



ENVIRONMENTAL REPORT

2018



**ROUTES ET RUES,
AU CŒUR DE TOUTES
LES MOBILITÉS**



June 2019

The voluntary commitment agreement (CEV - convention d'engagement volontaire) for road infrastructures...

Following the Environment and Energy Transition Round Table a voluntary commitment agreement involving the main actors in designing, constructing, and maintaining road infrastructures, streets, and urban public spaces was signed on 25 March 2009.

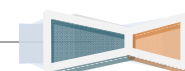
By this agreement the excavation and road construction enterprises together with their partners (Assemblée des Départements de France and Syntec Ingénierie) under the aegis of the FNTF (Fédération Nationale des Travaux Publics - National Federation of Public Works) and their speciality syndicates undertook – among other commitments - to:

- **Reduce greenhouse gas emissions by 33 % by 2020 through:**
 - generalising warm mixes
 - increasing the use of maintenance solutions based on bitumen emulsion
 - reducing emissions at the level of asphalt plant production
- **Reuse or recycle 100 % of the materials excavated on the work sites by 2020 and preserve the non-renewable resources, especially through:**
 - increased recycling of surpluses and waste from work sites
 - increasing the rate at which bituminous materials from road deconstruction are reused
- Reach an **industrial tools certification** rate of 50 %
- Create and develop an environmental software common to the public works enterprises in order to assess the impact of public works: **SEVE Eco-comparator**

This environmental report for 2018 shows the road building companies renewed efforts to attain these principal objectives.

SUMMARY

1	French production of asphalt concrete.....	2
1.1	The tonnage.....	2
1.2	Evolution of the distribution of production.....	3
2	French production of warm and semi-warm mixes.....	4
3	National production of bitumen emulsions	5
3.1	Spreading emulsions.....	5
3.2	Coating emulsions.....	6
4	Valorization of recycled materials	6
5	Average rate of reintroduction of RAP in bituminous mixes.....	7
6	In-place recycling	8
7	Soil treatment	9
8	Greenhouse gas emission (kg CO₂ éq.)	10
9	ISO 14001 certified asphalt concrete plants and bituminous emulsion factories.....	10
10	Deploying SEVE Eco-comparator.....	11
11	Conclusion.....	13



1 French production of asphalt concrete

1.1 The tonnage

This refers to the whole tonnage manufactured (Table 1) for hot, warm / semi-warm, and cold coatings (by calculating their proportions). The proportions are calculated according to the following formula:

$$\text{Company tonnage} = \sum p_i \times t_i$$

p_i : participation of the enterprise in entry i

t_i : tonnage produced in entry i

Asphalt concrete tonnage in France				
Year	Hot mixes	Warm mixes	Cold mixes ¹	Total France
2011	36 100 000	1 259 000	1 600 000	38 959 000
2012	31 733 000	2 633 000	1 460 000	35 826 000
2013	31 850 000	3 550 000	1 550 000	36 950 000
2014	28 698 500	4 023 300	1 418 300	34 140 100
2015	25 916 000	4 552 000	1 832 500	32 300 500
2016	29 277 600	4 324 200	1 858 300	35 460 100
2017	29 838 000	3 824 000	1 977 000	35 857 000
2018	30 601 000	3 728 000	1 976 000	36 305 000

Table 1 - Detailed trends of the tonnage of asphalt concrete in France 2011-2017

Figure 1 shows the trend of the French asphalt concrete production since 2011.

