

The European Commission's science and knowledge service

Joint Research Centre



Visualisation tools

Brussels, 11/10/2017

VISUALISATION: WHY?

Total CO2 emissions (kt CO2)	B_101000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
All Products	E000	4,003,475.4	4,070,276.0	4,053,003.9	4,158,424.7	4,162,684.7	4,139,862.6	4,159,090.0	4,096,976.1	4,014,383.4	3,693,884.3	3,813,105.2	3,669,893.9	3,645,214.9	3,559,588.4	3,379,207.0	3,421,014.2	
Solid Fuel	E2000	1,192,277.9	1,202,147.7	1,197,482.7	1,251,300.3	1,217,795.9	1,180,979.1	1,212,642.2	1,210,663.6	1,118,544.2	1,004,391.1	1,024,333.8	1,050,541.7	1,097,917.3	1,059,669.0	986,908.6	967,764.5	
Hard coal and derivatives	E100	794,010.1	792,581.5	789,001.3	833,831.7	806,796.3	781,445.0	812,973.0	805,643.6	726,044.5	631,119.7	661,447.6	658,399.2	704,040.6	680,871.7	621,733.7	610,267.5	
Hard Coal	E111	676,337.4	681,401.3	683,129.9	726,148.6	708,483.5	691,558.1	720,922.1	715,403.5	641,330.3	565,797.1	589,286.7	588,404.2	639,311.4	618,416.8	562,852.9	553,537.1	
Anthracite	E115	399.9	396.9	1,479.1	11,288.9	20,563.9	21,193.9	19,259.1	22,391.9	20,838.6	16,868.8	15,771.4	29,178.9	27,567.6	22,654.1	21,780.6	20,775.2	
Caking Coal	E116	41,501.2	40,906.0	40,765.1	42,616.5	43,460.0	40,610.5	37,009.7	40,975.8	32,298.4	23,648.9	19,269.4	22,651.1	28,983.5	11,764.8	15,801.1	8,384.1	
Other Bituminous Coal	E117	626,432.8	633,909.8	633,338.0	665,715.6	664,912.5	639,833.0	670,962.0	655,620.3	643,206.5	580,268.7	519,400.6	549,150.7	529,307.3	575,176.6	579,081.8	518,900.5	517,857.0
Sub-bituminous Coal	E118	8,003.6	6,188.7	7,557.7	14,182.9	14,182.9	14,182.9	9,033.0	8,729.3	7,724.6	5,878.9	5,095.2	7,267.0	7,503.7	5,916.2	6,363.7	6,520.7	
Patent Fuel	E112	2,642.5	2,257.0	2,085.5	12,492.0	12,492.0	12,492.0	1,405.9	1,291.6	1,562.7	1,331.6	2,239.7	1,445.9	1,728.8	1,516.9	1,160.0	1,236.9	
Coke	E120	114,211.6	108,138.3	103,140.4	500.6	500.6	500.6	90,283.2	88,431.6	82,464.0	63,066.3	69,267.6	67,718.9	62,742.0	59,348.1	57,139.9	55,210.6	
Coke Oven Coke	E121	114,211.6	108,138.3	103,140.4	500.6	500.6	500.6	90,283.2	88,431.6	82,464.0	63,066.3	69,267.6	67,718.9	62,742.0	59,348.1	57,139.9	55,210.6	
Gar Coke	E122	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Coal Tar	E130	818.5	784.9	625.2	11,616.2	11,616.2	11,616.2	361.9	516.9	687.5	924.8	553.7	547.3	541.3	589.9	581.0	282.9	
Lignite and Derivative	E2014	388,135.6	399,834.5	399,026.9	1,770,155.1	1,770,155.1	1,770,155.1	8,634.9	392,510.5	381,842.5	364,419.5	360,659.5	379,217.1	382,501.4	365,056.6	351,477.8	346,646.6	
Lignite/Brown Coal	E210	363,378.7	372,910.3	371,400.0	1,770,155.1	1,770,155.1	1,770,155.1	6,644.4	362,201.1	351,564.9	337,726.2	331,576.0	352,049.1	357,051.5	339,297.1	327,080.9	323,734.7	
Peat	E210	11,182.0	14,205.4	15,178.9	504.1	504.1	504.1	14,572.5	15,585.5	14,174.7	13,001.0	15,179.8	13,670.4	11,454.7	10,301.1	10,460.9	9,959.6	
BKB (brauncoal briquettes)	E230	12,895.3	12,121.5	11,834.1	504.1	504.1	504.1	13,906.3	14,210.9	14,586.3	13,003.1	13,293.1	12,868.2	13,337.9	14,799.3	13,408.2	12,460.4	
Peat Products	E230	679.6	597.4	615.0	504.1	504.1	504.1	511.6	513.0	716.6	689.2	610.5	629.5	657.3	659.0	527.9	491.8	
Oil Shale and Oil Sand	E410	10,132.2	9,731.7	9,452.5	10,034.2	10,034.2	10,034.2	10,034.2	12,509.4	11,457.2	8,851.9	12,226.7	12,925.4	11,375.3	13,740.7	13,697.1	10,850.4	
Total petroleum products (without biofuels)	E0000	1,733,283.2	1,766,776.0	1,747,701.5	1,762,528.4	1,769,651.1	1,765,865.6	1,755,193.2	1,703,712.7	1,689,393.3	1,593,963.7	1,570,321.8	1,513,529.4	1,464,622.2	1,430,426.1	1,413,561.2	1,442,964.2	
Crude oil, feedstocks and other hydrocarbons	E100	1,321.9	277.4	265.5	277.7	504.1	174.5	174.5	171.5	40.2	87.9	43.4	37.1	43.2	46.2	34.1	19.1	
Crude oil and NGL	E110	1,321.9	277.4	265.5	277.7	504.1	174.5	174.5	171.5	40.2	87.9	43.4	37.1	43.2	46.2	34.1	19.1	
Crude Oil without NGL	E105	435.0	277.4	134.1	175.3	472.9	174.5	174.5	43.3	40.2	46.6	40.2	37.1	36.8	36.8	21.4	-	
Natural Gas Liquids (NGL)	E106	886.9	-	131.4	102.4	31.2	-	-	-	-	41.3	3.1	-	6.4	9.4	12.7	19.1	
Feedstocks and other hydrocarbons	E190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Refinery Feedstocks	E191	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Additive/Oxygenator	E192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other Hydrocarbons (without biofuels)	E193	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
All Petroleum Products	E200	1,731,961.3	1,766,498.6	1,747,436.0	1,762,250.7	1,769,651.1	1,765,691.2	1,755,029.5	1,703,541.0	1,689,353.1	1,593,875.8	1,570,278.4	1,513,492.3	1,464,579.0	1,430,379.8	1,413,520.1	1,442,945.1	
Refinery Gas and Ethane	E210	61,713.7	60,682.4	62,394.7	65,787.0	69,114.1	69,391.1	68,813.3	71,049.1	70,496.8	65,992.7	67,584.4	67,609.2	65,821.2	62,634.3	63,495.1	66,109.5	
Refinery Gas (net, Liquid)	E214	61,286.8	60,135.0	61,995.5	65,503.6	68,782.9	69,095.6	68,578.1	70,865.2	70,470.5	65,949.0	67,537.7	67,562.5	65,774.5	62,584.8	63,428.0	66,007.3	
Ethane	E215	426.9	547.4	399.2	283.4	331.2	295.5	235.2	183.9	26.3	43.7	46.7	46.7	46.7	49.5	67.1	102.2	
Liquefied petroleum gas (LPG)	E220	55,092.7	55,132.0	54,303.2	55,448.0	55,673.7	56,549.8	54,900.6	54,124.1	52,399.8	51,154.1	51,808.5	49,345.1	47,627.3	46,897.2	45,729.6	46,288.5	
Mataropink	E230	391,680.8	384,301.6	379,304.3	365,303.4	354,289.1	338,592.3	326,915.1	316,116.4	298,529.6	285,938.4	268,806.7	257,338.0	241,964.9	232,938.6	232,199.2	226,813.0	
Gasoline (without biofuels)	E234	391,169.8	384,283.1	378,808.9	364,845.6	353,812.8	338,029.3	326,454.5	315,659.1	298,012.3	285,950.0	268,449.5	257,005.4	241,687.1	232,682.8	231,958.9	226,588.8	
Aviation Gasoline	E235	511.0	518.5	495.3	457.8	476.2	553.1	460.7	457.3	516.3	388.5	357.2	332.6	255.8	240.3	224.2	-	
Kerosene - Jet Fuel	E240	152,952.7	150,332.3	146,335.4	150,714.1	161,792.4	168,898.7	174,277.9	178,095.6	178,579.2	166,421.1	167,494.6	168,453.2	164,671.6	164,943.5	164,741.1	170,075.5	
Gasoline Type Jet Fuel	E246	261.7	310.1	102.7	93.0	140.3	43.3	46.4	9.3	3.0	-	-	-	-	-	-	-	
Kerosene Type Jet Fuel	E247	137,290.1	133,128.9	131,479.6	135,744.1	145,287.2	152,685.0	157,550.9	162,851.0	162,742.5	150,085.2	150,247.7	154,464.5	150,910.7	150,630.2	151,759.5	156,837.5	
Other Kerosene	E244	15,300.9	16,893.4	14,753.2	14,877.0	16,364.9	16,170.4	16,680.6	15,235.3	15,832.7	16,335.9	17,246.9	13,988.7	13,760.8	14,313.4	12,981.6	13,238.0	
Naphtha	E250	1,148.0	1,776.0	1,628.1	1,180.3	822.8	603.6	449.2	348.6	696.3	3,200.4	4,034.7	4,144.7	4,478.3	4,699.4	4,473.4	4,551.8	
Gas/Diesel oil (without biofuels)	E260	780,093.2	821,803.2	817,463.7	843,722.9	859,831.7	874,543.2	884,810.7	860,653.7	874,860.8	835,464.3	842,725.1	820,810.7	805,450.2	806,557.6	800,494.0	820,140.3	
Residual Fuel Oil	E270A	228,676.9	230,242.8	222,165.3	210,205.4	180,148.7	169,451.1	155,809.2	136,259.7	125,736.6	110,462.8	93,075.4	77,401.9	68,362.2	55,343.2	48,725.7	50,950.9	
Other Petroleum Products	E280	60,603.2	61,748.4	63,841.4	69,889.6	87,977.7	87,661.4	88,793.9	88,054.0	86,793.9	88,054.0	75,142.0	74,748.9	68,389.4	66,203.3	56,366.0	53,671.9	58,015.7

