



# **EU Member States Energy Dependence Indicators**

## **Special focus: Lithuania**

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# Energy dependence indicators

- An indicator-based assessment framework - to what extent Member States are energy dependent
- Energy dependence = vulnerability of MS to energy price shocks or energy supply disruptions
- Why so important? Increased energy prices may lead to GDP losses, inflationary pressure, trade balance deterioration
- Focus on factors leading to energy dependence, not on its consequences and impacts

## Scope and methodology

- Three dimensions covered:
  - security of energy supply,
  - energy and carbon intensity,
  - contribution of energy products to external trade balance.
- For each dimension, Member States assessed on the basis of:
  - set of individual indicators,
  - a composite indicator for each dimension,
  - additional information (e.g. mitigating factors)
- Analysis of the average of last 5 years (2006-2010)+ for comparison, 2006 and 2010

# Dimension 1: Security of energy supply

**Security of energy supply:** uninterrupted availability of energy sources at an affordable price while respecting environmental concerns

## Indicators of security of energy supply in EDI set:

- import dependence - net energy imports/ consumption:  
gas, oil, solid fuels, total primary energy;
- geographical diversification of energy import sources (HHI):  
gas, oil, solid fuels;
- diversification of energy consumption by fuel (HHI),
- Non-EEA share in energy imports

## Security of energy supply

	Import dependency				HHI energy imports			Non-EEA share of imports			Gross inland energy consumption, shares by fuel					
	Gas (%)	Oil (%)	Solid fuels (%)	Total Primary (%)	Gas	Oil	Solid fuels	Gas (%)	Oil (%)	Solid fuels (%)	Gas (%)	Oil (%)	Nuclear (%)	Renewables (%)	Solid fuels (%)	HHI energy sources
	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010	2006-2010
AT	83	92	97	67	0.40	0.13	0.37	86	54	10	22	40	0	25	11	0.28
BE	100	98	96	78	0.28	0.17	0.22	25	56	90	26	41	21	3	7	0.29
BG	94	100	34	47	1.00	0.46	0.42	100	87	98	14	24	22	6	37	0.27
CY		101	95	99		0.11	0.94		52	100	0	96	0	3	1	0.92
CZ	97	97	-16	27	0.66	0.29	0.72	78	72	8	16	22	15	5	44	0.29
DE	84	95	38	60	0.32	0.13	0.13	45	56	82	23	34	11	8	24	0.24
DK	-97	-64	94	-24		0.18	0.24		21	90	21	39	0	17	22	0.27
EE	100	66	0	22	1.00	0.28	0.91	100	55	100	12	19	0	12	59	0.42
ES	100	100	78	80	0.20	0.07	0.19	92	81	99	23	48	11	8	10	0.31
FI	100	95	65	53	1.00	0.54	0.42	100	79	91	10	29	16	24	17	0.21
FR	98	98	100	51	0.18	0.07	0.15	52	72	84	15	33	42	7	5	0.31
EL	100	100	4	71	0.52	0.16	0.44	100	90	85	10	55	0	6	27	0.39
HU	83	81	42	61	0.61	0.67	0.27	93	85	57	39	28	15	6	11	0.27
IE	92	99	63	88	1.00	0.49	0.32	0	7	86	28	53	0	4	15	0.38
IT	90	92	100	85	0.23	0.13	0.18	82	94	95	38	43	0	8	9	0.34
LT	100	95	91	63	1.00	0.88	0.81	100	98	97	30	32	23	12	3	0.28
LU	100	100	100	97	0.25	0.57	0.38	50	0	100	25	63	0	3	2	0.46
LV	93	98	100	57	1.00	0.26	0.88	100	48	97	30	32	0	32	2	0.29
MT		100		100							0	100	0	0	0	1.00
NL	-64	95	112	36	0.35	0.08	0.20	18	63	94	42	42	1	3	9	0.36
PL	69	99	-11	28	0.62	0.60	0.40	91	83	76	13	26	0	6	56	0.39
PT	100	99	100	81	0.47	0.07	0.35	100	80	95	16	52	0	18	10	0.35
RO	25	50	24	26	0.92	0.31	0.22	100	91	72	32	26	7	14	23	0.24
SE	100	99	89	37	1.00	0.23	0.19	0	37	83	2	28	32	32	5	0.28
SI	100	99	21	51	0.37	0.23	0.56	81	11	80	12	36	20	12	21	0.25
SK	100	91	84	65	0.99	0.67	0.29	100	84	41	28	20	23	6	22	0.23
UK	25	8	70	24	0.44	0.22	0.27	16	34	97	38	36	8	3	16	0.30
EA											24	39	15	8	13	0.26
EU27	62	83	41	54	0.18	0.09	0.13	60	66	86	24	36	14	8	17	0.25

