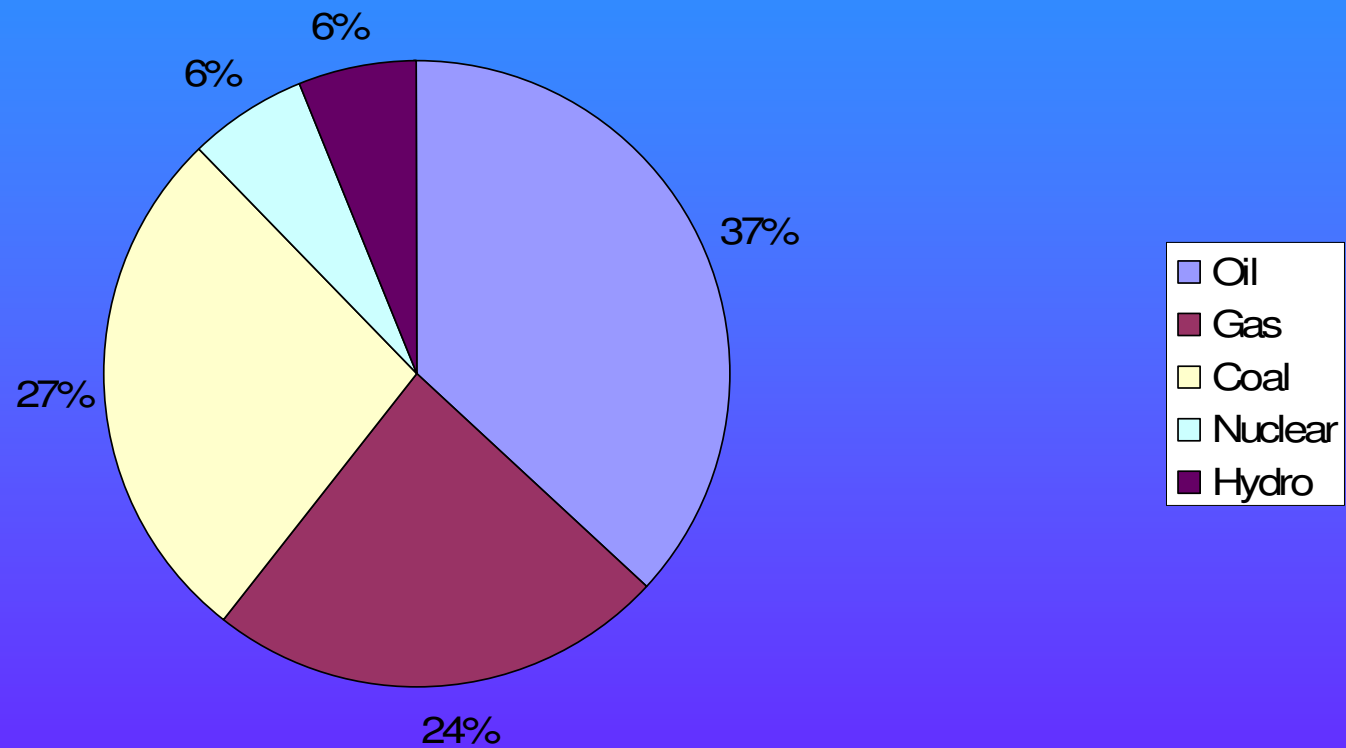


Nuclear Power Renaissance or Regression ?

