



# Energy Cost Monitoring (ECM)

Nomura Lab at Keio Economic Observatory (KEO), Keio University, Tokyo

ECM\_JPN\_202310

October 31, 2023

(This report was prepared by Koji Nomura, Sho Inaba, Mansaku Yoshida.)

## 1 Recent Estimates

### 1.1 Growth Rates

	Quarter-over-quarter growth rate			Month-over-month growth rate		
	2023Q1	2023Q2	2023Q3	July, 2023	August, 2023	September, 2023
a. RUEC (Real Unit Energy Cost) (=b-c=e-d)	-5.4%	-11.2%	-4.2%	-0.8%	-0.5%	1.7%
b. Real Energy Price (=b1-b2)	-3.7%	-8.2%	-7.0%	-2.1%	-1.6%	-2.2%
b1. Energy Price	-2.4%	-6.8%	-6.4%	-1.9%	-1.4%	-2.3%
b2. GDP Price	1.4%	1.6%	0.6%	0.2%	0.3%	-0.2%
c. Energy Productivity (=c1-c2)	1.8%	3.4%	-3.0%	-1.4%	-1.1%	-3.8%
c1. Real GDP	0.8%	1.2%	0.0%	0.1%	0.1%	0.1%
c2. Energy Consumption	-1.0%	-2.1%	3.0%	1.5%	1.3%	4.0%
d. Nominal GDP (=b2*c1)	2.2%	2.7%	0.6%	0.3%	0.3%	-0.1%
e. Energy Cost (=b1*c2)	-3.4%	-8.8%	-3.6%	-0.4%	-0.1%	1.6%

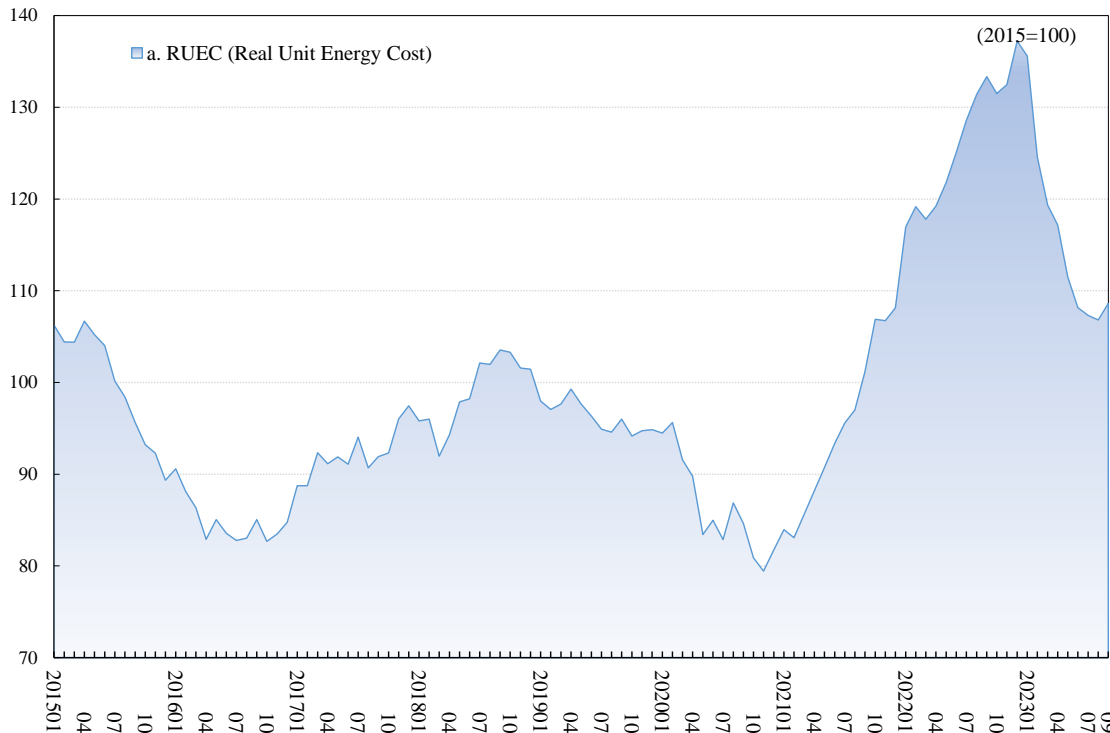
Unit: %. Notes: The most recent month is the forecasts, the previous month is the preliminary estimates, and the last two months or earlier are the final estimates. The aggregate volume indices of real GDP and energy consumption are measured using the translog index, based on the prices and volumes measured at 36 industries and 21 types of energy, respectively. The aggregate price indices of real GDP and energy consumption are defined implicitly.