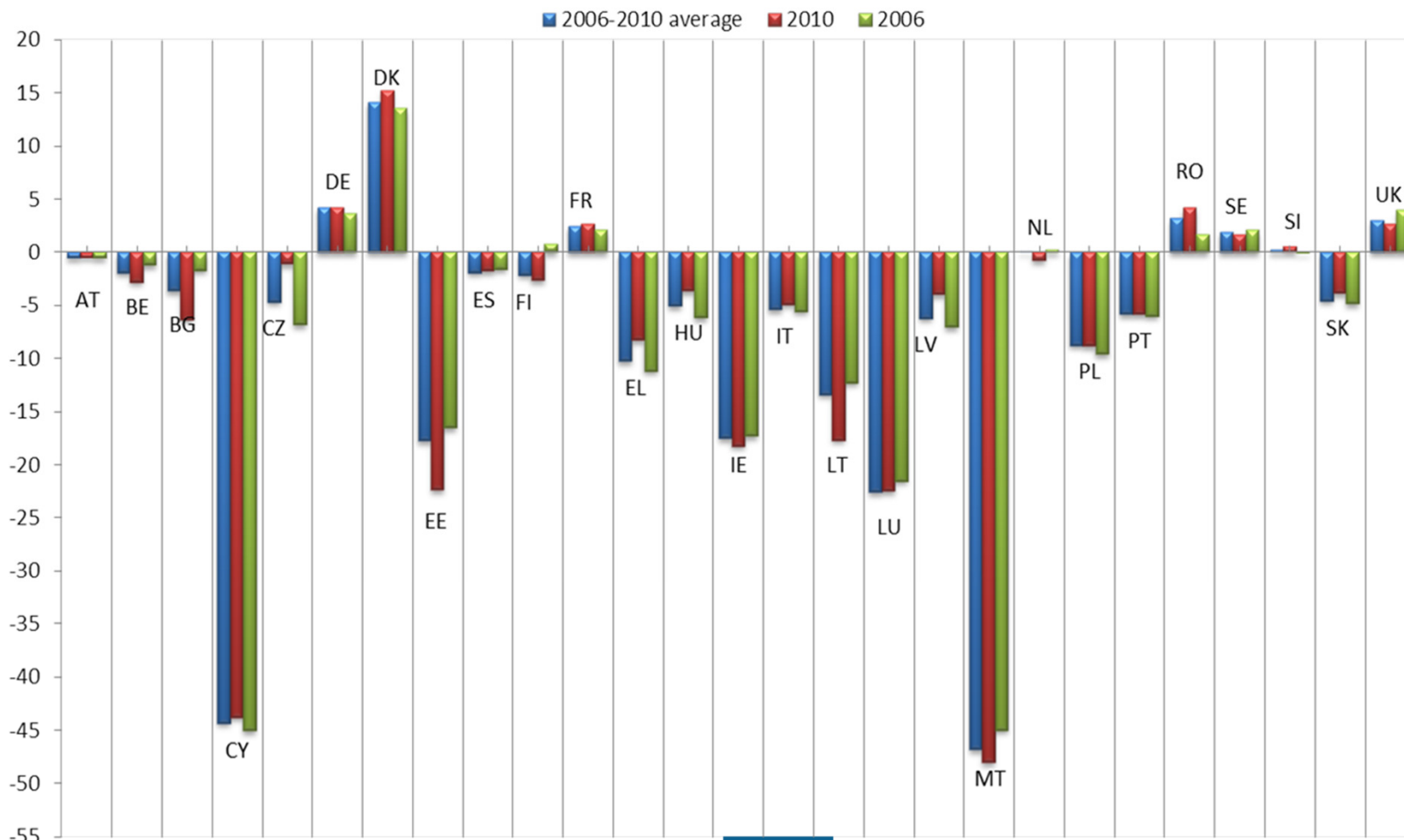
Security of energy supply																
	Import dependency				HHI energy imports			Non-EEA share of imports			Gross inland energy consumption, by fuel - %					
	Gas (%)	Oil (%)	Solid fuels (%)	Total Primary (%)	Gas	Oil	Solid fuels	Gas (%)	Oil (%)	Solid fuels (%)	Gas (%)	Oil (%)	Nuclear (%)	Renewables (%)	Solid fuels (%)	HHI energy sources
	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
AT	74%	89%	88%	62%	0.47	0.13	0.34	85%	50%	14%	24%	38%	0%	26%	10%	0.28
BE	99%	98%	98%	77%	0.25	0.17	0.24	26%	58%	88%	28%	42%	20%	4%	5%	0.29
BG	95%	101%	25%	40%	1.00	0.58	0.57	100%	84%	97%	13%	23%	22%	8%	39%	0.27
CY		104%	66%	101%		0.05	0.90		48%	100%	0%	95%	0%	4%	1%	0.91
CZ	85%	96%	-16%	26%	0.78	0.29	0.52	88%	75%	18%	18%	21%	16%	6%	41%	0.28
DE	82%	96%	41%	60%	0.30	0.13	0.13	42%	57%	82%	22%	34%	11%	10%	23%	0.24
DK	-68%	-52%	69%	-18%	1.00	0.12	0.22		27%	83%	23%	36%	0%	20%	20%	0.26
EE	100%	56%	-1%	13%	1.00	0.26	1.00	100%	32%	100%	9%	17%	0%	14%	64%	0.47
ES	99%	100%	86%	77%	0.20	0.06	0.17	90%	82%	99%	24%	47%	12%	12%	6%	0.31
FI	100%	87%	58%	48%	1.00	0.67	0.38	100%	87%	92%	10%	28%	16%	25%	19%	0.21
FR	93%	98%	101%	49%	0.17	0.08	0.14	53%	75%	83%	16%	31%	41%	8%	4%	0.30
