SURVEY ON THE EVOLUTION OF WOOD FUEL PRICES IN 2019-2020

SYNTHESIS
ACKNOWLEDGEMENTS

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Technical coordination - ADEME: Alice Fautrad, ingénieur
Direction/Unit: Generation and Renewable Energies; Forestry Supply Bioeconomics Services
1. The objectives, scope and methodology of the study

1.1 The objectives of the study

As part of its policy to promote the transition of the national energy mix, the French government has set ambitious goals for the wood and biomass sectors, especially in terms of heating use.

On the occasion of the publishing of “The study of domestic wood heating”, ADEME estimates that in 2017, 6.8 million households use wood heating systems, or 43% of the total individual housing park. Associated wood consumption is estimated at 5.6 Mtoe, of which 5.1 Mtoe wood logs and 0.5 Mtoe pellets. The consumption of other wood fuel types (reconstituted logs, woodchips) in the housing sector is insignificant. In terms of consumed quantities, the associated volume is 23.1 Mm³ for wood logs and 25.7 Mm³ in total. While auxiliary heating accounted for 70% of wood heating use in 1999, in 2012, figures were equally divided between auxiliary and main heating. Nonetheless, it is important to note that in 2017 the part of auxiliary heating has seen a slight increased (53%).

Recently envisioned regulatory developments including the potential prohibition of open fire places in Ile de France region, have shown that beyond any quantitative objectives, considering the strong qualitative constraints is a prerequisite to insuring the sustainable development of the biomass sector. These constraints stem from both the quality of heating systems and from the type and the quality of the wood.

In this context, the ADEME is focusing on a number of issues. One of these issues is ensuring the competitiveness of different wood and biomass fuel prices, in the context of strong variability of electricity and fossil fuel prices. In this context, monitoring the evolution of these prices is a necessity, which the ADEME has taken on over the past 10 years by publishing regular surveys on the evolutions of the prices of various wood and biomass fuels.

The quality of the fuels used by companies and individuals plays a crucial role in meeting the environmental constraints associated with their use. Identifying and understanding the distribution channels, the extent to which certified products are used, and on a general note, the quality of the wood, are all factors of major importance. It is thus necessary to get a better understanding of the distribution of the higher quality fuels and of the noticeable differences in their prices.

The market for wood and biomass fuels remains characterized by wide discrepancies in terms of prices, packaging, means of delivery and relative importance of various distribution channels.

In this context, ADEME launched a study which, on one hand, aim to ensure the ongoing publication of surveys and indexes first produced in 2003 and, on the other hand, aims to expand the scope of the work by analyzing in greater detail various factors that influence wood fuel prices (delivery and packaging, composition in terms of wood species, moisture content, regional diversity ...).

Regarding fuels used on commercial, industrial and collective housing premises, ADEME has been using, since 2013, data from official surveys conducted by the CEEB, under an INSEE mandate. However, as these surveys do not integrate delivery costs, data cannot directly be compared with that of the prices of other energy sources (natural gas, oil ...). Taking these limitations into account, a methodology for the evaluation of the delivery costs was developed in 2015, its purpose being to provide a more homogenous comparison basis.

The study conducted by CODA Strategies thus contains, in the first volume, the results of a survey conducted among distributors of wood fuels mainly for residential heating purposes. In order to situate the French market within the international context, the report also includes international data on wood pellet prices. The second volume is dedicated to identifying and presenting wood prices for commercial, industrial and collective housing markets. This second report is supported by CEEB data, and sees the use of the above-mentioned method of estimating delivery costs.

1 ADEME, STUDY ON THE RESIDENTIAL WOOD HEATING MARKET: 2018
1.2 The methodology

Two major markets are analyzed throughout the study: the residential wood heating market and the collective and industrial market. The methods of collecting and processing data are specific to each of these markets.

- **An in-depth survey of residential sector prices**

For the residential sector, a survey of 331 statistically representative wood fuels suppliers was conducted. This survey was used to determine the current prices for the fuels most used within households (wood logs, pellets, reconstituted logs and sticks...) Moreover, the factors influencing wood price variability on the residential market were determined: the impact according to the region where the fuels were sold, the period of the transaction, the delivery options, the impact of labeling and of the quality and the types of the wood sold were all analyzed.

The information obtained through the survey was further improved via an on-line price collection campaign. This was done in order to enlarge the dataset and thus to ensure a better representativeness of the sample at a regional level.

Regarding the residential market in particular, “The study of domestic wood heating”, published ADEME highlighted the strong diversity in terms of the distribution channels visible throughout the sector\(^2\) and the relatively limited role of professional purchasing channels. The annual sectoral survey conducted by AGRESTE\(^3\), estimated that residential wood consumption stood at 30.4 million m\(^3\), of which only 8 million m\(^3\) associated to a professional distribution channel. The prices listed in this report apply only to those wood purchases that are official and formal business transactions, and as such, those purchases that are invoiced. These prices are representative of less than 25% of overall residential wood consumption.

In this study, the Lower Heating Value of wood logs is considered to be 2000 kWh LHV / stere. This value corresponds to wood (moisture content below 20%, satisfactory diameter, hardwood) meeting the France® Bois Bûche standard, which represents the bulk of the wood sold by professional distribution channels, although it doesn’t reflect the average LHV of wood on the market in France, which tends to be closer to 1500 kWh/ stere.

