



Europe and Nuclear: about public confidence

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The Institute of Energy Economics

Tokyo, Japan, 5 November 2013



Food for Thoughts...

○ **what is at stake?**

tell an attractive story: nuclear yesterday, today and tomorrow in people's life

○ **(re)gaining trust: some challenges ahead**

- *utilities, investors: EU Energy policy; a sound market organization*
- *the media, the public: how safe is safe enough? the back-end*
- *the decision-makers: governments, regulators, third-party advocates*

○ **wrapping up with questions...**

A Storyline

It all started with Science and Physics...



SOLVAY International
Conferences, Brussels, Belgium

A Storyline

...it went on with the support of Technology...



The Nobel Prize in Physics
2013 François Englert, Peter Higgs



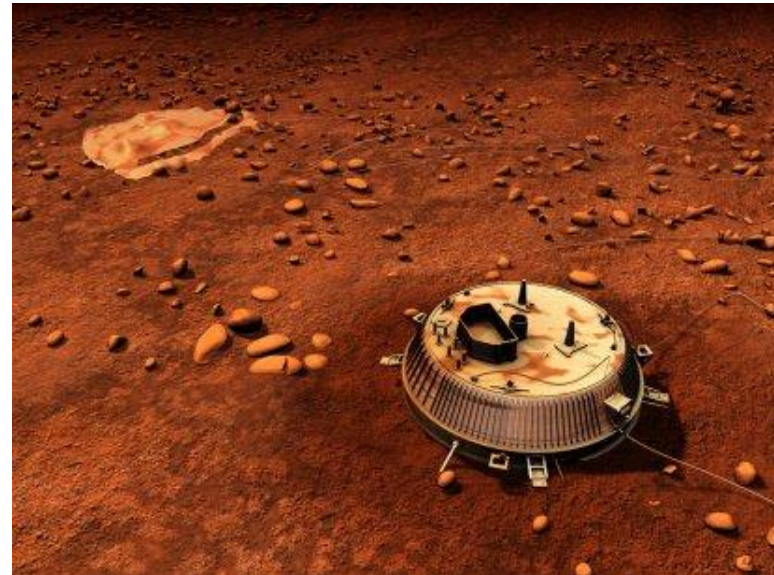
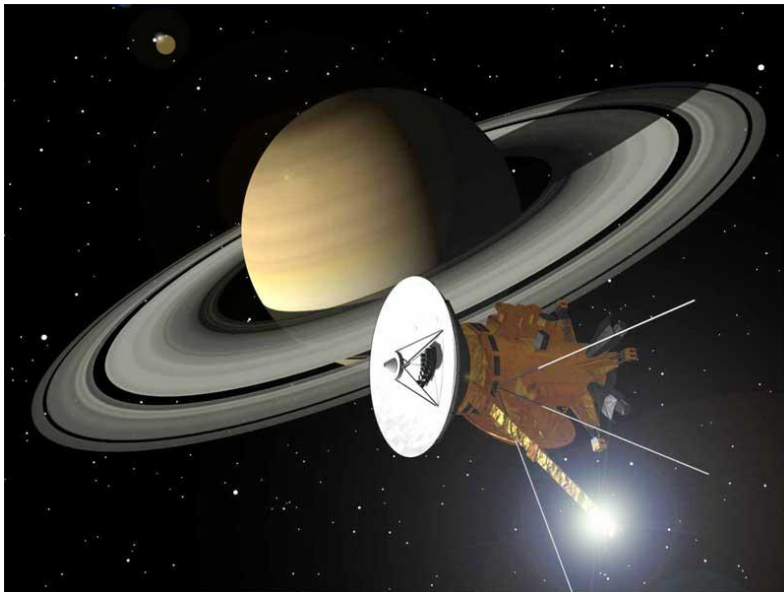
A Storyline

...it flew to outer space...

Cassini-Huyghens

(NASA/ESA/ASI)