EL	100%	99%	5%	69%	0.40	0.16	0.41	100%	89%	87%	11%	52%	0%	7%	27%	0.37
HU	79%	84%	42%	58%	0.50	0.70	0.30	94%	86%	57%	38%	26%	16%	8%	11%	0.25
IE	93%	98%	50%	86%	1.00	0.50	0.58	0%	8%	79%	31%	50%	0%	4%	14%	0.37
IT	91%	93%	101%	84%	0.20	0.11	0.18	85%	96%	92%	39%	40%	0%	10%	8%	0.33
LT	100%	99%	88%	82%	1.00	0.91	0.87	100%	98%	99%	36%	38%	0%	16%	3%	0.30
LU	100%	99%	100%	97%	0.34	0.56	0.45	35%	0%	100%	26%	62%	0%	3%	1%	0.45
LV	62%	94%	103%	42%	1.00	0.17	0.65	100%	50%	97%	32%	28%	0%	35%	2%	0.31
MT		101%		101%							0%	100%	0%	0%	0%	1.00
NL	-62%	93%	121%	31%	0.35	0.08	0.25	16%	58%	94%	45%	40%	1%	3%	9%	0.38
PL	69%	97%	-5%	32%	0.81	0.64	0.40	90%	83%	82%	13%	26%	0%	7%	54%	0.38
PT	100%	98%	98%	75%	0.42	0.07	0.34	100%	80%	92%	18%	51%	0%	22%	7%	0.35
RO	17%	51%	18%	22%	0.96	0.27	0.31	98%	84%	53%	30%	26%	8%	16%	20%	0.23
SE	100%	94%	102%	37%	1.00	0.25	0.20	0%	39%	83%	3%	28%	29%	34%	5%	0.28
SI	99%	101%	19%	49%	0.35	0.21	0.57	80%	8%	83%	12%	35%	20%	15%	20%	0.24
SK	100%	89%	76%	63%	1.00	0.66	0.27	100%	82%	37%	28%	21%	21%	8%	22%	0.22
UK	38%	15%	52%	28%	0.33	0.23	0.24	33%	34%	96%	40%	35%	8%	3%	14%	0.31
EA											25%	37%	15%	10%	12%	0.25
EU27	62%	84%	39%	53%	0.16	0.09	0.13	60%	66%	84%	25%	35%	13%	10%	16%	0.24

