

## Chapter 9

# Gross Capital Formation

### Introduction

#### Gross Capital Formation Defined

1. In the SNA, *gross capital formation* (GCF) is one of the principal components of final expenditures, typically accounting for around 20% of GDP. The main components of GCF have already been listed in Chapter 3, but for convenience they are repeated here.

<b>Table 1. Gross Capital Formation as defined in the SNA</b>
<p><b><i>Gross fixed capital formation</i></b>, consisting of</p> <p style="padding-left: 40px;"><u>Acquisitions less disposals of new or second-hand tangible fixed assets</u> in the form of:</p> <p style="padding-left: 80px;">Machinery and equipment (conventionally referred to in the ICP context as “equipment goods”);</p> <p style="padding-left: 80px;">Dwellings;</p> <p style="padding-left: 80px;">Other buildings and structures;</p> <p style="padding-left: 80px;">Cultivated assets (trees and livestock that are used repeatedly, or continuously, over long periods of time to produce goods such as rubber, fruit, milk, wool, <i>etc.</i>)</p> <p style="padding-left: 40px;"><u>Major improvements to existing fixed or natural assets, including land.</u></p> <p style="padding-left: 40px;"><u>Acquisitions less disposals of intangible fixed assets</u> (<i>e.g.</i>, computer software)</p>
<p><i>plus Changes in inventories</i> (acquisitions less disposals of stocks held by producers)</p>
<p><i>plus Acquisitions less disposals of valuables</i> (precious metals or stones, expensive jewels, works of art, <i>etc.</i> held as investments).</p>
<p><i>equals</i> <b>Gross Capital Formation</b></p>

2. *Gross fixed capital formation* (GFCF) is by far the largest component of total gross capital formation. Fixed assets are goods that are used repeatedly, or continuously, for at least a year in the process of producing other goods or services. Notice that dwellings are treated as fixed assets that are used, together with other inputs, to produce housing services for renting or own use. Owner occupiers do not consume the dwellings as such but rather the housing services produced by the dwellings.
3. In the System of National Accounts, fixed assets are valued at purchaser prices payable for them. In the case of equipment goods, the purchaser price includes

all the transportation or other costs incurred in delivering and installing the asset in the desired location. The purchaser price includes any (non-deductible) taxes payable on the assets and also includes the costs of any professional services incurred, such as the fees payable to surveyors, architects, lawyers, *etc.* As explained below, there are occasions when, for practical or cost reasons, it is necessary to depart from the strict SNA definition of purchaser prices in reporting prices of fixed assets for the ICP.

4. GFCF consists of the value of both new and existing (*i.e.* used or second hand) fixed assets acquired *less* the value of any existing assets sold to another enterprise for use in production or sold as scrap. Imports of second hand machinery and equipment can be a major component of GFCF in certain countries and there is extensive international trade in used assets such as road vehicles, ships and aircraft.
5. *Changes in inventories* consist of the value of the raw materials, semi-finished or finished goods put into inventories (or stocks) by producers *less* the value of the goods disposed of. The semi-finished goods include work-in-progress, which can be particularly important for production processes with long gestation periods, such as construction projects or forests. See paragraphs 26 to 29 of Chapter 3 for further details.
6. *Valuables* consist of goods held as stores of value or in the expectation of capital gains. They include gold and other precious metals or stones, works of art, and expensive jewelry. Acquisitions *less* disposals of valuables constitute a form of investment or gross capital formation. See also paragraphs 29 and 30 of Chapter 3.

### **Price Surveys for Gross Capital Formation**

7. Two kinds of price surveys are conducted for ICP purposes. One is a survey of the prices of *equipment goods* and of *computer software*. The second is a survey of the prices of a set of *construction components* – *i.e.* the elementary parts that are assembled by a construction firm to make dwellings, non-residential buildings and civil engineering works. This chapter deals with the methods used in these two surveys. Price surveys are not carried out for the other components of GCF. The procedure followed for the other two components, *changes in inventories* and *net acquisitions of valuables* is to impute a PPP on the basis of the PPPs calculated for other categories of expenditure. These are usually referred to as “reference PPPs”.

### **Some Special Problems**

8. Capital goods can be much more complex and variable than consumer goods. For this reason, it may be more difficult to obtain perfect matches between the capital goods purchased in different countries than for consumer goods. Brands have an important role to play, but characteristics of a capital good with the same international brand and serial or model number are actually liable to differ from country to country because of variations in local tastes, conditions, climates, regulations or the marketing strategy adopted by the

producer. The characteristics of buildings and other structures can also be extremely complex and highly variable from country to country. Many structures are unique without any comparable or matching products in any other country, or even in any other time period within the same country.

9. The complexity of many capital goods is so great that the expertise required to draw up appropriate specifications for the products to be priced and to obtain average prices for them are not to be found within most statistical offices. Building engineers, architects, quantity surveyors or other experts have to draw up the specifications and determine the appropriate prices. In some countries these specialists can be found in government departments such as public works departments, construction ministries or other government agencies responsible for building regulations or for purchasing equipment for government use. In other countries this work has to be contracted out to consultancy firms specializing in engineering and/or construction. These consultancies can be expensive and may use up a lot of the total resources available for PPP work. Contracting out the work to professional consultancy firms also means that there is no equivalent to the pre-survey for consumer goods involving prolonged interaction between the regional coordinators and the national statistical offices.

## II. Pricing Equipment Goods

### General approach

10. The approach adopted for equipment goods is similar to that followed for consumer goods and services in that it starts with the creation of a set of Standard Product Descriptions (SPDs) by the Global Office. (See “Equipment Goods Survey” by Stephen Burdette, ICP website)
11. However, there is an important difference compared with consumer goods and services in that the Global Office has partly converted the SPDs to Product Specifications (PSs) in the following manner:
  - For each SPD the Global Office has identified the manufacturers and model numbers of the equipment to be priced. At least two manufacturers and model numbers are specified for each SPD.
  - Countries are requested to provide prices for these in the order of preference in which they are listed. In other words, the first model listed is the preferred one and should be priced by countries provided that it is available and in common use. If it is not, then the next model in the list should be priced, and so on.
  - If two or more of the listed models are available and in common use, countries are requested to provide prices for all of them.
  - If none of the models listed are available and in common use, countries should price an equivalent model that is commonly used in their country. An equivalent model is one that meets the same needs with equal efficiency.
  - If countries decide to price an equivalent model rather than one of those specified in the SPD, they must also provide the information on **Product**

**Characteristics** that is listed below the photograph on the second page of the SPD. This part of the SPD does not need to be completed if prices are reported for one of the specified items of equipment.

- The Product Characteristics listed in this part of the SPD are of two kinds – **key characteristics** and **other characteristics**. Key characteristics are shaded and must always be completed. Countries are requested to provide information on the other (non-shaded) characteristics to the extent possible.

### **Layout of the SPDs and Reporting Forms**

12. The SPDs are also the forms on which countries will report the prices and related information. Box 1 below is a sample SPD for a “Utility Tractor”. This is a general purpose tractor used primarily on farms.
13. The SPD first gives a general description of the piece of equipment and its usual purpose. This is followed by its principal specifications which, in this case, are the engine power, drive configuration (two-wheel drive) and type of roll-over protection provided for the tractor-driver.
14. Three utility tractors are specified. The Kubota M6800 is identified as the preferred model but there are two alternates a Massey-Ferguson and a Mahindra. Provision is also made for an unspecified alternate in the event that none of the three listed models are available and in common use in the country.
15. The next part of the SPD requests information on the terms and conditions of the sale – specifically whether installation and transportation costs are included and about product taxes. Prices are requested for mid-2005 if possible but provision is also made for reporting the 2006 price. (See below for further information on the timing of data collection.)
16. Information is next requested on the source of the price data, after which there is a picture of the piece of equipment. It is generic image and is not necessarily a picture of the preferred or alternate pieces of equipment specified in the SPD.
17. After the picture there is a list of product specifications. These are only to be filled in by countries that have priced an unspecified alternate. The product specifications are of two kinds – *key characteristics* and *other characteristics*, with the key characteristics identified by shading. For example, in the case of a utility tractor, shipping weight is a key-characteristic whereas fuel-type is not. It is compulsory to provide information on key characteristics while countries are requested to provide information on other characteristics if they can do so easily.