*Pu²³⁸-powered to Titan,
Saturn's largest moon*

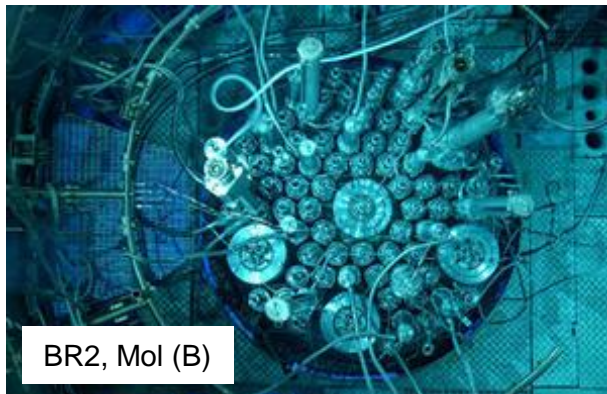


A Storyline

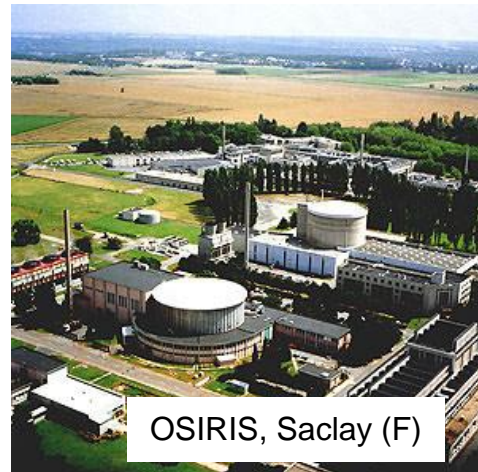
...it supports diagnosis and therapy...



HFR, Petten (NL)



BR2, Mol (B)



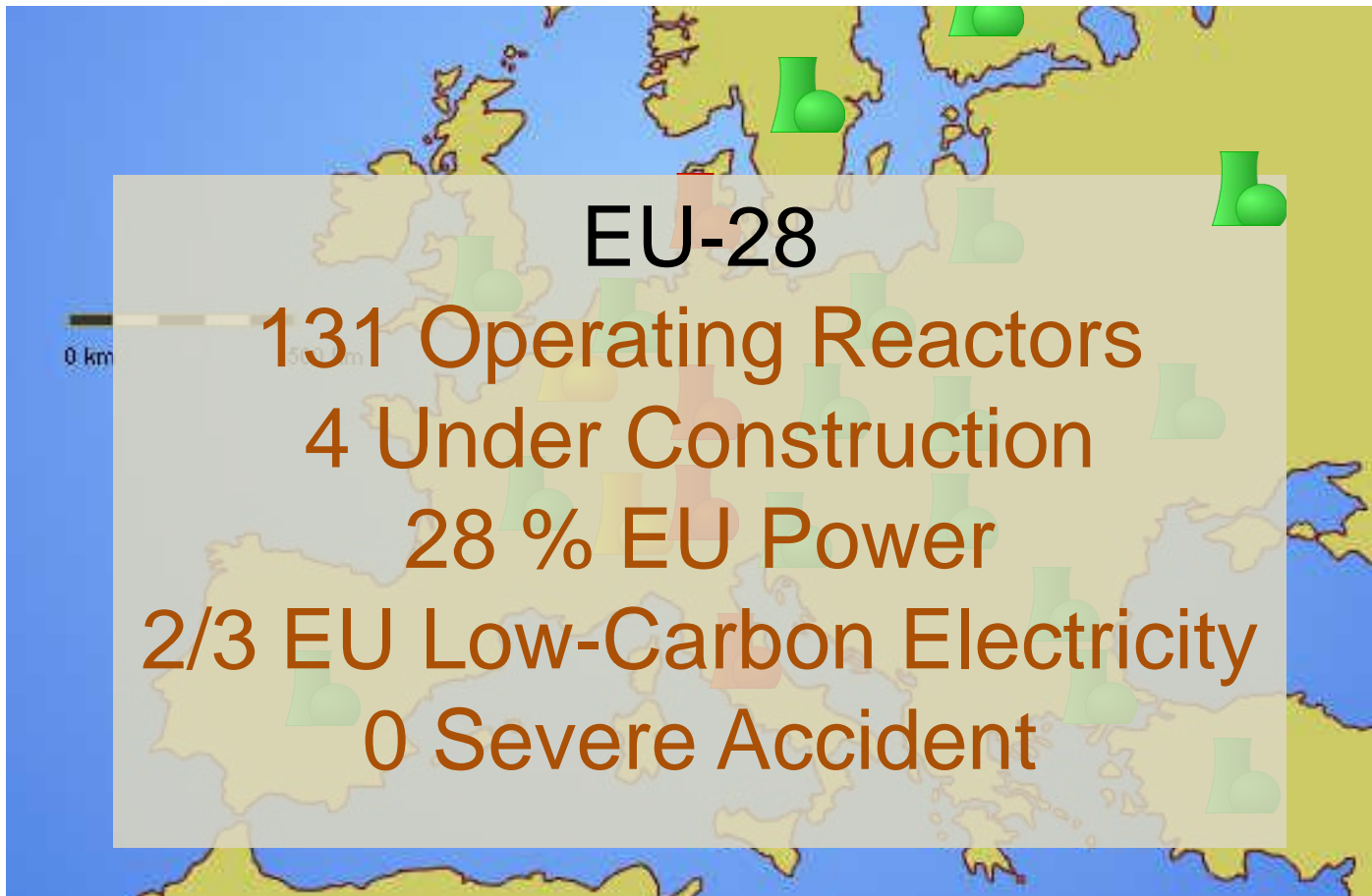
OSIRIS, Saclay (F)

