



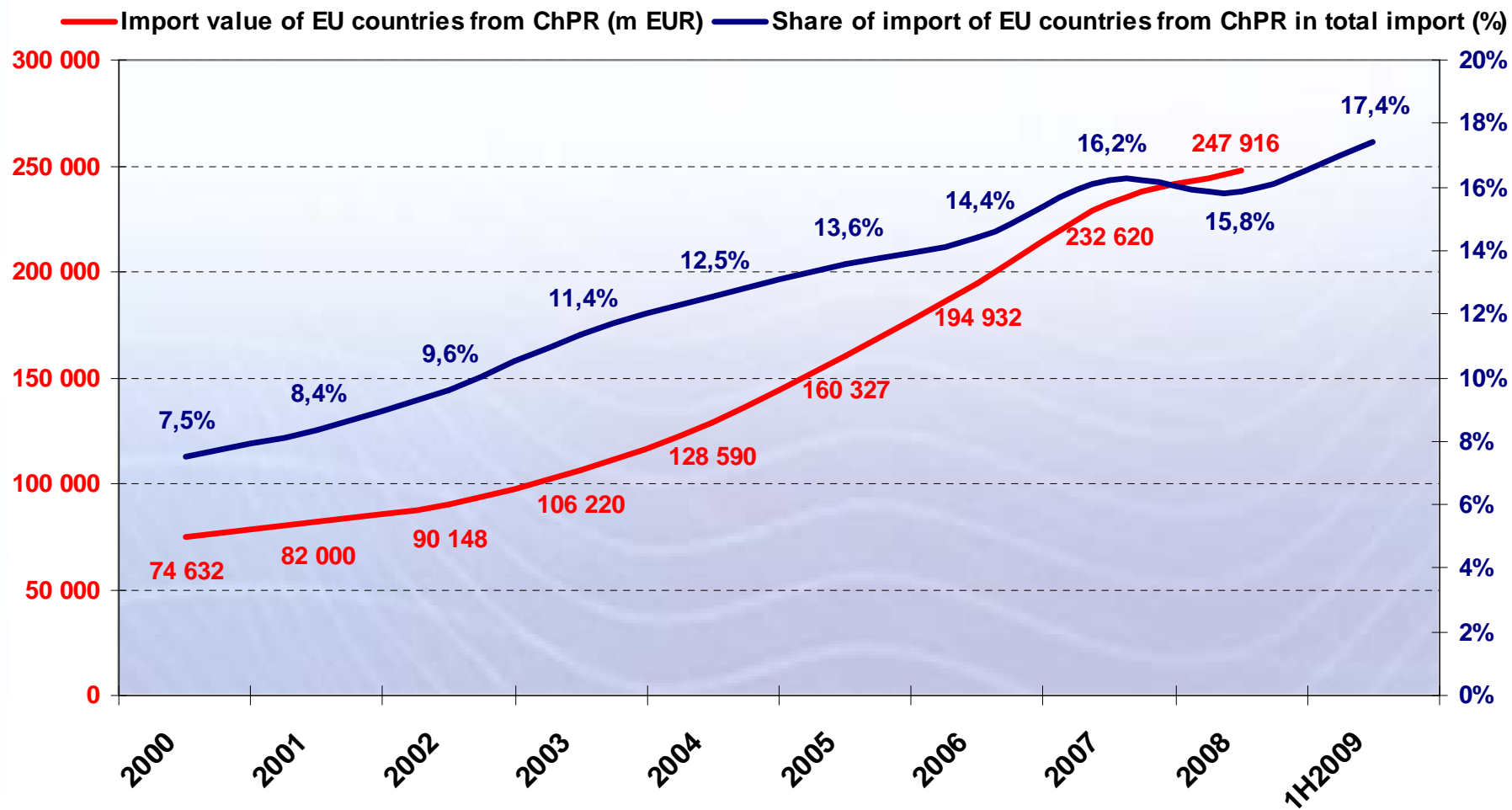
Purchase of electronic components from the Far East

Toruń, 21st June 2010



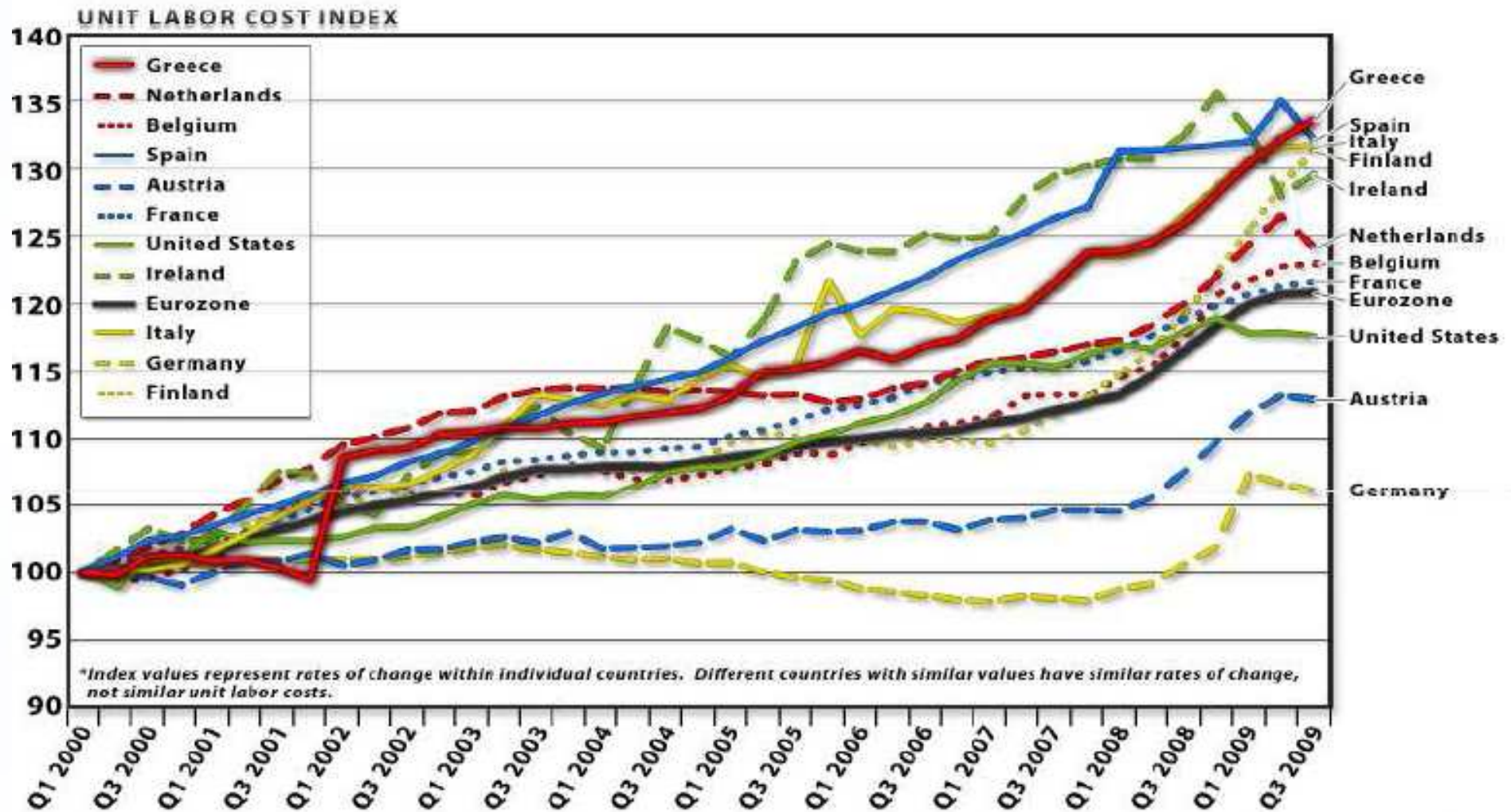
Import from Chinese People's Republic to EU countries

