

A Nuclear Renaissance



Mike Tynan
Chief Executive
Westinghouse UK

Introduction to Westinghouse

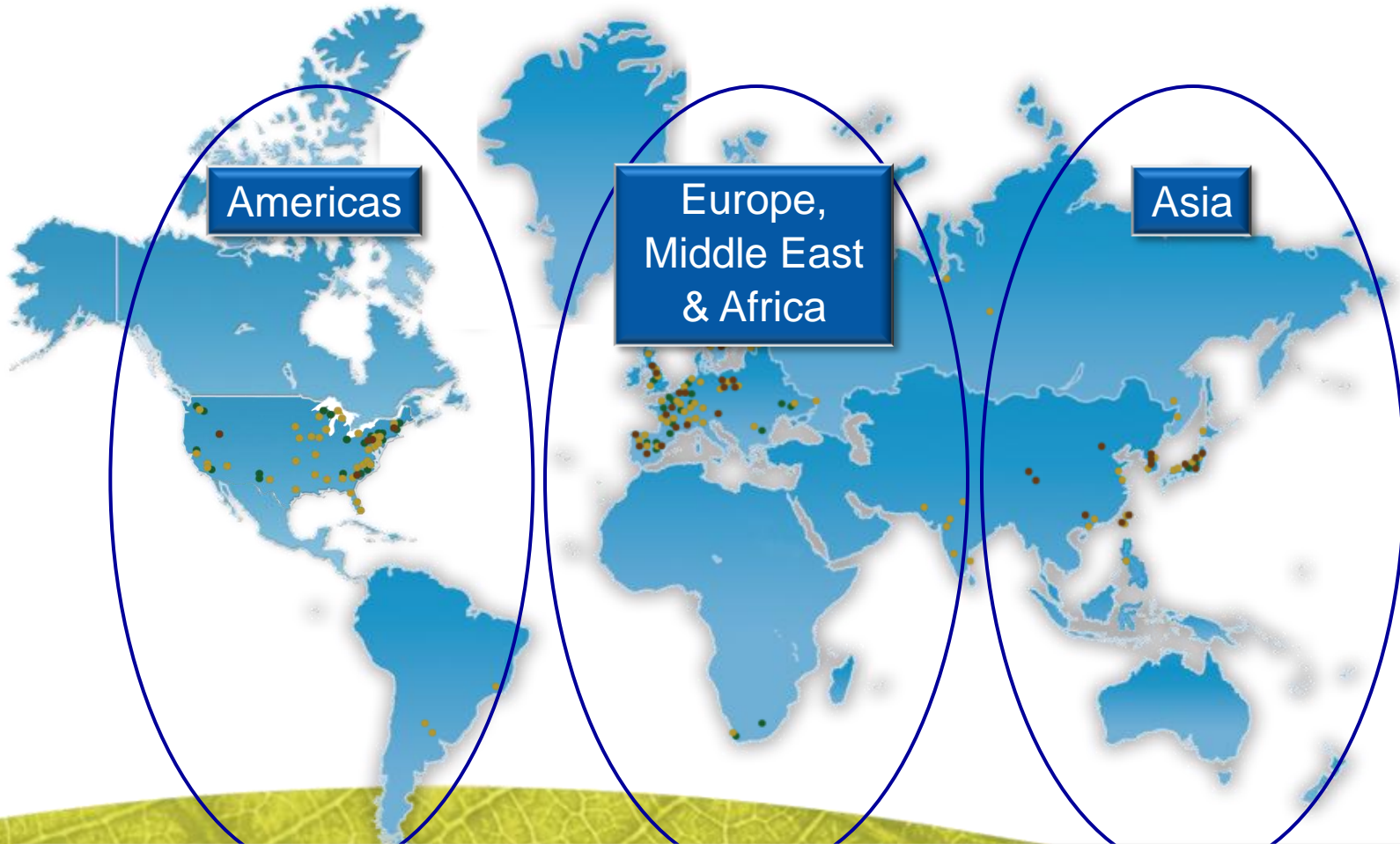
Westinghouse: A Global Company

More than 15,000 People in 17 Countries Around the World



Introduction to Westinghouse

Westinghouse: 3 Regions



~30% of Westinghouse business, ~30% of Westinghouse workforce
in the EMEA region

Toshiba Westinghouse

Business Expansion and Enhanced Competitiveness

TOSHIBA

 Westinghouse



ABWR

BWR Business
Construction ABWR
Maintenance & Services

Mainly PWR Business
Construction AP1000
Maintenance & Services



AP1000

**The Global Leader, Promoting
Both BWR and PWR Technologies**

 Westinghouse

Westinghouse: 4 Product Lines

Nuclear Services

Focused on operating plant success through reliable operation, maximized power output and better (shorter, more predictable) outages

