

621.317

. . . , . . .

23:00 07:00,

(2011

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01.2014

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, 100 .

 $90,0/30,8 = 2,92$.

100 .

600 .

 $- 122,83/41,9 = 2,93$.

()

 $600 - 168/134 = 1,25$

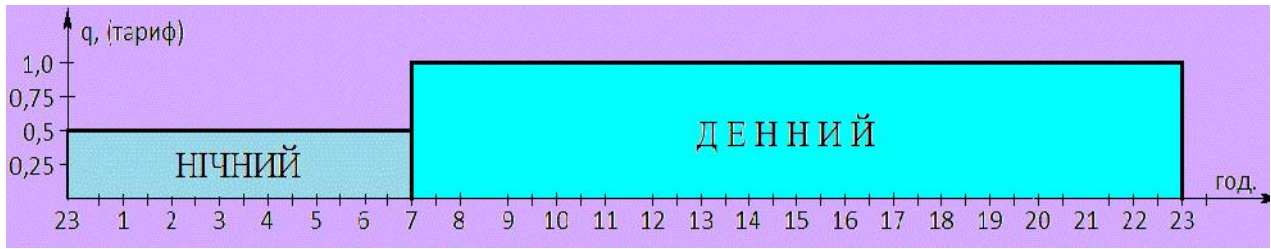
(.1).

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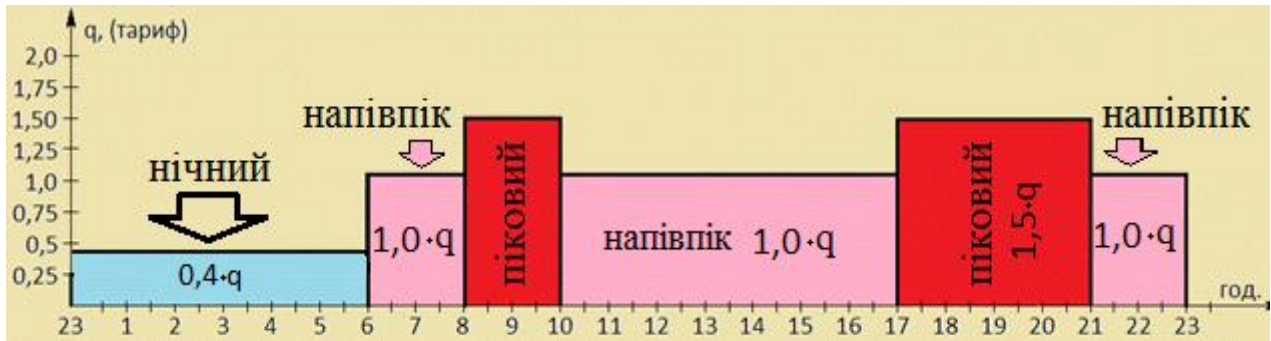
2015-2017 . /(.)

/'		01.2014	04. 2015	09.2015	03.2016	06.2016	03.2017
1	100	30,8	36,6 +19 %	45,6 +25 %	57,6 +25 %	71,4 +25 %	90,0 +26 %
2	100 600	41,9	63,0 +50 %	78,9 +25 %	99,0 +25 %	129,0 +30 %	168,0 +30 %
3	600	134,0	140,7 +5 %	147,9 +5 %	156,0 +5 %	163,8 +5 %	168,0 +5 %