■ Trade between Poland and Chinese People's Republic in 2009 was in value of 11 bn EUR, where the import to Poland was in value about 10 bn EUR.



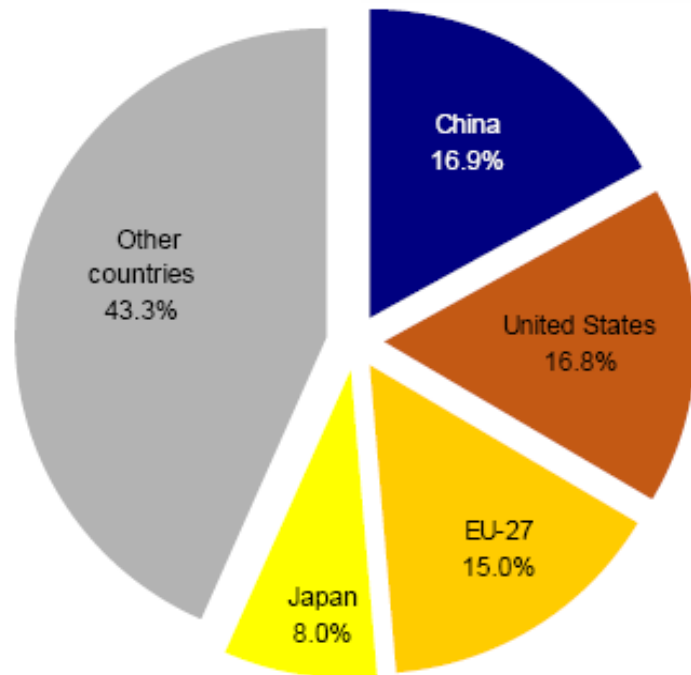
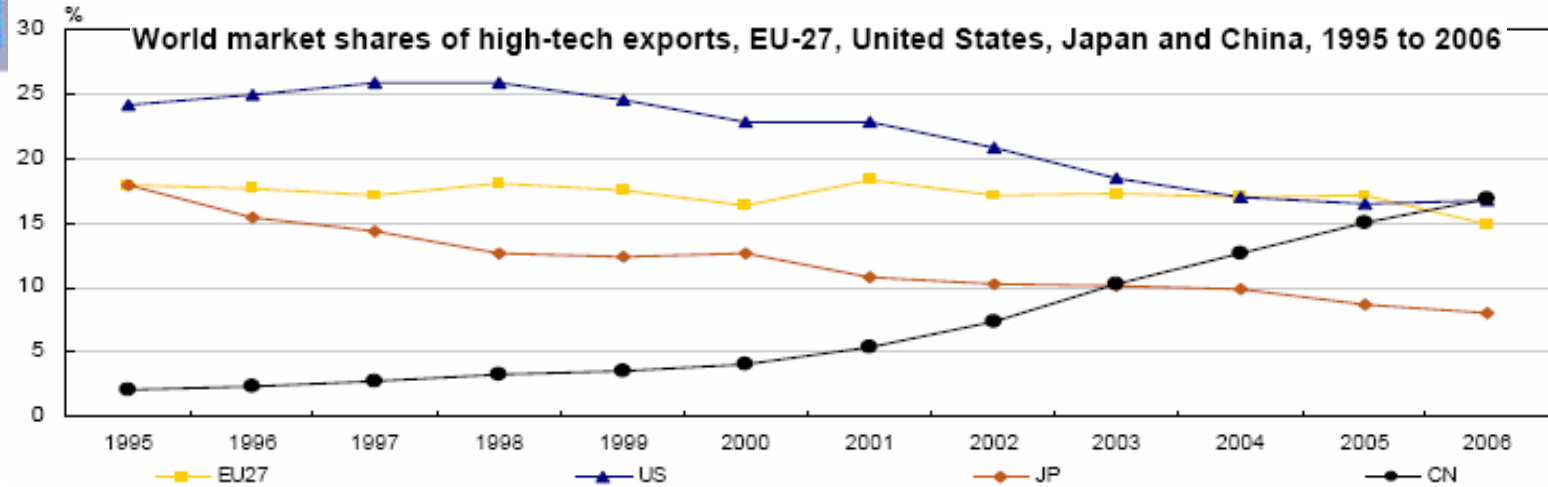


Increase of unit labour cost in the world





World market shares of high-tech products



World market shares of high-tech exports, EU-27, United States, Japan and China – 2006