VISUALISATION: WHY?

- ❖ Facilitate accessing the information
- ❖ Identify trends and patterns
- ❖ Enhance communication

→ Better analysis

VISUALISATION: INTERACTIVE

Intuitive visualisation interfaces...

With tailor-made visuals

Explore a sector, a fuel, compare countries... at a glance with predefined dashboards

Allowing flexible exploration

User selects and defines views what and how to view

... built for an in-depth understanding of trends

User-defined aggregation/decomposition level

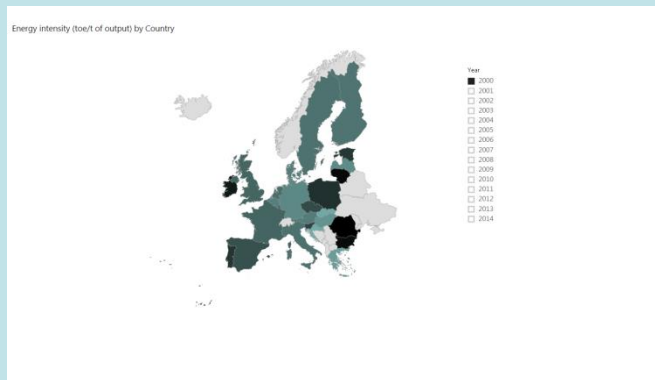
Generate insights through the analysis of

