

Developing the circular economy in Europe through the "Economy of resources" Proposal for experimentation with "plastics"

Objective:

In the context of the circular economy package, the European Commission published in January 2017 a roadmap "Strategy on Plastics in a Circular Economy », highlighting the issue of low rate of recycling and reuse of plastics.

To address that issue, i.e. to accelerate the development of plastics recycling in Europe, this document proposes a mechanism aimed at supporting the production and use of Recycled Plastics¹ (RP) at European level, which can be adapted for each country.

Proposal for an incentive mechanism aimed at perpetuating and accelerating the development of the plastics recycling industry

The mechanism is aimed at anchoring the "economy of resources" in European policy and thereby at contributing to the re-industrialisation of Europe through the use of "waste mines". (Annex 1)

The principle is based on using a single mechanism to promote the production and use of Recycled Plastics² in Europe (economy of resources), in order to contribute to the implementation of the European Plastics Strategy and the Roadmap on the Circular Economy.

Experimentation in the field of "plastics" would enable the system to be tested on a growing key industry, the plastics industry, which is struggling to set up and develop systems for recovery and re-use due to a lack of profitable opportunities. (Annex 2)

The fundamental idea behind this incentive mechanism is that of capitalising on the transmission of "recycling certificates" issued by European recyclers to their customers using RP in order to set up a joint promotion of the production and use of Recycled Plastics. (Annex 3)

The certificates would state the quantities of RP sold to the converters, and the associated environmental benefits: avoided CO₂ emissions, and more generally, greenhouse gases, as well as energy savings linked to the regenerated tonnes.

The additional "environmental" benefits must be used as markers providing assurance that the industrial operations carried out are "beneficial" for the environment and, in particular that the development of material recovery can be carried out without consuming additional energy³.

The proposed mechanism could be developed according to the following principles:

- 1) Establishment of a European fund to promote "economy of resources" and related carbon, achieved at European level and which would build on an international willingness to reduce greenhouse gas emissions.**

This fund could be financed by the "Circular Economy" fund.

¹ Recycled Plastics: (definition in 2ACR glossary)

² Definition of Recycled Plastics in 2ACR glossary

³ Theoretically, it is possible to recycle all materials; however, although doing so will become increasingly widespread as a result of successive technological innovation, it must not entail more operations and consequently more energy consumption. A balance must be found between economy of resources and energy savings.

In order to avoid falling within the limits of state aid (de minimis rule = € 200K/company over 3 years), the fund could "purchase" the certificates from the companies generating them and register them. Purchased at a price fixed in advance, their value could increase over time together with the evolution of changes in the "price of carbon".

The fund could leverage and purchase certificates either directly or through specialised banking institutions within the Member States (CDC or BPI, for instance, in France).

2) **Establishment of a regulatory centre, at European level**, whose purpose would include:

- Completing at European level the Eco-profiles of Recycled Plastics established in France ,
- Ensuring, in complete confidentiality, the continuous improvement of regenerators' / recyclers' processes, either directly or through national offices,
- Validating and certifying the "regeneration / recycling certificates" issued by regenerators / recyclers, either directly or through national offices,
- Ensuring the interface with the European management of the fund and possibly with national institutions.

3) **Key elements of the system's functioning**

The producer of Recycled Plastics (recycler) would provide the company "purchasing" its material with a certificate stating the tonnes purchased, the material concerned, the carbon and energy savings, etc.

The purchasing company (converter using Recycled Plastics) would forward a copy of the certificate to the European office in order to trigger the payment of the value of the certificate, based on the tonnes of CO₂ saved.

The European regulatory centre would pay the value of the certificate to the RP regenerator / recycling company.

This system has the advantage of only supporting the recycled tonnes that have been sold, which means, in a certain way, the cooperation initiatives between producers and users of RP. Deadweight effects and investments in overcapacity should therefore be limited.