Nuclear Fuel

A single-source fuel provider for PWR, BWR, VVER, AGR and Magnox reactors worldwide

Nuclear Power Plants

Specializing in the technology of new nuclear power plants and component manufacturing

Nuclear Automation

Instrumentation and control solutions to enhance the reliability of nuclear plant control and safety systems

All product lines team with Toshiba



Westinghouse UK: Fuel

- Springfields Fuels Limited acquired 1 April 2010



- Develop Springfields Site under long term lease
 - AGR Lifetime contract
 - LWR fuel
 - UO₂ powder
 - Conversion
 - repU



Westinghouse UK: Services



Tier 1

- Site Management

Tier 2/3

- D&D
- Waste Management

Tier 2/3

- D&D
- Waste Management

Tier 2/3

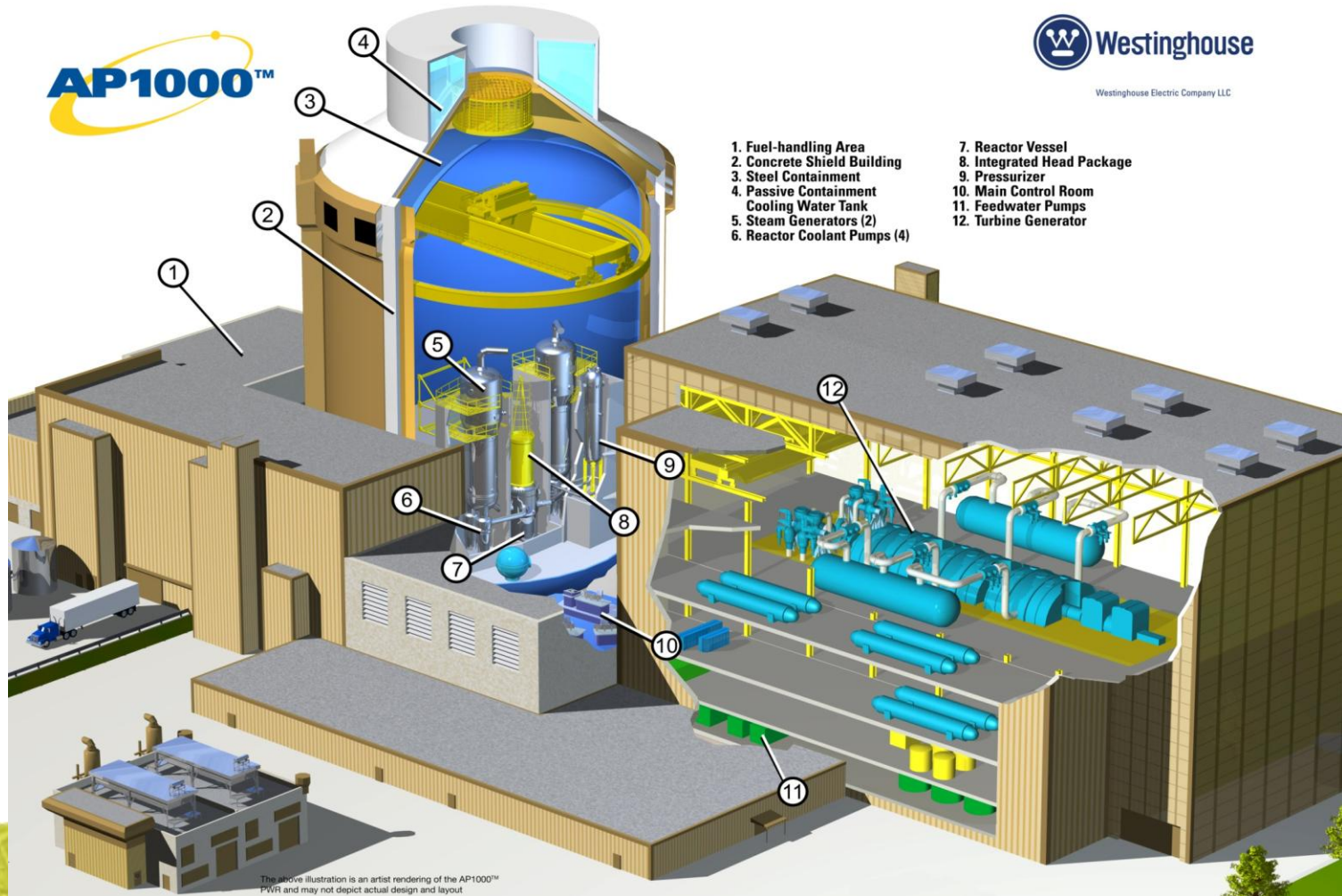
- AGR Lifetime Extensions
- Sizewell B support
- I&C