#### **Box 1. Sample SPD for Equipment Goods**

**Basic Heading: Special Purpose Machinery**  
**Product Name: UTILITY TRACTOR**

**Basic Heading Code: 11.01.13.3**  
**Product Code: 02**

**DESCRIPTION:**

Utility Tractors are purpose-built for a flexible variety of agricultural operators globally. It can be a support tractor on larger farms or a primary tractor on farms ranging from 40 to 100 hectares. This category of tractor configuration will range from basic two-wheel-drive power (2WD) to mechanical front-wheel-drive with cab, multiple PTOs and hitches. High specification tractors in this category can also have GPS and on-board micro-processors. The basic configuration dates from the 1939 Ford tractor with Ferguson system.

**SPECIFICATIONS:**

Diesel engine power ranges from 37.5 to 75 kW and the configuration is two-wheel drive with open roll over protective structure (ROPS).

<b>SELECTION</b>	<b>MANUFACTURER</b>	<b>MODEL</b>
<input type="checkbox"/> Preferred	Kubota	M6800
<input type="checkbox"/> Alternate 1	Massey-Ferguson	MF471
<input type="checkbox"/> Alternate 2	Mahindra	7520
<input type="checkbox"/> Unspecified Alternate		

**CHARACTERISTICS (For Unspecified Alternate)**

Power (kW): \_\_\_\_\_ Weight (kg): \_\_\_\_\_  
 Open ROPS  Closed ROPS

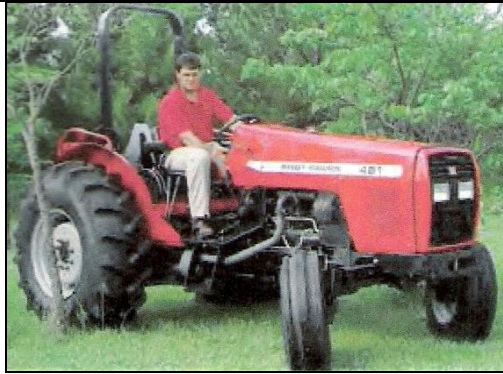
	<b>Terms &amp; Conditions:</b>	<b>Cost Estimate (2005)</b>	<b>Cost Estimate (2006)</b>
<b>A</b>	<b>Equipment Costs (in national currency)</b>		
<b>B</b>	Installation if not included		
<b>C</b>	Transportation if not included		
<b>D</b>	Non-deductible tax if not included		
<b>E</b>	Deductible tax if included		
<b>F</b>	<b>Sub Total (B + C+D - E)</b>		
	<b>Total Cost [A + F]</b>		

**PRICING INFORMATION (Source of Price)**

- Distributor  Catalogue  
 Dealer  Other: \_\_\_\_\_  
 Expert/Consultant

**Comments:**

ICP, December 2005



**Utility Tractor**  
(Indicative Picture)

**PRODUCT CHARACTERISTICS:**

**Engine**

**Weight**

Fuel Type		Shipping Weight(kg)	
Gross Power (kW)		Operating Wt (kg)	
Power Take Off Power (kW)		Max. Operating Wt (kg)	
Emission Cert. Stage			

**Hitch System (Three Point)**

Front Category: _____	Rear Category: _____
Front Lift Capacity (kg): _____	Rear Lift Capacity (kg): _____
<input type="checkbox"/> Front Position Control	<input type="checkbox"/> Position Control
<input type="checkbox"/> Front Draft Control	<input type="checkbox"/> Draft Control <input type="checkbox"/> Position/Draft Mix

**Drawbar System**

<input type="checkbox"/> Fixed	<input type="checkbox"/> Italian (pintle)
<input type="checkbox"/> Swinging	<input type="checkbox"/> French (piton fixe)
<input type="checkbox"/> German (pintle)	<input type="checkbox"/> UK (auto hitch)

**Power Take Off (PTO)**

<input type="checkbox"/> <b>Front</b>	<input type="checkbox"/> <b>Rear</b>
<input type="checkbox"/> Speed	<input type="checkbox"/> Speed
<input type="checkbox"/> Live	<input type="checkbox"/> Live
<input type="checkbox"/> Independent	<input type="checkbox"/> Independent
<input type="checkbox"/> Hydrostatic	<input type="checkbox"/> Hydrostatic

**Drivetrain**

<input type="checkbox"/> Hydrostatic	<input type="checkbox"/> Powershift
<input type="checkbox"/> Constantly Variable (CVT)	Forward Speeds: _____
<input type="checkbox"/> Mechanical Transmission	Reverse Speeds: _____
Forward Speeds: _____	Minimum Speed (kph): _____
Reverse Speeds: _____	

<input type="checkbox"/> Sliding Gear Change <input type="checkbox"/> Synchronesh	Maximum Speed (kph): _____
<b>Operator Station</b>	
<input type="checkbox"/> <b>Cab/ROPS</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Suspension</li> <li><input type="checkbox"/> Suspended seat</li> <li><input type="checkbox"/> Instructor seat</li> <li><input type="checkbox"/> FOPS</li> <li><input type="checkbox"/> Air conditioning</li> <li><input type="checkbox"/> Air filtration</li> <li><input type="checkbox"/> Adjustable steering wheel</li> <li><input type="checkbox"/> Adjustable control pod</li> <li><input type="checkbox"/> Windscreen demister</li> <li><input type="checkbox"/> Windscreen wiper</li> <li><input type="checkbox"/> Windscreen washer</li> <li><input type="checkbox"/> Rear view mirror <ul style="list-style-type: none"> <li><input type="checkbox"/> Interior</li> <li><input type="checkbox"/> Exterior</li> </ul> </li> </ul>	<input type="checkbox"/> <b>Open/ROPS</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Suspended seat</li> <li><input type="checkbox"/> Adjustable seat</li> <li><input type="checkbox"/> FOPS</li> <li><input type="checkbox"/> Sun Shield</li> </ul>
<b>Operator Control</b>	
<input type="checkbox"/> Mechanical Steering <input type="checkbox"/> Hydrostatic Steering <input type="checkbox"/> Assisted Power Steering <input type="checkbox"/> Mechanical Brakes <input type="checkbox"/> Hydraulic Brakes <input type="checkbox"/> Boosted Brakes	<input type="checkbox"/> Mechanical Shift <input type="checkbox"/> Hydraulic Shift <ul style="list-style-type: none"> <li><input type="checkbox"/> Electro-Hydraulic Shift</li> </ul> <input type="checkbox"/> Mechanical Lift Controls <ul style="list-style-type: none"> <li><input type="checkbox"/> Hydraulic Lift Controls</li> </ul> <input type="checkbox"/> Remote Hitch Controls

### How Many Equipment Goods Should be Priced?

18. The Global Office has identified a core-list of 108 equipment goods to be used for the “Ring Comparison” that will link the Regions in order to calculate the Global PPPs. The full list of core items is given in Annex 1 and Table 2 shows how these 108 core items are distributed among the Basic Headings for *Machinery and Equipment* and *Other Products*. “Other Products” includes a number of disparate assets such as livestock, land improvement, mineral exploration and software but prices are only required for software. For Basic Headings for which no prices will be collected, reference PPPs will be used.
  
19. When Regions draw up their own lists for the equipment goods to be priced, they should look first at these 108 items and price as many of them as they consider to be representative for their Region. They should also price other items that are not on the core list if they are important in their countries. Countries should provide prices for at least 80 of the items specified in the SPDs for equipment goods.