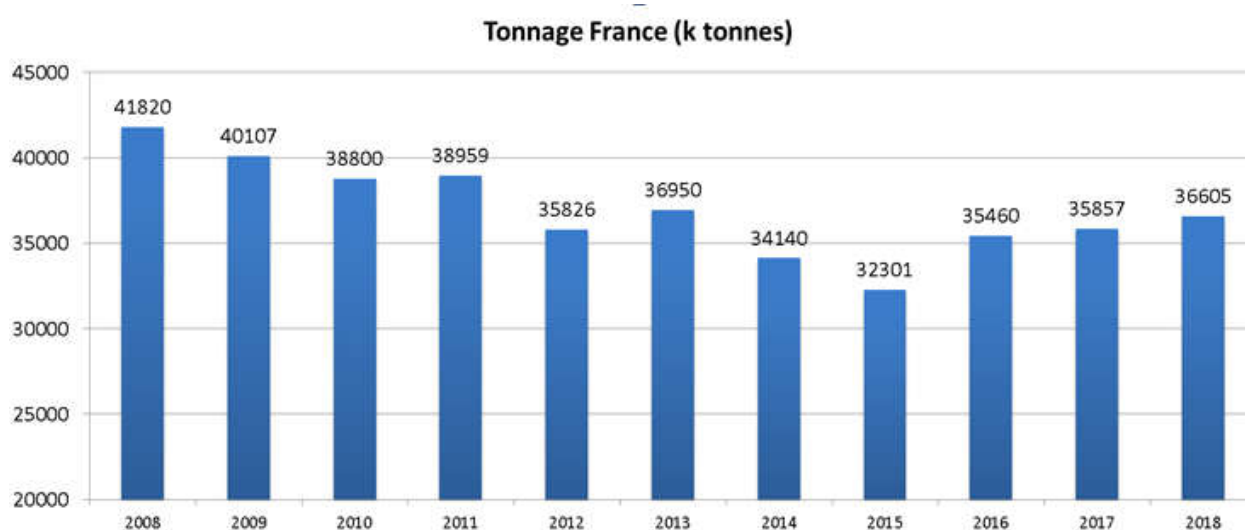
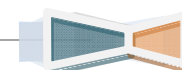


Figure 1 - Trend of tonnage of asphalt concrete in France¹

¹ This figure includes all gravel emulsion and cold bituminous mixes.



1.2 Evolution of the distribution of production

The Figure 2 shows the distribution of the production of hot, warm and cold mixes in 2017.

Distribution of bituminous asphalt production 2018

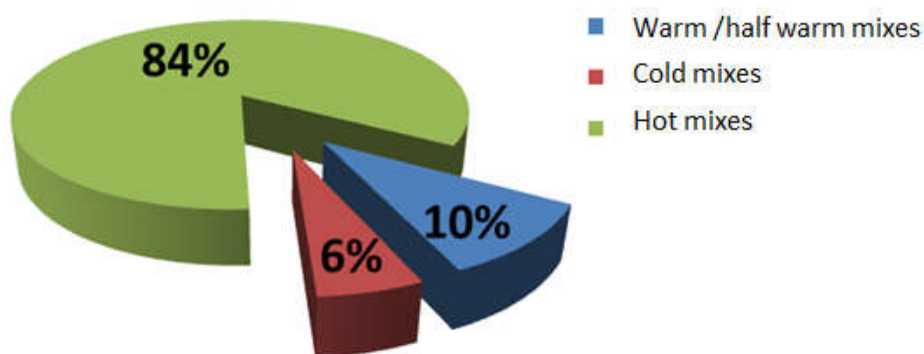


Figure 2 - Distribution of the production of asphalt mixes in 2018

The Figure 3 shows the distribution of the production of hot, warm and cold mixes from 2013 to 2016.

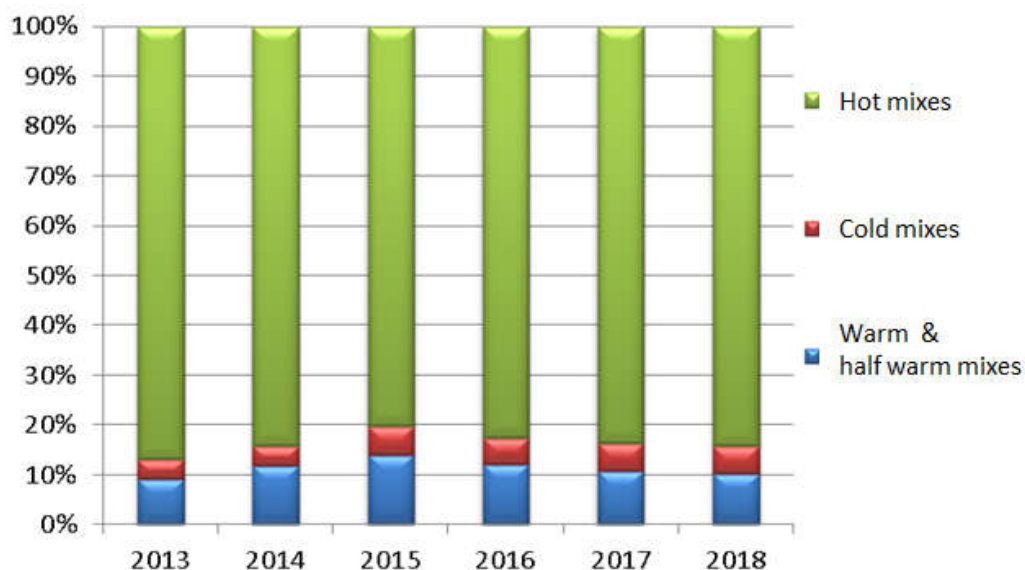
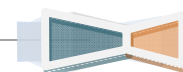