Tier 2/3

- D&D
- Waste Management

Maintain Existing Fleet and Decommission Retiring Fleet

Westinghouse: Nuclear Power Plants



Westinghouse Business Summary



Legacy Plant



Existing Plant



New Build



Engineer



Licence



Build



Fuel



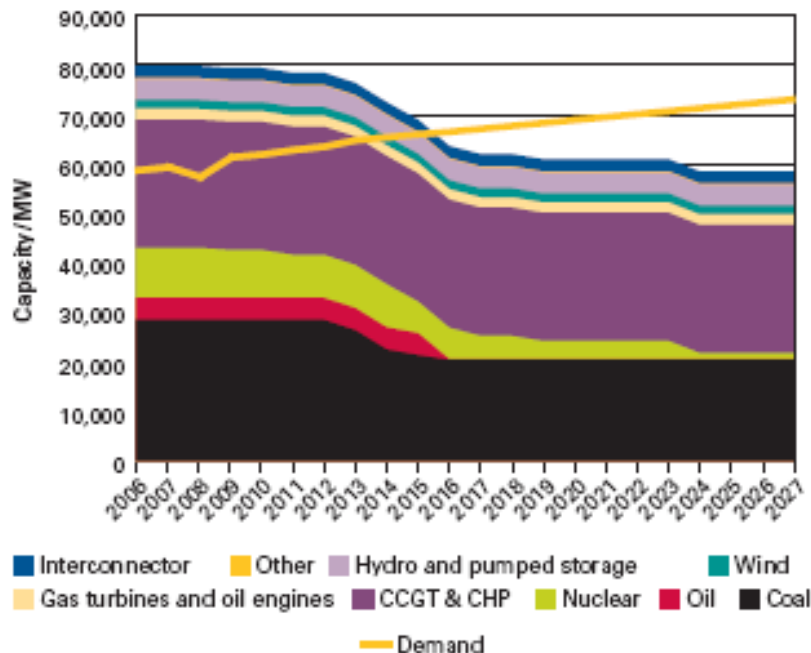
Service



Decommission



Energy Crunch from dip in Nuclear & Coal Generation

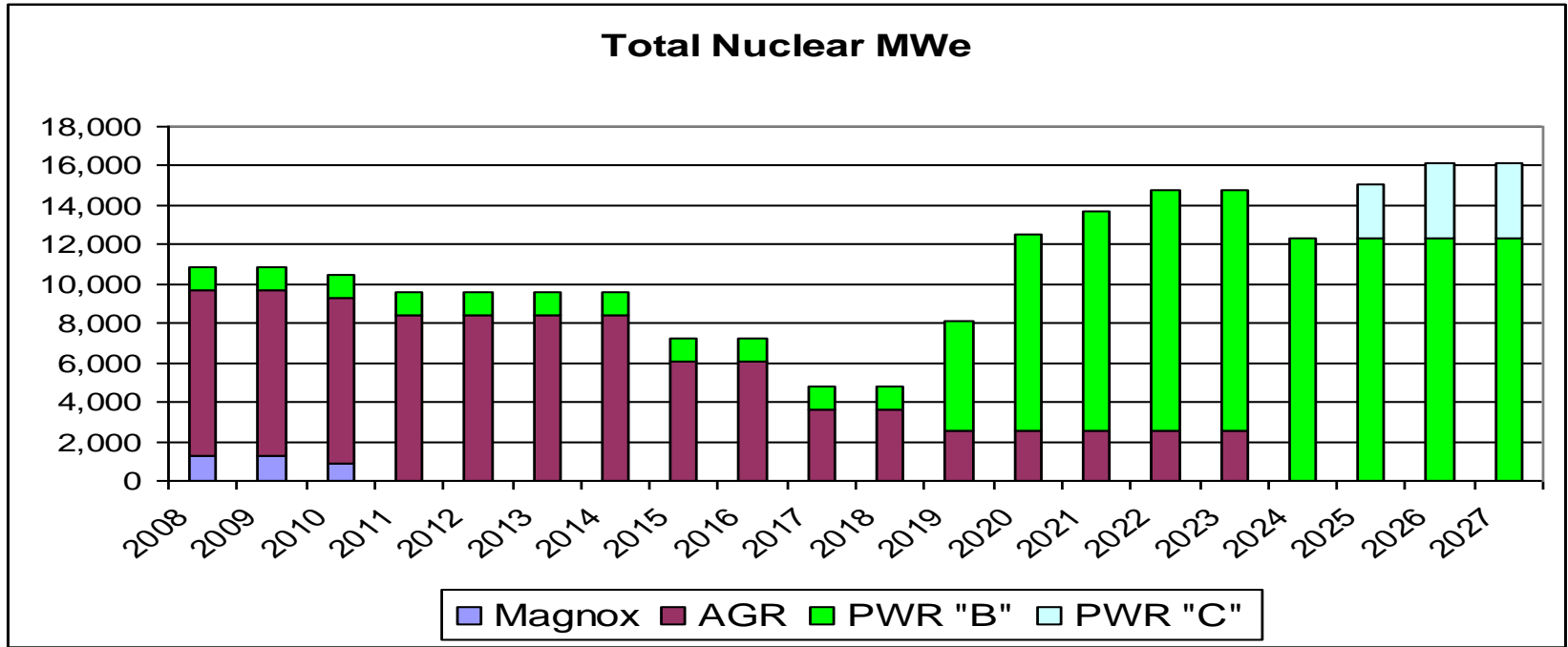


