

18th REFORM Group Meeting, Salzburg – August 26–30, 2013

Climate Policy Strategies and Energy Transition



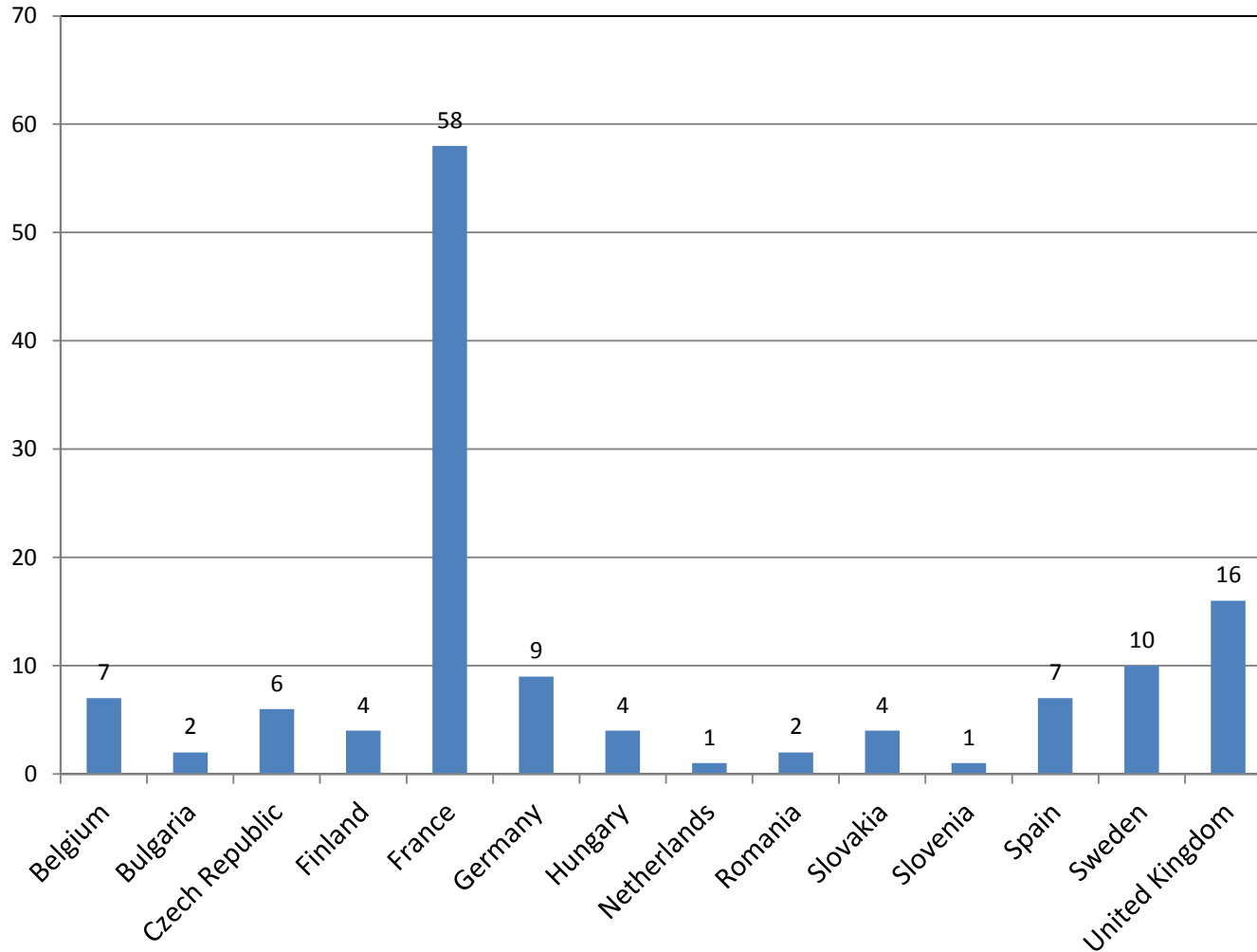
Michael Schreyer

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27.08.2013

Nuclear Power in the EU : Trends, Legislation, Future of Euratom – the European Atomic Energy Community

