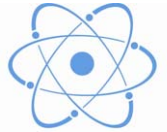


# JACOBS



KIVI NIRIA  
Afdeling Kerntechniek

*DUTCH YOUNG GENERATION*



NETHERLANDS  
NUCLEAR SOCIETY

## KIVI/NNS Symposium 'Bouwen aan Nucleair Nederland'

Qualifications for Participating  
in Nuclear Projects

Rob van den Berg

23 April 2010

## Overview

- Context - nuclear new build
- Perspectives on local participation
- Nuclear versus conventional requirements
- Qualifications needed to participate

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## Nuclear New Build Industry Needs & Challenges

## Global Context\*

*“With countries like Italy and Sweden repealing their nuclear moratoria, the first-time entry of the Middle East into the nuclear market and the development of large nuclear projects in countries as diverse as China, Vietnam, Thailand, India, Russia, Finland, the UK and France, it would appear that the world is embracing nuclear power generation on an unprecedented scale.”*

\* Deloitte 2010, *Emerging ideas – A look at ten of the top emerging issues in the power and utilities sector*

## Nuclear new build in Western Europe\*

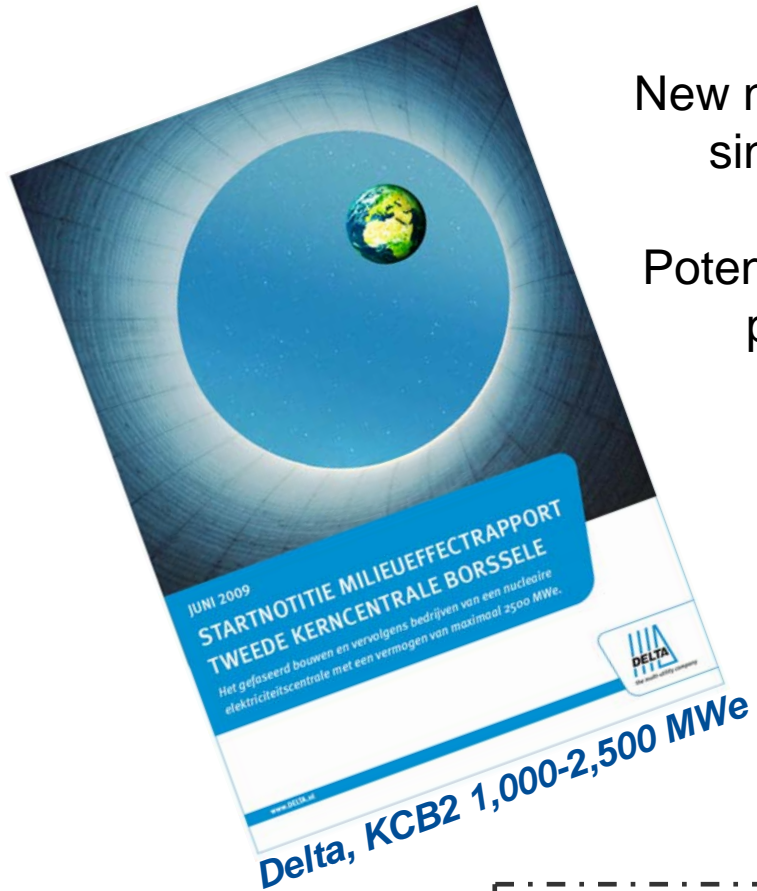
Country	Nuclear share in Power Generation	NPPs Operation	NPPs Construction	NPPs Planned	NPPs Proposed	Political Support
France	76%	58	1	1	1	++
Belgium	54%	7	0	0	0	turning +
Italy	0%	0	0	0	10	turning +
Spain	18%	8	0	0	0	indifferent
UK	14%	19	0	4	6	++
Netherlands	4%	1	0	0	1	turning +
Germany	28%	17	0	0	0	indifferent
Sweden	42%	10	0	0	0	turning +
Finland	30%	4	1	0	1	++
<b>TOTAL</b>	-	<b>124</b>	<b>2</b>	<b>5</b>	<b>19</b>	
<b>WORLD</b>	<b>15%</b>	<b>438</b>	<b>52</b>	<b>143</b>	<b>344</b>	<b>turning +</b>