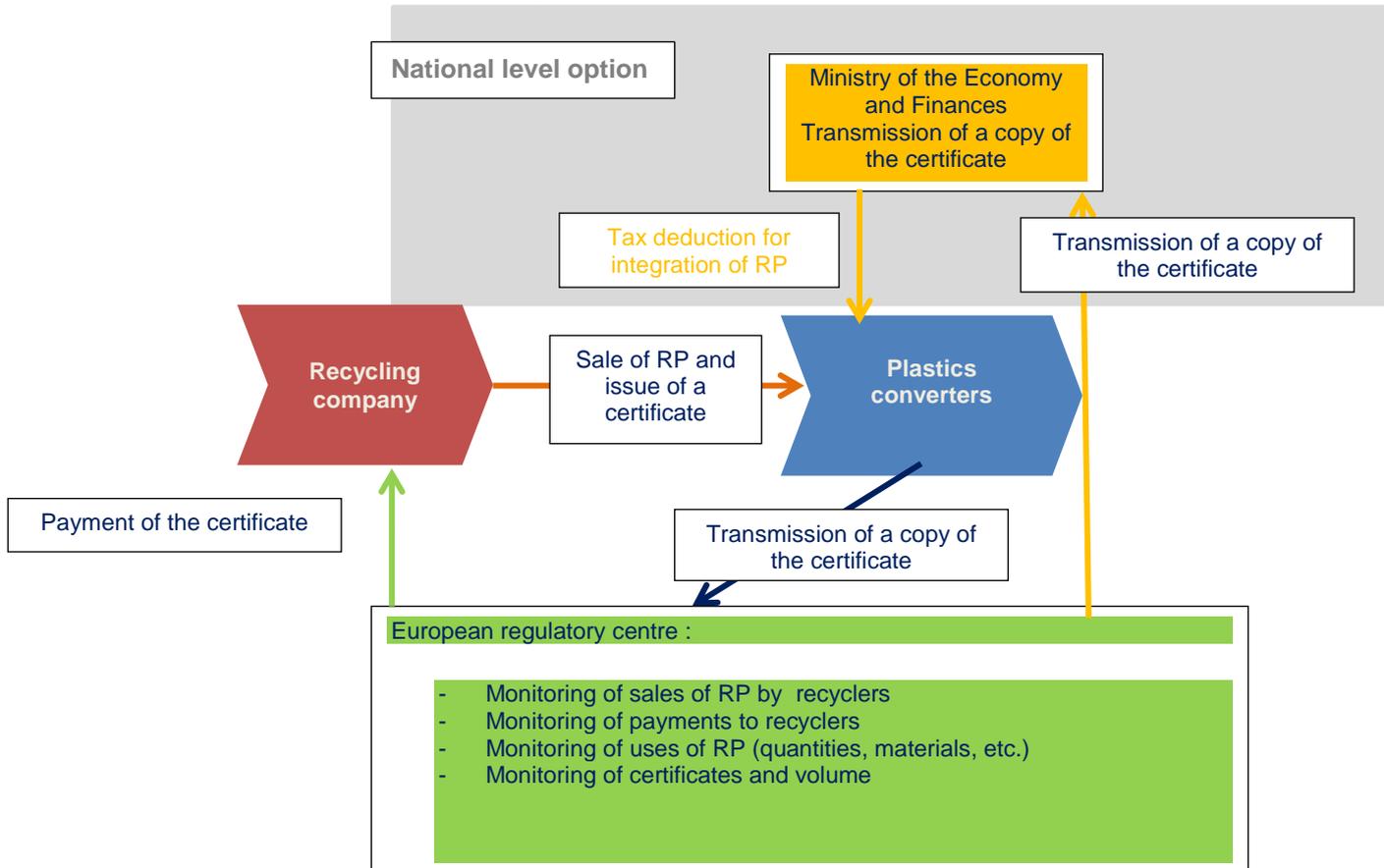
In addition, some countries may also wish to promote the use of recycled plastics in their territories. This could be achieved by asking the European regulatory centre to send a copy of the certificate to the country's tax authorities, which could grant a **tax deduction linked to the use of RP**.