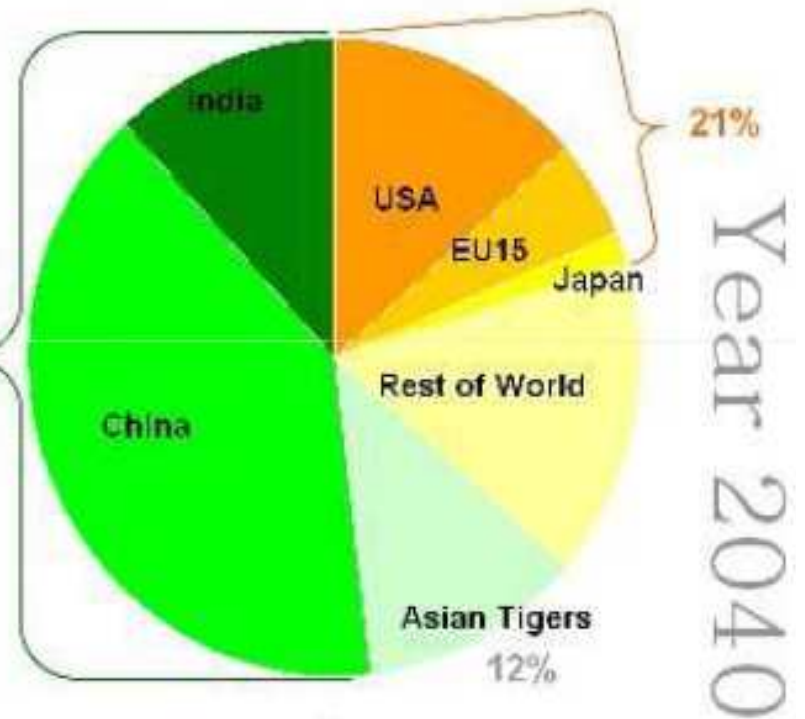
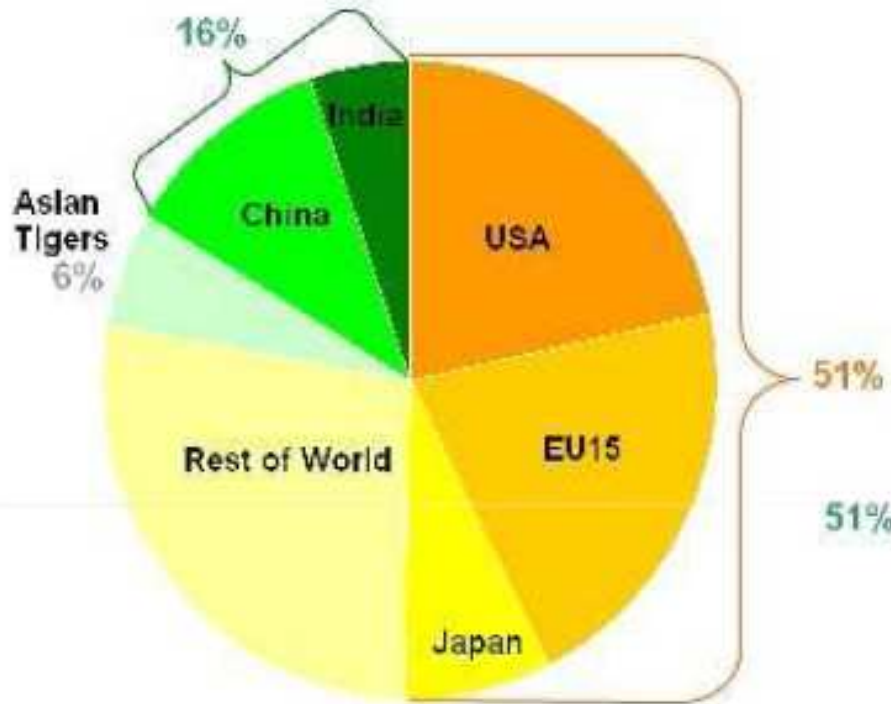
EU-27: excluding intra-EU trade
 CN: excluding Hong Kong

