

ENERGY PRICES AND TAXES

Energy Statistics Division



Prepared for Training Session on Energy Statistics

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1) The importance of price statistics

2) Which prices do we collect?

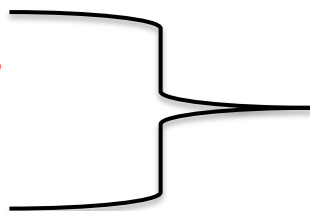
a) End-Use prices

b) Price indices

c) Crude Oil Import Costs

d) Other prices data

e) Common Challenges



EPT Questionnaires

*We hope we can get
them from you!*

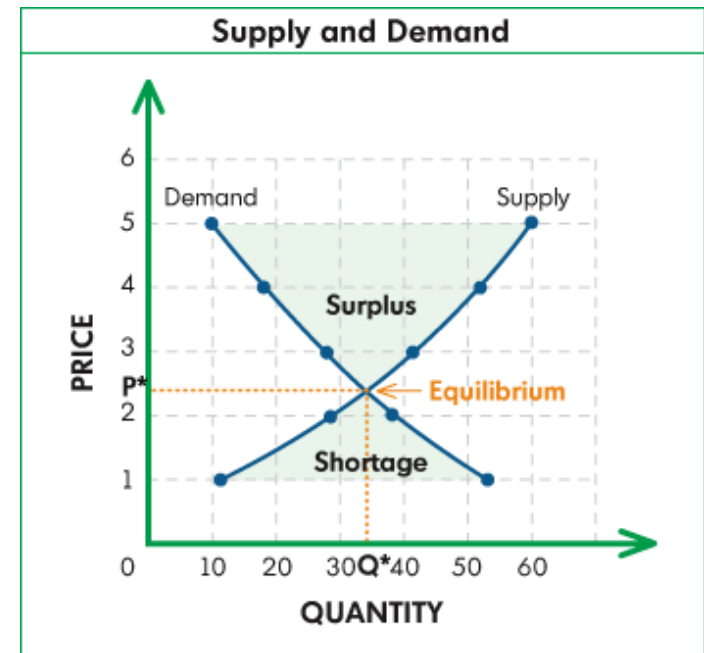
3) What do we do with the data?

4) Where do we report?