<b>Table 2. Core list of Equipment Goods for ICP 2005</b>		
Basic Heading	Description	Number of products
15.01.11.1	FABRICATED METAL PRODUCTS	5
15.01.12.1	GENERAL PURPOSE MACHINERY	15
	A. Engines and Turbines, Pumps & Compressors	10
	B. Other General Purpose Machinery	5
15.01.13.1	SPECIAL PURPOSE MACHINERY	39
	A. Agricultural and Forestry Machinery	2
	B. Machine Tools	6
	C. Machinery for Metallurgy, Mining, Quarrying & Construction	22
	D. Machinery for Food, Beverages and Tobacco Processing	4
	E. Machinery for Textile, Apparel and Leather Production	0
	F. Other Special Purpose Machinery	5
15.01.14.1	ELECTRICAL & OPTICAL EQUIPMENT	29
	A. Office Machinery	5
	B. Computers and Other Information Processing Equipment	9
	C. Electrical Machinery and Apparatus	2
	D. Radio, Television and Communications Equipment & Apparatus	3
	E. Medical, Precision and Optical Instruments, Watches and Clocks	10
15.01.15.1	OTHER MANUFACTURED GOODS n.e.c.	0
15.01.21.1	MOTOR VEHICLES, TRAILERS and SEMI-TRAILERS	11
15.03.11.1	SOFTWARE	9
<b>TOTAL</b>		<b>108</b>

## **Prices to be Reported**

### Definition of prices for equipment goods

20. To be consistent with the national accounts, countries are required to provide prices for machinery and equipment that are consistent with their valuation as fixed capital assets in the national accounts. This means that the prices must include trade, transport, delivery and installation charges, they must only include import duties and other product taxes that are actually paid by the purchaser, and they must be reported after deducting any discounts that are generally available to most producers. The following rules should be observed in reporting prices for machinery and equipment.
- **Discounts.** The price should refer to the purchase of a single item so that it is not affected by discounts that may be available for large orders. However, the price of the single item should be reported after deducting any discount that is customarily available to most purchasers and that is available for most of the year.



- **Transport and delivery costs.** When prices of equipment goods do not include transport and delivery costs, these should be estimated by countries selecting their own average distance over which the items are transported and delivered.
  - **Installation costs.** There are usually costs associated with the installation of fixed equipment and these are included as part of gross fixed capital formation in the national accounts. Installation charges include not only any charges that the purchaser pays for the item to be physically installed at the factory or other site but also any costs for testing, running-in or calibrating the equipment. In the case of transport equipment there are usually no installation costs.
  - **Product taxes.** Finally, the price should only include *non-deductible* product taxes. Countries that levy value added taxes normally allow purchasers to deduct the full amount of tax on capital goods. Sales and other product taxes and sometimes import duties may also be fully or partly deductible on capital goods.
21. The transaction characteristics have to be respected since countries are required to report actual transaction prices and not list or catalogue prices. List or catalogue prices may be the initial source of price data but these prices must be adjusted to meet the transaction characteristics noted above.

#### National prices

22. The prices required are the national average prices. Country experts should decide how these are to be collected following these guidelines:
- In some small countries it may be sufficient to collect prices in only a single location – namely the capital city or the largest commercial or industrial town.
  - In larger countries where there are several centres of significant industrial and commercial activity, prices will need to be collected in several of these centers in order to calculate an average national price.

#### Number of price observations

23. In many countries there will be a single dealer with the rights to sell the specified type of equipment and in this case a single price observation will be sufficient. In other countries, however, there may be several distributors of the specified type of equipment and in this case several price observations will be required to establish the average national price. The decision as to whether one or more price observations are necessary is left to the national experts.

#### Timing of data collection

24. The prices reported should be average prices for the year 2005 and, in principle, these should be the average of prices collected at regular intervals throughout the year. However, experience shows that provided all countries price equipment goods at approximately the same period, there is no need to collect prices throughout the year. Price collection in mid-year is recommended.

25. For this round of the ICP, countries are being asked to collect data for equipment goods in mid year 2006. Unless inflation is 5 percent or larger, the prices will be used ‘as is’ for the price comparisons. If inflation exceeds 5 percent, appropriate adjustments will be made.

#### Used Equipment

26. All the products specified for the equipment goods survey are for new items. For a number of countries, however, a significant proportion of their GFCF in equipment goods consists of imports of second-hand goods, some of which may have been reconditioned. Experimental pricing of second-hand equipment goods shows that there is considerable variation in the quality of the goods priced by different countries. It is very difficult to find second-hand goods that are comparable for pricing purposes. Substantial quality adjustments may be necessary to make the prices comparable and such quality adjustments are not feasible in practice at the present time. In ICP 2005, therefore, price collection is confined to new equipment goods. Prices of second-hand goods are not acceptable, even when second-hand equipment goods are more representative than new goods.

#### Sources of price information

27. The prices of equipment goods can be obtained directly from producers, importers or distributors or from their catalogues. They may even be obtained from actual purchasers - which is preferable in principle, but difficult in practice. The prices can be collected by whichever method, or combination of methods, countries find the most convenient - personal visit, telephone, letter, internet, etc. The prices must however be adjusted to conform to the valuation principles outlined above with regard to discounts, transport and delivery charges, installation costs and product taxes.
28. These are the sources most likely to be used for obtaining the price information:
- **Within a National Statistical Office:**  
Those who compile a producer price, a wholesale price, or an import price index are most likely to have familiarity with the types of goods being compared for these basic headings. For some items, like automobiles or computers, the comparisons used for consumption are also relevant for equipment although prices collected for household consumption expenditure will need to be adjusted by subtracting value added taxes and other product taxes which are payable by households but which can be deducted by enterprises.
  - **Within the Country:**  
Distributors and dealers in equipment in a country will have the knowledge of the models and their detailed characteristics and price. It is important in obtaining prices from dealers to make sure all local taxes and any other charges are included.
  - **Outside the Country:**

A separate listing of websites is provided as Annex 2 to this document that should be of value to both country and regional staff. Websites are often available in more than one language, and usually give all the technical information called for in the PS/SPDs that the Global Office has provided. Websites may be tailored to regions of the world and often provide names and contact information for dealers and distributors. In smaller countries, there may be regional distributors covering adjacent countries.

- **Local Purchasers:**

Departments of government, especially Public Works, purchase equipment on a regular basis. They may buy directly from manufacturers, but in many cases they will also have contacts with dealers and distributors.

### Editing prices

29. Countries which have collected multiple prices for each specified type of equipment can carry editing procedures in the same way as for consumer goods and services. Other countries will have reported the transaction prices in the largest city for a single point in time and the price reported will usually come from a single outlet. In this case, the editing procedure cannot be used by the country, although they can still be used by the Regional Office to compare prices across countries with a view to detecting outliers.
30. Editing the prices of equipment goods simply by examining and comparing their prices alone is not sufficient because of the complexity of the items priced. The fact that the prices for some specification appear plausible and consistent across countries does not mean that the goods priced are comparable across countries. The technical characteristics of the items that are not outliers still need to be checked against each other and any mismatches discovered must be treated in the same manner as outliers identified by the editing procedure.
31. Outliers identified by the Quaranta editing procedure by the regional coordinators should have their technical characteristics checked against the technical characteristics of the items priced by other countries. There are two possible outcomes: either the technical characteristics of the outlier match the technical characteristics of the items priced by at least some of the other countries, or the technical characteristics do not match the technical characteristics of any of the items priced by the other countries. In the first case, it is necessary to refer the outlier back to the reporting country asking it to confirm the price. In the second case, it is necessary to ask the country to provide a price for an equipment good whose technical characteristics do match the technical characteristics of the goods priced by some of the other countries. Depending on the country's response the price of the outlier will be retained, replaced or dropped.
32. The main responsibility for editing the technical characteristics of the goods that countries have priced for the equipment goods survey rests with the Regional Coordinators. Countries, however, are responsible for making sure that the regional coordinator is in a position to be able to identify matches and

mismatches among the goods priced. Before sending their prices to the regional coordinator, countries are required to verify that the reporting forms are complete with the name and number of the make and model priced and the technical characteristics that are indicated as *important characteristics* on the reporting form. It is in the interest of countries to provide this information from the beginning as it will reduce the subsequent response burden that editing imposes.

