# Regulation quality of electricity supply in Ukraine

# Legislative framework

- Electricity Law with changes of 05.07.2012:
  - Regulator approves continuity of supply and commercial quality indicators
- Regulator Law (in force from 26.11.2016)
- Electricity Market Law (adopted by Parliament 13.04.2017, has not come into force yet):
  - Regulator's powers are expanding on Power Quality Regulation

# Implementation of a service quality monitoring system

- In 2005 NERC started the implementation of a service quality monitoring system:
  - 06.07.2006 - implementing the monitoring of indicators of the electricity supply continuity and commercial service quality (NERC's Resolution №68-p)
  - In the framework of a Twinning Project, with the assistance of the Italian Regulator AEEG, the monitoring forms were finalized in 2007
- Reporting forms (NERC's Resolution №1015 from 25.07.2013):
  - № 11-NERC (quarterly) "Report on indicators of continuity of electricity supply"
  - № 12-NERC (quarterly) "Report on indicators of the commercial quality".

# 2. Continuity of supply

# Continuity of supply indicators (DSO)

- Classification of interruption:
  - Due to:
    - Planned with notification(10 days before)
    - Planner without notification
    - Interference of other licencees and consumers
    - Force majeure
    - Third party interference
    - Technical causes

  *Responsibility of DSO's*

  - By duration: short (< 3 min) and long (≥ 3min)
  - By voltage level: 110/150 кV, 27,5-35 кV, 6-10 кV, 0,4 кV
  - By territorial density: rural and urban
- Each DSO has to maintain and send to the NEURC Registers of interruptions in electricity supply
- Continuity of supply indicators: SAIDI, SAIFI, ENS, MAIFI

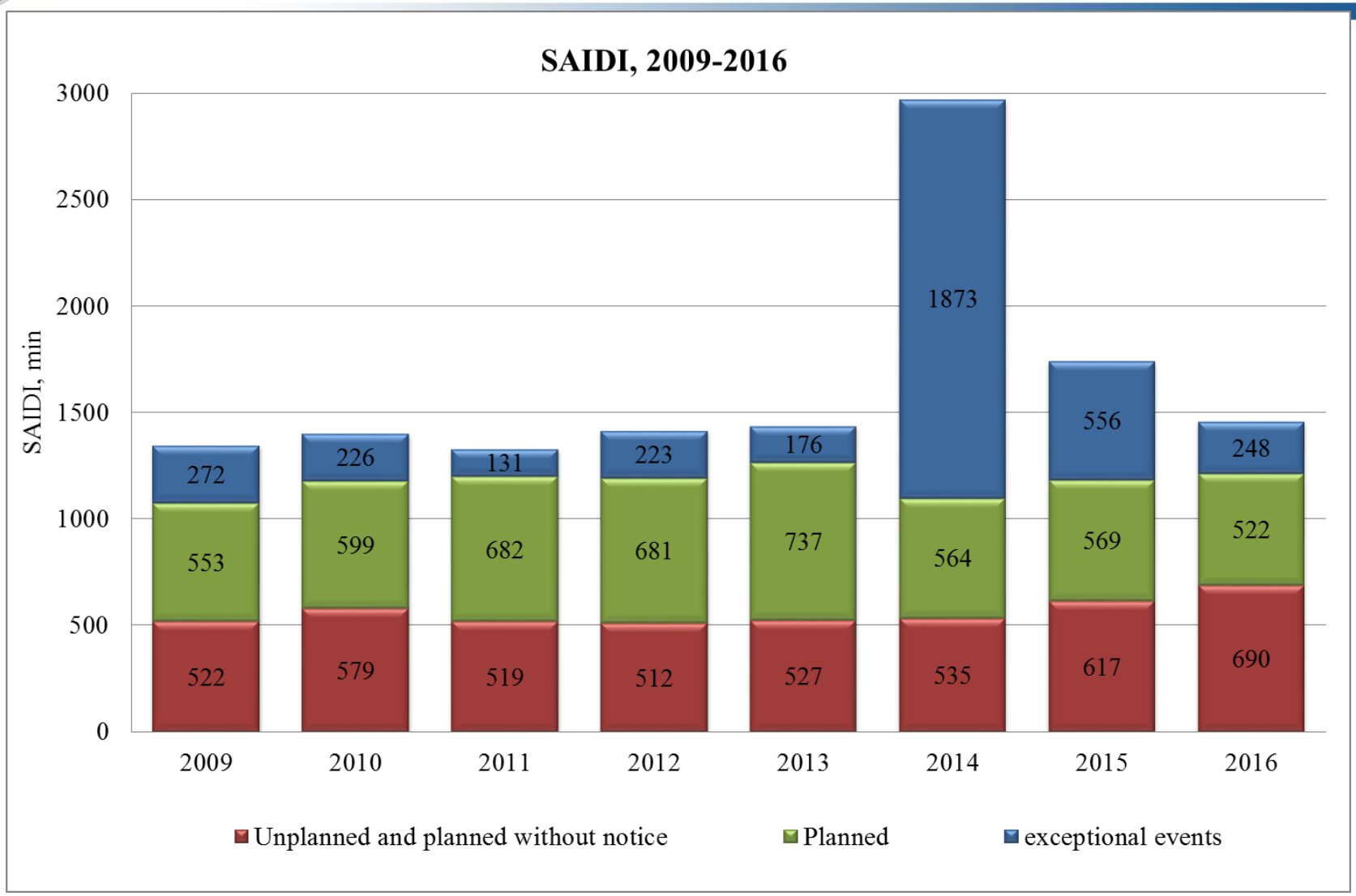
# Register of interruptions in electricity supply