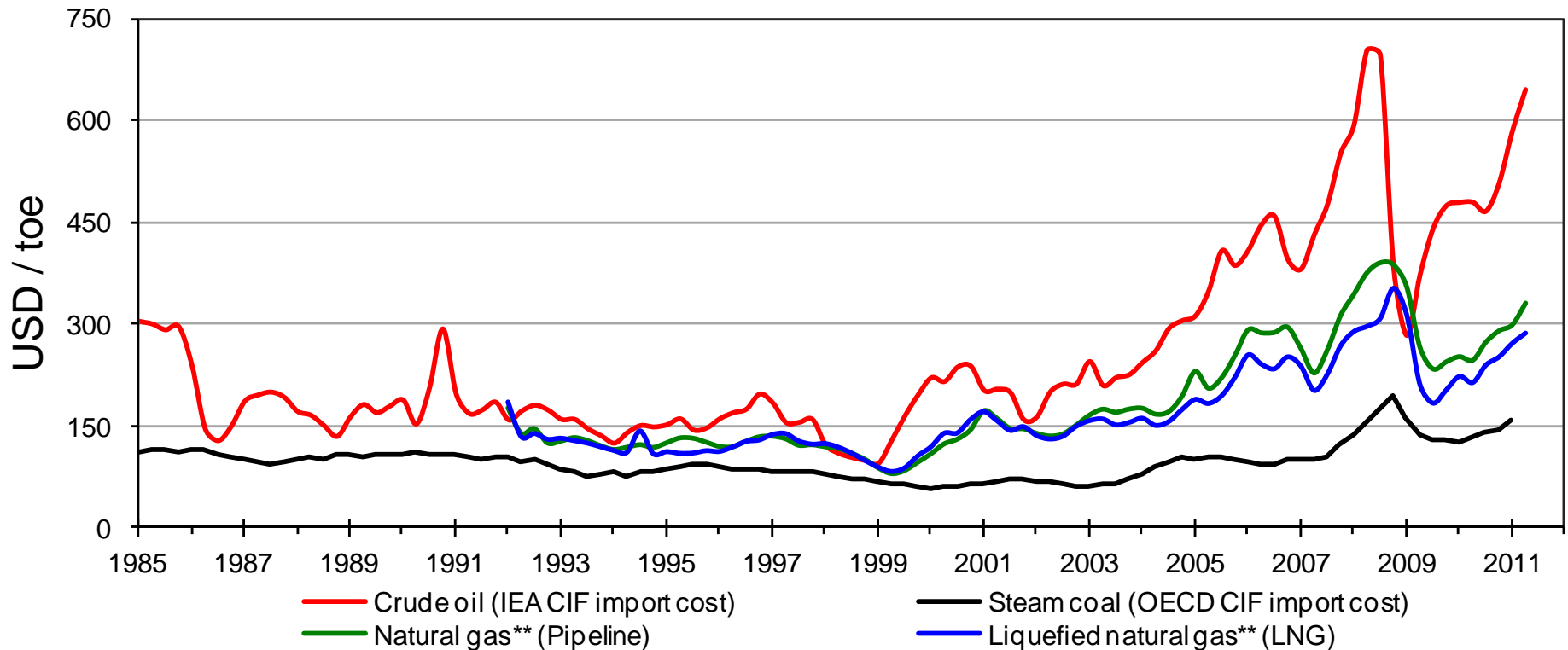
5) Conclusion

1) Energy prices – why collect them?

- Efficient policies require more and more up-to-date data
- Increased knowledge of pricing aspects of the international markets
 - Demand = supply logic vs. regulation
- International comparison of prices and taxes
- Price elasticity of different energy products
 - demand response
- Inter-fuel competition
- Inputs to various models and analyses
- Cost of living developments
- Energy products value chain
- Antitrust policy



1) Fuel competition - Import costs (USD/toe)



