

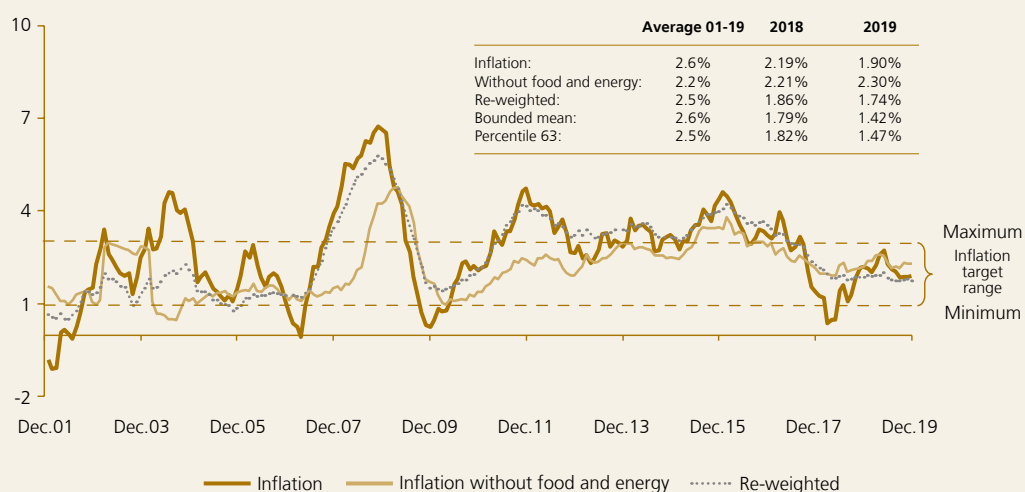
# IV INFLATION

In 2019, in a context in which economic activity remained below its potential and inflation expectations were within the inflation target range, annual inflation, measured by the change in the consumer price index (CPI) of Metropolitan Lima, was 1.90 percent, close to the midpoint of the target range (1 - 3 percent). Moreover, at the national level, the change in the CPI was 1.88 percent, also below the level observed in the previous year (2.49 percent).

Trend inflation recorded rates between 1.4 and 1.7 percent, remaining within the target range. The indicator of weighted trend inflation declined from last year's 1.87 percent to 1.74 percent in 2019. Furthermore, inflation excluding food and energy was 2.30 percent (2.21 percent in 2018), while the change in food and energy prices was 1.43 percent (2.17 percent in 2018), below its long-term average.

<b>Table 54</b> <b>TREND INDICATORS OF INFLATION</b> (12 months % change)					
	CPI	Re-weighted 1/	Bounded mean 2/	Percentile 63 3/	CPI without food and energy 4/
<b>2001-2019</b>					
Average % change	2.59	2.51	2.58	2.53	2.15
SD	0.31	0.14	0.12	0.13	0.23
Mar.18	0.36	1.93	1.58	1.50	1.99
Jun.18	1.43	1.88	1.61	1.67	2.23
Oct.18	1.84	1.86	1.76	1.76	2.13
Dec.18	2.19	1.87	1.79	1.82	2.21
Jan.19	2.13	1.91	1.80	1.86	2.40
Feb.19	2.00	1.87	1.81	1.85	2.39
Mar.19	2.25	1.90	1.76	1.87	2.56
Apr.19	2.59	1.91	1.71	1.83	2.59
May.19	2.73	2.01	1.69	1.82	2.56
Jun.19	2.29	1.84	1.58	1.66	2.30
Jul.19	2.11	1.77	1.44	1.57	2.15
Aug.19	2.04	1.73	1.39	1.50	2.20
Sep.19	1.85	1.73	1.41	1.55	2.16
Oct.19	1.88	1.76	1.46	1.56	2.34
Nov.19	1.87	1.79	1.48	1.58	2.31
Dec.19	1.90	1.74	1.42	1.47	2.30
1/ Re-weighted: Reduces the weight of items with greater volatility, considers the original weights of each item between the standard deviation of their monthly percentage changes. 2/ Bounded mean: Weighted average of the percentage change of prices between the 34th and 84th percentiles. 3/ Percentile 63: Corresponds to the percentage changes of the item located in the 63th percentile 4/ CPI without food and energy: CPI excluding food, fuel and electricity.					

