of contaminated sludges.

- Construction supervision of the railway access to the Escombreras basin expansion in Cartagena, Spain, comprising 2,560 m of railway trackbed plus 1,600 m of ballastless track in the berthing area.

- Detailed design of a bulk grain storage centre for Berge Marítima in the Escombreras basin in Cartagena, Spain.

- Framework contract with the Port Authority of Bilbao in Spain for 24+24 months, to prepare studies and civil engineering designs. Specifically, the detailed design of the crown wall and access roads on the central breakwater in the first stage (Abra Exterior) of the Port of Bilbao expansion.

- Four-year maintenance dredging design for the Basque Country Ports Dredging Plan, in Spain.

- Diagnostic study of the Estuary of Bilbao as an axis to revitalise the town centre with water activities on the Estuary and its margins, for Bilbao City Council, Spain.
Construction engineering services for the emergency works carried out on beaches in Valencia and Castellón, in Spain, after the sea storms in 2019.

Construction engineering services, quality control, geotechnical assistance and instrumentation control for Port of Barcelona works and technical support to the Port Authority Projects Department in Spain.

Construction supervision of the Poniente Norte pier expansion in Port of Palma de Mallorca, Spain. Reinforced concrete floating caissons 34 m long were used to create a 36,000 m² esplanade which was subsequently filled.

This project is particularly significant as Spain’s first large maritime works project developed using BIM.
Infrastructure management

- Cave Creek Road improvement project in Phoenix, Arizona, USA. Ramps, sidewalks and driveways will be adapted to meet ADA standards for people with disabilities. Services include street lighting, drainage and landscaping design, and traffic signal renewals on a 3.5 km stretch.

- Pavement Management System for the nine ASUR Group airports 2019-2023 in Mexico. All the pavements will be surveyed, operation and maintenance studies conducted, and consulting services delivered using DÉDALO®, Management System technology.

- Saltillo-Monterrey highway management in Mexico, developing, adapting and implementing ĪCARO Management System technology. This is a pilot project prior to application in a concession portfolio.

- Rehabilitation design for emergency works on secondary road sections in the Ancash region of Peru. A first section in Lacramarca and San Diego is 158 km long while the second in Huacaschuque and El Condor covers 48 km.

- Comprehensive Highway Development Plan in 19 Provinces in Ecuador, funded by the IDB. The studies cover a 74,672 km long road network.

- Technical advisory services for the evaluation of 24 km of works on the Caraguatatuba – São Sebastião ring road in São Paulo state, Brazil.

- Independent technical advisory services for the construction and O&M of the new Los Libertadores border complex, at 2,990 m above sea level, between Argentina and Chile.

- Independent technical advisory services for the audit and monitoring of the Autopista del Sol, Route 27, San José – Caldera highway concession in Costa Rica.

- Technical support and investment management consulting services for the Integration Corridors Road Rehabilitation and Maintenance Paving Programme in Paraguay. Routes 6, 8 and 13, and maintenance of 1,200 km of roads.

- Technical independent engineer services to review ore terminal operation at the port of Nueva Palmira in Uruguay.

- Road asset management system maintenance for 1,600 km of the United Arab Emirates Federal Road Network.

- Technical advisory services for the 178 km Autoestrada da Beira Interior concession in Portugal.

- ĪCARO technology implemented as the Maintenance Management System to operate 1,628 km of roads in Portugal, comprising 17 motorways, 6 national roads and 6 additional routes.

- Inspection and monitoring of structure and slope anchors, and of geotechnical issues on the Gipuzkoa Provincial Council road network in Spain, with a total of 48 control points and 9,200 anchors.
TYPSA provided technical advisory services for the process of buying back two motorways under concession in the Madrid Region main road network, namely Section 1 of the M-45, and the section between the M-40 and the M-522 of the M-501 Ruta de los Pantanos.

The M-45 is a free, peri-urban motorway, operating under shadow toll, located to the south-east of Madrid. Section 1 is 14.1 km long and runs between the A-2 and M-23 (O'Donnell junction) with 3 lanes in each direction, 5 interchanges, 11 overpasses and 2 underpasses. The initial 25-year concession period was subsequently extended to 34 years and will expire in 2032.

The Ruta de los Pantanos concession is a free, interurban, shadow toll motorway between the M-40 and the M-522 (Quijorna), located to the west of the city of Madrid. This 21.8 km section of the motorway has 12 interchanges and 33 structures The concession period is for 25 years and will expire in 2024.

The technical advisory services provided for the acquisition process analysed the concession's technical feasibility, verifying contractual compliance in terms of the mandatory quality criteria for routine and heavy road maintenance, and operation. OPEX and CAPEX forecasts up to the end of the concession were also analysed.

The works, resources, programming and cost forecasts for routine and heavy maintenance (reinforcements, renewals) were analysed in view of the current condition of the road, past actions, future traffic estimates, contractual requirements and the applicable regulations.

In addition to the technical assessment and technical risk analysis of the concession, future cost estimates were validated taking into account contractually stipulated operation and handback requirements.
Water engineering and management

- San Miguel River study in the municipality of Atizapán de Zaragoza in Naucalpan, Mexico.

- Management and technical coordination of the 800 km Tietê - Paraná waterway works programme in Brazil, including extension of the waterways system by more than 200 km.

- Construction engineering services to heighten Itabiruçu dam from 68 m to 85 m, to contain solid waste from the Conceição mining complex in Itabira, Minas Gerais State, Brazil.

- Detailed design, construction support, risk analysis and operating manual for the Maravilhas II tailings dam in Itabirito, Minas Gerais state, Brazil.

- Preliminary design of the 114.5 km Xingó Channel in Alto Sertão in Sergipe state, Brazil.

- Studies, review and update of the state of Rio Grande do Norte Water Resources Plan, covering a 52,800 km² basin, for a population of 3.4 million, in Brazil.

- PPP structuring for the ‘Integration of the São Francisco River with River Basins of the northern Nordeste’ project in Brazil, to operate water distribution infrastructure.