Source: Digest of UK Energy Statistics/DECC

- Between now and 2020
 - 12GW of oil & coal closes
 - Large Combustion plant Directive
 - 7GW of nuclear closes
 - End of Magnox
 - 5/7 AGR have closed
- May see higher prices, coal extensions and / or new gas capacity

Loss of capacity and carbon concerns => UK Government Policy of new nuclear build

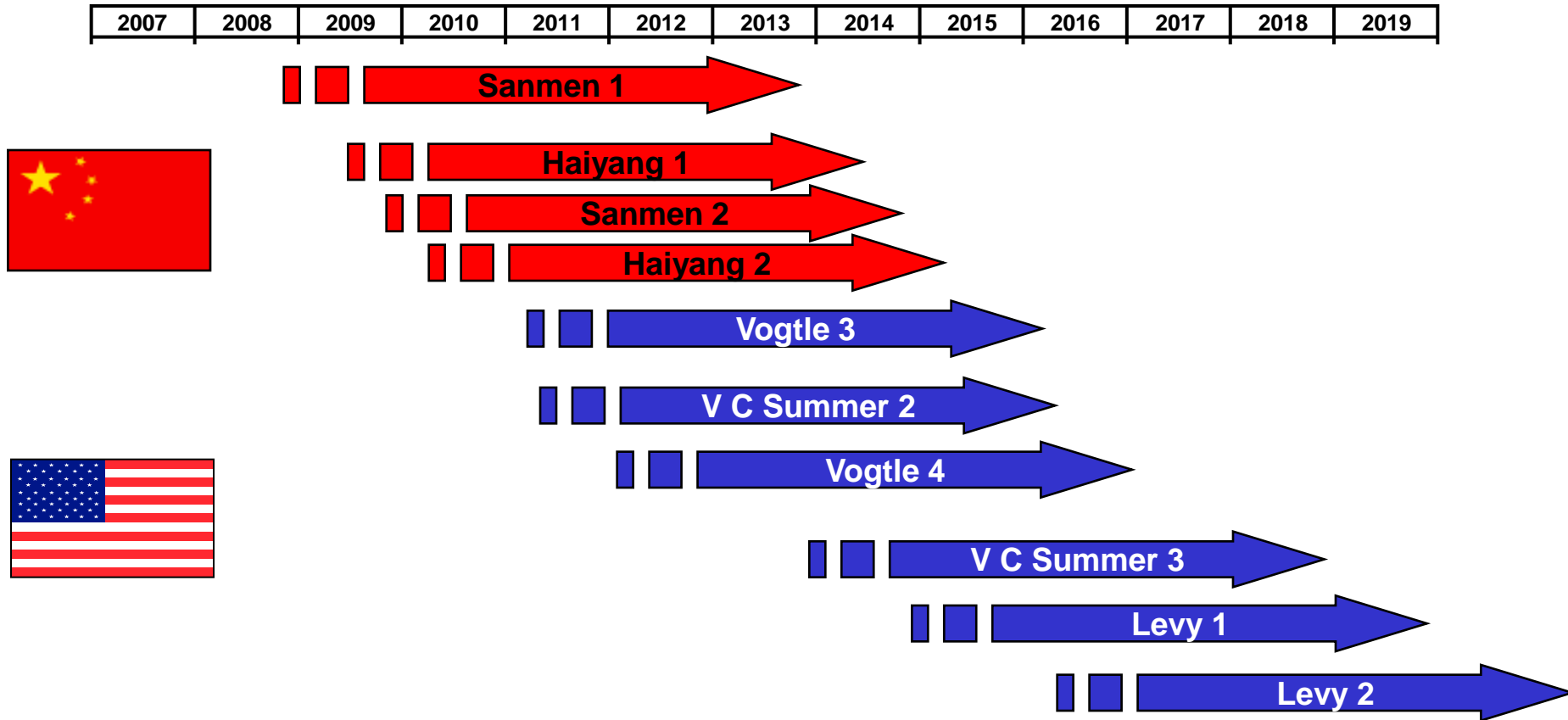
Energy Crunch from dip in Nuclear & Coal Generation