The tax deduction would be easier to implement and could take over from systems aimed at promoting the integration of RP, such as Orplast, once it has been launched. This would also be a means to test a "market or consumer" incentive, in the same spirit as circular VAT.

Finally, this transmission should also enable the establishment of a system for monitoring:

- sales of RP by regenerators / recyclers, per type of resin, produced and used in Europe,
- payments per regenerator / recycler
- quantities of RP integrated / used (volume, materials, etc.) and the acceleration of the economy of resources,
- certificates and amount of CO₂ saved
-

The diagram below outlines the proposed system.



The proposed system is a European system aimed at developing the economy of resources across the whole of Europe.

The objective to valorise the tons of CO₂ saved across Europe should make it possible to limit the purchases of certificates at Europe's borders, which should avoid deadweight effects in border countries.

Within Europe, in order to avoid competition from countries with lower wage costs, a system for adjusting the payment of the certificate by taking into account the transport costs of the RP (e.g. a reduction of the price of the certificate equal to the square of the distance travelled, or the means of transport (road, rail or waterway), or CO₂ intensity) should serve to re-balance supply and demand.

Finally, if the Member State voluntarily includes this system in a national programme, the tax deduction could be adjusted according to the provenance of the RP and the means used to transport them.

Such adjustments need to be studied in detail in order to calibrate the potential risk of regeneration outside the country's borders in relation to the cost associated with the system's increased complexity.

One of the key points of the system would be the "verification" that the mechanism only takes into account post-consumption plastic waste, and not production waste.

Given that many recyclers process both types of waste, account should be taken of this when issuing the certificates, for instance by requesting an audit by the Procurement Auditor in order to calculate the proportion of "post-consumption" waste and only allocate a payment on the proportion of post-consumption waste regeneration.

The traceability systems implemented will also serve to validate the actual tonnage of converted post-consumption waste.

In addition, the "transport" adjustment should change the average cost.

Only the recycling of post-consumption waste should trigger the aid.

4) Financial evaluation of the system

The French studies showed that there is a lack of profitability of 26€/ T of recycled plastics (10€/ T for collection and sorting and 16€ for recycling) and that a support system is needed to unlock investments⁴.

This could be covered by a valorisation of the savings of CO₂ per ton of recycled plastic of € 30⁵.

This proposed support mechanism targets only the recycling step, considering that existing mechanisms (ERP schemes) cover the financing of collection, sorting and decontamination. It is destined to be reduced and disappear over time, much like that implemented to support renewable energies.

With a desire to establish this fund for a minimum of 7 years, the objective is to increase the quantities of recycled plastics produced and used in Europe by 10% each year, from an estimated 3 millions of tons of RP in 2016 to 6 million of tons at the end of the period.

On this basis, assuming a financial help of 16 € per ton of recycled plastic produced & used in Europe, starting from the first ton of RP produced, **a preliminary estimate of the requested European fund is € 500 M** over the 7 years (50 M€ the first year up to 95 M€ the last year).

At the end of this period, the quantities of RP could represent around 10% of the plastics consumed in by converters in Europe.

This financial information remains to be specified and the financial engineering study remains to be drawn up.

The financial aid mentioned in this document only covers the recycling phase and potentially (at national level) the consumption phase of recycled materials.

In order for the system to be a fully economically sustainable, it would be useful to develop an additional funding system for the upstream steps in the chain (collection, sorting,), which are also struggling to be viable, although being indispensable for accessing end-of-life products and materials.

5) Efficiency evaluation

After 4 years, an evaluation of the results of this mechanism (quantities of RP sold and incorporated, types of plastics and of products, level of investments, environmental benefits...) should be carried out.