**Graph 46**  
**INFLATION**  
(Last 12 months % change)



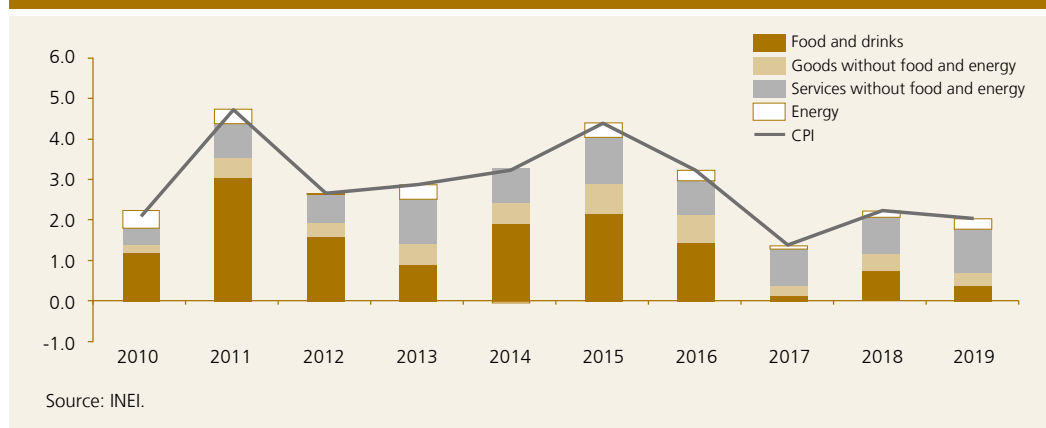
Source: INEI.

**Table 55**  
**INFLATION**  
(% change)

	Weight	2017	2018	2019	Average % chg. 2002-2019 1/
<b>CPI</b>	<b>100.0</b>	<b>1.36</b>	<b>2.19</b>	<b>1.90</b>	<b>2.74</b>
<b>1. CPI excluding food and energy</b>	<b>56.4</b>	<b>2.15</b>	<b>2.21</b>	<b>2.30</b>	<b>2.18</b>
<b>a. Goods</b>	<b>21.7</b>	<b>1.24</b>	<b>2.25</b>	<b>1.39</b>	<b>1.80</b>
Textiles and footwear	5.5	1.53	0.92	0.23	2.05
Domestic appliances	1.3	0.89	1.32	0.34	-0.30
Other industrial products	14.9	1.16	2.83	1.90	1.81
<b>b. Services</b>	<b>34.8</b>	<b>2.70</b>	<b>2.19</b>	<b>2.86</b>	<b>2.46</b>
<i>Of which:</i>					
Education	9.1	4.58	4.73	5.22	4.15
Rent	2.4	0.38	1.27	0.74	0.60
Health	1.1	1.83	1.76	1.47	2.82
Transportation	8.9	1.38	1.09	2.15	2.56
Water consumption	1.6	13.04	0.00	5.01	4.73
<b>2. Food and energy</b>	<b>43.6</b>	<b>0.46</b>	<b>2.17</b>	<b>1.43</b>	<b>3.31</b>
<b>a. Food and beverages</b>	<b>37.8</b>	<b>0.31</b>	<b>1.95</b>	<b>1.00</b>	<b>3.26</b>
<i>Of which:</i>					
Chicken meat	3.0	-4.83	-1.32	-7.27	1.41
Bread	1.9	0.87	0.94	0.92	3.52
Rice	1.9	2.11	-0.23	0.14	1.59
Sugar	0.5	-3.67	-11.45	-7.00	1.48
Noodles	0.5	0.71	2.54	2.39	2.43
Oils	0.5	4.84	-2.10	-2.28	2.97
Potato	0.9	-38.99	27.16	12.57	4.95
Fresh and frozen fish	0.7	-7.23	-5.95	-2.53	2.45
Meals outside the home	11.7	3.65	2.19	1.69	3.65
<b>b. Fuels and electricity</b>	<b>5.7</b>	<b>1.55</b>	<b>3.67</b>	<b>4.32</b>	<b>3.67</b>
<b>Fuels</b>	<b>2.8</b>	<b>3.95</b>	<b>5.35</b>	<b>-0.39</b>	<b>3.24</b>
Oil and lubricants	1.3	5.05	7.75	0.64	2.78
Gas	1.4	3.08	3.28	-1.65	1.97
<b>Electricity</b>	<b>2.9</b>	<b>-0.21</b>	<b>2.39</b>	<b>8.04</b>	<b>3.37</b>

