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Generation IV – A Swedish perspective

Brief overview

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“One-point-six-billion people lack access to electricity.

Without electricity you cannot do anything in this world.

Two to three billion people still rely on traditional energy sources, such as firewood, peat or dung. This affects their health and keeps people trapped in poverty”.

*UN Secretary General Ban Ki Moon
(2010)*



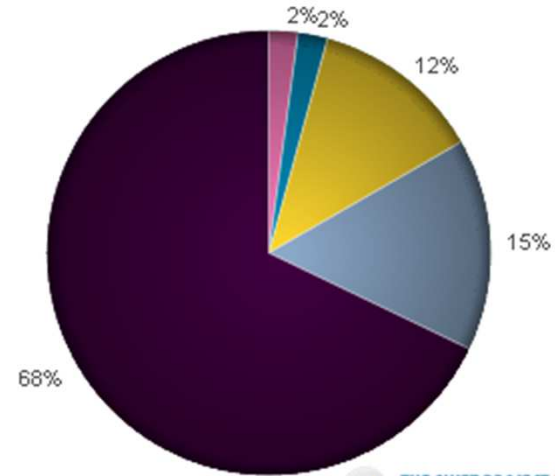
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World Electricity Production from All Energy Sources in 2011 (TWh)

Electricity Source	TWh
Others	425
Wind	436
Nuclear	2 507
Hydroelectric	3 117
Conventional Thermal	13 720



Total = 20205 TWh

 THE SHIFT PROJECT DATA PORTAL
Browse Energy and Climate Data





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Sweden, facts...



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Sweden, facts...

has developed own nuclear power technology
without U.S. licenses

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Sweden, facts...

together with France, the only two countries that succeeded to maintain welfare societies while decreasing CO2 emissions

-CO2 emissions [g per kWh] 2010 (IEA)

-Sweden: **30**

-France: **76**

-Average European OECD countries: 331

-Germany and Denmark: 461 and 360, respectively!



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A “nuclear spring” ???



- Currently expanding research and education within nuclear technology.
 - Cautious political support for N.P.
 - Public mainly in support of N.P.
 - Lots of students attend nuclear engineering programmes or courses
-

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A “nuclear spring” ???



October 7, 2007, the Swedish Government put aside approx. 500 kEUR for research within new nuclear technology. Eventually that went up to 6 MEUR.

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A “nuclear spring” ???



In 2008, using this funding, the Swedish Research Council announced a research call.

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A “nuclear spring” ???



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In collaboration, the three universities worked out a proposal to the Swedish Research Council regarding Generation IV research.

Generation IV in
Universities of Sweden,
GENIUS

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The GENIUS programme

Base of the research programme:

- Sweden has a long nuclear tradition
- Sweden has still a strong competence
- Sweden has a long standing position in the world community (well-fare, security, environment)
- Sweden has a high-ranked steel industry
- Sweden needs nuclear capacity building

The Research Council granted 2009 approx.
4 MEUR to the GENIUS programme.

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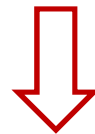


The GENIUS programme

Generation IV considered as a system:

Hardware: Reactors, Recycling, Final storage, Instrumentation, Safeguards, Physical protection

Software: Policymaking, Non-proliferation, New basis for documentation and definitions



1. Materials
2. Fuel
3. Safety and Security



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The GENIUS programme



Fuel, recycling of nuclear waste



Materials, reactors



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Reactor monitoring,
safeguards, "soft" issues

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The GENIUS programme



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Four Ph.D. projects:

Safeguards in recycling facilities

Matilda Åberg Lindell

**New detector materials for safeguards
and monitoring**

Anna Shepidchenko

Sensitivity analysis in nuclear systems

Erwin Alhassan

LFR instrumentation

Peter Wolniewicz

“Soft” issues

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Commercial Gen IV implementation earliest 2060-70

Competence building from now on (?)

Actions for Gen IV on the global arena

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Thank you

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