Number of operating reactors by country , July 2013



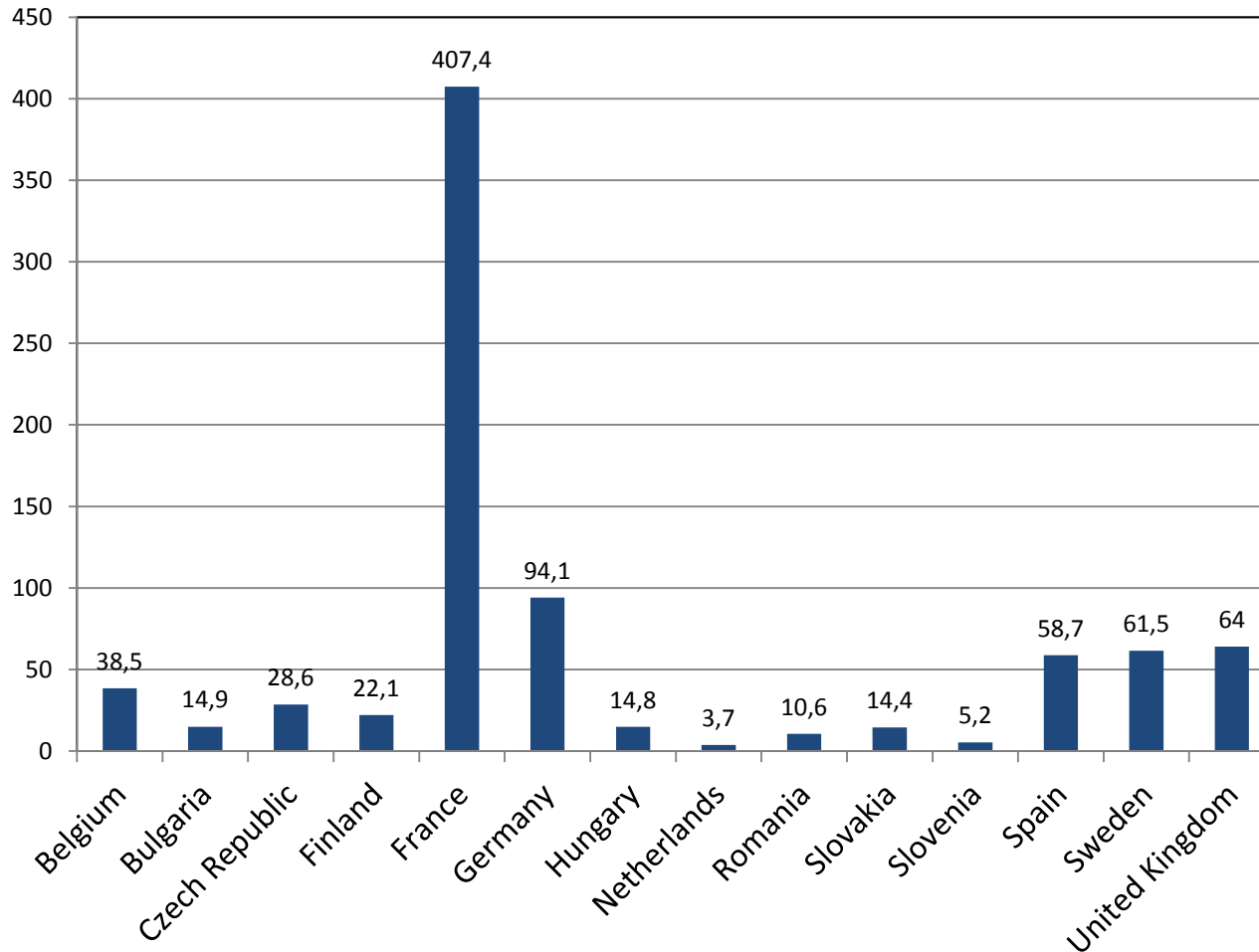
Total:
131 reactors in
14 Member
States

Historic
maximum:
in 1989
177 operating
reactors

Source: IAEA, Nuclear power reactors in the World, Reference Data Series No 2, 2013

<http://www.iaea.org/PRIS/CountryStatistics/CountryStatisticsLandingPage.aspx> ; WNISR 2013 <http://www.worldnuclearreport.org/-2013-.html>