Figure 3 - Distribution of asphalt mixes production 2013-2017



2 French production of warm and semi-warm mixes

An asphalt concrete is called a warm mix asphalt when – for a given usual road bitumen, a hard bitumen or special bitumen – the process enables the coating temperature to be diminished by at least 30°C below the maximum acceptable temperature for the bitumen while still being above 100°C. The asphalt concrete is a semi-warm mix when the process allows production at a temperature between 85°C and 100°C².

CEV’s goal for 2012 was to reach a tonnage of **1 500 000 tons**. This goal was met and even exceeded expectations with **2 633 000 tons**.

In **2018**, the production of warm and semi-warm mixes has been very largely exceeded the 2012 goal to reach a tonnage of **3 728 000 tons**, i.e. an **increase of 45%** compared to 2012. However, a decrease in their production is observed since 2015.

In 2018, manufacturing techniques are divided between foaming and bitumen additivation, with the following distribution:

- **79% foamed bitumen**
- **21% bitumen additive**

The Figure 4 shows how this tonnage has evolved since 2008.

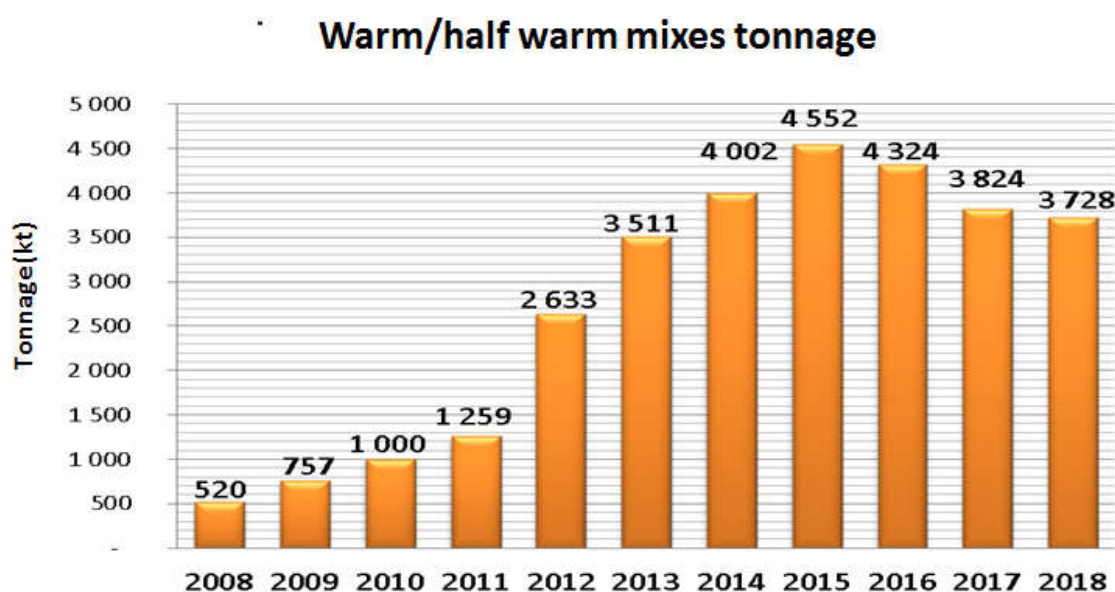
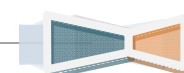


Figure 4 - Evolution of the tonnage for warm and semi-warm mixes 2008-2017

² According to the definition of the Guide IDRRIM “Enrobés Tièdes (Warm Coatings)” (2015)



3 National production of bitumen emulsions

The tonnage for the emulsions below only concerns the members of the SFERB.