### 1.2 Indices

	Quarterly index			Monthly index		
	2023Q1	2023Q2	2023Q3	July, 2023	August, 2023	September, 2023
a. RUEC (Real Unit Energy Cost) (=b/c=e/d)	126.5	112.3	107.6	107.3	106.8	108.6
b. Real Energy Price (=b1/b2)	141.5	129.9	120.8	123.0	121.0	118.4
b1. Energy Price	147.1	137.1	128.3	130.5	128.7	125.7
b2. GDP Price	103.9	105.5	106.2	106.1	106.4	106.2
c. Energy Productivity (=c1/c2)	111.8	115.6	112.2	114.5	113.2	108.9
c1. Real GDP	102.6	103.8	103.8	103.7	103.8	103.9
c2. Energy Consumption	91.7	89.8	92.5	90.5	91.7	95.4
d. Nominal GDP (=b2*c1)	106.6	109.6	110.3	110.0	110.4	110.3
e. Energy Cost (=b1*c2)	134.9	123.0	118.6	118.1	117.9	119.9

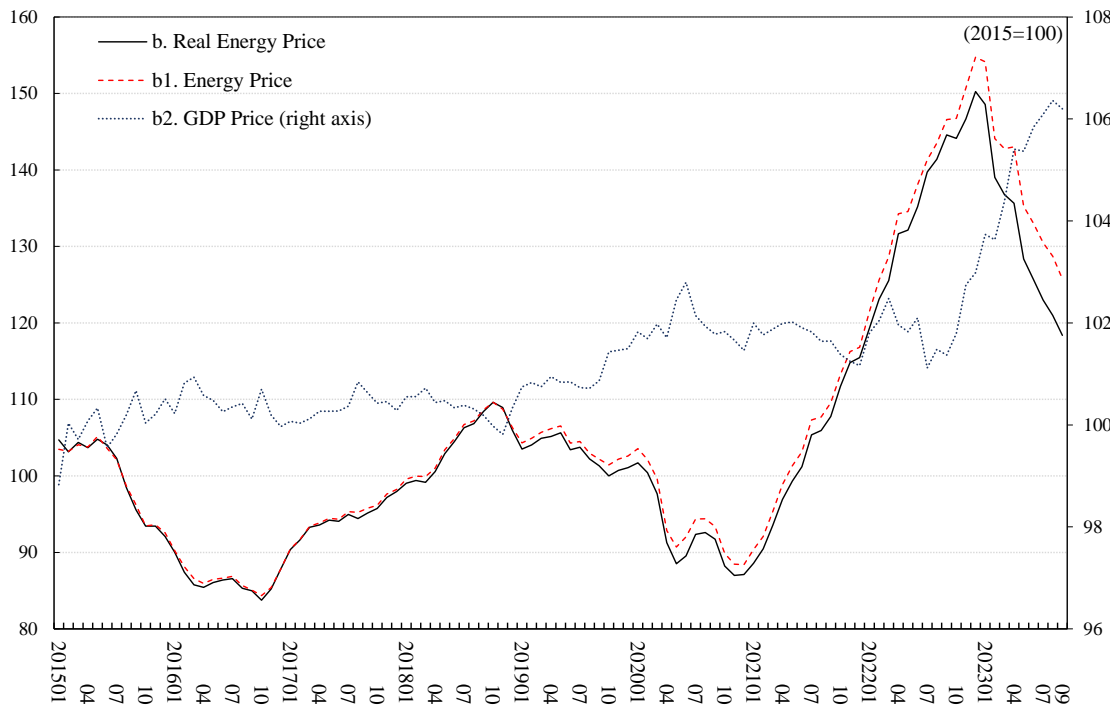
Unit: 2015 average=100.