\* World Nuclear Association, April 1, 2010

## Industry Needs & Challenges

- Design standardization and regulatory harmonization
- Supply chain re-learning and development
- Formation of strategic partnerships across the supply chain
- Significant shortage of (specialist) skills anticipated
- Large scale retirement of experienced personnel
- Resource constraint regulators
- Heavy manufacturing capacity constraints
- Possible construction wave due to timing of planned projects

## Expanding Nuclear in The Netherlands

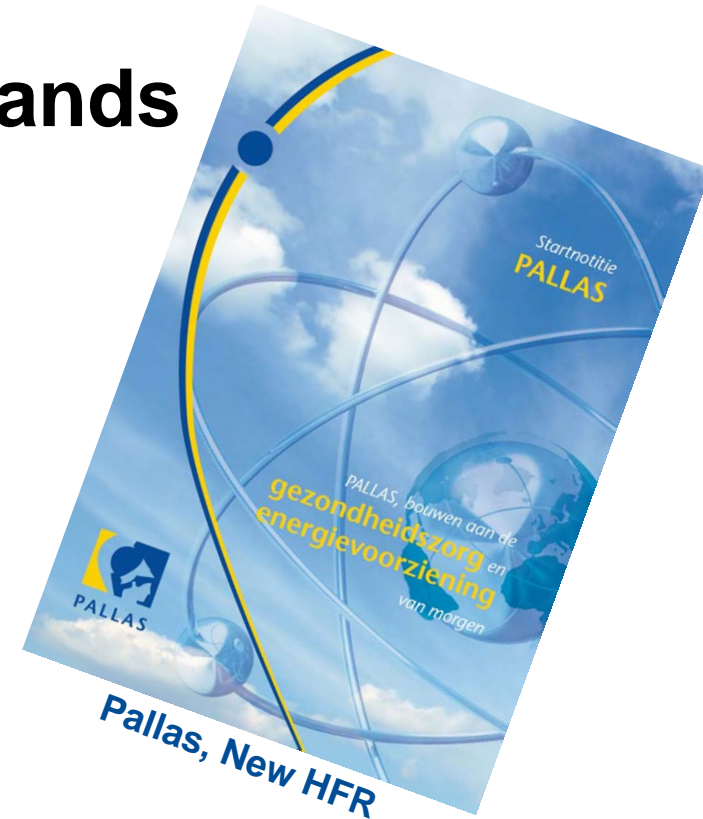


New nuclear build  
since 1973

Potentially largest industrial  
project ever in NL

Combined capital  
investment in  
€ 4 – 6 billion range

Typically +1,000  
companies involved



*The prospect of nuclear new build in The Netherlands presents potentially significant opportunities for the local industry in an attractive re-emerging international market*

