

11. Energy Performance

11A. Present Situation

Please complete the following table providing the most recent data that is available:

Table 1: Benchmarking Data - Energy Performance

Indicator		Unit	Year of Data
Final energy consumption	3,983,763	MWh	2017
Final energy use per capita	20.35	kWh/capita	2017
Share of renewable energies of final energy demand	6.23	%	2017
Share of locally produced renewable energies of final energy demand	5	%	2017
Energy performance of municipal buildings	N.a.	kWh/m ²	
Final Energy Use/Sector			
Agriculture & fisheries	24.7	%	2017
Industrial & commercial (<i>*excluding industries ETS</i>)			
Transport	25.7		
Domestic	30.9		
Services & Commercial (<i>*Tertiary non municipal buildings, equipment/facilities</i>)	17.3		
Other (<i>*Municipal buildings, municipal fleet and public lighting</i>)	1.4		
Total	100		

Describe the present situation and development (particularly in relation to the building sector), using quantitative data and figures. Where available, information/data should be provided from previous years (5-10) to show trends. Highlight the most relevant driving forces for the observed trends. List any disadvantages resulting from historical, geographical and/or socio-economic factors which may have influenced this indicator.

1. Present total final energy consumption by sectors (structure of energy consumption);
2. Past development of energy consumption and current plan (activities) for energy efficiency improvements and decreasing the use of energy, particularly for energy performance of municipal buildings (in kWh/m²) with specific reference to city owned buildings and important developments related to other end-use sectors besides the building sector (e.g. transport, industry production, services, public, lighting, electrical appliances, food);
3. Present situation, development and current plan for the energy supply mix, particularly regarding the renewable versus non-renewable mix of energy sources during the past ten years (for both heat,

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electricity and transport; expressed in kWh, MWh or GWh);

4. The current plan for integration and performance of renewable energy technology in municipal buildings and homes compared to the total energy use;
5. The development so far and the current plan of compatible and integrated district heating energy and of combined heat and power energy consumption compared to the total energy use, (expressed in kWh, MWh or GWh);
6. Application of innovative technologies (e.g. current plan for increasing the use of LED lamps in public lighting and use of green roofs/walls for energy saving).

(max. 600 words and five graphics, images or tables)

The positive effects of the structural, cultural and awareness initiatives and actions carried out by Parma community clearly emerge from the comparison of energy consumption between 2004 - base year according to BEI, Baseline Emission Inventory of Sustainable Energy Action Plan *SEAP* - and 2017, **with an overall 10.4% reduction in total consumption and 19.5 % in per capita consumption.**

	BEI 2004	MEI 2010	MEI 2017	Variation
Municipal buildings and facilities	42,867	50,460	34,913	-18.6 %
Tertiary buildings and facilities	769,134	604,337	687,970	-10.6 %
Residential	1,430,997	1,304,162	1,232,074	-13.9 %
Public lighting	14,276	21,736	21,000	47.1 %
Manufacturing (no ETS)	903,638	1,023,398	984,024	8.9 %
Transports	1,286,274	1,225,527	1,023,782	-20.4 %
TOTAL	4,447,186	4,229,621	3,983,763	-10.4 %

Table 1 - Trend in total energy consumption (MWh)

	BEI 2004	MEI 2010	MEI 2017	Variation
Municipal buildings and facilities	0.24	0.27	0.18	-26.8 %
Tertiary buildings and facilities	4.38	3.24	3.52	-19.6 %
Residential	8.14	6.99	6.30	-22,7 %
Public lighting	0.08	0.12	0.11	32.1 %
Manufacturing (no ETS)	5.14	5.48	5.03	-2.2 %
Transports	7.32	6.56	5.23	-28,5 %
TOTAL	25.30	22.60	20.36	-19.5 %

Table 2 - Trend in per capita energy consumption (MWh/inhabitant)

The need for a specific strategy aimed at energy consumption reduction dates from 2014, following the drafting of the *SEAP* and the identification of priority areas, based on the baseline analysis findings.

As regards Municipal buildings the action of the municipality mainly targeted schools, through numerous interventions for seismic safety and energy saving. The overall results are **18.6% reduction of total consumption and 26.8 % of per capita consumption.**

As regards Residential buildings the actions focused mainly on the energy efficiency upgrading of social housing buildings and condo buildings located in the suburban area. Interventions on private buildings were also supported through the activation of advantageous financing mechanisms, thanks to the involvement of local banks. The extension of the district heating network is without a doubt one of the projects that most contributed to reducing energy consumption. The system is powered by heat produced by an ETS cogeneration waste-to-energy plant from combustion of the non-recoverable waste fraction (almost 20% of the total municipal waste). The overall results are **13.9% reduction in total consumption and 22.7 % in per capita consumption**.

