

# Energy Security Risk Index: Dimensions for Bulgaria

Policy Briefing

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# *Measuring Energy Security: Significance and Policy Implications*

## What is Energy Security?

**Energy security** refers to the level of uninterrupted availability of energy resources sufficient to meet energy consumption demand at an affordable price.

- **Significance of energy security for industries**
- **Significance of energy security for households**
  
- **Global energy security challenges :**
  - little overlap between resource-rich energy producers and major economies (consumers)
  - reliance on international trade, which is vulnerable to global and regional turmoil , inelastic demand, market cartelization practices, etc.
  - long-term dependence on certain resources and/or suppliers
  - possible conflict between environmental concerns, competitiveness and access to resources

## Fundamentals of Long-term Energy Security

- Reducing import dependence
- Increasing the number of suppliers
- Utilization of indigenous resources and renewable energy resources
- Reducing overall energy demand by introducing energy-efficient technologies

## Quantifying Energy Security as a Policy Tool

**Quantifying energy security:** key to adequately tackling energy security risks

- **Policy implications on EU level**
  - access to natural resources
  - import exposure (the role of Russia, Middle East)
  - environmental concerns
- **The case of Bulgaria**
  - national specificities: level of economic development and energy infrastructure
  - regional characteristics (South-East Europe, Black Sea Region, ties with Russia, Turkey)
  - position in the EU: compliance with EU policy

## Tools for Quantifying Energy Security

**Methodology for quantifying energy security/level of energy poverty:** quantifying energy security is not trivial and there is very little consensus on what metrics should be used

Several approaches have been utilized:

- Shannon Index
- Herfindahl-Hirschman Index
- Supply-demand Index



# Tools for Quantifying Energy Security: Institute for 21<sup>st</sup> Century Energy (1)

- **Index of U.S. Energy Security Risk: Assessing America's Vulnerabilities in a Global Energy Market:**
  - annual energy risk indicator
  - uses quantifiable data, historical trend information, and government projections
  - retrospective look from 1970 to nowadays, and prospectively from nowadays to 30 years ahead
- **International Index of Energy Security Risk (IIESR):**
  - new tool (started in 2012) to help better understand and assess international energy markets
  - 75 countries (top energy users), 28 metrics
  - Only historical data (back to 1980), no projections





## Tools for Quantifying Energy Security: Institute for 21<sup>st</sup> Century Energy (2)

- **IIESR metrics used to rank 75 countries (including Bulgaria):**
  - global fuel reserves
  - fuel imports
  - national energy expenditure
  - price and market volatility
  - energy use intensity
  - reliability of electricity generation
  - efficiency of the transport sector
  - environmental policies
- The results for Bulgaria represent only the index scores for the country as excerpted from the IIESR rankings

