21st REFORM Group Meeting, Salzburg – August 28 – September 1, 2017

Prospects of Climate Change Policy and Green Finance -
Low Carbon Strategies, Energy Plans and Implementation of the Paris Agreement
Agenda

Monday 28.08.2017	**Ecological Modernization Capacity of Japan and Germany in Comparison** **Chair persons: Lutz Mez (BEConsultants), Lila Okamura (Dokkyo University, Helmut Weidner (FFU)**
9.00-9.30	Welcome (Lutz Mez, BEConsultants, Berlin)
9.30-11.00	**Panel 1:** Ecological Modernization of Japan and Germany Introduction, Theoretical Approach and Focus - A Think piece (Helmut Weidner, FFU Berlin) Nuclear Policy and Bottom-up Ecological Modernization in Niigata (Hiroshi Sasaki, Niigata University)
11.00-11.30	**Coffee & Tea Break**
11.30-13.00	**Panel 2:** Governance and Management of Nuclear Waste Nuclear Waste Governance in Germany (Daniel Häfner, FFU Berlin) Governance and Management of Nuclear Waste in Japan (Lila Okamura, Dokkyo University, Japan)
13.00-15.00	**Lunch**
15.00-17.00	**Panel 3a:** Market and technology trends of automotive future in Japan and Germany Germany (Weert Canzler, WZB Berlin, Germany) **Panel 3b:** Rare Earth strategies in comparison Rare Earth strategies of EU/Germany and Japan in comparison (Lutz Mez, BEConsultants Berlin)
17:00-17.30	**Coffee & Tea Break**
17.30-19.00	**Panel 4:** the German-Japanese Energy Transition Council (GJETC) Background and goals of the German-Japanese Energy Transition Council (Peter Hennicke, GJETC) Climate Policy of Japan and Germany in comparison (Franzjosef Schafhausen, E.U.K.-Consulting)
19.00	**Dinner**
21.00-22.30	**Renewable Energy Movies, Made in Japan**
Tuesday 29.08.2017	**Status and Trends of Renewable Energy and Social Change** **Chairpersons: Tetsu Iida (ISEP, Japan), Tomas Kåberger (Chalmers University, Sweden)**
9.00-10.30	Global Overview of Renewable Energy Sources Promotion Policies (Tomas Kåberger, Chalmers) Positioning Nuclear Power in the Low-Carbon Electricity Transition (Yuliya Yurchenko, University Greenwich, UK)
10.30-11.00	**Coffee & Tea Break**
11.00-13.00	Potential Destructive Change of Energy and Society - a case in Japan (Tetsu Iida, ISEP, Japan) Political conflicts over EU renewable energy policy, 2010-2017 (Volkmar Lauber, University Salzburg, Austria)
13.00-15.00	**Lunch**
15.00-16.30	Energy Policy and Industry Policy in Europe – The Case of Photovoltaics (Ruggero Schleicher-Tappeser, sustainable strategies, Berlin) How to integrate energy conservation and large shares of Renewable Energy in smart energy systems (Frede Hvelplund, Aalborg University, Denmark)
16.30-17.00	**Coffee & Tea Break**

Tuesday 29.08.2017	**Status and Trends of Renewable Energy and Social Change** **Chairpersons: Tetsu Iida (ISEP, Japan), Tomas Kåberger (Chalmers University, Sweden)**
17.00-19.00	How to Integrate Large Shares of Variable Renewables in Electricity Systems (Reinhard Haas, TU Vienna, Austria) Auctions for renewable energy - goals and current empirical record (Katherina Grashof, IZES, Germany) Effects of Large-Scale PV and Wind Energy Integration on Electricity Supply and Demand Balance in Western Japan, based on Zero Nuclear Scenarios (Asami Takehama, Ritsumeikan University, Japan)
19.00	**Dinner**
Wednesday 30.08.2017	**Implementation Progress of the Paris Agreement** **Chairpersons: Franzjosef Schafhausen (E.U.K.-Consulting) & Hans-Joachim Ziesing (BEConsultants)**
9.00-11.00	Development of Global GHG Emissions (Hans-Joachim Ziesing, BEConsultants, Germany) The Paris Agreement and Energy-Climate Policies in the EU (Franzjosef Schafhausen, E.U.K.-Consulting, Germany)
11.00-11.30	**Coffee & Tea Break**
11.30-13.00	The Paris Agreement and Energy-Climate Policies of Japan (Yukari Takamura, Nagoya University) Self-governance in Global Climate Policy (Aviel Verbruggen, University of Antwerp, Belgium)
13.00-15.00	**Lunch**
15.00-16.30	Climate Change Policy of the United States under the Trump Administration (Daniel Mazmanian, USC & John Jurewitz, Pomona College, USA)
16.30-17.00	**Coffee & Tea Break**
17.00-19.00	**Roundtable: Prospects and Progress under the Paris Agreement** **Moderator: Lutz Mez (Berlin Energy Consultants, Germany)** Martin Bursik (Ecoconsulting), Rebecca Harms (EU Parliament), Gerd Leipold (Climate Transparency), Daniel Mazmanian (USC), Yadollah Saboohi (SERI), Franzjosef Schafhausen (E.U.K.-Consulting), Peter W. Schulze (DOC Research Institute), Yukari Takamura (Nagoya University)
19.30 **20.00**	**Reception** **Gala Dinner**
Thursday 31.08.2017	**Low Carbon Strategies and Energy Plans** **Chairpersons: Daniel Mazmanian (USC, USA), Lutz Mez (BEConsultants, Germany)**
9.00-11.00	Comparing the climate performance of the G 20 countries (Gerd Leipold, Climate Transparency, Germany) Lessons learned from RE auctions in emerging economies and Africa (Anton Eberhard, University of Cape Town, South Africa) Brazilian Renewable Energy auctions (Mauricio Tolmasquim, UFRJ, Rio de Janeiro, Brazil)
11.00-11.30	**Coffee & Tea Break**
11.30-13.00	**The Paris Agreement and the Transport Sector** Disrupting mobility: Decarbonising transport? (Florian Lennert & Robert Schönduwe, innoZ) Initiatives for Energy Efficiency and Planning in Cities - Case: Municipality of Elsinore, Danmark (Karen Marie Pagh Nielsen, Municipality of Elsinore, Danmark)
13.00-15.00	**Lunch**

Thursday 31.08.2017	**Low Carbon Strategies and Energy Plans** **Chairpersons: Daniel Mazmanian (USC, USA), Lutz Mez (BEConsultants, Germany)**
15.00-16.30	Energy Transitions: The National Planning Problematique in the Context of Global Pressures (Burkhard Auffermann & Jyrki Luukkanen, TSE Finland Future Research Center) Ecological Modernization of the Energy Sector in Germany and Spain (Tobias Haas, University of Tuebingen, Germany)
16.30-17.00	**Coffee & Tea Break**
17.00-18.30	The Japan government's business plan for TEPCO (Eri Kanamori, Ritsumeikan University, Japan) Moving towards Renewable Energies integration in Iran's Energy market: challenges and opportunities (Maryam Bakhshi, FFU, Germany)
19.00 **20.00**	**Dinner** **Concert**
Friday 01.09.2017	**Economic and Technological Future of Nuclear Power** **Chairpersons: Reinhard Haas (TU Wien), Aviel Verbruggen (University of Antwerp, Belgium)**
9.00-11.00	The status of the World Nuclear Industry (Mycle Schneider/Antony Froggatt, WNISR) On the dramatic changes in the Economics of Nuclear Power (Reinhard Haas, TU Vienna)
11.00-11.30	**Coffee & Tea Break**
11.30-12.30	Decommissioning of Nuclear Power Plants and Storage of Nuclear Waste (Christian von Hirschhausen & Ben Wealer, TU Berlin) Corporate Policies of Nuclear Vendors (Steve Thomas, University of Greenwich)
13.00-15.00	**Lunch**
15.00-18.30	**Governing Nuclear Waste** **Chairpersons: Maria Rosaria Di Nucci (FFU, Germany), Peter Hocke (ITAS, KIT, Germany)**
15.00-16.30	Japan's Chaotic Nuclear Waste Mismanagement after Fukushima (Tsunehido Chino, Shinshu University) The Decay of the Atomic Industry Complex (Lutz Mez, BEConsultants & Achim Brunnengräber, FFU)
16.30-17.00	**Coffee & Tea Break**
17.00-18.30	In Whose Backyard? Voluntarism, Compensation and Participation in the Siting of Nuclear Waste Repositories (Maria Rosaria Di Nucci, FFU) Contested Forms of Highly-complex Governance in Multi-level-systems - Results from an International Comparison of Nuclear Waste Politics (Peter Hocke & Sophie Kuppler, ITAS, KIT)
19.00	**Dinner**

The REFORM Group (Restructuring Energy Systems for Optimal Resource Management) is an inter-national network among research organizations, universities, consultancies and decision makers involved in the scientific and technical system of research and policy consultancy in the energy field. Established in 1991 by Atle Midttun und Lutz Mez with the aim of fostering interaction and transfer of knowledge between research, policy, politics and innovation and accelerating the transformation of the energy system, the core group has grown to over 50 members. Cooperation takes place through international joint initiatives, e.g. projects and publications, workshops and since 1995 an annual conference at Schloss Leopoldskron in Salzburg, Austria.