Thought 1

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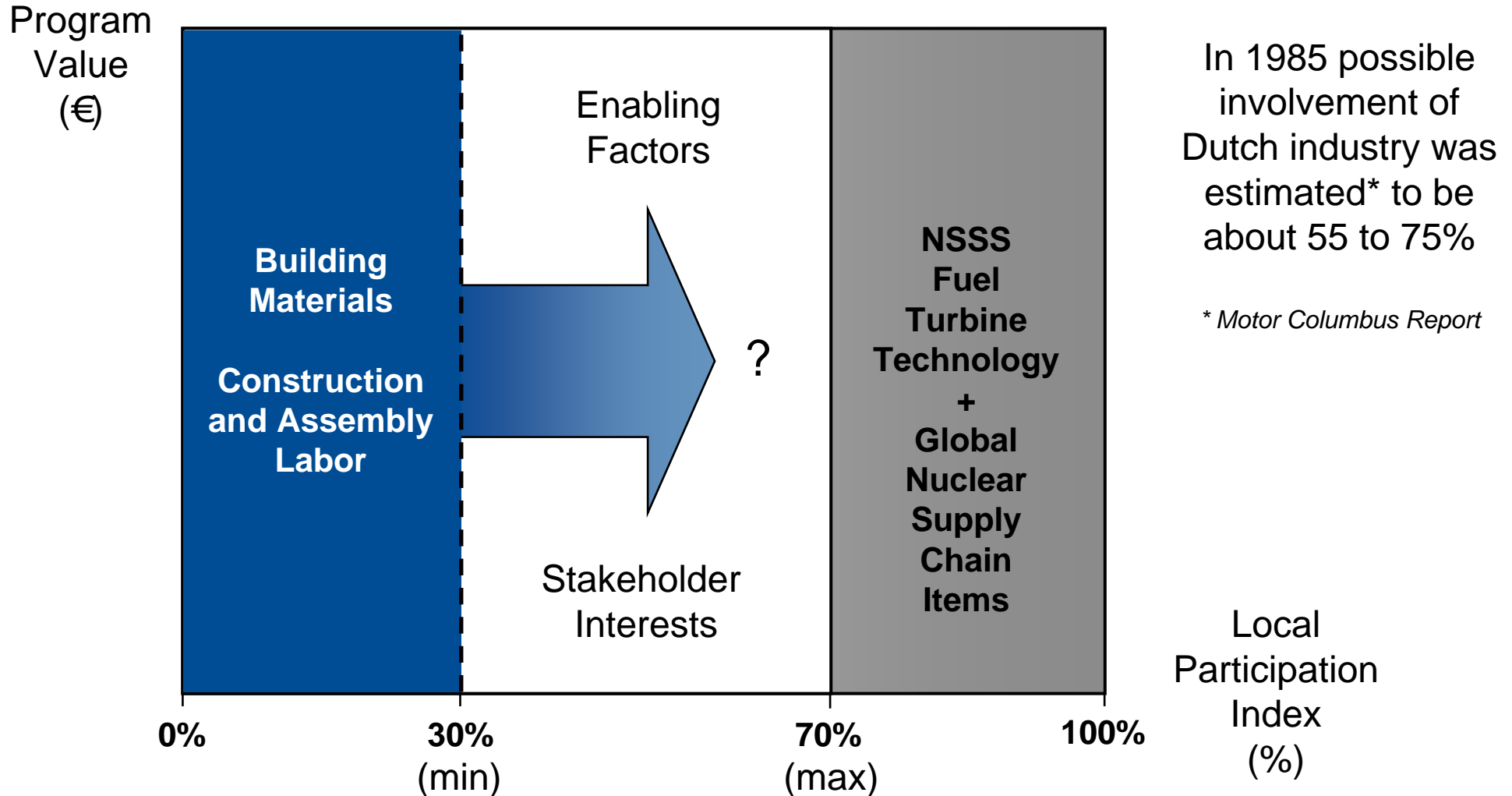