2 Monthly RUEC (Real Unit Energy Cost)



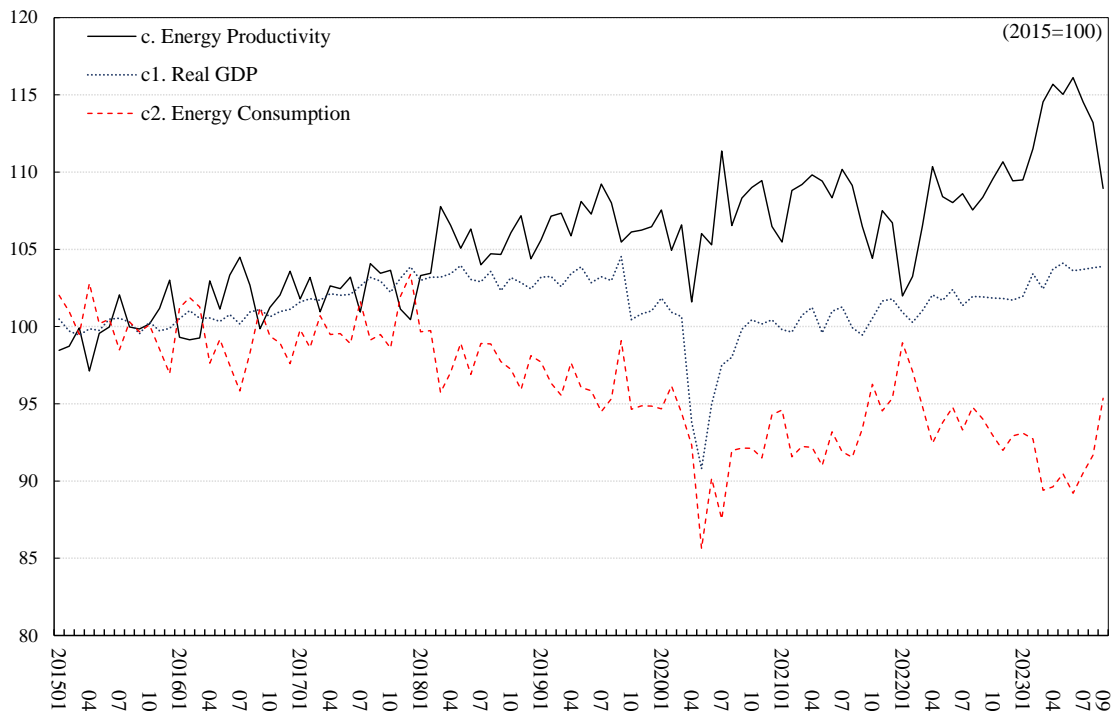
Unit: 2015 average=100. Note: Observation period is from January 2015 to September 2023.