	<u>Import dependency</u>	<u>Share electricity generation by fuel - %</u>					
	Electricity (%)	Gas (%)	Oil (%)	Nuclear (%)	Renewables (%)	Solid fuels (%)	HHI electricity generation
	2010	2010	2010	2010	2010	2010	2010
AT	4	23	2	0	68	7	0.52
BE	1	35	0	50	8	4	0.38
BG	-31	4	1	33	14	48	0.36
CY	0	0	98	0	1	0	0.96
CZ	-26	5	0	33	8	55	0.41
DE	-3	15	1	22	18	42	0.28
DK	-4	20	2	0	32	44	0.34
EE	-47	5	0	0	8	86	0.75
ES	-3	32	5	20	33	8	0.27
FI	13	15	1	28	30	26	0.26
FR	-7	5	1	75	15	4	0.59
EL	11	17	11	0	18	54	0.36
HU	15	31	1	42	8	17	0.31
IE	2	62	2	0	14	22	0.45
IT	15	52	7	0	27	13	0.36
LT	72	55	11	0	29	0	0.40
LU	62	0	0	0	35	0	0.13
LV	14	45	0	0	55	0	0.50
MT	0	0	100	0	0	0	1.00
NL	3	66	1	3	9	19	0.48
PL	-1	4	2	0	7	87	0.76
PT	5	28	6	0	53	13	0.38
RO	-6	12	1	19	33	34	0.28
SE	2	3	1	39	55	1	0.46
SI	-18	3	0	34	30	32	0.31
SK	4	10	2	52	23	13	0.35
UK	1	46	1	16	8	28	0.33
EA	1						
EU27	0	24	3	27	21	25	0.24