Source: Eurostat's high-tech statistics



Forecast of the share in the world PKB

Year 2000



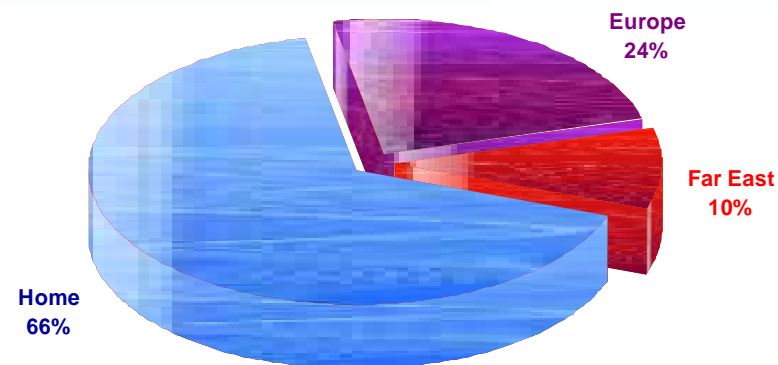
Year 2040

Source: Fogel 2009

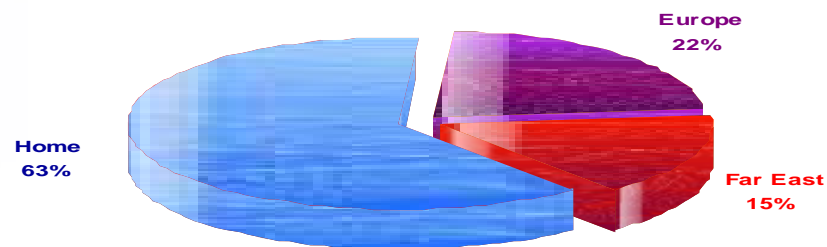


Geographical structure of purchases

- **Total purchases of Grupa Apator in 2009 were 121 m PLN**

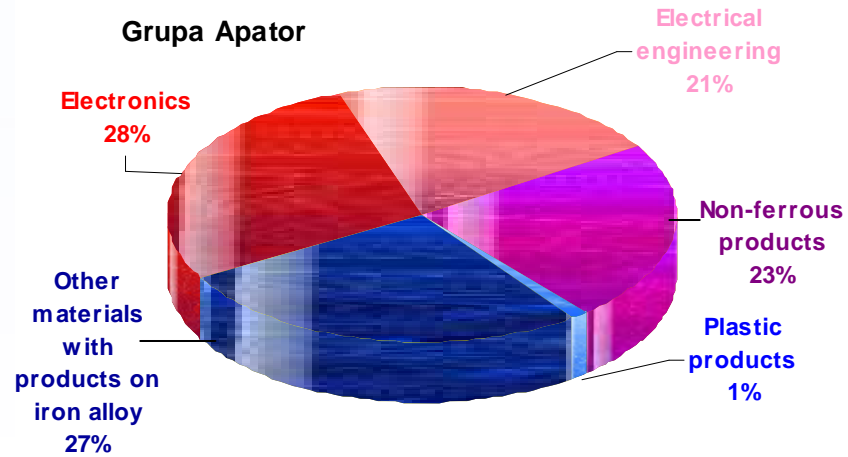


- **Total purchases of Apator in 2009 were 40 m PLN**

