Why the Country need a Governmental decision concerning energy generation now?

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Business Development Director

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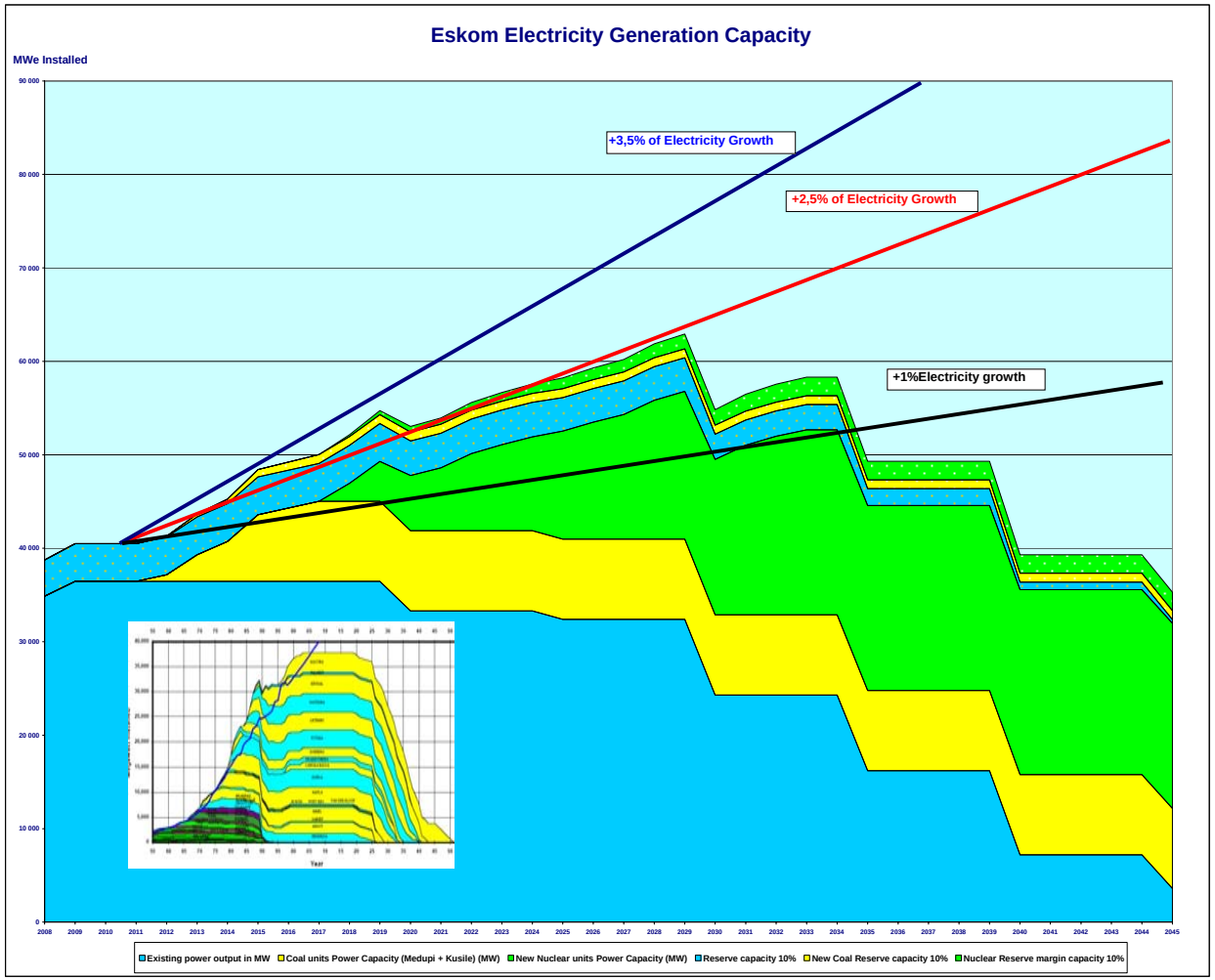
South Africa's energy vision

➢ Economy and the need for electricity

- Energy is needed to develop the Economy.
- In the last 40 years in South Africa the energy consumption has greatly exceeded the GDP growth.
- Energy demand will continue to grow whilst the production will decrease (age of the coal units).
- Industrial investors need a long term view on Security of Supply and Tariff.

⇨ Even with a decision to launch 20,000 MWe of new production capacity, the country will not be able to reach the necessary GDP targets to eradicate poverty. Load Shedding can be expected (or black out) for the next 20 years if GDP is higher than 3%.

