



# KEY CONDITIONS for local supply chain to allow for a successful industrial involvement

**Jean-Marc DE GUIO**

**16-17 oct 2018 - Sosnowiec**





## OVERVIEW

- A major undertaking
- Localization : vision and benefits
- What is at stake ?
- Potential scope of localization
- Industrial strategy
- Construction ,Operation,Maintenance
- Sourcing and Qualification Process
- Partnership

# DEVELOPING A SUPPLY CHAIN: A MAJOR UNDERTAKING

**Safety** : a key factor for developing a nuclear power plant program.

**Suppliers** : has to comply with strict codes and standards

**Owner/operator** : responsible for relationship with the nuclear regulator, vendors and suppliers during the **whole life cycle of the NPP**.

**Local supply chain : a necessity**

▶ **Construction** :  
▶ civil works,  
▶ erection, ....

▶ **Operation** :  
▶ maintenance  
▶ Components replacement  
▶ NDE, ...

## POLISH STRENGTH and PATH FORWARD

- You do not start from scratch : **strong industrial background**
- Path of nuclear competences
- Polish companies work on sites
- Polish companies are in supply chain of major nuclear players

### To go forward:

- Nuclear programme requires additional and joint effort
- Current cooperation with global nuclear industry
- Level of public acceptance



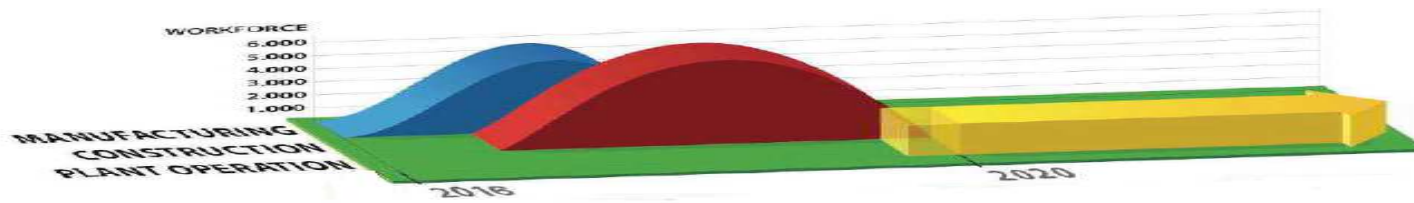
## LOCALIZATION VISION AND BENEFITS

- ▶ Develop a robust local supply chain in terms of Safety, Quality, Cost and Delivery to offer competitive and reliable solutions to owner operators