	SFERB emulsions tonnage (coating + spreading)
2018	720 150
2017	729 052
2016	720 593
2015	723 620
2014	731 100
2013	801 600
2012	747 780

Table 2 - Emulsions tonnage (coating + spreading) of SFERB members

The production for the factories other than SFERB members (also including those managed by the administration) is estimated at 58 000 tons for 2018. These data are not considered in this report because it is not possible to differentiate their practices in coating or spreading techniques.

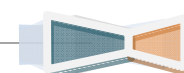
3.1 Spreading emulsions

In this category all the tonnages for emulsions for tack coats, curing and sealing works as well as for Surface Dressing are considered. The Table 3 details these tonnages.

Z	Tons of emulsions for tack coats	Tons of emulsions for surface dressing	Tons of emulsions for curing / sealing	Total tons of spreading emulsion
2018	131 000	277 100	131 000	539 100
2017	127 000	292 500	127 000	546 500
2016	117 000	323 000	117 000	557 000
2015	108 000	334 000	108 000	550 000
2014	115 000	326 000	115 000	556 000
2013	131 000	356 000	131 000	618 000
2012	130 000	325 000	130 000	585 000

Table 3 - Detailed tonnage for spreading emulsions of SFERB members

Thus, for the year 2018, the area covered by surface dressing emulsions can be estimated at 139 million m² and **161 million m²** all techniques combined.



3.2 Coating emulsions

In this category all the tonnages for emulsions produced for manufacturing coatings emulsion (gravel emulsion, cold mix asphalt and in place cold mix surfacing (ECF)) are considered. The Table 4 details these tonnages.

	Tons of emulsions for Gravel Emulsion and Cold Mix Asphalt	Tons of emulsions for In place cold mix surfacing	Total tons - coating emulsions
2018	120 800	60 250	181 050
2017	138 390	44 162	182 552
2016	120 400	43 193	163 593
2015	122 600	51 020	173 620
2014	98 000	77 100	175 100
2013	107 800	75 800	183 600
2012	102 200	60 580	162 780

Table 4 - Detailed tonnage for coating emulsions of SFERB members

As a reminder, the tonnage for cold mixes manufactured in plant (Gravel Emulsion and cold mix asphalt) for 2018 is 2 013 400 tons.

The tonnage of emulsions used for in place coldmix surfacing (ECF) is estimated at 44 162 tons, i.e. **43 million m²** road surface covered by this technique.

4 Valorization of recycled materials

The tonnage includes all the recycled materials (bituminous chippings and crushed crust and concrete for subsequent use). The Figure 5 gives these tonnages since 2012.