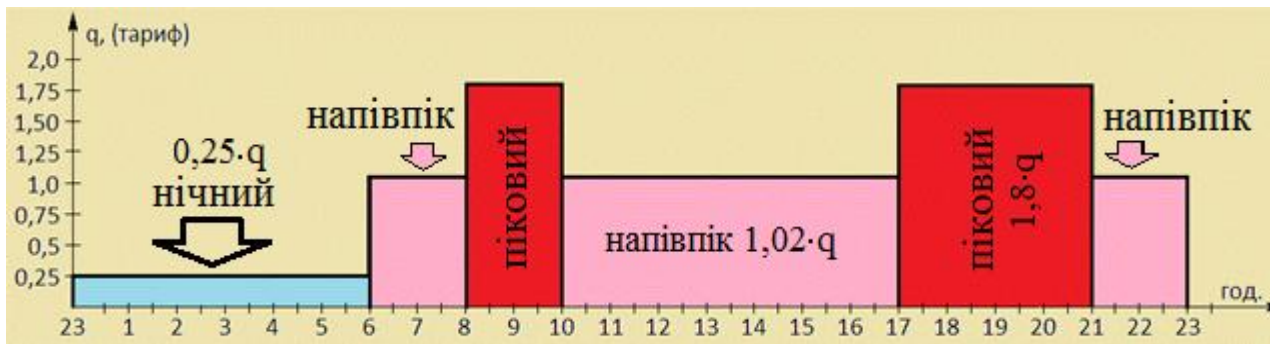
[1-10] -



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- 100 .),

03.2017 . ($q_1 = 90$./(. .))
 (. . .2 4). $q_1 -$;
 , $q_1 = 0,90$ /(. .).
 1, 2 3
 . 1;
 $I_1 = q_1 \cdot W = 0,90 \cdot 96 = 86,4$, (1) $W -$, . . .

2

	-	1	2	3	4
		1000	0	500	32
		0	1000	500	64
	-	1000	1000	1000	96
	1	100	100	100	96
	2	500	500	500	0
	3	400	400	400	0
	-	0,5	0,5	0,5	0,5
	-	1,0	1,0	1,0	1,0
	-	-	-	-	-
1 (100 . .), q_1	100	90	90	90	96
2 (600 . .), q_2	600	168	168	168	0
3 (600 . .), q_3	600	168	168	168	0
:	-	-	-	-	-
:	-	-	-	-	-
$K = (1000 \cdot 0,5 + 0 \cdot 1) / 1000 =$	-	0,5	1	0,75	0,833

100	-	-	-	-	-
$q_1 = 90$ / ()	-	-	-	-	-
$q_1 = 0,5 \cdot 100 \cdot 90 / 100 =$	-	45	90	67,5	72,0
100	-	-	-	-	-
$q_2 = 168$ / (·)	-	-	-	-	-
$q_2 = 0,5 \cdot 500 \cdot 168 / 100 =$	-	420	840	630	0,00
600	-	-	-	-	-
$q_3 = 168$ / (·)	-	-	-	-	-
$q_3 = 0,5 \cdot 400 \cdot 168 / 100 =$	-	336	672	504	0,00
:	-	-	-	-	-
$C_\Sigma = 45 + 420 + 336 =$	-	801	1602	1201,5	72,0

.2

	-	1602	1602	1602	86,4
,	-	801	0	400,5	14,4
, %	-	50	0	25	16,7

Δ % Δ %

$q_2 = q_1 \cdot (W \cdot 0,5 + W) =$ (2) $(\cdot \cdot 0,5)$
 $= 0,9 \cdot (32 \cdot 0,5 + 64) = 72,0$ $\Delta \% = 0,5 \cdot \Delta \%$

$\Delta = q_1 - q_2 = 86,4 - 72,0 =$.3.
 $= 14,4$ 16,7 %.

.4 .2): - 801 (50 %), - 100 (), ,
 - 0 (0 %), - 400,5 (25 %).