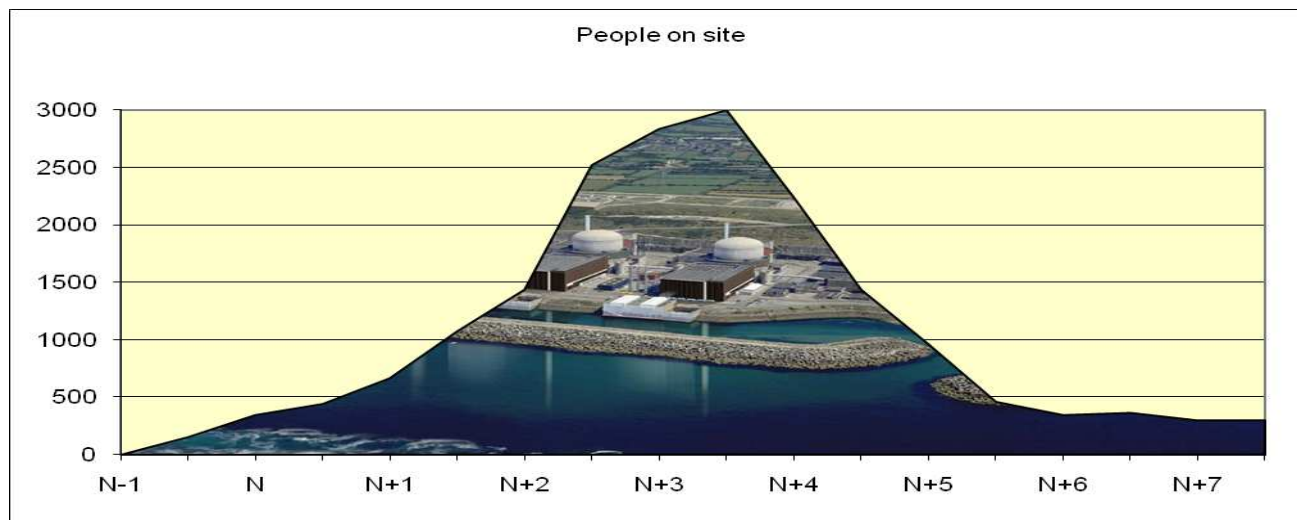
# EMPLOYMENT OPPORTUNITIES

## EMPLOYMENT OPPORTUNITIES IN NUCLEAR NEW BUILD FOR AN EPR TWIN UNIT PLANT



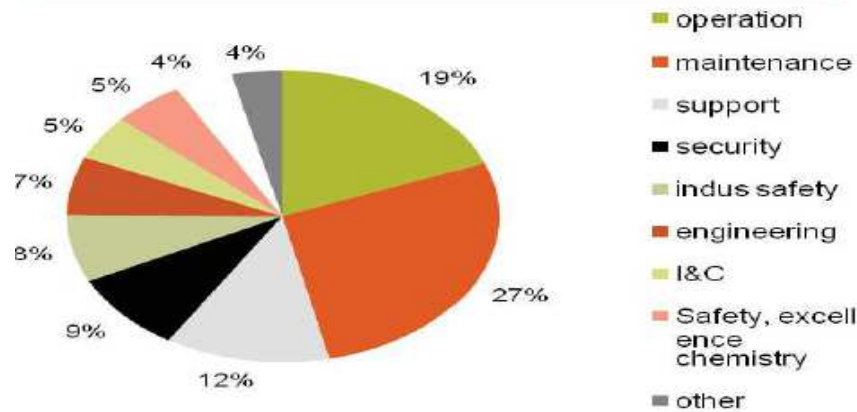
## EFFECT ON LOCAL ECONOMY AND EMPLOYMENT OF A STANDARD NPP PROJECT

Increase employment during both construction and operation  
Involvement of very local companies (located near the chosen site) through direct contracts with the general contractor, or through sub-contracts.



# JOBS DURING OPERATION & MAINTENANCE

2 EPR units : 700 people



Support to operation, maintenance, outage work services

- ▶ Nuclear logistics and services
- ▶ Non Destructive Examination
- ▶ Handling, reactor opening and closure
- ▶ Electromechanical maintenance
- ▶ Piping, welding
- ▶ Heat insulation
- ▶ Nuclear transportation
- ▶ Components replacement

## Subcontractors for Operation & Maintenance

- ▶ 100 to 200 permanent contractors during operation phase (for 2 units)
- ▶ 300 to 1,000 additional contractors for maintenance during 1 plant outage (per reactor)



# POTENTIAL SCOPE OF LOCALIZATION DURING PLANT CONSTRUCTION

*Degree of investment and complexity*

**Most easily to obtain, no need for special qualification**

- ▶ Earthworks & Foundations
- ▶ Concrete and rebar supply
- ▶ Intake and outfall construction
- ▶ Auxiliary buildings
- ▶ Substations
- ▶ Cranes
- ▶ Piping
- ▶ Valves
- ▶ Pumps
- ▶ Installation Work
- ▶ Fire Fighting Equipment
- ▶ Cable trays

**Minimum investment or time needed to qualify**

- ▶ Pumps (non-primary) Valves
- ▶ Filters
- ▶ Vessels
- ▶ HVAC
- ▶ Pipe fabrication
- ▶ Motors
- ▶ Transformers
- ▶ MV & LV
- ▶ Switchgears
- ▶ Junction Boxes
- ▶ Heat Exchanger
- ▶ Engineering
- ▶ Power Cable

**Significant investment needed**

- ▶ Fuel fabrication
- ▶ Spent fuel reprocessing
- ▶ High level waste storage
- ▶ Steel works (critical)
- ▶ Heavy forgings
- ▶ Reactor Pressure Vessel
- ▶ Steam Generator manufacture
- ▶ Polar Crane
- ▶ Safety & Operational I&C
- ▶ Main auxiliaries pumps
- ▶ Main Control Room
- ▶ Emergency Diesel Generators

## INDUSTRIAL STRATEGY

Industrial strategy:

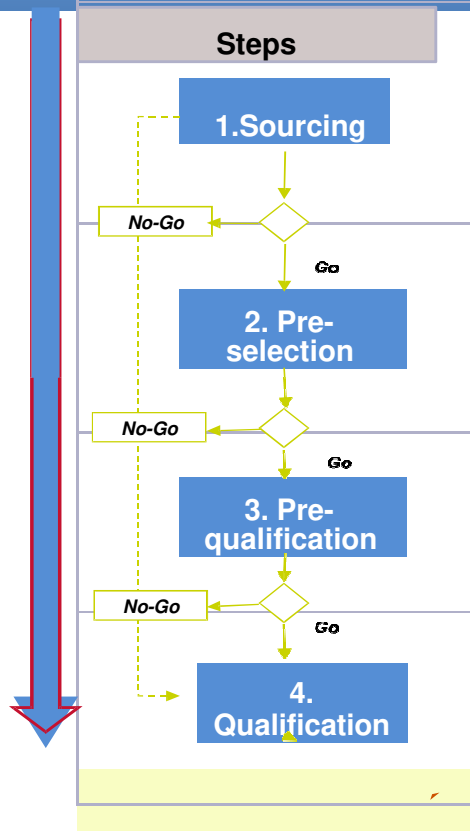
- Keep capabilities of the suppliers on long term
- Organize the contracts so that the suppliers can share the objectives  
Appropriate Allotment Organization
- Give wide fields of responsibility to the contractors:prefer all inclusive contracts,from design to installation , including manufacturing
- Use as far as possible lessons learnt from previous projects ( with experienced companies )
- Be open to new technologies ( with new suppliers )

