Energy consumption vs. economic development

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Definitions

- "Simple elasticity" for 2 measures' connection is the ratio of these measures' annual relative increase:

$$e1 = r\ TPEC\ /\ r\ GDP\ ;$$

$$e2 = r\ EE\ /\ r\ GDP.$$

where $r\ TPEC = \Delta\ TPEC/\ TPECi$

$$r\ EE = \Delta\ EE\ /\ EEi \quad \text{and}$$

$$r\ GDP = \Delta\ GDP\ /\ GDP$$

Elasticity for primary energy (*e1*) and for electricity (*e2*) vs GDP: 1980 – 2008
Source: Study for National Prognosis Commission using IEA data

	e1	*e2*	*r$_{GDP}$* (%)
Europe	0.309	-	2.3
EU 27	0.355	0.69	2.1

Primary energy and electricity elasticity vs GDP (2004 -2007)
Calculations of data provided by EUROSTAT

	e1	*e2*	r_{GDP} (%)
Austria	0.19	0.31	3.16
France	-0.185	0.166	2.12
Germany	-0.27	0.67	2.16
Netherlands	0.41	0.55	3.08

Primary energy and electricity elasticity vs GDP (2004 -2007)
Calculations of data provided by EUROSTAT

	$e1$	$e2$	r_{GDP} (%)
Poland	0.32	0.184	5.52
Spain	0.42	0.756	3.73
UK	-1.69	0.202	2.57
Portugal	0.58	0.64	1.40
Italy	0.133	1.22	1.43

Primary energy and electricity elasticity vs GDP (2004 -2007)
Calculations of data provided by EUROSTAT

For Romania, (same period):

$e1 = 0.27;$

$e2 = 0.35;$

$r_{GDP} = 6.12$

Other factors

- Market liberalization.
- New EU Directive (D 27/2009) transposed through Law 121/2014 on energy efficiency – mandatory targets to reduce final energy consumption (3% for public owned buildings and 1.5%/year for final consumption) .
- Learning curves for new technologies.
- For other countries: obligation schemes, for Romania: alternative policies.

Romania's target

- D 27/2012 art. 3(1): reduction of primary energy final consumption for 2020 forecasted through PRIMES 2007 by 19% = 10 mil toe.

- Tacking into account the existing consumption contraction, Romania has to reduce (2014 – 2020): 5.817 mil toe.