Sectorial dynamics

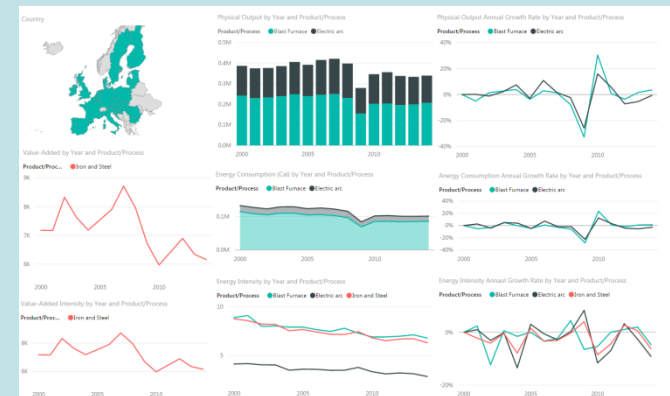
Links and correlations

EXAMPLES

Types of output and visualisations

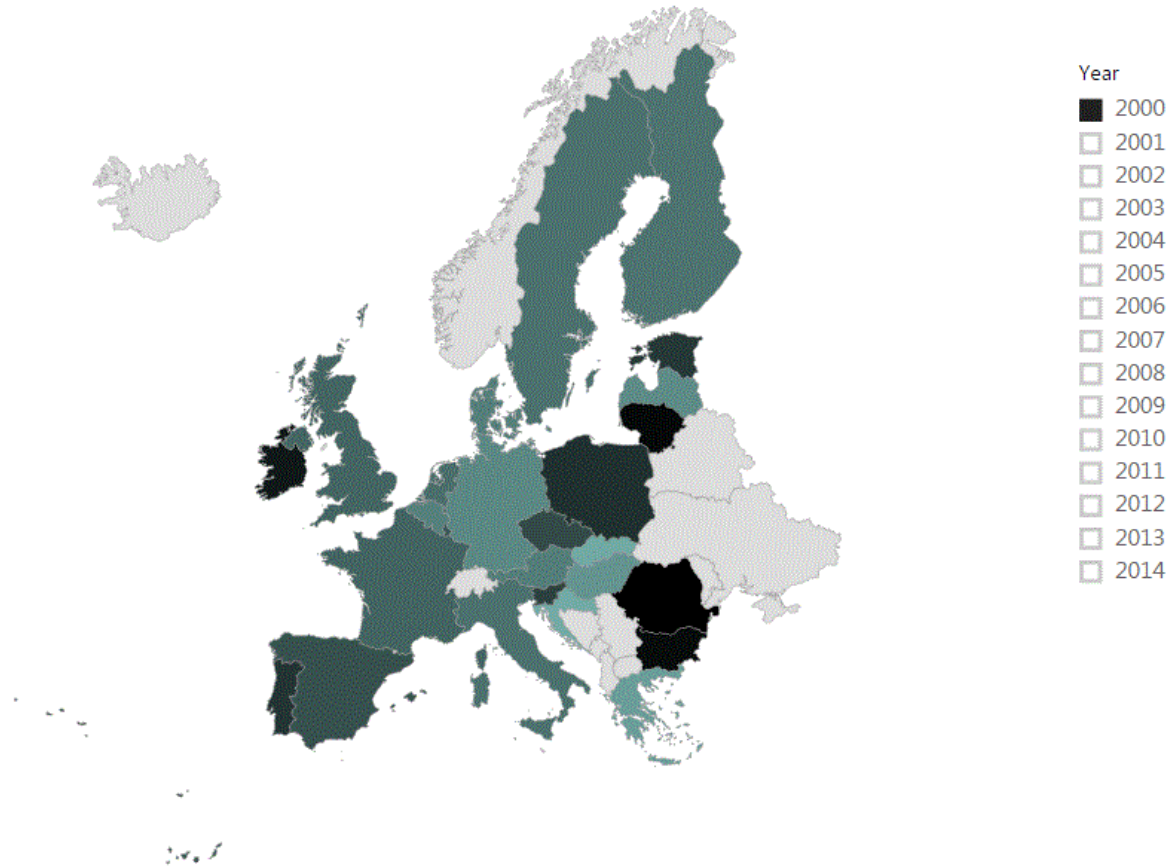