- **Use of data provided by professional organizations for the collective and industrial sectors, estimation of delivery costs.**

The price of wood chips and hedgerows as well as the prices of the wood fuel types destined for the municipal, collective and industrial sectors were analyzed based on data obtained from price surveys conducted by trade associations and professional organizations, most notably by the CEEB, under an INSEE mandate (for the provision of the survey). Additional data processing was carried out to include VAT rates and especially transportation costs within the overall prices.

Besides presenting prices and indexes published by these organizations, the report describes and analyzes the methodology involved in the data collection and analysis process.

Delivery costs of wood fuels were also estimated in order to establish a relevant basis of comparison regarding the different energies used in the collective and industrial sector. This estimation is based on a methodology mobilizing a survey of more than 60 heating plants as well as 15 in-depth interviews conducted with sector experts. Its use allows integrating delivery costs within the overall prices. In 2019, this survey was conducted anew, thus ensuring that the updated estimate of average delivery costs remains representative of the economic realities of the market.

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\(^2\) ADEME – Study on the domestic heating wood market», June 2013

\(^3\) AGRESTE - Timber harvest and sawnwood production in 2012– AGRESTE PRIMEUR – The firewood harvest is estimated at 4.8 Mm\(^3\) according to AGRESTE compared to 4.3 Mm\(^3\) in 2012
2. Prices of wood fuels for the residential market

2.1 The price competitiveness of wood energy

After a period of irregular but continual increase in prices, going from 2005 to 2014, 2015 and 2016 marked a break in the overall trend with a significant drop in prices for almost all types of wood fuels. 2017 has seen prices hikes for roughly all relevant types of wood fuels, though 2014 levels have not been reached.

In 2018, the multiple types of fuels showed differentiating patterns of price evolutions while in 2019 a global price stabilization has been observed with slight fluctuation considering the fuel type. This stabilization was broken during the new period 2020 which saw an increase in all studied wood fuels. The price increase has been observed for both prices excluding and including delivery, the latter having increased more significantly.

Regarding wood logs, demand for small forms (25 and 33 cm) coming from households is progressing, most probably because of the development of the market for wood-burning stoves with small hearths. In addition, all resellers report a significant increase in the sales regarding these forms.

In terms of price, an increase has been tested for all forms. This increase can be explained by the desire of resellers to compensate for the drop in the sales volumes. Therefore, wood suppliers declare that the lockdown due to the Covid crisis, hasn’t had an impact on the wood prices.

A trend towards a reduction in the price differences between bagged pellets sold at retail and bagged pellets sold in pallets has been observed since 2017. In 2020, the tariff gap is currently of 1 € for prices excluding delivery, while in 2016, it was € 24 per tonne (delivered or without delivery). However, this comparison is limited mainly because pellets on skids are often delivered while pellet bags are mostly withdrawn by individuals at the sales point (purchase in DIY store, etc.)

The low prices for pellet bags set by some suppliers could explain this important yearly variation. In 2020, prices for pellets sold in bags have dropped, a trend driven by some sellers willing to gain parts over the main competitor for this type of products, the DIY stores.

Monitoring prices of pellet bags is difficult to be conducted over a long period of time because of the variation of the offered quality. A seller can frequently change the supplier and therefore the communicated tariff could refer to a different product every year. In order to take into account this quality variation, respondents are asked to specify the quality of the sold products referring to the three categories: “premium”, “average” or “below average”. These elements are further analyzed in the price variation factor parts. However, this product classification is estimated by the seller and it can refer to marketing as well as to technical characteristics. Most of the sold pellets are certified with different quality labels (EN +, DIN +, NF granules) and therefore guarantee a good product quality.

According to interviewed professionals, the quality of the pellets delivered on skids is generally better. This observation can explain the convergence of the prices of pellets sold on skids and in bags. For the latter category and especially the products sold in DIY stores which are often coming from Eastern European countries, the prices are considerably lower.

After the drop of the reconstituted logs’ prices in 2018, a progression was observed in 2019 and 2020. The average increase of the prices over the last 15 years for this type of fuel has been the weakest compared to the other wood products. The slow progression is certainly the consequence of the competition on the market, reinforced by the entry of DIY store as well as the development of Internet sales.
Table 1: Price evolution of wood fuels excluding delivery for residential clients
(Without delivery, €/t, including VAT, kWh LHV)