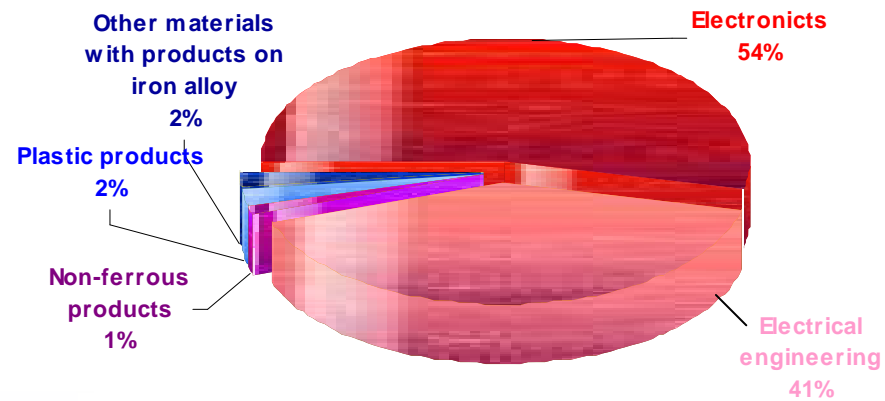




Share in purchases in the Far East

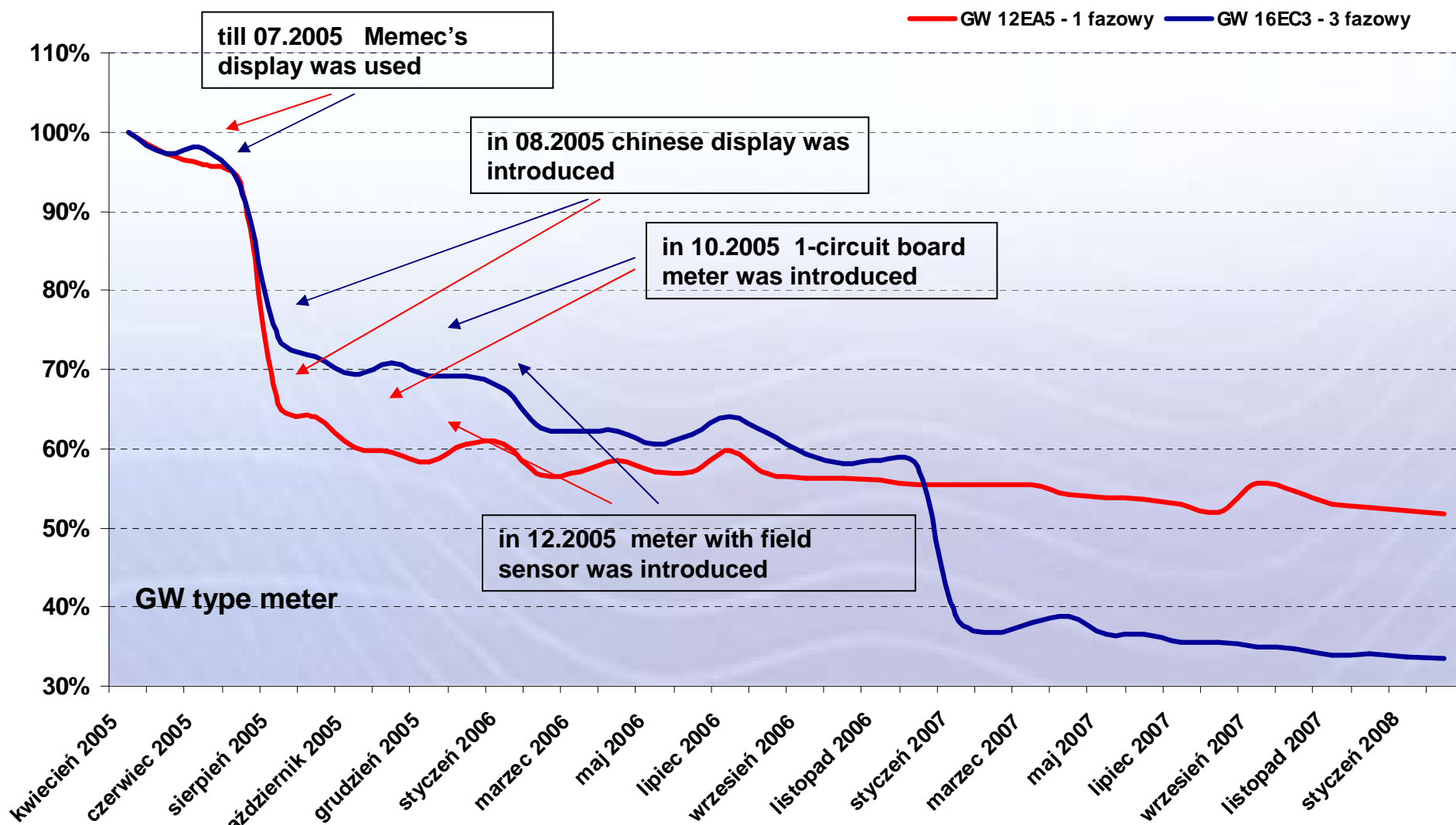


Apator SA



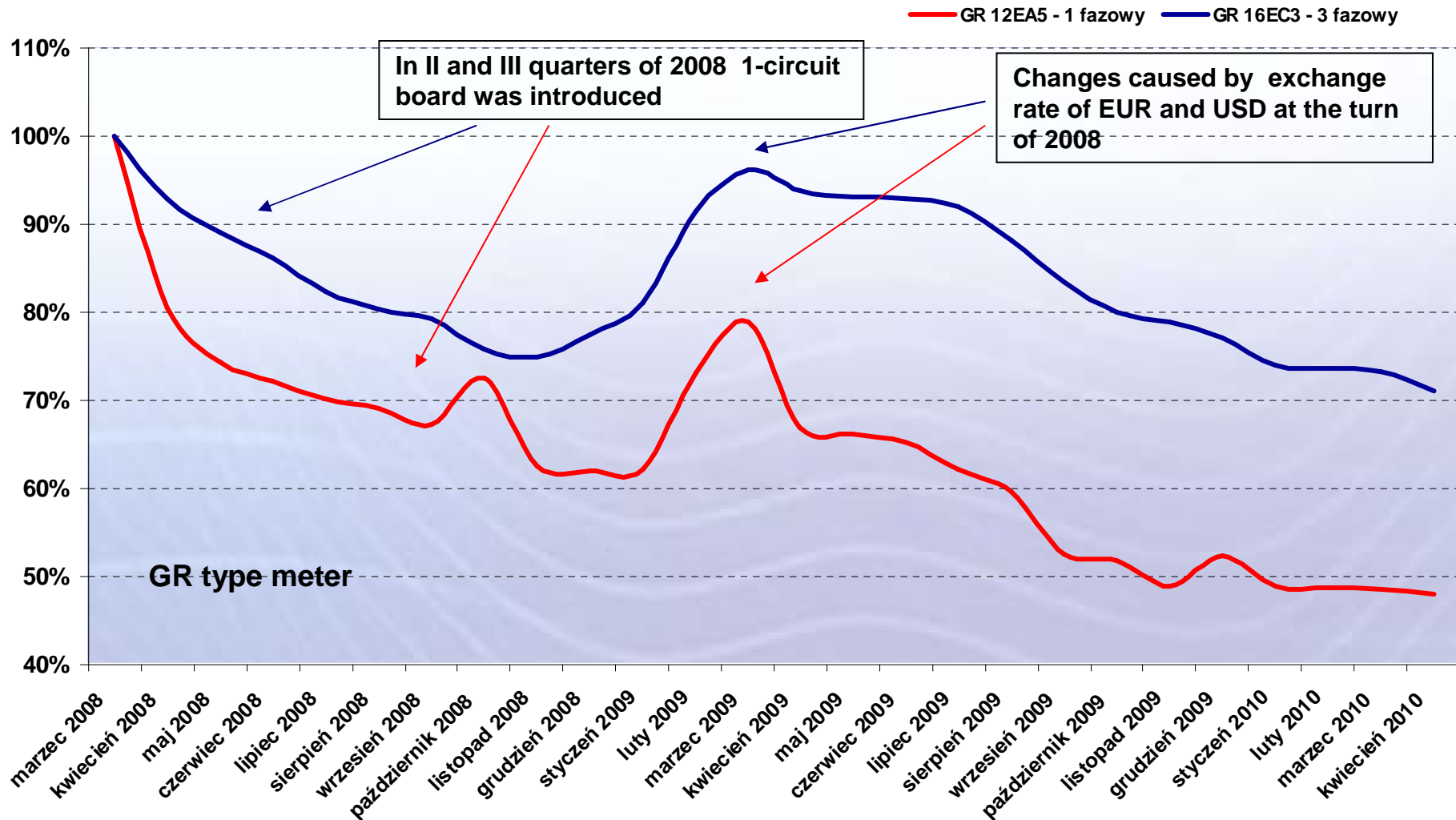


Changes in costs of materials of electronic elements for electronic electricity meters - GW type meters



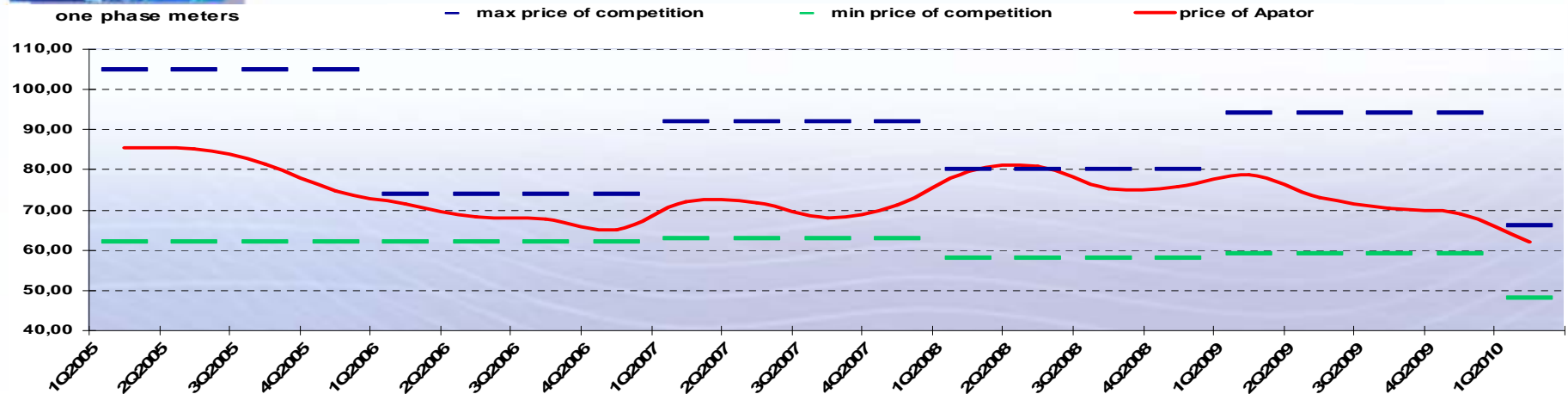


Changes in electronic material costs for electronic electricity meters – GR type meters