# *International Index of Energy Security Risk: Results for Bulgaria*



# IIESR: Results for Bulgaria (1)

## Energy Security Risk Summary: Bulgaria

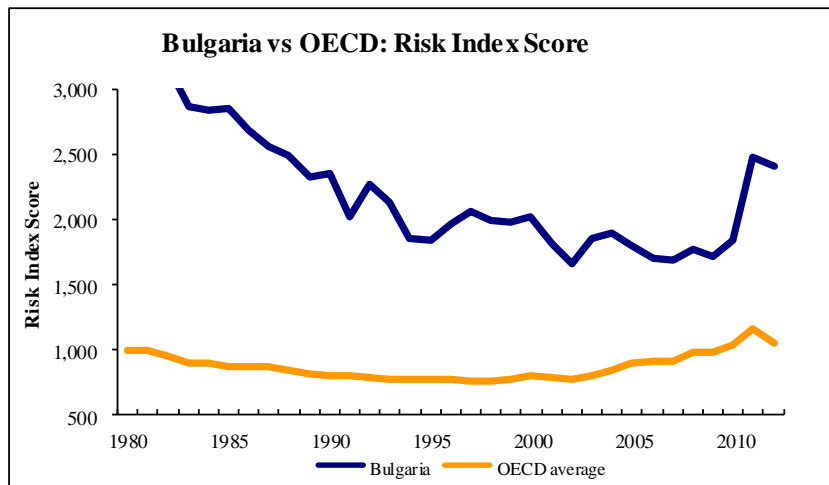
### ***Risk Scores:***

<b>2012 Energy Security Risk Score</b>	<b>1,846</b>
2012 Top 75 Energy User Group Rank	73
Score in Previous Year	1,714
Rank in Previous Year	70
Score in 1980	3,524
Average Score: 1980-2012	2,238
<b>Best Energy Security Risk Score</b>	<b>1,654 (2002)</b>
Worst Energy Security Risk Score	3,524 (1980)
<b>Risk Scores Relative to OECD Average:</b>	
Average Annual Difference 1980-2012	158%
Best Relative Score	75% (2009)
Worst Relative Score	252% (1980)