- UK Government Policy of new nuclear build
- Can AGR life extensions help fill the gap?
 - creates opportunity for Fuel & Services

Niche Magnox / AGR fleet => Fully fledged PWR market in 15 years

AP1000 Units Under Contract



AP1000 China Projects Progress



Sanmen 1 - Commercial Operation 2013
Four units operational by 2015

UK Generic Design Assessment

On **14 December 2011** the UK Office for Nuclear Regulation and the Environment Agency awarded the Westinghouse AP1000 interim Design Acceptance Confirmation (iDAC) and interim Statement of Design Acceptability (iSoDA) certificates respectively.

Office for Nuclear Regulation
An agency of HSE

Interim Design Acceptance Confirmation
ONR-GDA-iDAC: 13-002
Issue: 1

**GENERIC DESIGN ASSESSMENT OF WESTINGHOUSE AP1000[®] NUCLEAR REACTOR
INTERIM DESIGN ACCEPTANCE CONFIRMATION
FOR THE WESTINGHOUSE AP1000 NUCLEAR REACTOR**

The Office for Nuclear Regulation (ONR), an agency of the Health and Safety Executive (HSE), in accordance with the document *Guidance on the Management of GDA Outcomes* Version 1, 23 June 2010, hereby gives the Westinghouse Electric Company LLC (Westinghouse) an Interim Design Acceptance Confirmation (iDAC) for the AP1000 nuclear reactor.

This iDAC is given following the assessment of the material included in the GDA Submission described in Annex 1.

The GDA issues which must be resolved by Westinghouse in connection with the AP1000 nuclear reactor design before ONR(HSE) will consider issuing a Final Design Acceptance Confirmation ("unresolved GDA issues") are identified in Annex 2 of this iDAC.


This iDAC is valid for a period of ten years beginning on the date on which it is issued.

Signed  Date of Issue
14/12/11

Kevin Allers
Director for Nuclear New Build
Office for Nuclear Regulation
An agency of the Health and Safety Executive

* AP1000 is a registered trademark of Westinghouse Electric Company LLC in the United Kingdom and may be used or registered in other countries.

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 Environment Agency

Generic assessment of candidate nuclear power plant designs


Interim statement of design acceptability for the AP1000[®] design submitted by Westinghouse Electric Company LLC (Westinghouse)

The Environment Agency has undertaken a Generic Design Assessment of the Westinghouse UK AP1000[®] design, during the period July 2007 to June 2011, using the process set out in the document *Process and Information Document for Generic Assessment of Candidate Nuclear Power Plant Designs*¹.

The findings of our assessment are summarised in the decision document for the Generic Design Assessment of Westinghouse's UK AP1000[®].