South Africa's energy vision



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France's Energy vision

➢ Back to the 70's

- France had few coal mines and very little gas reserves.
- Population was around 50 M inhabitants and a strong economical development was required.

➢ Government decision:

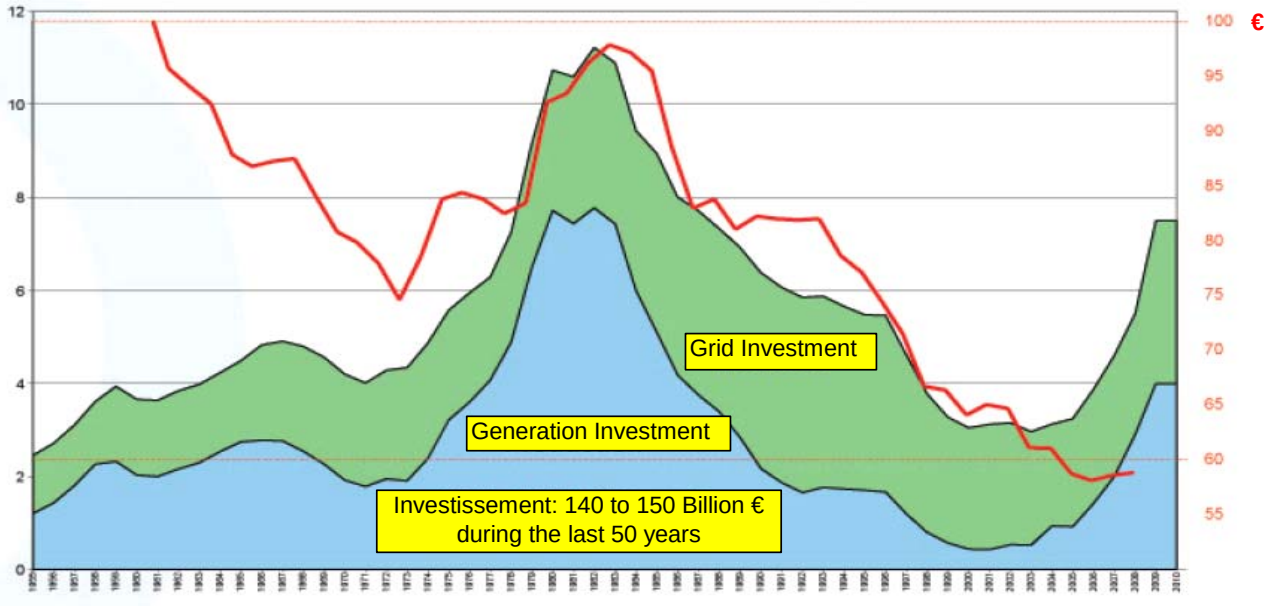
- To define the role of EDF:
  - To provide France with Security of Supply to allow economic development.
  - To provide electricity to the whole population (today 99,9%)
  - To provide electricity at an affordable price both for residential and industry (second cheapest industrial tariff) .
  - After the investment period to provide revenue to the state (Today EDF the biggest utility and one of the most profitable)
- To launch the most important infrastructure programme ever made
- To select PWR instead of continuing with our own Gas-Graphite reactors.
- SoE EDF was not able to pay the infrastructure programme with cash.
- The French banks did not have enough liquidity to finance the programme.

France's Energy vision

- **Decision:**
  - To provide a State Guarantee for the entire financing of the project
  - To use international market funding
  - To accept off take agreements for circa 7% of the fleet capacity to assist with the cash investment and will receive electricity at production cost during the whole live of the plant
  - No return on asset during the investment period
  - No cost for the Taxpayer

France's Energy Vision

- **The evolution of the regulated Tariff and Investment in France from 1955 to 2010 (in €2007 constant value)..**



⇨ The interesting think is that the tariff is following the investment. It's why all European companies are requesting a higher tariff at present time.

⇨ In France where 99,9% of the houses are connected to the national grid the cost of grid investment is still important (maintenance, modernization….).

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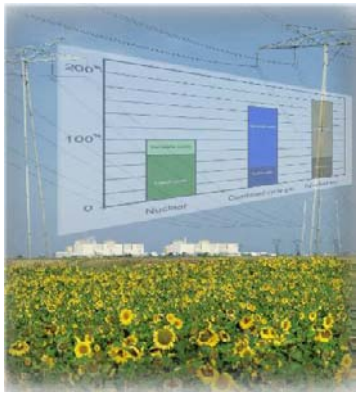
South Africa's energy vision

➢ **Which type of Energy?**

- South Africa needs a good energy mix to reduce CO_2 emissions: including clean coal, nuclear and renewables.
- New capacities are built for 40 years for Coal Plants and more than 60 years for nuclear Plants ⇨ changes in regulation could have a strong impact on Opex except for CO_2 free energy.
- Renewables seems to be good but are very expensive compare to the actual cost of energy in RSA:
  - Solar:10 times the coal price
  - Wind: 4 times the coal price

⇨ After the next increase of tariff in SA, France (with 85% of electricity coming from nuclear) will have the cheapest industrial electricity cost.