Conclusions of this evaluation may lead to adapt the system for the following years.

Conclusion

This system which would potentially support both the production (recycling) and the use of RP would, at least in part, meet the ambition to develop an "economy of resources" in the physical sense of the term in Europe.

In addition, the development of a support for the first step "collection, sorting" would no doubt be useful to ensure the supply of input material required by the development of recycling, at a time when that particular step in the chain is also struggling due to a lack of profitability which may be slightly smaller but could still hinder the desired increase in power.

In addition, the quantitative increasing demand for "resource waste" should come together with higher quality and safety requirements, leading to higher processing costs.

⁴ Source: Feasibility study of incentive mechanisms aimed at securing the business model of recycling systems in France: application to plastics (DGE, Ademe, 2ACR, May 2017)

⁵ Estimated carbon savings of 1,15 Teq CO₂ per T of RP

Apart from economic mechanisms, the establishment of training and educational programmes would supplement and foster the changes in attitudes required within companies and between manufacturers (need for transversality and value-sharing).

Similarly, major awareness-raising initiatives focused first on the professional world and subsequently the general public will be key to ensure the success of this voluntary approach aimed at combining economy of resources and jobs creation through re-industrialisation.

Finally, the development of this incentive mechanism aimed at supporting the production and use of Recycled Plastics at European level could be a large-scale experiment for the development of an economy of resources in the broadest sense of the term, beyond plastics, and become one of the drivers for the conversion towards a more circular European economy.

Annex 1: Background

A growing plastics market, and a recycling and recovery industry that is struggling to develop, despite clear political ambitions

Plastics, although relatively recent, are very diverse materials which are continuously gaining ground thanks to their properties and functionalities. Helping to reduce weight, improve flexibility and "usefulness", plastics are omnipresent in our everyday lives, both at home and at work. They contribute to reducing the environmental footprint in many industries such as the automotive industry (weight reduction for vehicles), the construction industry (insulation) and the packaging industry (weight reduction of packaging, etc).

Conversely, at the other end of the chain, the plastics recycling industry remains poorly developed, compared to other recycling industries such as metals and glass.

Several structural elements explain this weak development: **the large number of plastics**, applications and related innovations, **the dispersion of plastics waste** sources due to the low percentage of plastics in end-of-life products except in packaging (less than 20% for electronic devices and vehicles, less than 1% in the construction industry, etc.), **the number of steps involved in regeneration** as compared to the recycling of other materials, and more.

From an economic standpoint, despite its desire to catch up, the plastics recycling industry is currently facing unfavourable circumstances due to the volatility of material prices and access to waste which is limited by the competition of other waste management channels and exports. De facto, the industry is suffering a **problem of cost-competitiveness**, faced with competition from virgin plastics whose prices continue to fall, driven by low oil prices and production overcapacities of certain virgin plastics.

Finally, at the other end of the chain, there are obstacles of different natures (economic, technical, standards-related, cultural) to the incorporation of recycled plastics in end products, which phenomena contribute to reducing the market opportunities for recycled plastics.

Ambitious policies for the development of plastic recycling, justified by measurable environmental and social benefits

Despite the difficulties encountered by the plastics recycling industry, the aspirations / targets of French and European policies regarding the development of the circular economy and recycling are ambitious:

- development of a "plastics" strategy
- a proposal to recycle and prepare for reuse 70% of all municipal waste by 2030,
- a proposal to recycle 80% of packaging waste⁶.

In addition to reducing waste, the development of the recycling industry would have positive quantifiable socio-economic and environmental effects:

- The use of recycled plastics would, based on current data, help to reduce **the environmental footprint of virgin plastic by 20-30%**,
- Supporting the industry could help to develop non-relocatable jobs: € 1 M financial support in the use of RP, would create 9 jobs (direct, indirect, induced)⁷.