This year's meeting is organized by Berlin Energy Consultants with support of Stiftung Mercator, the Institute for Sustainable Energy Policy, Dokkyo University, Ecologic Institute, the ENTRIA projects ITAS/KIT and FFU, Chalmers Energy Area of Advance, and the Energy Economics Group at TU Vienna.

Organization & contact: Lutz Mez & Vlasta Wallat – Email: kontakt@berlin-ec.com

On the dramatic changes in the Economics of nuclear power

Reinhard HAAS

Energy Economics Group, TU Wien

Salzburg, 1 September 2017

CONTENT:

1. Introduction: Motivation
2. Cost structure
3. The economic impact of delays in construction times
4. Historical cost developments
5. Cost developments in Europe
6. Historical costs: The big picture
7. Technological Learning
8. Construction times
9. Conclusions

1. INTRODUCTION

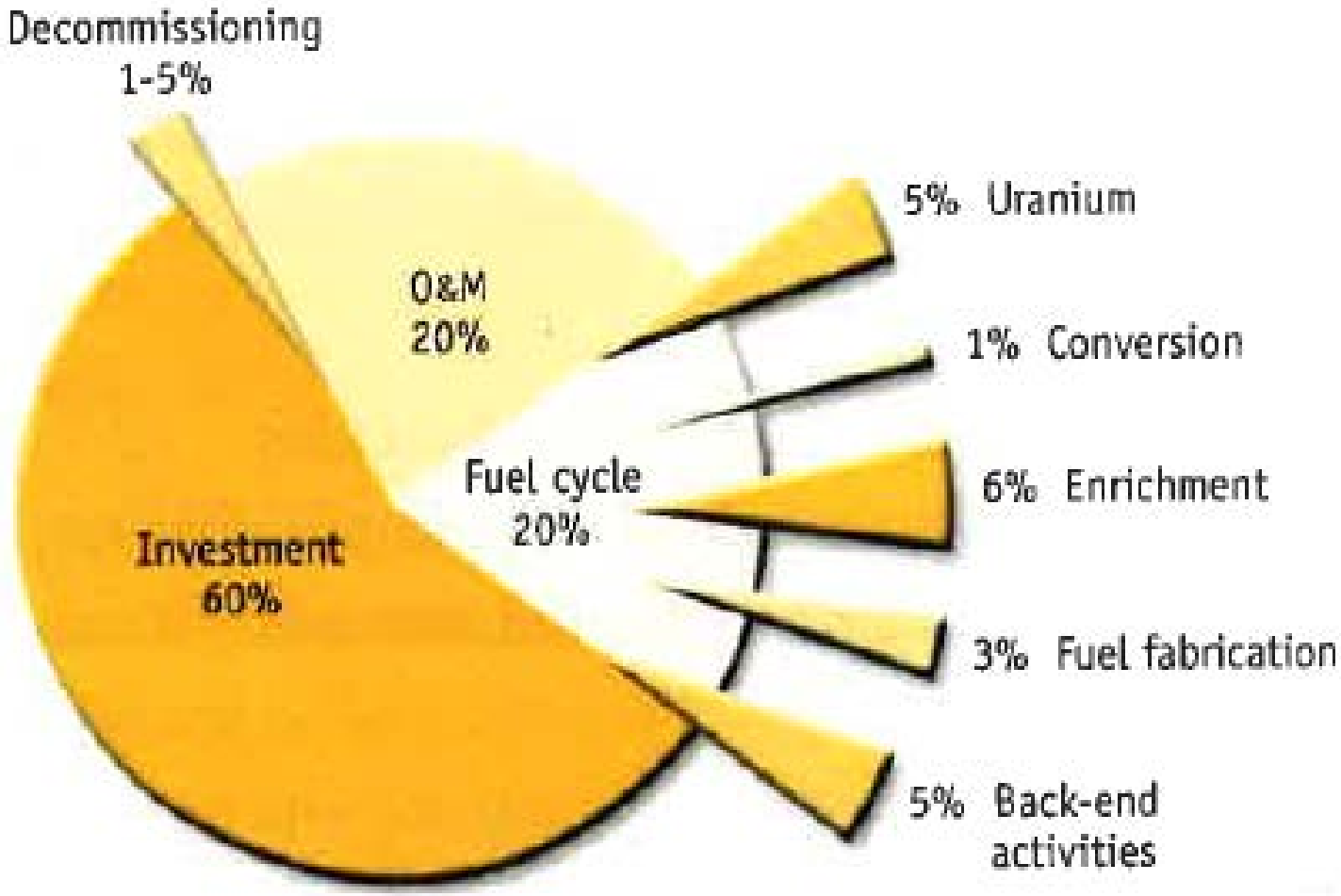
Motivation:

- **Atoms for peace →**

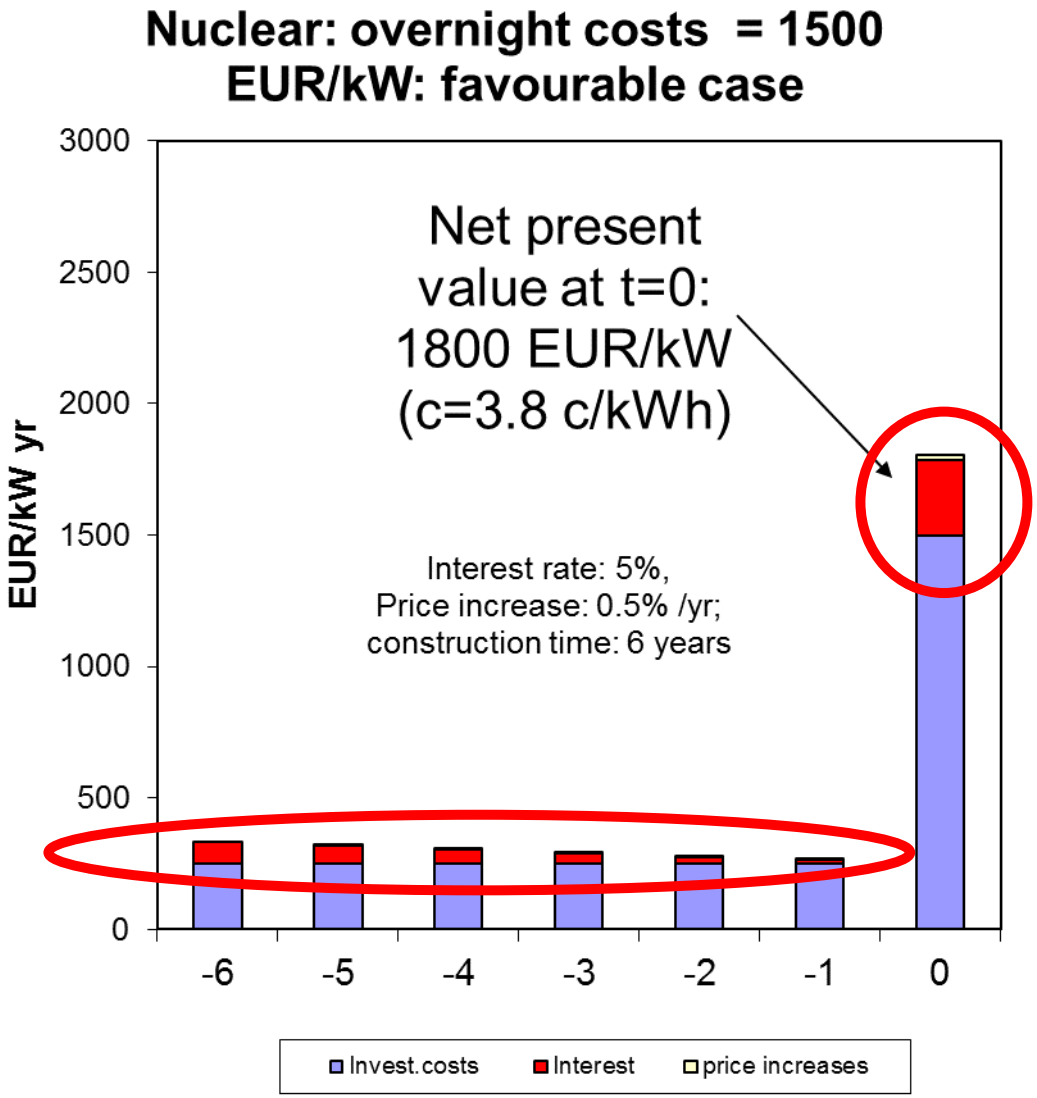
  → Too cheap to meter

*** Competition & democracy**

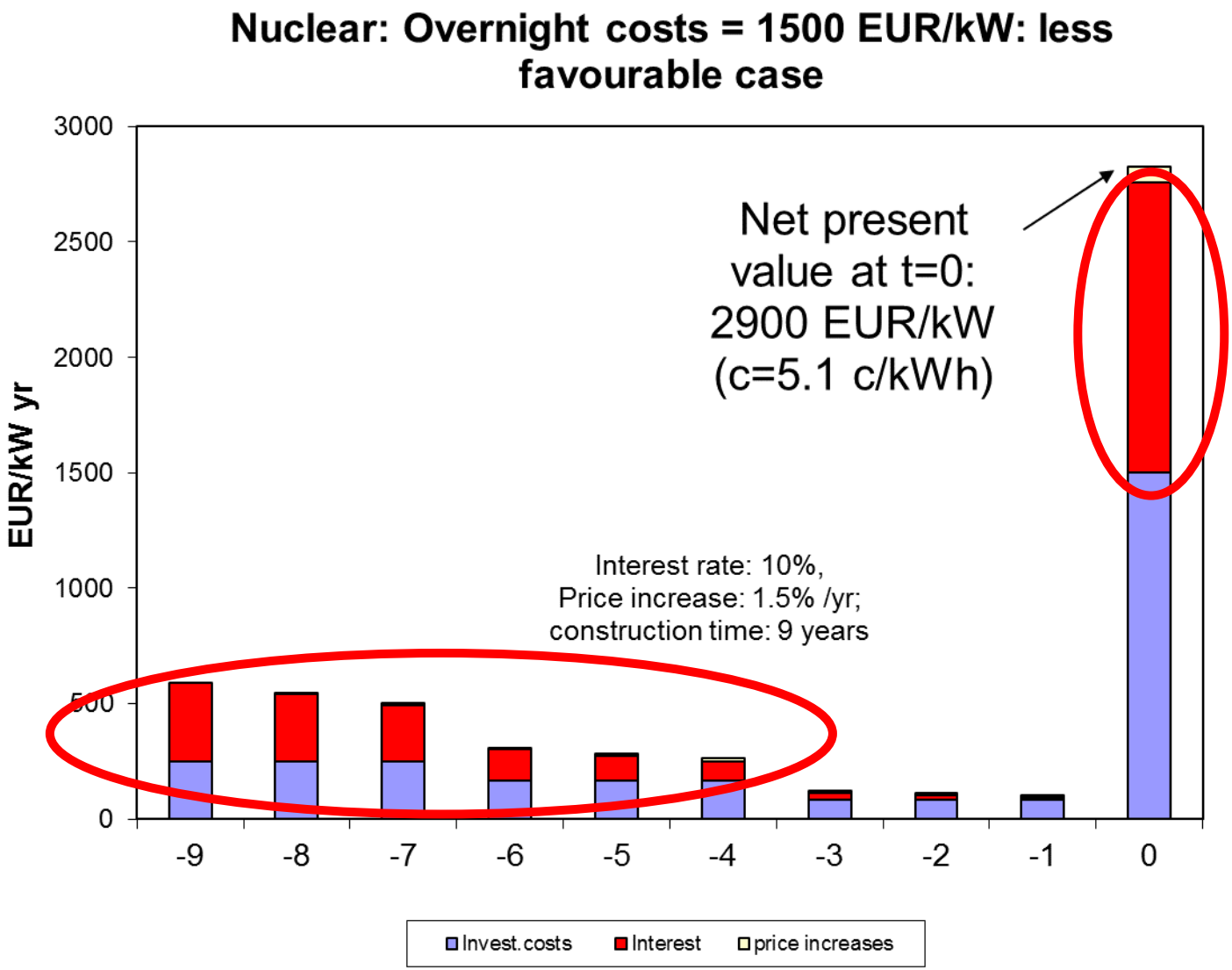
2. COST STRUCTURE



3. ECONOMIC IMPACT OF DELAYS



Problem of delays



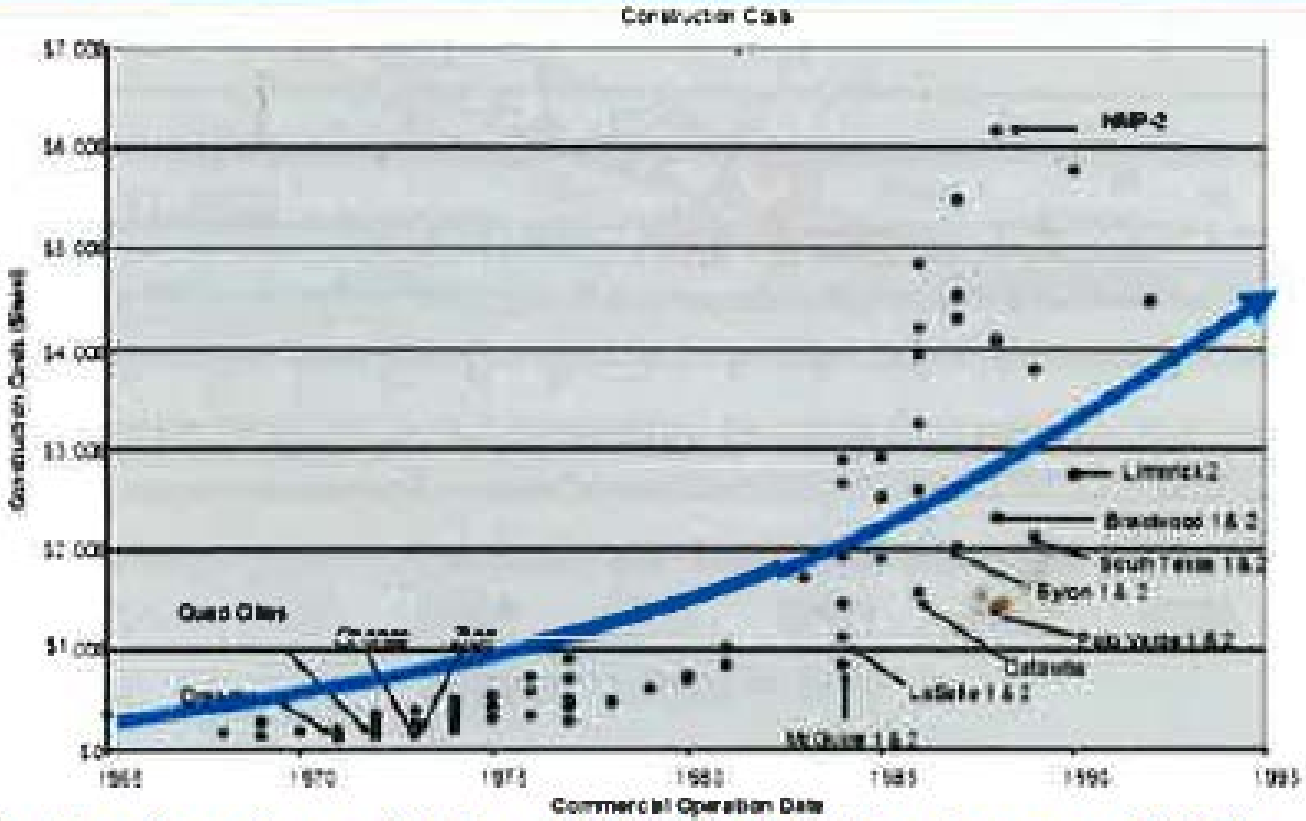
