PRODUCER PRICE INDEX COMPILATION METHODOLOGY

SECTION I

GENERAL PROVISIONS

1. The Producer Price Index Compilation Methodology (hereinafter referred to as "Methodology") has been prepared in order to lay down various statistical indicator compilation aspects. The methodology is meant for statisticians and users of the producer price index (hereinafter referred to as "PPI").

2. The Methodology briefly describes the statistical survey on producer prices (hereinafter referred to as "Survey") and PPI compilation stages, explains the objective of the Survey, provides its legal basis, explains the main concepts, indicates the classification and the level of detail thereof used for the Survey, describes the Survey methods, statistical data sources, data collection and processing methods, PPI calculation formulae, and other specific aspects. It also provides information on the deadlines for, layers and methods of the provision of information for users, literature used for the preparation of this Methodology. The annexes to the Methodology contain the examples of the calculation of price indices and price changes.

3. The main PPI compilation development stages are as follows:

3.1. Statistics Lithuania started calculating the monthly PPI in 1992, according to the International Standard Industrial Classification of All Economic Activities (ISIC), produced in Lithuanian following Government Resolution No 464 of 16 April 1998 on the introduction of international classifications in the Republic of Lithuania. The ISIC is available on the Official Statistics Portal, at osp.stat.gov.lt → Classifications. At that time, PPIs for mining and quarrying and manufacturing (sections C and D) were calculated. To calculate PPIs for 1992–1994, prices for industrial commodities, including the value added tax (VAT) and excise duties, were used.

3.2. In 1996, a transition was made to the Statistical Classification of Economic Activities in the European Community (NACE) Rev. 1. Additionally, the calculation of PPIs for electricity, gas and water supply (Section E) and a total PPI for sections C–E was started. From then on, industrial enterprises have been providing prices without VAT and excises.

3.3. Upon the adoption of Council Regulation (EC) No 1165/98 of 19 May 1998 concerning short-term statistics (OJ 2004, Special Edition, Chapter 13, Volume 20, p. 291), the calculation of three separate PPIs was started: PPI for the total industrial production, PPI for the industrial production sold on the Lithuanian and non-Lithuanian markets, and PPI by five main industrial groupings (hereinafter referred to as "MIGs").

3.4. Since 2004, the calculation of PPIs according to the Classification of Products and Services (*Produktų, gaminių ir paslaugų klasifikatorius*, PGPK 2002), approved by Order No 32 of 14 February 2003 of the Director General of Statistics Lithuania on the approval of the Classification of Products and Services, was started.

3.5. In 2009, PPIs for 2000–2003 were recalculated according to the Classification of Economic Activities (*Ekonominės veiklos rūšių klasifikatorius*, EVRK Rev. 2), approved by Order No DĮ-226 of 31 October 2007 of the Director General of Statistics Lithuania on the approval of the Classification of Economic Activities, which is the national version of the Statistical Classification of Economic Activities in the European Community (NACE Rev. 2), PPIs for 2004–2008 – according to the Classification of Products and Services (PGPK 2008), approved by Order No DĮ-190 of 12 August 2009 of the Director General of Statistics Lithuania on the approval of the Classification of Products and Services. Since 2009, PPIs have been calculated and published according to the most current PGPK version. The most current PGPK versions – PGPK 2010 and PGPK 2013 – have been introduced in order to better reflect the technological development and economic structural changes, as well as to modernise the production of European statistics.

SECTION II
OBJECTIVE

4. The objective of the PPI compilation – to determine the overall change in prices of industrial production sold by Lithuanian producers over a certain period. The PPI is required for the calculation of various indicators at constant prices, economic analysis, assessment of changes in prices of industrial production sold by Lithuanian producers.

5. Survey period – 15th day of each month.

6. The main users of the PPI are the Bank of Lithuania, the European Central Bank, the Statistical Office of the European Union (Eurostat), other international organisations, National Accounts and Industrial Statistics divisions of Statistics Lithuania, the media, business and academic communities.

SECTION III

MAIN CONCEPTS AND ABBREVIATIONS

7. Concepts used in the methodology:

7.1. **Elementary price index** refers to a price index for an elementary aggregate for the calculation whereof weights are not used. It equals to the ratio of prices in the reference and the price base periods.

7.2. **FOB (free on board) price** is the price of a product which includes expenditure related to the transportation of products incurred within the territory of the Republic of Lithuania.