| № | Code of source of information | Equipment name | Voltage level | | | | Classification of interruptions | | | | | | Date and start time of interruption dd.mm.yyyy hh:mm | Date and time of end of interruption dd.mm.yyyy hh:mm | Duration, min. | Type of interruption | Voltage level 0,4 кV | | | | Voltage level 6 - 20 кV | | Voltage level 27,5 – 35 кV | Voltage level 110 / 154 кV | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | planned | | unplaned | | | | | | | | urban | | rural | | urban | rural | | | |
| | | | 110 - 154 kV | 27,5 - 35 kV | 6 - 20 kV | 0,4 kV | with notice | without notice | the fault of other licensees or consumers | force majeure | the fault of others entities | technical network problems | | | | | own transformers 35-6/0,4, number. | selling points on voltage level 0,4кV, number. | own transformers 35-6/0,4, number. | selling points on voltage level 0,4кV, number. | selling points, number. | selling points, number. | selling points, number. | selling points, number. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| Total: 8 interruptions | | | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 3 | | | 2 076 | l-7/sh-1 | 14 | 1 118 | 9 | 748 | 67 | 6 | 10 | 2 | |
| 1 | 05 | | X | | | | | | | | | X | 01.06.2008 11:01 | 01.06.2008 11:10 | 9 | long | 4 | 200 | 2 | 258 | 25 | | 5 | 1 | |
| 2 | 05 | | X | | | | | | | | | X | 05.06.2008 10:10 | 05.06.2008 10:13 | 3 | long | 4 | 200 | 2 | 258 | 25 | | 5 | 1 | |
| 3 | 04 | | | X | | | X | | | | | | 05.06.2008 16:00 | 05.06.2008 20:10 | 250 | long | 2 | 108 | | | 12 | | | | |
| 4 | 04 | | | X | | | | X | | | | | 08.06.2008 10:00 | 09.06.2008 12:50 | 1 610 | long | 1 | 100 | 2 | 52 | | 5 | | | |
| 5 | 04 | | | | X | | | | | X | | | 10.06.2008 07:01 | 10.06.2008 07:02 | 1 | short | 2 | 100 | 2 | 40 | 5 | 1 | | | |
| 6 | 04 | | | | X | | | | X | | | | 11.06.2008 21:01 | 11.06.2008 22:10 | 69 | long | 1 | 250 | 1 | 120 | | | | | |
| 7 | 05 | | | | | X | | | | | | X | 21.06.2008 21:00 | 21.06.2008 23:11 | 131 | long | [1] | 160 | | | | | | | |
| 8 | 05 | | | | | X | | X | | | | | 30.06.2008 11:01 | 30.06.2008 11:04 | 3 | long | | | [1] | 20 | | | | | |