4. HISTORICAL COSTS DEVELOPMENTS

JIM HARDING: U.S. COSTS DEVELOPMENTS

Constellation Energy

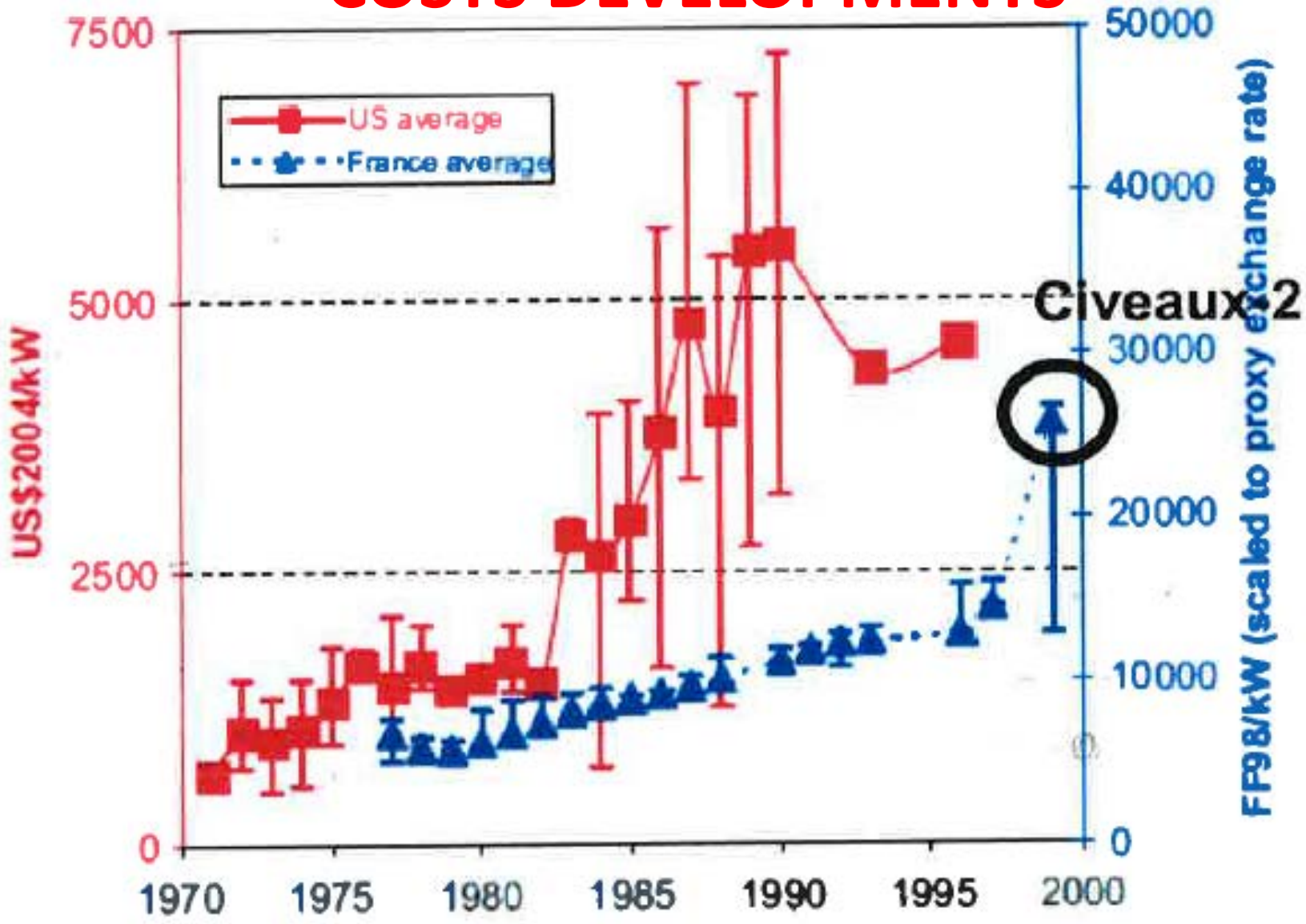
The easy energy works.

Background - Industry Experience "Last Time"



Source: Jim Harding: Seven Myths of the Nuclear Renaissance (2007)