## Local Participation Perspectives

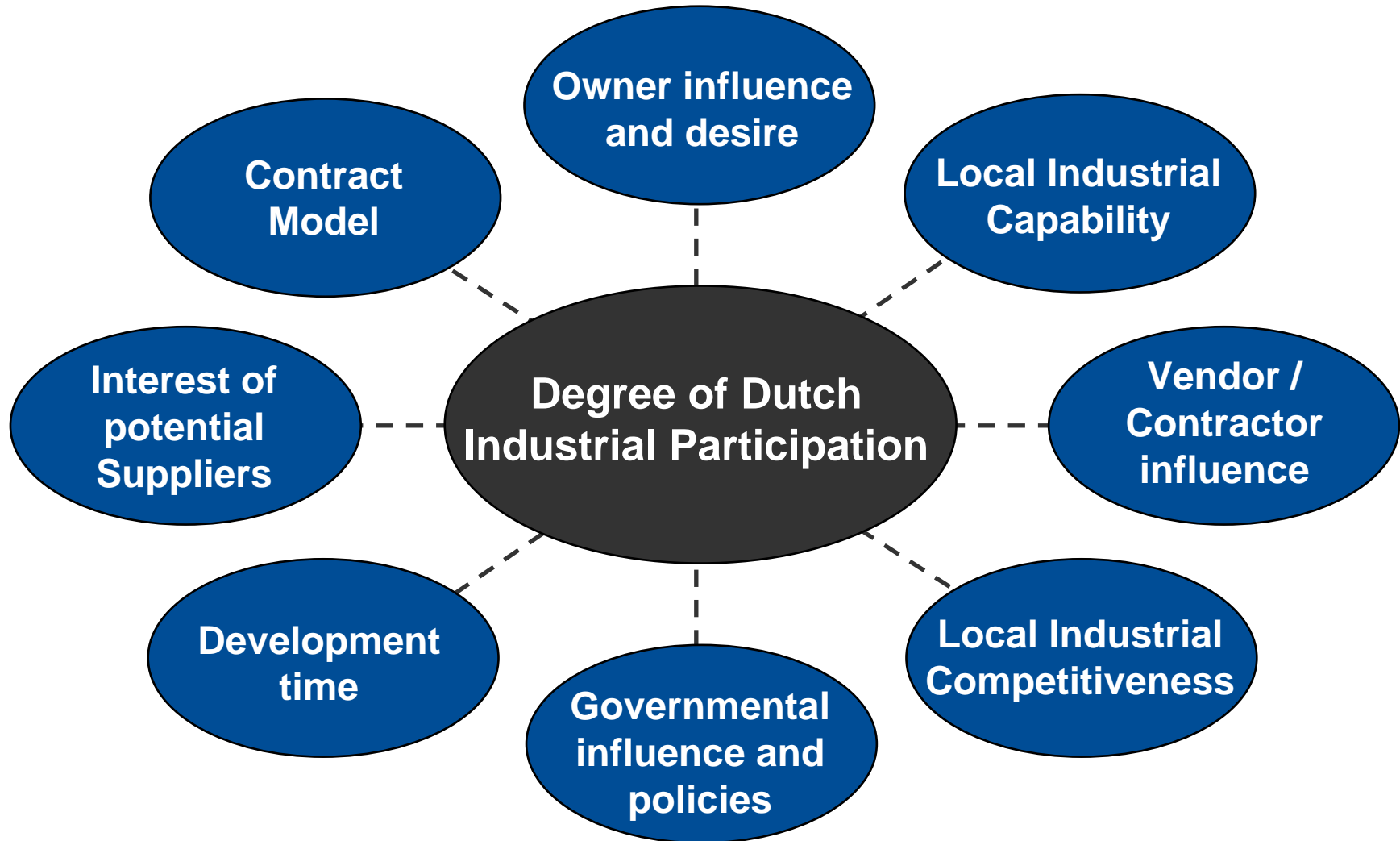
## Why Local Participation ?

- Public acceptance
- Development of local support infrastructure  
*(1 day down time equals € 3–5 million lost revenues)*
- Knowledge building for 60 years of asset management
- Job creation (direct, indirect, temporarily, long term)
- Technology spin-off
- Export opportunities
- Geo-political considerations
- Balance of payments