Nuclear electricity production in 2012 (TW(e)h) by Country



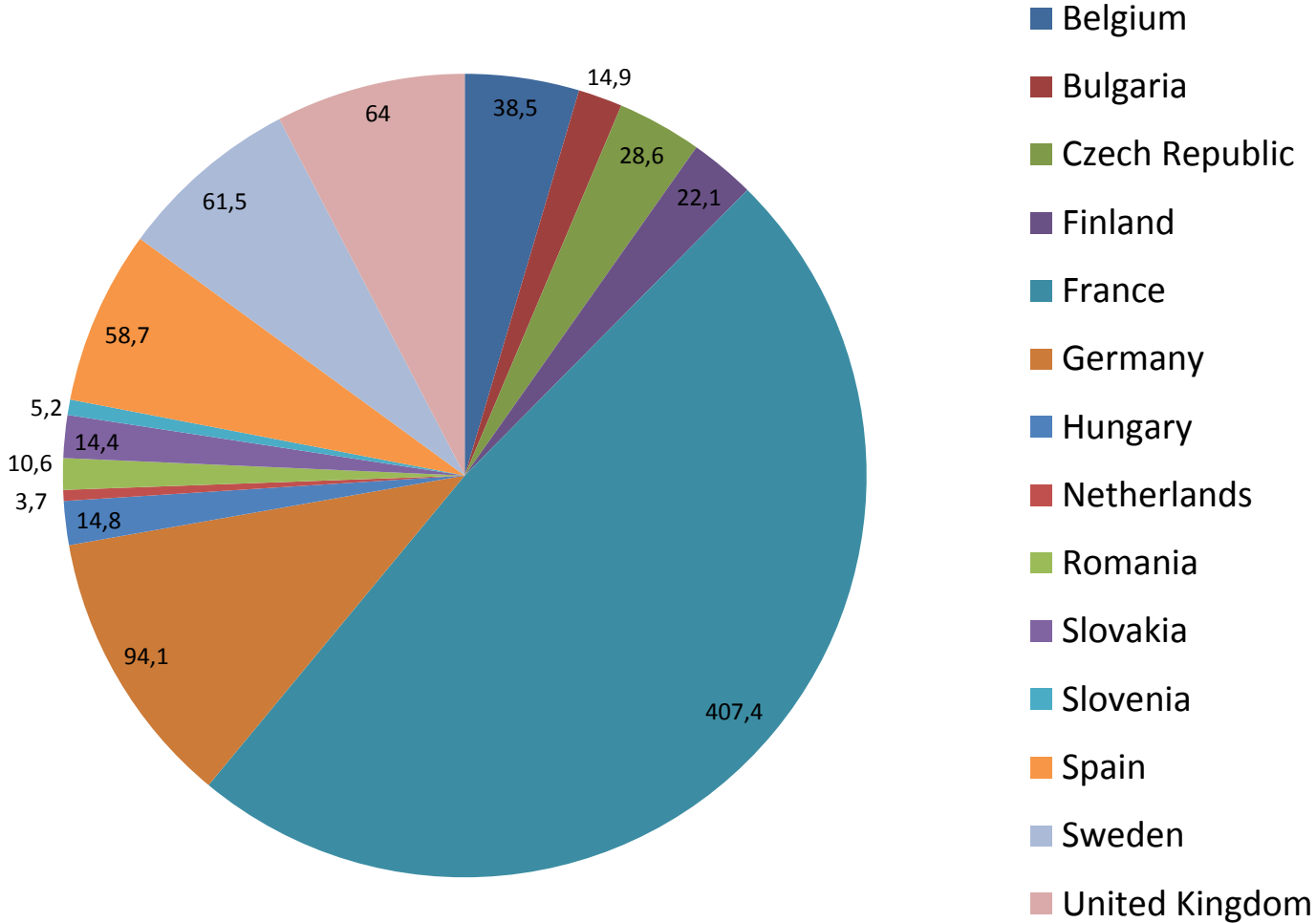
**Total 2012:
838 TWh**

**Historic
maximum
EU 27
2004:
1008 TWh**

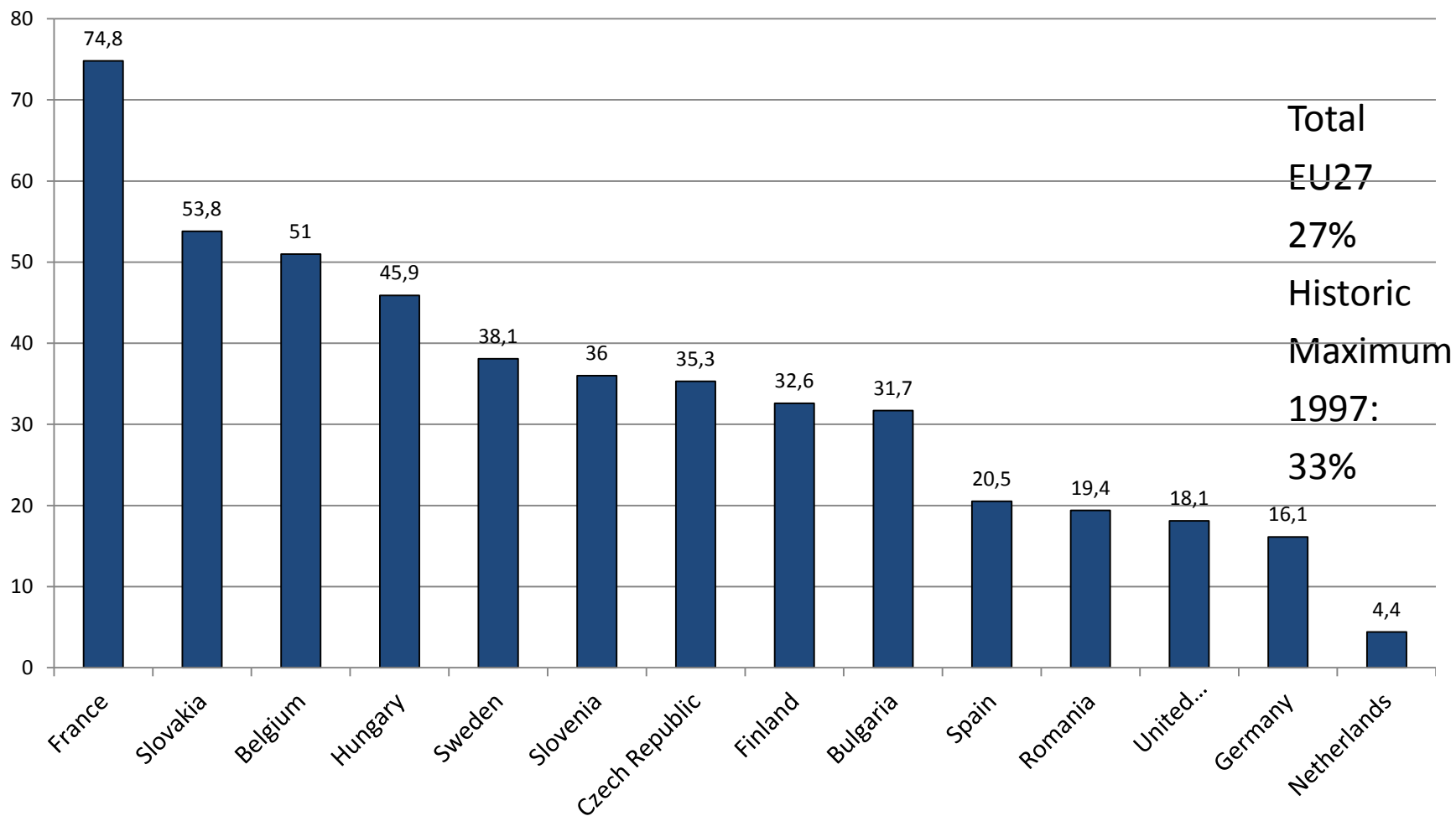
Source: IAEA, Nuclear power reactors in the World, Reference Data Series No 2, 2013