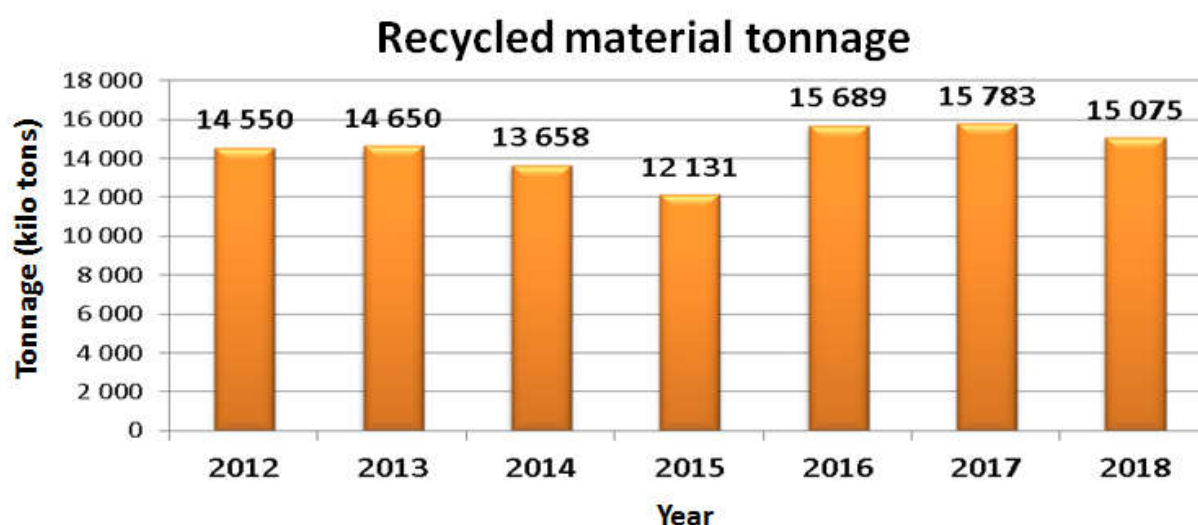
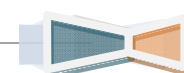


Figure 5 - Recycled materials tonnages from 2012 to 2018



In 2018, the tonnage of recycled materials remains stable and stays above 15 million of tons.

New indicator implemented in 2016: number of recycling platforms managed by the road industry

In order to properly account for these materials managed by the road industry, a new indicator is set up in 2016. It is the number of recycling platforms in the road industry. In 2018, more than 663 recycling platforms were counted for a tonnage of more than 15,075,000 tons. Asphalt aggregates are part of this tonnage, and 7,817,000 tons were reused in new mixes.

Recycling platforms: 663
Recycled materials: 15 075 000 tons
Reclaimed asphalt pavement: 7 817 000 tons

5 Average rate of reintroduction of RAP in bituminous mixes

CEV's goal for 2017 is to reach a rate for reintroducing RAP in the formulas of at least 15 %. The average rate of reintroduction of RAP in asphalt concrete (hot&warm mixes) is around 18,1 % for 2018. As shows in, this rate is no longer increasing. The reasons could be due to the available resources combined with the increase of the number of plants equipped to recycle at increasingly higher rates.

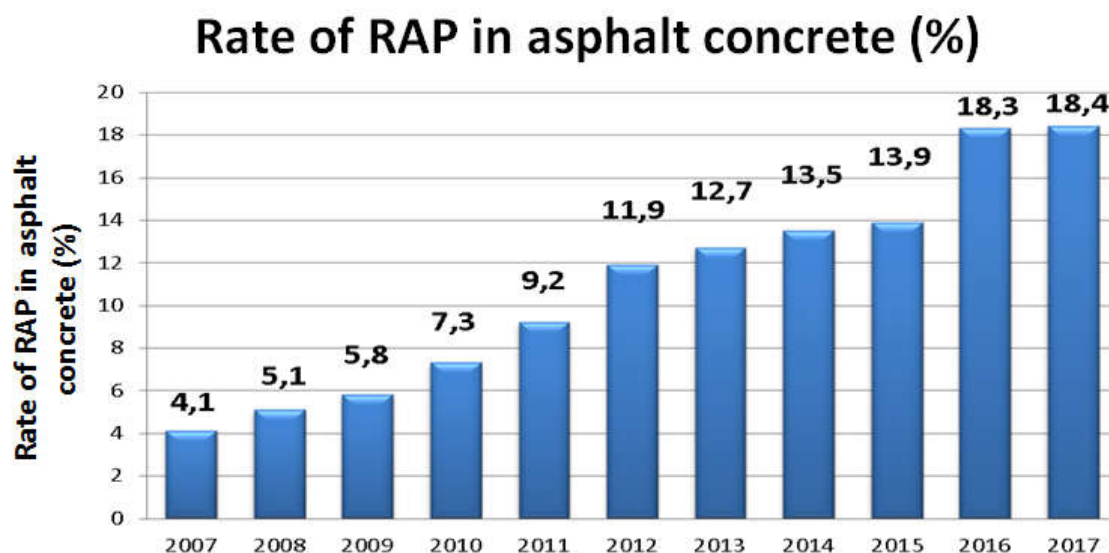
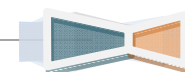


Figure 6 - Evolution of the rate of RAP in asphalt concrete (%)



6 In-place recycling

This indicator corresponds to all the tons of road surfaces in-place recycled by bituminous binders (emulsion + foam) or road hydraulic binders. The monitoring of this indicator started in 2012 with its addition the CEV's monitoring survey. In Table 5, the indicator is expressed in m² and tons³.