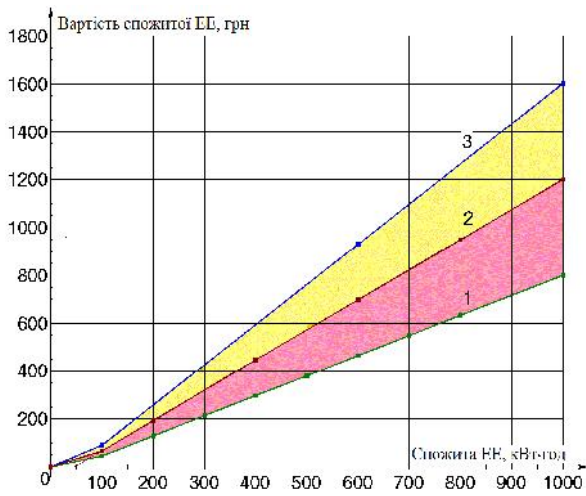
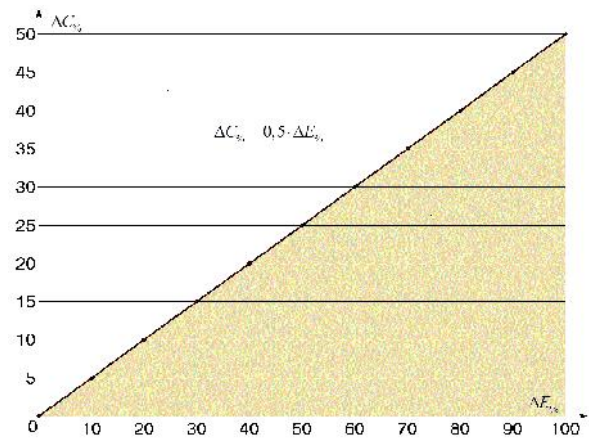
4,32 5 %.

0 % (, -

23 7) 50 % (.4, - .6.

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1600
1000
(. . . 6 . .),
1,2 3



. 5.
Δ %
Δ %

(. . . 6 . . 1 . 4).

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1000
. 1600
100 % ,

(1600-800 = 800 -

. 4.
: 1) 23 7 ; 2)
, ; 3) 7
23

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3

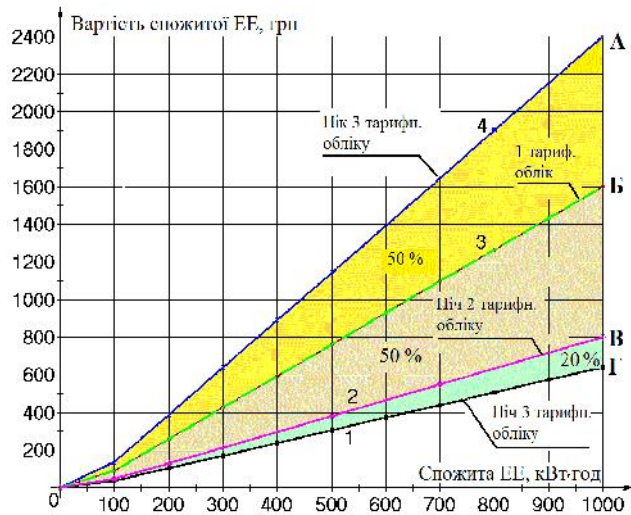
	-	1	2	3	4
		0	1000	333,3	24
		0	0	333,3	44
		1000	0	333,3	28
	-	1000	1000	1000	96
	1	100	100	100	96
	2	500	500	500	0
	3	400	400	400	0

	–	1,5	1,5	1,5	1,5
	–	1,0	1,0	1,0	1,0
	–	0,4	0,4	0,4	0,4
	–	–	–	–	–
1 (100 ·), q_1	100	90	90	90	96
2 (600 ·), q_2	500	168	168	168	0
3 (600 ·), q_3	400	168	168	168	0
:	–	–	–	–	–
:	–	–	–	–	–
$K = (24 \cdot 1,5 + 44 \cdot 1 + 28 \cdot 0,4) / 96 =$	–	0,4	1,5	0,97	0,95
100 ·	–	–	–	–	–
$q_1 = 90 / ()$	–	–	–	–	–
:	–	–	–	–	–
$q_1 = 0,95 \cdot 96 \cdot 90 / 100 =$	–	36 .	135 .	87,0	82,08 .
100	–	–	–	–	–
$q_2 = 168 / (\cdot)$	–	–	–	–	–
:	–	–	–	–	–
$q_2 = 0,95 \cdot 0 \cdot 168 / 100 =$	–	336 .	1260 .	812	0 .
600	–	–	–	–	–
$q_3 = 168 / (\cdot)$	–	–	–	–	–
:	–	–	–	–	–
$q_3 = 0,95 \cdot 0 \cdot 168 / 100 =$	–	268,8	1008 .	649,5	0 .
:	–	–	–	–	–
$C_{\Sigma} = 82,08 + 0 + 0 =$	–	640,8 .	2403	1548,5	82,08 .