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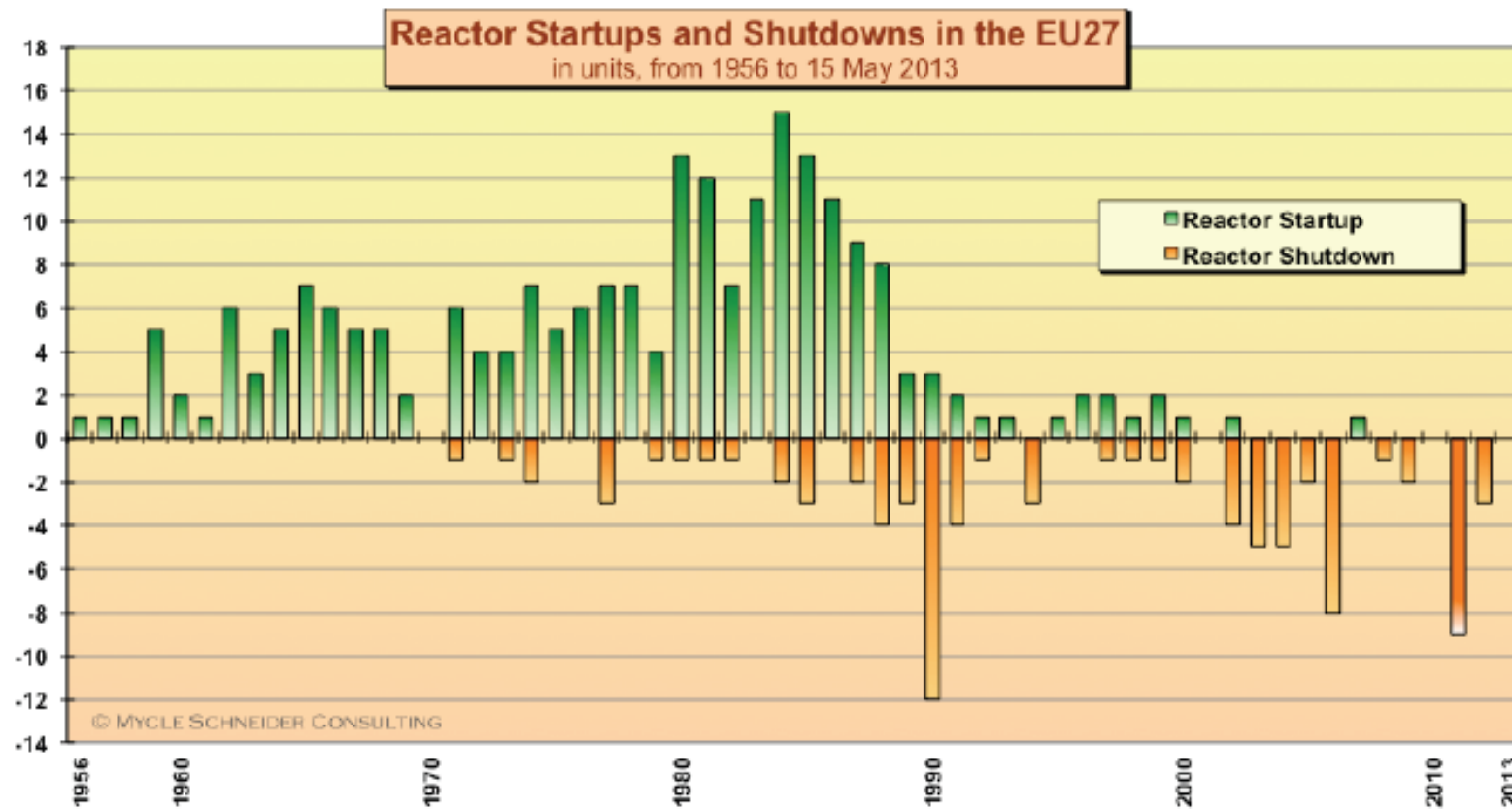
Nuclear electricity as % of total electricity generation 2012 by country