## Degree of Dutch Industrial Participation



## Enabling Factors



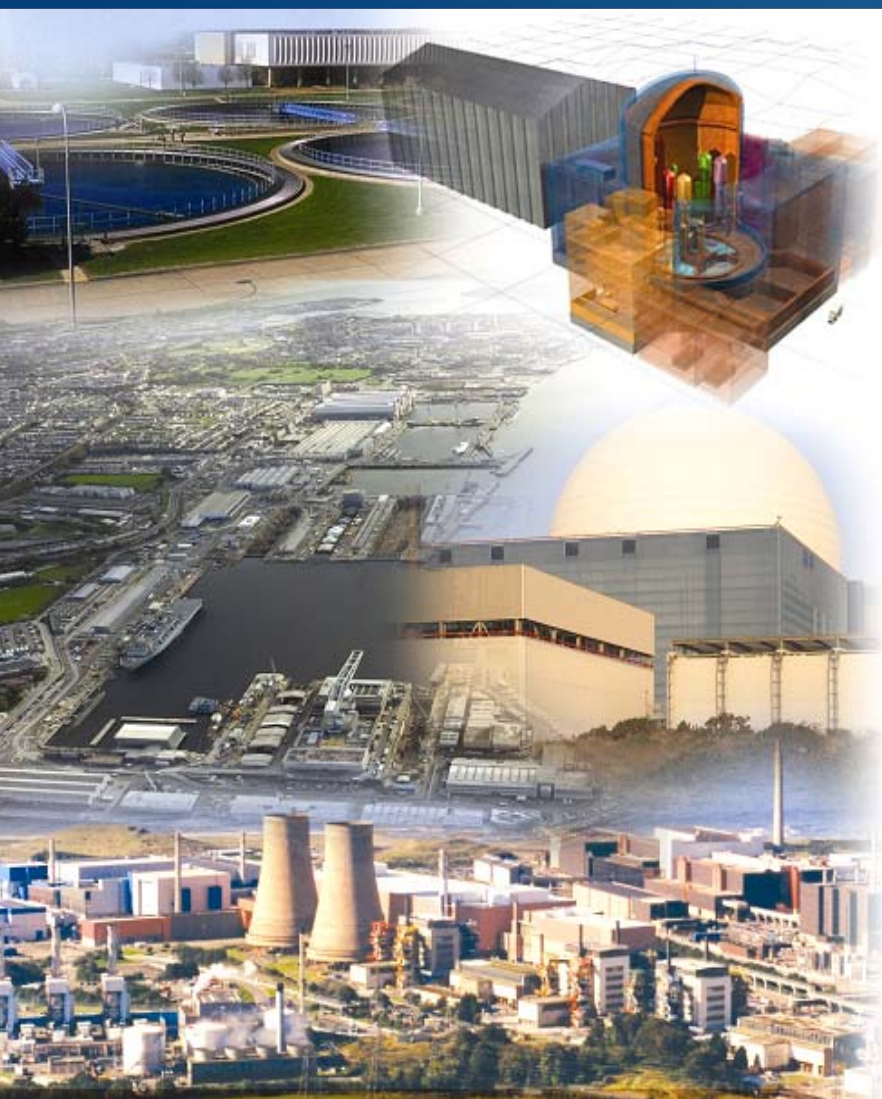
## Alignment of Stakeholder Interests

- Owner wants a safe and reliable plant at low generating cost;
- Vendor/contractor is seeking a high quality, low risk, cost competitive supply chain;
- Industry looks for an attractive and predictable market to justify investments or cost of (re-)entry;
- Government generally favors involvement and development of local industry;

*Local industry participation beyond minimum doesn't happen by chance.  
A partnership among stakeholders can contribute to an environment  
where local industry participation can be optimized*

*Thought 2*

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## Nuclear versus Conventional