# Continuity of supply indicators - 2016

| Voltage level | SAIDI | | | | | | | SAIFI | | | | | | | ENS | | | | | | | MAIFI | | | | | | | Selling points, numbers | Energy consumption, ths. kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | planned | | unplaned | | | | Total | planned | | unplaned | | | | Total | planned | | unplaned | | | | Total | planned | | unplaned | | | | Total | | |
| | with notice | without notice | the fault of other licensees or consumers | force majeure | the fault of others entities | technical network problems | | with notice | without notice | the fault of other licensees or consumers | force majeure | the fault of others entities | technical network problems | | with notice | without notice | the fault of other licensees or consumers | force majeure | the fault of others entities | technical network problems | | with notice | without notice | the fault of other licensees or consumers | force majeure | the fault of others entities | technical network problems | | | |
| 110 / 154 кV | 1,4 | 5,3 | 2,9 | 5,5 | 0,1 | 5,7 | **20,9** | 0,02 | 0,05 | 0,04 | 0,03 | 0,00 | 0,11 | **0,25** | 151,3 | 794,5 | 482,4 | 1471,2 | 53,9 | 845,6 | **3798,9** | 0,007 | 0,018 | 0,001 | 0,001 | 0,000 | 0,009 | **0,036** | 826 | 28009135,060 |
| 27,5 - 35 кV | 28,6 | 11,3 | 1,8 | 10,6 | 1,5 | 17,8 | **71,5** | 0,12 | 0,21 | 0,01 | 0,07 | 0,01 | 0,22 | **0,65** | 4642,9 | 1960,0 | 469,6 | 1398,3 | 159,9 | 2294,3 | **10924,9** | 0,004 | 0,064 | 0,000 | 0,004 | 0,001 | 0,009 | **0,081** | 2 073 | 4391169,877 |
| 6 - 20 кV | 401,9 | 243,6 | 28,3 | 160,3 | 19,2 | 301,6 | **1 154,8** | 1,86 | 3,11 | 0,18 | 0,53 | 0,15 | 2,42 | **8,26** | 41990,3 | 28259,1 | 6041,9 | 15158,6 | 2094,2 | 37115,2 | **130659,4** | 0,107 | 0,591 | 0,007 | 0,042 | 0,006 | 0,410 | **1,162** | 86 940 | 22501865,78 |
| urban | 236,4 | 167,7 | 25,2 | 47,3 | 10,7 | 215,0 | **702,4** | 1,21 | 2,64 | 0,18 | 0,31 | 0,13 | 2,11 | **6,58** | 18290,1 | 14648,2 | 4085,3 | 4164,6 | 879,2 | 20291,0 | **62358,5** | 0,051 | 0,468 | 0,005 | 0,020 | 0,005 | 0,221 | **0,769** | 53 635 | 18341628,499 |
| rural | 642,2 | 382,5 | 39,4 | 407,0 | 39,9 | 416,2 | **1 927,2** | 2,86 | 3,82 | 0,21 | 0,79 | 0,19 | 2,81 | **10,67** | 23700,2 | 13610,9 | 1956,6 | 10994,0 | 1215,0 | 16824,2 | **68300,9** | 0,172 | 0,698 | 0,009 | 0,066 | 0,008 | 0,637 | **1,590** | 33 305 | 4160237,282 |
| 0,4 кV | 90,0 | 63,0 | 3,4 | 12,7 | 2,0 | 42,1 | **213,2** | 0,35 | 0,47 | 0,03 | 0,04 | 0,01 | 0,33 | **1,22** | 7816,9 | 5681,7 | 351,8 | 1160,6 | 176,5 | 3833,3 | **19020,9** | 0,000 | 0,002 | 0,000 | 0,000 | 0,000 | 0,002 | **0,004** | 17 850 446 | 51023362,02 |
| urban | 72,6 | 56,2 | 4,1 | 10,6 | 1,9 | 35,3 | **180,7** | 0,30 | 0,46 | 0,04 | 0,03 | 0,01 | 0,30 | **1,14** | 4334,3 | 3539,4 | 295,5 | 681,3 | 118,1 | 2385,8 | **11354,4** | 0,000 | 0,002 | 0,000 | 0,000 | 0,000 | 0,002 | **0,004** | 11 407 865 | 35945755,823 |
| rural | 113,2 | 75,3 | 1,6 | 15,4 | 2,0 | 48,5 | **255,9** | 0,42 | 0,50 | 0,01 | 0,05 | 0,01 | 0,33 | **1,32** | 3482,7 | 2142,3 | 56,3 | 479,3 | 58,4 | 1447,5 | **7666,5** | 0,000 | 0,002 | 0,000 | 0,000 | 0,000 | 0,001 | **0,004** | 6 442 581 | 15077606,202 |
| **Total** | **521,8** | **323,3** | **36,4** | **189,0** | **22,7** | **367,2** | **1 460,4** | **2,35** | **3,84** | **0,26** | **0,67** | **0,17** | **3,09** | **10,38** | **54601,4** | **36695,3** | **7345,7** | **19188,8** | **2484,5** | **44088,4** | **164404,1** | **0,119** | **0,674** | **0,008** | **0,046** | **0,007** | **0,429** | **1,283** | **17 940 285** | **105925532,7** |