	-	1602	1602	1602	86,4
,	-	961,2	-801	53,5	4,32
, %	-	60	-50	3,34	5,0

4

	100	300	400	500	600	700	800	900	1000
	90	426	594	762	930	1098	1266	1434	1602
	90	426	594	762	930	1098	1266	1434	1602
	45	213	297	381	465	549	633	717	801
	45	213	297	381	465	549	633	717	801
, %	50 %	50 %	50 %	50 %	50 %	50 %	50 %	50 %	50 %
	135	639	891	1143	1395	1647	1899	2151	2403
	90	426	594	762	930	1098	1266	1434	1602
	36	170,4	237,6	304,8	372	439,2	506,4	573,6	640,8
-1	54	255,6	356,4	457,2	558	658,8	759,6	860,4	961,2
-1 , %	60	60	60	60	60	60	60	60	60
-1	45	213	297	381	465	549	633	717	801
-1 , %	50	50	50	50	50	50	50	50	50
	99	486,6	653,4	838,2	1023	1207,8	1392,6	1577,4	1762,2
	73,3	73,3	73,3	73,3	73,3	73,3	73,3	73,3	73,3



50 %, 2
 . 6 -
 :)
 (3 1)
 2,5
 ;)
 (3 4) -
 1,5
 3-
 3-
 (4 1)
 73,3 %
 3,75

. 6. : 1 -
 ; 2 -
 ; 3 -
 4 -

5.

2-

100	50	6,30	1
0	150	2,10	2
135	65	4,30	3
167	83	3,20	4
200	100	2,58	5
240	120	1,82	6

1 2) 20%,
 1,25
 (1800) 400
 (. . 5). 4,3 (3)
 1. , (7:00 23:00)
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 (. . 4,).
 2.
 3. 23:00 07:00 ,

1. // Delo.ua. - [] - : <https://delo.ua/business/pochemu-gosudarstvo-podderzhivaet-perehod-na-osoznanoe-potreble-322196/>

2. Delo.ua. Buildportal. - [] - : <http://budport.com.ua/news/3305-naskolko-vygodno-ukraincam-perehodit-na-mnogozonelektroschetchiki>

3. // - 2005. 3. - 16-19.

4. // - 2002. - 520.

5. // - 1999. - 6. - 8-10.

6. // VI « 2014 . [] - : <http://www.scienceforum.ru/2014/763/6192>

7. C [] - : <http://www.radiodvd.jino-net.ru/>

8. XXI : / . . . , 2004 – 364 .

9. Sendin, A.; Berganza, I.; Arzuaga, A.; Osorio, X.; Urrutia, I.; Angueira, P. Enhanced Operation of Electricity Distribution Grids Through Smart Metering PLC Network Monitoring, Analysis and Grid Conditioning. *Energies* 2013, 6, 539–556.

10. Deconinck G., Decroix B.: “Smart Metering Tariff Schemes combined with distributed energy resources”, *ESAT/ELECTA, Critical Infrastructures, CRIS* 2009.