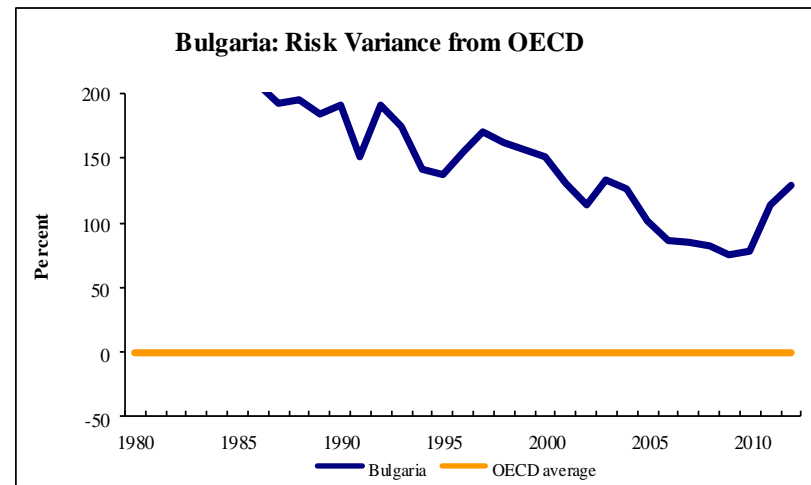


# IIESR: Results for Bulgaria (2)

**Bulgaria vs. OECD Risk Index Score**



**Risk Variance from OECD**





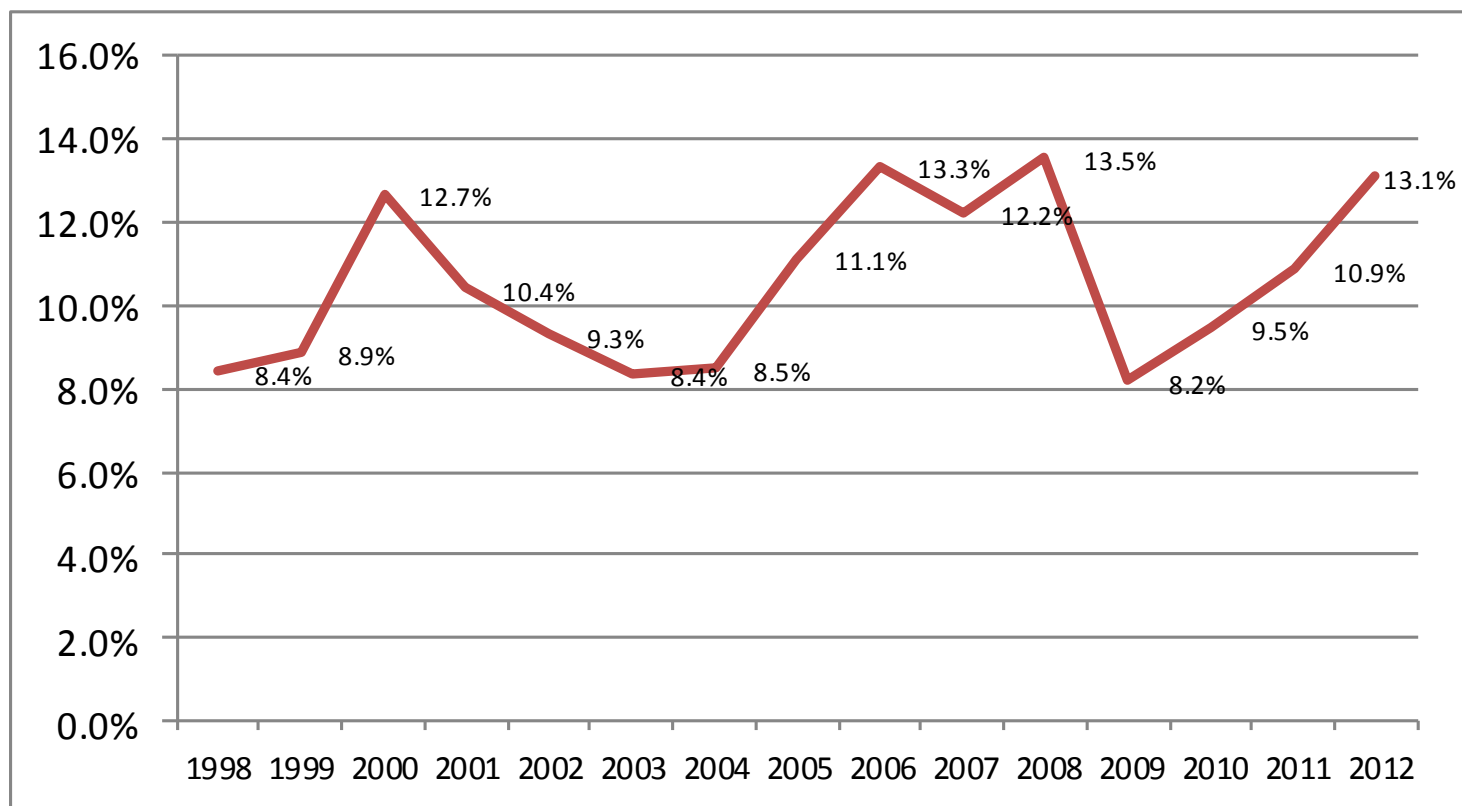
## IIESR: Results for Bulgaria (3)

- **Positive results/developments:**
  - Coal import exposure (100% below average OECD risk levels)
  - Electricity capacity diversity (72% below average OECD risk levels)
  - CO<sub>2</sub> emissions trend (48% below average OECD risk levels)
  - Transport energy per capita (42% below average OECD risk levels)
  - Energy consumption per capita (42% below average OECD risk levels)
  - Retail electricity prices (31% below average OECD risk levels)
  - CO<sub>2</sub> per capita (30% below average OECD risk levels)
- **Main challenges for Bulgarian energy security**
  - Energy expenditure volatility (3180% above average OECD risk levels)
  - Energy expenditure intensity (855% above average OECD risk levels)
  - CO<sub>2</sub> GDP intensity (370% above average OECD risk levels)
  - Energy intensity (289% above average OECD risk levels)
  - Petroleum intensity (252% above average OECD risk levels)
  - Transport energy intensity (197% above average OECD risk levels)
  - Gas import exposure (134% above average OECD risk levels)