- Update of ATLAS Brazil: Urban Water Supply 2025 – 2035. Action plan covering demand, resources, infrastructure, quality and water security, for a population of 175 million in a total of 5,570 municipalities, in Brazil.

- Studies, analysis and diagnosis of the risks arising from the 13 km long Imperial Canal, in the Araucania region in Chile.

- Review and additional design improvements to the detailed design for the 3 m³/s Nueva Cocinera Canal in Illapel, Coquimbo region in Chile.

- Detailed design of Arroyo Casupá dam. A roller compacted concrete gravity dam, 35 m high above foundations and with a reservoir capacity of 100 hm³, in Uruguay.

- Water resource assessment and water quality analysis in five drainage basins with a total surface area of 116,705 km² in the regions of Ucayali, Huanuco, Loreto, Ayacucho, Huancavelica, Apurímac, Cusco, Arequipa and Puno, in Peru.

- Integrated flood and mass movement management plan for river basins in Peru, including the 837 km² Lacramarca River basin near Chimbote in Ancash, the 1,948 km² Motupe River basin in Lambayeque and the 900 km² La Leche River basin also in Lambayeque.

- Water resources management plans in two Atlantic pilot-case basins, namely the 7,940 km² Mayo River basin and the 34,547 km² Mantaro River basin, in Peru.

- Pre-feasibility study of the Cañete River multipurpose project, with a 230 m dam, a 400 hm³ reservoir, a 150 MW cavern power plant, irrigation water for 26,000 ha and water supply for 4.8 million inhabitants, in Peru.
Turkmenistan is covered almost entirely by the Karakum Desert, which seriously complicates drinking water access for its main cities and particularly its capital Ashgabat. The Turkmen government has therefore embarked on several projects to guarantee the supply of desalinated water from the Caspian Sea to some of the main cities.

At the government’s direct request, TYPSA provided engineering services for the projects known as Turkmenbashi and Ekerem, in a first stage. Both these projects seek to supply desalinated drinking water from the Caspian Sea: the former to the capital, Ashgabat, and the latter, to the Ekerem region, bordering on neighbouring Iran.

The water supply capacity to Ashgabat, which is 590 km from the Caspian Sea, will be 1.2 million m$^3$ per day, while the supply capacity to Ekerem be 250,000 m$^3$ per day.

After collecting the relevant inputs, identifying the stakeholders involved, and analysing current applicable local and international regulations, a comprehensive programme was drawn up and an initial schematic solution developed for both projects.

Works in the second stage included the preliminary and tender designs, construction bidding documents and bidding support for the Turkmenbashi project.

The desalination plant in this ambitious project set the world record for capacity in 2020. Its 1,991 km network of pipelines supplies 29 cities along the route, which are home to approximately 42% of the country’s population.

The project includes the construction of an independent irrigation water production and transport line for 140,000 m$^3$/day, delivering water to two reservoirs, each with a capacity of 6.5 hm$^3$. The irrigated area exceeds 6,000 ha.

In addition, the project includes 6 large pumping stations, 4 of them with power ranging between 20 MW and 32 MW, a 265 MW gas power plant, 2 photovoltaic plants (33 MW and 50 MW respectively,) power lines, substations and all the access and service roads.

The magnitude of the project and the short time available for completion, posed a challenge both in technical and management terms.
Urban water systems and treatment

- Tender design for the Lake Titicaca Basin Wastewater Treatment System in Juliaca, Puno, Key, Ayaviri, Juli and Moho for a total population of 1,120,000, in Peru.

- Detailed engineering for Talara refinery auxiliary treatment plants in Peru.

- Study of alternatives and detailed design of the gravity rainwater drainage system along the central strip of the city of Piura in Peru.

- Detailed design and technical assistance for El Salitre wastewater treatment plant expansion in Colombia.

- Advisory and management services for the ‘Integral Sanitation Programme of the Bay of Asunción and the Metropolitan Area’ in Paraguay.

- Design of water supply infrastructure for Trayen, Aillinco, Paillanao rural localities and the Araucania region in Chile.

- Feasibility studies for the design of sewerage systems in Tome, Rapel and Caren in the Monte Patria region of Chile.

- Supervision of the “Tietê Project” sanitation programme in the metropolitan region of São Paulo, for a population of about 21 million, in Brazil.

- Water supply system feasibility study in 24 municipalities in the Seridó region in Rio Grande do Norte, Brazil.

- Urban Water Supply Atlas of all municipalities in Brazil information and data update.

- Design of the wastewater treatment plant and sewer in Jaboatão, Pernambuco State in Brazil. With a 1,868 l/s flow, the plant will serve a population equivalent of 1.1 million.

- Design of the Jardim São Paulo Wastewater Treatment Plant - WWTP, in Recife in the State of Pernambuco in Brazil. For a population of 570,000.

- Technical support in the PPP tender process for SANESUL-operated municipal sanitation networks in the State of Mato Grosso do Sul in Brazil. The study covers a population of 1,120,000.

- Preliminary and detailed design of the Bangú Wastewater Treatment Plant, Rio de Janeiro, Brazil, for a population equivalent of approximately 350,000.

- Integral Study of the Sanitation System in the Municipality of Almoloya de Juárez in Mexico. The study covers an area of 484 km² with a population of 148,000.

- Wastewater treatment plants and sewerage collection network in Mardin, Turkey. Construction supervision of two new wastewater treatment plants, which will serve populations of 45,000 and 325,000 respectively, and of the Mardin sewerage network. (178 km).
Non-revenue water reduction and optimisation of energy efficiency in Costa Rica

TYPSA is providing support services to the Costa Rican Institute of Aqueducts and Sewers (AyA) to design a strategy to reduce non-revenue water in its distribution network. Services include preparing a more effective management model and developing an Action Plan for designs and construction works worth about $160 million.

The AyA serves a total population of 2.07 million, of which almost half is in the San José metropolitan area. Drinking water reaches 99.3% of the population within the institute’s service area: slightly above the national average, which is in the order of 89.5%.