7.3. **Producer price index (PPI)** is a relative measure reflecting the overall change in prices for industrial commodities produced by national producers and sold on the Lithuanian and non-Lithuanian markets during a certain period.

7.4. **Index base period** is the period with the index equated to 100 points. When one has a time series of price indices calculated with a single index base period, one can determine price indices for different periods (see the Annex to the Methodology).

7.5. **Index chain-linking method** refers to the linking of two time series of price indices with different index base periods by recalculating the former so that it has the same index base period as the latter. The linking period (month, quarter, year) has to be common for both time series.

7.6. **Price base period** is a period based on the price level in which the overall change in prices is measured.

7.7. **Basic price** refers to the price which excludes VAT and similar deductible taxes directly linked to turnover, all duties and taxes on the products invoiced by the observation unit but includes subsidies on products received by the producer, if there are any.

7.8. **Representative product** is a product selected for a statistical survey on producer prices the relative share (weight) of the value whereof in a certain elementary aggregate is high, and whose price change is close to the overall price change within the elementary aggregate.

7.9. **Respondent** is a natural or legal person, another organisation or an affiliate thereof providing or obliged to provide statistical data to official statistics institutions.

7.10. **Statistical Register of Economic Entities** (hereinafter referred to as "Statistical Register") is a list of statistical observation units used for carrying out statistical surveys and other pieces of statistical work, which is constantly supplemented and updated with data from statistical surveys, state and/or departmental registers, databases and/or information systems of institutions or agencies.

7.11. **Weight** refers to the expression, in value terms, of the volume of products of a certain classification level, compared to the volume of products of a higher classification level, in the weight base period.

7.12. **Weight base period** is the period whose data are used for calculating index weights.

SECTION IV
LEGAL BASIS

8. In the Survey, the following legal acts are followed:

8.1. Council Regulation (EC) No 1165/98 of 19 May 1998 concerning short-term statistics (OJ 2004, Special Edition, Chapter 13, Volume 20, p. 291), as last amended by Commission Regulation (EU) No 461/2012 of 31 May 2012 (OJ 2012 L 142, p. 26).

8.2. Commission Regulation (EC) of 28 September 2006 implementing and amending Council Regulation (EC) No 1165/98 concerning short-term statistics as regards definitions of variables, list of variables and frequency of data compilation (OJ 2006 L 281, p. 15).

8.3. Commission Decision 2002/990/EC of 17 December 2002 further clarifying Annex A to Council Regulation (EC) No 2223/96 as concerns the principles for measuring prices and volumes in national accounts (OJ 2004, Special Edition, Chapter 10, Volume 3, p. 191).

SECTION V
CLASSIFICATIONS USED

9. Classifications used in the Survey:

9.1. Classification of Products and Services (PGPK);

9.2. Classification of Economic Activities (EVRK 2 red.), approved by Order No DĮ-226 of 31 October 2007 of the Director General of Statistics Lithuania on the approval of the Classification of Economic Activities.

9.3. Nomenclature of Countries and Territories for the External Trade Statistics of the Community and Statistics of Trade between Member States.

10. The classifications are available on the Official Statistics Portal, at osp.stat.gov.lt → Classifications.

SECTION VI
SURVEY POPULATION, COVERAGE, PARAMETERS ESTIMATED

11. The PPI covers mining and quarrying, manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities (EVRK Rev. 2, sections B–E).

12. For the PPI compilation, industrial product categories (PGPK 10-digit level) are selected based on industrial statistics on the sales of industrial production in value terms, VAT and excise excluded.

13. The Survey covers enterprises of various forms of ownership carrying out industrial activity. Each month, they provide statistical data on the prices of industrial products sold on the Lithuanian and non-Lithuanian markets.

14. Geographical coverage – the entire economic territory of the country.

15. Survey target – actual selling prices of representative industrial products produced and sold by domestic producers on the Lithuanian and non-Lithuanian markets, VAT and excise excluded, including subsidies and taking into account discounts, i.e. basic prices. If the application of discounts is a random phenomenon, e.g. once or twice a year, prices are provided without regard to discounts. Representative industrial products sold on the non-Lithuanian market are valued at FOB prices.

16. Based on the statistical data collected, price indices and price changes for 29 divisions, 4 sections of EVRK Rev. 2, the all-item PPI, and PPIs for five MIGs are calculated.