Nuclear Energy provides sufficient and affordable CO_2 free electricity



- **Sufficient:**
  - Can meet the level of expectations of the nation for base-load electric energy generation
  - Can satisfy any program size depending on the national strategy choice of energy Mix
- **Affordable**:
  - electricity generation from nuclear is cost effective
  - is among the lowest costs of all technologies
  - is equivalent to coal (without CO2 taxes)
  - is little sensitive to fuel cost, future costs are certain
  - is Carbon neutral = not affected by CO_2 taxes, allowances or CO_2 capture costs

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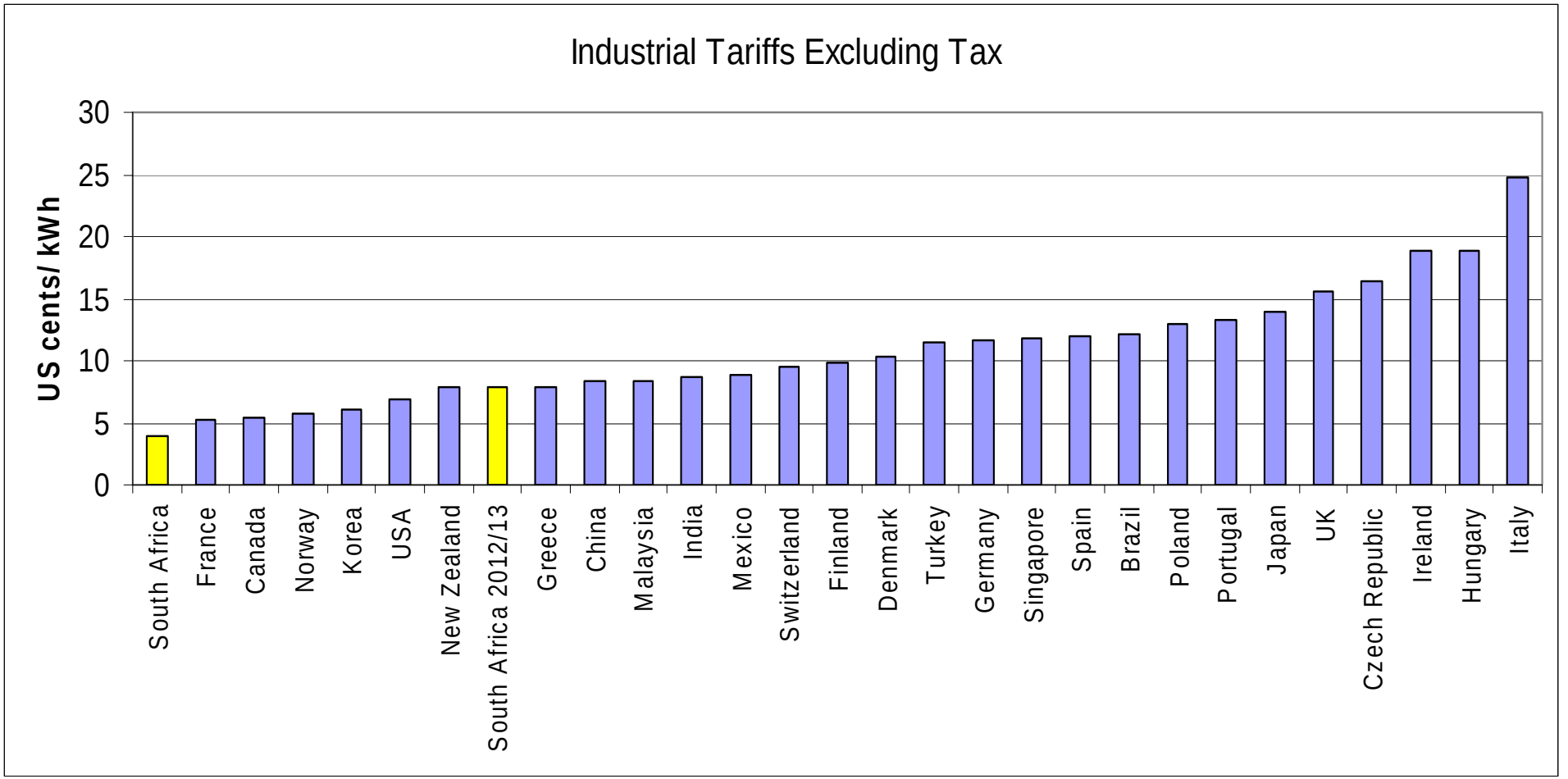
International Price Comparison