3 Monthly Real Energy Price



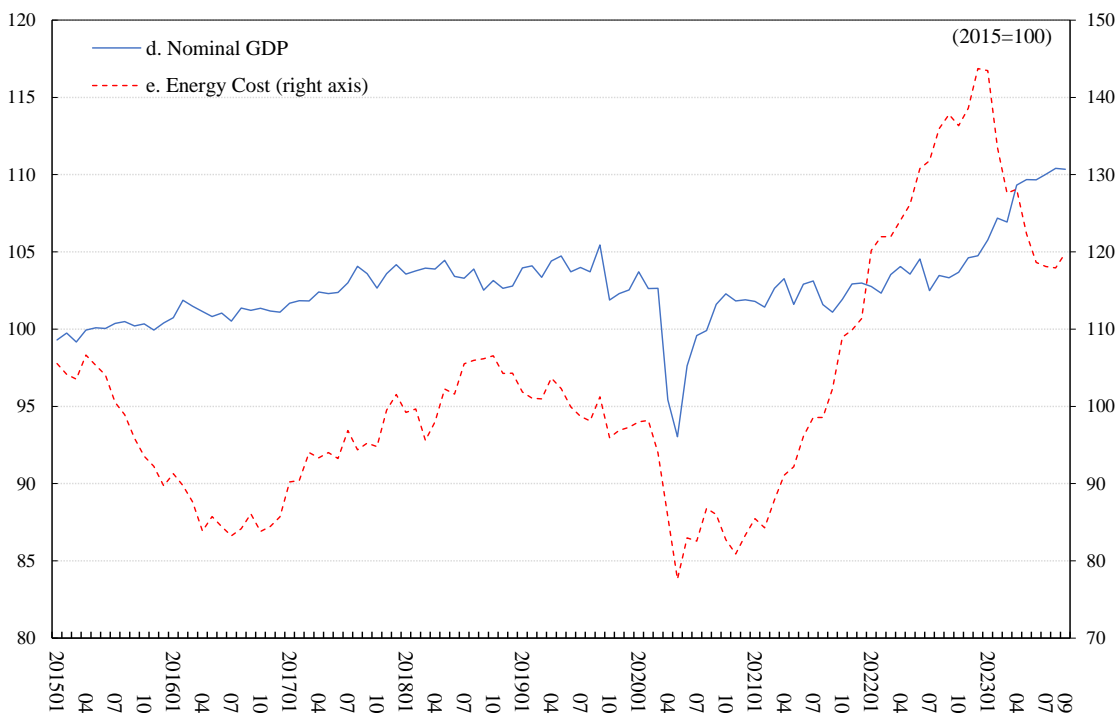
Unit: 2015 average=100. Note: Observation period is from January 2015 to September 2023.

4 Monthly Real GDP and Energy Productivity



Unit: 2015 average=100. Note: Observation period is from January 2015 to September 2023.

5 Monthly Nominal GDP and Energy Cost



Unit: 2015 average=100. Note: Observation period is from January 2015 to September 2023.