# SAIDI, 2009-2016



# 2.1 Q-factor in incentive regulation formula

# SAIDI in incentive regulation formula

- Determined by NERC's resolutions №1009 from 23.07.2013, №1032 from 26.07.2013.
- Target: achieve SAIDI (0,4-20 кV) to 150 minutes (for urban areas) and 300 minutes (for rural areas) for 8 years from the date of transition to incentive regulation
- Maximum penalty – 1% of the income
- ***Incentive regulation does not apply***

# Q-factor

$$Q = (SAIDI_{target} - SAIDI_t) \times P \times \frac{E_t}{365 \times 24 \times 60}$$

where:

$SAIDI_{target}$ - target SAIDI. Calculated yearly taking into account the average SAIDI for 3 years before transition to incentive regulation and target 150/300 min.

$SAIDI_t$ - actual SAIDI in year $t$.

$P$ – price of energy not supplied.

$E_t$ - energy distributed in year $t$.

If $\left(SAIDI_{target} - SAIDI_t\right) > 0$ $then$ $Q = 0$

# 3. Commercial quality

# Commercial quality indicators

- Each company has to maintain and send to the NEURC:
  - Register of the written requests by households
  - Register of the provided services
- Commercial quality indicators:
  - The number of cases
  - Average time
  - % of cases in which the time limits were not fulfilled

# Register of the provided services

| № | Code of service | Code of source of information | Information about consumer | | | | Date of beginning dd.mm.yyyy | Delay of the fault of the consumer | | Date of execution dd.mm.yyyy | Duration (without duration of delay) | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Customer name | Address | Phone | other | | cal. days | work. days | | cal. days | work. days | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| Total: 7 | | | | | | | | | | | 7 | | |
| 1 | S1.4.1 | 9Ж | Consumer 1 | | | | 04.01.2013 | 2 | 2 | 08.01.2013 | 2 | 3 | |
| 2 | S1.4.1 | 9Ж | Consumer 2 | | | | 04.01.2013 | 26 | 21 | 01.02.2013 | 2 | 3 | |
| 3 | S3.2 | 16Пр | Consumer 3 | | | | 11.01.2013 | 1 | 1 | 31.01.2013 | 19 | 15 | |
| 4 | S3.2 | 16Пр | Consumer 4 | | | | 11.01.2013 | | | 18.01.2013 | 7 | 6 | |
| 5 | S1.1 | 12017 | Consumer 5 | | | | 16.01.2013 | | | 25.01.2013 | 9 | 8 | |
| 6 | S1.1 | 12017 | Consumer 6 | | | | 16.01.2013 | | | 25.01.2013 | 9 | 8 | |
| 7 | S1.1 | 12017 | Consumer 7 | | | | 15.01.2013 | | | 29.01.2013 | 14 | 11 | |