Assuming exchange rate R 10ZAR to 1 USD by 2013



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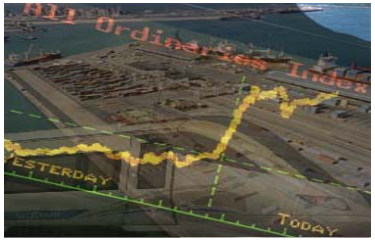
South Africa's nuclear vision

- Diversify the energy mix to reduce CO_2 emissions
- Enter into the global energy market
  - Attain global leadership in the nuclear energy sector
  - Develop Industry sector linked to nuclear
- Contribute to a national program of social and economic transformation
- Maximize the value of uranium produced by South African mines
- Improve the quality of human life while supporting the advancement of science and technology



Nuclear projects are a stimulus for the economy

A productive infrastructure investment strategy that:

- Creates tens of thousands of jobs
- Establishes a productive infrastructure feeding the economic and social growth
- Is now used by Governments to boost their economy:
  - **France** will speed up the construction of second and third new units by 4 years
  - **USA** DOE providing 58B$US for loan guarantee to allow a fast track for construction
  - **UK** will speed up the licensing process and request job creation in the Country

The French example

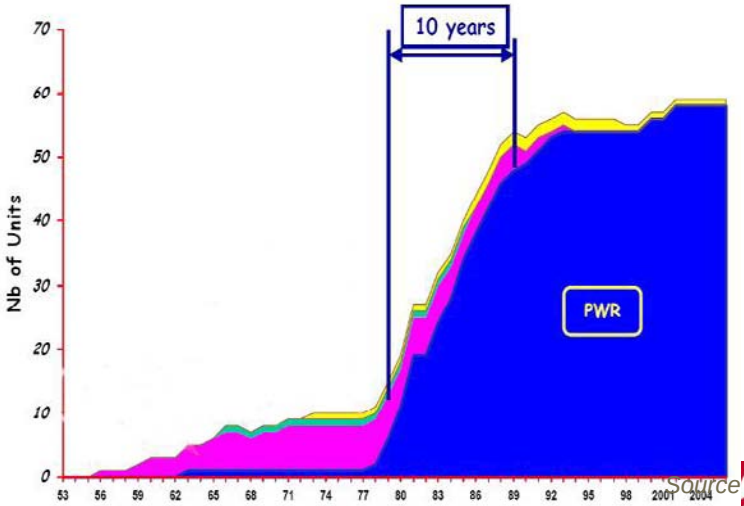
19 PWR nuclear power plants, **58** units, **63**GWe, **78**% of the nation electricity

as per 2008

- Launch of program of fully standardized reactors:
  - economies of scale,
  - development of the industries,
  - operation advantages:
    - return of experience,
    - operator training, etc...
- Financing on international markets with government guaranty
- No cost to the taxpayer

The Program of fully standardized PWRs initiated in early 70's

With a rhythm of 6 units ordered every year, most of constructions came on line within **10 years**



