

Energy Security: IAEA Activities and the Role of Nuclear Power

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*UN ECE Committee on Sustainable Energy
Geneva, Switzerland, 18-20 November, 2009*



IAEA
International Atomic Energy Agency

Overview

1. IAEA activities in energy security
2. Supply security: focus on nuclear energy
3. Nuclear: other benefits and concerns
4. Main messages



1. IAEA activities in energy security

NE-PESS assistance to MS includes:

- capacity building to explore own SED options
- assess 3E linkages: economy-energy-environment

Related activities:

- develop and disseminate tools: models
- train analysts in integrated energy planning
- provide tech. guidance: national energy studies
- develop and disseminate indicators for SED
- contribute to internat. activities on CC and SD
- member of UN Energy: contribute to reports



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1. IAEA activities in energy security

Energy security: a primary concern, one **example**:

~~ Growing concern in the **Baltic** since 1991:

- dependence on single foreign supplier of oil+gas
 - EU accession: new commitments + opportunities
 - needed robust energy strategies new conditions
- IAEA **tools + training + assist** in regional study:
- region as an integrated unit, not isolated states
 - a long-term, least-cost investment portfolio
 - ES: obtain the most security for the lowest cost



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1. IAEA activities in energy security

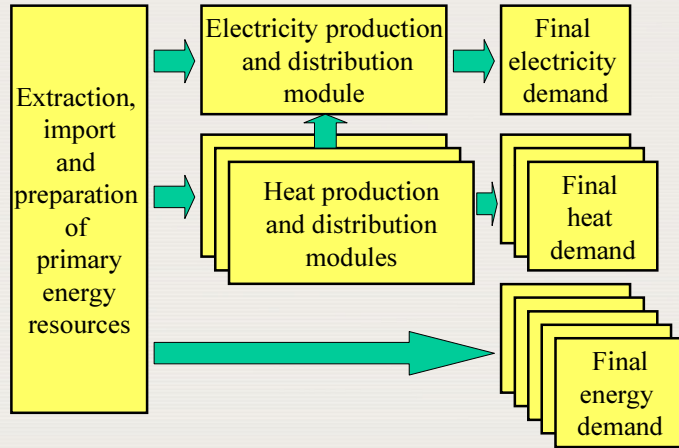


Figure 6.1. Principal structure of the Estonian energy system model



1. IAEA activities in energy security

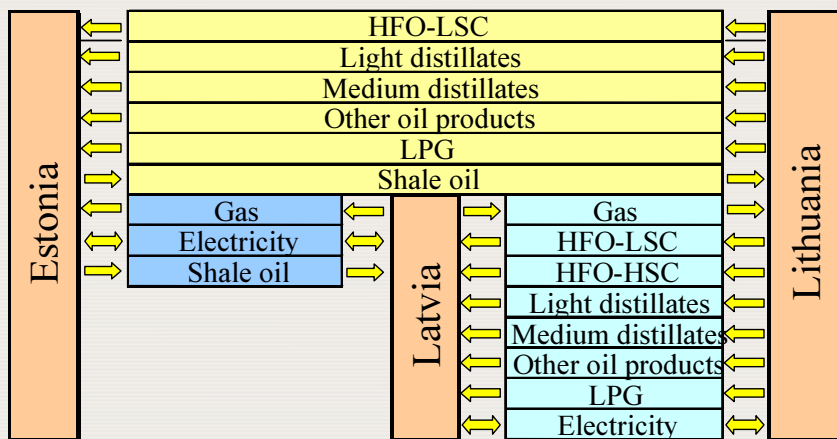


Figure 6.5. Links between Baltic countries in the multi-regional model. HFO-HSC, heavy fuel oil-high sulphur content; HFO-LSC, heavy fuel oil-low sulphur content; LPG, liquid petroleum gas