SECTION VII
METHODS USED

17. Sampling of industrial product categories (codes). At the end of each year, summary statistical data of the Industrial Statistics Division on the sales of industrial production on the Lithuanian and non-Lithuanian markets in value terms by PGPK code and on enterprises carrying out industrial activity are analysed. Industrial product categories (codes) are sampled using a purposive sampling method. Industrial product categories (codes) where the sales of industrial production account for a large proportion (over 50 per cent) of the total production in a respective economic activity are sampled at the 10-digit level.

18. Sampling of enterprises:

18.1. A purposive sampling method is used, i.e. the enterprises whose sales of industrial production on the Lithuanian and non-Lithuanian markets account for a large proportion in a

respective product category (PGPK 10-digit level) are selected. The sales of industrial production on the Lithuanian and non-Lithuanian markets in value terms by the enterprises sampled in each industrial product category have to make up no less than 50 per cent of the total sales of industrial production on the Lithuanian and non-Lithuanian markets within that industrial product category (PGPK 10-digit level). Thus, industrial enterprises of various forms of ownership are selected. Small (having less than 4 employees) enterprises are not included.

18.2. Each year, the list of enterprises sampled for the Survey is revised and updated based on the summary data of the Industrial Statistics Division. For the compilation of the final list of enterprises, the Statistical Register is used.

19. For the sampling of representative industrial products, a purposive sampling method is used. For the said purpose, an annual statistical questionnaire for the selection of representative industrial products sold KA-09 (hereinafter referred to as "Questionnaire KA-09"), approved by Order of the Director General of Statistics Lithuania, is used. For every enterprise sampled for the Survey, a list of industrial products selected for price observation at the PGPK 10-digit level is prepared and provided. From the list, an enterprise has to select and describe specific representative industrial products, whose prices it will later provide in a monthly statistical questionnaire on prices of industrial production sold KA-08 (hereinafter referred to as "Questionnaire KA-08"), approved by Order of the Director General of Statistics Lithuania. When selecting representative industrial products, enterprises have to comply with the following requirements:

19.1. The industrial product selected has to be representative, i.e. the relative share (weight) of its sales in the category of homogenous industrial products in value terms has to make up at least 50 per cent. If it is not possible to distinguish one such industrial product, two or more have to be selected – so that the relative share (weight) of the total of sales of those industrial products makes up at least 50 per cent.

19.2. The production of industrial products has to be fully operational, and the products need to have been produced for a relatively lengthy period of time, i.e. at least a year.

20. Representative industrial products are taken to the Survey at the beginning of each year, based on statistical data from the filled-in the questionnaires KA-09, received from enterprises.

SECTION VIII
STATISTICAL DATA SOURCES, DATA COLLECTION AND PROCESSING

21. The main statistical data sources for the PPI compilation are statistical data from Lithuanian industrial producers on the representative industrial products selected in the Questionnaire KA-09, submitted to the Price Statistics Division by November 8 of each year, and

statistical data on the selling prices of representative products from the Questionnaire KA-08, submitted to territorial data preparation divisions (hereinafter referred to as "DPDs") by the 22nd day of the reference month. Based on the statistical data from the Survey, price indices for industrial production sold on the Lithuanian and non-Lithuanian markets (euro and non-euro area) are calculated:

21.1. Source of statistical data on the representative industrial products selected and their sales in value terms. In the Questionnaire KA-09, the enterprises sampled for the Survey provide the codes, names and detailed descriptions of representative industrial products. It is important that the following main characteristics determining the price are indicated:

21.1.1. type, model, item number, size, weight, capacity, type of raw material, quality, composition, etc. of the representative industrial product;

21.1.2. letter code of the recipient country (for representative industrial products sold on the non-Lithuanian market);

21.1.3. terms of sale (type of transaction, measurement unit and its size, payment terms, delivery terms, type of price, type of discount).

21.2. Statistical data source for prices of representative industrial products. In the Questionnaire KA-08, enterprises provide prices of the representative industrial products selected and described in the Questionnaire KA-09 in the reference month and reasons for their change, against the previous month. It is essential that, in the course of the Survey, the price of an exactly the same representative industrial product is provided every month, i.e. the characteristics of such a product, the type of its price, payment and delivery terms, measurement unit, etc. have to remain unchanged from month to month. It is also important that the reasons for changes in the prices of representative industrial products are indicated.