1/ Regime Inflation Targeting since 2002.  
Source: INEI.

**Graph 47**  
**CONTRIBUTIONS TO THE ANNUAL CPI VARIATION**  
(% points)



The lower year-on-year inflation rate reflected lower food prices, which in 2018 were affected by lower plantings of some products. Likewise, the price of fuels remained quite stable due to the fact that there was no increase in the excise tax on fuels as occurred the previous year.

In terms of contribution to inflation, the item with the highest positive contribution was education tuition and fees (0.54 percentage points) as a result of the adjustment of these prices in private schools, private universities, and higher education institutes at the beginning of the school year. The item with the second highest contribution was electricity rates, with 0.27 percentage points, due to the adjustments approved by the regulatory agency affecting the price of the energy generation component mainly. The category of meals outside the home contributed with 0.23 percentage points, but registered the smallest annual variation observed in this item since 2006.

**Table 56**  
**ITEM WITH THE HIGHEST WEIGHTED CONTRIBUTION TO INFLATION: 2019**

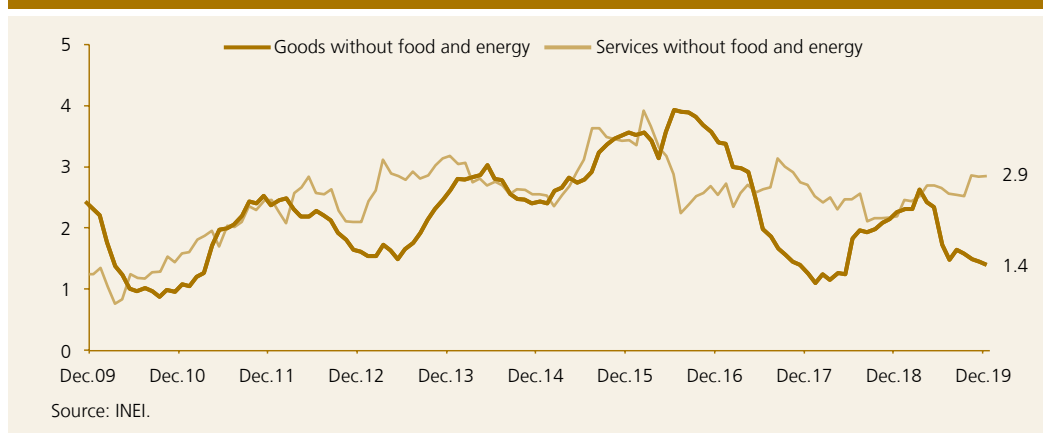
Positive	Weight	% chg.	Contribution	Negative	Weight	% chg.	Contribution
Education costs (tuition and fees)	8.8	5.3	0.54	Chicken meat	3.0	-7.3	-0.20
Electricity	2.9	8.0	0.27	Onion	0.4	-31.5	-0.14
Meals outside the home	11.7	1.7	0.23	Papaya	0.2	-18.1	-0.04
Urban fare	8.5	2.2	0.17	Sugar	0.5	-7.0	-0.04
Potato	0.9	12.6	0.12	Telephone rates	2.9	-1.3	-0.02
Beer	0.8	11.5	0.10	Gas	1.4	-1.7	-0.02
Water consumption	1.6	5.0	0.09	Fresh and frozen fish	0.7	-2.5	-0.02
Eggs	0.6	14.8	0.06	Other stews	0.2	-4.6	-0.01
Tickets to shows	1.7	3.8	0.06	Tomato	0.2	-4.6	-0.01
Toiletries	4.9	1.2	0.06	Oils	0.5	-2.3	-0.01
<b>Total</b>			<b>1.70</b>	<b>Total</b>			<b>-0.51</b>