# Commercial quality indicators - 2016

| | Indicators | Number | Time limit | Non-compliance percentage |
|---|---|---|---|---|
| S1 | Providing access to the distribution network: | 279469 | | |
| S1.1 | delivery of technical specifications: | 86480 | | |
| S1.1.1 | without the need to negotiate with the TSO | 85687 | 15 working days | 0,3% |
| S1.1.2 | In case of need to negotiate with the TSO | 793 | 30 working days | 0,0% |
| S1.2 | connection of customer's appliances to the network | 45256 | | |
| S1.2.1 | standard connection (simple works): | 41061 | | |
| S1.2.1.1 | without the need to interrupt supply of other customers | 20822 | 5 days | 2,4% |
| S1.2.1.2 | in case of the need to interrupt supply of other customers | 20239 | 10 days | 2,4% |
| S1.2.2 | nonstandard connection: | 4159 | | |
| S1.2.2.1 | without the need to interrupt supply of other customers | 1822 | 5 days | 5,4% |
| S1.2.2.2 | in case of the need to interrupt supply of other customers | 2337 | 10 days | 9,5% |
| S1.2.3 | appliances for RES-generation: | 36 | | |
| S1.2.3.1 | without the need to interrupt supply of other customers | 13 | | 0,0% |
| S1.2.3.2 | in case of the need to interrupt supply of other customers | 23 | | 0,0% |
| S1.3 | reconnection of consumer's appliances to the network after disconnection (non-households) | 11326 | 5 working days | 0,9% |
| S1.4 | reconnection of consumer's appliances to the network after disconnection (households) | 136407 | | |
| S1.4.1 | urban | 104702 | 3 days | 1,4% |
| S1.4.2 | rural | 31705 | 7 days | 1,6% |
| S2 | Submission of draft contract on electricity supply for review: | 27402 | | |
| S2.1 | for customers (non-households) with the connected capacity of up to 150 kW | 25677 | 7 working days | 2,5% |
| S2.2 | for customers (non-households) with the connected capacity of 150 kW and over | 1725 | 14 working days | 0,5% |
| S3 | Examination of electricity bills and verification of metering equipment | 51272 | | |
| S3.1 | examination of electricity bills with verification of metering equipment: | 14689 | | |
| S3.1.1 | examination of electricity bills (non-households) | 981 | 5 working days | 13,3% |
| S3.1.2 | meter inspection (non-households) | 13708 | 20 days | 6,6% |
| S3.2 | examination of electricity bills (households) | 36583 | 5 days | 0,8% |
| S4 | Measurement of power quality (non-households) | 45 | 2 days | 0,0% |
| S5 | Claim on violation on contract terms (households) | 23 | | |
| S5.1 | arrival of a company's representative for making up a claim on violation of contract terms: | 20 | | |
| S5.1.1 | urban | 6 | 3 days | 16,7% |
| S5.1.2 | rural | 14 | 7 days | 0,0% |
| S5.2 | elimination of drawbacks specified in the claim or a justified denial | 3 | 10 days | 0,0% |
| S6 | Reply to a written appeal (claim) from a customer | 59625 | month | 1,0% |
| S7 | Meter inspection (households) | 3372 | 20 days | 3,8% |
| | | 421208 | | 1,5% |

# 3.1. Implementation of call centers

# Implementation of call centers

- Call centers are implemented in compliance with the specified requirements (NERC's Regulation №1070 from 16.08.2013)
- Call centers are mandatory for suppliers with number of consumers more than 100000