22. Sources of weights:

22.1. The main source for the compilation of a weighting system are statistical data of the Industrial Statistics Division on the sales of industrial production in value terms, VAT and excise excluded (statistical questionnaire on enterprises' industrial production P-12, approved by Order of the Director General of Statistics Lithuania). The statistical survey on enterprises' industrial production covers enterprises of all types whose main economic activity according to EVRK Rev. 2 is mining and quarrying (B) and manufacturing (C) and whose annual turnover exceeds EUR 55 thousand, as well as non-industrial enterprises whose annual industrial turnover exceeds EUR 150 thousand. The Survey also covers enterprises with annual turnover below EUR 55 thousand if their production is of high importance for the Lithuanian economy.

22.2. Statistical data on the sales of industrial production in value terms, VAT and excise excluded, by enterprises with the main economic activity being electricity, gas, steam and air

conditioning supply (EVRK Rev. 2, Section D) and water supply, sewerage, waste management and remediation activities (EVRK Rev. 2, Section E) are obtained from monthly statistical questionnaires on electricity production PEG-11, electricity transmission PEP-11, electricity distribution and supply PET-11, natural gas supply PD-11, heat production and distribution PŠ-11, water collection and distribution PV-11, approved by orders of the Director General of Statistics Lithuania.

22.3. Statistical data on the annual sales of representative industrial products in value terms are received from the questionnaires KA-09.

23. For statistical data collection, the electronic statistical data collection and transfer system *e-Statistics* (*e. Statistika*) or paper questionnaires KA-09 and KA-08 are used. The forms of the said questionnaires are re-examined in September–November of each year and, if needed, updated.

24. In the Questionnaire KA-09, enterprises indicate the 10-digit PGPK code from which the representative industrial product has been selected, its serial number, which has to tally with the one indicated in the Questionnaire KA-08, and the two-letter code of the recipient country (for representative industrial products sold on the non-Lithuanian market).

25. In the Questionnaire KA-08, representative industrial products of every enterprise are coded with the serial number, indicated in the Questionnaire KA-09, starting from the first, 10-digit PGPK and recipient country codes. The code of the recipient country is entered by the enterprises.

26. In the address section of the questionnaires KA-09 and KA-08, enterprises enter their nine-digit code from the Register of Legal Entities and a six-digit code of their main economic activity according to EVRK Rev. 2.

27. Statistical data on prices of representative industrial products, collected by the specialists of DPDs (Questionnaire KA-08), are checked by comparing them with the statistical data for the previous months; the comments and explanations provided by enterprises, changes in the quality of representative industrial products are analysed. In case of questionable prices, enterprises are contacted by phone – to clarify the reasons for such changes in prices.

28. The specialists of DPDs, having performed primary statistical data control and editing and having corrected the errors detected, enter the statistical data into a special program.

SECTION IX
STATISTICAL DATA AND INFORMATION QUALITY ASSURANCE

29. There may be cases when, for various reasons, an enterprise cannot provide a price of a representative industrial product. Depending on the reason, various methods may be used to obtain or estimate the missing data:

29.1. The production of the representative industrial product selected was terminated or significantly decreased. If that is the case, this product has to be replaced with another representative product which is as similar to it in its characteristics as possible. If it is not possible, the missing price may be determined using a price index calculated based on the prices of other representative industrial products within that category; for the next year's Survey, a new representative industrial product is selected.

29.2. The enterprise no longer provides prices for the representative industrial products selected for the Survey because its liquidation has been started, its activity has been suspended, it has changed its activity, it has been reorganised, etc. If that is the case, another enterprise within the same economic activity has to be selected. The size, assortment of products, turnover of the new enterprise selected have to be similar to those of the former. If it is not possible, the missing prices may be determined using the price indices calculated based on the prices of other representative industrial products within that category; for the next year's Survey, a new enterprise with new representative industrial products is selected.

29.3. For the estimation of prices which were not provided for other reasons, the following methods are used:

29.3.1. the price from the previous month may be repeated if the price of that representative industrial product in other enterprises remained unchanged or changed just marginally;

29.3.2. the missing price may be determined using the price index calculated using the prices of other representative industrial products within that category.

30. The questionnaires KA-09 are sent out to the enterprises sampled. About 90 per cent of the enterprises to whom the Questionnaire KA-09 is sent agree to participate in the Survey and to submit prices of representative industrial products in the Questionnaire KA-08 to the DPDs on a monthly basis. The enterprises which refuse to participate in the Survey have to inform Statistics Lithuania thereof in writing and indicate the reasons for the refusal. Statistics Lithuania can release an enterprise from participation in the Survey in the following cases: if the enterprise no longer carries out economic activity; its liquidation has been started; its production activity has been suspended; it has changed the type of activity, so it terminates the sales of industrial products and other commercial activity; it has been reorganised, so it can no longer provide prices for the

representative industrial products selected; it sells only unique industrial products made to order, which makes their prices incomparable.