Dashboards Reports



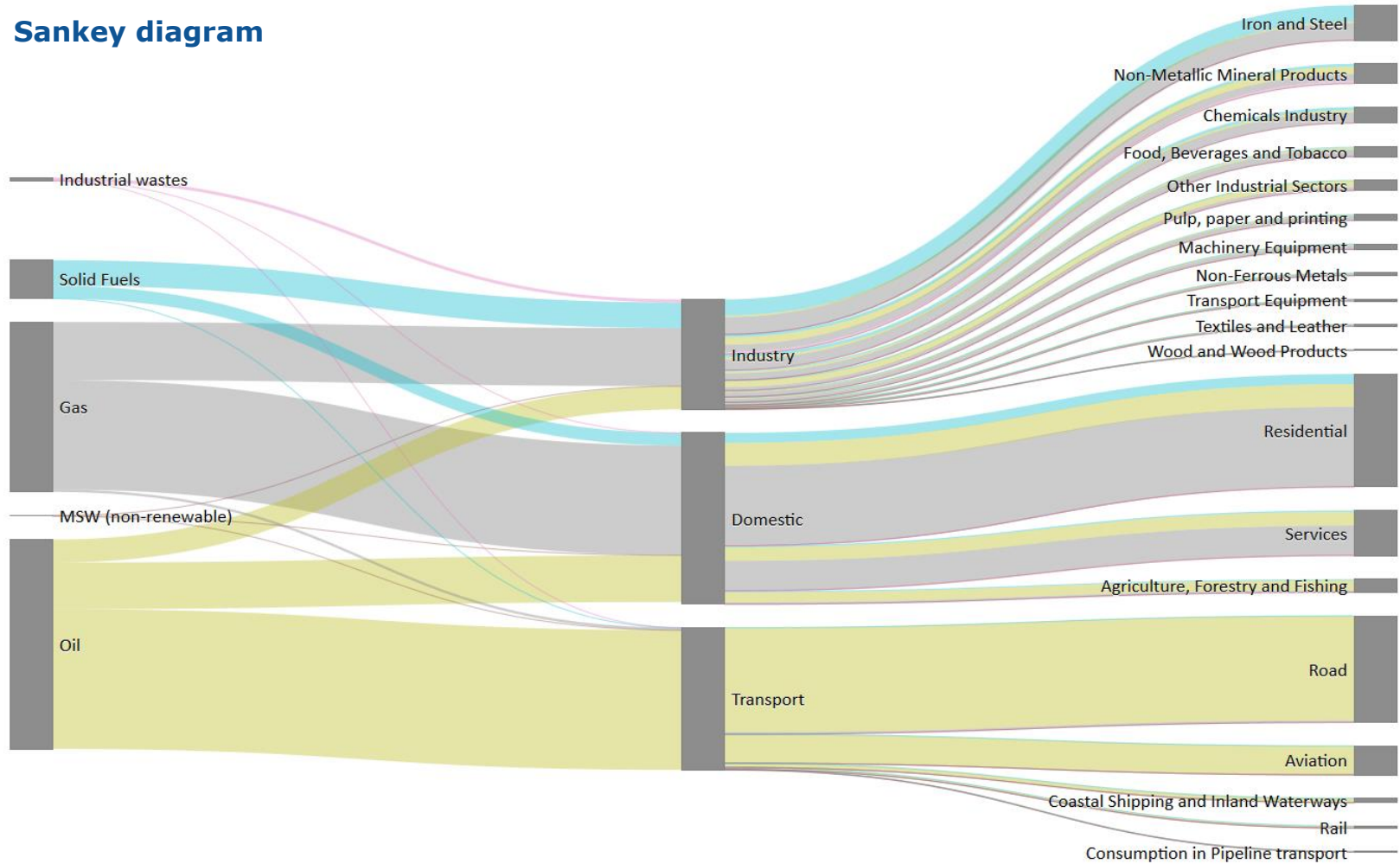
MAPS OF VALUES AND INDICATORS

Energy intensity (toe/t of output) by Country

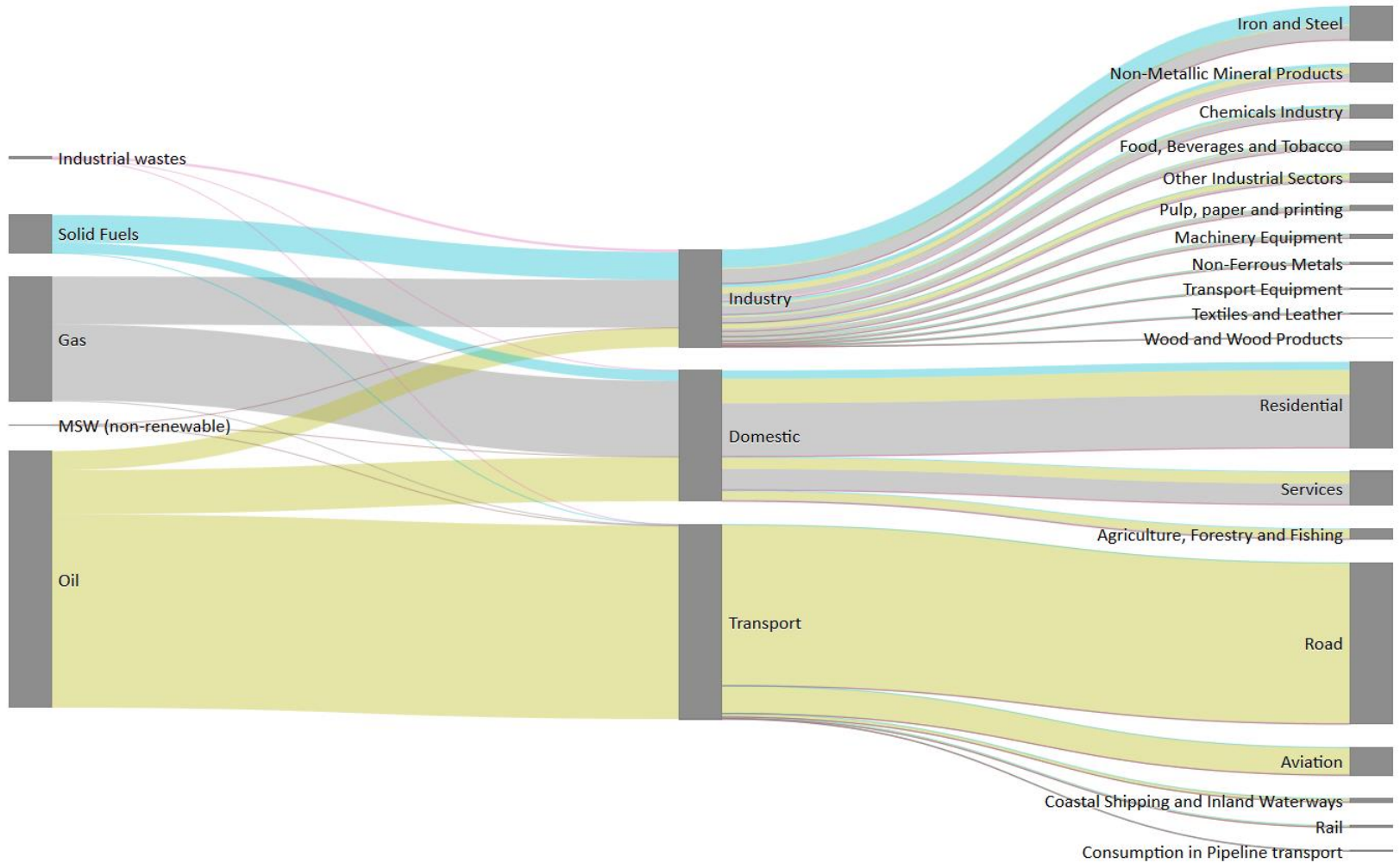


BALANCES AND FLOWS