Source : EDF

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Flamanville 3 EPR suppliers

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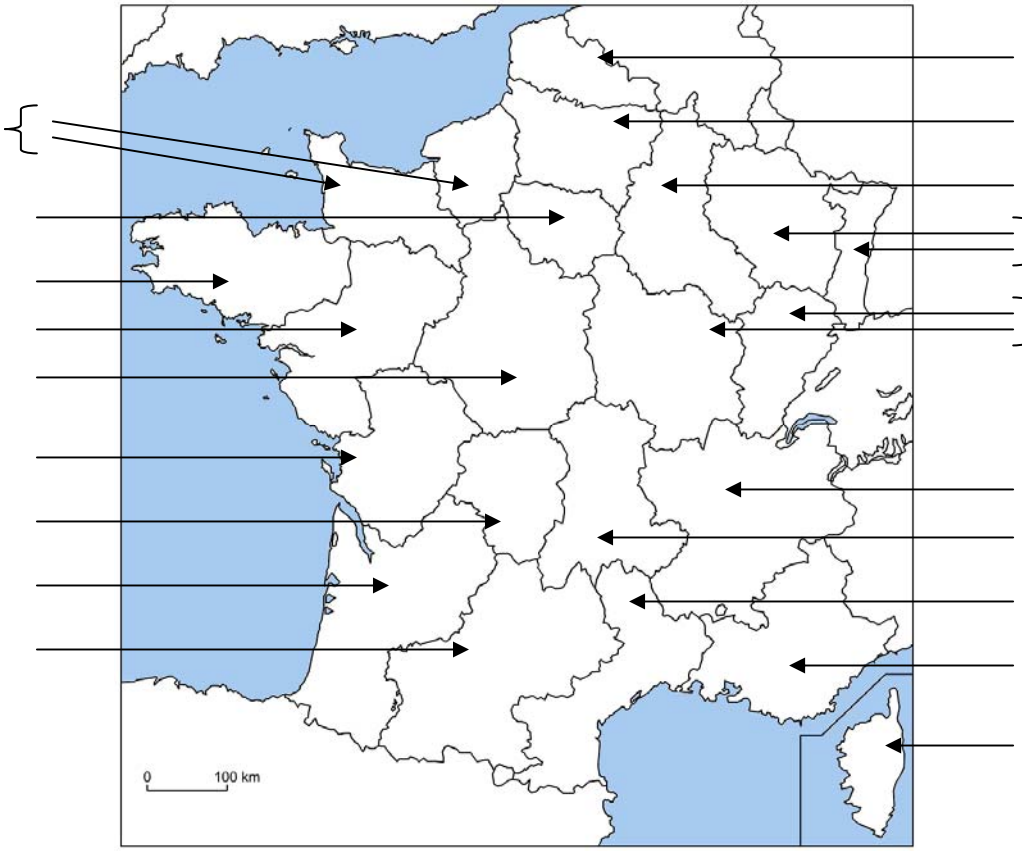
Flamanville 3 EPR suppliers

in France (248)



32	28
36	3
2	4
15	21
11	20
4	
2	50
5	3
1	4
	5
	1

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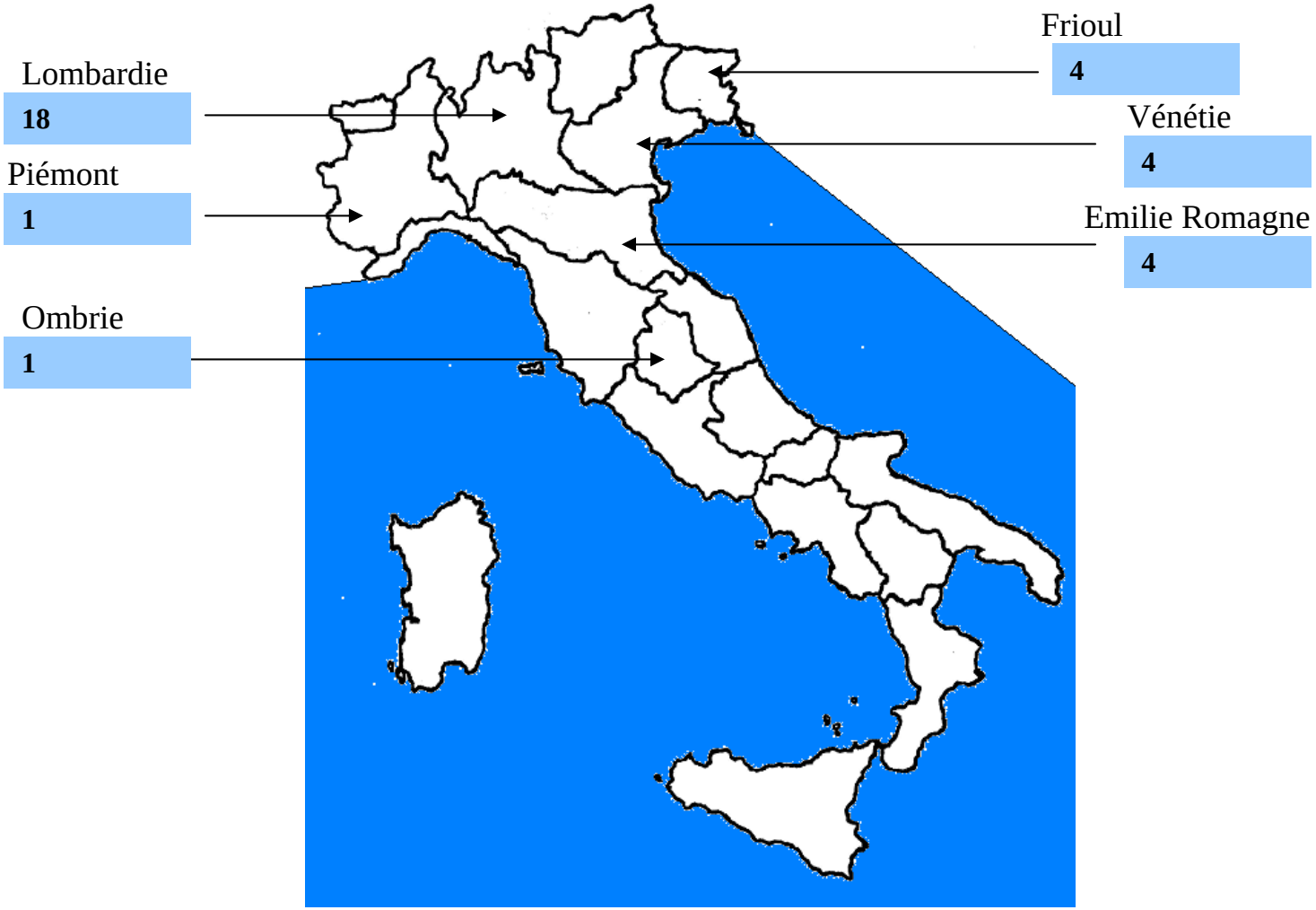
Flamanville 3 EPR suppliers