Non-revenue water (NRW) in the distribution system accounts for more than 50% of the volume produced, with losses being closely related to high service pressures, high network breakdown rates, illegal connections, and delays in attending to faults, as well as losses from customer measurement errors.

In addition to the urgent need to renew pumping station facilities and equipment, the concept behind drinking water distribution network design needs to be adapted to energy performance strategies for greater hydraulic and energy efficiency.

The project aims to reduce NRW by 17% and energy consumption by 7.5% in all drinking water distribution systems in the Metropolitan Area and in the seven main peripheral systems.

These objectives are to be achieved within 5 years. During the first year and a half, the Baseline will be generated, the Action Plan defined, and actions developed to be tendered and executed in the remainder of the period. Furthermore, management, institutional, commercial and technical capacities need to be created so that AyA can implement the project sustainably and independently.

To develop the project, TYPSA is leading a consortium comprising 20 full-time experts with international experience, most of them authorities in their fields, and another 16 part-time experts to ensure the specialities and all areas of knowledge required are covered.

- Preliminary design review, basic design and detailed engineering for the Manfouha WWTP (Phase 4) in Riyadh, Saudi Arabia.
- Construction supervision and contract monitoring services for the Shuaibah-3 desalination plant, in the expansion phase for 250,000 m³/day water production capacity in southern Jeddah, Saudi Arabia.
- Supervision of the design, construction, commissioning and operation of 6 desalination plants for 550,000 inhabitants located in Tunisia’s southern provinces.
- Technical design and construction supervision support to Udal Sareak water authority for secondary supply networks in 67 municipalities in the Historical Territory of Bizkaia, Spain.
- Construction supervision for the expansion of Muskiz WWTP in Spain. With a treatment capacity for a population equivalent of 12,000, and a maximum flow of 310 l/s.
- Control of the operation and maintenance of 60 wastewater treatment plants in the southern region of Murcia, Spain.
- Operation and maintenance of Terrassa - Les Fonts water regeneration plant in Spain.
- Diagnosis and planning of urban drainage networks operated by Canal de Isabel II in municipalities and basins in the Madrid Region in Spain.
- Detailed design of the Pinedo 1 WWTP upgrade works, for 300,000 inhabitants in Valencia, Spain. 5,500 m of cast iron pipe between Realón water treatment plant and Albal.
Sustainable cities

**Cities**

- Sports Boulevard urban axis project in Riyadh, Saudi Arabia. First and second phase of the urban regeneration of one of the city’s major axes along a 135 km catalysing green path, including urban infrastructure and sports, leisure and cultural facilities.

- Review, modification, value engineering and monitoring of the implementation of the University of Al Jouf 720 ha master plan, in Saudi Arabia.

- Design and site supervision of the new urban development project in Zenata, some 15 km north-east of Casablanca in Morocco, with 70 ha of urban and 42 ha of green areas.

- Diagnostic study of the Bilbao Estuary, in Spain, as a hub to revitalise the town centre with water activities on the Estuary operated from its margins. The study analyses the space and its constraints along 14 km of estuary for different uses or activities and leisure business clusters.

- Design and construction management of an underground dual-use car park for visitors and residents in José Miguel Barandiarán park in Errenteria, Spain. The 2,715 sq m car park has 162 spaces on two basement levels.

- Construction management of the El Cañaveral urban development project and technical assistance for commissioning, plus additional traffic and environmental studies and infrastructure designs, in Madrid, Spain.

- Consultancy services to set up a support office for business development areas in Madrid, Spain.

- Masterplan for the wine cellar district in Quel, La Rioja, Spain. Restoration and maintenance works to make use of cultural heritage.

**Sustainable Drainage**

- Design of the sustainable drainage system and hydrological-hydraulic modelling of the SUDS (Sustainable Urban Drainage System) in Calle Cristobal de Moura, Barcelona, Spain.

- Construction management assistance within the sustainable urban drainage framework, including proposals for monitoring systems, for the Avda. del Greco remodelling project in Seville, Spain.

- Preliminary design of a prototype green corner and remodelling of a section of Water Corridor 2 in Arrecife, Lanzarote, Spain.

- Technical sustainable urban drainage support for SUDS detailed design and monitoring plan in Avda. las Asociaciones de Vecinos, in Seville, Spain.

- Detailed design of a rain garden in the Manzanares River Park, Madrid, Spain.

- SUDS design guide and training course for Castelló de la Plana City Council, in Spain.
General Urban Plan Modification on railway land in Irún

Goal: Create an innovative urban district through a Transport-Oriented Development (TOD).

Urban Planning revision is a priority for Irún City Council, which makes the remodelling of railway land a requirement. The railway facilities occupy a large area of inner-city land and split the central urban layout spatially and functionally.

Urban planning procedures are to be implemented to allow real estate development on former railway land and TYPSA has been selected to design the modification for the urban development known as Vía Irún.

This Specific Modification will provide a structured and detailed plan for Ministry of Transport and ADIF railway land in disuse and its environs, allowing a city and urban regeneration project to be developed that makes full use of the potential for integrated renewal.

The proposal for Vía Irún compromises an area of 64,023 sq m and features the creation of a centralising hub around the high-speed station and the public transport interchange, articulating the relationship with the city centre and both sides of the railway area.

TYPSA sought specific support and advice on public participation, urban planning, and gender issues. The Criteria and Objectives document was prepared and approved after an intense and interesting public participation process.

LIFE CERSUDS, Ceramic Sustainable Urban Drainage System

Projects such as LIFE CERSUDS are born to foster the use of green infrastructure in urban planning and enhance city adaptability to climate change. Such projects align with Circular Economy principles and Agenda 2030 SDGs.

The project involves the design of a totally new and attractive permeable paving system, comprising ceramic cobbles arranged on draining bases that mitigate the effects of urban stormwater flooding, reducing pollution from urban runoff and significantly improving water management in cities.