The good performance of Transport sector (**- 20,4 % total consumption; - 28,5 % per capita consumption**) is mainly due to the initiatives aimed at increasing cycling mobility, the use of public transport, the reorganization of logistic. 15 actions of the SEAP plan having a direct and indirect impact on the reduction of emissions in the transport sector are still ongoing.

The local electrical power generation mainly derives from **photovoltaic systems**. Between 2016 and 2017, 161 were installed, amounting to a **total 3.2 MWp power**. The total installed power has m concerned the residential and tertiary sectors, mostly related to new construction projects.

The consumption of Public Lighting shows a decreasing trend compared to 2010 but is higher than in 2004. This is due to the strong increase in the number of light points.

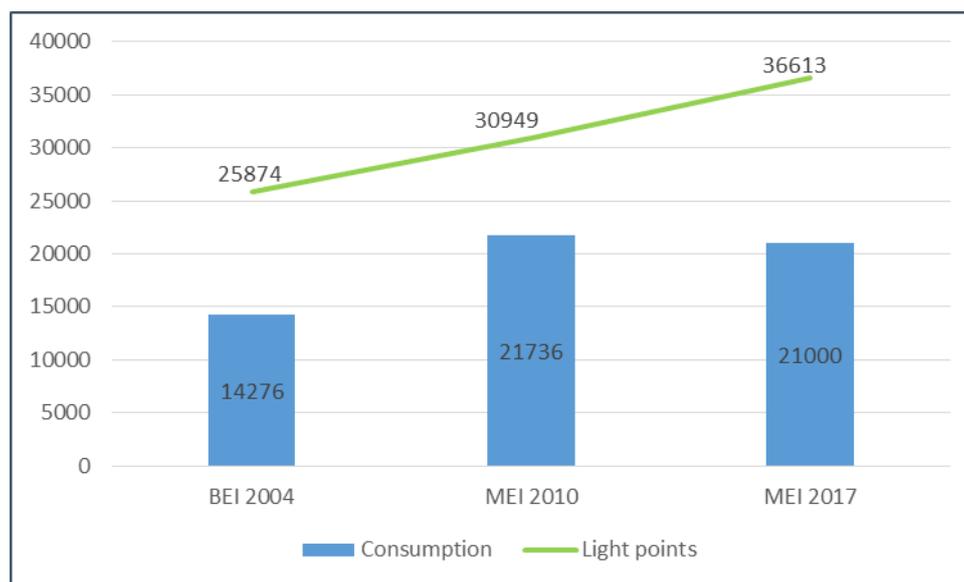


Figure 1 - Trend in energy consumption (MWh) and light point of Public Lighting

However, the municipality has launched an important project aimed at the retrofitting of the public lighting network, which envisages the entire replacement of obsolete systems with other more modern LED-based systems. At the end of 2017 only 150 light points had been changed and therefore no significant changes were recorded. In 2018 the change of more than 18,000 light points took place. Yet, once the project will be completed, more than 60% energy saving is expected.