in Italy (32)



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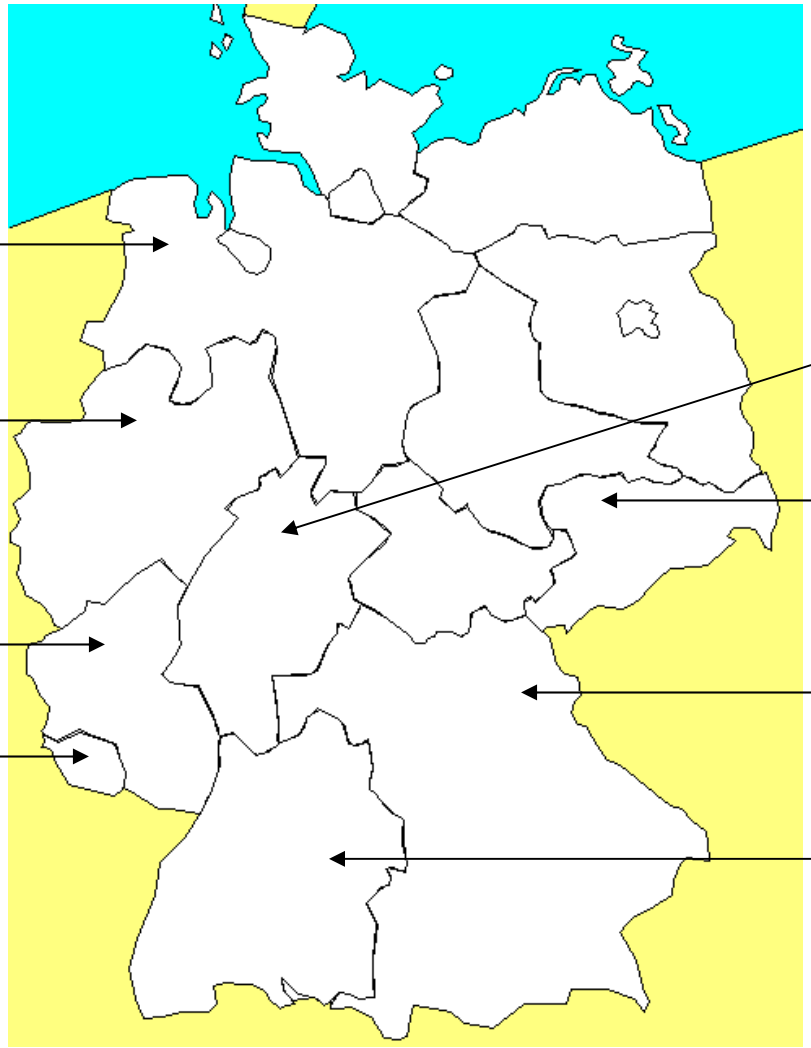
Flamanville 3 EPR suppliers

in Germany (46)