The Environment Agency is satisfied that Westinghouse has demonstrated the acceptability for environmental permitting of the AP1000 on the generic site, as defined in Schedule 1, subject to the GDA issues identified in Schedule 2.

This statement is provided as advice to Westinghouse, under section 37 of the Environment Act 1995. It does not guarantee that any site-specific applications for environmental permits for the AP1000 will be successful.

Name	Date
[name of authorised person]  Ian Parker Manager, Nuclear Regulation Group (North) Authorised on behalf of the Environment Agency	14 December 2011

References

1. Process and Information Document for Generic Assessment of Candidate Nuclear Power Plant Designs, Environment Agency, January 2007. <http://publications.environment-agency.gov.uk/pdf/GEDH0107BL/TN-e-a.pdf>
2. Decision document for the Generic Design Assessment of Westinghouse's AP1000[®], Environment Agency, December 2011.

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US Final Design Certification

On **22 December 2011** the US Nuclear Regulatory Commission awarded the Westinghouse AP1000 Final Design Certification.



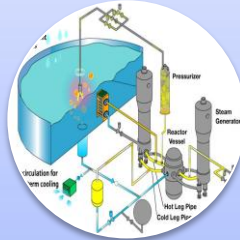
AP1000

Confidence from Being Part of a Global Fleet



Standard Design

lessons learned from initial units transferred to future units



Passive design

smaller footprint and less plant & equipment



Modular Design

improves QC and shortens construction schedule



Horizontal supply chain

reduces costs and eliminates shortages of key components

Experience from building plants in China & US will provide valuable insights as additional plants are built across the world

Good Progress on China Programme is Giving Confidence Elsewhere

- All 4 units in China are under construction, with Sanmen Unit 1 still on schedule for commercial operation in November 2013.
- The 2nd, 3rd and 4th AP1000 units are catching up, due to lessons learned on Unit 1.
- Modular construction approach is helping to ensure construction keeps to schedule. Where there has been slippage, this has been recovered.



Sanmen Unit 1: December 2010

Positive Effects of Modular Construction

Sanmen Unit 1 Milestones	Feb 2007 Plan	Actual	Delta
FCD completed	31-Mar-09	29-Mar-09	0
CA20 set in place	31-May-09	29-Jun-09	-1
CVBH set in place	30-Jun-09	21-Dec-09	-6
CV 1st Ring set in place	31-Dec-09	18-Mar-10	-3
CV 2nd Ring set in place	31-May-10	31-May-10	0
CV 3rd Ring set in place	30-Sep-10	12-Sep-10	+0.5
CV 4th Ring set in place	31-Dec-10	17-Dec-10	+0.5

With the setting of the CV 2nd Ring, against the construction schedule milestones, Sanmen Unit 1 has recovered the 6-month delay in setting the CVBH. This was achieved as a result of modular construction.



China Update - Schedule



“Overall, the AP1000 Sanmen Project remains on schedule. All key project milestones were met in 2010 and the project continues to work towards successfully completing all 2011 key project milestones this year.”

State Nuclear Power Technology Company (China) – June 2011

Sanmen – March 2009



Sanmen – December 2010



Sanmen – August 2011



We are **On Schedule** in China

2006

Dec 2006 - China selects Westinghouse AP1000 technology

2007

Mar 2007 – Project timescales agreed with customer – Sanmen 1 COD set as end of 2013

2008

2009

Mar 2009 – Concrete basemat poured at Sanmen 1 - on schedule

2010

2011

2012

Jan 2012 – Chairman of SNPTC Board, Wang Binghua, confirms that Sanmen 1 will begin operation in 2013^[1]

2013

Dec 2013 – Scheduled start of commercial operation for Sanmen 1

[1] reported by Reuters, 15 Jan 2012

AP1000 Construction Update

US – 4 units under construction

- Two units at Vogtle in Georgia
 - NRC issued Combined Operating License: 9 Feb 2012
 - First unit scheduled to produce power in 2016



AP1000 Construction Update

US – 4 units under construction

- Two units at VC Summer in South Carolina
 - First unit scheduled to produce power in 2016



Learning Lessons from Overseas



As the AP1000 programme develops around the world, it is imperative that we retain the accumulated learning and experience, whilst working with respected companies with local knowledge