1. IAEA activities in energy security

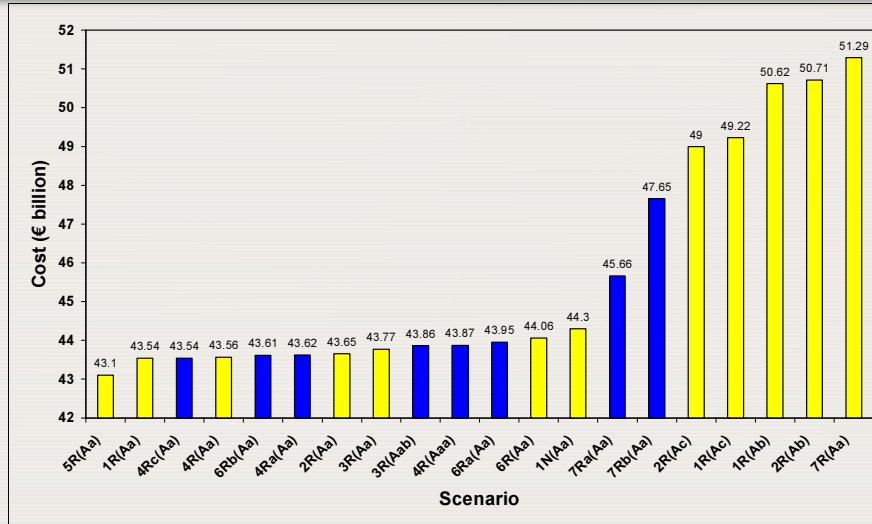


Figure 8.1. Cost comparison of the main scenarios and the sensitivity cases.

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1. IAEA activities in energy security

Baltic: most powerful *general conclusion* across all scenarios and variants:

Addressing energy supply and security issues on a *coordinated regional basis reduces* investment and operating *costs*, and *benefits the economies* of the three countries compared with individual country schemes

Point #1: Energy security is key concern of MSs hence: important aspect of modelling and capacity building in energy planning of IAEA



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2. Supply security: focus on nuclear

Energy security: growing concern worldwide

- **long term**: availability and prices
- **short term**: disruptions

Robust energy strategies have to

- *balance* supply security, economic efficiency, environmental protection:

complex linkages: trade-offs and synergies

- *be valid* under a broad range of future conditions: technology options, energy prices, political situations, environmental targets



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2. Supply security: focus on nuclear

Energy supply security:

- many definitions and targets
- criteria depend on national/regional conditions

Key strategy for secure availability:

diversification

- *energy sources and technologies*
- *domestic and imported energy sources*
- *sources and routes of imported energy*
- *emergency stockpiles (EU, OECD)*



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2. Supply security: focus on nuclear

Diversification of *energy sources & technologies*:
IF currently no nuclear power in energy mix →
nuclear: additional source;
increase diversity index



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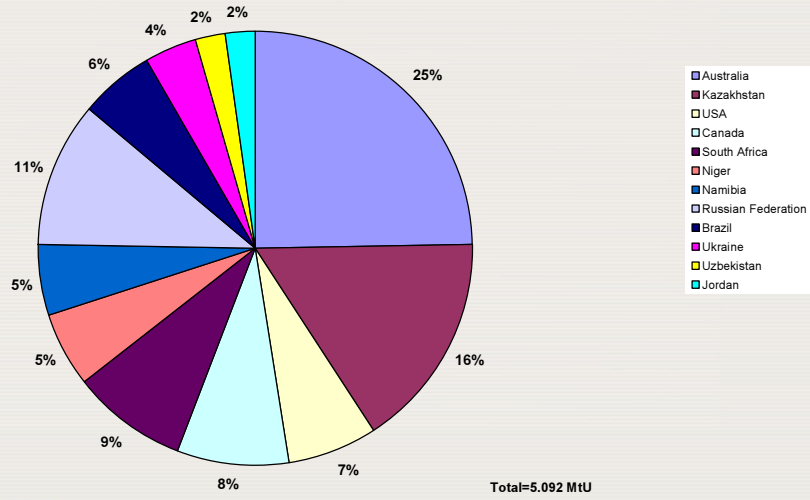
2. Supply security: focus on nuclear