# Report on Quality of Call-Center Services

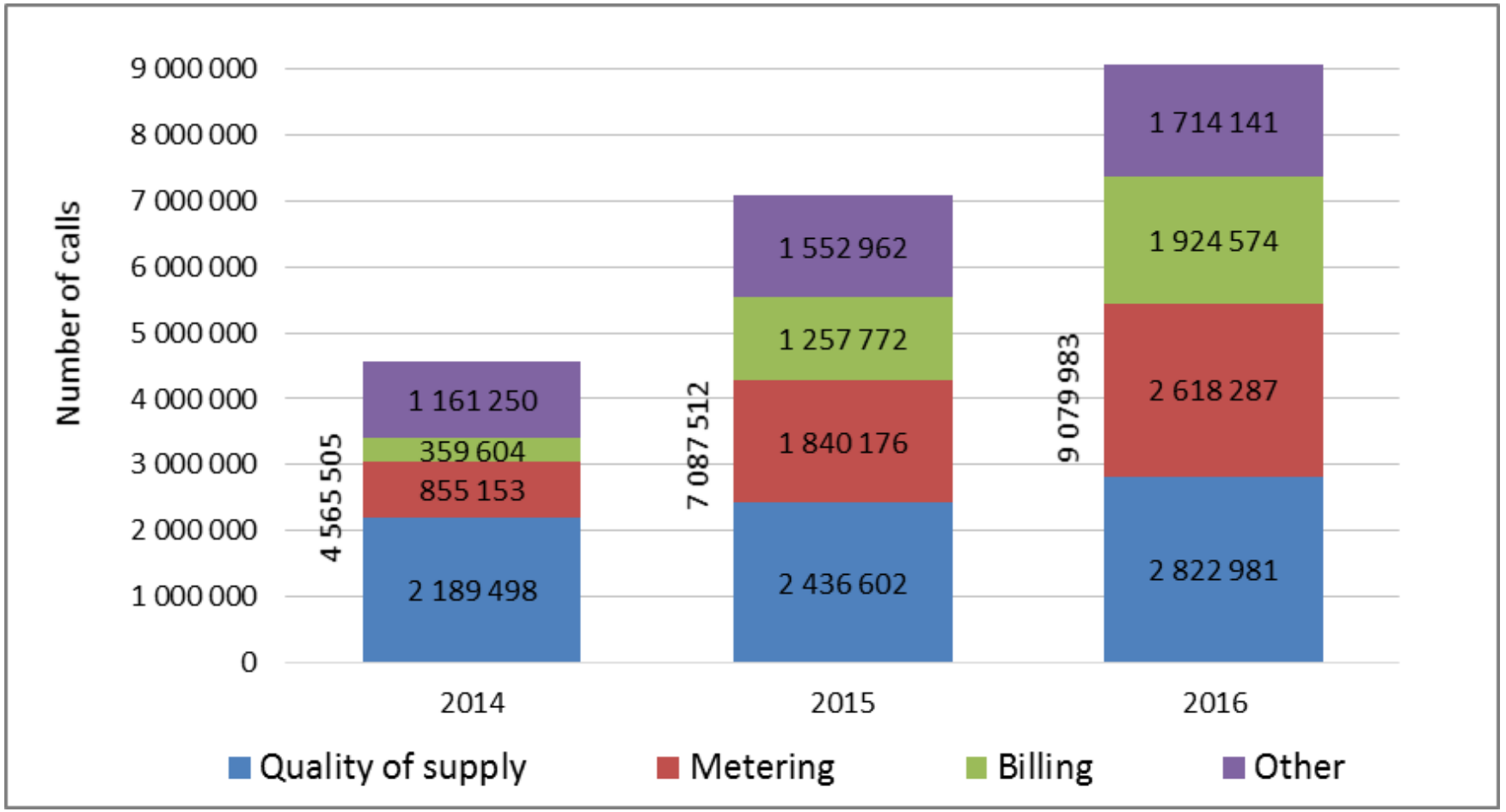
| | Indexes | Unit | Value |
|---|---|---|---|
| 1 | Service level (30 sec) | % | - |
| 2 | Total number of calls | number | - |
| 3 | Number of calls that are answered by operator | number | - |
| 4 | Call Abandon Rate | % | - |
| 5 | Average time from the beginning to the end of call | sec | - |
| 6 | Average waiting time | sec | - |
| 7 | Average waiting time for lost calls | sec | - |
| 8 | Maximum time from call queue to connection with operator | sec | - |
| 9 | Average Handle Time | sec | - |
| 10 | Average number of calls that are answered by one operator | number | - |