Preparing for UK Success - the UK Delivery Team



New Build Target Customers in the UK

- Horizon Nuclear Power

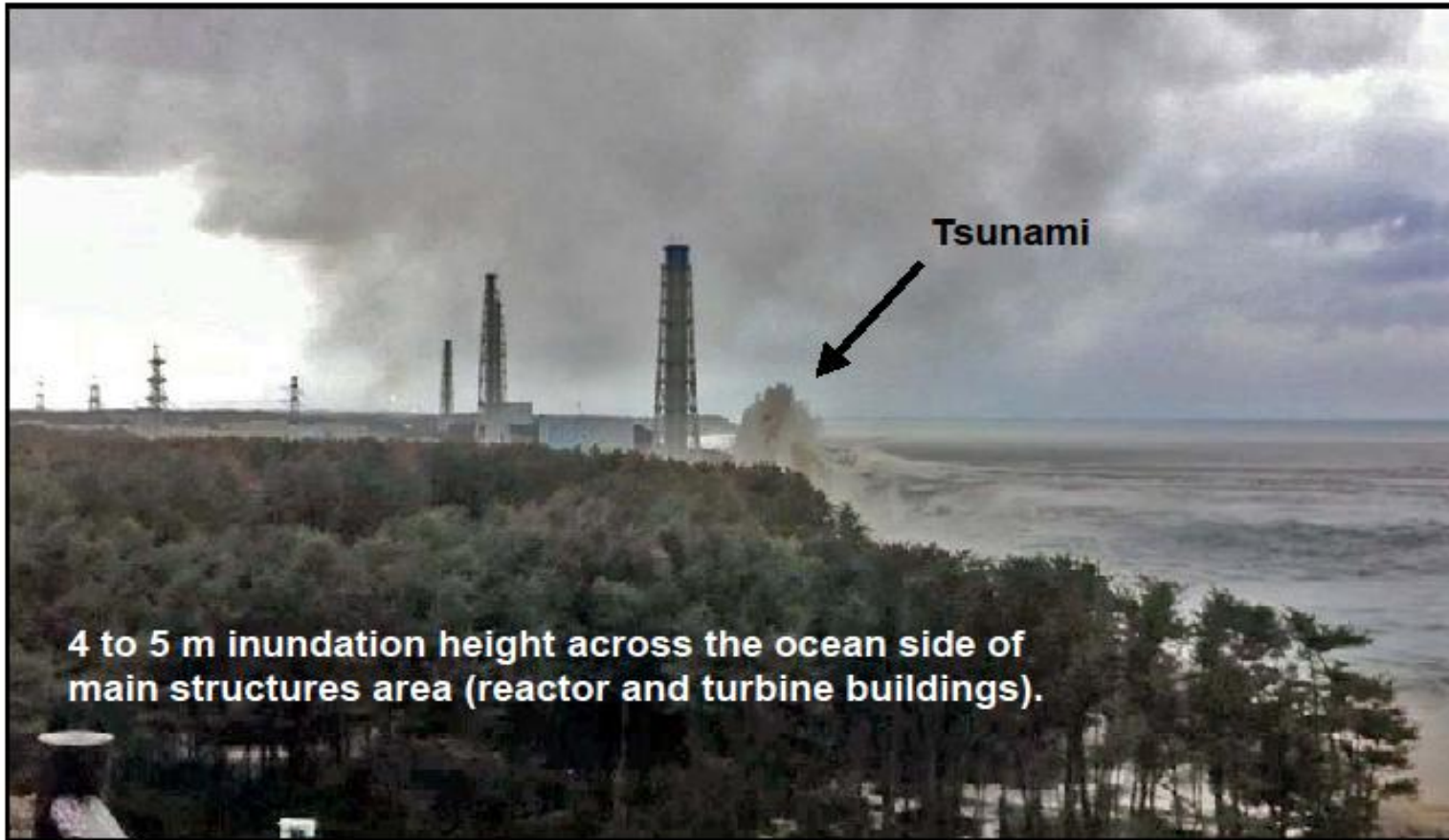
- Two sites at Wylfa in North Wales and Oldbury in Gloucestershire
- Potential for 3 AP1000 reactors on each site
- First site at Wylfa scheduled to produce first electricity in 2021
- Reactor choice for Wylfa expected from Horizon imminently (between Westinghouse AP1000 and Areva EPR)

- NuGen

- One site at Sellafield in Cumbria: Potential for 3 AP1000 reactors
- Scheduled to produce first electricity in 2023
- Potential RFP Summer 2012: only two designs licensed, so could well be another two horse race