## IIESR: Results for Bulgaria (4)

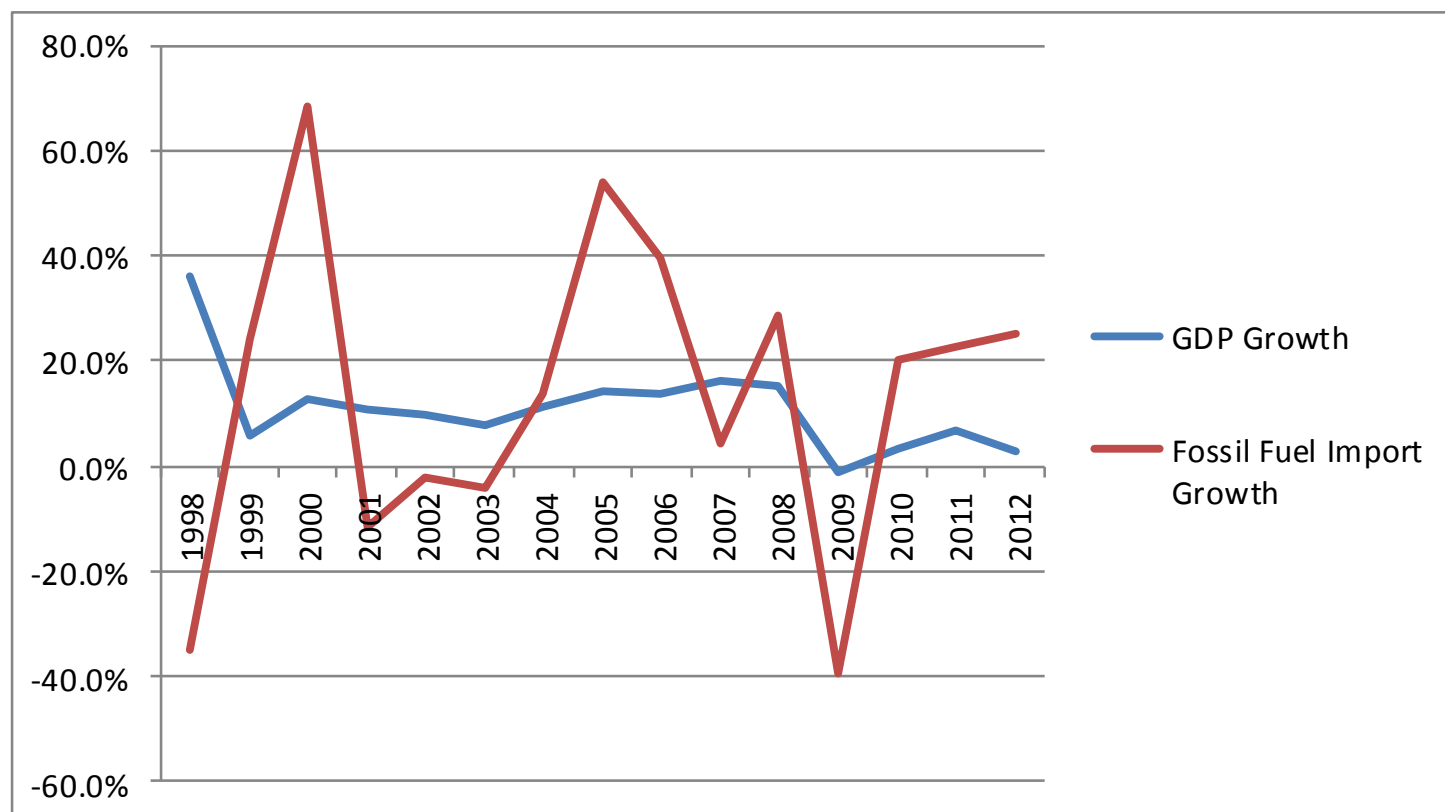
Dynamics of Fossil Fuel Import as a % of GDP (Nominal) (1998-2012)