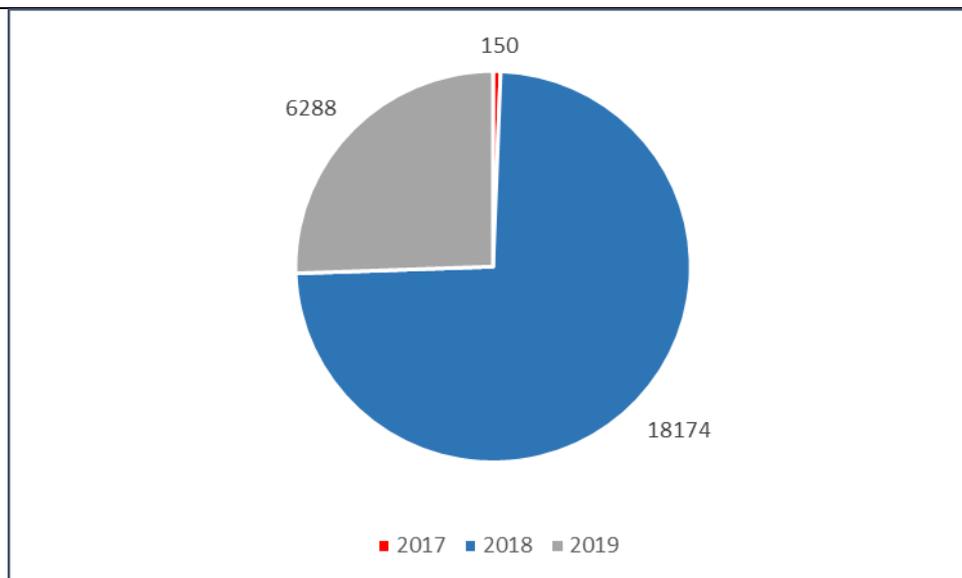


Figure 2- Light points replaced and being replaced

11B. Past Performance

Describe the measures implemented over the last five to ten years concerning energy, as a qualitative narrative. Comment on which measures have been most effective.

Make reference to:

1. Attempts to improve the energy performance (i.e. energy efficiency standards particularly of municipal buildings) above national requirements;
2. Maximising and prioritising the use of renewable energy technology (particularly in municipal buildings);
3. Measures to facilitate integrated district system solutions (e.g. co-generation) and a more sophisticated city-wide control;
4. Measures to trigger stakeholder engagement in the city to improve overall energy demand performance preferably including local government institutions, local market actors and citizens; mention existing co-operations.

(max. 800 words and five graphics, images or tables)

Following the preparation of the SEAP, Parma implemented an integrated strategy for reducing energy consumption, enhancing some successful actions carried out in previous years and identifying others, particularly in the priority sectors identified in the BEI.

To reduce energy consumption of Transport Parma has invested heavily to decrease individual trips using one's private vehicle, encouraging public transport, intermodal transport, cycling and walking. As planned in *SUMP* restricted traffic zones and "environmental islands" have been extended; the logistics were reorganized, and

there has been a spreading of cycling initiatives; bike and car sharing services have been enhanced; electric mobility was encouraged also by installing 22 charging outlets. A total investment amounting 3.270,000 Euros was allocated for sustainable mobility within the *Municipal Investment Plan* during the 2015-2017 period.

The municipality has also carried out support activities for businesses to improve their performance in terms of sustainable mobility. A Mobility Manager network has been set up involving 45,000 people, with 21 leading companies involved. In this context, companies have also played an important role in encouraging electric mobility. Chiesi and Davines have 18 and 9 charging outlets in their offices respectively. Barilla bought 83 PHEV and installed 31 charging outlets, the largest Italian charging station.

Since 2005, Parma has become the Lead Partner of the ICBI Convention (Low Impact Fuel Initiative), promoting the conversion of the public fleet to LPG and CNG and to co-finance dedicated infrastructures. The actions carried out have led to a significant decrease in the gasoline consumption (-59,8 %) while biofuels, CNG and LPG rates have increased.

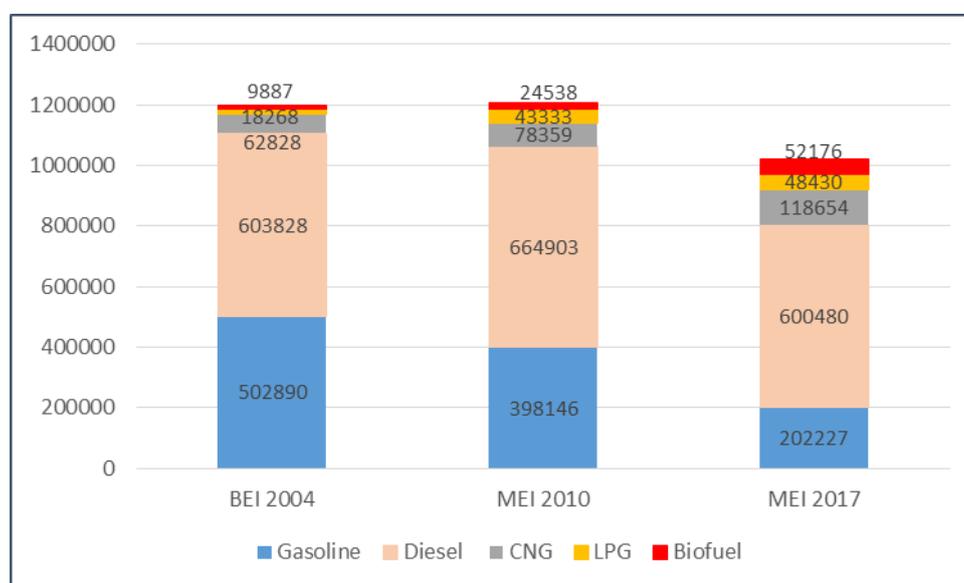


Figure 3 - Trend of energy consumption by fuel (MWh)

In 2015, the City council initiated a SEAP/SUMP harmonization process. The City has joined the European project *SIMPLA* and set up the **unified Energy and Mobility Sector**, which was an important step towards the integration of policies and planning tools affecting energy consumption.