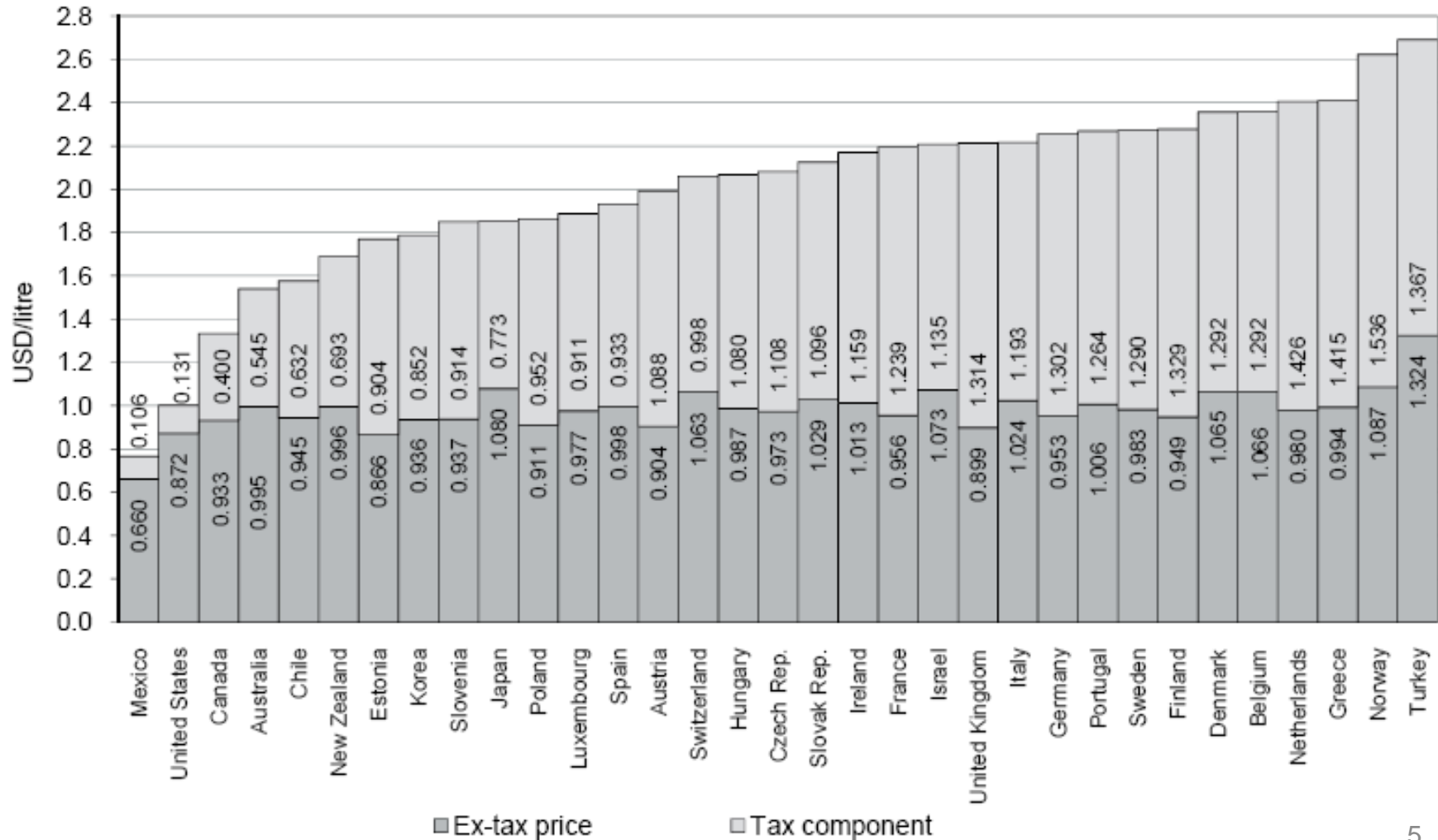
Real prices deflated by the US PPI

** Average natural gas import costs for EU member states.

1) International comparison – gasoline (USD/l)

Figure 16 - Unleaded gasoline¹ prices and taxes

2Q2011



What the final consumer pays “from their pocket”

- Country wise average prices
- Including transport costs to the consumer
- Prices actually paid (net of rebates)
- Include all taxes which are **not refundable**
 - **VAT (Value Added Tax)** only for households (in EU)
- **Average prices** \neq tariffs \rightarrow (gas and electricity)
 - average revenue per unit delivered
 - utilities data
 - average expenditure per unit purchased
 - consumption surveys
- If only tariffs available \rightarrow weighted average of tariffs
 \rightarrow the most representative tariff

2.a) Which End-Use prices?

- **Products (14)**
 - Oil products (10), natural gas, steam coal and coking coal, electricity
- **Sectors (3)**
 - **Households** – residential or individual consumers
 - **Industry** – industrial and manufacturing sectors
 - **Electricity generation** – prices paid by power plants
- **Price components**
 - Ex-tax price, Excise tax, VAT %, VAT amount
 - Total tax, Total price
- **Price indices (4 groups, 2 markets)**
 - Oil products, Natural gas, Electricity, Coal
 - Retail and Wholesale

2.a) End-Use prices – our data sources

- **Direct communication (via Questionnaires)**
 - Ministries, Statistical Offices, Governmental Energy Agencies, Utility firms
 - **Most preferable**
- Data from official publications
- Websites of institutions, utility firms
- We always explain what each price means
 - **Country notes**
 - Product specifications
 - Tax information
 - Price calculation
 - Data sources



2.a) End-Use prices – the EPT questionnaire

- All prices in **national currencies**
- MS Excel file
 - simple
 - user friendly
 - easy to fill out
- Always accompanied by a **country notes file**
 - MS Word
- **Quarterly**

AUTOMOTIVE DIESEL						
price for NON-COMMERCIAL USERS per litre						
	Ex-Tax Price	Excise Tax	VAT %	VAT Amount	Total Tax	Total Price
2008	16.729	9.95	0.19	5.07	15.02	31.749
2009	12.085	9.95	0.19	4.187	14.137	26.222
2010	..	..	..	..	..	..
1Q2008	16.371	9.95	0.19	5	14.95	31.322
2Q2008	18.116	9.95	0.19	5.33	15.28	33.398
3Q2008	18.405	9.95	0.19	5.39	15.34	33.742
4Q2008	14.026	9.95	0.19	4.56	14.51	28.536
1Q2009	11.152	9.95	0.19	4.01	13.96	25.112
2Q2009	12.083	9.95	0.19	4.186	14.136	26.219
3Q2009	12.586	9.95	0.19	4.282	14.232	26.818
4Q2009	12.521	9.95	0.19	4.269	14.219	26.74
1Q2010	13.555	10.95	0.2	4.901	15.851	29.406
2Q2010	14.996	10.95	0.2	5.189	16.139	31.135
3Q2010	..	..	..	..	..	..
4Q2010	..	..	..	..	..	..