		In place cold recycling with bituminous emulsion or foam bitumen	In place recycling with road hydraulic binders
2018	tons	286 360	600 890
	m ²	1 589 300	1 333 975
2017	tons	197 478	482 197
	m ²	1 097 614	1 071 549
2016	tons	117 755	965 969
	m ²	654 500	2 146 800
2015	tons	167 172	562 314
	m ²	928 700	1 249 600
2014	tons	114 700	486 500
	m ²	637 500	1 081 200
2013	tons	94 750	390 120
	m ²	526 400	867 000
2012	tons	75 290	293 740
	m ²	418 800	652 800

Table 5 - Tonnage for in place recycling (emulsions or hydraulic binders)

Those two techniques show an overall increase of around 750 000 m² par compared to the surfaces accounted for in 2017. The evolution of emulsion pavement recycling is on the rise (+44 %) compared to 2017 and the same trend is observed for hydraulic binders (+24 %).

The interest of these techniques is twofold:

- Preservation of the resource of new materials.
- Removal of transport related to the routing of new materials.

³ The values in m² of recycled pavements in place are calculated using thickness of 8 cm for emulsion technique and 20 cm for road hydraulic binder technique.

Surface covered by in-place recycling

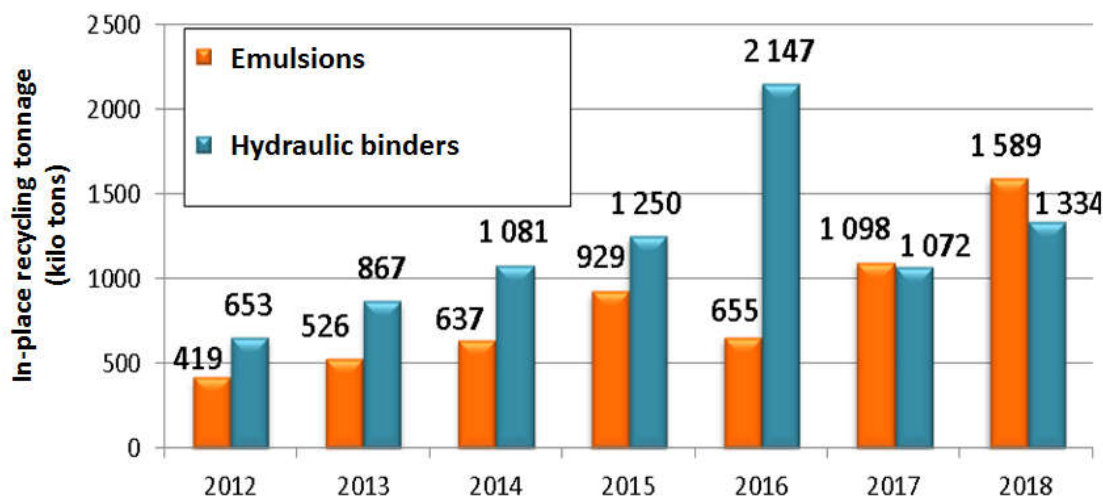


Figure 7 - Evolution of surface covered by in-place recycling in France.

7 Soil treatment

This indicator corresponds to all the cubic meters of soil treated with lime and/or hydraulic binders. The soil treatment technique makes it possible to reinforce an earthworks platform and thus reduce the thickness of the different pavement layers dimensioned above to obtain a structure that meets the same dimensioning criteria. This technique is therefore one of the techniques that favours the preservation of natural resources and the economy of material transport. Monitoring of this indicator began in 2017 with its introduction into the CEV monitoring survey. In Table 6, the indicator is expressed in m³.