About Residential and other buildings one of the most effective actions consisted in the extension of the district heating network. From 2004 to 2017 the number of DH users doubled. Over the past few years, several municipal buildings were connected to the DH network, including about 20 public buildings, University, schools, theaters, municipal offices and libraries. Other smaller networks, separate from the main one, are also available. The Hospital Area is equipped with a trigeneration network.

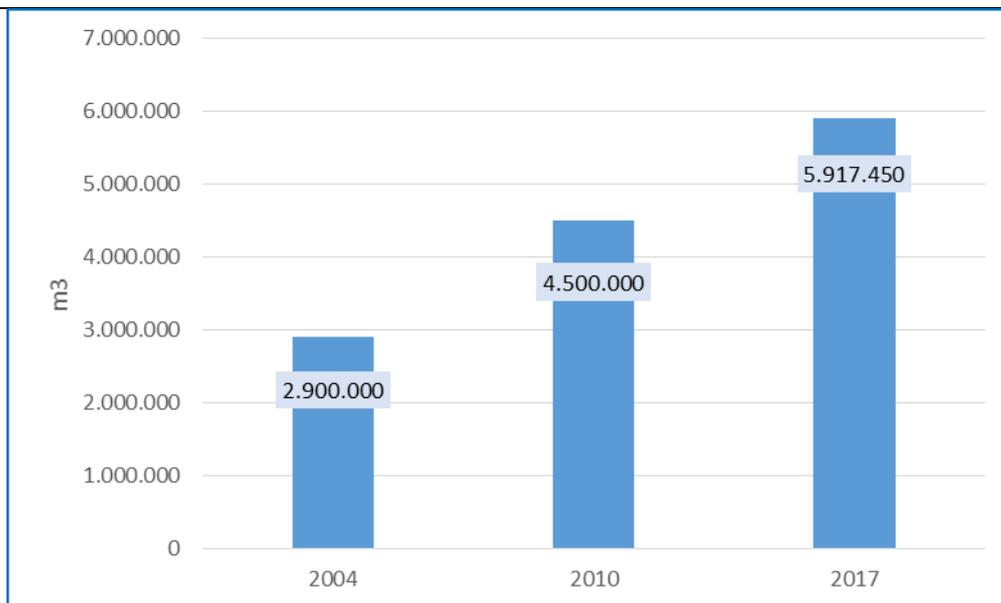


Figure 4 - Building volume served by DH (m3)

Good results have also been achieved thanks to initiatives aimed at increasing the energy efficiency of buildings. By analyzing the number of EPA certificates by type of intervention and energy class, it shows that 95% of EPA certificates concerns new A and B class buildings. It is a comforting testimony of the direction taken by the municipality, also thanks to the Energy Regulation in force since 2010.

Some relevant energy efficiency interventions were carried out by companies. Among these fall the construction of: the **new Chiesi Group headquarters**, a fully "Carbon Neutral" building; the **new Davines Group headquarters**, that use biogas, solar and geothermal energy; the **new Crédit Agricole headquarters**, awarded with the LEED Platinum certification.

Even the action on the schools turned out to be particularly interesting, also due to its repercussions in terms of raising awareness of the students. In all municipal kindergartens and in some schools energy efficiency measures **have been completed, with energy savings estimated at almost 55%**.

With regard to renewable energy plants, during the 2004-2017 period, a large number of photovoltaic systems have been installed in the city with a total output of approximately 55.000 MWh, which roughly cover just over 6,2 % of the city's energy consumption. As far as solar thermal energy is concerned, a total 2,714 MWh production has been estimated, including both commercial and residential applications.

Finally, the retrofiting of public lighting proved to be particularly effective. At the end of 2018 the network was extended by 3.5 km and the change of about 18.300 light points resulted in a consumption savings estimated at 50%.

Awareness raising and stakeholder involvement activities were carried out both during the preparation of Plans (SEAP, SUMP) and in some European projects (i.e. LEMON - *Less Energy More Opportunities*). One of the most effective - *Parma Futuro Smart project* - was conducted in the framework of the *Ruggedised project*, involving key local stakeholders (companies, associations, universities, start-ups) to co-design and co-manage the future Parma.