⁶ Proposal of the European Parliament), March 2017

⁷ Feasibility study of incentive mechanisms aimed at securing the business model of recycling systems in France: application to plastics (DGE, Ademe, 2ACR, May 2017)

Annex 2: Evaluation of the lack of profitability of the plastics recycling value chain

The collaborative approach for the development of the plastics recycling industry, led by 2ACR, within the Chemicals & Materials Industrial Strategic Committee from late 2013 had, as its first objective, through studies and working groups, to share evaluations of current and potential waste sources and outlets per type of resin, to understand the complexity of the "plastics value chain" ecosystem, and to analyse the industry's economic balance and the market relations between the various links in the chain.

Using France as a testing ground, the first study⁸ demonstrated the "societal" feasibility of a "voluntary" scenario, presented in the form of an "**experimentation contract**", aimed at reaching a "**material**" recycling of 300,000 additional tonnes (input to recyclers) of plastic waste per year within 5 years, necessarily supplemented by the development of production and utilisation capacities for 500,000 tonnes of SRF (by 2020).

This scenario, which would cost €150 M over 5 years, would help to strengthen French recycling and recovery industry and to create 2,000 jobs linked to the development of the ecosystem. From a societal standpoint, such investment in the industry would be paid back in 5 years through the economies linked to the new non-relocatable jobs.

Three main priority areas have been proposed for developing the industry. They correspond **to the actions to be taken for the 3 key steps in the value chain:**

- Actions aimed at providing **improved access to resources for recycling**,
- **Actions on demand** in order to ensure the creation and growth of new markets and more generally the creation of an ecosystem enabling exchanges between the various links in the chain and a better consideration of eco-design, in terms of integration of recycled materials, re-use and intrinsic recyclability of products,
- **the establishment of multi-annual economic, financial and tax mechanisms to ensure a broad "seeding" of the industry**, all of which are key elements for achieving economic balance for all links in the chain.



Outside of these three steps in the value chain, the **economy of resources** would, over time, depend on better acceptance by products manufacturers of eco-design concept in terms of the integration of recycled materials, re-use and the intrinsic recyclability of products.

However, the integration of this new dimension of the **economy of resources** in eco-design criteria, **which is key for the development of the circular economy**, will be long and complicated.

It will correspond to the first and last step of the value chain. Given that it will need to be implemented in parallel, it will require work to be conducted upstream on the concepts of product life cycles and materials.

In the meantime, **the development of an economy of resources** requires work to be conducted on the following three key steps:

- **collection/ sorting/ treatment**,
- **recycling/ regeneration**,
- **integration of recycled material in new plastic products.**

⁸ Study of the plastics recycling value chain in France (DGE, Ademe, 2ACR, Dec. 2014)

1) Step 1: Collection/ sorting/ treatment

Traditionally, recycling materials, and plastics in particular, has been driven by "environmental" policy and in particular by the application of the concept of **Extended Producer Responsibility (EPR)**.

EPR, as a true "Push" system, has improved the physical and economic access to end-of-life products and therefore to the materials they are made of.

Although it has enabled important quantities to be diverted from landfills or incinerators, this area of work still requires major attention. EPR systems do not concern all products, nor do they concern most of the waste from economic activities. The difficulties linked to dumping and illegal channels remain to be solved.

Finally, recovery criteria for EPR systems are still very much linked to **quantitative criteria**, without reference to the various materials making up end-of-life products⁹.

EPR systems were originally set up for the purpose of reducing quantities put in landfills and reducing environmental pollution. Although initiatives are gradually being launched to achieve a more circular economy - including proposals for guides on eco-design, funding of R&D aimed at improving recycling and recovery - re-use of materials remains difficult for the eco-organisations responsible for implementing EPR. Many re-uses of materials are carried out outside the scope of the EPR system in question.

The second French study also highlighted a lack of profitability for this "initial" links in the value chain of end-of-life product treatment.