	Treated soils in m ³
2018	2 490 000
2017	3 128 000

Table 6 - Volume of soil treated

8 Greenhouse gas emission (kg CO₂ éq.)

This indicator corresponds to the greenhouse gas emissions expressed in kilogramme CO₂ equivalent per tonne of asphalt concrete produced. This calculation only takes into account the consumption of burner fuel (fuel-oil, natural gas, or lignite).

The Figure 8 shows the evolution of GHG emissions since 2009.

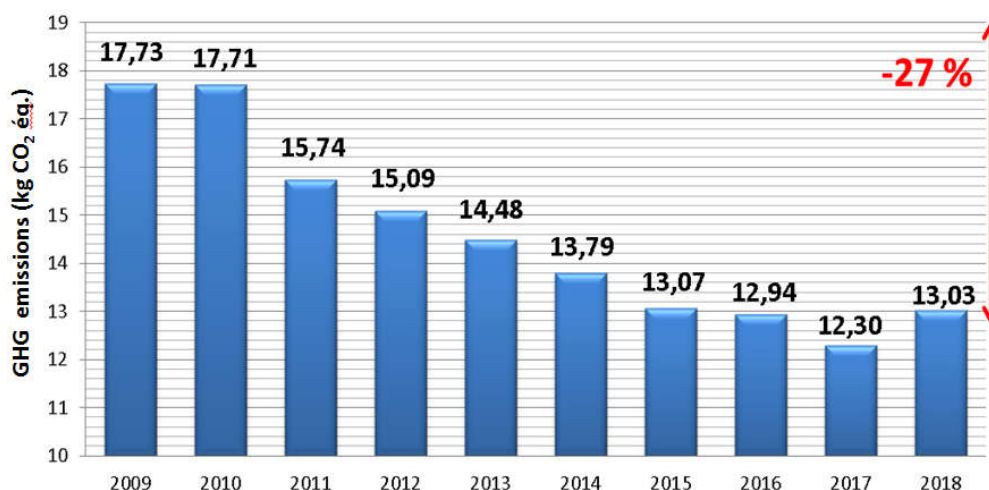


Figure 8 - Evolution of greenhouse emissions (burner's consumption)/asphalt concrete ton produced.

For 2012, CEV's goal was **16,84 kg CO₂ eq / asphalt concrete ton produced**. With an average value of **15,09 kg CO₂ eq / asphalt concrete ton produced** in 2012. **The goal fixed was reached.** The value of 2018 shows a steady increase with the average value of:

13,03 kg CO₂ eq / asphalt concrete ton produced.

A reduction of 27 % compared to 2009 is noted. The 2020 goal is to reduce greenhouse gas emissions by 33 % compared to 2009. Efforts are still needed to achieve this value.

9 ISO 14001 certified asphalt concrete plants and bituminous emulsion factories

The objective of the CEV for the year 2012 was to reach a certification rate of industrial tools of 50 %. This goal has been achieved. Since then, this value kept growing and reached 63 % for ISO 14001-certified stations and factories.

Table 7 shows the evolution since 2012 of asphalt mixing plants and ISO-14001 certified binder plants :

2018	63 % ISO 14001 certified asphalt concrete plants
2017	63 % ISO 14001 certified asphalt concrete plants
2016	63 % ISO 14001 certified asphalt concrete plants
2015	63 % ISO 14001 certified asphalt concrete plants
2014	63 % ISO 14001 certified asphalt concrete plants
2013	62 % ISO 14001 certified asphalt concrete plants
2012	61 % ISO 14001 certified asphalt concrete plants

Table 7 - Trend of ISO 14001 certification of plants and factories

In addition, asphalt plants are gradually completing their equipment in order to reduce energy consumption and greenhouse gas emissions. Many of them are now equipped with an electric binder fleet and a hangar to protect and cover the storage of sand and asphalt aggregates. These indicators have been monitored since 2016 and are now integrated into the monitoring of the Voluntary Commitment Agreement. Table 8 shows the number of establishments equipped.

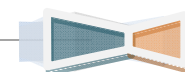
	Number of plants equipped with a hangar for sand and asphalt aggregates	Number of plants equipped with an electric binder fleet
2018	129	166
2017	122	148

Table 8 - Numbers of plants equipped with hangars and electric fleets.