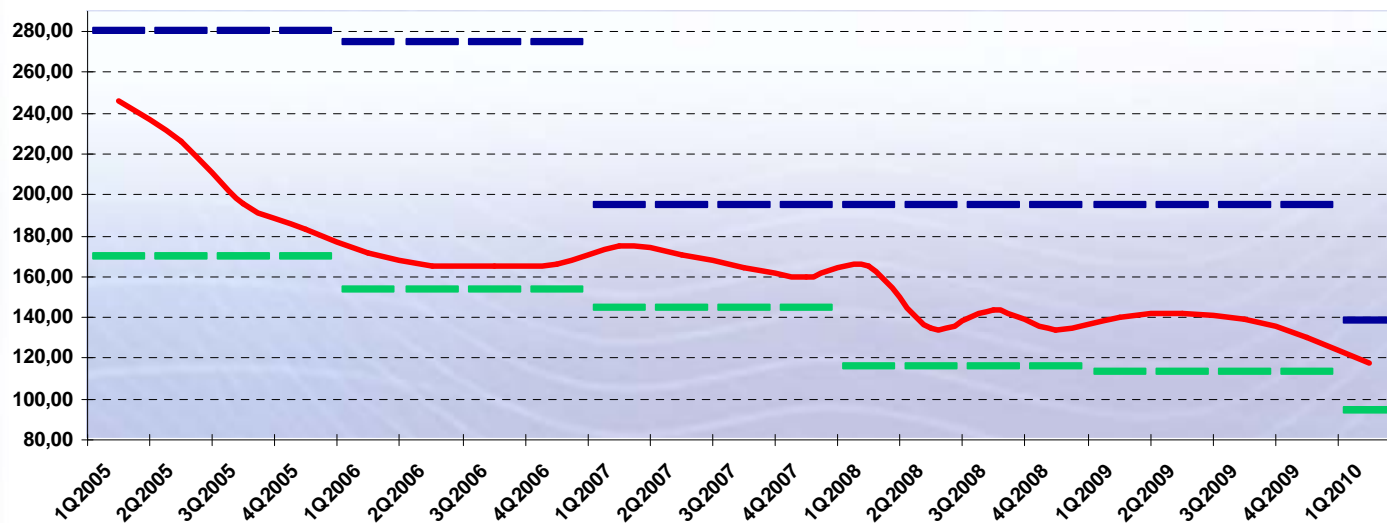




Prices of GW and GR type electronic electricity meters

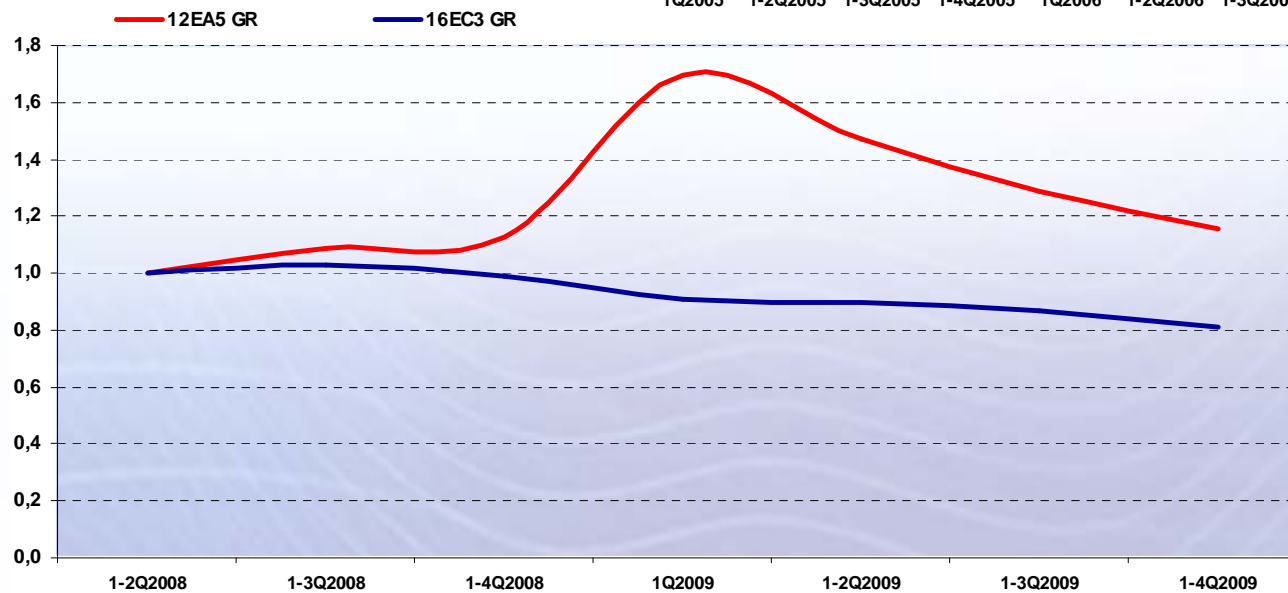
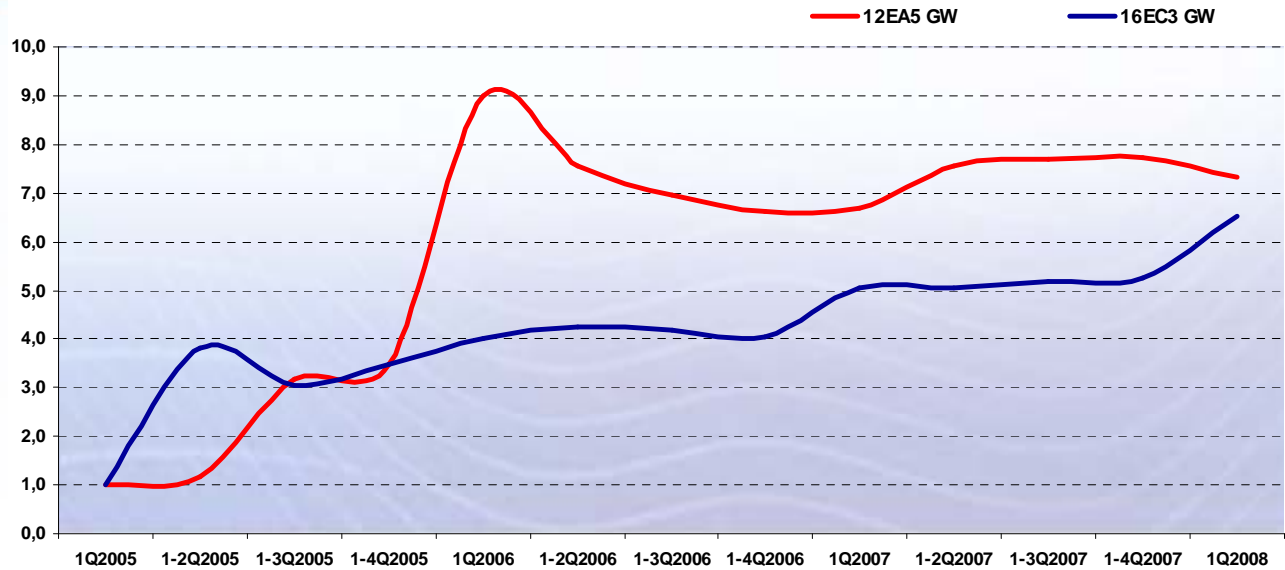


three phase meters





Changes in profitability of technical manufacturing costs of GW and GR type meters