31. The specialists of the Price Statistics Division perform secondary statistical data editing. PPIs are checked at various compilation stages. The results obtained are analysed; the errors which might impact the final results are searched for. Monthly price changes are calculated, with the major focus on the price changes equal to or exceeding 10 and minus 10 per cent, representative industrial products whose prices changed due to changes in quality, change of the season, as well as on the price changes whose impact on the all-item PPI is the largest; such changes must be explained.

32. Changes in prices of industrial products in the reference month are compared with the changes in prices of industrial products in the previous month and with consumer price changes. In case of questionable results, statistical data are once again checked with respondents.

33. The PPI for the reference month may be revised if the statistical data submitted by enterprises have been corrected.

SECTION X
STATISTICAL INDICATOR CALCULATION FORMULAE AND OTHER THEORETICAL EXPLANATIONS

34. In the PPI compilation, the Laspeyres formula is applied, i.e. fixed base weights for 12 months are used. Based on statistical Survey data and information, the all-item PPI, PPIs for the Lithuanian and non-Lithuanian markets, euro and non-euro area are calculated.

35. The PPI is calculated from the lowest, i.e. representative industrial product, to the highest – all-item PPI – level.

36. An elementary price index is calculated as a ratio of prices in the reference and the price base period:

$$I_i^{0,t} = \frac{P_i^t}{P_i^0}, \qquad (1)$$

where:

$I_i^{0,t}$ – price index of the representative industrial product i in the reference period t, against the price base period 0;

P_i^t – price of the representative industrial product i in the reference period t;

P_i^0 – price of the representative industrial product i in the price base period 0;

i – representative industrial product.

37. The price base period is December of the year t–1 (t – reference period), i.e. prices for each month of the reference year are compared with the prices of December of the previous year.

38. Price and weight base periods are changed on an annual basis.

39. Using the Laspeyres formula, elementary price indices are aggregated to higher-level price indices by PGPK levels: PPIs for industrial product subcategories (10-digit level), categories (6-digit level), classes (4-digit level), groups (3-digit level), divisions (2-digit level), sections (1-letter level), and the all-item PPI.

40. The PPI for industrial products categories (10-digit level) is calculated as follows:

$$I^{0,t} = \sum_{i=1}^{n} S_i^0 I_i^{0,t} , \qquad (2)$$

where:

$I^{0,t}$ – PPI for industrial product categories (10-digit level) in the reference period t, against the price base period 0;

S_i^0 – sales of the representative industrial product i, against the sales of the industrial product category (10-digit level), in value terms in the price base period 0, or a weight:

$$S_i^0 = \frac{P_i^0 Q_i^0}{\sum_{i=1}^{n} P_i^0 Q_i^0} , \qquad (3)$$

where:

Q_i^0 – amount of the representative industrial product i in the price base period 0;

i – representative industrial product, when $i = 1, \ldots, n$

n – number of representative industrial products.

41. The larger the sales of the representative industrial product, against the sales of all industrial products within that category, i.e. the greater its weight, the larger the impact of the change in prices of that representative industrial product on the change in prices for the industrial product category of a higher PGPK level.

42. PPIs for other classification levels are calculated in a similar manner.

43. Thus, every higher-level PPI is a weighted arithmetic mean of lower-level price indices.

44. The all-item (euro and non-euro area) PPI $I_B^{0,t}$ in the reference period t, against the base period 0, is calculated as a weighted arithmetic mean of two PPIs – euro area and non-euro area – at each PGPK level.

$$I_B^{0,t} = \frac{I_E^{0,t} S_E^0 + I_{neE}^{0,t} S_{neE}^0}{S_E^0 + S_{neE}^0} , \qquad (4)$$

where:

$I_E^{0,t}$ – euro area PPI of a certain level in the reference period t, against the base period 0;

S_E^0 – weight of the euro area of a certain level in the base period 0;

$I_{neE}^{0,t}$ – non-euro area PPI of a certain level in the reference period t, against the base period 0;

S_{neE}^{0} – weight of the non-euro area of a certain level in the base period 0;

E – euro area;

neE – non-euro area.