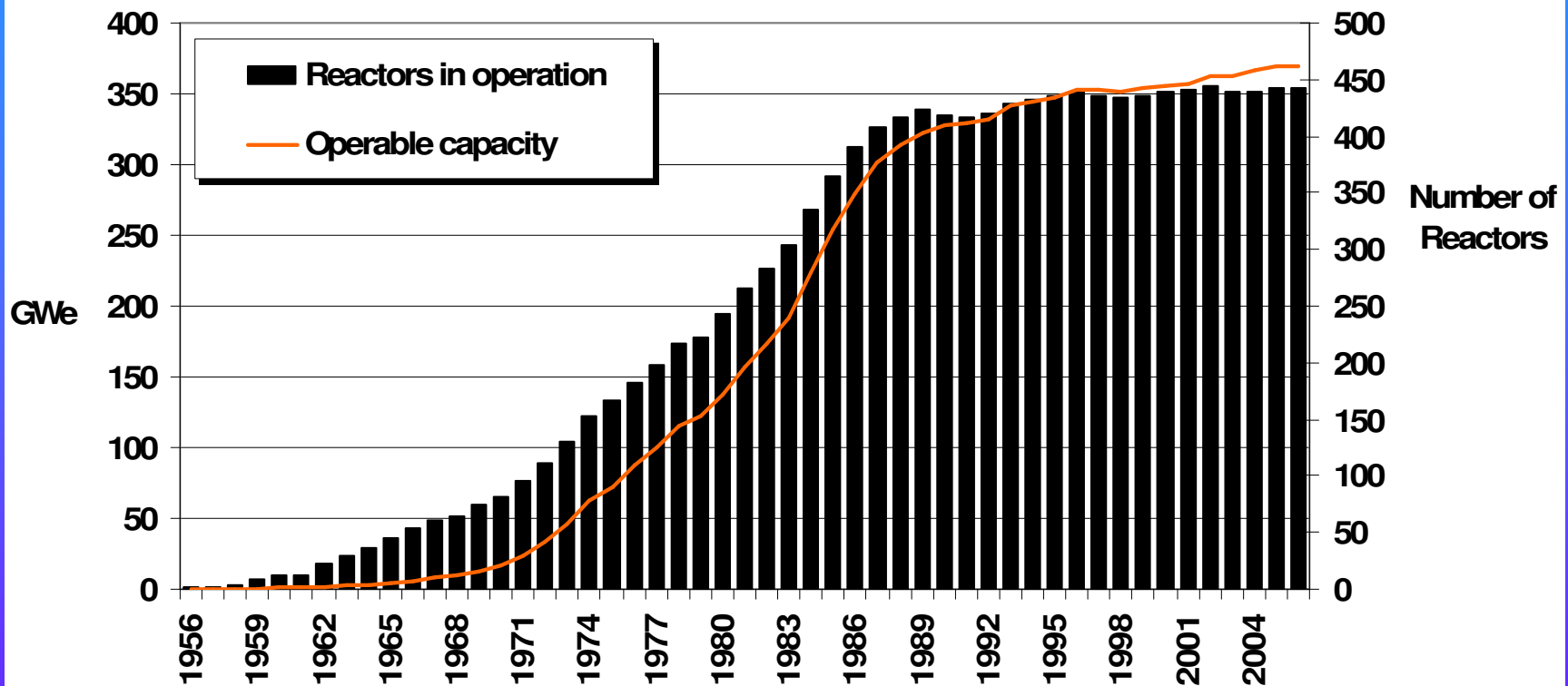
Antony Froggatt

Independent Energy Consultant

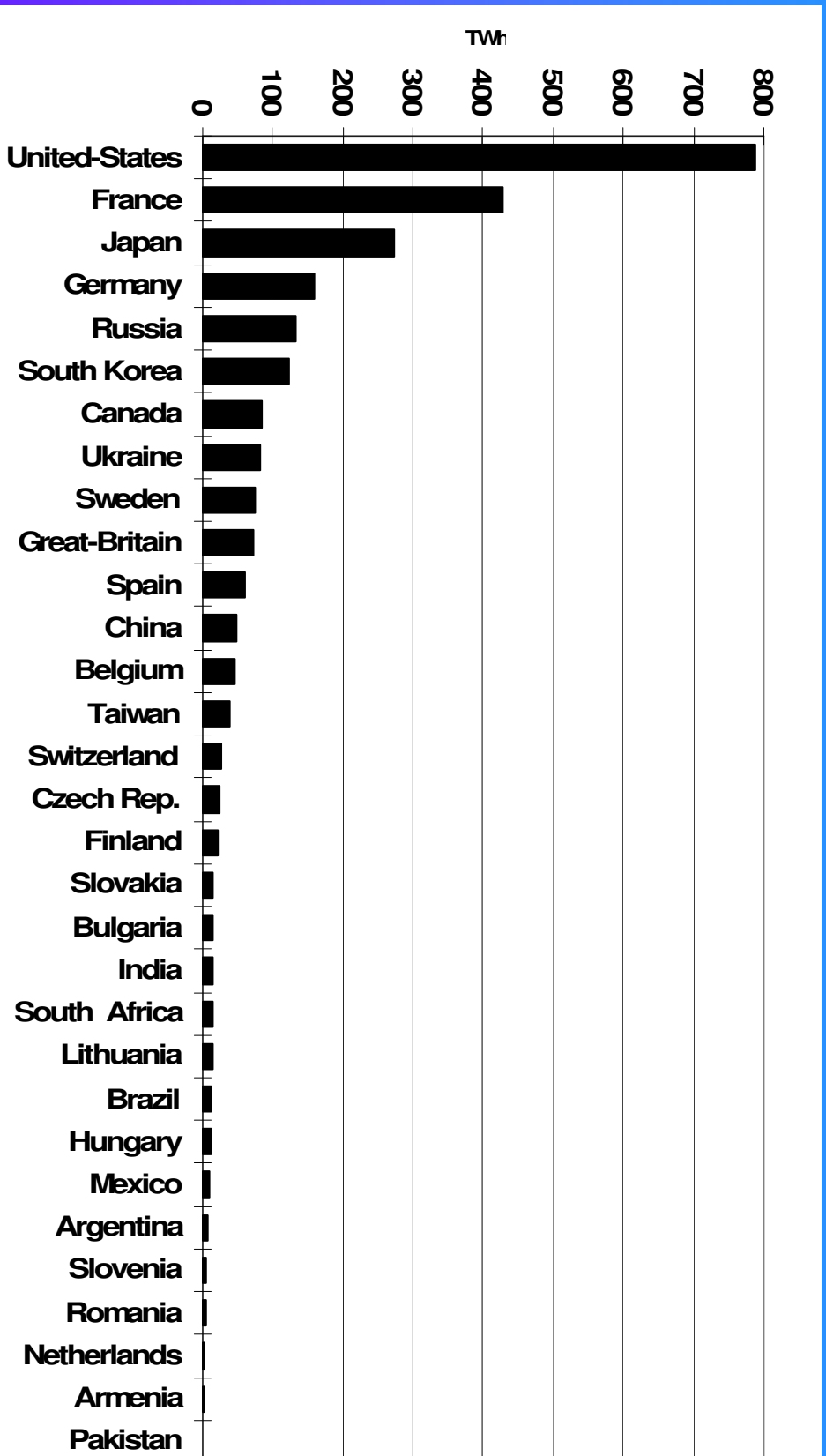
Global Energy Production



Global Reactors and Installed Capacity



Generation of Nuclear Electricity in World (2004)



Global Current Status

- Not Global Industry
- Of the 130-180GW of new capacity each year, 1.5-2.5% is nuclear
- 22 of last 31 reactors completed were in Asia

Political Promotion?

- G8 – Draft:
 - We believe that the development of nuclear energy would promote the global energy security. It must be based on assuring nuclear non-proliferation regime, safety and security of nuclear materials, enhancing nuclear and environmental safety, improving economic competitiveness, and further reducing the risks associated with its development.
 - Innovative nuclear power systems based on closed nuclear fuel cycle with fast neutron reactors and international nuclear fuel centers may become a new qualitative step in this direction. Such technological basis would allow realizing the potential of nuclear energy as a virtually inexhaustible energy source, optimizing economic conditions of nuclear performance and alleviating problems related to non-proliferation and nuclear wastes.

- EU- Green Paper: A European Strategy for Sustainability, Competitive and Secure Energy.
 - Decisions by MS relating to nuclear energy can also have very significant consequences on other Member States in terms of the EU's dependence on imported fossil fuels and CO2 emissions [or exposure to risk].
 - An objective might be to aim for a minimum level of the overall EU energy mix originating from secure and low carbon energy sources.