### III. Pricing Construction Projects

#### General approach

33. There are three main methods of calculating PPPs for construction goods:
- The first involves collecting the prices of a basket of inputs consisting of different kinds of labor (unskilled laborer, bricklayer, carpenter, plumber, etc.), standard building materials (cement, sand, plywood, etc.) and plant and equipment (hire of trucks, excavators, cranes, etc.).
  - The second, entails pricing a set of standard components or operations such as “constructing so many square metres of brick wall” or “laying so many square metres of roofing tiles” or “constructing a supporting column of specified size and load-bearing capacity”.
  - The third approach is to price model construction projects. The prices obtained for the model projects include all cost components so that the prices compared using this approach are purchaser prices and so are consistent with the prices used in the national accounts. This is an advantage of the system but a disadvantage is that since the model projects are the same for all countries, some of the projects may be representative in some countries but not in others.
34. The standard method for use in ICP is referred to as the *Basket of Construction Components* approach or BOCC and is a combination of the first and second methods listed above. The standard BOCC approach, described below, will be used by the African, Asian and Pacific, Latin American and West Asia Regions.<sup>1</sup> (see “An Implementation Framework for the Basket of Construction Components Approach, Kenneth Walsh and Anil Sawhney, ICP Website)
35. In the BOCC method 34 “components” are defined and these are listed in Table 3. The table also shows which components are relevant for calculating PPPs for the three Basic Headings under *Construction*.

Note that the 34 components are of two kinds:

- **Composite components** such as a *round bridge pier* or a *concrete airfield pavement*,

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<sup>1</sup> The OECD-Eurostat group will continue to use the third approach described above (model construction projects) and the CIS countries will continue to use a modified version of the BOCC approach which they have developed over several previous comparison.

- **Basic inputs**, specifically:
  - Skilled and unskilled ;
  - Rent of four types of equipment – a back-hoe, a centrifugal pump, a vibratory plate compactor and a sand filter;
  - Six kinds of building material – Portland cement, sand, aggregate,<sup>2</sup> plywood, reinforcing steel, and structural steel.

36. Table 3 shows how the 34 items are assigned to the three Basic Headings under Construction.

**Table 3. Construction components included in the baskets for Residential buildings, Non-residential buildings and Civil engineering works**

<b>Construction Component</b>	<b>BH 150211.1 Residential buildings</b>	<b>BH 150221.1 Non-residential building</b>	<b>BH 150231.1 Civil engineering works</b>
<b>Composite components</b>			
Column Footing	✓	✓	
Culvert			✓
Drilled Shaft			✓
Earthwork	✓	✓	✓
Electrical Service Point	✓	✓	
Exterior Painting	✓	✓	
Exterior Wall Cement Plaster	✓	✓	
Interior Ceiling Plaster	✓	✓	
Interior Painting	✓	✓	
Interior Wall Ceiling Plaster	✓	✓	
Roadway Lane			✓
Round Bridge Pier			✓
Structural Column Round	✓	✓	
Structural Column Square	✓	✓	
Round Bridge Pier			✓
Aluminum Frame Window	✓	✓	
Bridge T Beam			✓
Bridge Spread Footing			✓
Concrete Airfield Pavement			✓
Exterior Sidewalk	✓	✓	
Masonry Interior Wall	✓	✓	
Concrete	✓	✓	✓
<b>Basic inputs</b>			
Backhoe	✓	✓	✓
Vibratory Plate Compactor		✓	✓

<sup>2</sup> “Aggregate” is gravel which, together with cement, water and sand, is used too make concrete.

<b>Construction Component</b>	<b>BH 150211.1 Residential buildings</b>	<b>BH 150221.1 Non-residential building</b>	<b>BH 150231.1 Civil engineering works</b>
Centrifugal Pump			✓
Sand Filter			✓
Portland Cement	✓	✓	✓
Aggregate	✓	✓	✓
Sand	✓	✓	✓
Reinforcing Steel	✓	✓	✓
Structural Steel	✓	✓	✓
Plywood	✓	✓	✓
Unskilled	✓	✓	✓
Skilled	✓	✓	✓

37. In the BOCC method, prices for subsets of these 34 components are used to obtain PPPs for “Systems”. PPPs for systems are then used to obtain PPPs for the three Basic Headings i.e. residential buildings, non-residential buildings, and civil engineering works.
38. Table 4 shows how the Systems for Residential buildings are obtained by combining different sub-sets of the 34 components. There are eight systems for Residential buildings - *site work*, *substructure*, *superstructure*, *exterior shell*, *interior partitions*, *interior/exterior finishes*, *mechanical and plumbing*, and *electrical*. Systems broadly correspond to the sequential stages in which a construction project is carried out. The different sets of Systems and components relevant for the other two Basic Headings – Non-residential building and Civil engineering works – are shown in Tables 5 and 6.
39. In Tables 4 through 6, the composite components are shown in normal script and the basic inputs in italics. The PPPs for Systems will be based only on price relatives for **composite components**, except in the case of three Systems for which no composite components have been identified. These are the *Mechanical and Plumbing* Systems for both Residential and Non-residential buildings and the *Mechanical Equipment* System for Civil engineering works. For these three Systems the PPPs will be calculated from the price relatives of the **basic inputs** shown under these Systems.
40. In principle, therefore, only prices of the composite components plus prices of three of the twelve basic inputs (skilled and unskilled labor and hire of a vibratory plate compactor), are needed to calculate PPPs. However, countries are required to provide prices for the other nine basic inputs as well. This information will be useful both to the countries and the Regional Offices in reviewing the costs reported for composite components. In addition, if some countries cannot report reliable cost estimates for composite components, it may be necessary to base the PPPs on the prices of the basic inputs relevant for the various systems.

**Table 4. Components of Systems for Residential Buildings**

<b>System</b>	<b>Component</b>	<b>System</b>	<b>Component</b>
<b>Site work</b>	Aggregate base Earthwork Exterior sidewalk Concrete <i>Aggregate</i> <i>Portland cement</i> <i>Sand</i> <i>Backhoe</i>	<b>Exterior shell</b>	Aluminum frame window <i>Sand</i> <i>Portland cement</i> <i>Unskilled labor</i> <i>Skilled labor</i>
	<i>Unskilled labor</i> <i>Skilled labor</i>		<b>Interior partitions</b>
		<b>Substructure</b>	Aggregate base Column footing Aggregate <i>Portland cement</i> <i>Reinforcing steel</i> <i>Sand</i> <i>Concrete</i> <i>Backhoe</i> <i>Plywood</i>
<b>Interior/exterior finishes</b>	Exterior wall cement plaster Interior ceiling plaster Interior wall plaster <i>Exterior paint</i> <i>Interior paint</i> <i>Portland cement</i> <i>Sand</i> <i>Plywood</i> <i>Unskilled labor</i> <i>Skilled labor</i>		
<b>Mechanical and plumbing</b>	<i>Unskilled labor</i> <i>Skilled labor</i>		
<b>Superstructure</b>	Structural column round Structural column square Concrete <i>Aggregate</i> <i>Portland cement</i> <i>Reinforcing steel</i> <i>Sand</i> <i>Structural steel</i> <i>Plywood</i> <i>Unskilled labor</i> <i>Skilled labor</i>	<b>Electrical</b>	Electrical service point <i>Unskilled labor</i> <i>Skilled labor</i>