^{99m}Tc
used by 10,000 hospitals
40 M procedures annually



A Storyline

...but it also divides Europe



A Storyline

800+ companies
900,000 jobs
 70×10^9 €/y



ŠKODA JS a.s.



HITACHI

FENNOVOIMA



Rolls-Royce®



EU's 2050 Energy Roadmap

COM(2011) 885 final, 15/12/2011

- 80-95 % economy-wide GHG emission reduction by 2050 (vs. 1990)
- **structural changes** ahead: increased reliance on electricity, renewables, gas, nuclear ("a key source of low carbon electricity generation"); investments, costs; market structure
- **nuclear** ranges from **2.5%** ("Low Nuclear") to **19%** ("Delayed CCS")
- **the low end:**
 - units phased out at the end of their lifetime
 - no replacement
 - completing 4 units under construction (FI, FR, SK)
- **the high end:**
 - about 140 GWe of nuclear capacity (100 new units) by 2050

High Nuclear in 2050 and the global economy

time period	activities	investment (G€/a)	jobs
2012-2020	safety upgrades LTO (first step)	10.0	10,000
2015-2035	LTO	4.5	50,000
2025-2045	New Build	25.0	250,000
2012-2050	decommissioning	3.0	20,000
	fuel/waste management	5.0	10,000

[internal analysis - 20% nuclear power share]

10 CEOs: "Rebuild Europe's Energy Policy"

Magritte Club, Brussels, October 2013

- FAILURE of *competitiveness***: energy bills up +17-21 % in 4 years
- FAILURE of *security of supply***: 51 GW capacity mothballed (= B, CZ, P)
- FAILURE of *climate change***: CO₂ emissions +2,4 % (2011-2012)

put EU Policy back on track by:

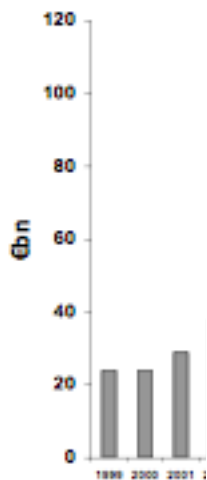
fostering the integration of mature renewables
into the regular market

giving priority
to the utilization of existing competitive power capacity
rather than subsidizing new constructions

strengthening fundamentally
the European carbon market

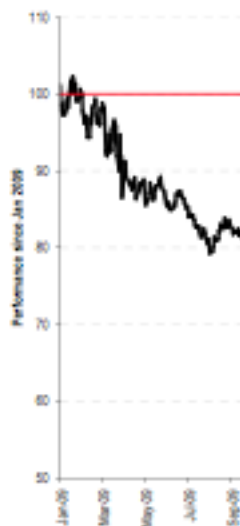
Financial Markets: skeptical

Annual Capex – actual and required



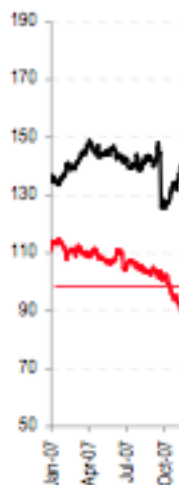
Source: Citigroup Investment Research

European Utility Sector has been de-rated



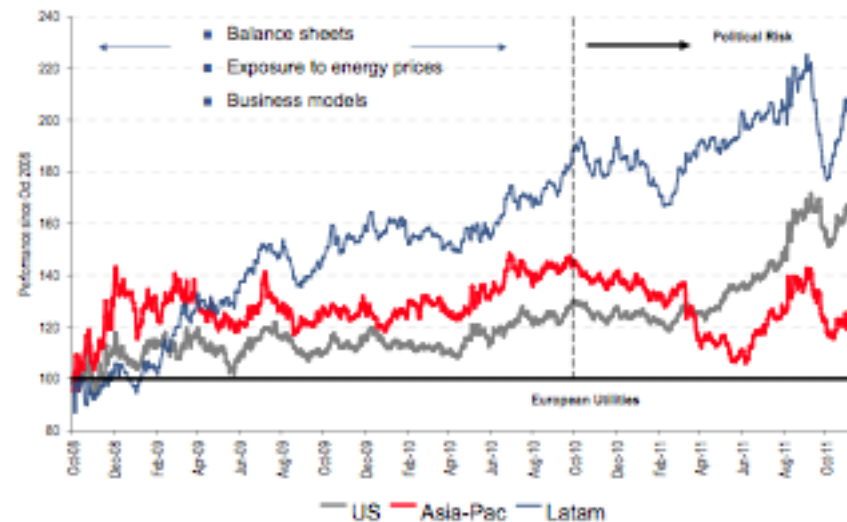
Source: Bloomberg, Citigroup Investment Research