45. When compiling the PPI, relative weights, expressed in per cent or per mille, are not calculated separately. The weights used in the PPI compilation are the sales of industrial production in the year $t-2$ in value terms by all PGPK levels. Since, according to the Laspeyres formula, weight and price base periods have to be consistent, the weights of each industrial product category (10-digit level) in the year $t-2$ are updated to December of the year $t-1$ using respective price indices as follows:

$$S^{December(t-1)} = S^{(t-2)} \times \frac{I^{2010,December(t-1)}}{I^{2010,(t-2)}}, \qquad (5)$$

where:

$S^{December(t-1)}$ – weight of the industrial products category (10-digit level) in the year $t-2$, expressed at the prices of December of the year $t-1$;

$S^{(t-2)}$ – weight of the industrial products category (10-digit level) in the year $t-2$;

$I^{2010,December(t-1)}$ – price index of the industrial product category (10-digit level) in December of the year $t-1$, against the index base period 2010;

$I^{2010,(t-2)}$ – price index of the industrial product category (10-digit level) in the year $t-2$, against the index base period 2010.

46. Formula (2) may be presented as follows:

$$I^{0,t} = \sum_{i=1}^{n} \frac{P_i^0 Q_i^0}{\sum_{i=1}^{n} P_i^0 Q_i^0} \times \frac{P_i^t}{P_i^0} \qquad (6) \text{ or} \qquad I^{0,t} = \frac{\sum_{i=1}^{n} P_i^t Q_i^0}{\sum_{i=1}^{n} P_i^0 Q_i^0} \qquad (7)$$

47. If on the same day (in the same month), a representative industrial product was sold at different prices, the average selling price is entered into the Questionnaire KA-08, which is calculated according to a weighted arithmetic mean formula:

$$\bar{P}_i^t = \frac{\sum_{j=1}^{m} P_{ij}^t Q_{ij}^t}{\sum_{j=1}^{m} Q_{ij}^t}, \qquad (8)$$

where:

$\bar{P}_i^t$ – average price of the representative industrial product i in the reference period t;

P_{ij}^t – price of the transaction j in the representative industrial product i in the reference period t;

Q_{ij}^t – amount of the transaction j in the representative industrial product i in the reference period t;

j – transaction in the representative industrial product i, when $j = 1, ..., m$;

m – number of transactions in the representative industrial product i.

48. According to the formula (7), the prices of transactions in the representative industrial product as on the selling day (in the selling month) are multiplied by the respective amounts of transactions in the representative industrial product (different batches of the representative industrial product may be sold at different prices). The resulting figure is then divided by the total amount of the representative industrial product sold that day (month) – to obtain the average price of that representative industrial product on that day (in that month).

49. The PPI base period is the year 2010.

50. PPIs for the reference year are linked with the PPIs for the previous year using an index chain-linking method. The linking period is December of the previous year.

SECTION XI
SOFTWARE USED

51. Statistical data are processed and the PPI is calculated using a special programme created in Oracle; additional calculations are made in a MS Excel spreadsheet. When needed, the program is updated.

SECTION XII
OTHER SPECIFIC ASPECTS

52. Since the price of a representative industrial product sold on the non-Lithuanian market is recalculated into euro using the ratios of the euro to the foreign currency, published by the European Central Bank, which is in force when the taxable value of the representative industrial product is determined for taxation purposes, the price level is affected by fluctuations in exchange rates.

53. Change in the quality of the representative industrial product. When the quality of the replacing representative industrial product selected significantly differs from that of the replaced product, the impact of the change in quality on the price growth/drop is assessed – to maintain comparability between the prices of the replaced and the replacing product. To do so, the price of the replaced product in the price base period is corrected by eliminating the impact of the change in quality. The following quality adjustment methods are used:

53.1. Overlap method. According to this method, prices of the replaced and the replacing representative industrial product are collected in the same month, which is considered to be the month of the backward linking of the series of the price ratios for the old product and forward linking of the series of the price ratios for the new product. It is then considered that the price change before the linking month is reflected by the price change for the replaced product, after the linking month – by the price change for the replacing product. The difference between the prices of the replaced and the replacing representative industrial product in the linking month is treated as a price change due to quality change and has no impact on the time series.