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<tbody>
<tr>
<td><strong>Logs 25 cm</strong></td>
<td>52</td>
<td>66</td>
<td>66</td>
<td>66</td>
<td>70</td>
<td>72</td>
<td>72</td>
<td>71</td>
<td>71</td>
<td>75</td>
<td>75</td>
<td>76</td>
<td>79</td>
<td>4.8%</td>
</tr>
<tr>
<td><strong>Logs 30 cm</strong></td>
<td>55</td>
<td>62</td>
<td>64</td>
<td>65</td>
<td>67</td>
<td>70</td>
<td>74</td>
<td>69</td>
<td>68</td>
<td>72</td>
<td>73</td>
<td>73</td>
<td>74</td>
<td>1.9%</td>
</tr>
<tr>
<td><strong>Logs 40 cm</strong></td>
<td>51</td>
<td>57</td>
<td>57</td>
<td>62</td>
<td>61</td>
<td>64</td>
<td>68</td>
<td>63</td>
<td>63</td>
<td>67</td>
<td>65</td>
<td>66</td>
<td>69</td>
<td>3.8%</td>
</tr>
<tr>
<td><strong>Logs 1 m</strong></td>
<td>38</td>
<td>52</td>
<td>51</td>
<td>53</td>
<td>52</td>
<td>57</td>
<td>61</td>
<td>56</td>
<td>55</td>
<td>57</td>
<td>55</td>
<td>56</td>
<td>59</td>
<td>4.6%</td>
</tr>
<tr>
<td><strong>Bulk pellets</strong></td>
<td>165</td>
<td>189</td>
<td>194</td>
<td>224</td>
<td>234</td>
<td>253</td>
<td>281</td>
<td>274</td>
<td>266</td>
<td>287</td>
<td>259</td>
<td>270</td>
<td>278</td>
<td>2.8%</td>
</tr>
<tr>
<td><strong>Pellet bags</strong></td>
<td>245</td>
<td>288</td>
<td>264</td>
<td>272</td>
<td>293</td>
<td>328</td>
<td>332</td>
<td>324</td>
<td>320</td>
<td>350</td>
<td>306</td>
<td>316</td>
<td>316</td>
<td>0.6%</td>
</tr>
<tr>
<td><strong>Pellet bags</strong></td>
<td>309</td>
<td>296</td>
<td>302</td>
<td>295</td>
<td>303</td>
<td>315</td>
<td>315</td>
<td>317</td>
<td>318</td>
<td>320</td>
<td>318</td>
<td>313</td>
<td>319</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Reconstituted logs</strong></td>
<td>N.D.</td>
<td>299</td>
<td>321</td>
<td>308</td>
<td>287</td>
<td>310</td>
<td>328</td>
<td>336</td>
<td>331</td>
<td>351</td>
<td>343</td>
<td>349</td>
<td>356</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

Source ADEME – Survey conducted by CODA Strategies

DIY stores are becoming a strong competitor on the wood market and while their price influence is very substantial on the pellets segment, they maintain high tariff policy for wood logs offering value-added services (delivery on pallets, dry wood). For this type of products, DIY stores tend to influence market prices upward.

In 2020,ay time, an increase in the prices has been observed for both undelivered and delivered products. This evolution is especially noticeable for the wood logs including a delivery which marked an increase of more than 9%, an evolution which seems surprising insofar as the fuel prices decreased during the period.

The health crisis and the followed lockdown have had an impact on the wood market and more particularly on the increase in the sold quantities.

The closing of DIY stores pushed households to purchase wood products from local sellers who marked a significant increase in their activity. Nevertheless, suppliers declared that this situation haven’t had an impact on the prices which were kept at the same level as before the lockdown.

Table 2: Price evolution of wood fuels including delivery for residential clients
(Delivery included, €/t, including VAT, kWh LHV)

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</tr>
</thead>
<tbody>
<tr>
<td><strong>Logs 25 cm</strong></td>
<td>54</td>
<td>69</td>
<td>70</td>
<td>69</td>
<td>72</td>
<td>83</td>
<td>87</td>
<td>74</td>
<td>74</td>
<td>79</td>
<td>80</td>
<td>78</td>
<td>86</td>
<td>9.7%</td>
</tr>
<tr>
<td><strong>Logs 30 cm</strong></td>
<td>60</td>
<td>65</td>
<td>65</td>
<td>67</td>
<td>74</td>
<td>80</td>
<td>81</td>
<td>73</td>
<td>72</td>
<td>76</td>
<td>77</td>
<td>76</td>
<td>83</td>
<td>9.9%</td>
</tr>
<tr>
<td><strong>Logs 40 cm</strong></td>
<td>55</td>
<td>61</td>
<td>60</td>
<td>63</td>
<td>67</td>
<td>73</td>
<td>75</td>
<td>68</td>
<td>67</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>77</td>
<td>9.3%</td>
</tr>
<tr>
<td><strong>Logs 1 m</strong></td>
<td>44</td>
<td>54</td>
<td>54</td>
<td>55</td>
<td>56</td>
<td>63</td>
<td>66</td>
<td>60</td>
<td>58</td>
<td>59</td>
<td>61</td>
<td>61</td>
<td>65</td>
<td>5.8%</td>
</tr>
<tr>
<td><strong>Bulk pellets</strong></td>
<td>190</td>
<td>235</td>
<td>215</td>
<td>250</td>
<td>260</td>
<td>274</td>
<td>283</td>
<td>285</td>
<td>276</td>
<td>283</td>
<td>283</td>
<td>280</td>
<td>305</td>
<td>8.7%</td>
</tr>
<tr>
<td><strong>Pellet bags</strong></td>
<td>285</td>
<td>311</td>
<td>290</td>
<td>318</td>
<td>318</td>
<td>338</td>
<td>345</td>
<td>341</td>
<td>337</td>
<td>322</td>
<td>325</td>
<td>326</td>
<td>330</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>Pellet bags</strong></td>
<td>328</td>
<td>313</td>
<td>321</td>
<td>332</td>
<td>330</td>
<td>348</td>
<td>354</td>
<td>351</td>
<td>356</td>
<td>363</td>
<td>359</td>
<td>365</td>
<td>378</td>
<td>3.5%</td>
</tr>
<tr>
<td><strong>Reconstituted logs</strong></td>
<td>N.D.</td>
<td>358</td>
<td>370</td>
<td>329</td>
<td>333</td>
<td>341</td>
<td>356</td>
<td>361</td>
<td>356</td>
<td>363</td>
<td>359</td>
<td>365</td>
<td>378</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

Source ADEME – Survey conducted by CODA Strategies

Auxiliary heating use

Throughout this report, wood heating systems are considered as an auxiliary heating solution when their overall contribution to the thermal requirements of the household is minor. As such, the tariffs taken into account when comparing the price of wood fuels and other energies are chosen as to ensure coherence according to this type of use:

- **Propane**: 13 kg tank
- **Electricity**: 1 700 kWh/year, 6 kVA subscription, flat rate
- **Gas**: B0 Tariff, 2 326 kWh HHV/year

For wood and biomass fuels, in the case of pellets, 15 kg retail bags are considered mainly because this form of conditioning appears to be the most appropriate for this type of use.