**Table 5 Components of Systems for Non-Residential Buildings**

<b>System</b>	<b>Component</b>	<b>System</b>	<b>Component</b>
<b>Site work</b>	Aggregate base	<b>Exterior shell</b>	Aluminum frame window
	Earthwork		<i>Sand</i>
	Exterior sidewalk		<i>Portland cement</i>
	Concrete		<i>Unskilled labor</i>
	<i>Aggregate</i>	<i>Skilled labor</i>	
	<i>Portland cement</i>	<b>Interior partitions</b>	Masonry interior wall
	<i>Sand</i>		<i>Portland cement</i>
<i>Backhoe</i>	<i>Sand</i>		
<b>Substructure</b>	<i>Unskilled labor</i>	<i>Plywood</i>	
	<i>Skilled labor</i>	<i>Unskilled labor</i>	
	Aggregate base	<i>Skilled labor</i>	
	Column footing	<b>Interior/exterior finishes</b>	Exterior wall cement plaster
	<i>Aggregate</i>		Interior ceiling plaster
	<i>Portland cement</i>		Interior wall plaster
	<i>Reinforcing steel</i>		<i>Exterior paint</i>
<i>Sand</i>	<i>Interior paint</i>		
<i>Concrete</i>	<i>Portland cement</i>		
<i>Backhoe</i>	<i>Sand</i>		
<i>Plywood</i>	<i>Plywood</i>		
<b>Superstructure</b>	Structural column round	<i>Unskilled labor</i>	
	Structural column square	<i>Skilled labor</i>	
	Concrete	<b>Mechanical and plumbing</b>	<i>Vibratory plate compactor</i>
	<i>Aggregate</i>		<i>Unskilled labor</i>
	<i>Portland cement</i>	<i>Skilled labor</i>	
	<i>Reinforcing steel</i>	<b>Electrical</b>	Electrical service point
	<i>Sand</i>		<i>Unskilled labor</i>
	<i>Structural steel</i>		<i>Skilled labor</i>
	<i>Plywood</i>		
	<i>Unskilled labor</i>		
	<i>Skilled labor</i>		



**Table 6 Components of Systems for Civil Engineering Works**

<b>System</b>	<b>Component</b>	<b>System</b>	<b>Component</b>
<b>Site work</b>	Concrete	<b>Superstructure</b>	Roadway lane
	Aggregate base		Bridge T beam
	Earthwork		Concrete airfield pavement
	<i>Portland cement</i>		Concrete
	<i>Aggregate</i>		<i>Aggregate</i>
	<i>Backhoe</i>		<i>Plywood</i>
	<i>Sand</i>		<i>Portland cement</i>
	<i>Unskilled labor</i>		<i>Reinforcing steel</i>
<b>Substructure</b>	<i>Skilled labor</i>	<i>Sand</i>	<i>Structural steel</i>
	Round bridge pier	<i>Unskilled labor</i>	<i>Skilled labor</i>
	Bridge spread footings	<b>Underground utility</b>	Culvert
	Aggregate base		Drilled shaft
	Concrete		Concrete
	<i>Aggregate</i>		<i>Backhoe</i>
	<i>Portland cement</i>		<i>Portland cement</i>
	<i>Reinforcing steel</i>		<i>Sand</i>
	<i>Sand</i>		<i>Sand filter</i>
	<i>Backhoe</i>		<i>Unskilled labor</i>
	<i>Plywood</i>		<i>Skilled labor</i>
	<i>Unskilled labor</i>		<b>Mechanical equipment</b>
<i>Skilled labor</i>	<i>Centrifugal pump</i>		
<b>Electrical equipment</b>	Electrical service point		
	<i>Unskilled labor</i>	<i>Unskilled labor</i>	
	<i>Skilled labor</i>	<i>Skilled labor</i>	

**How many items should be priced?**

41. Countries should price all 34 components. Note that 12 of these are very common basic inputs which can be priced without difficulty. The 22 composite components on the list have been selected because they represent types of construction work that are common throughout the world.

## Prices to be reported

### Definition of the prices for construction

42. The prices to be reported are as follows:

- For the 22 **composite components**, the price is the total of the cost, at purchaser prices, of the materials, labor and hire of any necessary equipment. Note the following points.
  - The price reported for completed components does not include any profit margin or any fees for architects, quantity surveyors and other construction specialists. It consists only of the direct costs of materials, labor and hire of equipment.
  - The purchaser prices of the materials and hire of equipment includes only non-deductible product taxes. Value added taxes are often fully deductible for goods and services that are considered to be investments and so will usually be excluded from the purchaser price.
  - For labor, compensation of employees is to be reported. See the definition in the next paragraph.
- For **skilled and unskilled labor**, compensation of employees is to be reported and not just cash wages and salaries. Compensation of employees consists of:
  - Wages and salaries paid in cash before deduction of income taxes, social security contributions that are paid by the employee and, where relevant, union dues;
  - Employers' contributions to social security schemes; and
  - The cost to the employer of income in kind provided to the employees in the form of free or subsidized housing and food.

In many countries, construction workers are usually employed on a temporary basis and employers do not make any payments on their behalf into a social security system nor provide income in kind. In such cases compensation of employees will equal wages and salaries before deduction of income taxes, social security contributions that are paid by the employee and union dues.

- For **rent of equipment** purchaser prices are to be reported. These include non-deductible product taxes and the costs of transporting the equipment to the construction site. If the owner of the equipment also supplies a specialized operator for the equipment, these labor costs will also be included in the purchaser price.
- For **building materials** purchaser prices are to be reported. Purchaser prices include non-deductible product taxes and the costs of delivering the materials to the construction site.

### National prices

43. For **composite components**, countries are required to supply average national prices. These should be weighted averages of the costs of the materials, labor and hire of equipment required to construct the component in different regions of the country with the weights proportional to the value of construction work being carried out in those different regions. In small countries, it may be

sufficient to estimate the cost of the completed component in a single location – e.g. the capital city – but in many countries it will be necessary to take account of regional variations in calculating national average costs for completed components.

44. The same reasoning applies for **building materials, hire of equipment and labor**. National prices should be weighted averages of prices in all the parts of the country where construction activity is significant. In small countries this may be a single location but in most countries, prices will have to be collected in a number of different locations.

#### Number of price observations

45. For **composite components**, a single estimate of the national average is required.
46. For **building materials** and for **hire of equipment**, prices should be collected from at least five outlets in each part of the country where construction activity is significant.
47. For **skilled** and **unskilled labor** the number of observations required depends on the data sources used and these are discussed below.

#### Timing of data collection

48. The prices reported should be average prices for the year 2005 and in principle, these should be the average of prices collected at regular intervals throughout the year. However, provided all countries price equipment goods at approximately the same period, there is no need to collect prices throughout the year. Price collection in mid-year is recommended.
49. For this round of the ICP, countries are being asked to collect data in 2006 and use the data directly to compute PPPs unless inflation is 5 percent or greater in which case appropriate adjustments will be required.

#### **Product specifications and reporting forms**

50. Box 2 gives an example of a reporting form for one of the 22 composite components - namely *Earthwork* which appears in all three Basic Headings.

Hire of all kinds of equipment, purchase of all kinds of building materials and payments for all kinds of skilled labor are to be reported and not only those kinds of equipment, building materials, and skilled labor that are included in the list of basic inputs. For example, in most countries crawler-dozers and dump trucks would be used for the type of earthwork specified. The cost of hiring both kinds of equipment must be included in the cost of this composite component.

**Box 2. Sample SPD for Construction: Earthwork**

**Source Information:**

- Date of price collection: \_\_\_\_\_ Country: \_\_\_\_\_
- Describe source of price

<input type="checkbox"/> Architect	<input type="checkbox"/> General Contractor
<input type="checkbox"/> Engineer	<input type="checkbox"/> Specialty Contractor
<input type="checkbox"/> Average, Price Index data collection	<input type="checkbox"/> Other ( _____ )

**Quantity and Details:**

This component is intended for collection of pricing data for excavating, transporting, water treating, and compacting 5000 cubic meters (bank measurement) of soil excavation. Assume that soil conditions are similar to those commonly described as common soil (this means excluding rocky condition or a condition that is referred to as a “problem soil”) and that earthwork is to be performed under average workability and traffic ability conditions. For purposes of this pricing, assume that the earthwork is to be conducted as part of a mass grading operation for a project, and that all transport of soil will take place within the project boundaries (no off-site or over-road transport is required). Stripping of topsoil is not to be included in the price. No shoring is required for the cut portion of the earthwork. The average haul distance is 800 m, with a maximum haul distance of 1000 m. The fill will be constructed only out of the 5000 bank cubic meters of cut, and is to be compacted to a minimum density of 95% of the maximum density of the standard Proctor compaction test (ASTM D698 or equivalent) at moisture content within 2% of optimum. Assume that compaction testing will be conducted, but the cost of this testing is not to be included in the price.