Source: IAEA, Nuclear power reactors in the World, Reference Data Series No 2, 2013

<http://www.iaea.org/PRIS/CountryStatistics/CountryStatisticsLandingPage.aspx>; WNISR 2013 <http://www.worldnuclearreport.org/-2013-.html>

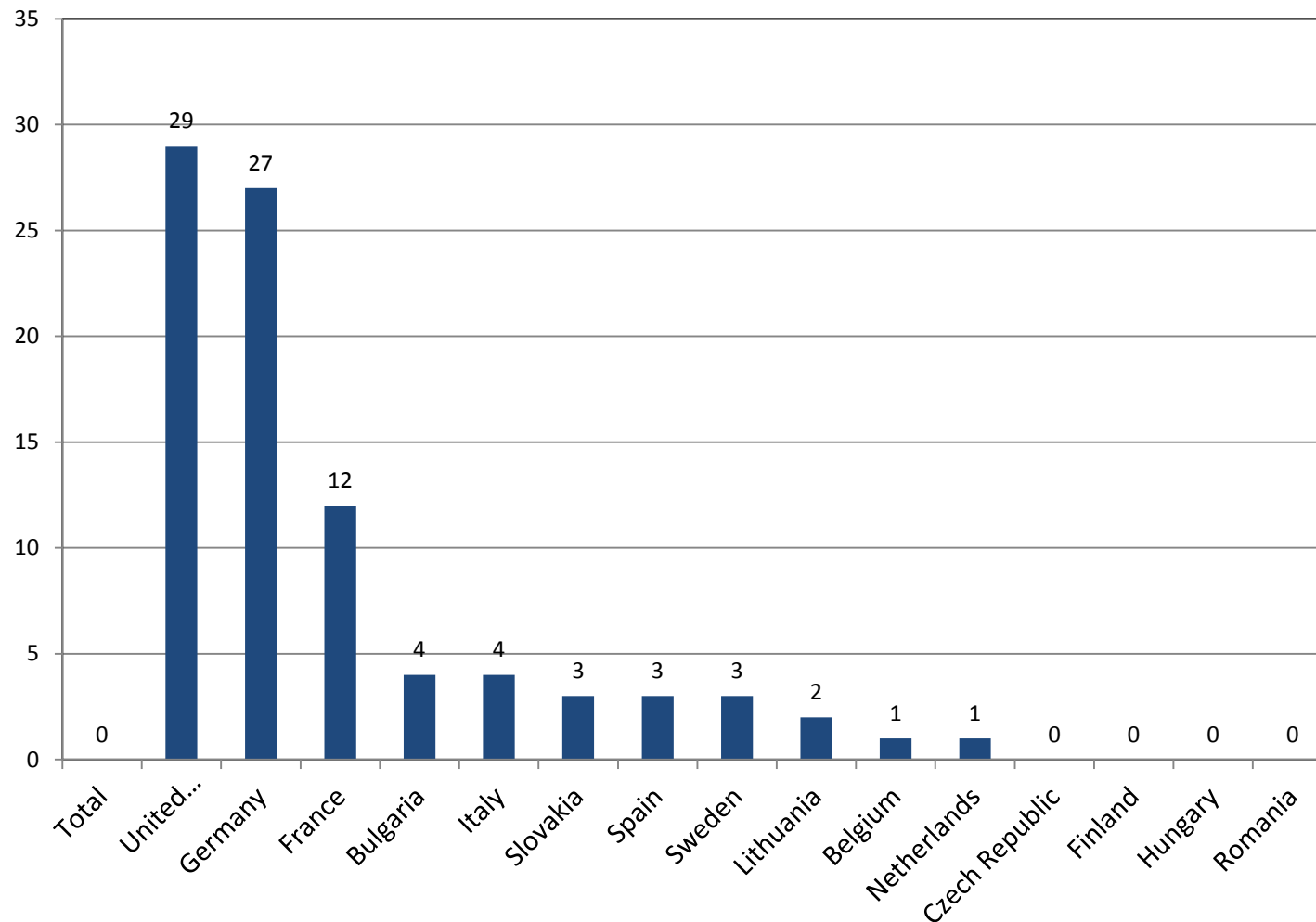
Figure 26: Nuclear Reactors Startups and Shutdowns in the EU27, 1956–2013