Source: INEI.

## 1. Inflation Excluding Food and Energy

Inflation excluding food and energy, indicator reflecting trend inflation, was within the target range in 2019. The goods component fell from 2.3 percent in 2018 to 1.4 percent in 2019 due mainly to the lower price increase in the category of vehicles prices. On the other hand, the services component showed a higher pace of growth, rising from 2.2 percent in 2018 to 2.9 percent in 2019, this result being explained mainly by increases in water rates and urban fares.

**Graph 48**  
**CPI GOODS AND SERVICES WITHOUT FOOD AND ENERGY**  
 (Percentage change last 12 months)



## Goods

The lower variation in prices of goods in 2019 is explained mostly by the conduct of the prices of vehicles (down from 12.2 percent in 2018 to 1.6 percent in 2019) and cigarettes (down from 21.3 to 14.6 percent in the same period), since both had been affected by the rise in the excise tax on these goods in 2018.

It is worth mentioning that the excise tax on new vehicles, which previously had a rate of 10 percent, was lowered in mid-2019: the tax on sale of vehicles with a capacity greater than 1,400 cc but of less than, or equal to, 1,500 cc was set at 7.5 percent, while for the tax on sale of vehicles with a capacity of less than, or equal to, 1,400 cc was set at 5 percent. On the other hand, the rate of 10 percent remained unchanged for vehicles with capacities greater than 1 500 cc. In addition, another element contributing to this result was a lower variation in the exchange rate (which decreased by 0.3 percent in 2019 after increasing by 3.6 percent in 2018).

## Services

The increase in drinking water rates (5.0 percent) stands out in 2019. In January, Sunass authorized Sedapal to increase water rates by 3.0 percent after its compliance with investment targets. This adjustment included a 2.3 percent increase in drinking water supply and 5.6 percent increase in sewage services. Moreover, between September and November, the rates were again adjusted by 2.0 percent, based on the partial fulfillment of Sedapal's management and investment goals.

Urban fares (2.2 percent), which include the services provided by buses, micro buses, taxis, and motorcycle taxis, showed a greater increase than in previous years (1.0 percent in 2018). This higher increase is explained in part by the 15 percent adjustment observed in the feed-in routes and services of the Metropolitano bus system at the end of September.

The price of education –tuition and education fees– increased 5.3 percent, showing a slightly higher increase than in 2017 (4.9 percent). Price increases were observed in tuition fees in private schools, private universities, and higher education institutes in February and March, while increases in education fees stood out in private schools and universities in March.

## 2. Food and Energy Prices

Food and energy prices, whose changes are mainly related to supply factors, increased by 1.4 percent in 2019 (2.2 percent in 2018). Food prices increased by 1.0 percent (2.0 percent in 2018),



while energy prices rose by 4.3 percent (3.7 percent in 2018). In the energy sector, the price of electricity rose by 8.0 percent, whereas fuel prices fell by 0.4 percent.