**Pricing Information:**

**Material Costs** (in national currency)

Type	Quantity (Column 1)	Unit Cost (Column 2)	Extended Material Costs (Column 1 X Column 2)
TOTAL COST FOR MATERIALS (in national currency):			_____ (a)

**Costs** (in national currency)

Type:	Number of Hours Required (Column 1)	Rate per hour (Column 2)	Extended Costs (Column 1 X Column 2)
Unskilled			
Skilled (list by type):			

TOTAL COST FOR (in national currency):			_____ (b)
<b>Equipment Costs</b> (in national currency)			
Type:	Number of Hours Required (Column 1)	Rate per hour (Column 2)	Extended Equipment Costs (Column 1 X Column 2)
TOTAL COST FOR EQUIPMENT (in national currency):			_____ (c)
Total Price for earthwork (in national currency – sum of a, b, and c): _____			
Comments (if any)			

**Sources of price information**

51. The sources of price data differ depending on the nature of the component:
- A construction expert should be used provide the prices for composite components, building materials and hire of equipment. The expert could be an architect, quantity surveyor, construction engineer or a building contractor. In some countries it will be possible to find someone with the necessary expertise in a government agency such as a public works department or construction ministry. In other countries private sector consultants will have to be hired.
  - For skilled and unskilled labor there are several possible sources:
    - Some countries regularly compile statistics on the costs of various kinds of labor and may be able to supply the necessary data from existing records.
    - In some countries all or most workers in the construction industry belong to trade unions which enforce standard levels of employee compensation. Provided that a high percentage of employees in the industry are unionized, the standard trade union rates can be used.
    - In other countries it will be necessary to make a special investigation into compensation for both skilled and unskilled workers. In this case the sources could be specialist or general building contractors, public or private employment agencies, or advertisements in trade publications aimed at the construction industry.

## Editing prices

52. Methods used to edit price data for BOCC will again depend on the type of component:
- For **completed components** there will be only a single price observation per country. The Quaranta Tables can be applied by the Regional Offices but not by national statistical offices.
  - For **building materials**, and for **plant hire** countries should make multiple price observations so the full editing procedures can be used both by countries and by the Regional Offices.
  - For **compensation of employees** some countries will make multiple observations so that the editing procedures can be used both by the countries and by the Regional Offices. The Regional Office will perform a Quaranta edit.

## Weights

53. The BOCC approach uses three types of weights:
- W1—for aggregation of the three Basic Headings – Residential and Non-residential and Civil engineering works - to obtain GDP;
  - W2—for aggregation of Systems to obtain Basic Headings;
  - W3—for aggregation of composite component and/or basic inputs to obtain Systems.

**W1 weights** are Basic Heading weights and come from the national accounts.

54. Unweighted geometric averages are used to obtain price relatives for Systems from the composite components or basic inputs. In other words the **W3 weights** are set at unity. Note, however that weights are still implicitly being used because in constructing composite components different combinations of labor, materials and plant hire will be used in different countries depending on relative prices.<sup>3</sup>
55. Special calculations are required for the **W2 weights**. Two broad strategies for calculating W2 can be adopted by National Statistical Offices (NSO).
- Strategy 1: Under the first strategy the NSO retains the service of a construction expert to determine the values of W2. If the NSO has hired an outside expert to cost the composite components, this same person may be able to provide the W2 Weights.
  - Strategy 2: Under this strategy NSO performs all the W2 calculations in house. This approach is only advisable where the NSO can request help from the country's public works department or ministry of construction.
56. . The procedure for calculating W2 Weights involves the following steps:

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<sup>3</sup> However, in the case of the three Systems for which only basic inputs are used there are neither implicit nor explicit weights.

**Step 1:** Collect priced Bills of Quantity (BOQs) from past projects for the three Basic Headings.

- For the Residential buildings BOQs for single-family dwellings and apartment buildings and the like are required.
- For Non-residential buildings, BOQs for farm buildings, office buildings, industrial buildings, hospitals, schools and buildings for cultural and religious purposes should be collected.
- For the Civil engineering works, BOQs for roads, highways, airports, water and sewer systems, telecommunication structures, marine structures, power generation and transmission infrastructure are to be collected.

The larger the sample, obviously the more reliable the overall result will be. However, at a minimum one project of each type within each Basic Heading should be used, and preferably at least three. Note that the BOQs to be collected are for past project and there is no need to generate new data for this process.

**Step 2:** Every item in the priced BOQ needs to be classified as belonging to one of the systems. For someone with expertise in construction or engineering it is not difficult to map each line item in the BOQ to a particular system. It is not necessary to have an extremely detailed BOQ for this purpose. A summary or “roll-up” BOQ which lists only the principal divisions and a few major categories within each division is both sufficient and somewhat easier to work with. With a “roll-up” BOQ, the mapping of the line items to the appropriate systems can be accomplished in a few minutes.

Table 7 illustrates this step. Columns 1 through 5 are already available; Column 6 is completed in Step 2.

**Table 7: Sample BOQ illustrating allocation of Items to Systems**

<b>Item Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Rate</b>	<b>Item Cost</b>	<b>System</b>
3.1 Building concrete 150 kg cement 5 cm thick	m3	4	100	400	<b>Substructure</b>
3.2 foundations reinforced concrete for strip and independent footings 350 kg cement	m3	19	140	2660	<b>Superstructure</b>
3.3 Rough formwork for item 3.2	m2	97	12	1164	<b>Superstructure</b>
3.4 Reinforced concrete for anchorages lintels parapet and upright	m3	41	140	5740	<b>Superstructure</b>
3.5 Rough formwork for item 3.4	m2	574	12	6888	<b>Superstructure</b>
3.6 Reinforced concrete 250 kgs for slab 10 cm thick	m2	260	12	3120	<b>Superstructure</b>

**Step 3:** After the classification of all the items in the BOQ is complete, the contributing cost of each system to the total project can be calculated using equation

$$W2_{S_i} = \frac{\sum_{\text{all } k} I_k}{T}$$

Where:

$W2_{S_i}$  = W2 *Weight* for the  $i^{\text{th}}$  System

$I_k$  = line item cost for the  $k$  line items classified as belonging to system  $i$ ;

and  $T$  = total direct cost of the project, i.e. excluding taxes, profits, and overhead.

This process is repeated for all  $i$  Systems in each of the three Basic Headings.



## Annex 1. ICP Equipment Ring List

BH Code	Basic Heading Title	Product Name	Pr. Code	No. of Products	
15.01.11. 1	<b>FABRICATED METAL PRODUCTS</b>	Horizontal Cylindrical Storage Tank (5,000 Liters)	1	<b>5</b>	
		Horizontal Cylindrical Storage Tank 10,000 Liters)	2		
		Tank for Storing Liquid Food & Beverage Products (1,000 Liters)	3		
		Tank for Storing Liquid Food & Beverage Products (5,000 Liters)	4		
		Pressurized Gas Storage Tank	5		
15.01.12. 1	<b>GENERAL PURPOSE MACHINERY</b>	<b>A. Engines &amp; Turbines, Pumps &amp; Compressors</b>		<b>10</b>	
		Air Compressor - Small	1		
		Air Compressor - Towed	2		
		Industrial Diesel Engine (Heavy Duty) - Tier2 Stage2	3		
		Industrial Diesel Engine (Heavy Duty) - Tier3 Stage3A	4		
		Light Industrial Diesel Engine	5		
		Marine Diesel Engine (Commercial)	6		
		Marine Diesel Engine (Pleasure)	7		
		On-Highway Commercial Diesel Engine (Heavy Duty)	8		
		Water Pump - Centrifugal	9		
		Water Pump - Jet	10		
		<b>B. Other General Purpose Machinery</b>			
		Air Conditioner - Residential	11		
		Air Conditioner - Room	12		
		Rough Terrain Forklift - Extendable Boom	13		
Rough Terrain Crane – Hydraulic Extendable Boom	14				
Rough Terrain Crane	15				
15.01.13. 1	<b>SPECIAL PURPOSE MACHINERY</b>	<b>A. Agricultural &amp; Forestry Machinery</b>		<b>5</b>	
		Compact Tractor	1		