Reconstituted logs are predominantly used in auxiliary heating, due to their high price. However, they can also be used, as a complement to traditional wood logs for primary heating solutions (for example to ensure a steady flame or during the ignition process).

The following chart provides a price comparison for various fuel types used in auxiliary heating applications. It reflects the evolution of prices over the 2006-2019 period.
The chart clearly shows that for auxiliary heating, wood appears to be the most competitive of energies. This conclusion stands for all of the available types of wood fuels covered in this study (logs, pellets).

For the fourth consecutive year, the price of propane conditioned in 13 kg bottles has been increasing, reaching 20.5 c€ including VAT / kWh LHV, thus becoming one of the most expensive fuel types on the market.

The price of electricity continued to increase in 2020, with a progression of 5% compared to the previous period thus widening the gap with the other energies and making the electricity even less competitive. However, the analyze of the energy price only should be considered with precaution because of the low price of electrical equipment such as electric radiators which can encourage households to use these systems for auxiliary heating.

**Figure 1** Comparison of wood fuel prices for residential auxiliary heating use (c €. Including VAT, kWh LHV, including delivery)

Source: Wood and biomass fuels, ADEME, a Coda Strategies survey. (1) Propane: CFBP / PEGASE 13 kg tank (2) Electricity: Eurostat, Band DB 1000 kWh-2500 kWh; Retained energy content: wood pellets = 4600 kWh LHV/t, reconstituted logs 4600 kWh LHV/t, log 2000 kWh LHV/stere.
**Primary heating use**

The competitiveness of wood solutions is also proven in the context of use for the main heating of homes. However, the price differential is smaller than in the case of auxiliary heating.

After a significant drop in the price of natural gas in 2017, an increase in the price of natural gas has been observed during the last three periods to now reach 7.9 c € / kWh.

Bulk granules remain competitive compared to other energies with a cost that currently stands at 6.6 c € / kWh PCI. It should be noted that equipment using this type of fuel (mainly pellet boilers) is currently experiencing a low level of sales.

In 2020, the cost of pellets delivered on skids has increased, but its level remains lower than the domestic fuel price which experienced a very sharp increase in 2018 and 2019 and then a decrease in 2020 reaching 8.2 c € / kWh LHV. However, the price difference between the two types of fuels is narrowing down compared to previous periods. The price decrease observed on domestic fuel prices is making the energy as competitive as reconstituted logs whose tariff is at the same level. However, wood logs generates savings of around 50% compared to both domestic fuel oil and natural gas.
2.2 Evolution of wood prices throughout the recent period

The most appropriate way of gauging the evolution of wood prices is by analyzing the costs per kWh LHV, including delivery and VAT. Doing so allows for comparing, on a relevant basis, the energy output of the different types of fuels. Taking delivery into account allows for a better understanding of the most usual supply situations for residential sector users purchasing their wood through official channels.
The overall increase in wood prices has remained moderate throughout the past few years. However, the dynamics associated to each market should be distinguished. A deeper analysis shows that while the prices of wood logs have progressed slowly over the past few years, those of pellets have witnessed a significant rise over 2011-2014 period, with 2015 somewhat breaking this trend.

For pellets in bags, the conditioning explains a significant part of the evolution of the prices:

- Prices of pellets delivered in bulk, on skids, have remained stable between 2015 and 2018. This was followed by an important increase in 2019.
- After a significant increase between 2005 and 2014, retail prices of pellets in bags have witnessed decrease in 2016 and 2017, before stabilizing in 2018-2019 and marking a slight increase in 2020.

This convergence is partially related to the rise of sales of pellets in bags in hardware stores, with these distributors having engaged in aggressive pricing strategies. A second factor influencing price levels is the variation in the quality of the products on offer, wood coming from Eastern Europe being sold cheaper, especially in the aforementioned settings.

![Figure 3](image-url)  
*Figure 3 Evolution of retail wood fuel prices (Including delivery, in € including VAT / kWh LHV)*

Source ADEME - Survey conducted by CODA Strategies

(*) The weighted average price of wood logs is calculated by assigning to the different log sizes a coefficient equal to their weight in household purchases, as estimated by the survey conducted by the ADEME in 2013: 25 cm: 4%, 33 (and 40) cm: 14%, 50 cm 52% 1M: 9%. (ADEME study, in May 2013, of residential wood heating: markets and supplies)

In order to insure consistency when comparing the different fuel prices, the above graphic presents all prices including delivery.

However, the data on pellet sold in bags should be considered as not being particularly representative due the low number of sellers offering delivery for this type of wood fuel.