References

1. Ilchenko V. Nochnaya konomyya: Shto daet gosudarstvu i Ukraintsam perehod na mnohozonnnye lektroschetkyki / V.Ilchenko // Delo.ua [Electronic resource] <https://delo.ua/business/pochemu-gosudars tvo-podderzhivaet-perehod-na-osoznannoe-potreble-32 2196/>
2. Delo.ua. Naskolko vyhodno Ukraintsam perehodit na mnohozonnnye lektroschetkyki / Buildportal. [Electronic resource] <http://budport. com.ua/news/3305-naskolko-vygodno-ukraincam-pere hodit-na-mnogozonnnye-elektroschetkyki>
3. Tarasenko M.G. Energy multirate electricity metering, which are used for outdoor lighting [Enerhoefektyvnist' bahatotaryfnoho obliku elektroenerhiyi, yaka vykorystovuyut'sya dlya zovnishn'oho osvitlennya]/ M.G. Tarasenko // Elektroinform. – 2005. 3. – P. 16-19.
4. Avdeeva N.L. The problems of energy saving and evaluation of its scope in the field of final consumption [Problemy sberezhennya jenergoresursov i ocnka ego masshtabov v sfere konechnogo potreblennya] / N.L. Avdeeva, T.B. Isadskaja // Jelektrojenergetika Rossii: sovremennoe sostojanie, problemy i perspektivy: Sb. nauchn. tr. M.: Jenergoatomizdat. – 2002. – 520 p.
5. Dubinskij E.V. Multitariff accounting of electricity an important prerequisite for its conservation and optimization of energy systems [Mnogotarifnyj uchet jelektrojenergii vazhnaja predposylka ee jekonomii i optimizacii raboty jenergosistemy] / E.V. Dubinskij // Jenergosberezhennje. – 1999. – 6. – P. 8-10.
6. Rahmanin E.G., Monogarov S.I. History of the development and trends in the development of electric power metering counters. [Istorija razvitija i tendencii razvitija schjotchikov uchjota jelektricheskoy jenergii]. Materials of the VI International Student Electronic Scientific Conference "Student Scientific Forum" February 15 - March 31, 2014. <http://www.sciencforum.ru/2014/763/6192>
7. Modern digital electricity meters accounting [Covremennye cifrovye schjotchiki uchjota jelektrojenergii] KIIPIA Soft Electronic resource] <http://www.radiodvd.jino-net.ru/>
8. Podkoval'nikov S.V. Energy XXI century: energy systems and management. [Jenergetika XXI veka: sistemy jenergetiki i upravlenie imi]. / S.V. Podkoval'nikov, S.M. Senderov, V.A. Stennikov. – Novosibirsk: Nauka, 2004 – 364 p.
9. Sendin, A.; Berganza, I.; Arzuaga, A.; Osorio, X.; Urrutia, I.; Angueira, P. Enhanced Operation of Electricity Distribution Grids Through Smart Metering PLC Network Monitoring, Analysis and Grid Conditioning. Energies 2013, 6, 539–556.
10. Deconinck, G. Decroix B.: "Smart Metering Tariff Schemes combined with distributed energy resources", ESAT/ELECTA, Critical Infrastructures, CRIS 2009.

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23:00 07:00,

**ECONOMIC EFFECTIVENESS OF MULTIPLE-TARIFF ACCOUNTING OF
ELECTRIC ENERGY IN UKRAINE****M.G. Tarasenko, K.M. Kozak***Ternopil National Technical University I. Pulyuya, Ukraine*

It has been established that applying a single-rate counter the consumer has not any motivation on when and what consumers of electric energy to turn overnight. In the case of multi-tariff counter, when the night is an opportunity to save money, there is some motivation. For user is enough to change the order of the day and he will get real savings to cover the cost for electricity. Thus, not only subscribers will pay less for electricity consumed at night, but also, they will contribute to leveling the load on the energy system. The application of multi-accounting in enterprises fully justified only if the technological process of manufacturing production is only at night. These bakeries, dry cleaning, laundry and more. Other companies are forced to adapt to our biological rhythms and cannot shift their power at night. In domestic use, multi-accounting has more nuances. It has been established that for the urban population the best is multiple-tariff accounting of electric energy in which exclude the possibility to pay for consumed electricity bigger than by using single tariff counters. But the economic effect of using multiple-tariff accounting of electric energy not everyone will feel the same way. The greater the volume of consumption and the most of them will be in the period between 23:00 and 07:00, the greater will be the benefit to the consumer. There has been proposed an analytical expression for determining the percentage of saving financial resources from the portion of electricity consumption at the night time periods by using multi-tariff accounting.

Keywords: multi-tariff, accounting, electricity, payback, counter, energy saving.