## IIESR: Results for Bulgaria (5)

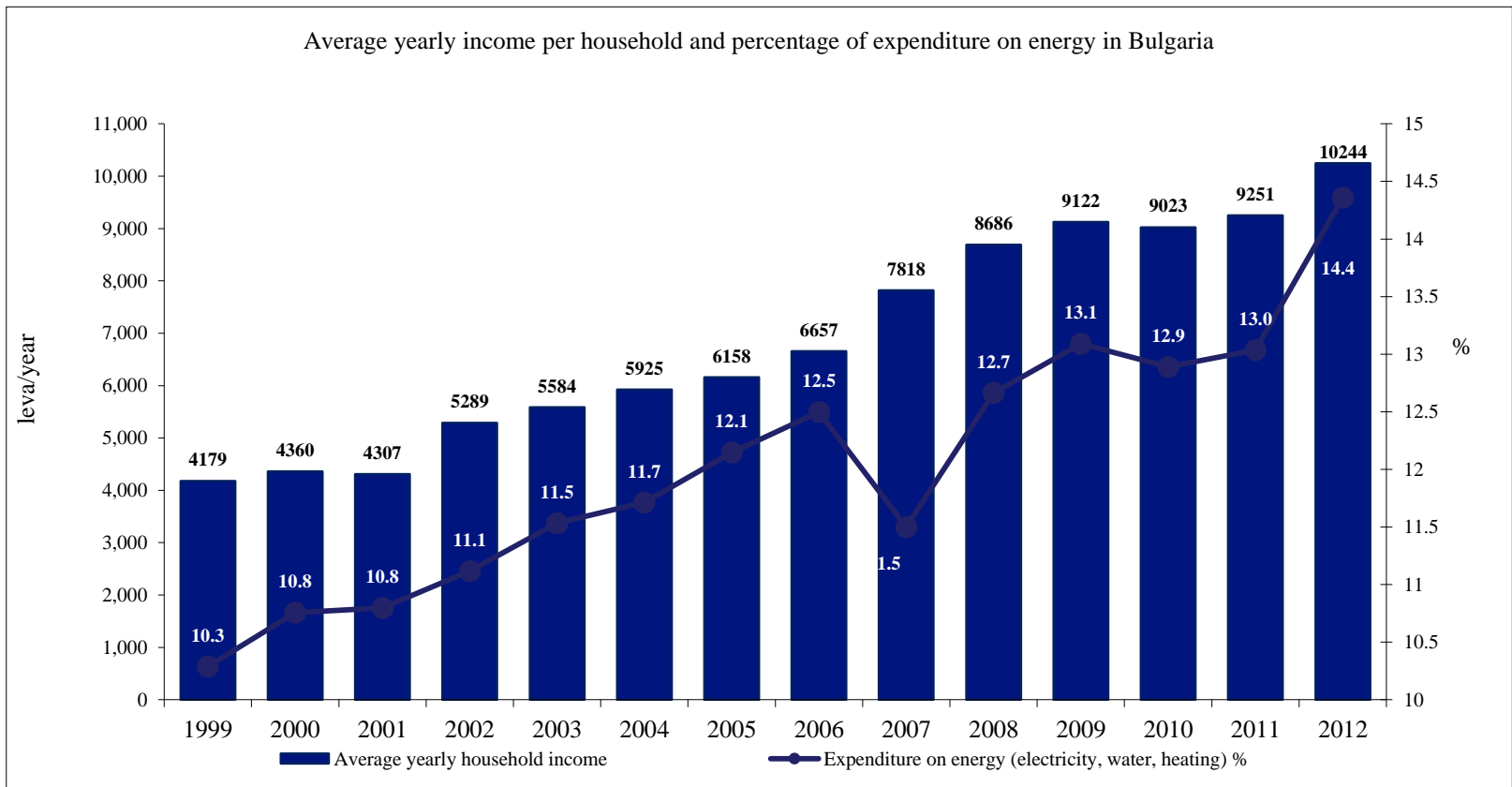
Dynamics of Fossil Fuel Import Growth vs. GDP Growth (Nominal) (1998-2012)