Sankey diagram

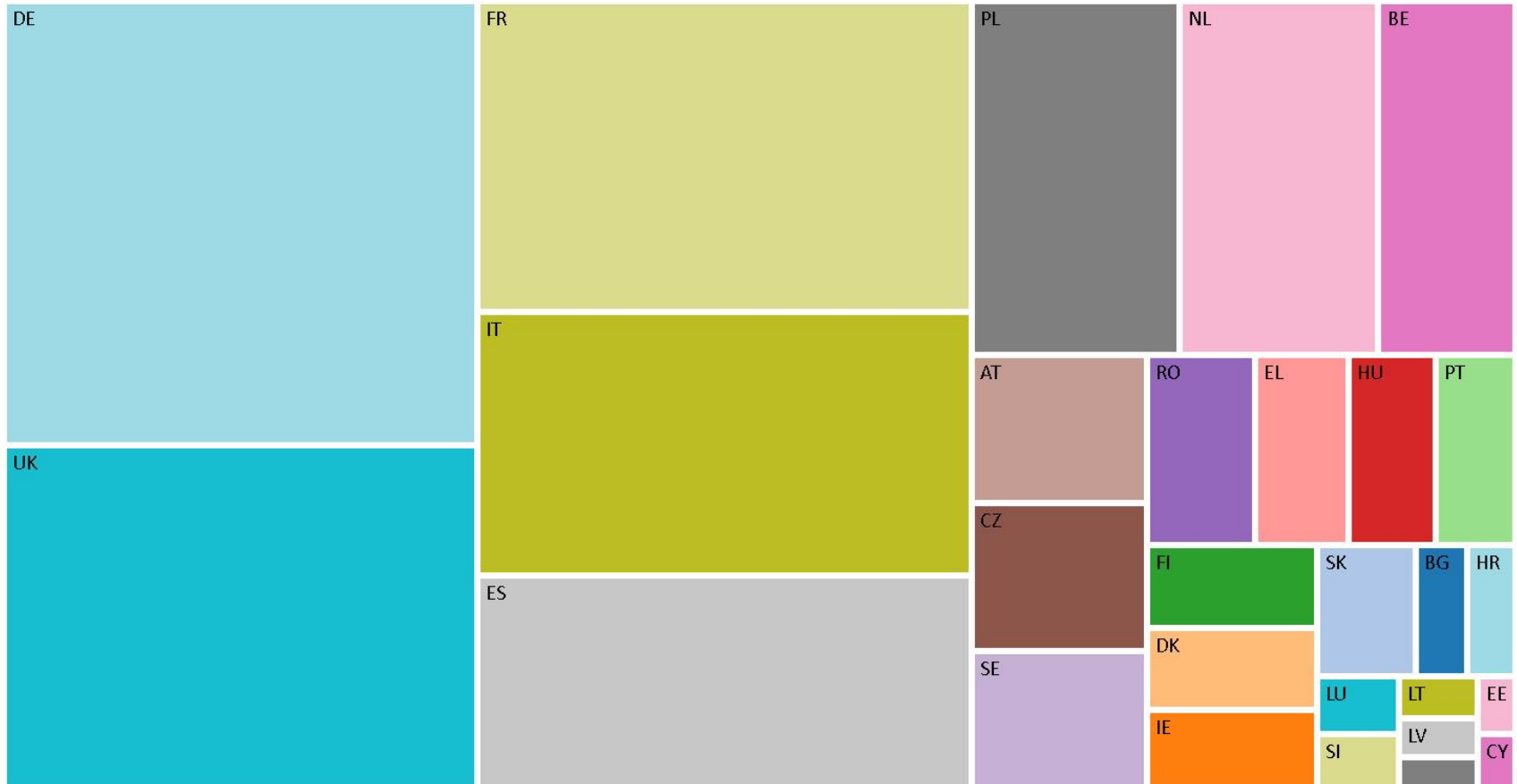


BALANCES AND FLOWS



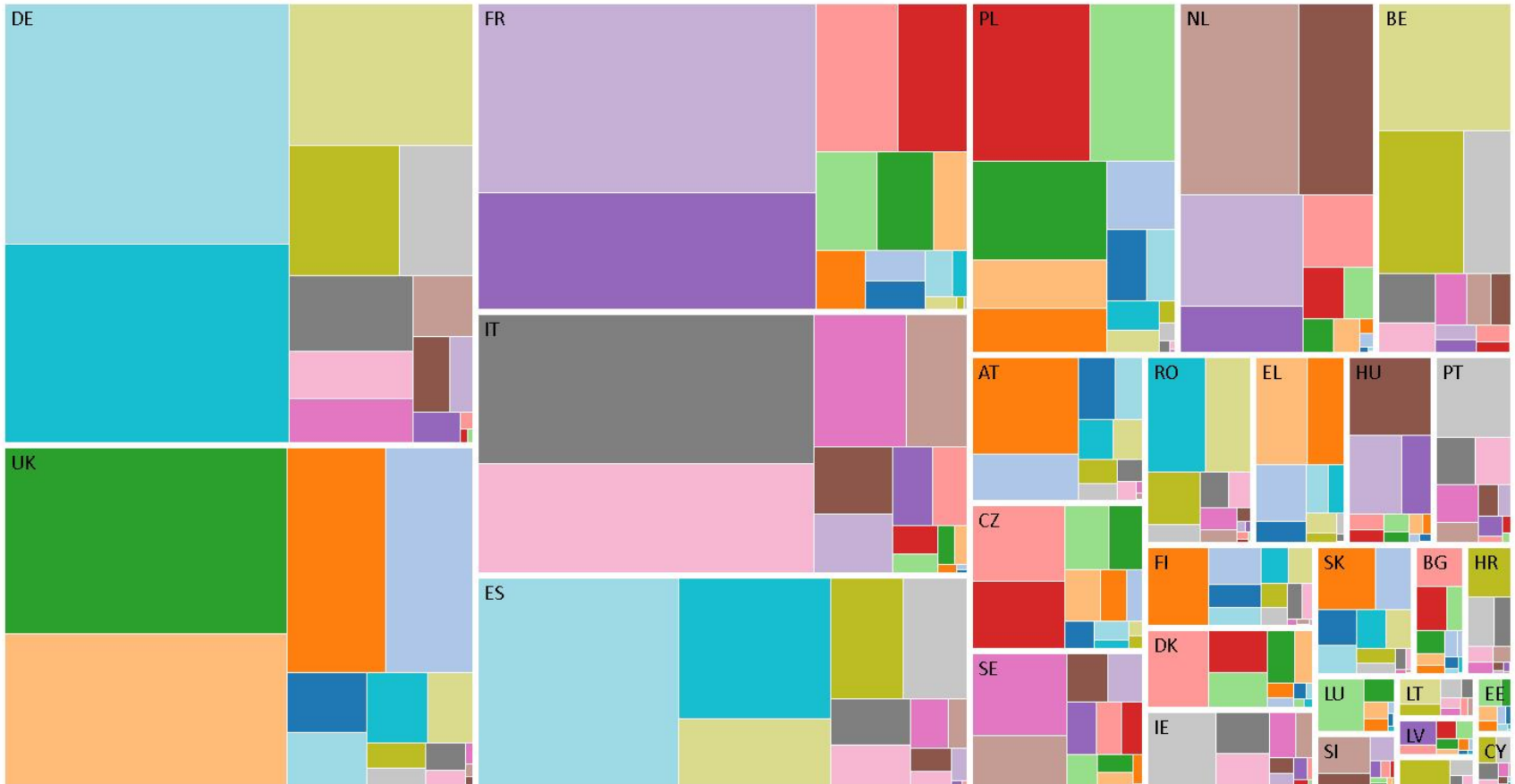
Treemaps

Final Energy Consumption. EU countries.