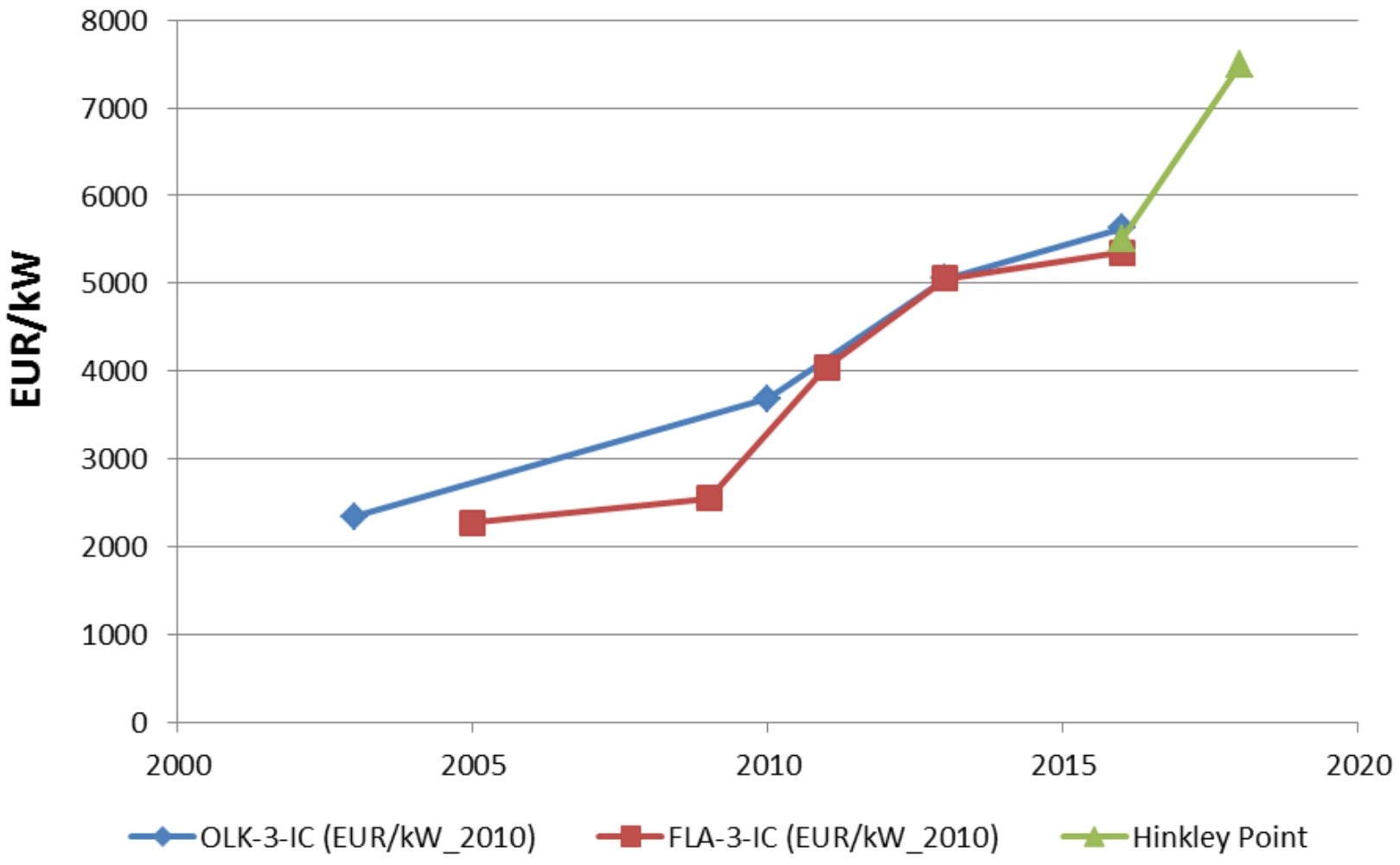
ARNULF GRUEBLER: U.S. AND FRANCE COSTS DEVELOPMENTS

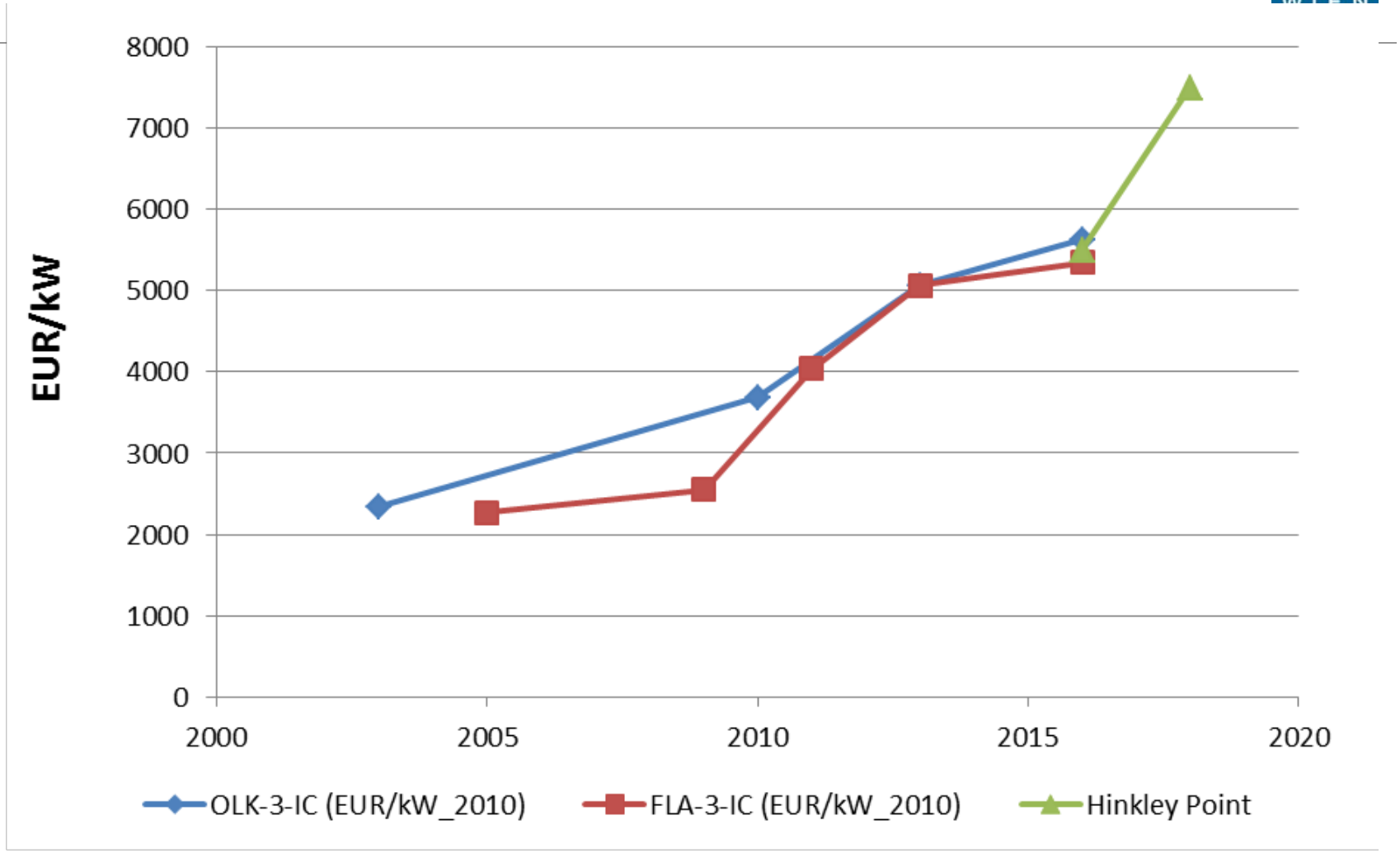


Source: Grübler 2010

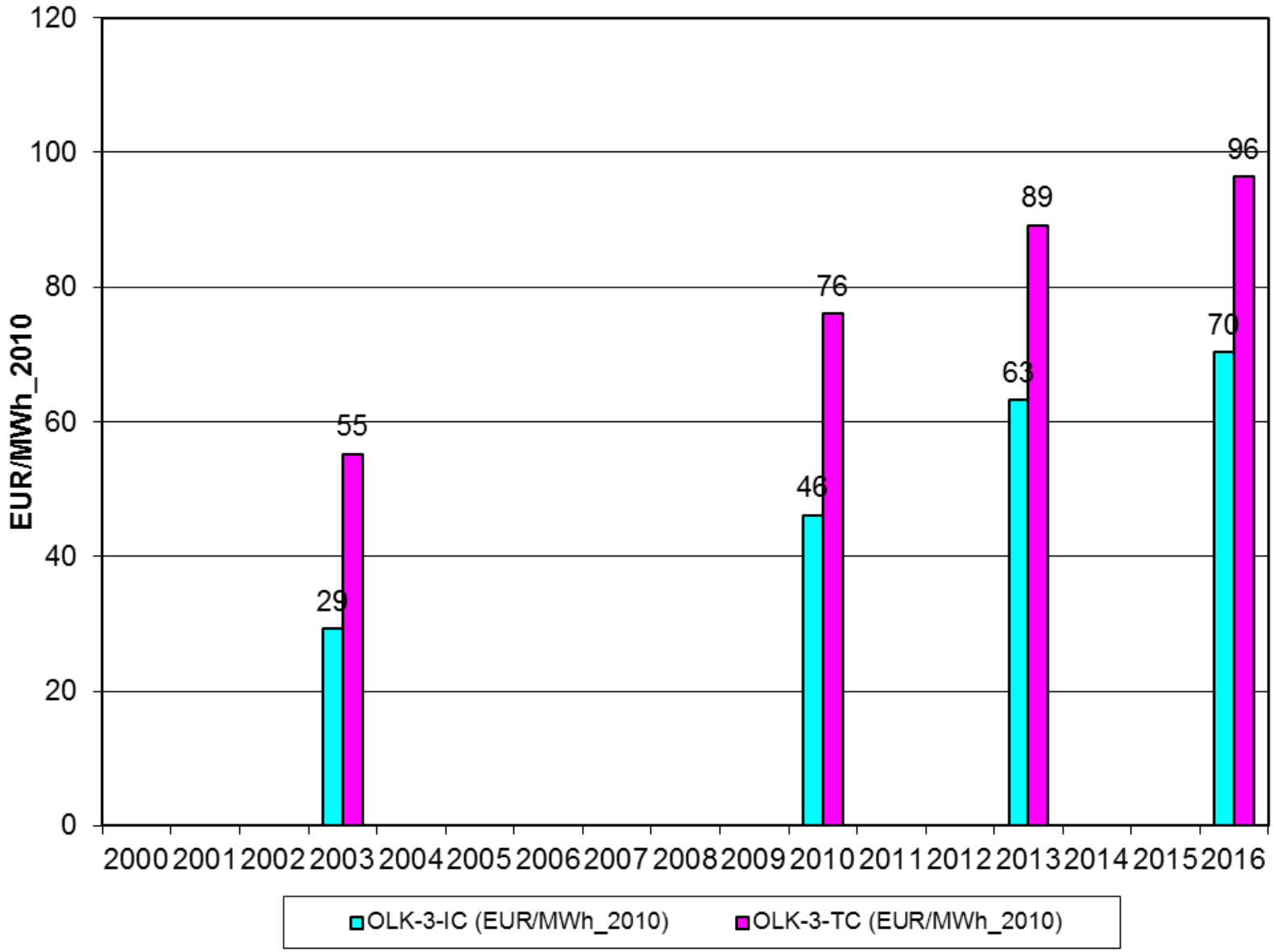
5. COST DEVELOPMENT OF OLKILUOTO-3, FLAMANVILLE-3 AND HINKLEY POINT C