	Utility Tractor	2	2
<b>B. Machine Tools</b>	MIG Welder (Arc Welder)	3	
	Power Circular Saw	4	
	Power Hand Drill	5	
	Grinder Power Handheld	6	
	Router	7	
	Sander	8	6
<b>C. Machinery for Metallurgy, Mining, Quarrying &amp; Construction</b>			
	Backhoe Loader	9	
	Crawler Dozer - Large	10	
	Crawler Dozer - Medium	11	
	Crawler Dozer - Small	12	
	Crawler Loader - Large	13	
	Crawler Loader - Medium	14	
	Crawler Loader - Small	15	
	Dumper1 - Rigid Frame	16	
	Dumper2 - Over 30 Tonnes	17	
	Dumper3 - Under 30 Tonnes	18	
	Hydraulic Excavator1 - Large	19	
	Hydraulic Excavator2 - Compact	20	
	Hydraulic Excavator3 - Mini	21	
	Motor Grader	22	
	Skid Steer Loader	23	
	Skid Steer Loader - Rubber Track	24	
	Trenchless	25	
	Wheel Dozer	26	
	Wheel Loader1 - Large	27	
	Wheel Loader2 - Mid-Size	28	
	Wheel Loader3 - Compact	29	
	Wheel Loader4 - Small	30	22
<b>D. Machinery for Food, Beverages &amp; Tobacco Processing</b>			
	Mincing Machine (0.5 KW Power)	31	
	Mincing Machine (1 KW Power)	32	
	Spiral Dough Mixer (for 50 Kg)	33	
	Spiral Dough Mixer (for 100 Kg)	34	4
<b>E. Machinery for Textile, Apparel &amp; Leather Production</b>			0
<b>F. Other Special Purpose Machinery</b>			
	Blow Molding Machine for 50 Liters	35	
	Blow Molding Machine for 100 Liters	36	

	Injection Molding Machine for 50 Tonnes (Low-end)	37	
	Injection Molding Machine for 1,000 Tonnes (High-end)	38	
	Extruder	39	<b>5</b>
<b>15.01.14.1</b>	<b>ELECTRICAL &amp; OPTICAL EQUIPMENT</b>		
	<b>A. Office Machinery</b>		
	Copier	1	
	Fax Machine	2	
	Digital Projector	3	
	Overhead Projector	4	
	Paper Shredder	5	<b>5</b>
	<b>B. Computers &amp; Other Information Processing Equipment</b>		
	Desktop Computer - Compaq	6	
	Desktop Computer - Dell	7	
	Laptop Computer	8	
	Inkjet Printer	9	
	Laser Printer	10	
	Multifunction Printer	11	
	PDA	12	
	Scanner	13	
	Server	14	<b>9</b>
	<b>C. Electrical Machinery &amp; Apparatus</b>		
	Electric Motor	15	
	Generator	16	<b>2</b>
	<b>D. Radio, Television &amp; Communications Equipment &amp; Apparatus</b>		
	2-Way Radio	17	
	DVD Player	18	
	Security Camera	19	<b>3</b>
	<b>E. Medical, Precision &amp; Optical Instruments, Watches &amp; Clocks</b>		
	Anesthesia Unit	20	
	Chemistry Analyzer	21	
	CT Scanner	22	
	Infant Incubator	23	
	Infusion Pump	24	
	Mammography Unit	25	
	MRI	26	
	Patient Monitor	27	
	Ultrasound	28	
	X-Ray Machine	29	<b>10</b>
<b>15.01.15.1</b>	<b>OTHER MANUFACTURED GOODS n.e.c.</b>		<b>0</b>

<b>15.01.21.</b> <b>1</b>	<b>MOTOR VEHICLES, TRAILERS &amp; SEMI-TRAILERS</b>	Commercial Vehicle - 28 Passengers	1	
		Diesel Minibus - 8 Passengers	2	
		Diesel Minibus - 15 Passengers	3	
		Diesel Minibus - 21 Passengers	4	
		Intra-City Bus - 26 to 44 Passengers	5	
		Inter-City Bus - 45 Passengers	6	
		Lorry Cab Chassis 5 Tonnes	7	
		Lorry Cab Chassis 10 Tonnes	8	
		Lorry Cab Chassis 15 Tonnes	9	
		Pickup Truck	10	
		Van Truck	11	<b>11</b>
<b>15.03.11.</b> <b>1</b>	<b>SOFTWARE</b>	Graphic Design Software 1	1	
		Graphic Design Software 2	2	
		Office Software Suite 1	3	
		Office Software Suite 2	4	
		Operating System Software 1	5	
		Operating System Software 2	6	
		Anti-Virus Software 1	7	
		Anti-Virus Software 2	8	
		Statistical Software	9	<b>9</b>
		<b>TOTAL</b>		

## **Annex 2. Web-sites that can be used for identifying & pricing equipment goods**

### **Fabricated Metal Products**

[www.alcoa.com](http://www.alcoa.com) (aluminum extrusions)

### **General Purpose Machinery**

[www.ingersol-rand.com](http://www.ingersol-rand.com) (cranes, compressors)

[www.volvo.com](http://www.volvo.com) (cranes)

[www.kawasaki.com](http://www.kawasaki.com) (gas turbines)

[www.cat.com](http://www.cat.com) (engines, gas turbines)

[www.johndeere.com](http://www.johndeere.com) (diesel engines)

[www.komatsu.com](http://www.komatsu.com) (diesel engine, forklift)

[www.cummins.com](http://www.cummins.com) (engines)

[www.liebherr.com](http://www.liebherr.com) (cranes)

[www.lindelifttruck.com](http://www.lindelifttruck.com) (forklift)

[www.linkbelt.com](http://www.linkbelt.com) (cranes)

[www.manitowoccranes.com](http://www.manitowoccranes.com) (cranes)

[www.jlg.com](http://www.jlg.com) (cranes, forklift)

[www.manitou-na.com](http://www.manitou-na.com) (cranes, forklift)

[www.mit-lift.com](http://www.mit-lift.com) (forklift)

[www.mustangmfg.com](http://www.mustangmfg.com) (forklift)

[www.pettibone-mi.com](http://www.pettibone-mi.com) (cranes)

[www.towercranes-usa.com](http://www.towercranes-usa.com) (tower cranes)

[www.snorkelusa.com](http://www.snorkelusa.com) (truck mounted cranes)

[www.tadanoamerica.com](http://www.tadanoamerica.com) (cranes)

[www.technocrane.com](http://www.technocrane.com) (cranes)

[www.terex-crane.com](http://www.terex-crane.com) (cranes)

[www.yale.com](http://www.yale.com) (forklift)

[www.airtechnical.com](http://www.airtechnical.com) (crane)

[www.demag-us.com](http://www.demag-us.com) (crane)

[www.noellcrane.com](http://www.noellcrane.com) (crane)

[www.mantisranes.com](http://www.mantisranes.com) (cranes)

[www.badgerequipment.com](http://www.badgerequipment.com) (cranes)

[www.kobelcoamerica.com](http://www.kobelcoamerica.com) (cranes)

[www.palfinger.com](http://www.palfinger.com) (crane)

[www.positech-solutions.com](http://www.positech-solutions.com) (cranes)

[www.stellarindustries.com](http://www.stellarindustries.com) (cranes)

[www.altec.com](http://www.altec.com) (cranes)