10 Deploying SEVE Eco-comparator



SEVE is one of the tools of the voluntary commitment agreement signed by the Profession in 2009. The Table 9 shows the trend for deploying SEVE in France since its launch in 2012.



Statistique SEVE	2012	2013	2014	2015	2016	2017	2018 ⁴	2019 ⁵
Maitrise d'ouvrage abonnée ⁶	13	23	26	38	30	42	43	48
Entreprises abonnées	43	60	68	67	70	76	79	80
Universités / écoles	< 6	< 10	< 10	10	11	13	13	22
Utilisateurs	2165	2214	2420	2651	2851	3332	3654	3698
Projets en base	3279	3852	4526	5631	6605	7638	8711	9533
Nombre moyen d'utilisateurs mensuels	295	335	415	621	602	630	627	442⁷
Nombre de visites mensuelles	868	1090	1101	1735	1729	1794	1687	921⁸

Table 9 - Evolution of the SEVE Eco-comparator deployment since 2012

The Table 9 shows a new increase in the use of the software between 2017 and 2019. In October 2016, the SEVE software has been upgraded to version 3 which is integrating a module earthworks and new indicators. In addition, its highlighting in the issue of October 2016 of "Guide de l'achat public", co-published by ADEME and the Ministry of Ecology and Finance, gives it all the legitimacy to be used in the framework of the invitations to tender. However, the number of calls for tenders accepting variants and requiring the submission of an environmental report is still very low: **182** throughout the metropolitan area in 2018.

The development of version V3 in connection with the new European Directive on Public Procurement was carried out within a European project "SustainEuroRoad" that ended in 2018. The activities of main services, road construction and earthworks can be counted in SEVE.

This European project made it possible to update the life cycle analysis of one tonne of asphalt mix and one kilometre of pavement from cradle to grave. The results are available on www.routesdefrance.com and www.sustaineuroad.eu

The life cycle analysis is available in French and English. To measure the impacts of road construction works, so-called "demonstration" projects were carried out in France (the Departmental Council 33 near Bordeaux), Germany near Düsseldorf, Spain on several asphalt plants and Hungary on a highway construction site.

A study with INRS and Grenoble University Hospital documented the application of asphalt mix on 75 sites and verified the influence of the application temperature, that of the equipment used and the absence of influence of the recycling rate on the impacts in the air. The method used to measure the exposure to the work involved in the use of bituminous materials is based on the global index, which effectively tracks the totality of the impacts.

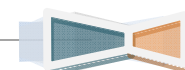
⁴ As at 19/03/2018.

⁵ As at 19/05/2019.

⁶ Many project owners launch construction contracts with SEVE without subscribing.

⁷ These data come from a different source than in previous years.

⁸ These data come from a different source than in previous years.



SEVE is now also available in "international", German, Spanish and Hungarian versions.



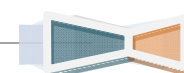
11 Conclusion

As a reminder, here are the main objectives for the period **2017 - 2020**:

- 2017: Achieve a reintroduction rate of asphalt aggregates in formulas of at least **15 %**.
(2018 : 18,15 % RAP)
- 2020 : Reduce GHG emissions (to burners) by 33 % by 2020 compared to 2009
(2017 : decrease of 27 % - 13,03 kg CO₂/ ton of mix)
- 2017 : Achieve a proportion of warm mixes in the total production of **30 %**
(2017 : 10 % of total tonnage)
it should be noted that the percentage (warm + cold) reaches 20 % in 2015
- To deploy the eco-comparator SEVE

Given these results, the Road Profession is continuing to progress towards the objectives it has set itself and is pursuing this improvement, except for warm mix asphalts. Indeed, an effort needs to be done on the part of the warm mix asphalt, for the rate of 30 % planned for 2017 has yet to be reached. This effort will require the involvement of the signatory prescriber project managers of the national CEV as well as local.

To help them, the finalization of the revision of the standard "Terminologie" NF P98-149 clearly defining the warm mixes, and more generally classifying the mixes by temperature ranges is eagerly awaited.



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