Source: IAEA-PRIS, MSC, June 2013

Permanently shutdown reactors in the EU, July 2013

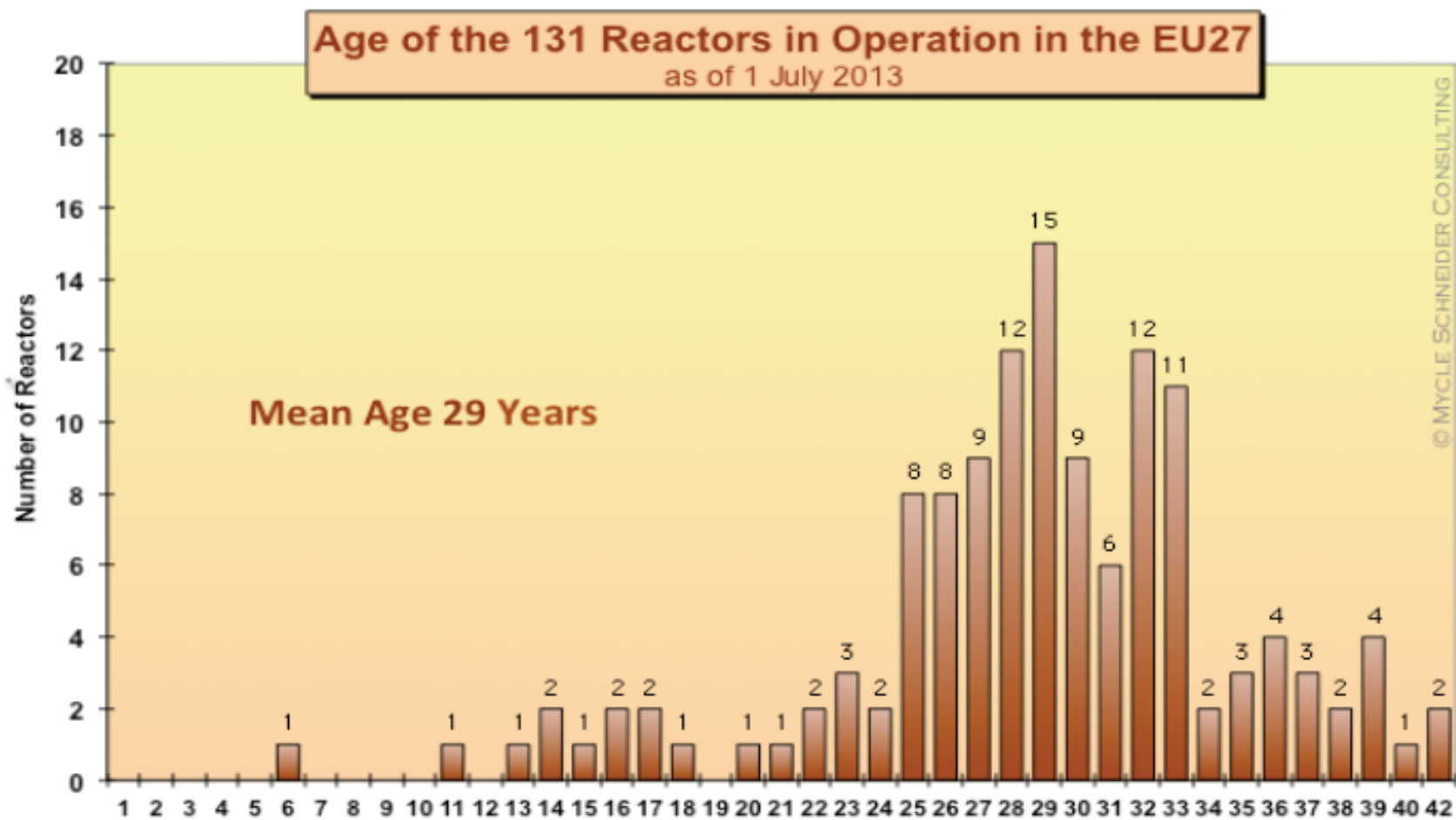
Total: 89



Source: IAEA, Nuclear power reactors in the World, Reference Data Series No 2, 2013

<http://www.iaea.org/PRIS/CountryStatistics/CountryStatisticsLandingPage.aspx>; WNISR 2013 <http://www.worldnuclearreport.org/-2013-.html>

Figure 28: Age Pyramid of the 131 Nuclear Reactors Operated in the EU



Sources: IAEA-PRIS, MSC, July 2013

Examples of decisions / legislation in Member States concerning NPPs

- **Belgium:** legislation on the maximum lifetime of NPP: shut down after 40years at the latest
- **Bulgaria:** 2013 parliament vote to permanently abandon the Belene new Npp project
- **France:** announcement to shut down Fessenheim and reduce the share of nuclear in electricity production from 75% to 50% by 2025
- **Germany:** phasing out nuclear until December 2022
- **Italy:** clear popular vote against restart of NPP
- **Lithuania:** 2012 majority in popular vote against nuclear
- **Spain:** recent shut down of a reactor