53.2. Expert judgement method. According to this method, the impact of the change in quality on the price is assessed by the enterprise's expert, who enters it, in percentage expression, into the Questionnaire KA-08. Upon the receipt of such statistical data, the Price Statistics Division corrects the price of the representative industrial product in the price base period by eliminating the impact of the change in quality according to the following formula:

$$p_p^0 = p^t \div \frac{p^t \pm (p^t - p^{t-1}) \times \frac{\Delta K}{100}}{p^0}, \tag{9}$$

where:

p_p^0 – recalculated price of the representative industrial product in the price base period 0;

p^t – price of the representative industrial product in the reference period t;

p^{t-1} – price of the representative industrial product in the previous period t–1;

p^0 – price of the representative industrial product in the price base period 0;

ΔK – percentage change in the price of the representative industrial product due to the change in quality;

$\pm$ – plus is entered into the formula if the quality and the price change in the opposite direction (e.g. as the quality improves, the price decreases, and vice versa), minus – if the quality and the price change in the same direction (e.g. as the quality improves, the price grows, and vice versa).

53.3. When differences in quality are obvious, but, upon consultation with the staff of the enterprise, it is not possible to determine what percentage of the price change was conditioned by the change in quality of the representative industrial product, an assumption is made that 50 per cent of the price change was conditioned by the change in quality, while the other 50 per cent was the pure price change. The price of the representative industrial product in the price base period is calculated according to a formula derived from the formula (8):

$$p_p^0 = p^t \div \frac{p^t \pm (p^t - p^{t-1}) \times \frac{50}{100}}{p^0}. \tag{10}$$

53.4. Option pricing method. According to the method, expenditure on the new element of the representative industrial product, which previously was not available, is estimated. Then, the price of the representative industrial product in the price base period is recalculated on the assumption that the former representative product had that new element, and, subsequently, the price of the new representative product in the reference month is compared with the recalculated price of the former representative product in the price base period.

53.5. Quantity adjustment method. This method is used is used when size of the measurement unit of the representative industrial product changes in the reference period. It is not a change in the product qualities – rather in its terms of sale. E.g., in the reference month, the price is provided for 5 litres of oil, while in the previous month the price was provided for 2.5 litres. In such case, one has to calculate what the price of the representative industrial product in the price base period would be if the size of the measurement unit was the same as in the reference month, i.e. 5 litres. The price of the representative industrial product in the price base period is recalculated as follows:

$$p_p^0 = p^0 \times \frac{Mtv.vnt.dydis^t}{Mtv.vnt.dydis^0}, \qquad (11)$$

where:

p_p^0 – recalculated price of the representative industrial product in the price base period 0;

p^0 – price of the representative industrial product in the price base period 0;

$Mtv.vnt.dydis^t$ – size of the measurement unit of the representative industrial product in the reference period t;

$Mtv.vnt.dydis^0$ – size of the measurement unit of the representative industrial product in the price base period 0.

54. Minor quality changes are not taken into account.

SECTION XIII
RESULTS PROVIDED FOR USERS

55. Statistical information on the PPI is published according to a statistical information release calendar:

55.1. In a news release on the 7th working day after the end of the reference month, the following information is provided: changes in prices for the total industrial production sold and for that sold on the Lithuanian and non-Lithuanian market (euro and non-euro area) by EVRK Rev. 2 division: over the month; in the reference month, against the respective month of the previous year; in the reference month, against December of the previous year. Moreover, information on the

largest impact of the EVRK Rev. 2 divisions on the overall changes in prices for the total industrial production sold, as well as for that sold on the Lithuanian and non-Lithuanian market over the month.

55.2. In a monthly publication *Economic and Social Development in Lithuania*, on the 28th–31st day after the end of the reference period, the following information is published: changes in prices for the total industrial production sold and for that sold on the Lithuanian market by EVRK Rev. 2 division: over the month; in the reference month, against the respective month of the previous year; in the reference month, against December of the previous year. Moreover, changes in prices for the total industrial production sold and for that sold on the Lithuanian and non-Lithuanian market by MIGs: over the month; in the reference month, against the respective month of the previous year; in the reference month, against December of the previous year. In addition, quarterly and annual PPIs (in the reference month, against the previous period; in the reference month, against the respective period of the previous year is provided.

55.3. In the *Statistical Yearbook of Lithuania, in November of each year, t*he following information is published: average annual PPIs, calculated based on the index base period, by EVRK Rev. 2 divisions.

56. In the Database of Indicators, the following information is published: price changes by EVRK Rev. 2 division (2-digit level), section (1-letter level), the all-item PPI and by MIGs: over the month; in the reference month, against the respective month of the previous year; in the reference month, against December of the previous year; in December, against December of the previous year. Moreover, monthly, quarterly, and annual price indices, against the index base period; average annual price indices; relative weights used for the PPI compilation.