- **Sub-indices of CPI and PPI**
 - CPI (Consumer Price Index) – retail prices
 - PPI (Producer Price Index) – wholesale prices
 - Direct communication preferable (via **Questionnaires**)
 - Data from official publications or websites
 - Fixed base index
 - Index with the same base year
 - We always explain what each index represents
 - **Country notes**
- **Growth rates of indices should be close to growth of end-use prices**
 - Differences – sources (different surveys), weighting schemes

2.c) Crude Oil Import Costs

Why do we need them?

- Obtain reliable crude oil price information
- Increase government knowledge of pricing aspects of the international oil market
- Capture development in import prices for particular crude streams in one country vs. another.
- Identify changes in volume over time among crude streams including trends in average API gravities.
- Observe trends in price differentials between crude streams imported into respective countries

2.c) Crude Oil Import Costs – data sources

- **SOM (Standing Group on the Oil Market) Questionnaire**
 - Highly confidential
 - Government Reporting Form for Crude Oil Imports
 - Started in 1975 (one of the founding objectives of the IEA)
 - Collects information on oil imports (CIF prices) into IEA countries broken down by major crude stream
 - **reporting obligation of IEA member countries**
 - **Collected MONTHLY**
 - Contains data on:
 - Number of importing companies
 - Gravity of the crude
 - Sulphur content of the crude
 - Total value of import by specific crude type
 - Total volume of import by specific crude type
 - Cost of crude imported



Wholesale prices

- **Spot market prices – yearly, quarterly and monthly averages**
 - Crude Oil – Brent, WTI, etc.
 - Marine bunker spot prices
 - Oil Products- Gasoline, Gasoil, Jet/Kero, Naphtha, LSFO, HSFO (Low Sulphur Fuel Oil / High Sulphur Fuel Oil)
 - NW Europe, USA, Singapore
- **Import prices**
 - Crude oil by origin (from SOM)
 - Natural gas (gaseous and LNG)
 - Steam coal, coking coal (also export prices)

- **Various Qualities of Product Used**
 - E.g. How to account for different types of coal, with varying prices and calorific values
 - Solution:
 - Use a weighted average for the price based on quantities of each type consumed
 - Explain methodology in Country Notes file and indicate the weighted calorific value etc.
- **Annual Average Prices for Products with Cyclical Demand**
 - E.g. Heating oil is used more commonly during winter months
 - Solution:
 - Base the annual average price on a weighted average (by quarterly consumption) of the quarterly prices

2.e) Common Challenges Encountered (2)

- **Price Data is Region Specific**
 - E.g. Prices data is only available for the capital city
 - Solution:
 - Use the available data but add a note in the Country Notes file indicating the source of the data e.g. Data used for Unleaded Gasoline 95 is the Average Price for the Capital City Area

3) What do we do with the data?

- **Checking**
- **Calculations**
 - Prices in **USD** and **USD PPP (Purchasing Price Parity)** per **unit** – international price comparison
 - Prices in **USD** per **toe** – inter-fuel price comparison
 - Regional prices (IEA, OECD Europe, OECD Total, etc.)
 - Weighted averages by consumption
 - Indices of energy End-use prices
 - Estimation of missing prices
 - Households (H), industry (I) and combined index (H & I)
- **Checking**
- **Publishing**

4) Where do we report?