 - Such a benchmark would reflect the potential risks of import dependency, identify an overall aspiration for the long term development of low carbon energy sources and permit the identification of the essentially internal measures necessary to achieve these goals.

Financial Community

- *World Nuclear Association*
 - *‘nuclear power in the 21st Century will be economically competitive even without attaching economic weight to the global environmental virtues of nuclear power or to national advantages in price stability and security of energy supply’*
- *Standard and Poors*
 - *‘If new construction of nuclear power is to become a reality in the U.K., Standard & Poor’s has significant concerns over the future structure of the generating industry. In particular, the potential for increased regulation of the liberalized generating industry, a higher level of political interference in the market structure, and the ongoing prospects for nuclear power in a competitive power market. **Standard & Poor’s expects that investment in nuclear power will rely on the long-term sustainability of high electricity prices in the U.K. energy market***
 - *Developing new nuclear generation in the deregulated European market environment is a high-risk venture, given the long construction times and high capital costs. Siting issues are likely to be more sensitive today than in the 1970s and 1980s when most reactors were built. Furthermore, political support will remain fragile to nuclear safety performance worldwide. Another Chernobyl-like accident can rapidly cool the current cordial sentiments. **Fundamental issues, such as the final storage of nuclear waste and far-reaching social consensus, are still likely to be required before a potential large-scale renaissance can happen***