Domestic vs imported energy sources
Self sufficiency - Import dependence:
Even if imported: nuclear practically “domestic”
- Uranium from many regions (no OUEC)
- Competitive fuel market
- Easy to store next load (no short-term risk)
- Recent IAEA proposals: international fuel bank
+ supply guarantees



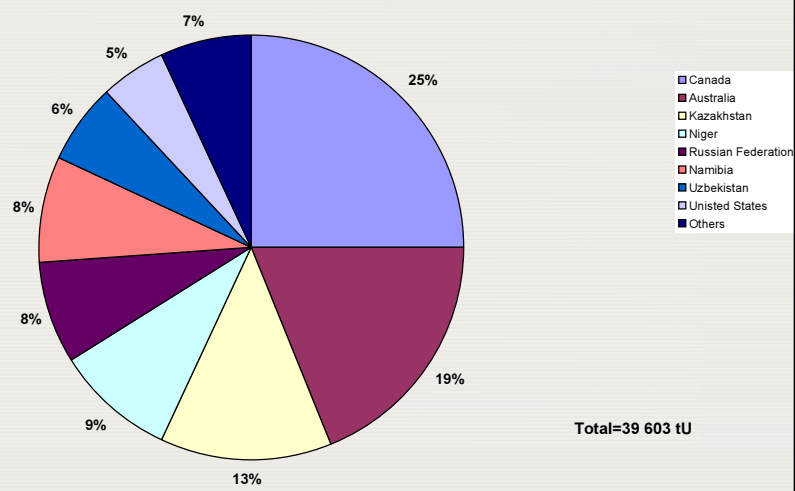
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2. Supply security: focus on nuclear



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2. Supply security: focus on nuclear



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2. Supply security: focus on nuclear

Fuels price levels

Fossil sources:

competing uses, cheap technologies, fast growing demand:

→ elevated (relative to \$30/b oil) likely to remain and increase over the long term

Uranium:

no alternative use, abundant resources

→ low prices (<<\$130/kg) likely to remain

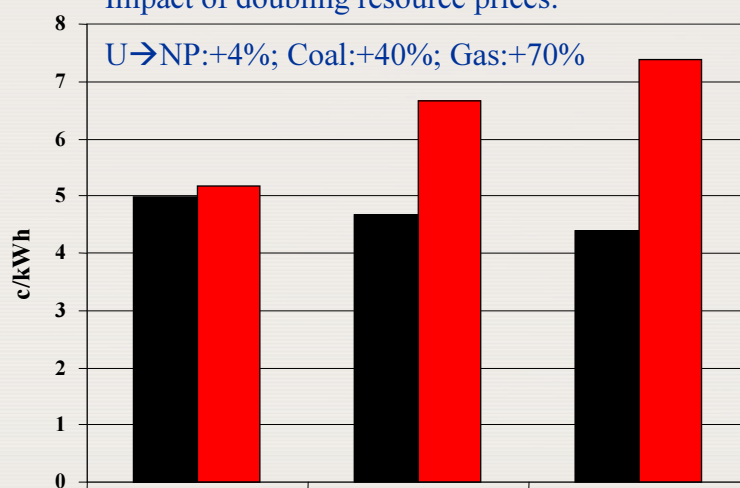


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2. Supply security: focus on nuclear

Impact of doubling resource prices:

U→NP:+4%; Coal:+40%; Gas:+70%



Nuclear

Coal

Natural gas

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2. Supply security: focus on nuclear

Point #2:

Nuclear can address several aspects of supply security

- adds to supply mix: new resource/technology
- low-risk fuel supply: disperse, stable regions
- long-term low price: abundant resource base
- low volatility risk: fuel cost small share of electricity price

Currently: these benefits not visible to private investors ← public goods, underprovided



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3. Nuclear: other benefits and concerns

Local/regional air pollution and *climate change*:
tiny emissions from operation;
low emissions on life-cycle basis

Combining supply security and climate change:

- coal: SS+ (if domestic); CC- (even with CCS)
- gas: SS +/- (dom/imp); CC +/- (replace coal/oil)
- nuclear: SS+ ; CC +