Overall Standard for call center Service level (30 sec) – 75 %

# Report on the Number of Calls (data on Ukraine by 2016)

| Code of topic | Topic | Subtopic | Code of subtopic | Number of calls | Share, % |
|---|---|---|---|---|---|
| T1 | Connection to the network | connection fee | T1.1 | 3 457 | 0,04 % |
| | | time for connection | T1.2 | 3 790 | 0,04 % |
| | | delivery of technical specifications | T1.3 | 2 461 | 0,03 % |
| | | temporary connection | T1.4 | 208 | 0,00 % |
| | | other | T1.5 | 6 874 | 0,08 % |
| T2 | Measuring | meter reading | T2.1 | 2 618 227 | 28,84 % |
| | | functioning of meter | T2.2 | 46 112 | 0,51 % |
| | | multirate meter | T2.3 | 54 375 | 0,60 % |
| | | examination of meter | T2.4 | 5 305 | 0,06 % |
| | | repair of meter | T2.5 | 9 053 | 0,10 % |
| | | replacement of meter | T2.6 | 30 237 | 0,33 % |
| | | other | T2.7 | 135 255 | 1,49 % |
| T3 | Quality of supply | voltage quality | T3.1 | 117 637 | 1,30 % |
| | | continuity of supply | T3.2 | 2 587 507 | 28,50 % |
| | | other | T3.3 | 123 777 | 1,36 % |
| T4 | Contract | change of contract | T4.1 | 3 381 | 0,04 % |
| | | re-execution of contract | T4.2 | 23 245 | 0,26 % |
| | | incomplete information in the contract | T4.3 | 350 | 0,00 % |
| | | suspension of the contract | T4.4 | 46 | 0,00 % |
| | | termination of contract | T4.5 | 255 | 0,00 % |
| | | payment period | T4.6 | 143 | 0,00 % |
| | | terms of signing a contract | T4.7 | 1 563 | 0,02 % |
| | | other | T4.8 | 15 039 | 0,17 % |
| T5 | Activation of supply for request | Activation of supply after change the owner of building | T5.1 | 264 | 0,00 % |
| | | connection to the network after temporary disconnection | T5.2 | 4 210 | 0,05 % |
| T6 | Disconnection for nonpayment | | | 56 653 | 0,62 % |
| T7 | Billing | misbill | T7.1 | 33 364 | 0,37 % |
| | | unclear bill | T7.2 | 229 654 | 2,53 % |
| | | debts | T7.3 | 1 306 496 | 14,39 % |
| | | other | T7.4 | 355 060 | 3,91 % |
| T8 | Tarriffs | change of tarriff | T8.1 | 74 179 | 0,82 % |
| | | wrong price | T8.2 | 237 | 0,00 % |
| | | block tarriffs | T8.3 | 77 612 | 0,85 % |
| | | other | T8.4 | 20 290 | 0,22 % |
| T9 | Benefits | | | 112 105 | 1,23 % |
| T10 | Stealing of electricity | | | 3 853 | 0,04 % |
| T11 | Complaints of employees | | | 3 547 | 0,04 % |
| T12 | Additional services | | | 85 741 | 0,94 % |
| T13 | Other information | | | 628 212 | 6,92 % |
| T14 | Failed calls | | | 300 209 | 3,31 % |
| **Total** | | | | 9 079 983 | 100,00% |