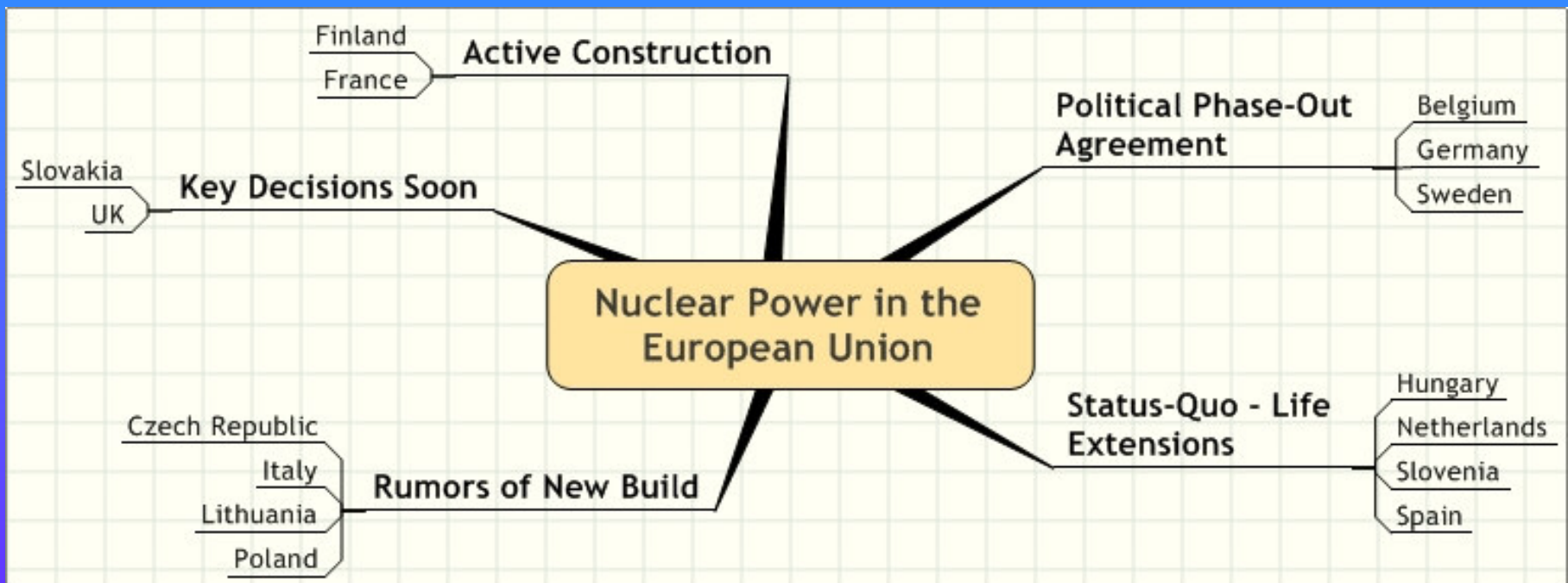
- UBS

- a potentially courageous 60-year bet on fuel prices, discount rates and promised efficiency gains

- HSBC

- Hence this financial risk [new build] coupled with unforeseen construction delays, the risk of cumbersome political and regulatory oversight, nuclear waste concerns and public opposition could make new nuclear a difficult pill to swallow for equity investors.

Status of Nuclear Power in Europe



Prospects

- 148 reactors operating in 13 EU MS
- Installed capacity is 130.5 GW
- Average age of reactors is 22 years.
- Assuming operating life of 50 years just to maintain current level of nuclear in EU, there would need to be 3 new EPRs connected to the grid every year.
- At best 2 will be connected in next 10 years

Global Nuclear Programme

- Nuclear power uses uranium, which is limited.
- Current resources estimates suggest that uranium will be depleted, at current use levels, quicker than the other major fuels.
- A rapid increase in the use of nuclear will accelerate the depletion rate of uranium
- Decreasing uranium reserves lead to plutonium economy - Generation IV reactors.

Thousand Exajoules	Consumption in 1998	Reserves	Reserves-last (yrs)	Resources	Resource last (yrs)
Oil	0.14	11.11	80	21.31	152
Gas	0.08	14.88	186	34.93	436
Coal	0.09	20.67	229	179.00	1988
Uranium	0.04	1.89	47	3.52	88

Investment Decisions

- Around € 1 trillion of investment will be needed in the energy sector over the next 20-30 years.
- Next decade will be key in determining energy policy and investment framework for a generation.
- Climate change needs rapid action.
- Urgency of situation requires priority must be given to acceptable and widely applicable solutions.
- Security of supply and climate change concerns best address by energy efficiency and renewables.