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# Security of energy supply: aggregated score





# Security of energy supply

Factors that **mitigate the risk of security of energy supply** but not included in EDI set as too difficult to quantify:

- Level of integration and development of national energy markets;
- Capacity and number of energy interconnections: gas and oil pipelines, energy grid interconnections, gas and oil ports etc;
- Storage capacity for gas and oil reserves.

## Dimension 2: Energy / carbon intensity

**Energy intensity** – how much energy, measured in toe, consumed per unit of GDP.

Indicators of energy and carbon intensity in EDI set:

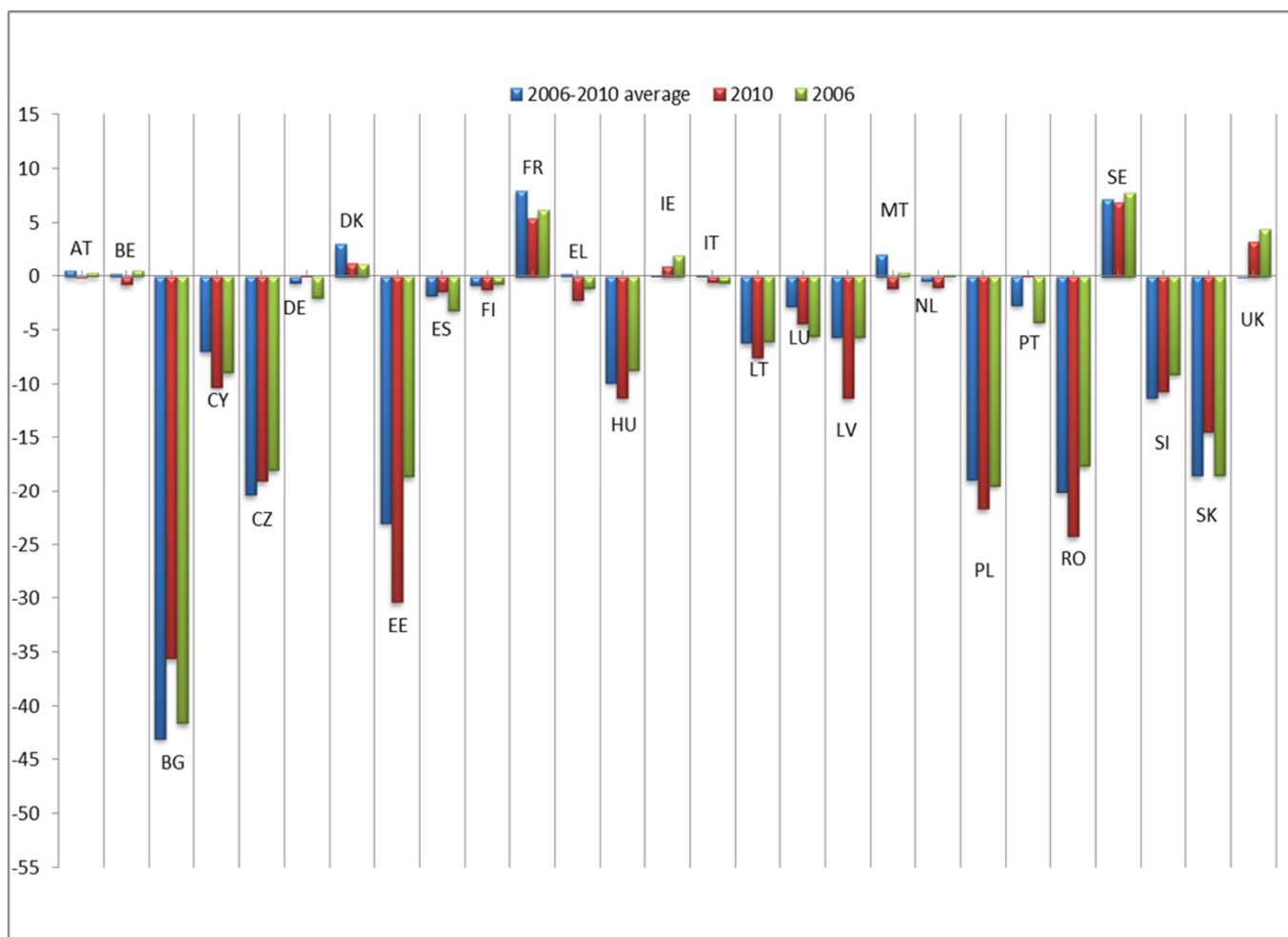
- energy intensity in the economy;
- energy intensity in industry, transport, households;
- share of energy intensive sectors in GVA;
- carbon intensity in the economy;
- carbon energy intensity of energy use, transport, households;
- weight of energy in HICP basket.

Energy and carbon intensity of the economy										
	Energy intensity of the economy (kgoe/1000 EUR)	Energy intensity of industry (kgoe/1000 EUR)	Energy intensity of transport (kgoe/1000 EUR)	Energy intensity of households (kgoe/1000 EUR)	CO2 intensity of the economy (ton CO2 eq./toe)	CO2 intensity of energy use (ton CO2 eq./toe)	Share of energy intensive sectors in total GVA (%)	CO2 intensity of transport sector (ton CO2 eq./toe)	CO2 intensity of households (ton CO2 eq./toe)	Weight of energy in HICP basket (%)
	2006-2010	2006-2010	2005-2009	2006-2010	2006-2010	2006-2010	2005-2009	2005-2009	2004-2008	2006-2010
AT	130	162	602	47	0.3	1.9	10.7	1.6	0.13	8
BE	185	218	448	54	0.4	1.8	10.5	1.1	0.19	11
BG	731	608	1209	116	2.5	2.5		3.3	0.30	14
CY	184	200	942	30	0.8	2.7	5.6	2.1	0.16	11
CZ	383	263	627	112	1.2	2.6	14.5	1.8	0.21	14
DE	144	115	499	50	0.4	2.3	9.2	1.3	0.15	11
DK	95	76	359	44	0.3	2.6	7.9	0.9	0.09	11
EE	478	296	664	147	1.6	2.9	9.9	1.9	0.23	12
ES	144	175	677	29	0.4	2.2	9.2	1.7	0.14	10
FI	220	303	403	63	0.4	1.6	12.0	1.1	0.09	7
FR	151		481	43	0.3	1.4	6.7	1.3	0.13	9
EL	151	189	434	36	0.6	3.3	6.9	1.2	0.13	7
HU	293	152	750	122	0.8	2.0	11.0	2.1	0.28	14
IE	91	59		40	0.4	2.8	14.1		0.19	9
IT	124	134	451	34	0.4	2.4	9.4	1.3	0.12	8
LT	365	187	582	103	1.0	1.5	8.6	1.7	0.24	13
LU	139	304	997	45	0.4	2.3	5.9	2.4	0.17	11
LV	327	404	708	159	0.8	1.8	6.5	1.9	0.15	12
MT	178			23	0.6	2.9	6.6		0.11	6
NL	153	149	446	41	0.4	2.0	11.6	1.0	0.15	10
PL	344	246	859	110	1.4	3.3	7.2	2.4	0.25	14
PT	160	228		31	0.5	2.2		2.0	0.10	10
RO	422	370	541	117	1.5	2.5	13.7	1.5	0.22	18
SE	157	200	419	47	0.2	1.0	11.4	1.0	0.08	12
SI	232	196	804	69	0.6	2.2	13.3	2.4	0.28	13
SK	391	325	793	88	1.0	1.8	15.8	2.0	0.14	17
UK	114	115	464	36	0.3	2.4		1.1	0.12	8
EA	146	145	515				9.4			10
EU27	153	150	512		0.4	2.2	9.6	1.3		10