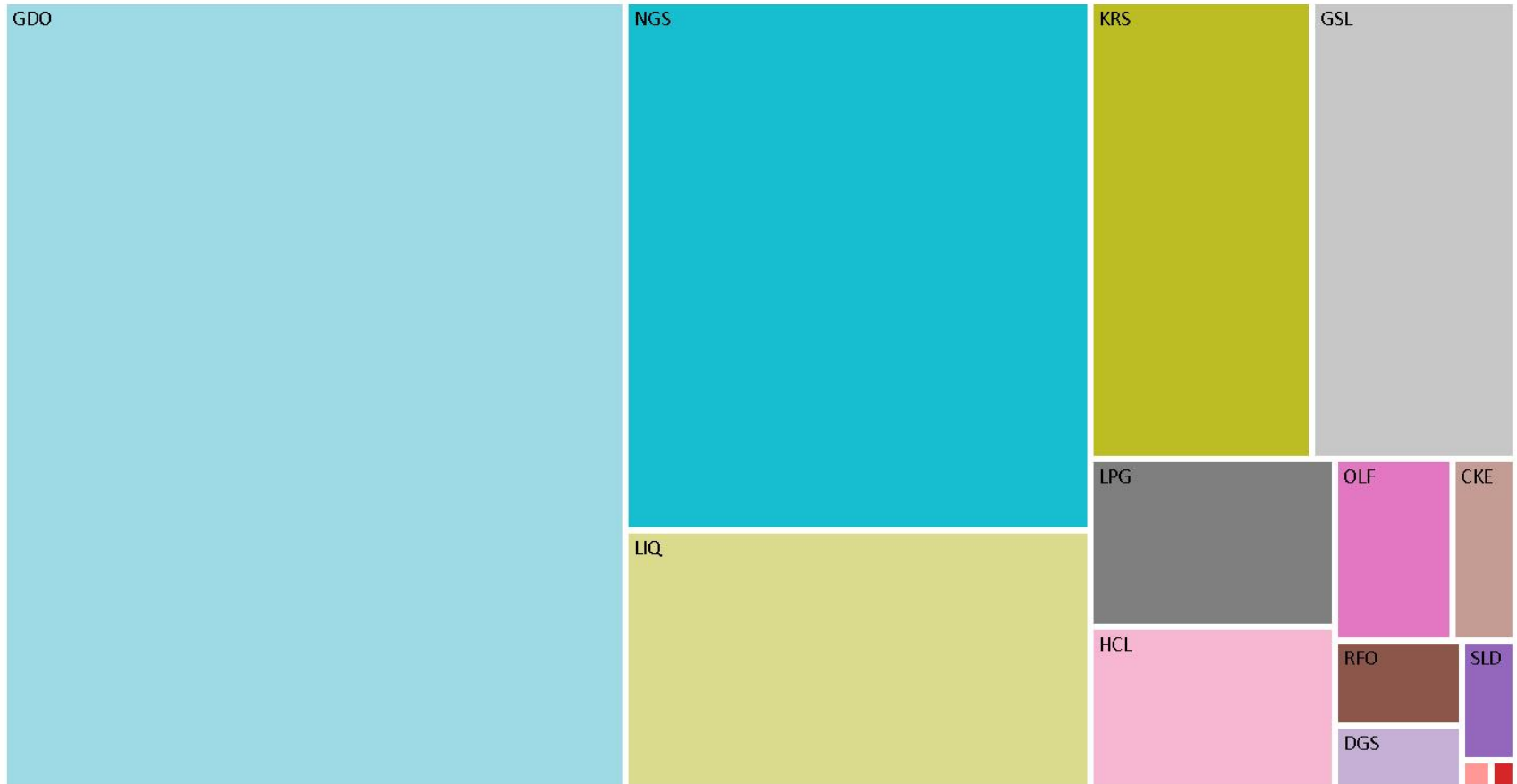
Treemaps

Final Energy Consumption. EU countries by fuel.