## Food

Price changes standing out in 2019 were the increases observed in the prices of potatoes and eggs, on the one hand, and the falling prices of chicken, onions, papayas, and sugar, on the other hand.

The price of **potatoes** increased by 12.6 percent. The price rises observed at the beginning of the year were due to lower supplies from the central and southern sierra as a result of lower farm gate prices in the previous season and weather variability. Lighter temperature anomalies and the normalization of rainfall thereafter contributed to increase the crops and offset the price increases.

The price of **eggs** increased by 14.8 percent despite higher production (up about 8.0 percent from the previous year). This price increase was mainly due to higher marketing costs as well as to increased supply to the provinces in the middle of the year.

On the other hand, the price of **chicken** fell by 7.3 percent as a result of increased supply as well as due to the greater availability of fish, the main substitute of chicken.

The price of **onions** dropped by 31.5 percent as a result of a recovery in supplies from Arequipa and the seasonal entry of lower-priced varieties from June onwards.

Likewise, the price of **sugar** fell by 7.0 percent, in line with increased supply. It is worth mentioning that the wholesale supply of sugar from national agricultural companies increased by approximately 18 percent compared to 2018.

The price of **papayas** fell as well, in line with increased supplies from the regions of San Martín and Ucayali.

## Energy

**Electricity rates** increased by 8.0 percent, in accordance with the rate rises authorized by the regulatory body Osinergmin. These increases were mainly associated with the updating of energy generation prices established in the contracts between generators and distributors, as well as with the settlement of the compensation mechanism for regulated users approved by Osinergmin. In addition, various charges for the transmission component were updated on a quarterly basis, including the compensation for security of cold reserve supply and unit charges for the electricity generation capacity of thermal power plants.

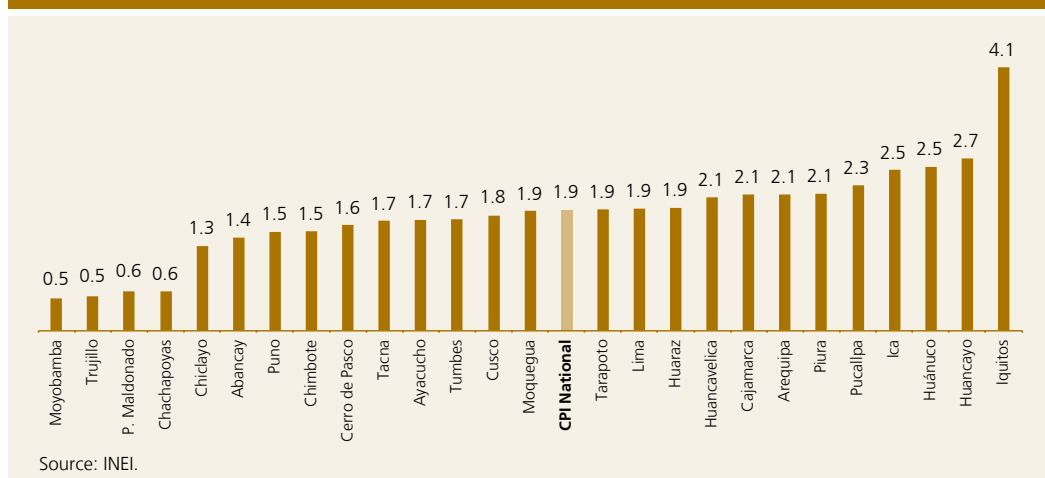
The prices of **gasolines and lubricants** increased by an average of 0.6 percent as a result of the higher crude oil prices. In contrast, the price of bottled LPG fell by 1.7 percent due to the lower LPG refining margins in international markets.

## 3. Domestic Inflation

In 2019, domestic inflation recorded a year-on-year rate of 1.9 percent, down from 2.5 percent in 2018. On the other hand, inflation excluding food and energy at the country's level was 2.2 percent, down from 2.4 percent in 2018.