6 Data Table

	a. RUEC (Real Unit Energy Cost)							d. Nominal GDP	e. Energy Cost
	b. Real Energy Price			c. Energy Productivity					
		b1. Energy Price	b2. GDP Price		c1. Real GDP	c2. Energy Consumption			
2015	100.0 (.074)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
2016	84.9 (.063)	86.2	86.6	100.4	101.6	100.7	99.2	101.1	
2017	92.2 (.068)	94.4	94.7	100.3	102.3	102.4	100.1	102.8	
2018	99.0 (.073)	104.3	104.6	100.3	105.3	103.1	97.9	103.4	
2019	96.3 (.071)	103.0	104.0	101.0	106.9	102.7	96.0	103.7	
2020	86.4 (.064)	92.4	94.2	101.9	106.9	98.3	91.9	100.2	
2021	95.1 (.070)	102.6	104.4	101.7	108.0	100.6	93.1	102.3	
2022	126.2 (.093)	136.0	138.7	102.0	107.7	101.6	94.3	103.6	
2020 Q1	93.9 (.070)	99.9	101.8	101.8	106.4	101.1	95.1	103.0	
Q2	86.1 (.064)	89.8	91.9	102.3	104.3	93.2	89.3	95.4	
Q3	84.8 (.063)	92.2	94.1	102.0	108.7	98.4	90.5	100.4	
Q4	80.7 (.060)	87.5	88.9	101.7	108.3	100.3	92.6	102.0	
2021 Q1	84.2 (.062)	90.9	92.6	101.9	107.8	100.1	92.8	101.9	
Q2	90.8 (.067)	99.2	101.1	102.0	109.2	100.6	92.1	102.6	
Q3	97.9 (.072)	106.4	108.2	101.7	108.6	100.2	92.3	101.9	
Q4	107.2 (.079)	114.0	115.4	101.3	106.2	101.3	95.4	102.6	
2022 Q1	118.0 (.087)	122.6	125.2	102.1	103.9	100.7	97.0	102.9	
Q2	122.0 (.090)	133.0	135.6	102.0	108.9	102.0	93.7	104.1	
Q3	131.1 (.097)	141.9	143.8	101.3	108.2	101.7	94.0	103.1	
Q4	133.7 (.099)	147.0	150.7	102.5	109.9	101.8	92.6	104.3	
2023 Q1	126.5 (.094)	141.5	147.1	103.9	111.8	102.6	91.7	106.6	
Q2	112.3 (.083)	129.9	137.1	105.5	115.6	103.8	89.8	109.6	
Q3	107.6 (.080)	120.8	128.3	106.2	112.2	103.8	92.5	110.3	
2018 01	95.8 (.071)	99.0	99.6	100.6	103.3	103.0	99.7	103.6	
02	96.0 (.071)	99.4	100.0	100.6	103.5	103.2	99.7	103.8	
03	92.0 (.068)	99.2	99.9	100.7	107.8	103.2	95.7	103.9	
04	94.3 (.070)	100.6	101.0	100.4	106.6	103.4	97.0	103.9	
05	97.9 (.072)	102.9	103.4	100.5	105.1	104.0	98.9	104.5	
06	98.2 (.073)	104.5	104.9	100.3	106.3	103.1	96.9	103.4	
07	102.1 (.076)	106.3	106.7	100.4	104.0	102.9	98.9	103.3	
08	102.0 (.075)	106.8	107.2	100.3	104.7	103.6	98.9	103.9	
09	103.5 (.077)	108.4	108.6	100.2	104.7	102.3	97.7	102.5	
10	103.3 (.076)	109.6	109.6	100.0	106.1	103.2	97.2	103.1	
11	101.6 (.075)	108.9	108.7	99.8	107.2	102.8	95.9	102.6	
12	101.4 (.075)	106.0	106.3	100.3	104.4	102.4	98.1	102.8	
2019 01	98.0 (.073)	103.5	104.3	100.7	105.6	103.2	97.7	104.0	
02	97.1 (.072)	104.1	104.9	100.8	107.1	103.2	96.3	104.1	
03	97.7 (.072)	104.9	105.7	100.7	107.3	102.6	95.5	103.4	
04	99.3 (.073)	105.2	106.2	100.9	105.9	103.4	97.7	104.4	
05	97.7 (.072)	105.6	106.5	100.8	108.1	103.9	96.1	104.7	
06	96.3 (.071)	103.4	104.3	100.8	107.3	102.8	95.8	103.7	
07	94.9 (.070)	103.7	104.5	100.7	109.2	103.2	94.5	104.0	
08	94.6 (.070)	102.2	103.0	100.7	108.0	103.0	95.3	103.7	
09	96.0 (.071)	101.3	102.2	100.9	105.5	104.5	99.1	105.4	
10	94.2 (.070)	100.0	101.4	101.4	106.1	100.4	94.6	101.9	