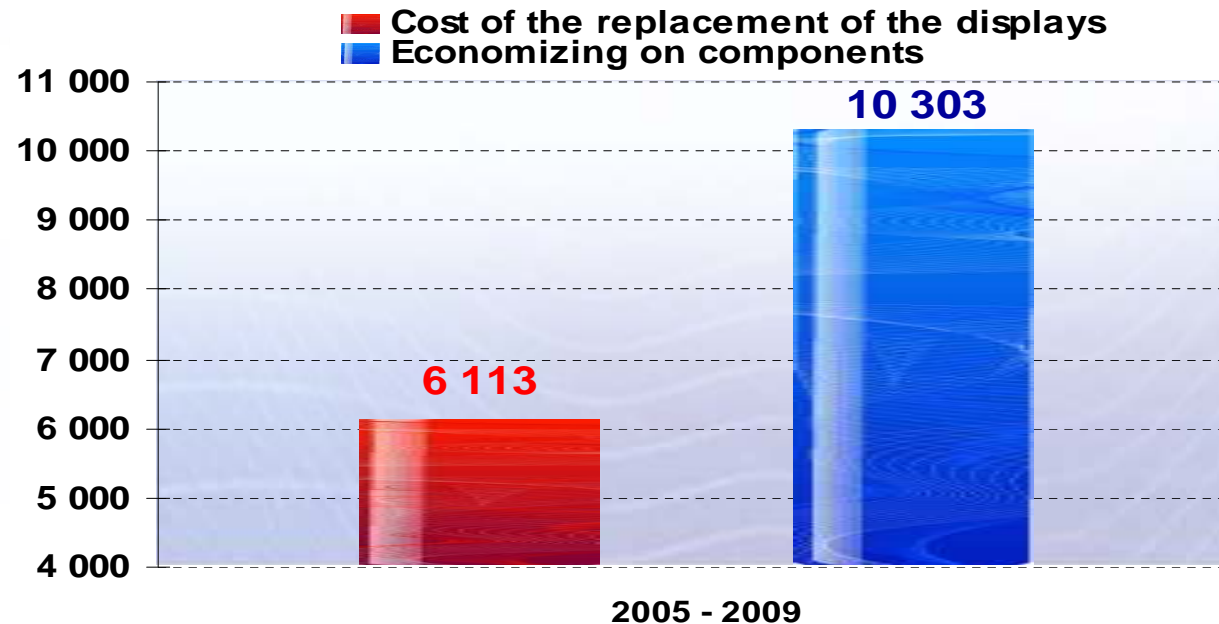




Quality problems and economizing on purchasing in the Far East

Since 2007 occurred some quality problems of the displays being delivered from Chinese manufacturer. Those displays were installed in meters since the August 2005 and they were delivered by the Polish distributor JM Elektronik in Gliwice. The seller in the reference list informed that the Chinese manufacturer also had manufactured the displays for Citroen, Bosch, Samsung and Mitsubishi.

In 2008 Apator SA brought a case to a court in order to get the compensation of the costs of repairs from JM Elektronik (latent defect). The witnesses were examined and expert were selected by the court (from Warsaw University of Technology). In June 2010 experts took samples of the displays in order to give expert opinion.





Purchasing process of electronic components

Preventive actions:

- **quality control by reliability testing of the products-procedure;**
- **auditing of manufacturers of electronic subassemblies – introduction of the complete identification of the components from the suppliers by bar coding (for instance Hanza, Sims);**
- **delivery of critical elements only from famous manufacturers (for instance Texas Instruments, STMicroelectronics, Microchips Technology Inc.)**

The rules of cooperation with the Far East:

- **the representative in Chinese People's Republic whose role is to make contacts with manufacturers and quality control of their products;**
- **the departure twice a year to audit the manufacturers of subassemblies**



Procedure of reliability testing of products and components

Reliability test procedure is used for:

- electronic components being used in electronic metering equipment,
- printed circuit boards being used in electronic metering equipment

Procedure defines detailed rules and mode of proceeding in case of :

- acceptance of a new product for manufacturing,
- acceptance of substitute of electronic component for manufacturing,
- definition of requirements regarding reliability testing and additional special ones for selected electronic components,
- definition of the schedule for testing,
- statistic reliability testing for products





Procedure of reliability testing of products and components

Products and components are subject to:

- **testing according to the standard PN-ISO 2859-1:2003,**
- **reliability testing according to PN-EN 62059-31-1 including testing of critical elements**

1. Acceptance of a new product in respect of manufacturing:

- **manufacturing the batch of samples in quantity defined by development department and subject them to routine testing and reliability testing;**
- **manufacturing of pilot batch in quantity defined by salesmen and design engineers and subject them to reliability testing**

2. Implementation of substitute – critical element:

- **acceptance by design engineers of technical parameters of components presented in catalogues ;**
- **manufacturing the batch of samples: 10 units of the product and subject them to routine testing and reliability testing;**
- **manufacturing of the pilot batch: 100 – 1 000 units of the product with components from the batch made by the supplier later than the batch for sample series and subject them to routine testing and reliability testing;**
- **manufacturing of considerable manufacturing batch of 1 001 – 10 000 units with components from the batch made by the supplier later than the batch for sample/pilot series and subject them to routine testing and reliability testing**



Procedure of reliability testing of products and components

3. Implementation of substitute – standard component:

- acceptance of technical parameters of components by design engineers presented in catalogues ;
- design engineers make the decision whether it is necessary to carry out single electrical testing and what is to be the scope. After the acceptance of components by design engineers the components are allowed to be used in serial manufacturing. However, the earliest possible time the components should be mounted in 3-5 pieces of the product and subject to reliability testing – negative result of reliability testing means the withdrawal the consent to use that component..

4. Testing of current manufacturing:

- subject to testing of random selected samples not rare than once per month suitable to the sales volume and subject them to routine testing and reliability testing.