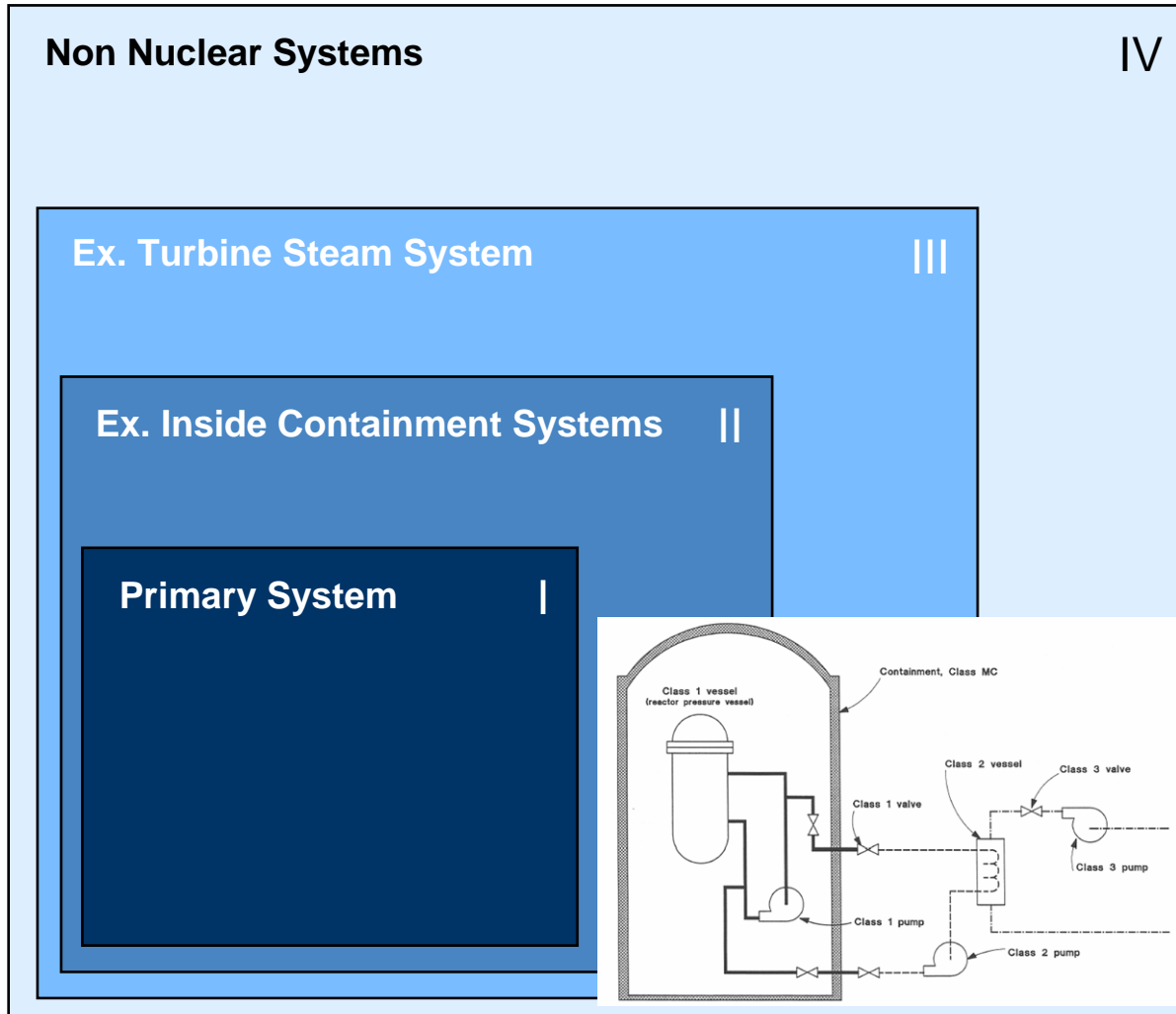
## Additional Requirements

## Additional Nuclear Requirements

- Regulatory framework (KeW, NVRs, IAEA etc.)
- Classification of systems, components and materials
- Design criteria (i.e. redundancy, diversity, separation)
- Design conditions (i.e. static and dynamic etc.)
- Qualification of design tools
- Documentation and records
- Independent checks / audits
- Nuclear safety culture

## Safety Classification Drives Design Requirements

### Example ASME Classification



### IAEA Classification

**A. Not Important to Safety**

**B. Important to Safety**

- Safety Systems
- Safety Related Systems

## Dutch Supply Base

- Impressive history – including significant exports (27 Reactor Pressure Vessels, valves, fuel racks etc.)
- No home market today nuclear grade equipment
- High standards in manufacturing (JSF example)
- Few companies familiar with nuclear requirements
- Lack of knowledge of price level in nuclear market
- Large market in adjacent industry sectors

*Present Dutch supply base has most likely the ability to significantly participate in nuclear new build. Interest needs to be triggered for making investments to institute QMSs of a more rigorous nature*

*Thought 3*

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## Qualifications Needed to Participate