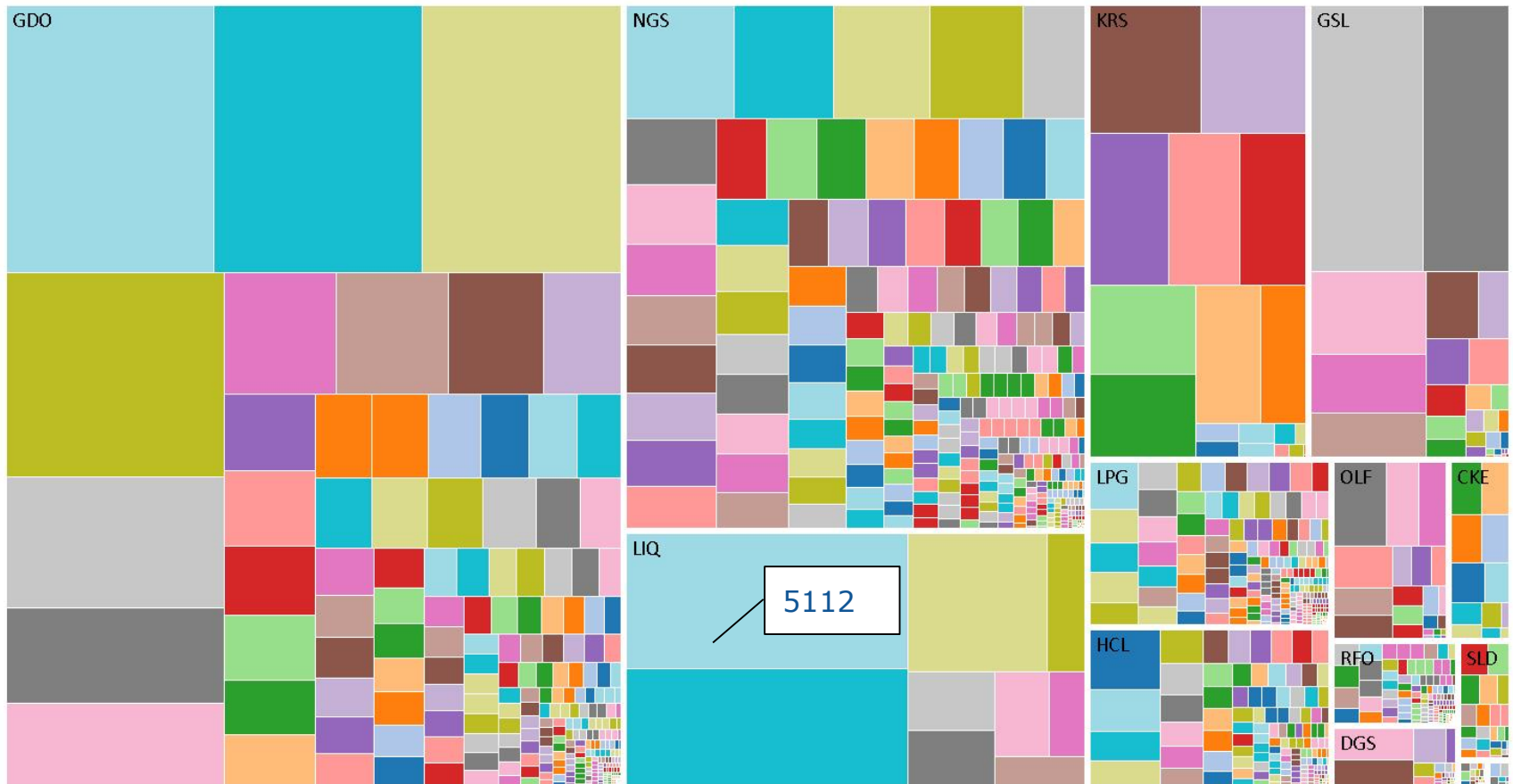
Treemaps

Final Energy Consumption. Spain by fuel.



Treemaps

Final Energy Consumption. Spain by fuel and sectors.



EXAMPLE : IRON AND STEEL INDUSTRY

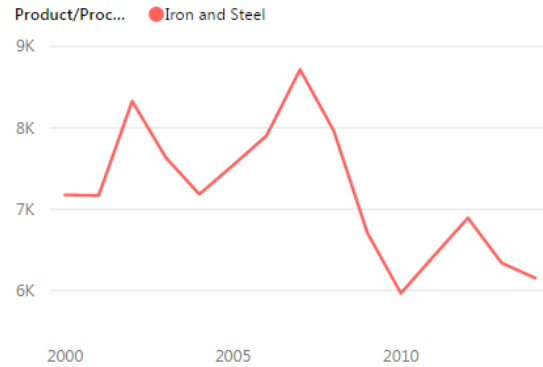


PROVIDING A SECTOR OVERVIEW...

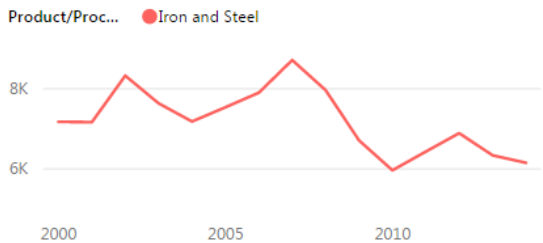
Country



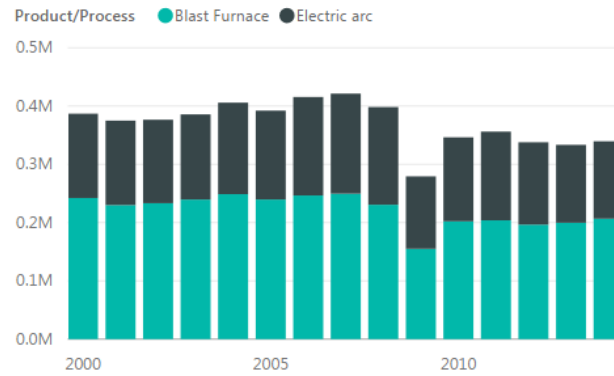
Value-Added by Year and Product/Process



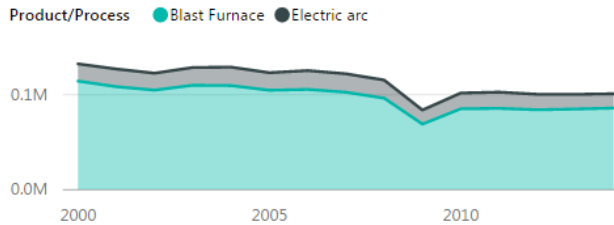
Value-Added Intensity by Year and Product/Process



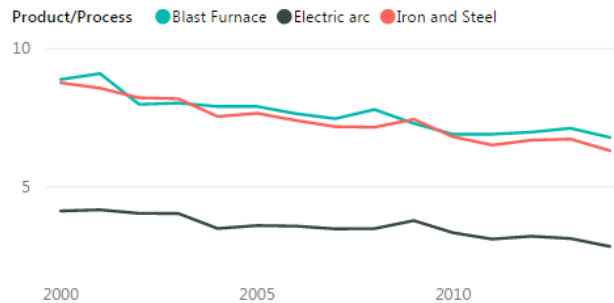
Physical Output by Year and Product/Process



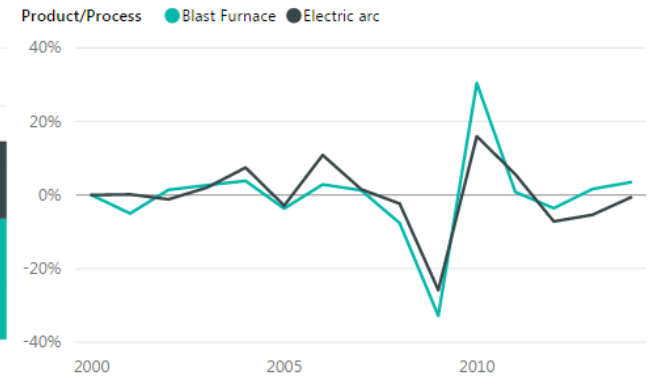
Energy Consumption (Cal) by Year and Product/Process



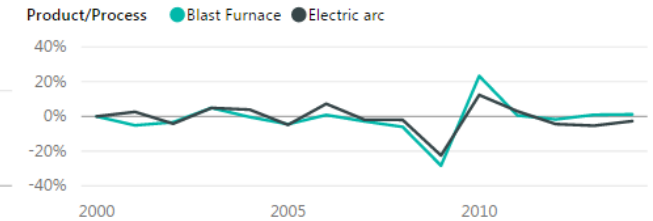
Energy Intensity by Year and Product/Process



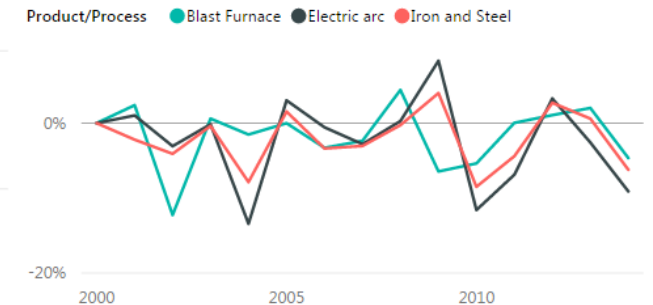
Physical Output Annual Growth Rate by Year and Product/Process