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## Energy and carbon intensity: aggregated score



# Contribution of energy to trade

- **No aggregation:** the only indicator considered is the net energy trade balance as a percentage of GDP.
- **Sub-indicators:** the main indicator de-composed into: relative energy trade balance, share of energy trade in total trade, macro trade openness.

Contribution of energy products to trade balance							
	Trade balance of energy products (% of GDP)			Current account	DECOMPOSITION (related to total energy trade)		
	Petroleum products	Gas	Total	balance (% of GDP)	Relative energy trade balance (%)	Share of energy in total trade (%)	Macro trade openness (% of GDP)
	2007-2011	2007-2011	2007-2011	2007-2011	2011	2011	2011
AT	-2.2	-0.6	-3.1	3.2	-57.3	7.5	88.2
BE	-2.7	-1.2	-4.2	-0.2	-19.3	13.7	182.2
BG	-4.5	-2.2	-6.8	-11.5	-32.0	18.7	113.2
CY	-6.2	-0.2	-6.4	-11.7	-72.7	24.4	42.2
CZ	-2.8	-1.5	-3.6	-3.1	-42.2	6.7	145.5
DE	-2.0	-0.9	-3.0	6.3	-66.1	7.4	75.5
DK	1.0	0.4	1.2	3.9	11.2	9.6	63.4
EE	-2.4	-1.2	-2.6	-3.0	-4.7	17.2	154.6
ES	-2.2	-0.8	-3.2	-6.5	-54.4	14.6	46.0
FI	-1.9	-0.6	-3.1	1.9	-39.6	16.1	61.9
FR	-1.9	-0.6	-2.6	-1.6	-60.1	10.9	47.1
EL	-3.1	-0.4	-3.6	-12.1	-27.2	28.4	30.9
HU	-2.5	-2.5	-5.4	-2.4	-51.3	7.7	153.5
IE	-2.1	-0.7	-2.9	-2.7	-69.1	5.8	88.8
IT	-1.7	-0.8	-2.8	-2.8	-60.9	12.7	49.1
LT	-3.2	-2.4	-5.8	-4.6	-18.8	29.6	139.4
LU	-3.8	0.0	-3.7	7.3	-89.7	5.1	84.7
LV	-3.2	-1.8	-5.0	-5.0	-42.8	12.0	104.4
MT	-1.0	-0.2	-1.2	-5.8	-9.0	28.3	118.0
NL	-2.3	-0.1	-2.5	6.3	-14.4	17.5	150.3
PL	-2.9	-0.3	-2.8	-5.1	-48.4	9.0	76.7
PT	-2.8	-0.7	-3.8	-10.0	-53.9	13.4	58.6
RO	-1.6	-0.6	-2.4	-7.6	-42.7	8.7	73.2
SE	-1.3	-0.2	-1.7	7.8	-25.6	11.0	67.3
SI	-4.3	-1.0	-5.3	-3.0	-47.0	9.7	139.5
SK	-2.0	-2.5	-5.6	-3.5	-38.2	10.4	162.9
UK	-0.2	-0.2	-0.6	-2.1	-15.9	13.3	48.4
EA	-2.1	-0.8	-3.0	-1.0			
EU27	-1.8	-0.7	-2.6	-1.0	-39.6	8.8	93.4