Design, Manufacture,  
and Construct

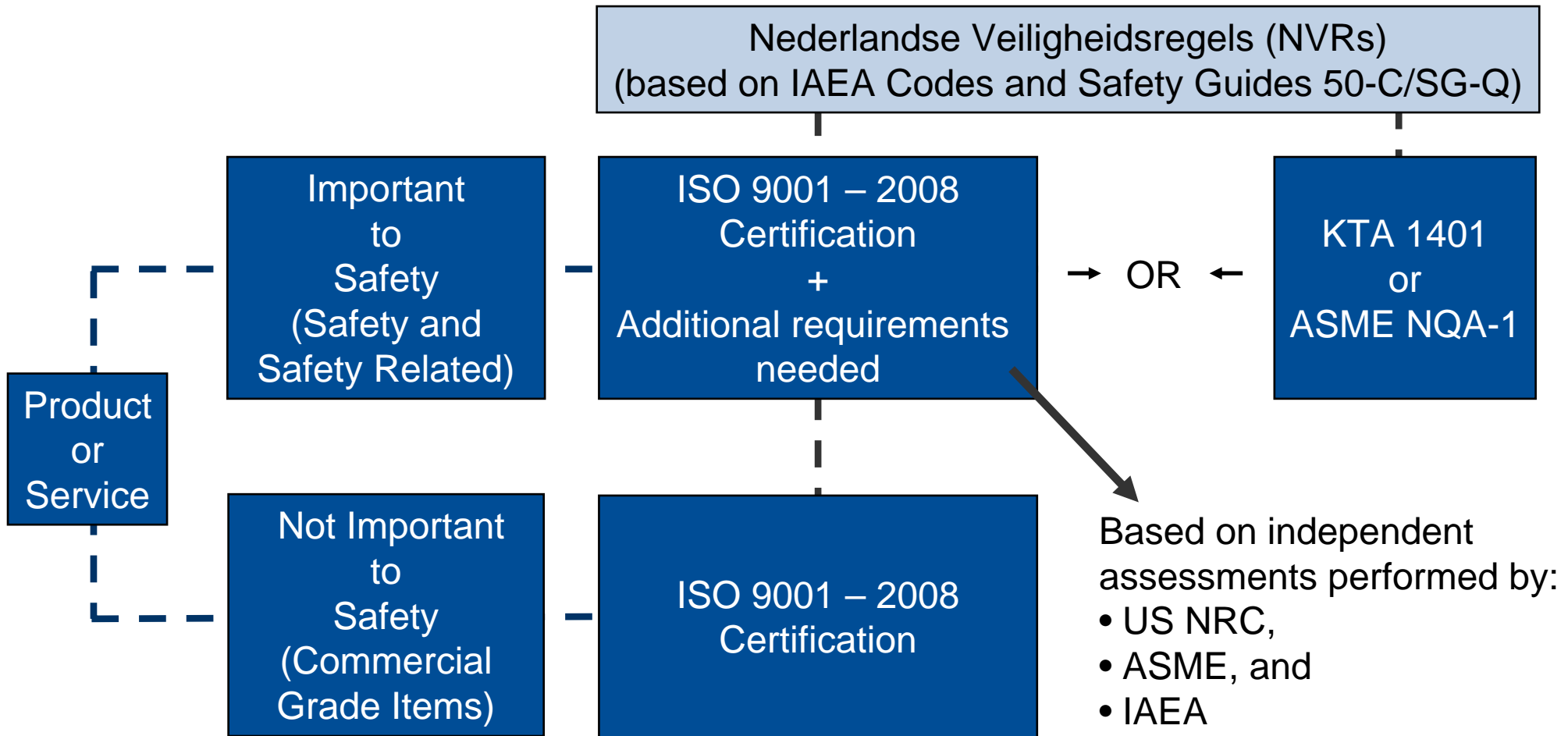
## Qualified Suppliers...