Basse Saxe
5

Rhénanie du Nord
-Westphalie
21

Rhénanie Palatinat
1

Sarre
2

Hessen
4

Saxe
1

Bavière
6

Bade Wurtemberg
6

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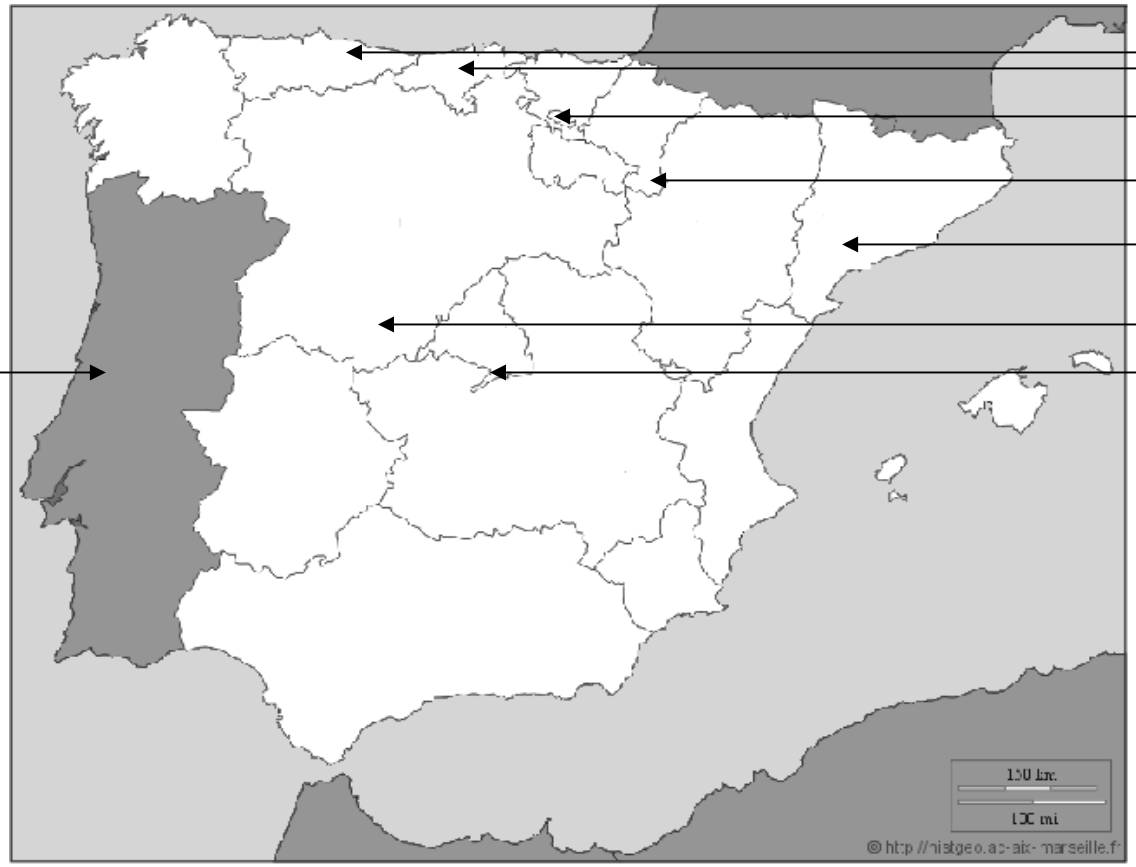
Flamanville 3 EPR suppliers

in Portugal (4)

in Spain (14)



4

4

5

1

1

1

1

1

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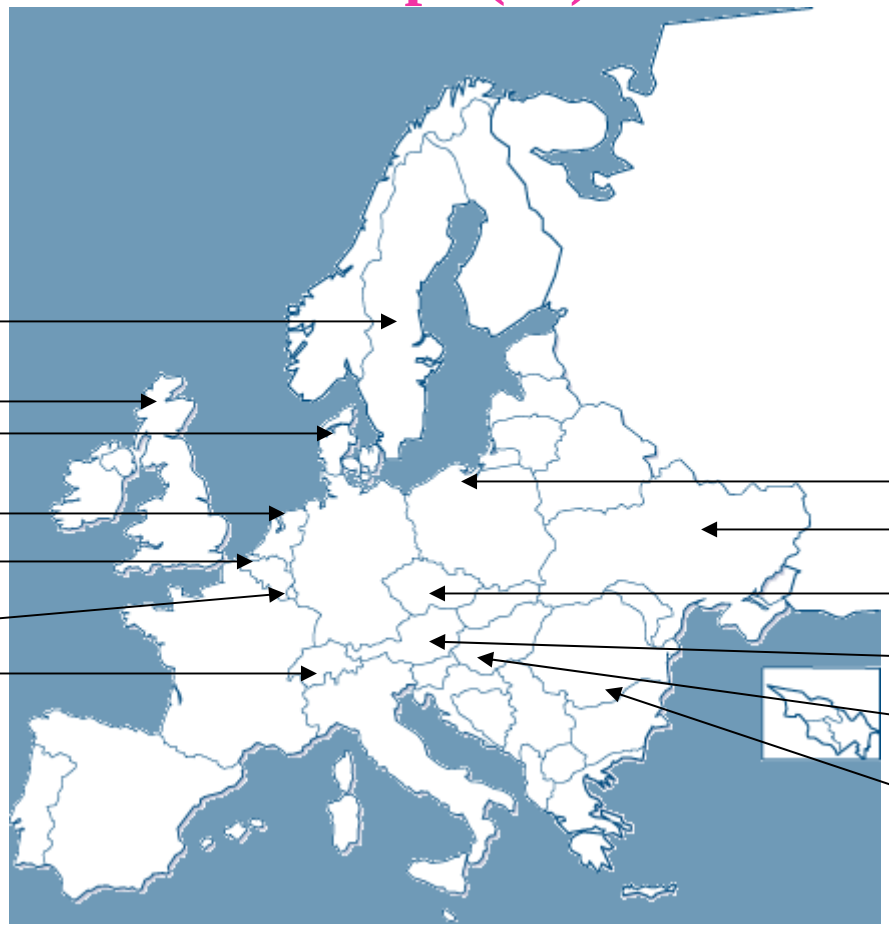
Flamanville 3 EPR suppliers