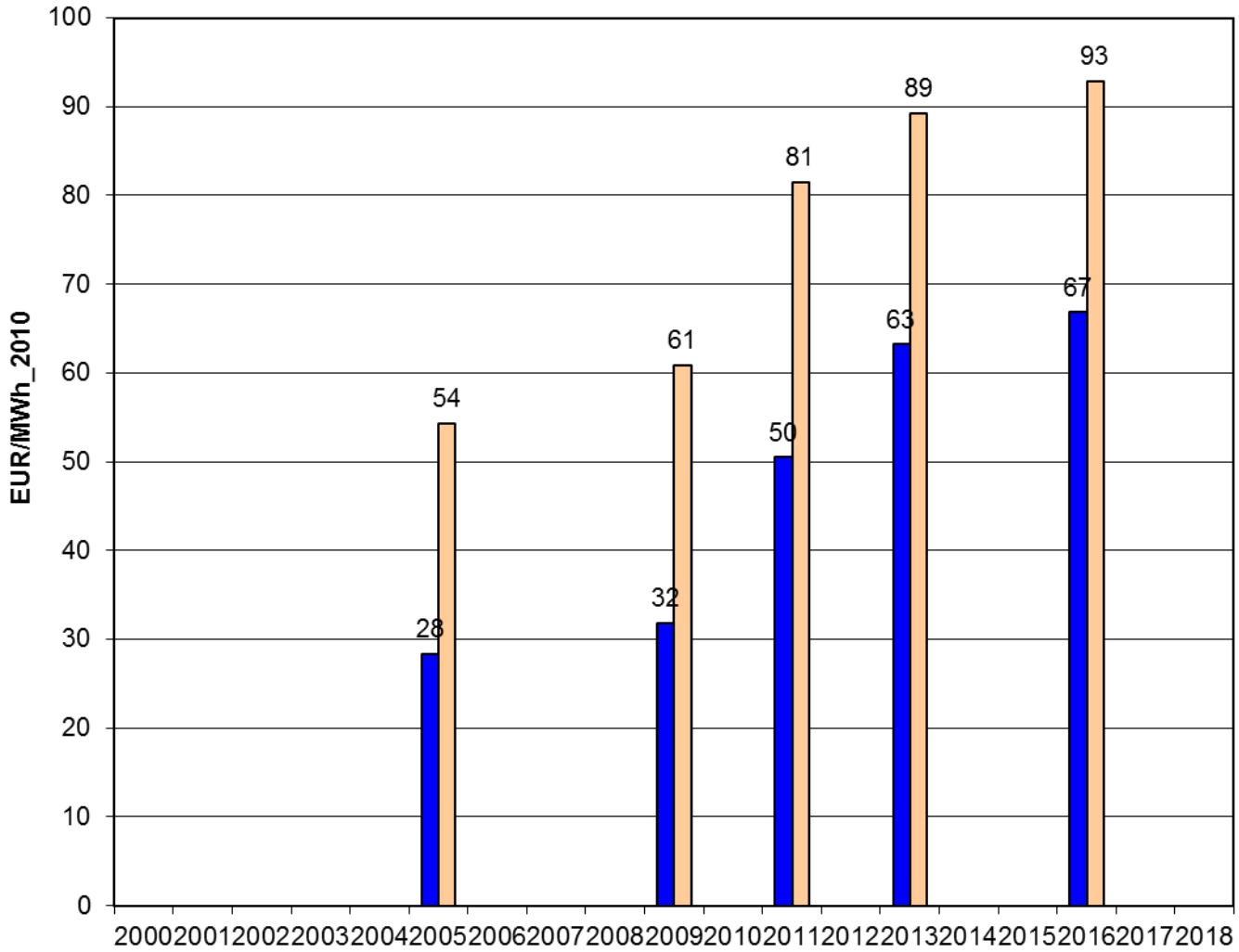
Development of Investment costs



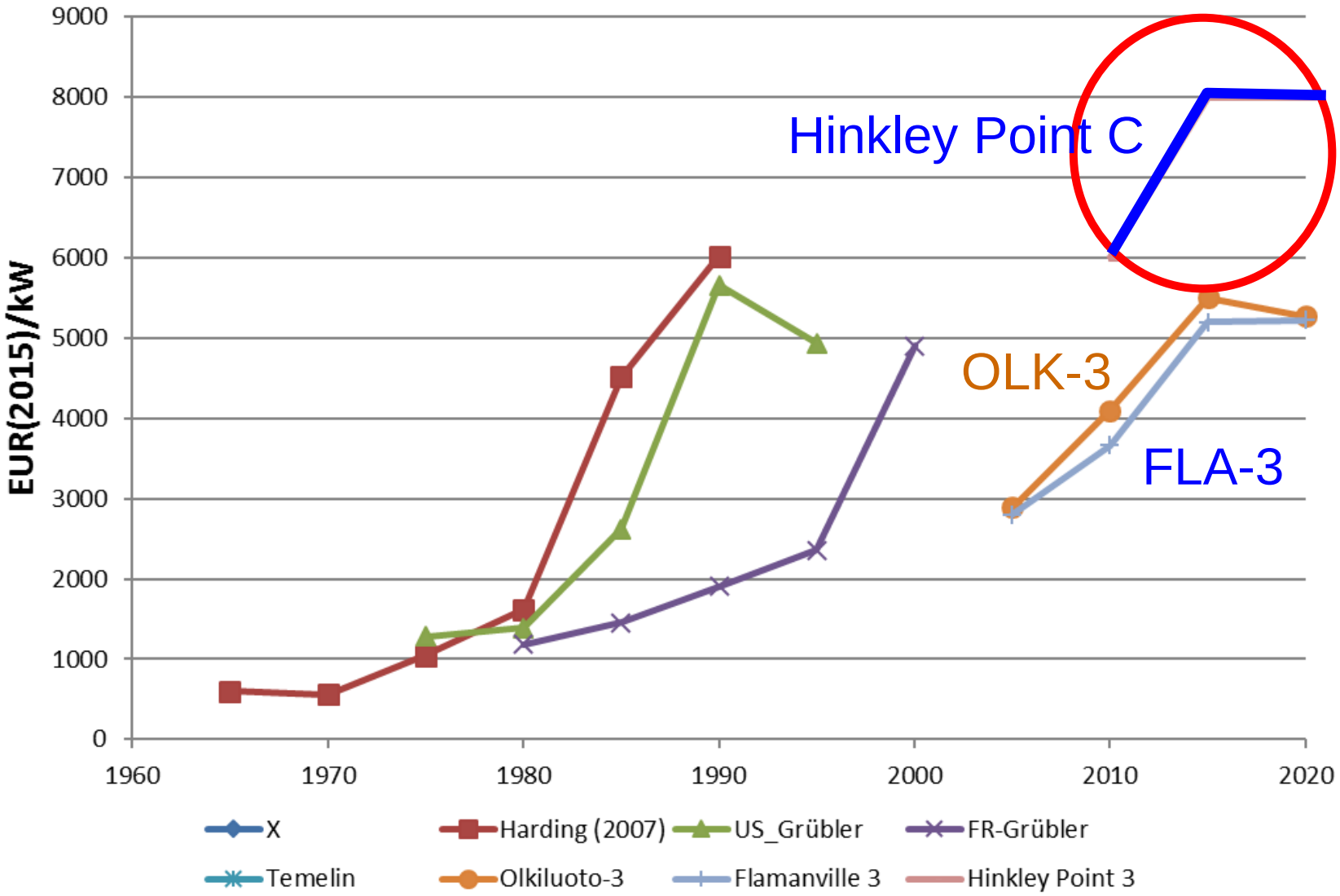

EUR/kW
8000
7000
6000
5000
4000
3000
2000
1000
0
2000
2005
2010
2015
2020
OLK-3-IC (EUR/kW_2010)
FLA-3-IC (EUR/kW_2010)
Hinkley Point