...can proof organizational and technical capability to deliver their goods and/or services safely in compliance with the applicable (quality) requirements

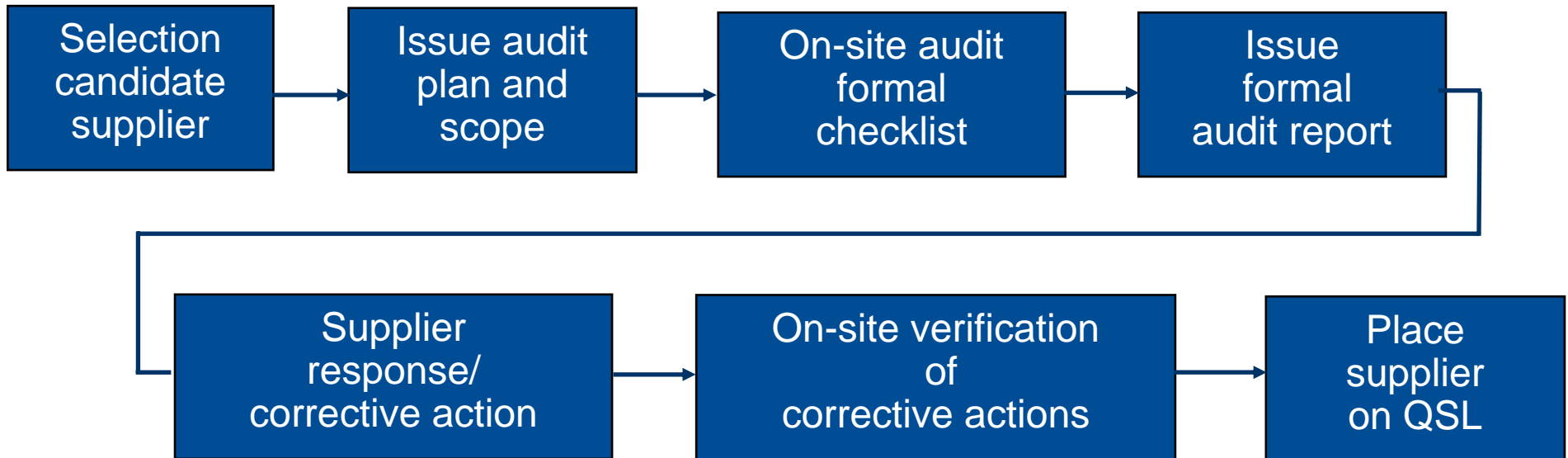
### Key Criteria

- Safety track record
- Technical facilities
- Tools & systems
- Qualified personnel
- Certified QMS
- Proven experience
- Production capacity
- Competitiveness

## QMS Requirements



## Typical Supplier Qualification Audit Process\*



- Assess QMS against requirements
- Assess QMS implementation
- Assess QMS effectiveness on current work

\* Westinghouse AP1000 UK equipment supplier launch

## Characteristics of a Successful Supplier

- Product or service meeting specifications
- Error free performance and mentality
- Strong corrective action program
- Self identification of errors
- Use of lessons learned to prevent errors
- Strong 'nuclear culture' or 'compliance culture'
- Continuous improvement program

## Summary

- *Nuclear new build presents potentially significant opportunity for Dutch supply base in an attractive international market;*
- *Optimum local industry participation requires stakeholders to align and collaborate for creating the right environment;*
- *The Dutch supply base has most likely the ability to significantly participate. Gaining broad interest requires an attractive and somewhat predictable outlook;*
- *Qualification may require cultural adaptation, familiarization with different requirements and upgrading to quality systems of more rigorous nature;*

*“The future is not anymore what it used to be\*”*

*Let's get moving*

*\* Expression used by an unknown participant in the UN Climate Conference in Copenhagen, 2009*

## References

- *Deloitte, Empowering ideas. A look at ten of the top emerging issues in the power and utilities sector.*
- *World Nuclear Power Reactors & Uranium Requirements, World Nuclear Association, 1 April 2010*
- *Motor Columbus, Project approach study for Nuclear Power Plants in The Netherlands, at the request of Ministry of Economic Affairs, 1985.*
- *Electrowatt at the request of IREM, 'The Dutch nuclear program, role of the Dutch industry', January 1986.*
- *Kwaliteitsmanagement eisen bij de bouw van kerninstallaties in Nederland, door S.L. de Boer, concept April 2010 (nog niet gepubliceerd)*