For details see: Schneider/ Frogatt et al.: World Nuclear Industry Status Report 2013

Examples of decisions / legislation in Member States concerning NPPs

However:

- **Czech Republic and UK** considering to attract investment in new NPPs with Contracts for Difference with guaranteed price by government for a multi-decade period
- **Hungary**: announcement by the PM to increase the share of nuclear in electricity production from 40% to 60%
- **Romania**: still plans to build new units
- **Poland**: Considerations to go on shale gas instead of nuclear
- **European Commission** talks about 16 – 17 „planned reactors“ in the EU

For details see: Schneider/ Frogatt et al.: World Nuclear Industry Status Report 2013



Country	Reactors in operation (construction) July 2013	Permanently shut down Reactors	Nuclear electricity production in 2012 (TW(e)h)	Nuclear electricity as % of total electricity generation 2012
Belgium	7	1	38,5	51,0
Bulgaria	2	4	14,9	31,7
Czech Republic	6	-	28,6	35,3
Finland	4 (1)	-	22,1	32,6
France	58 (1)	12	407,4	74,8
Germany	9	27	94,1	16,1
Hungary	4	-	14,8	45,9
Netherlands	1	1	3,7	4,4
Romania	2	-	10,6	19,4
Slovakia	4 (2)	3	14,4	53,8
Slovenia	1	-	5,2	36,0
Spain	7	3	58,7	20,5
Sweden	10	3	61,5	38,1
United Kingdom	16	29	64,0	18,1
Total	131	89*	838,5	27

*Including 4 permanently shut down reactors in Italy and 2 in Lithuania

Source: IAEA, Nuclear power reactors in the World, Reference Data Series No 2, 2013

<http://www.iaea.org/PRIS/CountryStatistics/CountryStatisticsLandingPage.aspx>

WNISR 2013 <http://www.worldnuclearreport.org/-2013-.html>

Nuclear Research reactors in the EU 27

Total: 140

Operational: 37

Shutdown: 103

Source: Com Staff Working Document SWD (2013) 59 p 8 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2013:0059:FIN:EN:PDF>

Country	Research Reactors	operational	shutdown	Decommissioning status				
	total			not specified	ongoing	safe enclosure	modified use	dismantled
Austria	1	1						
Belgium	5	3	2		1			1
Bulgaria	1						1	
Czech Republic	4	3	1					1
Denmark	3					1		2
Finland	1	1						
France	26	7	19		8	0		11
Germany	46	9	37		5	2	2	28
Greece		1		1				
Hungary	2	2		2				
Italy	14	5	9	4				5
Latvia	1		1		1			
Lithuania	0	0	0	0	0	0	0	0
Poland	5	1	4				1	3
Portugal								
Romania	2	1	1		1			
Slovakia								
Slovenia	1	1	0	0	0	0	0	0
Spain	3	0	3	0	0	0	0	3
Sweden	6		6		2			4
The Netherlands	3	2	1		1			
United Kingdom	19		19		2	5		12
Total	140	37	103	7	20	7	4	71

Decommissioning of NPP and nuclear facilities – EU and Euratom policy

89 permanently shutdown commercial reactors in the EU

103 shut down research reactors in the EU

Are there sufficient common rules in the EU for decommissioning and providing sufficient funds?

- 2006: Commission recommendations on decommissioning funds
 - Dialogue with Member States
 - Reports to the EP and Council comparing MS funding
 - Guidelines
-
- 2011 Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (must be transposed in national law by 23 August 2013)

Result of the recent report: very different approaches in decommissioning policies (between immediate decommissioning and deferred after period of “safe” enclosure); different calculations of the costs of decommissioning; different types of internal or external funds and their current use

Question: does the Commission fully use its competences according to the EURATOM Treaty?

EU Budget
Nuclear decommissioning assistance programme
for Bulgaria, Lithuania, Slovakia (€ million)

Country	1999-2003	2003-2006	2007-2013	2014-2020	Total
Lithuania <u>Ignalina</u>	210	285	837	451	1783
Slovakia <u>Bohunice</u>	90	90	423	225	828
Bulgaria <u>Kozloduy</u>	155	185	510	293	1143
Total	455	560	1770	969	3754

Sources: Documents European Commission; Draft Budget 2014

Joint Research Centre of the EU

Liabilities for decommissioning the joint nuclear research sites

(assessment of 2008 in mio €)

676 mio € for Ispra

427 mio € for Karlsruhe

69 mio € for Petten

42 mio € for Geel

Total: 1222 mio €

EU Budget

Financial period 2014 - 2020

ITER (International Thermonuclear Experimental Reactor)