[www.lenox.com](http://www.lenox.com) (HVAC)

[www.carrier.com](http://www.carrier.com) (HVAC)

[www.rheem.com](http://www.rheem.com) (HVAC)

[www.americanstandard.com](http://www.americanstandard.com) (HVAC)

[www.granger.com](http://www.granger.com) (HVAC, tools, electrical, lighting, welders, generators, motors)

[www.groveworldwide.com](http://www.groveworldwide.com) (cranes)

## Special Purpose Machinery

[www.agcocorp.com](http://www.agcocorp.com) (agricultural machinery brands- Challenger, Fendt, Massey-Ferguson, Valtra, Gleaner, Hesston, New Idea, Ideal, Sunflower, White planters, RoGator, TerraGator, Spra-Coupe, Farmhand, Glencoe, Sisu Diesel, TYE, Fieldstar, Lor\*al, Soilteq, Willmar)

[www.cat.com](http://www.cat.com) (earthmoving, mining, quarrying, material handling)

[www.cnh.com](http://www.cnh.com) (agricultural machinery brands-CASE IH, New Holland, Steyr) (construction machinery-CASE, New Holland, Kobelco)

[www.johndeere.com](http://www.johndeere.com) (agricultural, earthmoving, forestry and lawn care )

[www.ingersol-rand.com](http://www.ingersol-rand.com) (earthmoving)

[www.volvo.com](http://www.volvo.com) (earthmoving)

[www.komatsu.com](http://www.komatsu.com) (earthmoving)

[www.kawasaki.com](http://www.kawasaki.com) (earthmoving)

[www.jcb.com](http://www.jcb.com) (earthmoving, agriculture, forklifts)

[www.makita.com](http://www.makita.com) (power woodworking tools)

[www.black&decker.com](http://www.black&decker.com) (power woodworking tools)

[www.ryobi.com](http://www.ryobi.com) (power woodworking tools)

[www.portercable.com](http://www.portercable.com) (power woodworking tools)

[www.dewalt.com](http://www.dewalt.com) (power woodworking tools)

[www.bosch.com](http://www.bosch.com) (power woodworking tools)

[www.milwaukee.com](http://www.milwaukee.com) (power woodworking tools)

[www.skil.com](http://www.skil.com) (power woodworking tools)

[www.hilti.com](http://www.hilti.com) (power woodworking tools)

[www.hitachi.com](http://www.hitachi.com) (power woodworking tools)

[www.metabo.com](http://www.metabo.com) (metal working tools)

[www.ridgid.com](http://www.ridgid.com) (metal working tools)

[www.grizzley.com](http://www.grizzley.com) (power woodworking tools)

[www.festool.com](http://www.festool.com) (power woodworking tools)

[www.craftsman.com](http://www.craftsman.com) (power woodworking tools)

[www.chicagopneumatic.com](http://www.chicagopneumatic.com) (power Tools)

[www.universaltool.com](http://www.universaltool.com) (power tools)

[www.woodworker.com](http://www.woodworker.com) (power woodworking tools)

[www.jettool.com](http://www.jettool.com) (power woodworking tools)

[www.unverferth.com](http://www.unverferth.com) (agricultural trailers)

[www.balzerinc.com](http://www.balzerinc.com) (liquid manure haulers)

[www.rotomix.com](http://www.rotomix.com) (semi solid manure hauler)

[www.liebherr.com](http://www.liebherr.com) (earthmoving)

[www.linkbelt.com](http://www.linkbelt.com) (earthmoving)

[www.mustang.com](http://www.mustang.com) (earthmoving)

[www.gehl.com](http://www.gehl.com) (earthmoving)

[www.ditchwitch.com](http://www.ditchwitch.com) (earthmoving)

[www.vermeer.com](http://www.vermeer.com) (earthmoving)

[www.geartechnology.com](http://www.geartechnology.com) (gear tooth cutting)

[www.gleason.com](http://www.gleason.com) (bevel gear cutting)

[www.brown&sharpe.com](http://www.brown&sharpe.com) (metrology)

[www.barber-coleman.com](http://www.barber-coleman.com) (gear cutting machines)

[www.granger.com](http://www.granger.com) (tools, welders, woodworking)

[www.hobart.com](http://www.hobart.com) (welding machines)

[www.lincoln.com](http://www.lincoln.com) (welding machinery)

[www.mitrowskiwelding.com](http://www.mitrowskiwelding.com) (welding machinery)

[www.thermadyne.com](http://www.thermadyne.com) (welding and plasma cutting machines)

[www.bernina.com](http://www.bernina.com) (sewing machines and sergers)

[www.pfaff.com](http://www.pfaff.com) (sewing machines and sergers)

[www.singer.com](http://www.singer.com) (sewing machines and sergers)

[www.brother.com](http://www.brother.com) (sewing machines and sergers)

### **Electrical/optical/medical equipment**

[www.leviton.com](http://www.leviton.com) (switching devices)

[www.squared.com](http://www.squared.com) (control and switching devices)

[www.sylvania.com](http://www.sylvania.com) (controls, switching devices, lights)

[www.siemens.com](http://www.siemens.com) (controls, switching devices, lights, transformers, motors, medical devices)

[www.westinghouse.com](http://www.westinghouse.com) (controls switching devices, lights, motors)

[www.ge.com](http://www.ge.com) (controls, switching devices, motors, generators, transformers, lights, medical devices)

[www.basler.com](http://www.basler.com) (transformer, switching gear)

[www.kirloskar.com](http://www.kirloskar.com) (generators)

[www.marathonelectric.com](http://www.marathonelectric.com) (generators)

[www.onan.com](http://www.onan.com) (generators)

[www.lightinguniverse.com](http://www.lightinguniverse.com) (lighting)

### **Motor vehicles/trailers/semi-trailers**

[www.mack.com](http://www.mack.com) (cab/chassis, tractor)

[www.paccar.com](http://www.paccar.com) (truck/tractor brands-Kenworth, DAF, Leyland, Peterbilt, Foden)

[www.navistar.com](http://www.navistar.com) (cab/chassis, tractors)

[www.gmc.com](http://www.gmc.com) (cab/chassis, van, pickup)

[www.isuzu.com](http://www.isuzu.com) (cab/chassis, tractor, van, pickup)

[www.misubishi.com](http://www.misubishi.com) (cab/chassis, tractor, van, pickup)

[www.ford.com](http://www.ford.com) (cab/chassis, van, pickup)

[www.zil.com](http://www.zil.com) (cab/chassis, tractor)

[www.tatra.com](http://www.tatra.com) (cab chassis, tractor)

[www.renault.com](http://www.renault.com) (cab/chassis, tractor)

[www.iveco.com](http://www.iveco.com) (cab/chassis, tractor)

[www.freightliner.com](http://www.freightliner.com) (van, cab/chassis, tractor)

[www.sterling.com](http://www.sterling.com) (cab/chassis, tractor)

[www.dodge.com](http://www.dodge.com) (van, pickup)

[www.scania.com](http://www.scania.com) (cab/chassis, tractor)

[www.volvo.com](http://www.volvo.com) (cab/chassis, tractor)

[www.eastmfg.com](http://www.eastmfg.com) (semi-trailer, trailer)

[www.fontainespecialized.com](http://www.fontainespecialized.com) (semi-trailers)

[www.haletrailer.com](http://www.haletrailer.com) (trailers)

[www.mausersteel.com](http://www.mausersteel.com) (semi-trailers)

[www.vancotrailers.com](http://www.vancotrailers.com) (trailers)

[www.wabashnational.com](http://www.wabashnational.com) (trailers)

[www.fruefauf.com](http://www.fruefauf.com) (trailers)

[www.nelsontrailers.com](http://www.nelsontrailers.com) (trailers)

[www.heil.com](http://www.heil.com) (truck hauling units)

[www.johnsontruckbodies.com](http://www.johnsontruckbodies.com) (truck hauling units)  
[www.knapheide.com](http://www.knapheide.com) (truck hauling units)