## CONSTRUCTION PHASE

Contribute to **create a local nuclear supply chain** for the construction phase:

- First step :organize the **scouting of the capabilities** of the local companies
- Second step :**adapt the allotment** of the projects to the detected capabilities of the local industry
- Third step :engage **a double qualification process**  
qualification of the companies (engineering, equipment supplies, erection) ;  
between 6 months to 2 years)  
qualification or prequalification of the critical (important for safety) components  
(up to 4 years for some equipments)

# SOURCING and QUALIFICATION PROCESS



## Sourcing:

Request For Interest  
Supplier Pre Selection

## Pre selection:

Supplier Pre Assessment (Quality management, design, manufacturing,..)

## Pre Qualification:

Action Plan definition and follow up  
Product or process qualification tests as necessary  
Detailed technical assessment

## Qualification:

Before contract, when the Qualification is satisfactory, approval of the Supplier  
(Approved Vendor List)

# QUALIFICATION CRITERIA



Piping  
Vessels/Exchangers  
Pump Valves

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**Quality Requirements**

With modulation according to Safety Class and National Regulations

- *Quality Management*
- *Documentation*
- *Inspection*

**Contract with Terms and Conditions**

- *Requisition*
- *Price*
- *Schedule...*

# A graded approach for the Purchasing & Supply Chain strategy...

According to the safety grade of the component, the Purchasing & Supply Chain strategy towards the suppliers market is graded :

Quality grading	Component status	QA requirements	HSE requirements to be considered
(NUC)	Products and services safety related	ISO-9001 complemented by nuclear specific requirements	Environmental program ISO14001 Health & Safety program (OH SAS 18001)
<b>STANDARD GRADE</b> (ISO)	Products and services non safety related but important For construction/operation	ISO-9001	
<b>NOT CLASSIFIED</b> (NC)	Other products and services	(ISO-9001 recommended)	

## OPERATION PHASE *e.g.* EDF

Contribute to **create a local nuclear supply chain** for the operation phase:

**Training of the employees**, in their country (mainly by the use of simulators) and in France (training courses in EDF training centers, and among EDF operator teams in nuclear units)

-Both for :

- ◆ *general management,*
- ◆ *outage management,*
- ◆ *operation management.*

**Sharing experience** with the operator during all the life of the units (Chinese Daya Bay 1 & 2 and South African Koeberg unit are considered like EDF units for EDF challenges for nuclear safety, human security, protection against radiation, cleanness, innovation,...).



## MAINTENANCE PHASE

Contribute to create a local nuclear supply chain for the maintenance phase:

- First step :organize the scouting of the capacities of the local companies
- Second step :organize, inside the owner company, a qualification and survey system of the contractors
- Third step :launch a special training for the workers, mainly about : safety of the plant protection against the radiation,professional gestures.
- Fourth step :launch the qualifications of the maintenance companies, then award the contracts
- Fifth step:get benefits from lessons learnt and share major insights with partners





## A CULTURE OF PARTNERSHIP

**Key for localization** as it benefits local companies

-Within their scope of activity , local companies:

- \* have a thorough **knowledge of country legislation**
- \* are well versed in **domestic standards** and industrial practices
- \* but lack experience in the nuclear sector or technology

-Experienced suppliers:

- \* have **experience in the nuclear** industry
- \* are **familiar with nuclear** requirements
- \* but lack the knowledge of the local environment

**Experienced and new suppliers join forces for mutual gain**





## CONCLUSIONS

- ❖ Be modest
- ❖ Anticipation and long term approach
- ❖ Apply codes&standards , quality assurance
- ❖ Qualification process and management commitment
- ❖ Know how,training,safety culture
- ❖ Partnership
- ❖ Organization of contracts/subcontracts

**Long term supply chain :  
an opportunity and a necessity**





**DZIĘKUJĘ BARDZO ZA UWAGĘ**

**[jmdeguio@dgo-expertise.fr](mailto:jmdeguio@dgo-expertise.fr)**