Energy Consumption Annual Growth Rate by Year and Product/Process



Energy Intensity Annual Growth Rate by Year and Product/Process



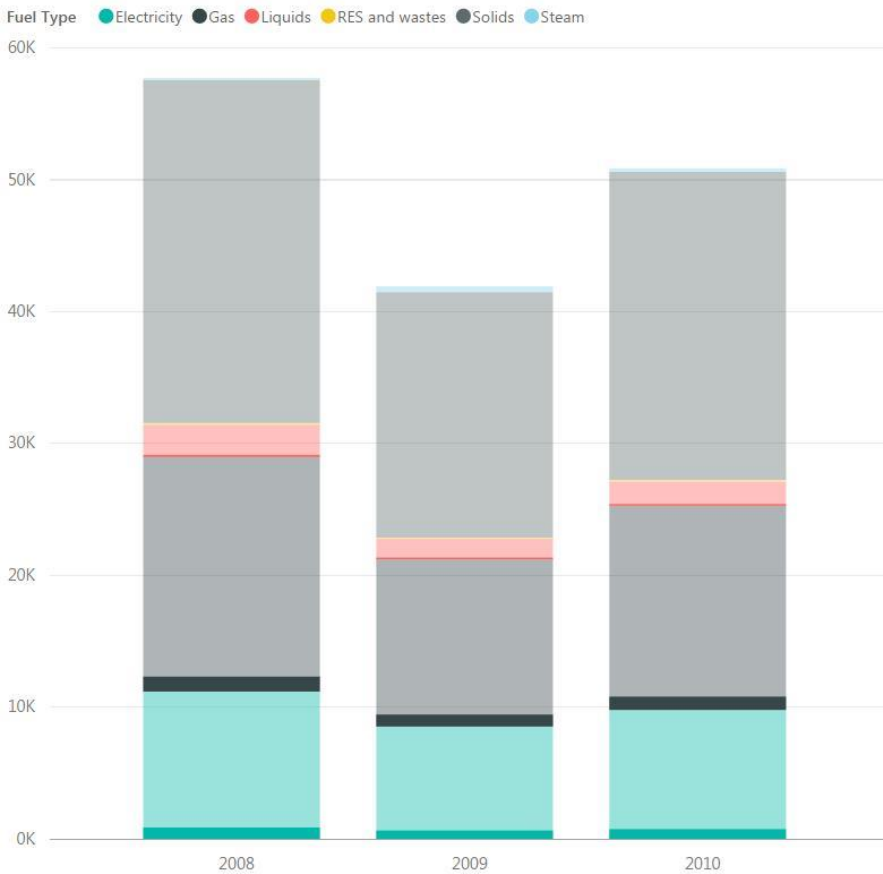
...OR FOCUSING ON SECTOR DETAILS

Year

Between ▾

16/05/2007 07/04/2010

Energy consumption by Year and Fuel Type



Cumulative energy consumption by Process

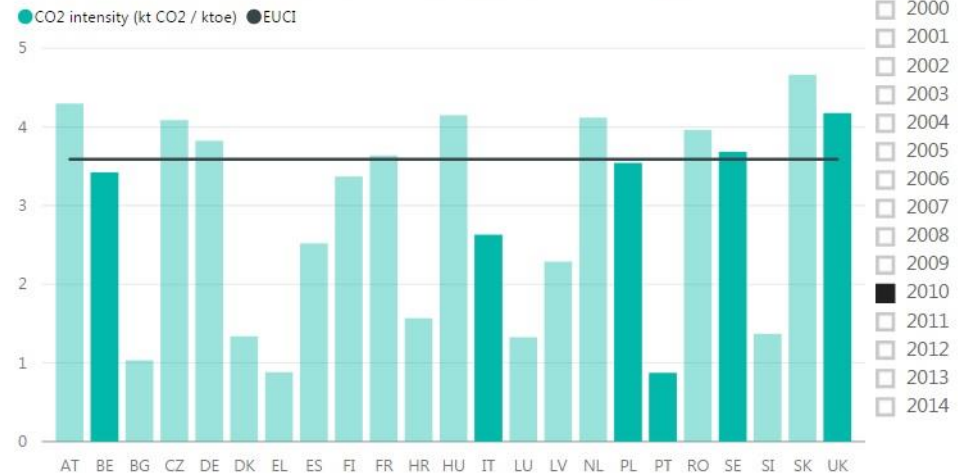


...OR MAKING COMPARISONS

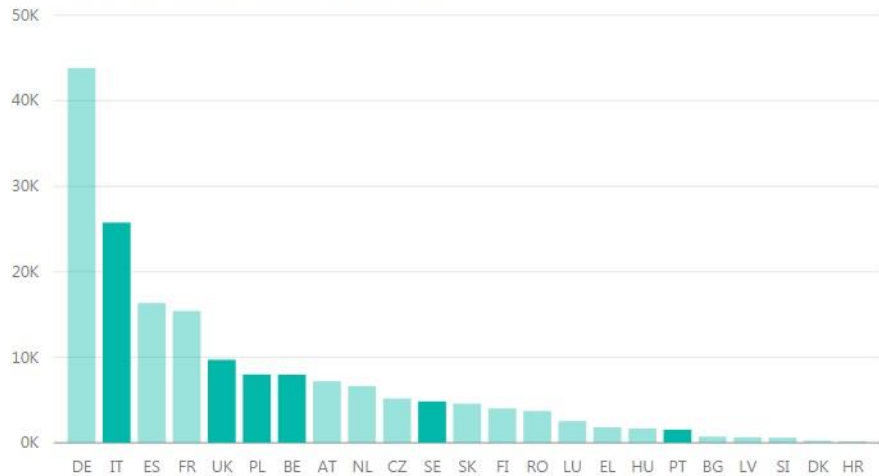
Iron & Steel : Select to highlight countries



Iron & Steel Carbon intensity (kt CO₂/ktoe) by Year and Country



Steel Production (t of output) by Country



Iron & Steel Energy intensity (toe/t of output) by Year and Country



CONCLUSIONS: VISUALISATION

Visualisation for both POTEnCIA and JRC-IDEES

Important contribution to transparent energy related policy analysis

- ❖ Facilitates accessing the information
- ❖ Allows for better analysis
- ❖ Enhances communication



Thank you for your attention

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