Domestic inflation is calculated as the average inflation rate of the 26 major cities in the country. In 2019, ten cities showed higher inflation rates than Lima, while 15 cities showed lower rates.

**Graph 49**  
**INFLATION BY CITIES: 2019**  
(% change last 12 months)



The cities with the higher inflation in 2019 were Iquitos (4.1 percent), Huancayo (2.7 percent), Huánuco (2.5 percent), and Ica (2.5 percent).

In these four cities, meals outside the home were one of the items with the greatest contribution to inflation. The rise in urban fares also had an impact on the CPI in Iquitos and Ica, while the price of education –tuition and fees– was another of the items that contributed more to increase inflation in Ica, Huancayo, and Huánuco. In addition, beer prices –item affected by the rise in the excise tax in 2019 – was also among the prices with the higher positive contributions to inflation in Iquitos, Huancayo, and Huánuco.

As regards variations in the CPI excluding food and energy, eight cities showed higher price variations than Lima, while 17 cities showed lower price variations.

**Graph 50**  
**INFLATION WITHOUT FOOD AND ENERGY BY CITIES: 2019**  
(% change last 12 months)



Iquitos, Ica, Cajamarca, and Huancayo were the cities with the highest rate of inflation excluding food and energy, with urban fares, education (tuition and fees), medicines, and personal care items contributing the most to this indicator.



### Box 3 TREND INFLATION INDICATORS

Measurements of trend inflation for Peru are assessed and compared in this box. The Central Reserve Bank of Peru estimates and publishes several trend indicators that use exclusion methods (Inflation excluding food and energy prices, Core inflation by exclusion), trend smoothing estimations (kernel and reweighted inflation), and limited influence estimations (bounded mean and Percentile 63).

A set of trend inflation measurements allows central banks to isolate the long-term component of inflation from transitory components to assess their monetary policy actions properly. Thus, approximating observed inflation in the long term and being a good predictor of observed inflation are among the characteristics that a trend inflation indicator should have.

Results show that trend inflation measures do not deviate significantly from general inflation in the long term, but they do have lower volatility than total inflation. The current re-weighted measure of inflation is the indicator that most closely approximates the behavior of observed inflation in the long term.

	CPI	Excluding food and energy	By exclusion	Bounded	P63	Kernel	Re-weighted
<b>Accumulated % change 1995-2020</b>	<b>143.8</b>	147.4	147.3	148.7	147.3	146.9	144.4
<b>SD 1995-2020</b>	<b>0.37</b>	0.36	0.26	0.23	0.24	0.22	0.24

In order to assess the predictability of future inflation, the trend indicator is considered an inflation forecast and its degree of prediction error is assessed in a period ahead: the root-mean-square deviation (RMSD) in a year's time is calculated. The assessed indicator will reflect a more accurate projection if its RMSD is low for the time horizon under consideration. The performance analysis results of the trend indicators show that the reweighted inflation indicator has the second best prediction capacity than the other indicators considered.

#### TREND INDICATORS: RANKING OF THE ONE-YEAR PREDICTIVE ABILITY CRITERION EVALUATION

Re-Weighted 1/	2
Without food and energy 2/	4
Core by exclusion 3/	5
Bounded mean 4/	1
Percentile 63 5/	3
Kernel 6/	6

- 1/ Re-weighted: Reduces the weight of items with greater volatility, considers the original weights of each item between the standard deviation of their monthly percentage changes.  
2/ CPI without food and energy: CPI excluding food, fuel, and electricity.  
3/ Core by exclusion: CPI excluding foods that show the greatest variability in the monthly variation of their prices, as well as bread, rice, noodles, oils, fuels, public services and transportation.  
4/ Bounded mean: Weighted average of the percentage change of prices between the 34th and 84th percentiles.  
5/ Percentile 63: Corresponds to the percentage changes of the item located in the 63th percentile.  
6/ Kernel: CPI as weighted moving average.