With this drainage solution, excess water is diverted to a tank/channel located under the bicycle lane so that water can be recovered and reused for watering landscaped areas. This tank/channel acts as a collector, delaying and reducing the contribution to the network during peak rainfall.

As a pilot experience, 1.950 sq m has been paved in Calle Torre de Sant Vicent, a street in the municipality of Benicàssim, in Castellón (Spain), which will serve as a reference to replicate the system in other cities in Spain, Italy and Portugal. In its first year, this prototype has enabled more than 900,000 litres of very high-quality runoff water to seep underground and produced 12 tonnes less CO₂ than other permeable pavements.

LIFE CERSUDS has won several awards and recognitions:

- First Prize SOM CERAMIC 2018 for the Use of Ceramic Products of Castellón Provincial Council.
- Honourable Mention at the Innovation Space of Tektonica 2019, Portugal’s International Construction and Public Works Trade Fair.
- Prize for innovative product or material at Future Arena de Construmat 2019, International Construction Exhibition.

In addition, it was recognised by the European Union as an example of an innovative strategy to improve urban climate change resilience.
Buildings

- Structural and MEP design for the Antara I shopping mall connection with Antara Phases I and II, in Mexico City.

- Structural and MEP design for an office complex in San Andrés Cholula, in the state of Puebla, Mexico. The complex is structured in 4 blocks of 5 levels with 2 basements, with a gross floor area of 41,253 sq m.

- MEP design for the 505-key, 20,000 sq m Great Wolf Resort hotel in Tepeji de Rio, Hidalgo, Mexico.

- MEP design for the new 115-key Standard Ermita hotel, in Mexico City.

- Structural and MEP design for the remodelling and expansion of the Inditex Logistics Centre in Mexico City.

- Detailed design of the metal pergolas covering an area of 14,200 sq m at the Mohamed VI Polytechnic University in Benguerir, Morocco.

- MEP design and interior design for the Business and VIP lounges at several stations on the Medina-Mecca High Speed Line in Saudi Arabia. The various lounges total an area of 5,000 sq m in the cities of Medina, Mecca, Jeddah and King Abdullah Economic City.

- Structural design review and value engineering for the residential and administrative buildings on the Méndez Álvaro Campus, 90,000 sq m above ground, in Madrid, Spain.

- Preliminary and detailed design, and site supervision of the new shopping mall in Benidorm, Alicante, Spain. 125,000 sq m on five levels - two underground parking levels and three floors of retail space above ground.

- Design and construction supervision assistance for a four-storey, 30,000 sq m office building in the Arroyo Fresno PAU urban development area in Madrid, Spain.

- Structural and MEP design for two office buildings on the Paseo de la Zona Franca in Barcelona, Spain. Architecture by RBTA (Ricardo Bofill).

- Architectural and engineering services for the San Sebastián de los Reyes Data Centre, in Madrid, Spain, to accommodate the TIER III Red Eléctrica power grid Data Centre.

- Preliminary and detailed designs and construction supervision of the New Palau Blaugrana Arena in Barcelona, Spain, including a multifunctional main arena (15,000 seats), a mini-arena annex (3,000 seats), an ice rink, 2 football pitches, a bus station, and the redevelopment of the surrounding area.

- Preliminary and detailed designs and structural engineering services for a 340-key hotel with co-working facilities, in Madrid, Spain. The hotel comprises 3 buildings, one new-build and two refurbished historic buildings.

- Rayo Vallecano Stadium rehabilitation design and study of safety and functional conditions in Madrid, Spain.
Technical architectural design support services are being provided for construction in independent phases.

Real Madrid football club decided to completely redevelop the Santiago Bernabéu Stadium and awarded the contract to FCC Construcción as a Design-Build project. TYPSA collaborated with FCC Construction’s technical department at the tender stage, and both teams are now jointly developing the detailed design for this emblematic stadium, working to a record deadline and with a level of technical excellence commensurate with the iconic nature of this unique project.

This complete revamp will make the Santiago Bernabéu Stadium a worldwide benchmark of state-of-the-art sports architecture, implementing the latest advances in security and audiovisual technology together with innovative solutions for the structure and the fixed and retractable roof system. A construction project with innovative engineering, structured to enable the works to be combined with sports events and the Club’s current use of the facilities.

- Preliminary and detailed designs and structural engineering services for the new Vallehermoso stadium in Madrid, Spain, with a capacity for 12,000 spectators.

- Detailed design and structural engineering services for the rehabilitation of the Preciados 13 building in Madrid, Spain.

- Detailed design of the new high speed rail station in Ezkio. The surrounding urban landscape will also be developed together with the accesses to the future station. Gipuzkoa, Spain.

- Detailed design and structural construction supervision for the sodium salts and potash terminal at the port of Barcelona in Spain. Main storage building of 37,000 sq m comprising two 60 m clear span warehouses.
Project and construction management

- Construction management of an office complex in San Andrés Cholula, in the state of Puebla, Mexico. The complex is structured in 4 blocks of 5 levels with 2 basements, with a gross floor area of 41,253 sq m.

- Project and construction management of the Hacienda Cabo San Lucas complex in Baja California Sur in Mexico. This tourist development comprises apartment and leisure blocks with a GFA of approximately 26,000 sq m, and a 22,700 sq m hotel.

- Project and construction management of the expansion and partial renovation of the Inditex Logistics Centre in Mexico City. The works involve demolishing the existing offices and expanding the logistics centre to a total area of 8,300 sq m.

- Supervision of the turnkey project design, construction and equipment for a hospital complex in Villa Tunari, department of Cochabamba in Bolivia. 50,000 sq m and 222 beds.

- Contract management and construction supervision at the University of Al-Jouf in Sakaka, Quaryyat and Tabarjal in Saudi Arabia.

- Various technical, environmental and planning due diligence audits for hotel assets in Spain and Portugal, and advisory services for investors acquiring residential properties.

- Technical advice and project monitoring for Torre Caleido in Madrid, Spain. The project comprises two clearly distinct parts: a 112,000 sq m GFA plinth, or podium, 6 storeys high, and a 35-storey, 160 m tall tower.