Contribution of energy products to trade balance							
	<u>Trade balance of energy products as % of GDP</u>			<i>Current account</i>	<u>DECOMPOSITION (related to total energy trade)</u>		
	Petroleum products	Gas	Total	<i>balance as % of GDP</i>	Relative energy trade balance	Share of energy in total trade	<i>Macro trade openness</i>
	2011	2011	2011	2011	2011	2011	2011
AT	-2.6%	-0.8%	-3.8%	2.0%	-57.3%	7.5%	88.2%
BE	-3.2%	-1.4%	-4.8%	-0.8%	-19.3%	13.7%	182.2%
BG	-4.6%	-2.4%	-6.8%	0.9%	-32.0%	18.7%	113.2%
CY	-7.3%	-0.2%	-7.5%	-10.4%	-72.7%	24.4%	42.2%
CZ	-3.1%	-1.6%	-4.1%	-2.9%	-42.2%	6.7%	145.5%
DE	-2.5%	-1.0%	-3.7%	5.7%	-66.1%	7.4%	75.5%
DK	0.8%	0.2%	0.7%	6.5%	11.2%	9.6%	63.4%
EE	-1.5%	-1.1%	-1.3%	3.2%	-4.7%	17.2%	154.6%
ES	-2.6%	-0.9%	-3.6%	-3.5%	-54.4%	14.6%	46.0%
FI	-2.5%	-0.7%	-3.9%	-0.7%	-39.6%	16.1%	61.9%
FR	-2.4%	-0.7%	-3.1%	-2.2%	-60.1%	10.9%	47.1%
EL	-1.8%	-0.6%	-2.4%	-9.8%	-27.2%	28.4%	30.9%
HU	-3.2%	-2.3%	-6.0%	1.4%	-51.3%	7.7%	153.5%
IE	-2.6%	-0.8%	-3.6%	0.1%	-69.1%	5.8%	88.8%
IT	-2.0%	-1.4%	-3.8%	-3.2%	-60.9%	12.7%	49.1%
LT	-3.6%	-3.3%	-7.8%	-1.6%	-18.8%	29.6%	139.4%
LU	-4.0%	0.0%	-3.9%	7.1%	-89.7%	5.1%	84.7%
LV	-3.5%	-2.0%	-5.4%	-1.2%	-42.8%	12.0%	104.4%
MT	-2.7%	-0.3%	-3.0%	-3.1%	-9.0%	28.3%	118.0%
NL	-3.3%	-0.3%	-3.8%	9.2%	-14.4%	17.5%	150.3%
PL	-3.5%	-0.3%	-3.3%	-4.3%	-48.4%	9.0%	76.7%
PT	-3.1%	-0.9%	-4.2%	-6.4%	-53.9%	13.4%	58.6%
RO	-1.9%	-0.6%	-2.7%	-4.4%	-42.7%	8.7%	73.2%
SE	-1.5%	-0.3%	-1.9%	7.2%	-25.6%	11.0%	67.3%
SI	-5.4%	-1.1%	-6.3%	-1.1%	-47.0%	9.7%	139.5%
SK	-2.5%	-2.8%	-6.5%	0.1%	-38.2%	10.4%	162.9%
UK	-0.5%	-0.3%	-1.0%	-1.9%	-15.9%	13.3%	48.4%
EA	-2.5%	-0.9%	-3.6%				
EU27	-2.2%	-0.8%	-3.2%	-0.6%	-39.6%	8.8%	93.4%

## **Conclusions: priorities towards lower energy dependence**

- Increase the geographical diversification of energy imports
- Develop domestic energy sources and energy interconnections
- Improve energy efficiency, especially of buildings
  - good practices in Lithuania (Jessica Holding Fund, highest % of Structural Funds for energy efficiency)
- Reduce trade deficit in oil and gas  
(via energy savings, higher fuel taxation etc.)