The comparison between the evolution of energy prices in general and the price of wood and biomass fuels in particular, demonstrates a more or less parallel to evolution between 2006 and 2009. Starting in 2009, the tendency changed as a result of the sharp growth in global energy prices, with wood and biomass fuel prices remaining relatively stable.

The gap was further widened in 2015, due to the drop in wood prices observed that year. Since 2017, the rate of growth of fossil fuel and electricity prices again tends to experience strong growth, while biomass prices remain relatively stable. On an annual average, energy prices increased by 3.1% between 2007 and 2020, while this evolution was only 1.6% for the price of wood fuels.
Comparing the evolution in prices between wood fuels and other directly competing fuels leads to similar conclusions. Even though domestic fuel-oil (heating oil) prices in 2015 have decreased, wood fuels are still considerably cheaper over the long run. Above all, wood fuel prices have remained genuinely stable over the period, especially compared to other energies and in particular to domestic the domestic fuel-oil (heating oil).


Source: Survey conducted by CODA Strategies
Factors influencing the prices of wood for heating

Wood fuel prices are fairly heterogenous (see chart below).

The analysis shows that a significant number of factors influence wood prices: the location within the region, the quality of the products, the delivery methods, the moisture content, the essence of the wood, etc... The present study provides a number of insights on the impact of these different factors.

*Figure 6 Price dispersion per stere of wood logs (50 cm, without delivery and VAT)*

**Factors related to location**

Geographical location highly influences the price of wood for domestic use, with significant differences among French administrative regions. The main factor explaining the difference is the availability of wood in the regions. The highest wood log prices are observed in Brittany, Provence Alpes Côte-d’Azur, Pays de la Loire and Languedoc Roussillon. On the opposite, Burgundy, Franche-Comté and Champagne-Ardennes display the lowest prices. The disparity between the 3 most expensive and the 3 less expensive regions is on average 40 € per stere, which translates to a price a gap in excess of 45%. Ile de France, which during past years was one of the most expensive regions, now shows prices situated around the average.
Contrary to the previous situation, the new administrative regions are not homogenous in terms of wood fuel prices, seen as though, within the same region the level of forestation and implicitly of the available resources tends to see considerable differences.
Figure 8 Wood log prices, per new administrative region (50 cm – Heating Season - including delivery - €/stere)

![Chart showing wood log prices per new administrative region.]

Source: ADEME, Survey by CODA Strategies

**Labels and certifications**

Roughly 27% of the companies’ interviewed in the survey offered labelled products, a share which represents a strong increase compared to 2015 levels. "NF bois de chauffage" and "France Bois Bûche" are approximately equally represented while "France Bois Bûche" was more widespread during the past years.

The rate of multi label wood logs is still very limited (wood logs labeled NF Bois de chauffage and PEFC all in one). It could have been expected to have a higher rate of sellers having products labeled PEFC+

Figure 9 The range of labeled products by type of label

![Pie chart showing the range of labeled products by type of label.]

Source: ADEME, Survey by CODA Strategies
In general pellet distributors tend to market only certified products, with most companies’ offers covered by at least one certification scheme. 86% of the interviewees sell products covered by DIN PLUS, which makes this certification scheme, by far, the most popular on the market. EN Plus and NF Granulé are considerably less used.

**Figure 10 Types of certifications / labels used**

Source: ADEME, Survey by CODA Strategies

**Delivery methods and additional costs associated with conditioning**

Delivery is offered by almost all the companies interviewed in the survey with only 3% of respondents not offering any form of delivery.

About 90% of resellers impose a minimum quantity in order to provide a delivering service. The average minimum quantity is 3.4 steres with 85% of companies requiring less than 5 steres. Only 1% of respondents require a minimum of 10 steres.

**Figure 11 Percentage of companies delivering their products (wood logs)**

Source: ADEME, Survey by CODA Strategies

Delivery in bulk remains the most popular form of delivery on the market. Some companies offer additional conditioning and storage services for their clients, for example delivery on a skid or with stowage at the clients’ place.
Billing conditions tend to vary significantly according to the way the wood is delivered and conditioned. On average, sellers charge 29€ more for stowing woods in the client’s premises, whereas delivery on skids costs 19€ extra. The data relative to prices including delivery and stowage presented in the chart below are to be considered with precautions due to the low number of observations. Results were corrected for variations relative to geographical location.

*Figure 12 The extra costs associated to specific conditionning (€ including VAT / m³)*

The data relative to prices including delivery and stowage presented in the chart below are to be considered with precautions due to the low number of observations. Results were corrected for variations relative to geographical location.

*Source: ADEME, Survey by CODA Strategies*

**The impact of the species of the wood and of the moisture content**

The wood fuel supply is mainly composed of dry wood, which has a drying time of over 1 year. The proportion of companies offering wet wood increased in 2019 with 5% of resellers offering wood in green condition, a rate that fell in 2020.

*Figure 13 Dryness level of the wood on offer*

*Source: ADEME, Survey by CODA Strategies*
Few respondents segment their offers, for example, by selling wood that is drier compared to their standard offering. Roughly 5% of them market greener wood at lower prices. Due to the low number of respondents engaged in such practices, comparing prices according to humidity contents is not relevant.

**Commercialization outside the heating season**

The number of resellers offering low season rates has increased considerably over the past year progressing from 5% in 2019 to 21% in 2020. This increase can be explained by the decrease of the quantities of logs sold to individuals and the willingness of resellers to sell their stock. The discount granted has also increased from 5% to 7% in 2020. It varies widely among resellers but generally ranges between 3% to 10% with a few respondents declaring to grant 20% discount during the off-season.