Yield Relative and P/E Moving in Wrong Direction



Source: Datastream, CMA

Europe De-rated Relative to ROW



Source: Datastream, CMA

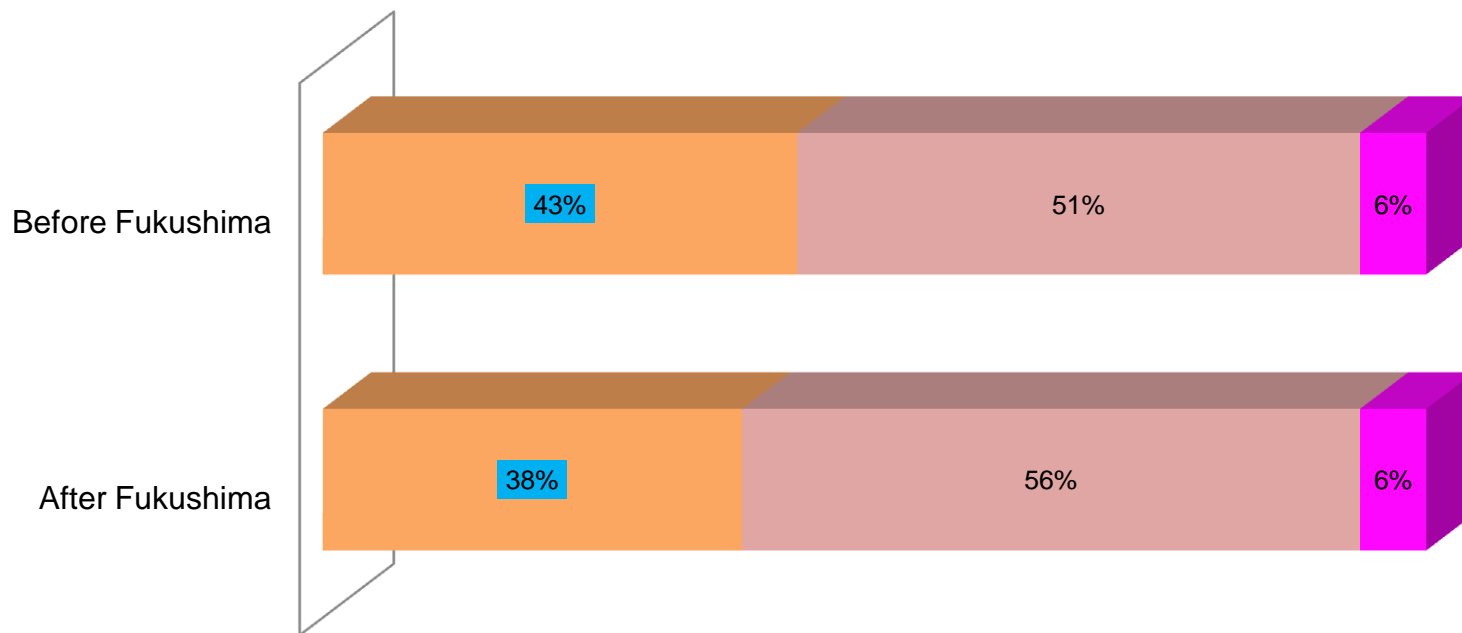
source: P. Hatherton, EURELECTRIC, Feb 2012

EU: "the days after..."