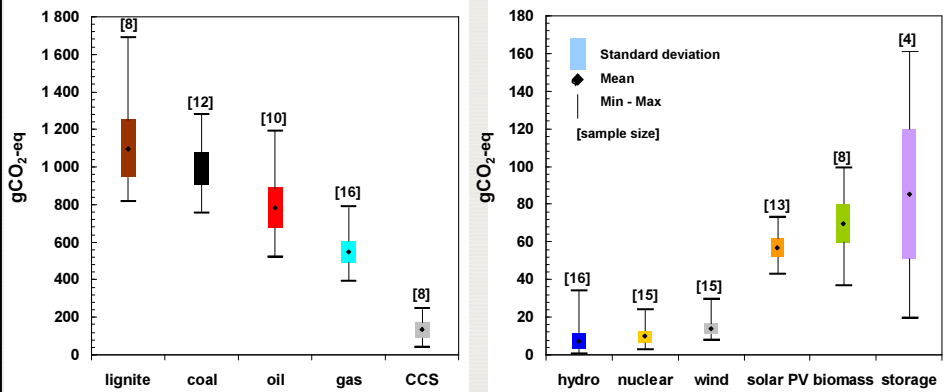
Comparison of life-cycle GHG emissions:



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3. Nuclear: other benefits and concerns

Life cycle GHG emissions of different electricity generating options



Nuclear power: Very low lifetime GHG emissions make the technology a potent climate change mitigation option

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Source: Weisser, 2007

3. Nuclear: other benefits and concerns

4+1 classic concerns:

- *safety*: good track record, >13K reactor years
- *waste*: 4 strategies, ultimate: geological disposal; waste as resource - question of U price
- *proliferation*: real risk, many efforts
- *economics*: improving, absolute – relative to others

Last two decades: major improvements on all 4

- → *public acceptance*: improving in many countries



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3. Nuclear: other benefits and concerns

Point #3:

Supply security and other benefits *and*
easing concerns over NP:

- ~60 countries interested in nuclear energy
- 12 countries actively considering

Explore questions: Economically efficient?

Compatible? How much? When?

Need for energy planning → national ene strategy

IAEA assistance: planning tools and capacity



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building in applications

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4. Main messages

Supply security: many aspects and targets –

- nuclear can enhance supply security

Other drivers for considering NP worldwide:

fast growing demand, domestic resources,
import prices and current account balance,
competitiveness, climate change, sustainability...

SS: public good → policies needed to provide it



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4. Main messages

Supply security has emerged as key concern

But: other energy – economy – environment issues and challenges abound

Nuclear energy is *not a magic cure*

but:

It could be *part of the remedy*

Where, when, how much, what arrangements:

depends on *national* circumstances and

priorities → *decision of sovereign states*

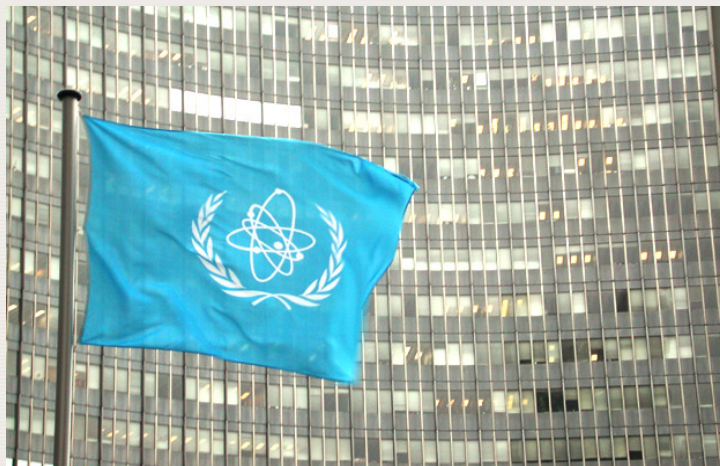
IAEA mandate: support, tools, capacity building



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<http://www.iaea.org/OurWork/ST/NE/index.html>



...atoms for peace.

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