**Figure 14 Rate of discount for sales outside of the heating season**

(Wood log – 50 cm including delivery, €/stere)

Source: ADEME, Survey by CODA Strategies

**2.3 The French pellets market in the European context**

An international comparison of the prices of pellets in bulk (which do not make up a significant share of sales on the French market) shows that French prices, which were for a long time among the lowest in Europe, are currently higher than those observed on the national markets of other pellet-consuming countries. Bulk pellet prices in France, as presented by the CEEB, are slightly lower than those identified in the Ademe survey (273€ vs. 283€), but this difference doesn’t change the results of the international comparison.

Several factors may explain this situation:

- The use of off-season pricing schemes, which tend to regulate prices, has been developing in France, but its role is still limited, especially when compared to other countries.
- Lower pressure from imports which limits the convergence with the prices of other European countries.
- The fragile financial situation of national producers makes them apply high prices in order to cushion the impact of the important investments conducted during 2010-2015 period.
- The development of the market is mainly driven by pellets in bags due to the importance of pellet boilers within the annual sales and, nowadays, within the overall heating equipment (and obviously in the associated wood consumption).
Figure 15 Comparison of the prices of pellets sold in bulk, in France and in 4 other wood-consuming countries in Europe

Source: ADEME, Survey by CODA Strategies (France) and compilation of data from professional organizations, quality A1
3. Analysis of firewood and biomass fuel prices for industrial and collective use

3.1 Data sources

In 2013, the method for estimating prices of wood fuels used in the municipal (i.e. installations used by local authorities) evolved. The price levels presented below are based on CEEB surveys. CEEB data do not include delivery costs, costs which must necessarily be taken into account in order to evaluate the competitiveness of biomass relative to other energies, on an equal footing.

As such, our report initially presents the official statistics as published by the CEEB. Further on, a method for estimating delivery costs is described and, in the final sections of this report, mobilized in order to obtain an estimate of prices including delivery (excluding and including VAT) for wood fuels, applicable in the collective / municipal and industrial sectors.

From 2017 onwards, CEEB has stopped publishing data on woodchips and hedgerows prices and replaced those publications with that of indices of their evolutions compared to 2012 price levels. The figures published in this report are thus estimated from these indices. This method, which is necessary to the data restrictions of the CEEB, is however not viable on the medium-term.

A survey of 60 commercial and municipal heating plants using pellets was conducted in order to establish the real pellet price paid by those stakeholders. This methodology was chosen in order to take into account the discounts obtained on large quantity purchases which cannot take into account the published data based on delivery of 5 tons.

After weighing the results according to quantities consumed, the average prices for pellets sold in bulk to commercial heating plants stand at 260 € / ton excluding VAT, but including delivery. The difference is of 7% compared to the average price declared by distributors (at 277 € / ton excluding VAT, for the general public).

![Figure 16 Pellet prices for collective heating and commercial heating plants](Image)

*Figure 16 Pellet prices for collective heating and commercial heating plants
(Price per ton including delivery and VAT)*

Source: ADEME, Survey by CODA Strategies

The difference highlights the discount obtained by local authorities and industrials using this type of equipment. The observed gap is stable compared to 2019. Moreover, with the strong development of bulk deliveries for the commercial market, suppliers are getting more interested in the latter one and less in the residential sector where a stagnation for this type of wood has been observed.
In this context, it could be considered that pellets sellers are ready to grant competitive tariffs to steadily install themselves on the market.

### 3.2 The competitiveness of wood and biomass fuels for collective and industrial use

The comparison of the prices of different sources of energy on a homogenous basis can be conducted by integrating the estimated delivery costs and incorporating VAT.
Figure 17 Comparison of wood fuel prices for collective or industrial heating purposes (€/excluding VAT/kWh – Delivery included)
### Wood Fuel Prices Evolution in 2019-2020

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Description</th>
<th>Source/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating oil</td>
<td>Delivery of 27,000 liters or more, source DIREM (tariff C4)</td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Before 2016, Tariff STS, Pégase database, Since 2016, Tariff I3 (10 000 GJ &lt; Consumption &lt; 100 000 GJ) and I4 (100 000 GJ &lt; Consumption &lt; 1 000 000 GJ) – Source: Eurostat database, price excluding VAT and other recoverable taxes</td>
<td></td>
</tr>
<tr>
<td>Fuel-oil</td>
<td>(Very Low sulfur content &lt;1%), source DIREM</td>
<td></td>
</tr>
<tr>
<td>Pellets</td>
<td>Conversion of the weighted average price according to a survey of 60 heating plants in LHV (242/4600)*100</td>
<td></td>
</tr>
<tr>
<td>Sawdust</td>
<td>From 2014 onwards, data is taken from CEEB surveys and averages between hardwood and softwood sawdust are conducted. These data sets were not calculated in previous years.</td>
<td></td>
</tr>
<tr>
<td>Bark</td>
<td>2014-2016 data are taken from CEEB datasets, averages between hardwood and softwood bark are determined.</td>
<td></td>
</tr>
<tr>
<td>Wood chips</td>
<td>CEEB data and different weights of 0.12 / 0.27 / 0.61 are applied according to the different moisture classes (&lt;30%, 30-40%, &gt; 40%), weights are also applied according to the relative share of each of the qualities in the total consumption of the heating plant.</td>
<td></td>
</tr>
</tbody>
</table>

For wood fuels, the prices include tax and delivery. Delivery costs are presented: for sawdust and barks delivery prices are estimated by CODA Stratégies (according to “estimates of delivery costs”, Annex A).