- Construction management and construction supervision of the new Seaside office building in the Canary Islands, Spain. A new two-storey 9,197 sq m GFA building with two basements will be built and the existing one demolished.

- Project and construction management services and construction supervision for a hotel in Pasito Blanco, Las Palmas de Gran Canaria, Spain. A new 5-star beach-front hotel, with 550 keys and a GFA of 81,873 sq m, including restaurants, bars, leisure and public areas, conference rooms, a kids’ club and a spa & wellness area.

- Construction supervision and health and safety coordination for the Hotel Meliá Valencia conservation works in Spain.

- Project Management for the design and construction of the Real Club La Moraleja golf club (courses 3 and 4) clubhouse in Madrid, Spain, throughout all investment stages.

- Technical advice and site supervision of Nokian Tyres Technological Centre, in Santa Cruz de la Zarza, Toledo, Spain. A unique building in the shape of drilled cylinders comprising a glass interior within the building envelope, with a diameter of 35.4 m.

- Owner’s engineering and project monitoring for the rehabilitation of a 6,861 sq m 19th-century building on 5 levels above ground plus a total of 2,963 sq m of new basement on 4 levels, located at Paseo de la Castellana 14 in Madrid, Spain.
Skyline Madrid, a new residential area

Skyline Madrid is a new iconic residential concept located in Paseo de la Dirección, in the northern part of Madrid, and will be the driving force behind the regeneration of the Tetuán district, while bringing infrastructure and service renewals.

More than 600 homes with 1 to 3 bedrooms will be built in two tower blocks, each approximately 100 m high on 25 floors, with spacious terraces, garage and storage space, 2 swimming pools (one will be an infinity pool on the 25th floor), a gym, solarium, sauna, concierge service and co-working space. Both towers offer panoramic views over Madrid.

TYPSA’s client engaged advisory services for its investment in the second tower, namely the T2.2, built to rent. TYPSA will thoroughly analyse and technically supervise the design, focusing on optimising functionality, cost, and quality. During construction, works will be proactively monitored to achieve the high quality expected of a building of this type.

- Project management framework agreement for the various Repsol buildings in Spain, providing project and construction management services.

- Construction supervision, and testing and commissioning support for the TIER III Red Eléctrica Española power grid Data Centre in San Sebastián de los Reyes, Madrid, Spain.

- Construction supervision assistance for the complete refurbishment of the old Legazpi market in Madrid, Spain, a 44,511 sq m emblematic building built in 1935. Services include materials and geometry control and MEP testing and commissioning.

- Design review, procurement management, and project and construction management for a new residential building at Calle Bretón de los Herreros 44, Madrid, Spain. GFA of 10,000 sq m.
M&E and IT systems

- Project and construction management on 5 sections of the Maya Train in Mexico, including MEP and railways systems.

- Preliminary and detailed design of the protein processing plant in Attalaquia, Hidalgo, Mexico.

- Tender design for the concession of Balmaceda and Punta Arenas airports in southern Chile. Electromechanical design.

- Technical assistance for the construction of electromechanical and instrumentation and control systems at El Salitre WWTP in Bogotá, Colombia.

- Design of air side M&E at New Bugesera International Airport in Rwanda.

- Master plan for the Sports Boulevard urban axis project in Riyadh, Saudi Arabia. Urban regeneration of a 135 km green path, including urban infrastructure and buildings.

- Preliminary and detailed design of the Al Akaria hotel in Al Aqeeq, Riyadh, Saudi Arabia.

- Design of electromechanical and telecommunications systems in the Umm Ghuwailina and Al Mansoura property developments in Qatar.

- Basic electromechanical engineering for the new Cross Island Line Eastern subway depot and workshop in Singapore.

- Civil and environmental designs for the HS2 high speed line in the UK. Technical support for tunnel ventilation and electromechanical systems in the ventilation shafts.

- Stockholm Metro, Sweden. Design of the electromechanical, ventilation and railway signalling systems, and telecommunications in 7 stations and 11 km of tunnel.

- Ostlänken high-speed line, Bäckeby-Tallboda section in Sweden. Preliminary design and environmental analysis of signalling systems.

- Detailed design of Red Eléctrica Española power grid Data Centres in Spain.

- Management, coordination and integration of the detailed M&E design for the Santiago Bernabéu Stadium redevelopment project in Madrid, Spain.

- Valencia Nord – San Vicenç de Calders railway line, Valencia Nord – Castellon section in Spain. Design of the signalling systems for the detailed design to implement mixed gauge track for increased capacity.

- Detailed design of electromechanical systems at the University Hospital of Araba, in Vitoria, Spain.

- Detailed designs for Picón I, II and III solar photovoltaic plants, Ciudad Real, Spain. Design of electrical systems.
The works package that TYPSA was engaged to deliver within the framework of the contract for the redevelopment of Santiago Bernabéu Stadium, includes several computational fluid dynamics simulations (CFD).

Technically complex simulation software created by TYPSA Group provides a tool that requires highly specialised professionals using an appropriate methodological approach to achieve the objectives pursued.

In the case of the Santiago Bernabéu Stadium, CFD tools were used with two different objectives: on the one hand, to conduct studies on air comfort and quality during matches, and on the other, to carry out combined studies on smoke evacuation and behaviour at earlier stages.

Air comfort and quality studies aim to analyse the impact that the various stadium redevelopment project measures could have on air quality.

One of the most important measures to be implemented is the outer building envelope and the extension of the roof, which will have both fixed and retractable parts. Other major actions include the installation of gas heaters on the roof, and the renovation of existing heaters to improve comfort in the stands.

To study the effects, information developed in BIM models is used to generate viable detailed geometric models for use in simulation tools. Despite the considerable effort required to reproduce this type of geometric model, an accurate representation of the characteristics expected in reality is important. The relevant boundary conditions can then be incorporated in the model in such a way as to capture and reproduce the heat exchange, aerodynamic flows and pollutant dispersion phenomena to be studied.