57. Statistical information is provided on user request.

58. All statistical information is presented at the national level.

SECTION XIV
REFERENCES

59. Literature used for the preparation of the Methodology:

59.1. *Consumer Price Index Manual: Theory and practice*, 2004: ILO/IMF/OECD/UNECE/The World Bank;

59.2. *Methodological guide. Index of Producer Prices of Industrial products (Domestic sales),* 2008: Federal Statistical Office of Germany;

59.3. *Methodology of short-term business statistics. Interpretation and guidelines*, 2006: Luxembourg: Office for Official Publications of the European Communities;

59.4. *Producer Price Index Manual: Theory and practice*, 2004: ILO/IMF/OECD/UNECE/Eurostat/The World Bank, http://www.imf.org/external/np/sta/tegppi/index.htm (last viewed on 2014-12-19);

59.5. *Handbook on industrial producer price indices (PPI)*, 2012: Luxembourg: Publications Office of the European Union.

SECTION XV
ANNEXES

60. Examples of calculation of producer price indices and price changes for various periods.

SECTION XVI
FINAL PROVISIONS

61. Upon the amendment of the legal acts mentioned in the methodology, the provisions of the most current versions of the said legal acts shall apply.

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Prepared by
Price Statistics Division

EXAMPLES OF CALCULATION OF PRODUCER PRICE INDICES AND PRICE CHANGES FOR VARIOUS PERIODS

To calculate producer price indices (PPIs) for various periods, one needs to have a time series of PPIs calculated with one index base period.

E.g., suppose, one has a PPI time series with the index base period 2010 (2010–100):

Year	Month											
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**	**XII**
2011	107.4	110.0	113.5	114.9	114.5	113.2	115.3	114.2	115.6	115.8	116.0	115.3
2012	117.8	119.4	121.6	121.0	120.7	115.5	118.4	121.8	122.1	120.2	118.2	117.6
2013	118.9	120.3	118.9	116.6	116.0	115.3	117.0	117.0	116.8	114.5	114.5	114.4

Example 1

To calculate the PPI for February 2013, against June 2012, the following calculations are made:

The PPI for February 2013 equals 120.3;

the PPI for June 2012 equals 115.5;

$$\frac{120.3}{115.5} \times 100 = 104.2$$

The relative change in prices during the period from June 2012 to February 2013, expressed in per cent, is as follows:

$$\frac{120.3 - 115.5}{115.5} \times 100 = 4.2\%.$$

Example 2

To compare the PPI for IV quarter 2012 with that for I quarter 2011, first, one has to calculate average PPIs in these quarters using the simple arithmetic mean formula.

The arithmetic mean of monthly PPIs in IV quarter 2012, calculated with the index base period 2010, is as follows:

$$\frac{120.2 + 118.2 + 117.6}{3} = 118.7$$

The arithmetic mean of monthly PPIs in I quarter 2011, calculated with the index base period 2010, is as follows:

$$\frac{107.4 + 110.0 + 113.5}{3} = 110.3.$$

The PPI for IV quarter 2012, against I quarter 2011, is as follows:

$$\frac{118.7}{110.3} \times 100 = 107.6.$$

The relative change in prices during the period from I quarter 2011 to IV quarter 2012, expressed in per cent, is as follows:

$$\frac{118.7 - 110.3}{110.3} \times 100 = 7.6\%.$$

Example 3

Analogously, PPIs for other periods may be compared, e.g., average PPIs for 2012 and 2011. For that purpose, average PPIs for twelve months, calculated as an arithmetic mean of monthly PPIs, are used.

The arithmetic mean of monthly PPIs for 2011, calculated with the index base period 2010, or the average PPI for twelve months, is as follows:

$$\frac{107.4 + 110.0 + 113.5 + 114.9 + 114.5 + 113.2 + 115.3 + 114.2 + 115.6 + 115.8 + 116.0 + 115.3}{12} = 113.8.$$

The arithmetic mean of monthly PPIs for 2012, calculated with the index base period 2010, or the average PPI for twelve months, is as follows:

$$\frac{117.8 + 119.4 + 121.6 + 121.0 + 120.7 + 115.5 + 118.4 + 121.8 + 122.1 + 120.2 + 118.2 + 117.6}{12} = 119.5.$$

The average PPI for 2012, against the average PPI for 2011, is as follows:

$$\frac{119.5}{113.8} \times 100 = 105.0.$$

The relative price change in 2012, against 2011, is as follows:

$$\frac{119.5 - 113.8}{113.8} \times 100 = 5.0\%.$$

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