# Number of Calls Handled by Operators, 2014-2016



# 3.2. Guaranteed Standards. Introduction of Compensations to Consumers for non-compliance with GS

# Introduction of Guaranteed Standards

- Adoption of Regulation No. 1841 – October 18, 2016
- Coming into effect – **from January 13, 2017**
- **General and guaranteed** Standards are approved
- The amount of **compensations** for non-compliance with the guaranteed standards is determined
- Payment method - automatic
- Compensation – by means of **reducing the consumer's bill** for electricity
- If within the set period of time the compensation **is not provided**, the size of the compensation should be **doubled**
- In case of non-payment of compensations revealed during inspection, the size of the revenue of the company is decreased by **5 times** the amount of unpaid compensations, and in addition, the compensation for consumers is doubled
- Compensation amount - 50-200 UAH (1,7-6,9 Eur) . From 2018 – 100-400 UAH (3,5-13,8 Eur)

# Guaranteed Standards and the Size of Compensations

| Indicators | Time limit | Compensation, UAH (without VAT) | |
|---|---|---|---|
| | | until 31.12.2017 | from 01.01.2018 |
| Submission of contract for connection and technical conditions: | | | |
| for standard connection | 5 working days | 100 | 200 |
| without the need to negotiate with the TSO (nonstandard connection) | 15 working days | 100 | 200 |
| in case of need to negotiate with the TSO (nonstandard connection) | 30 working days | 100 | 200 |
| Connection of customer's appliances to the network (standard connection): | | | |
| without the need to interrupt supply of other customers | 5 days | 100 | 200 |
| in case of the need to interrupt supply of other customers | 10 days | 100 | 200 |
| Connection of customer's appliances to the network (nonstandard connection): | | | |
| without the need to interrupt supply of other customers | 5 days | 200 | 400 |
| in case of the need to interrupt supply of other customers | 10 days | 200 | 400 |
| Reconnection of consumer's appliances to the network after disconnection (non-households) | 5 working days | 100 | 200 |
| Reconnection of consumer's appliances to the network after disconnection (households) | | | |
| urban | 3 days | 100 | 200 |
| rural | 7 days | 100 | 200 |
| Renewal of electricity supply after interruption of supply | 24 години | 100 | 200 |
| Submission of draft contract on electricity supply for review: | | | |
| for customers (non-households) with the connected capacity of up to 150 kW | 7 working days | 50 | 100 |
| for customers (non-households) with the connected capacity of 150 kW and over | 14 working days | 100 | 200 |
| Meter inspection(except households) | 20 days | 100 | 200 |
| Reply to a written appeal (claim) from a customer | 1 month | 100 | 200 |
| Meter inspection(households) | 20 days | 100 | 200 |

# 4. Power Quality

# Power Quality

- Today, the NEURC does not perform power (voltage) quality monitoring and regulation, these are in the competence of the Ministry of Energy
- When the Law of Ukraine “On the Electricity Market of Ukraine” enters into force, pursuant to its Article 18, approval of the power (voltage) quality indicators would be in the sphere of competencies of the NEURC.
- Standards:
  - DSTU EN 50160:2014 «Voltage characteristics of electricity supplied by public electricity networks»
  - GOST 13109-97 “Electricity. Compatibility of technical devices – electromagnetic. Quality standards for electricity in the general purpose electricity supply systems”.
- Power (voltage) quality monitoring and regulation envisions that the NEURC has to determine and set the following:
  - power quality standards
  - requirements for monitoring of certain indicators in the network (on a permanent basis or with certain frequency)
  - monitoring of data on deviation of power (voltage) quality indicators from the standards,
  - motivating companies to comply with power (voltage) quality standards
  - improvement of the procedure for resolving consumer complaints on voltage quality.

# 5. Prospects for the Development of the Service Quality Regulation

# Development of the Service Quality Regulation

1. ***Ensuring of the validity*** of the monitoring data of service quality indicators from electricity distribution companies
2. Implementation of ***the monitoring of service quality*** of the TSO ***NEK «Ukrenergo»***
3. ***Improvement of the system of guaranteed standards*** and the compensation procedures (expansion of the list of guaranteed standards including resolving consumer complaints on voltage quality)
4. Introduction of incentive regulation with ***Q-factor*** in tariff formula
5. Determination of ***the quality standards of services provided by call centers***
6. Introduction of Voltage Quality monitoring and regulation.

# Thank you for your attention!

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