- **Energy Prices & Taxes Quarterly Statistics**
 - Quarterly
 - Paper and pdf publication, online database



- **Oil Market Report – 3 tables**
 - Monthly



- **Oil prices web bulletin**
 - Monthly
 - Free of charge - <http://www.iea.org/stats/surveys/mps.pdf>

- **Annual statistical publication**
 - Several tables

4) Where do we report - End-use prices (nat.c)

- Excerpt from the quarterly book

AUSTRIA

Table 2 - Average prices and taxes in Euro

	Premium unleaded (98 RON) gasoline (per litre)					Premium unleaded (95 RON) gasoline (per litre)				
	Ex-tax price	Excise tax	VAT	Total tax	Total price	Ex-tax price	Excise tax	VAT	Total tax	Total price
2000	0.427	0.414	0.168	0.583	1.010	0.370	0.414	0.157	0.571	0.942
2001	0.405	0.415	0.164	0.579	0.984	0.338	0.415	0.151	0.566	0.904
2002	0.386	0.414	0.160	0.574	0.960	0.314	0.414	0.146	0.560	0.874
2003	0.385	0.415	0.160	0.575	0.960	0.319	0.415	0.147	0.562	0.881
2004	0.434	0.425	0.172	0.597	1.031	0.365	0.425	0.158	0.583	0.948
2005	0.520	0.425	0.189	0.614	1.135	0.436	0.425	0.172	0.597	1.034
2006	0.571	0.426	0.200	0.626	1.197	0.483	0.426	0.182	0.608	1.091
2007	0.581	0.448	0.206	0.654	1.236	0.486	0.448	0.187	0.635	1.121
2008	0.623	0.485	0.222	0.707	1.330	0.523	0.485	0.202	0.687	1.209
2009	0.510	0.485	0.199	0.684	1.194	0.386	0.485	0.174	0.659	1.045
2010	0.622	0.485	0.221	0.706	1.328	0.505	0.485	0.198	0.683	1.189
3Q2010	0.624	0.485	0.222	0.707	1.331	0.510	0.485	0.199	0.684	1.194
4Q2010	0.630	0.485	0.223	0.708	1.338	0.522	0.485	0.202	0.687	1.209
1Q2011	0.694	0.525	0.244	0.769	1.463	0.568	0.525	0.219	0.744	1.312
2Q2011	0.754	0.525	0.256	0.781	1.536	0.628	0.525	0.231	0.756	1.384
3Q2011	0.731	0.525	0.251	0.777	1.508	0.614	0.525	0.228	0.753	1.368

5) Conclusion

- Prices reporting is simple
 - IEA is here to help
 - [Exercises](#)
- Getting valid data to report is the most difficult part
 - You may already have most of the data available
 - Retail, Wholesale indices
 - Gasoline, Diesel prices → *pump price surveys?*
 - Electricity, Natural gas prices → *energy regulators?*
- The benefits of co-operation (submitting data)
 - Access to IEA publications
 - Open doors to IEA experts

We are looking forward to the future co-operation!

Thank you for your attention



PRICES@IEA.org

EXERCISES



Some basics for the exercises (1)

- Industry typically does not pay VAT or it is refunded at the end of the year
- Sometimes households do not pay Excise Tax (this will be indicated)
- Ex-tax price = Wholesale price + profit margin + charges
- Excise tax = all taxes except VAT
- VAT is usually given in %
- $VAT = \% \times (Ex\text{-tax price} + Excise\ Tax)$

Some basics for the exercises (2)

- Pay attention to units!
 - 1 MWh = 1000 kWh
 - 1 GWh = 1000 MWh
 - 1 billion of currency (C) = 10^9 C
- Weighted average prices =
$$\frac{\text{Sum (prices x amounts)}}{\text{Sum (amounts)}}$$
- Weighted average calorific values =
$$\frac{\text{Sum (calorific values x consumption)}}{\text{Sum (consumption)}}$$
- Weighted average VAT =
$$\frac{\text{Sum (\% x months)}}{\text{Sum (months)}}$$
- Average prices = $\frac{\text{Sum (revenue)}}{\text{Sum (consumption)}}$

Some basics for the exercises (3)

- When only Total Price is available, Extax Price =
Total Price – VAT (in percent or amount) – Excise Tax
- Pay attention to units!!
 - Mass = Volume (m^3) x Density (kg/m^3)
 - Standard m^3 = Normal m^3 x 1.055
 - NCV amount = GCV amount x 0.9 (for natural gas)
 - 1 kWh = 3600 kJ
- Calculate quarterly results before calculating weighted average annual price from quarterly results.