From this comparison, it appears that prices for the various wood and biomass fuels, apart from pellets, appear more competitive compared to all other energies. However, the gap with the tariffs of natural gas offered to big consumers is limited whereas the investment and maintenance costs of biomass installations are higher compared to those functioning on gas (the difference in the investment cost is partially compensated by public subsidies).

Data concerning wood fuels presented expressed excluding VAT, but including delivery. The estimation of delivery costs is presented in the annex of the main report.

### 3.3 The evolution of prices for collective and industrial use throughout the recent period

The following chart shows the evolution of the wood fuel prices for professional wood heating (wood boiler) plants. In order to ensure data set coherence and consistency with regards to the method of estimating delivery costs between 2013-2014 and 2015, the costs for 2013 and 2014 were reevaluated through the new method developed in 2015. As such, these values differ from those presented in the 2013 and 2014 reports.

Woodchips, the main type of wood fuels used by commercial plants, have undergone a parallel evolution with an average annual increase of +4.1%, a period of price stability (2013-2019) which came after an important price increase over the years 2005-2013.

The other wood fuels used in professional heating plants have shown an important price increase over the medium term. As mentioned before, this progression is due to a catch-up effect, with these prices increasing from a very low base. As such, current prices expressed in kWh LHV are reaching the prices of woodchips and hedgerows. For example, the average annual price increase of recycling woodchips is of 6% over the period. In the specific case of recycled wood chips, the end of their regulated “waste” status that occurred in 2014 has led to a series of constraints and cost increases.
**Figure 18 Evolution of prices, including delivery, but excluding VAT for professional heating plants**  
(€ c per kWh LHV, excluding VAT)

Source ADEME – Basic 2000 survey for the 2005-2012 period. CODA Strategies estimate based on CEEB data for 2013-2019. CAGR : Compound annual growth rate. For the years 2013 and 2014, the delivery cost estimation method, developed for the year 2015 (and onwards) was applied in order to avoid statistical bias due to a change in methodology. Weighted index : calculated on the basis of the contribution of the different types of fuels to overall heat production (“Fonds Chaleur” – Heat Fund – projects) : Wood chips 71.5%, Bark : 5.8%, Swadust 11.3%, Recycled wood chips : 11.4%.
4. Conclusion

On the residential market, 2015 marked a break in the previous price evolution trends, with a significant decrease in prices which was confirmed in 2016. In 2017 a recovery was observed, with an increase of around 3% to 6% depending on the fuel. For 2018, the data observed was more contrasted with decreases recorded for certain products (50 cm logs, granules in bags on pallets and in bulk, and reconstituted logs) while small forms of logs, for which demand had grown strongly, had experienced a moderate rise in prices. The year 2019 was characterized by price stability.

The year 2020 seems to mark a sharp break in the trend for wood logs, with price increases of up to 10%, an increase that has not been recorded in recent years. This development is even more remarkable as the "fundamentals" of the market would have rather led to anticipate a stability, even a price decrease: mild climate conditions, downward trend in household consumption, switch to pellet consumption, etc.

This development could be the result of an orientation of the offer towards formulas with higher added-value and in particular packaging by pallet, which is taking an increasingly important place in the market. The rate of product labeling, which is increasing strongly, could also explain this development. If this hypothesis were to be verified, it would then reflect an increased professionalization of the market and the implementation of differentiation strategies for professionals in the sector, seeking to differentiate their offer from the informal market.

However, it is difficult to confirm such an evolution at this stage, due to the disruptions that the market has experienced in the context of the health crisis. Price growth could be the result of a cyclical phenomenon, of the opportunism of resellers, faced with strong demand due to the slowdown in the activity of other market players.

It will therefore be necessary to wait for the results of the next price collection campaigns to confirm a change in the practices of distributors towards offers with higher added-value, justifying an increase in prices, or to consider that the prices observed for the 2019-2020 season mainly resulted from the very particular economic context of this period.

Regarding wood pellets on skids, 2020 has been following the trends observed in previous years. Moderate price growth reflects a rebalancing of the market benefitting producers and allows them to have a better economic balance in their activity.

The prospects for the next few years appear, at this stage, difficult to define. In an optimistic scenario for producers, the development of high added-value offers (packaging in pallets, rise in labeled offers, etc.) would allow them to strengthen their differentiation compared to informal channels and obtain more favorable remuneration conditions. Such a scenario would turn out to be rather virtuous, as it would be accompanied using better-quality wood, with a more favorable environmental impact. In a more pessimistic scenario for producers, a persistent decline in demand and a third successive lenient season could generate a significant imbalance between supply and demand and the need to reduce inventory levels. A sharp downward price correction could then occur.

In 2020, the fuel prices on the professional market have seen a slight decrease. This reduction is mainly explained by the evolution of natural gas prices which, due to the existing competition between these two types of fuel, could not remain without effect. In addition, the mild climate, the drop in consumption of the organic industry and also the effects of the health situation have reduced demand and led to overcapacity production.