Investment costs and total costs of Olkiluoto per MWh




EUR/MWh_2010
100
90
80
70
60
50
40
30
20
10
0
28
54
32
61
50
81
63
89
67
93
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
FLA-3-IC (EUR/MWh_2010)
FLA-3-TC (EUR/MWh_2010)

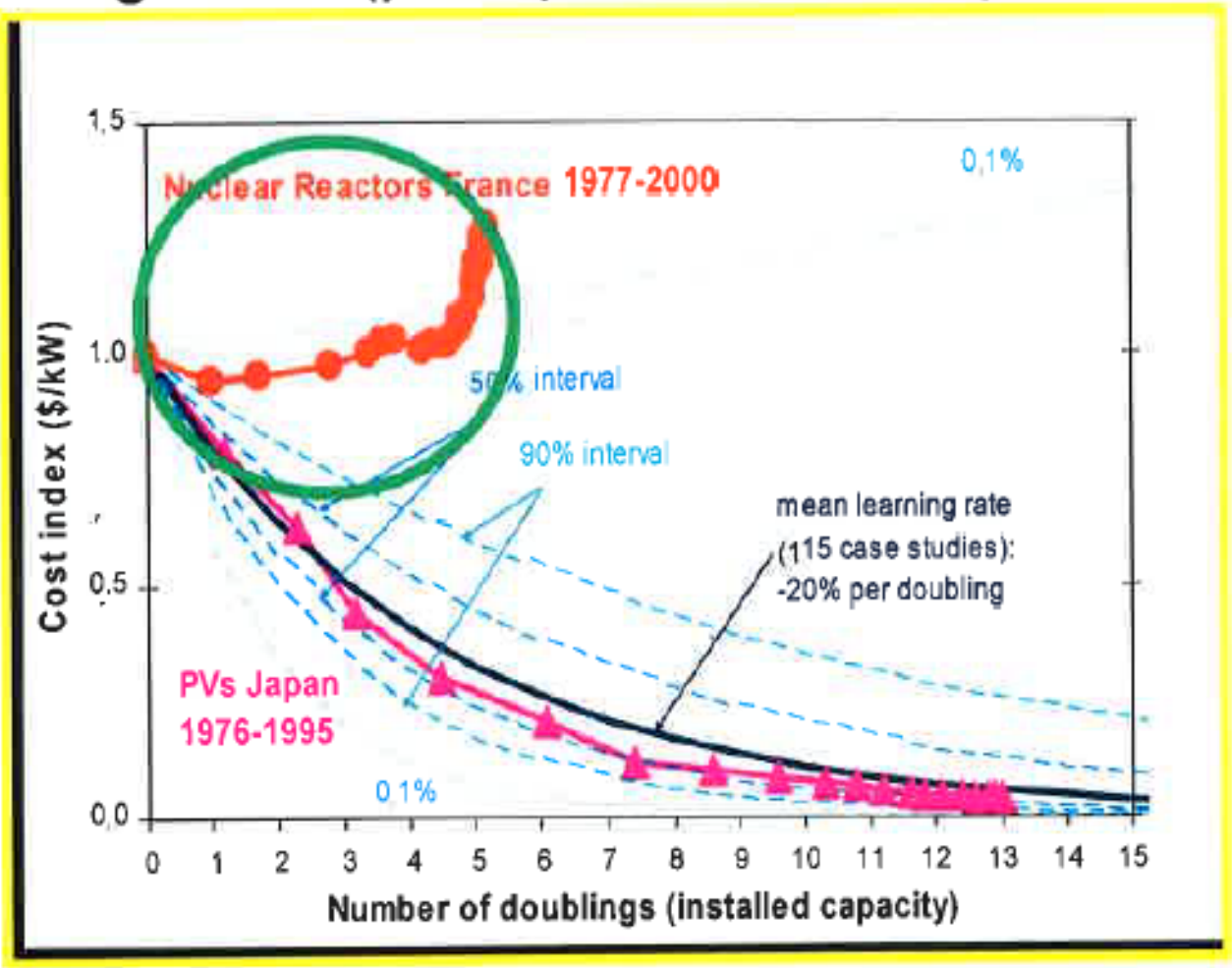
6. HISTORICAL COST DEVELOPMENT: THE BIG PICTURE



Why Hinkley Point is different

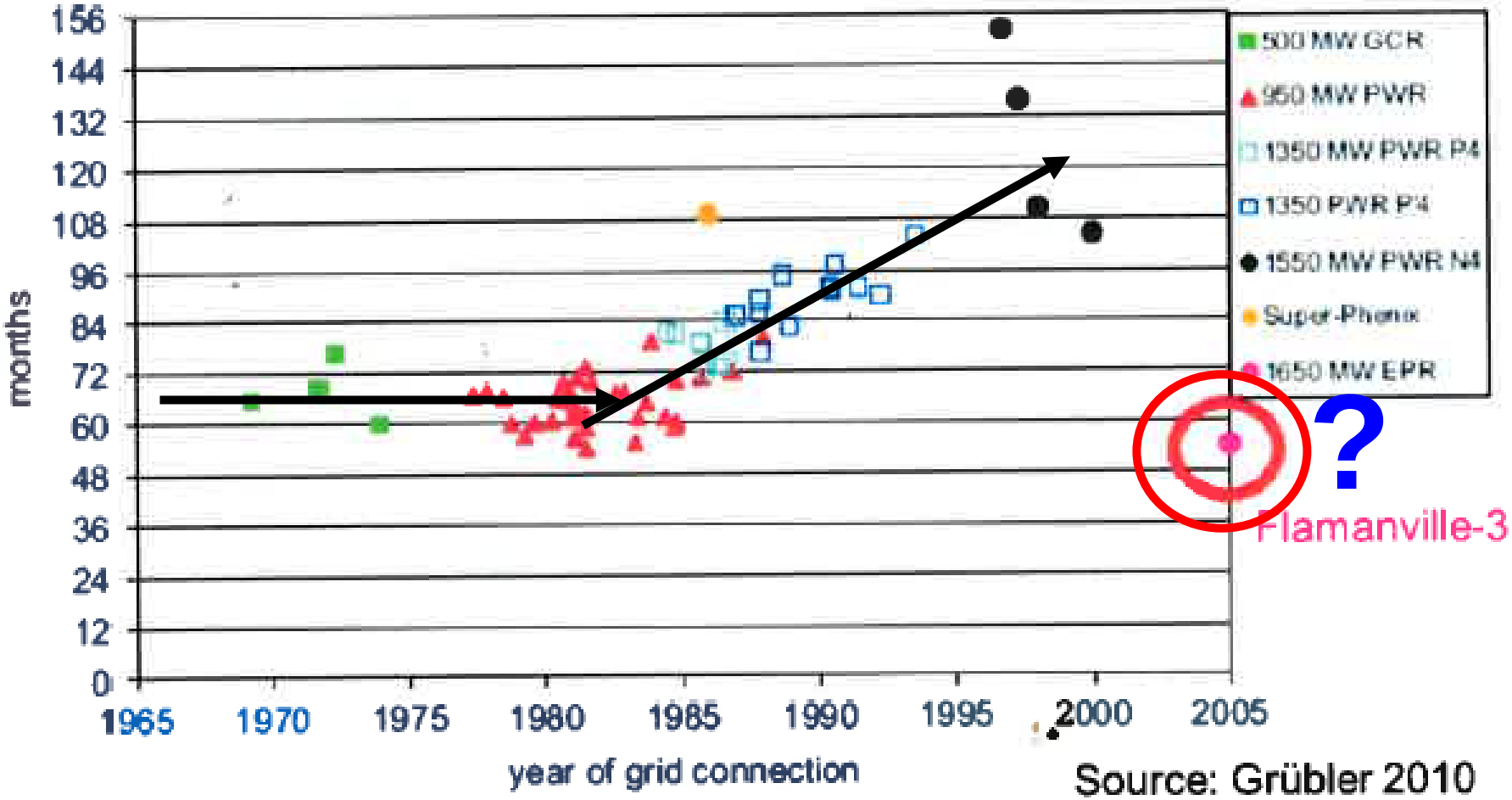
7. TECHNOLOGICAL LEARNING: WHY NOT FOR NUCLEAR?