Furthermore, Parma is one of the eleven European cities participating in the *Infinite Solutions* project, within which the "*Parma Energy Project*" initiative was launched. The Municipality and Crédit Agricole Cariparma have

designed a new financial instrument available to citizens to apply for soft loans to make their buildings more energy efficient. The Municipality provides a technical support for the verification and monitoring of energy efficiency upgrading projects. The project also aims at fostering culture around the energy efficiency theme.]

11C. Future Plans

Describe the future short and long term objectives for shaping a sustainable energy system and the proposed approach for its achievement. Include measures adopted, but not yet implemented, and details for future measures already adopted.

Emphasise to what extent plans are consolidated by commitments, budget allocations, and monitoring and performance evaluation schemes, what potential there is and what kind of barriers you might expect in the implementation phase. Express and explain if and how far the strategies and targets go beyond national ambitions.

Make reference to the city's strategy to achieve goals by 2030 and 2050 and highlight:

1. The role of energy efficiency improvements;
2. The role of an increasing share of renewable energy in the total energy supply;
3. The city's strategy regarding renewable versus non-renewable energy mix, (please break down the the percentage of different renewable energy sources that comprise the renewable energy mix). Describe the planned energy mixes for at least the coming two decades, preferably add diagrams to describe this evolution;
4. Other measures affecting the total energy use in the city, e.g. changes in transport systems, industrial practices, food and commodities production and consumption, urban morphology and use of Green Infrastructure, consumer behaviour and import and export chains.

(max. 800 words and five graphics, images or tables)

In the coming years the Municipality will go on implementing the priority strategies identified in its programming tools. These strategies will be revised and updated in view of 2030 and 2050, with reference to the *Action Plan for Energy and Climate*, which will be drawn up in 2020. The objective of reducing emissions by at least 45% by 2030 requires further and decisive moves towards greater energy sustainability.

As part of this process, the Municipal authority has already identified some further significant improvement objectives:

- by 2030, at least 15% of energy deriving from renewable sources;
- by 2030, 20% total consumption reduction compared to 2004.

To achieve the first objective the municipality will strengthen its collaboration with the Emilia Romagna Region, for a more effective use of ESI funds, and with other European partners. **Parma wants to become a Positive Energy City.** For this reason it is a partner as an Italian pilot city of a Horizon project - still under evaluation - aimed at creating *Positive Energy Districts*. In the identified area, the electricity and thermal networks will be optimized and a photovoltaic system of 1 MWp will be realized.

Thanks to the **POTENT** project (*Public Organizations Transform Energy Transition* - Europe Interreg programme), the City of Parma will cooperate with eight further European partners, with a view to make the transition to renewable and more effective energy sources. Sharing of best practices, education and training events for the drafting of a plan that will give greater thrust to the local energy transition, identifying new business models for energy production through the use of renewable sources.

The Municipality will continue its action for energy efficiency in schools. It has allocated about 3 million euros / year to complete the energy efficiency of **4 or 5 schools each year, to have all its schools within energy class "A"** in a short time.

Parma will also insist on energy efficiency of buildings. It has been awarded with further than 1 million euro EU funding for the **FEASIBLE project** addressed to energy efficiency of apartment buildings and social care facilities.

The **FEASIBLE project**, during its three year duration, will be one of the key energy projects implemented by the Municipal authority not only in terms of the considerable funding allocated by the Commission, demonstrating to believe in the feasibility of the proposed model and benefits deriving from it for the citizens of Parma, but especially for its local impact, as it promises to significantly improve the urban housing stock quality, reduce pollution and help people save on of energy bills. The project partner ATES (the Regional Agency for Energy and Sustainability) will launch a new service that will be designed to support citizens in every step of redevelopment works, informing them about the opportunities offered by different instruments, such as incentives and tax allowances set out at national level and by energy services companis, providing energy audits of apartment buildings involved, facilitating contacts between the apartment building dwellers and professionals performing energy efficiency refurbishment work and helping citizens in dealing with all the necessary paperwork to access to dedicated national funding.

Parma will carry out actions to achieve the SUMP objectives, in particular **a 40% reduction in the use of private vehicles**, so as to significantly reduce transport consumption. Some of these initiatives will be led by TEP, the public local transport company, and are oriented to favor the use of pulic transport and intermodality.