5. Elimination of critical elements of high mortality:

- process engineers provide with complete identifications of critical elements being used in manufacturing of the products and therefore the data are archived: manufacturer of the component used,, number of batch, date of manufacture, date of receipt to the warehouse, number of manufacturing batch of the products;
- quality control personnel based on received quality claims and reliability testing carried out regularly inform design engineers and procurement personnel about mortality of particular critical elements;
- design engineers make the analysis of the mortality of critical elements and the reasons of their damages. Based on it they replace the critical elements being used to those of higher parameters or they apply to procurement personnel to change the supplier.



Control system - management

Integrated management system is based on the following standards:

- **PN-EN ISO 9001:2009 – quality,**
- **PN-EN ISO 14001:2005 – environment,**
- **PN-N-18001:2004 – Safety and Health at Work**



Control system - MID

Possibility of certification of own products according to Directive MID by the entities of Grupa that manufacture electricity meters:

- **Pafal SA:**

- since July 2008 - module B for 3-phase post paid meters,
- since October 2008 – module D for 3-phase post paid meters,
- since April 2009 – module B for single phase post paid meters,
- since February 2010 – module D for single phase post paid meters;

- **Apator SA:**

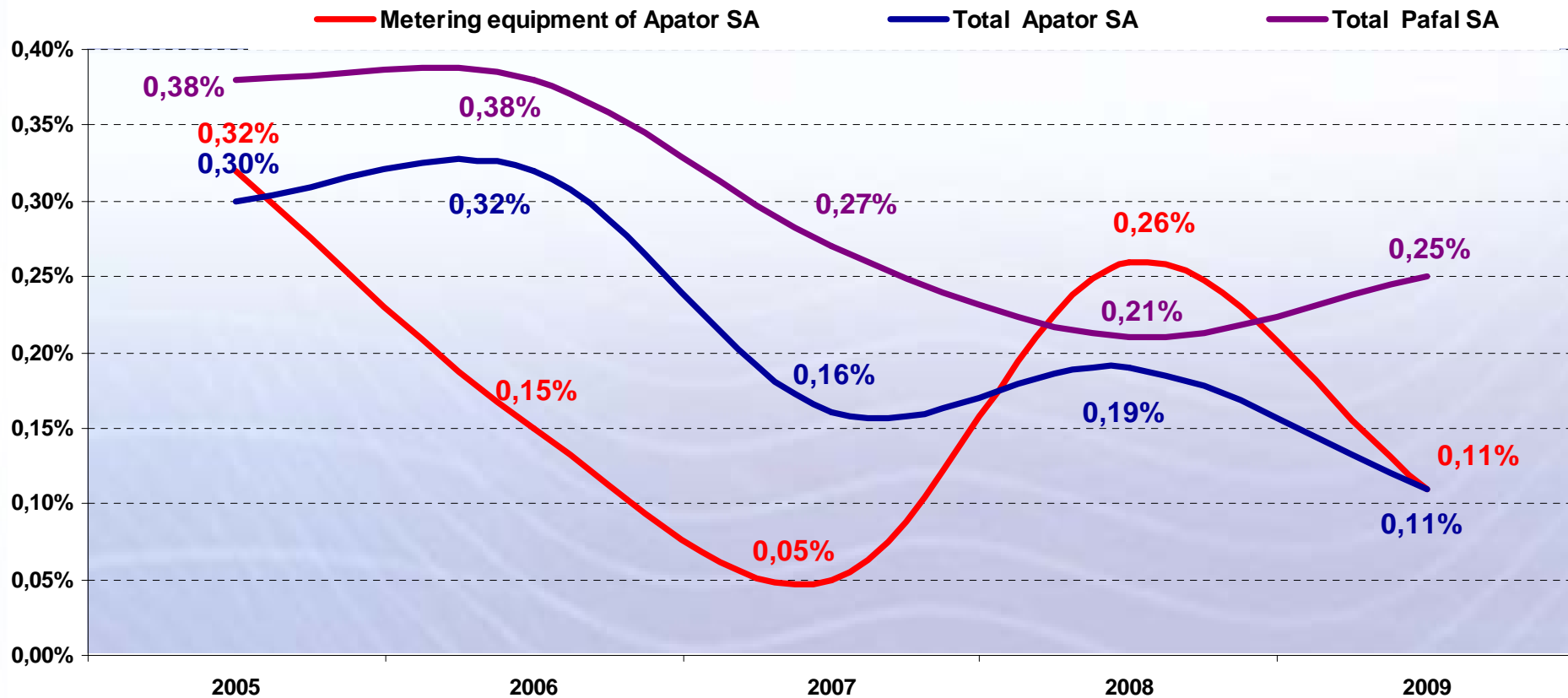
- since September 2009 – module B for single phase pre-paid meters,
- since December 2009 – module D for single phase pre-paid meters,
- planned date of the audit for modules B and D for 3-phase pre-paid meters is **September 2010**

Granting of module D gives the following possibilities:

- Independent assessment on compliance of metrological and quality requirements of the meter being manufactured without participation of Central Measurement Office (home sale) and to the countries of European Union). This fact means the prestige and financial benefit since there are lack of fees for legalization taken by Central Measurement Office that reduce considerably the cost of manufacturing of the product.
- Sale of certified product on all markets of the European Union without necessity to comply with additional requirements of the local measurement offices. The effect is also minimization of the time necessary to comply all formal requirements in case of the export to European Union countries.



Ratio of faults – manufacturers of electricity meters in Grupa Apator



Ratio is calculated as the relation of the costs of manufacturing faults to revenues on sales



Organization structure of the quality control in Apator SA

Managing Director of Apator SA

Quality and Service Management Department

Quality of Products Team of Inspectors

- 1) checking the compliance with technical and design requirements:
 - in input warehouse,
 - *in manufacturing area of the parts,*
 - *in assembly area of electronic parts and switchgear ,*
 - *in warehouse for finished products*

Calibration and Legalization Section

- 1) checking of metrological compliance with the Regulation of Ministry of Economy

Service Team

- 1) remedy of damages
- 2) making motions regarding operation
- 3) taking quality (corrective) actions

Measurements Team

- 1) checking the compliance of the product, subassembly or part with the assumptions of:
 - *obligatory regulations,*
 - *technical specifications,*
 - *design;*
- 2) verification of new suppliers

Product Testing Team

- 1) quality verification of products and new suppliers by:
 - reliability testing,
 - *testing of current products;*
- 2) Testing of the software of the equipment;
- 3) Testing of finished product



Thank you for your attention

Toruń, 21st June 2010