Technological Uncertainties: Learning rates (push) and market growth (pull)



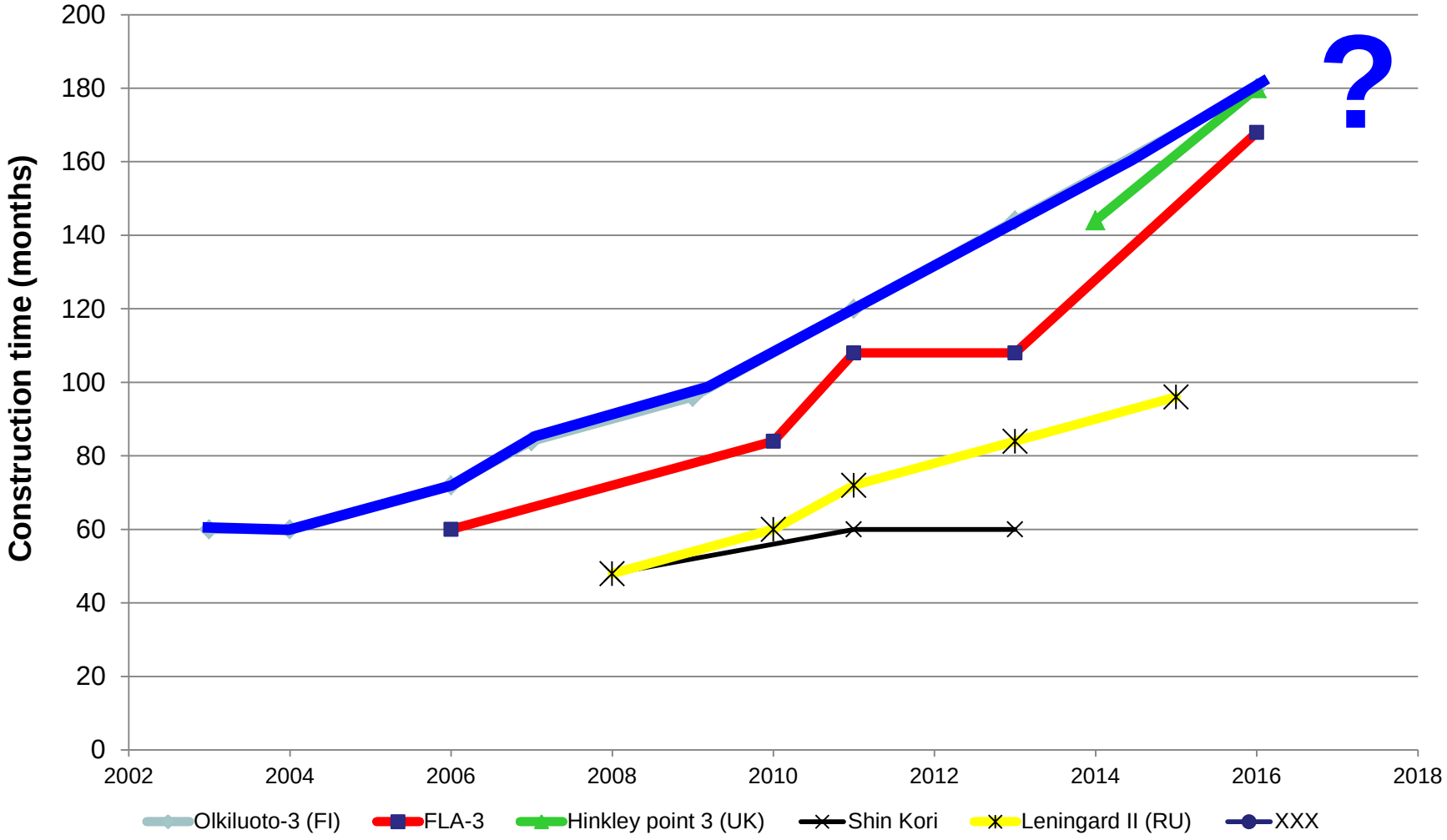
Source: Nakicenovic, Schrattenholzer, Grübler various papers

8. DEVELOPMENT OF CONSTRUCTION TIMES

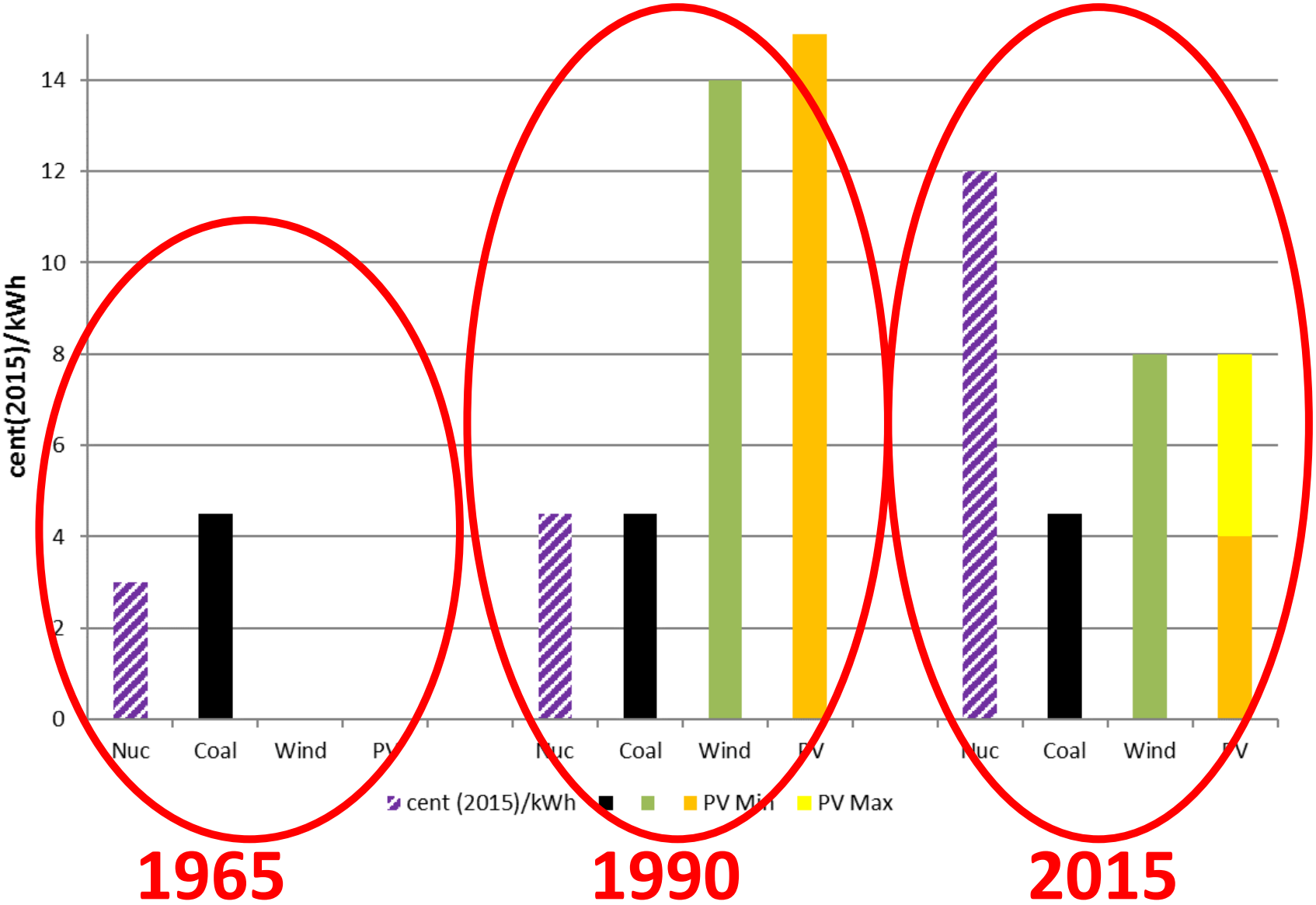


Source: Grübler 2010

Recent dynamics of construction times



8. ECONOMIC COMPARISON OVER TIME



9. CONCLUSIONS

- It is impossible to find any sound economic argument in Europe in favour of nuclear
- Currently, in Europe nuclear is the most expensive option to generate electricity
- Military reason No. 1 world-wide?
- If not, what is the reason?