Finally, the **retrofitting of the public lighting network** will be completed. By 2019 another 6,288 light points will be replaced. An *Energy Performance Contract* - EPC – that will finish in 2035 - has been stipulated to guarantee the maintenance of efficiency of interventions and environmental performance. The investment for structural interventions and subsequent management activities is on the whole equal to 29 million euros and and allows to achieve a significant cut in consumption, **from 21 million to 7 million KWh**.

11D. References

List supporting documentation, adding links where possible. Further detail may be requested during the pre-selection phase. Documentation should not be forwarded at this stage.

(max. 400 words)

1. **/Sustainable Energy Action Plan (SEAP), 2014**
<http://www.comune.parma.it/PAES/Il-Paes.aspx>
 Priority strategies <http://www.comune.parma.it/PAES/Target.aspx>
 Action Reporting <http://www.comune.parma.it/PAES/Monitoraggi.aspx>
 Baseline Emission Inventory (BEI) <http://www.comune.parma.it/PAES/baseline.aspx>
 Monitoring Emission Inventory (MEI) <http://www.comune.parma.it/PAES/Monitoraggi.aspx>
2. **Integrated environmental site (PAIP)**

- <https://www.irenambiente.it/it-IT/polo-ambientale-integrato-parma>
<http://www.comune.parma.it/ambiente/Inceneritore-di-Parma.aspx>
3. **Public lighting network**
<http://parmafuturosmart.comune.parma.it/progetti/parma-cambia-luce/>
 4. **Sustainable Urban Mobility Plan (SUMP), 2017**
<http://www.comune.parma.it/mobilita/Pums---Piano-Urbano-della-Mobilita-Sostenibile.aspx>
 5. **ICBI Convention (Low Impact Fuel Initiative)**
<http://icbi.comune.parma.it/project/default.asp>
<http://icbi.comune.parma.it/project/default.asp?pag=informazioni.asp>
 6. **SIMPLA Project "Sustainable Integrated Multi-sector Planning"**
<http://www.simpla-project.eu/media/82188/harmonization-report-comune-di-parma.pdf>
 7. **Chiesi Group headquarters**
<https://www.chiesi.com/stabilimenti-produttivi/parma/>
 8. **Davines Group headquarters**
<https://it.davines.com/pages/davines-village>
 9. **Crédit Agricole headquarters – LEED Platinum certification**
 10. <https://www.frigeriodesign.it/smartworking/inaugurato-a-parma-headquarter-green-life-di-credit-agricole-italia/>
 11. **LEMON project "Less Energy More Opportunities" (programma HORIZON 2020)**
<http://www.progettolemon.it/>
 12. **RUGGEDISED project "Designing smart, resilient cities for all" (programme HORIZON 2020)**
<https://ruggedised.eu/home/>
<https://ruggedised.eu/cities/parma/>
 13. **Parma Futuro Smart project**
<http://parmafuturosmart.comune.parma.it/>
 14. **Parma Energy Project**
<http://parmafuturosmart.comune.parma.it/progetti/parma-progetto-energia/>
<http://www.comune.parma.it/paes/ppe.aspx>
 15. **Infinite Solutions project - INnovative FINAncing for Local SusTainable Energy Solutions**
<https://ec.europa.eu/energy/intelligent/projects/en/projects/infinite-solutions>
<http://www.comune.parma.it/PAES/infinite-solutions-1.aspx>
 16. **POTeNT project "Public Organisations Transform Energy Transition" (Programme Interreg Europe)**
<https://www.interregeurope.eu/potent/news/news-article/6364/potent-is-on/>
 17. **FEASIBLE project "Fostering Sustainable Living cities" (programme HORIZON 2020)**
<http://www.comune.parma.it/notizie/news/2019-06-05/it-IT/A-Parma-un-finanziamento-europeo-per-efficienza-energetica-1.aspx>
<https://www.atesparma.it/2019/06/05/progetto-feasible-efficienza-energetica/>
 18. **Regional Agency for Energy and Sustainability (ATES)**
<https://www.atesparma.it/>
<https://www.facebook.com/SportelloEnergiaWebATES/>

Word Count Check

Please complete the below word count check for Indicator 11: Energy Performance, Sections 11A, 11B and 11C.

As per the Guidance Note (Annex 2 of the Rules of Contest), the word count includes text in graphics/tables and the body of text. The word count excludes text in the original application form, captions and text in Table 1: Benchmarking Data - Energy Performance.

Section	Number of words in graphics/tables	Number of words in body of text	Total number of words in graphics/tables and body of text	Max. words
11A	30	450	480	600
11B	5	784	789	800
11C	0	655	655	800