2,573 bn €

Euratom Research and Training Programm

2,373 bn €

Risk and Safety Assessments of the NPPs after Fukushima

Stress tests

All 14 MS with operating reactors participated plus Lithuania (plus Switzerland)
Voluntary basis

Findings according to the Commission

- 1) No technical reason to shutdown any NPP
- 2) All NPPs need to undergo safety improvements
- 3) Cost of these measures are estimated to be 30 mio € - 200 mio € per reactor unit, that's in total for the NPPs in the EU: 10 – 25 bn € in the coming years
- 4) National action plans with timetables by end 2012; peer review methodology will be applied

Draft proposal for a
Council Directive
amending Directive 2009 / 71 EURATOM establishing a
Community framework for the nuclear safety of nuclear
installations
13 June 2013

What is new in the directive according to the Commission?

- It introduces EU-wide **safety objectives**;
- sets up a **European system of peer reviews** of nuclear installations;
- increases **transparency** on nuclear safety matters;
- strengthens **the role and independence of national regulatory authorities**;
- introduces a requirement of **specific safety reviews for older nuclear power plants** for which a lifetime extension is considered;
- enhances **on-site emergency preparedness and response**

State Aid

Com DG Competition, Consultation Paper on: Energy and Environmental State Aid Guidelines 2014 – 2020, March 2013:

“DG COMP considers that the general principle of **technology neutrality** is a good starting point for the development of the EAG. ...”

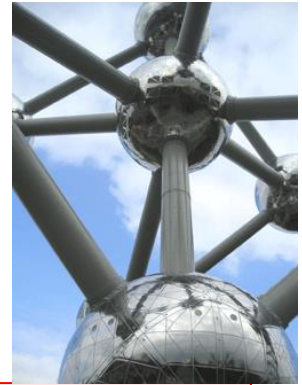
“So far the Guidelines have established rules allowing aid for specific RES technologies The **wish of some Member States to widen support also to other low-carbon energy sources including nuclear merits in-depth discussion** in order to analyse whether market failures justify intervention and whether it is possible to establish ex-ante rules in the framework of Guidelines while ensuring cost transparency and the internalisation of external costs.”

Lot of changes over time regarding the use of nuclear energy in the EU

- Number of reactors in operation is declining and will further decline
- Nearly half of the Member States have no operating nuclear power plant (14:14 or 15:13 depending on how the common reactor of Croatia and Slovenia is counted)
- Share of nuclear in electricity generation is declining
- Number of permanently shut down reactors is increasing and will further increase
- The consensus on the benefits of nuclear power of the founding period of EURATOM no longer exists
- There is the alternative of using renewable energy

Any Consequences for the EURATOM Treaty?

Overall Goal of EURATOM



to create the conditions necessary for the development of a powerful nuclear industry which will provide extensive energy resources, lead to the modernisation of technical processes

and contribute, through its many other applications, to the prosperity of their peoples.

Tasks of EURATOM



- (a) promote **research** and ensure the dissemination of technical information;
- (b) establish **uniform safety standards** to protect the health of workers and of the general public and ensure that they are applied;
- (c) **facilitate investment** and ensure, particularly by encouraging ventures on the part of undertakings, the establishment of the basic installations necessary for the development of nuclear energy in the Community;
- (d) ensure that all users in the Community receive a regular and equitable supply of ores and nuclear fuels;
- (e) make certain, by appropriate **supervision**, that nuclear materials are not diverted to purposes other than those for which they are intended;
- (f) exercise the right of **ownership** conferred upon it with respect to special fissile materials;
- (g) ensure wide commercial outlets and access to the best technical facilities by the creation **of a common market** in specialised materials and equipment ...
- (h) establish with other countries and international organisations such relations as will foster progress in the peaceful uses of nuclear energy.

Different positions on the future of Euratom

Abandon the Treaty?

Reform the Treaty?

Exit from Euratom-Treaty?

More renationalisation of nuclear policy?

Or making better use of the competences
conferred upon the European level by the

Euratom Treaty?

Screening and reforming of EURATOM

For which tasks should competence remain on the European level or be strengthened or conferred upon the European level?

- Safety issues related to generation of nuclear
 - Safety issues related to the heritage of the nuclear period
 - Research on these issues
- Which of these issues are covered by international regimes?
Which not or in a less effective manner?
- For which of these tasks does the Euratom-Treaty provide value added or the only legal base and for which tasks does also the TFEU provide a legal base?
- . Closing the democratic deficit

How to initiate a reform of EURATOM?

- European Citizens Initiative does not apply to EURATOM Treaty
- Ordinary revision of EURATOM:
 - Government of any Member State, the European Parliament or the Commission can submit to the Council proposals for the amendment of the EURATOM treaty; a convention will be convened that shall adopt recommendations by consensus; decision by MS taken by unanimity; ratification by all MS
- Discussions in public and academia