Some of the measures, such as the installation of gas fired radiators, can have beneficial effects on comfort by increasing the radiant temperature over the spectators, but undesirable effects on air quality through increased gas concentrations in the combustion process that add to spectator CO₂ emissions. CFD tools like these allow areas with potentially rarefied air flows to be analysed to reduce the impact on spectators and players.

Similarly, it is possible to analyse the effects of reduced comfort caused by air flows from the outside to the inside of the stadium through the access corridors to the stands. Possible mitigation measures can be developed once affected areas have been identified.
Renewable energy

SOLAR ENERGY
- Owner’s engineering for Townsite solar photovoltaic plant with energy storage in Nevada, USA. The project has an 80 MW power storage facility and a 180 MWac solar plant.
- Detailed engineering for a portfolio of Nautilus solar photovoltaic projects in Minnesota, USA, comprising a group of 9 x 2 MW plants.
- Owner’s engineering for the Citadel solar-plus-storage photovoltaic project in Nevada, USA. The plant comprises a 100 MW storage system and a 90 MWac plant.
- El Tuli & Helios photovoltaic cluster in Mexico. Owner’s engineering for the commissioning and operation of both plants, totalling 300 MW.
- Geotechnical survey supervision at Mi Ranchito, Ahumada II, Tastiota, Cajeme and Horus solar photovoltaic plants in Mexico.
- Supervision of the design, construction, operation and maintenance of a 37 MW solar photovoltaic plant in Zagtoui, Burkina Faso.
- Technical, environmental and social assistance to develop sustainable energy in emerging countries to facilitate electricity access for the most disadvantaged communities.
- Support for large-scale solar energy development in Uzbekistan through the Scaling Solar programme. Technical, social and environmental consulting.
- Design of the 148 MW Bluegrass solar photovoltaic farm in Queensland, Australia.
- Detailed engineering and construction support for a 5 MW photovoltaic solar plant at the US navy base in Rota, Spain.
- Detailed engineering for the 119 MW Torremendo solar photovoltaic plant in Murcia, Spain.
- Feasibility engineering for a plant generating hydrogen using an off-grid solar PV plant, in Plasencia del Monte, Spain.

WIND POWER
- Construction supervision of the foundations of the wind turbines at Guzmancito wind farm, Dominican Republic.
- Owner’s engineering for 5 wind projects in Argentina, namely Loma Blanca I, II, III, VI and Miramar, totalling 350 MW with 109 wind turbines.
- Detailed engineering of the Duna & Huambos wind farm in Peru, comprising 14 wind turbines with 36,75 MW total installed power.
- Detailed design of the Cumaru wind farm in Rio Grande do Norte, Brazil, with an installed capacity of 205,8 MW.
- Preliminary design of the 180 MW Tinaja Azul wind farm in the state of Coahuila, Mexico, with 53 wind turbines and a 25 km long 230 kV transmission line.
Integrating offshore wind energy in the Port of Granadilla, Tenerife (Canary Islands)

Ports have become drivers of innovation and development in renewable energy projects in response to the need to meet their ambitious energy self-sufficiency goals by 2030, both nationally and at European level.

In this context, wind energy in ports can provide an innovative solution that combines and simultaneously maximises the advantages of both onshore and offshore wind energy. Wind turbines can be installed both on the actual port infrastructure (breakwaters, yards) and in the port waters, which make it one of the best energy options for achieving the demanding goals of ports.

Within Spain’s geography, the Canary Islands have been identified as one of the areas with the best characteristics. Taking advantage of this favourable scenario, the Port Authority of Santa Cruz de Tenerife commissioned TYPSA to study the technical and economic feasibility of installing an offshore wind farm in the outer waters of the Port of Granadilla on the island of Tenerife.

The project focused on analysing wind resources, studying favourable conditions and constraints for wind farm development, integrating initiatives within the port regulatory framework, evaluating environmental loads and designing offshore foundations. These inputs enabled us to prepare an overall budget to determine the financial feasibility of the project, under different assumptions of energy sales depending on the production studied. TYPSA’s multidisciplinary approach led to an optimal solution that has definitely proved attractive for development, and following these principles, similar projects have been carried out for other port authorities.

- Electrical integration study, and construction control and monitoring of the 100 MW Boulenouar wind farm in Mauritania and its connection with the 225 kV Nouakcott-Nouadhibou line.
- Verification of the design and dynamic behaviour of shallow water foundations at the Ben Tre Lot 5 wind farm in Vietnam.
- Basic engineering for the Tottori I and Tottori II wind farms in Japan, comprising 34 and 35 wind turbines respectively.
- Framework contract for the development of foundation designs and R&D projects with solutions such as cable-stayed, pre-cast, ribbed or anchored foundations carried out mainly in Sweden, Norway and Finland.
- Technical and environmental study for the development of offshore wind farms in the Canary Islands, Spain.

HYDROPOWER
- Preliminary design, detailed design approval and construction supervision of the Sabaneta Dam counter dam in Arroyo Loro in the Dominican Republic, to increase the capacity of the existing hydroelectric power plant.
- Owner’s engineering for the modernisation of 6 + 6 generating units, 175 and 111 MW, at Jupiá (1,500 MW) and Ilha Solteira (3,500 MW) hydroelectric plants in Brazil. Services include quality control, site monitoring and equipment commissioning.
Environment

- Environmental services for the construction of two new lanes on the SR-24 road in Mesa, Arizona, including research into hazardous materials, and archaeological research. USA.

- Cultural resource services during the water infrastructure construction activities and archaeological excavation near Arizona State University in USA.

- Design, guidelines and capacity building to adopt ecological infrastructure protection solutions in Haiti.

- Technical assistance to the support programme to reform public administration and public finance in the Dominican Republic.

- Technical assistance to the Financial Fund for the Development of the Countries of the River Plate Basin (FONPLATA) to manage an EIB loan for adopting international environmental and social standards. Argentina, Bolivia, Brazil, Paraguay and Uruguay.

- Environmental assessment studies for the Pacific and Caraveli wind farms in Peru.