"The lock down allowed us to gain new customers. They found that using higher quality wood brought advantages in ease of use, performance and fire quality. We believe many of them will continue to use higher quality products over the next several years." - A wood logs marketing network

"The evolution of pellet prices over the next year will depend on the supply / demand balance. Several production site projects are under development. This should lead to an increase in the quantities put on the market of around 350,000 t / year. At the same time, sales of pellet stoves represent around 130 to 140,000 units / year and boilers 20,000, so consumption is increasing by around 200,000 t / year. There is therefore a potential imbalance between supply and demand which could ultimately weigh on prices"- An expert
For very large heating plants, the price of wood fuel is currently slightly higher than that of the lowest natural gas tariffs. Considering the additional investment cost (compensated by Fonds Chaleur) but also the less favorable yields of wood-burning equipment, as well as the greater maintenance constraints, the results in terms of economic competitiveness of these solutions are currently less favorable than what has been observed for certain years (for example in 2018, a year for which the weighted price of wood fuels was lower than that of the I4 and I5 tariffs for natural gas).

The evolution of the pellet prices follows a trend opposite to that observed on other markets, with price growth close to 10% between 2019 and 2020. It should be noted that the survey carried out among distributors (cf. report on the evolution of the prices of fuels for domestic heating) also showed a price growth of around 10% for the bulk pellets including delivery.

At the same time, a certain price convergence between the different fuels now seems to have been largely achieved and the catch-up effects between the different components of the wood and biomass fuel supply are becoming less marked. For example, recycling woodchips which were sold twice less expensive than woodchips in 2012 are now offered at a price 20% lower (compared to kWh PCI). For this fuel, the exit from waste status at the end of 2014 required more rigorous quality management and was therefore accompanied by a rise in production costs. Such an evolution is also observed for sawdust, whose price differential compared to woodchips fell from 30% to 0% between 2005 and 2020.

This stabilization of prices at a relatively competitive level for users is certainly the consequence of the rather mild weather conditions of recent years, but it also stems from factors specific to the organization of professional markets.

Supply remains higher than demand in the market today, but the gap appears to be narrowing. Biomass resources remain significant and above all benefit from the contribution of new product categories. Thus, professionals have cited hardwood crowns to us as significant inputs to the woodchip industry, these products previously used by wood logs producers no longer being used because of the difficulty in mechanizing their flow (this development is also explained by the decline in demand for domestic firewood, which reduces the need to resort to this type of resource to produce wood logs). But the excess of supply is also due to the significant investments made a few years ago, with the prospect of strong growth in consumption. However, if this is real, it did not live up to the forecasts posted at the start of the decade, due to a smaller number of projects more limited than anticipated, but also to low consumption linked to more lenient winters.

Faced with a tighter market, the producers of woodchips continued their search for productivity gains in the exploitation of forest deposits and in logistics, these productivity gains were able to consolidate their economic model and allow them to bear the fall in prices.

In the short term, great uncertainty remains about the final impact of the health crisis. If this uncertainty remained at the end of the heating period in 2020, a further slowdown in the economy during the winter of 2020-2021, combined with a possible mild winter and a continued low price of fossil fuels could lead to a strong destabilization of the market.

Faced with this threat, the measures to encourage the biomass sector put in place by the public authorities could have favorable effects, but with relatively long delays (the decision to invest in a wood - biomass installation does not result in an increase in demand only with a lag of several years).

One of the factors that may explain why price growth has been limited in recent years is undoubtedly the significant weight of large thermal operators in the market. Several of the professionals interviewed spoke of the very offensive behavior of these large groups which, relying on their market power, exert strong pressure on prices. The public authorities are undoubtedly entitled to question the effects of these aggressive purchasing strategies, which can weaken the economy of the supply chain, but are also potentially counterproductive in environmental terms: lengthening of supply distances to access the least costly deposits, generalization of just-in-time practices between forestry operations and heating plants without a woodchip drying phase.

In the medium term, a moderate increase in prices would have the advantage of stabilizing the financial situation of the various producers and of enabling actors to consolidate the virtuous principles in the exploitation of deposits and the quality of the products delivered.

We can observe on the market the rise of certain new outlets, in particular the small public service sector (colleges, town halls, gymnasium, swimming pools, etc.). These new markets partly consume pellets, which leads to an increase in professional demand for this type of fuel. Woodchips can also find new outlets there, some innovations making it possible, for example, to serve sites that do not have conventional storage capacities (underground silos).
The prices borne by end users remain very differentiated, depending on the quantities consumed, the quality of the fuel used and the ease of delivery. The specific study carried out on delivery costs has shown that these are very variable and represent on average around 20% of the total cost delivered. This very high variability is linked to the geographical location of the heating plant (distance from forest areas, urban density and ease of movement, etc.), purchasing volumes, which may call for different organizational methods and opportunities for optimizing deliveries, different depending on the region (possibility of taking charge of the delivery of other products to avoid empty returns). Regarding the average price of delivery, variations of up to 25% or 30% are possible. Therefore, the data estimated in this study should not be used without precaution to judge the competitiveness of a delivery service in a precise and specific case.

Beyond these considerations, the observation of professionalization and optimization of the economic conditions of delivery is essential. The transport of wood, and in particular of woodchips, is now largely carried out by specialists who have equipped themselves with the most efficient logistical means and are able to assess their costs very precisely.

During the last period, the cost of delivery has increased moderately, mainly associated with the evolution of the prices of petroleum products. The productivity gains achieved by the players have partly offset this upward trend.
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