Tsunami Impact at Fukushima Daiichi



Source: Tepco, 2011

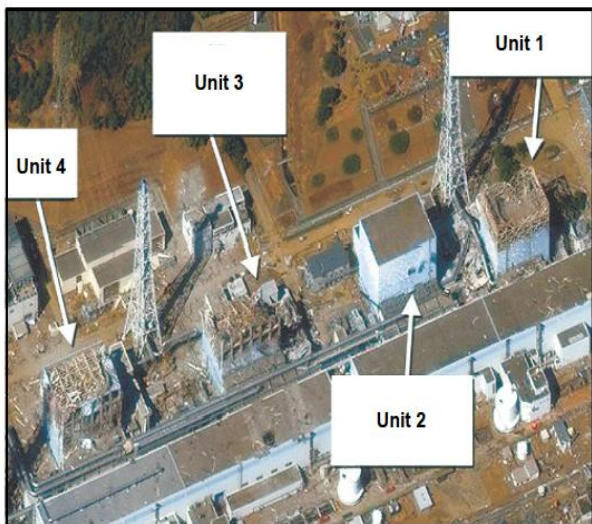
Tsunami Impact at Fukushima Daini



2 to 3 m inundation height on the side of unit 1 building.

Source: Tepco, 2011

Units 1 to 4 after Hydrogen Explosions



Sources: Areva NP, www.nirs.org

Aerial View after Hydrogen Explosions



Source: www.cryptome.org, 2011

Impact of Fukushima tsunami/earthquake on UK Nuclear Programme (highlights)

- Government announce Weightman Report: interim May 2011, “Final” September 2011
- NPS was inevitably delayed
- GDA iDAC delayed from June until December 2011
- HNP/ NuGen technology decisions subsequently delayed
- Greater uncertainty (for Westinghouse – at least)

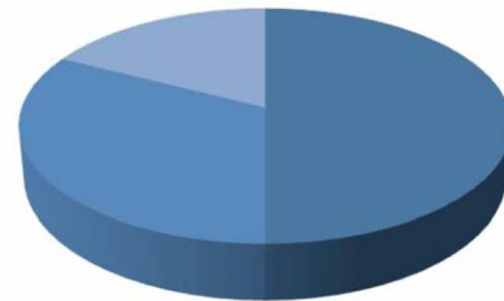
Potential £30 Billion value to UK economy



Around half from supply chain during construction

Around 35% from operation

Around 15% from fuel



- UK Supply Chain
- Operational Jobs
- Fuel Supply

17 March 2010 – Westinghouse Announce Participation in Major New UK Forging Press

- Plan for £140M project at Sheffield Forgemasters, with £80M loan from UK Government
- 15,000 tonne press, able to make “ultra-heavy” forgings for AP1000 and other modern nuclear reactors



17 June 2010 – Coalition Government Withdraws Funding as part of Budget Review

However Westinghouse participation remains on the table if funding can be replaced – we continue to believe that Sheffield is a high quality supplier and we would like to see the deal come back into being.

Our faith in the ability of the UK supply chain in general – and Sheffield in particular – to deliver to time, cost and quality remains undiminished.

Lord Mandelson (Sec of State for Business)
Mike Tynan (Westinghouse UK)

Nuclear Advanced Manufacturing Research Centre

- Westinghouse became a founder member of the South Yorkshire-based NAMRC when it was launched in December 2009
- We are actively involved in the Programme Board and the Research Board, as well as the Skills and Quality Working Groups
- We see NAMRC as an important contributor to boosting the quality and competitiveness of the UK supply chain in this area



HM Queen Elizabeth II opens NAMRC – November 2010



NUCLEAR AMRC

National Skills Academy for Nuclear



- Founder Member 2008
- Ensure that skills are not lost
- Build skill capability for future
- Portable training history:
 - Skills Passport
- Cert of Nuclear professionalism
- Industry representation

Summary

- Westinghouse see the UK as a key part of its global business
- We are actively working for selection by Horizon Nuclear Power and NuGen for their sites at Wylfa, Oldbury and Moorside (Sellafield)
- UK new build programme delayed post Fukushima
- Committed to “Buy Where We Build”, and committed to a strong UK and European presence as the market continues to develop
- Westinghouse UK: build, fuel and service UK AP1000’s