- Laboratory services for the SEDAPAL Wastewater Quality Evaluation Team in Peru. Sampling and analysis of 3,000 industrial discharges into the Lima and Callao sewage system over a two-year period.

- Preparation of the Strategic Programme for Climate Resilience in The Gambia.

- Technical assistance to the Programme for the Rehabilitation and Strengthening of the Resilience of Socio-ecologic Systems of the Lake Chad Basin (PRESIBALT) in Africa, financed by the African Development Bank.

- Climate risk diagnosis and early warning system development in Niger, funded by the African Development Bank.

- Management of the Sangha Tri-National Foundation Trust Fund for biodiversity protection in forests in Cameroon, the Central African Republic and the Congo, with KfW Development Bank funding.

- Review and assessment of coastal area legislation and regulations in Belize.

- Technical assistance to support the Union of the Comoros Programme for climate change resilience strengthening.

- Technical assistance to the Sectoral Forest and Environment Programme in Cameroon, funded by the French Development Agency (AFD).

- Technical assistance for the management of protected areas and fragile ecosystems in Cameroon, funded by the European Commission.

- Technical assistance to the Biodiversity for Life Programme (B4Life) for emerging and developing countries, funded by the European Commission.
Technical assistance for environmental sustainability integration in European Union cooperation policies, funded by the European Commission.

Environmental and social assessment for the refurbishment and construction of river cargo and passenger stations, piers and shipyards in Bangladesh.

Environmental assessment, environmental management plan, resettlement plan and inventory of assets affected by the new Bhanga and Payra railway construction project, Bangladesh.

Conceptual sustainability framework for the Sports Boulevard project in Riyadh, Saudi Arabia, setting both quality and quantity objectives.

Surface water monitoring programme and additional monitoring of waters in protected areas in the Guadalquivir, Guadiana and Júcar River Basin Districts in Spain.

Survey and characterisation of industrial wastewater in the Emasesa sewage network. 1,000 samples of industrial discharges were taken for analysis along the entire 2,980 km network, Spain.

Detailed design for noise barriers on Tarragona railway lines, Spain.

Design and construction supervision of the restoration, conservation and improvement works in the Júcar River Basin District in the Valencia Region and in the provinces of Teruel and Tarragona in Spain.

ADIF Alta Velocidad, Spain’s high speed rail infrastructure manager, is one of the country’s pioneers in environmental management systems that embrace the whole project lifecycle. TYPSA was engaged to provide the consulting services and technical assistance required for the environmental management of high speed rail works in northern Spain.

The three-year contract covers works on 700 km of lines in several sections: Vitoria – Bilbao – San Sebastian; Valladolid – Leon; Venta de Baños – Burgos and the Cantabrian – Mediterranean Corridor.

Services will basically verify appropriate compliance with the mitigation measures contained in the respective Environmental Statements (ES) and validate effectiveness. Above all, improvements will be proposed based on previous experiences and ADIF-AV environmental management system results.

Document control is essential since more than 11,000 documents are generated per year. Control is carried out using GIO (Project and Construction Management), proprietary software developed by TYPSA.

The ongoing works present a detailed picture of the environmental measures adopted on more than 45 sections currently under construction. They also provide the opportunity to assess their effectiveness, share the results with the Environmental Management coordinators of other lines and broaden experience in order to design more effective mitigation measures adapted to the particularities of the environment and type of works in future projects. Environmental permits and licenses in the various Spanish regions and for different official bodies, can also be more easily updated.

It is interesting to note that surface water pollution penalties were avoided, and that careful planning, coordination and noise control measures enabled construction works to continue during compulsory biological rest periods.
Agricultural engineering and rural development

- Technical assistance to strengthen institutional capacity in order to implement planning and strategies that address illicit drug trafficking and food security in Bolivia.

- Technical assistance to implement agricultural development investments in the South Department in the Republic of Haiti.

- Technical assistance to the food and food security programme in the Republic of Haiti.

- Preliminary and Tender design for the supply of desalinated water from the Caspian Sea for an irrigated area of more than 6,000 ha in Turkmenistan. Construction of a 381 km irrigation water pipeline with a capacity of 140,000 m³/day and two irrigation reservoirs each with a capacity of 6,5 hm³.

- Technical assistance to the project for improving the governance of resilience, food and nutrition security and sustainable agriculture, in West Africa. The project will be coordinated from Burkina Faso and includes a total of 17 countries.

- Technical assistance to the Fisheries Committee for the West Central Gulf of Guinea (FCWC) within the European Union PESCAO framework project for improved regional fisheries governance in West Africa, to develop a regional fishery policy.

- Pilot programme for rural development and agriculture (ENPARD) in Ain-Témouchent, Laghouat, Tlemcen and Setif rural areas in Algeria.

- Supervision and control of irrigation works in an area of 2,548 ha in the rice-producing area of Tiongoni in Mali, with funds from the European Commission.

- Technical assistance to the Food Security and Nutrition (FSN) programme to defend the most vulnerable population in Burundi.

- Evaluation of hydro-agricultural planning for the Gihanga-Kajeke stream area, in Burundi, and preparation of technical feasibility studies for further works.

- Assistance to support small and medium-sized enterprises and to develop value chains, within the framework of the Local Development for Jobs Project, in Burundi.

- Support to the Government of Malawi in establishing the National Irrigation Development Fund.

- Feasibility study and support for creating an agricultural growth pole in the Tillabéri Region in Niger.

- Technical support for agricultural transformation strategies and promotion of youth entrepreneurship in the agricultural sector in Gabon.

- Support for improved regional fisheries governance in West Africa (PESCAO), in Ghana. The aim is to increase the contribution of fisheries to sustainable food security and poverty alleviation.

- Technical assistance to increase agricultural production in South Sudan.
The purpose of the Programme is to revitalise rural areas through integrated rural development projects that are innovative, sustainable and create jobs. The Programme improves the livelihood of rural communities by increasing income sources and employment opportunities in the provinces (wilayas) of Ain Temouchent, Laghouat, Tlemcen and Setif.