Are you in favour of nuclear power? (Europe)

source: BVA Opinion, April 2012

Yes No Don't know

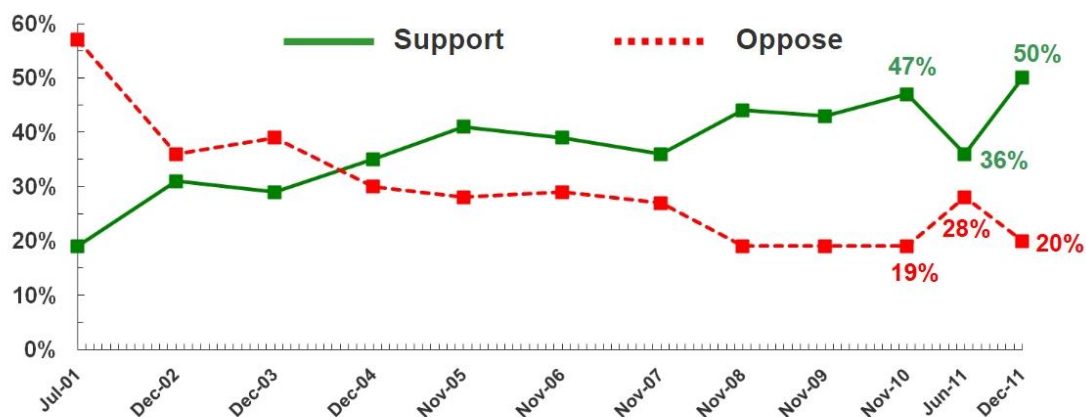


The Public: How Safe is Safe Enough?

- before **March 2011**:

56 % of EU citizens wanting nuclear energy to be maintained or increased [*Eurobarometer on Nuclear Safety, April 2010*]

- in the **UK**, the Netherlands, Spain, Switzerland and France, after a dip just after the accident, public acceptance of nuclear has recovered



UK: Support for
Nuclear New
Build

source: Ipsos MORI, 2012

UK: how did they manage it?

FEBRUARY 28, 2013
expert
Fukush
Jap
tsu

Electricity market re
policy overview

HM Government

Industrial strategy: government and industry in partnership

The UK's Nuclear Future



HM Government

Nuclear Industry Council

UK Nuclear Sector



40,000

40,000 dynamic, highly skilled people directly employed in the UK nuclear sector (2012)



Total commercial turnover of the UK nuclear supply chain for 2010/11 is estimated at **£4bn**. Five sites are earmarked for development by 2030



Global expansion is forecast to see investment of **£930bn** in building new reactors



The nuclear sector generated **19%** of the UK's electricity in 2012

#indstrategy

EU: Nuclear Safety Directive

- **Council Directive** (25 June 2009): a Community Framework for the nuclear safety of nuclear installations [2009/71/EURATOM]
- 13 June 2013: EC's proposal for a revised Directive (*incl.* lessons from the "stress-tests" process)
- 17 October 2013: final proposal, EP and Council to decide

- **issues of concern:**

too early

inconsistency of definitions (vs. IAEA)

too many detailed prescriptions

technical and legal questions to carefully address

peer review are powerful and should be kept, but...

EU: reviewing Third Party Liability?

- severe accident (INES 6-7): never a single example in the EU
- ***Paris (1960) and Vienna (1963) Conventions:*** all of the EU MS operating NPPs adhere to either the one or the other
 - ensuring that victims can claim and obtain compensation
 - ensuring that nuclear energy can continue to be used, defining a minimum limit of operator's liability
- ***strict liability:*** not to prove fault or negligence
 - channelled liability:*** exclusively the operator's
 - limited liability:*** in time and in amount, backed by insurance or financial security ensuring the full amounts are available
- **= a sound set of principles:**
 - robust regulatory regime, continuous improvement by operators
 - availability of adequate compensation for victims
 - firm foundation for investments, strong contribution to security of supply

EU: the Back End

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

Member States' responsibility:

*“MS shall establish and maintain a **national legislative, regulatory and organisational framework**”*

“MS shall ensure that...”

- regulatory authority
- financial resources
- transparency
- reporting:

Aug 23, 2015 for the first time, thereafter every 3 years

“It is broadly accepted, at the technical level that, at this time, deep geological disposal represents the safest and most suitable option as the end point of the management of high-level waste and spent fuel considered as waste.”

Directive 2011/70/EURATOM, (in the whereas...23rd)

Wrapping up with Questions...

- ✓ are we serious about **mitigating climate change**?
- ✓ are we worried about **energy poverty**?
- ✓ how **competitive** do we want the EU to be in the 21st century?
- ✓ how secure do we want our **energy supply** to be?
- ✓ are **investment frameworks** favourable?
- ✓ are governments -and will they stay-, **committed**?
- ✓ how does **the public** regards the technology, how mature is it?
- ✓ how **reliable** is the **operation** of nuclear power plants?
- ✓ can serious **accidents** be avoided, or their consequences mitigated?
- ✓ is industry capable of building **new reactors** to time and budget?

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