# IIESR: Results for Bulgaria (6)

## Average Annual Income per Household and Percentage of Expenditure on Energy in Bulgaria (1999-2012)



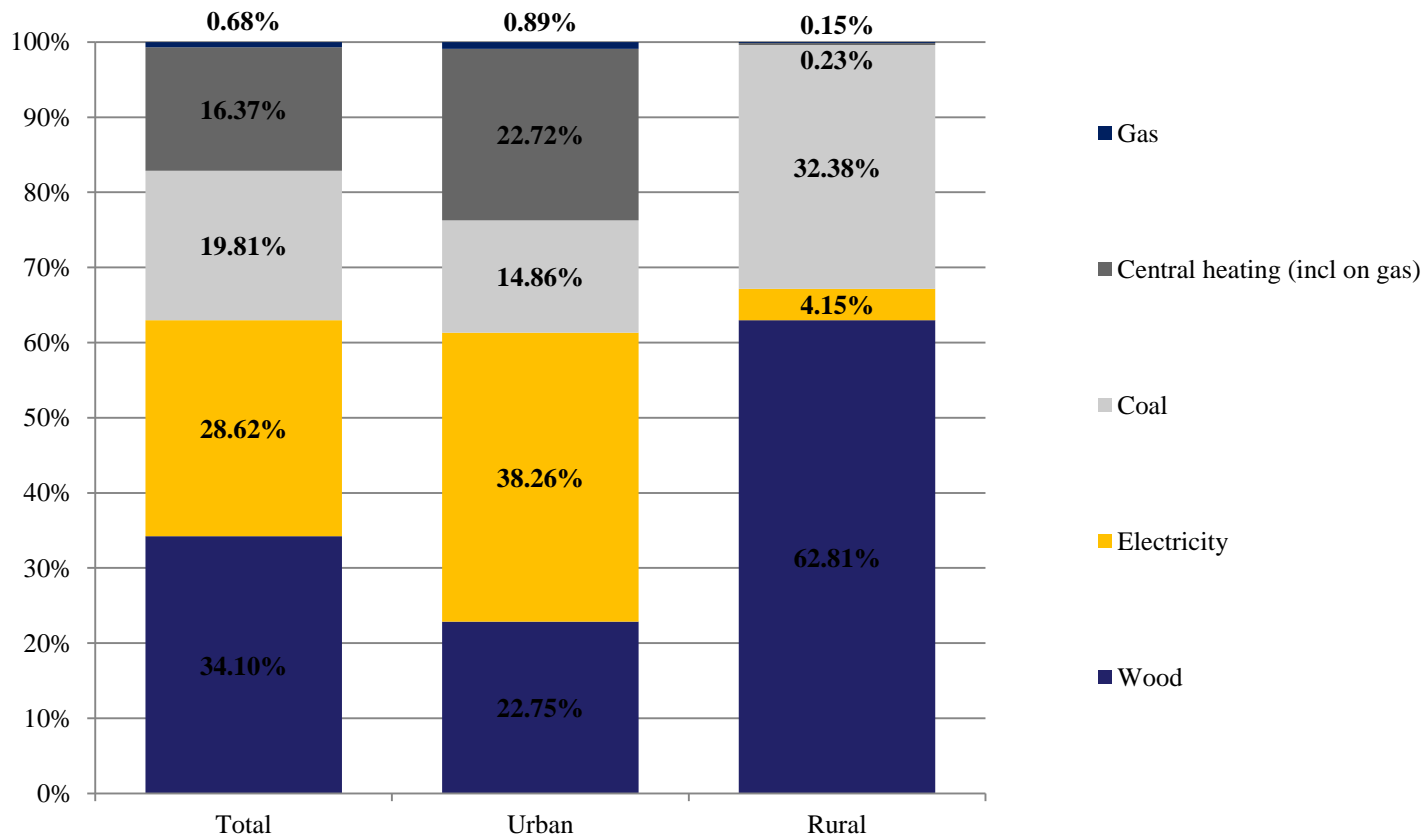




# IIESR: Results for Bulgaria (7)

## Main Heating Source by Type of Settlement (2011)

Main Heating Source by Type of Settlement in Bulgaria



# *Policy Perspectives from an Energy Security Standpoint*

## Country Perspectives from an Energy Security Standpoint

The *Energy Security Risk Index* suggests that Bulgaria is currently exposed to three major interrelated energy security risks:

- high level of energy poverty
- high exposure to fossil fuel import risks
- gas supply diversification and disruptions risks

# Sustainability and Competitiveness of Electricity Market in Bulgaria

- **Curbing accumulating deficits:**
  - re-negotiation of supply terms
  - de-centralization of governance
  - market liberalization
  
- **Possibility of positive characteristics turning into negative:**
  - level of diversification of electricity production sources
  - household electricity prices

## Security of Gas Supply in Bulgaria

**Energy Security Challenges:** Gas supply diversification and disruption risks are closely related to energy poverty and electricity prices, as this is the most viable options for the Bulgarian economy to receive lower energy alternatives after coal and wood, which are not sustainable options in the long-run.

- Gas transit arrangements
- Involvement in international pipelines and regional interconnectors
  - Nabucco and Southern Corridor pipelines
  - South Stream
  - regional interconnectors and reverse flow connections with neighboring countries

# Thank You!

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