On the basis of available data (ie for 60% of plastic waste covering packaging, WEEE, PVC window frames and agricultural plastics), the lack of profitability of the "Collection/sorting/treatment" link was estimated **at an average €10 per tonne** for this essential first step in beginning the later "lives" of the materials¹⁰.

2) Step 2: recycling/ regeneration

For this "pivotal" step in the transformation of end-of-life products or waste into "plastic materials", the feasibility study for incentive mechanisms aimed at ensuring the viability of the business model of plastics recycling systems in France¹¹, **confirmed the industry's lack of profitability** based on data from 2014, a lack which had already been identified in the study on the value chain conducted in 2014 on the basis of data from 2012.

This lack of profitability is an obstacle to the investments required for the development of this industrial step and considerably slows down the desired transition from a linear economy to a circular economy. This non-viability is the most important for the "Regeneration" link.

The lack of profitability of the "regeneration" link was estimated, **at an average of € 16 per tonne** just for the regeneration step¹² (on the basis of available data, ie for 60% of plastic waste covering packaging, WEEE, PVC window frames and agricultural plastics).

For the installed capacity, this means that prices of Recycled Plastics (RP) are insufficient to cover all costs and amortizations in particular, and that new investment decisions are generally postponed or even cancelled.

Several elements, however, are in favour of the development of this industrial link which is key to the economy of resources.

First of all, the projections made in the study show a relative decrease in the lack of profitability over time, as regenerated quantities increase.

⁹ The recycling of concrete in washing machines is valorised in the same way as that of electronics or plastics.

¹⁰ The model used was based on an assumption of zero growth in the prices of virgin Plastics, Recycled Plastics and oil between 2016 and 2021 and on an assumption of the realization of the investment when the return on capital employed is equal to 70% of the Weighted Average Cost of the Capital (WACC)

¹¹ Feasibility study of incentive mechanisms aimed at securing the business model of recycling systems in France: application to plastics (DGE, Ademe, 2ACR, May 2017)

¹² The model used was based on an assumption of zero growth in the prices of virgin Plastics, Recycled Plastics and oil between 2016 and 2021 and on an assumption of the realization of the investment when the return on capital employed is equal to 70% of the Weighted Average Cost of the Capital (WACC)

Secondly, the modelling of the environmental benefits generated by the increase in the regeneration of plastics in France¹³ shows that a "financial" valorisation of the **environmental benefit of the CO₂ emission savings at only € 30 per tonne** of CO₂ could make the recycling value chain (collection, sorting and production recycled plastics) "viable", should an ambitious approach be taken as regards fostering the growth of recycling and the valorisation of the environmental benefit.

Finally, as regards the valorisation of the impact on employment, funding corresponding to the median scenario (profitability covering 70% of the invested capital) could serve to create or maintain around 1,000 jobs, with a saving of around €16 M in avoided costs.

In summary, the valorisation of the environmental (CO₂ and energy, in particular) and social benefits (jobs) of RP production should make **the step of regeneration, the indispensable link in the implementation of an "economy of resources, viable.**

In order to implement this ambitious strategy of economy of resources, **the creation of a support mechanism for the industry will be required during the transition period in which volumes will not yet be large enough and the environmental benefits will not yet have been sufficiently valorised.**

3) Step 3: integration of recycled plastics in the new plastic products

At the downstream end of the chain, the development of the integration of recycled plastics (RP) has essentially been driven by "economic" motivations, linked to lower costs of RP for functionalities similar to those of virgin materials, but **without specific incentives linked to the economy of resources** that this approach could enable¹⁴.

Although retailers (P&G, Adidas, Apple, etc.) have professed a desire to use more RP, this is a recent movement linked to an increased awareness of the impact of "plastic waste" at sea.

In France, the Ademe's newly-created Orplast support system, a "pull" system promoting the integration of RP, was a true innovation.