11	94.7 (.070)	100.7	101.4	101.5	106.2	100.8	94.9	102.3	
12	94.9 (.070)	101.1	102.6	101.5	106.5	101.0	94.9	102.5	
2020 01	94.5 (.070)	101.7	103.6	101.8	107.6	101.8	94.7	103.7	
02	95.6 (.071)	100.4	102.1	101.7	104.9	100.9	96.2	102.6	
03	91.6 (.068)	97.7	99.6	102.0	106.6	100.6	94.4	102.6	
04	89.8 (.066)	91.3	92.9	101.7	101.6	93.8	92.3	95.4	
05	83.4 (.062)	88.5	90.7	102.5	106.0	90.8	85.6	93.0	
06	85.0 (.063)	89.5	92.0	102.8	105.3	95.0	90.2	97.6	
07	82.9 (.061)	92.4	94.4	102.1	111.4	97.5	87.5	99.6	
08	86.9 (.064)	92.6	94.4	101.9	106.5	98.0	92.0	99.9	
09	84.6 (.063)	91.7	93.4	101.8	108.3	99.8	92.1	101.6	
10	80.9 (.060)	88.2	89.9	101.8	109.0	100.4	92.1	102.3	
11	79.4 (.059)	87.0	88.5	101.7	109.5	100.2	91.5	101.8	
12	81.8 (.061)	87.1	88.4	101.5	106.5	100.4	94.3	101.9	
2021 01	83.9 (.062)	88.6	90.4	102.0	105.5	99.8	94.6	101.8	
02	83.1 (.062)	90.5	92.1	101.8	108.8	99.7	91.6	101.4	
03	85.6 (.063)	93.6	95.3	101.9	109.2	100.7	92.2	102.6	
04	88.2 (.065)	96.9	98.9	102.0	109.8	101.2	92.2	103.3	
05	90.7 (.067)	99.3	101.3	102.0	109.4	99.6	91.0	101.6	
06	93.4 (.069)	101.2	103.1	101.9	108.3	101.0	93.2	102.9	
07	95.6 (.071)	105.4	107.3	101.8	110.2	101.3	91.9	103.1	
08	97.0 (.072)	105.9	107.7	101.6	109.1	99.9	91.5	101.6	
09	101.2 (.075)	107.8	109.6	101.6	106.5	99.5	93.4	101.1	
10	106.9 (.079)	111.7	113.2	101.4	104.4	100.5	96.3	101.9	
11	106.7 (.079)	114.8	116.3	101.3	107.5	101.7	94.5	102.9	
12	108.1 (.080)	115.5	116.8	101.2	106.7	101.8	95.4	103.0	
2022 01	116.9 (.087)	119.3	121.5	101.8	102.0	100.9	98.9	102.8	
02	119.2 (.088)	123.1	125.6	102.0	103.2	100.3	97.1	102.3	
03	117.8 (.087)	125.5	128.7	102.5	106.5	101.0	94.8	103.5	
04	119.2 (.088)	131.7	134.3	102.0	110.4	102.0	92.5	104.1	
05	121.8 (.090)	132.1	134.6	101.8	108.4	101.7	93.8	103.6	
06	125.1 (.093)	135.2	138.1	102.1	108.0	102.4	94.8	104.5	
07	128.6 (.095)	139.7	141.3	101.1	108.6	101.4	93.3	102.5	
08	131.4 (.097)	141.4	143.5	101.5	107.5	102.0	94.8	103.5	
09	133.3 (.099)	144.6	146.6	101.4	108.4	101.9	94.0	103.3	
10	131.5 (.097)	144.1	146.7	101.8	109.6	101.9	93.0	103.7	
11	132.5 (.098)	146.7	150.7	102.7	110.7	101.8	92.0	104.6	
12	137.2 (.102)	150.2	154.8	103.0	109.4	101.7	92.9	104.8	
2023 01	135.6 (.100)	148.6	154.1	103.7	109.5	102.0	93.1	105.8	
02	124.6 (.092)	139.0	144.1	103.6	111.5	103.4	92.7	107.2	
03	119.3 (.088)	136.8	142.8	104.4	114.5	102.4	89.4	106.9	
04	117.2 (.087)	135.7	143.0	105.4	115.7	103.7	89.6	109.3	
05	111.5 (.083)	128.4	135.3	105.4	115.0	104.1	90.5	109.7	
06	108.1 (.080)	125.7	133.0	105.8	116.1	103.6	89.2	109.7	
07	107.3 (.079)	123.0	130.5	106.1	114.5	103.7	90.5	110.0	
08	106.8 (.079)	121.0	128.7	106.4	113.2	103.8	91.7	110.4	
09	108.6 (.080)	118.4	125.7	106.2	108.9	103.9	95.4	119.9	

Unit: 2015 average=100. Note: The numbers in parentheses are the ratio of final energy consumption cost to GDP at current prices.