AGRER has deployed a team of 76 long- and short-term experts to provide technical assistance services to the Programme to:

- Set up a participatory process to identify sustainable rural development projects that strengthen the planning and management capacity of local actors.
- Support the development of local agricultural products, crafts, cultural activities and tourism projects, and improve their quality to promote new sources of income.
- Disseminate information on successful rural projects, building new promotion networks.

A total of fourteen strategic sectors were identified and diagnosed, and collective branding and labelling systems were put in place. The priority agricultural products were olive oil, honey, milk, cheese, pistachio, capers, bitter almond, saffron, white onion, and wool. The cultural products were pottery, basketry and carpets, and the last sector was rural tourism.

A comprehensive training programme was conducted to teach 48 local civil servants a new profession, known as Advisor in Territorial Development, which is now pending official status.

Key figures:
- 13 projects identified through participatory processes.
- 30 rural companies and associations benefited from support in promoting targeted products.
- 74 local groups and associations created or strengthened.
- 402 consultation meetings were held between institutional actors and civil society.
- 500 people trained in governance, project management, engineering and marketing.
Support to development financing institutions

FRAMEWORK CONTRACTS

European Bank for Reconstruction and Development (EBRD)
- IPPF: Framework agreement for sustainable infrastructure project preparation in sectors including transport, water and wastewater, solid waste and district heating.

European Investment Bank (EIB)
- EIBAS Transport: Agreement to support EIB advisory services activities in the transport sector inside and outside EU-28.
- EIBAS Energy: Agreement to support EIB advisory services activities in the energy sector inside and outside EU-28.
- Consultancy services for urban development: Lot 2 - Water and solid waste sectors.
  - Consultancy services for the energy sector.

European Commission (EC)
- EuropeAid: Framework contract for support services for the implementation of European External Aid - Lot 1: Sustainable management of natural resources and resilience.
- EuropeAid: Framework contract for support services for the implementation of European External Aid - Lot 2: Infrastructure, sustainable growth and jobs.
- EuropeAid: Framework contract for support services for the implementation of European External Aid - Lot 3: Human rights, democracy and peace.

Foreign and Commonwealth Office - United Kingdom

INSTITUTIONAL STRENGTHENING AND GOOD GOVERNANCE

- Technical assistance and supervision of the rehabilitation works for damage caused to transport infrastructure by climatic phenomena, in Madagascar.
- Technical assistance for the implementation of the Trade and Entrepreneurship Training Program II (PRECEEI) in the Republic of the Congo.
- Technical assistance to FONPLATA (Financial Fund for the Development of the Countries of the River Plate Basin, Argentina, Bolivia, Brazil, Paraguay and Uruguay) to implement climate resilient infrastructure projects.
- Technical assistance to the Post-Earthquake Reconstruction and Reactivation Plan in Ecuador.
- Technical assistance for the reconstruction of infrastructure damaged during the 2016 earthquake in Manabí province, Ecuador.
- Technical assistance to implement the European Union Trust Fund for Colombia, supporting application of the peace agreement.
- Technical assistance to the delegation of the European Union to Turkey for the implementation of the RCOP regional competitive operational programme and the CISOP competitiveness and innovation sector operational programme.
- Technical assistance to improve the organisation and performance of working relationships with EU institutions in French Polynesia, Diagnostics, action plan and training activities.
- Activities to enhance visibility and understanding of the European Union’s role in bilateral and regional relations through ‘Public Diplomacy’ action in South Korea (in partnership).
Statistics and land management

STATISTICS AND SERVICE QUALITY CONTROL
- Survey to analyse housing demand in the Autonomous Community of Madrid, Spain.
- Pilot Disability Survey (EDAD): 2,500 face-to-face surveys in Spain.
- Design, preparation and analysis of surveys to obtain feedback from current and potential IFEMA customers. The programme involves 48 annual fairs, 8,200 exhibitor and 19,200 visitor questionnaires, Spain.
- Cleaning service quality control in public buildings at the University of Seville and at San Sebastián de los Reyes and Catarroja town halls, in Spain.
- Data cleansing and digitisation for the Military General Health Inspectorate’s clinical archive, in Spain.
- Data collection to monitor health and mortality rates among people affected by Toxic Oil Syndrome in Spain. Follow-up using paper or telephone questionnaires, on a sample of 12,500 affected persons.

LAND REGISTRY, INVENTORY AND ACQUISITION SERVICES
- Land acquisition services for the detailed design of four road sections in the eastern region of the island of Dominica.
- Land acquisition management for the Cocinera canal. Services include preparing land acquisition maps and property and title searches for the 157 plots on the Illapel section, in Chile.
- Land acquisition and right-of-way services for the Cheste-Chiva WWTP and main sewers in Valencia, Spain.
- Land acquisition for the public transport improvement works on the A-4 Autovía del Sur motorway. Section: Los Molinos Industrial Estate - San Marcos Industrial Estate in Madrid, Spain.
- Acquisition of property and rights affected by public works or for Roquetas de Mar City Council urban planning, Spain.

RESOURCES
- Technical support for the improvement and efficiency of economic, financial, employment and legal management services, Spain.
- Technical management and control support to the Spanish Service for the Internationalisation of Education (SEPIE) in its responsibilities as the National Agency (NA), particularly assisting in the internal audit on the Erasmus+ Programme in Spain.
- Specialised procurement advisory services for the Spanish Ministry of Defence.
- Support to the Reina Sofia National Art Museum financial department, Spain.
- Technical assistance to support the centralised public procurement system of the Institute for Housing, Infrastructure and Equipment for Defence in Spain.
- Technical support to the secretariat of the National Cancer Research Centre, a Spanish public sector foundation affiliated with the Carlos III Health Institute, Spain.
- IT support for various public bodies, namely the Spanish National Research Council (CSIC) Centre for Biological Research and the National Institute for Agricultural and Food Research and Technology (INIA) Centre for Animal Health Research, in Spain.
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