The results of the first call for proposals under this system, promoted by 2ACR to all manufacturers in the value chain, showed the relevance and effectiveness of the approach.¹⁵

The 15 million Euros in aid granted for the 68 first awarded projects represents 16% of the costs of the projects. Over the course of three years, it should lead to an annual increase of **94,000 tonnes of recycled plastics used by French plastics converters** and therefore contribute to saving an almost equivalent volume of virgin materials.

Brought back to a single tonne of RP, a support of 32 Euros (0.032 Euros per kilo), should help to perpetuate the annual recycling of over 120,000 additional tonnes of plastic waste entering regeneration process¹⁶.

Although the Orplast system has been one of the Ademe's most successful ventures, **it also highlighted the fragility of the chain.** RP users depend on their suppliers, the regenerators of plastic waste, whose sustainability and financial health are not safeguarded.

¹³ Assumption of 1 T of CO₂ saved per incoming tonne being regenerated - Source : Eco-packaging study (Etude Eco-Emballages) – ADEME, Environmental assessment of the plan to expand sorting conditions to all household plastic packaging (Bilan environnemental du projet d'extension des consignes de tri à l'ensemble des emballages ménagers plastiques) - May 2014

¹⁴ Mechanisms such as **circular VAT** (reduction of the VAT rate, depending on environmental and social "benefits") or the **eco-label coupled with a public procurement policy** oriented towards products "with an environmental benefit" are beginning to be mentioned and studied, although they remain difficult to implement. Source Feasibility study of incentive mechanisms aimed at securing the business model of recycling systems in France: application to plastics (DGE, Ademe, 2ACR, May 2017)

¹⁵ www.2acr.eu

¹⁶ Assumption: amortization calculated over 5 years

Annex 3: Production of Life Cycle Inventories (LCI) and eco-profiles of the main Recycled Plastics (RP) produced in France - Action of the National Association of Plastics Regenerators (Syndicat national des Régénérateurs de matières Plastiques - SRP)

The National Association of Plastics Regenerators (Syndicat national des Régénérateurs de matières Plastiques - SRP), which represents the companies in France managing a plastics regeneration unit¹⁷, coordinated a study aimed at determining the LCI and the eco-profiles of the 8 main RP produced in France: R-LDPE pellets and R-LDPE pellets Agri, R-HDPE pellets and R-HDPE Flakes, R-PET pellets and R-PET Flakes, R-PP and R-PVC.

The representativeness of this data is supported by the exhaustiveness of the sources of information: the SRP's 21 production sites provided their data, and they represent over 80% of RP production in France. Compliance with standards, in particular ISO 14 040, and the reliability of the Critical Review Committee, ensure the credibility of the approach.

This study, supported by the ADEME and 8 organisations, including 2ACR, demonstrates that **Recycled Plastics (RP) have all a lower impact than virgin resins (per kg) on CO₂ emissions and non-renewable energy consumption.**

The advantages of RP, for instance of 3 (R-PET pellets) to 17 (R-PVC) times fewer CO₂ eq emissions, and of 3 (R-PEBD Agri) to 9 (R-PVC) times less non-renewable energy used in their production, remain significant even taking into account the potential use of more material for RP.

Although this freely-accessible database (<http://www.srp-recyclage-plastiques.org>) is a tool designed to help companies make choices in the eco-design strategies and for their CSR report, it can also be used as a tool to promote the use of Recycled Plastics (RP) and therefore the economy of resources.

Since 1 April 2017, the SRP has been issuing "Carbon savings certificates" and "Non-renewable energy savings certificates" attached to the tonnes of RP sold.

The certificates could support the incentive mechanism aimed at perpetuating the plastics regeneration industry, as proposed in this note.

Finally, the system which is already used for the SRP's plastics regenerators could be expanded to include other recycled materials.

¹⁷ To qualify as a regenerator, each industrial site must carry out at least 2 of the following operations (washing, grinding, densification, micronisation, granulation, compounding).