Other Europe (42)



Sweden	4
UK	4
Danemark	2
Nederland	2
Belgium	7
Luxemburg	1
Suisse	9

3	Poland
1	Ukraine
4	Autriche
3	Checq Rep
1	Hongria
1	Roumania

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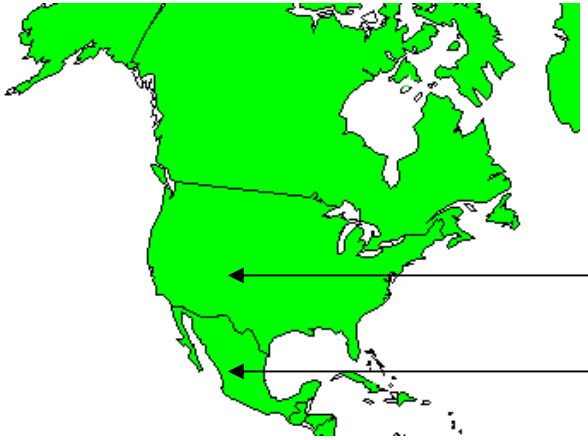
Flamanville 3 EPR suppliers

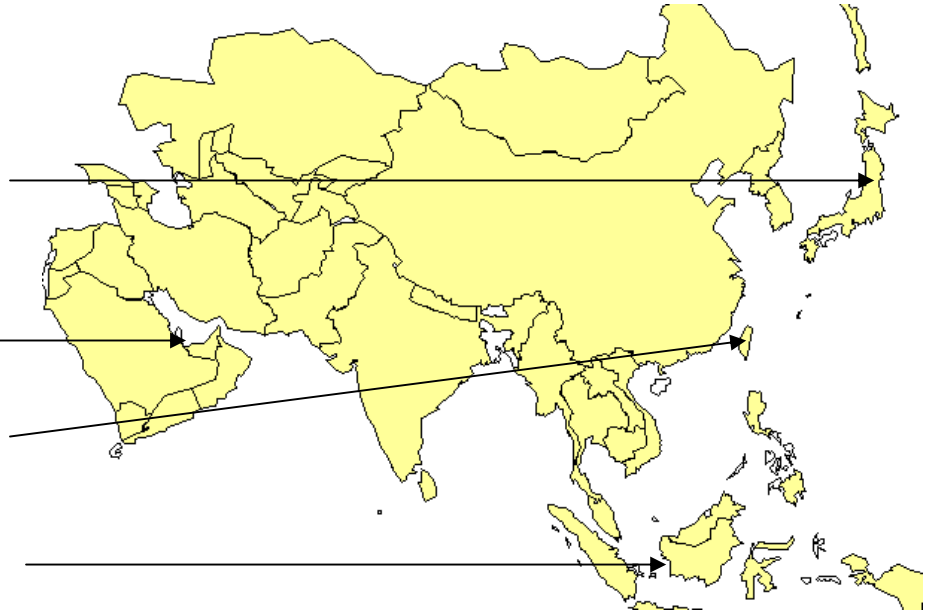
in Americas (9)



USA
4
Mexico
3

Japan
1
UAE
1
Taiwan
1
Indonesia
1
Brazil
2

in Asia (4)



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Nuclear projects are a stimulus for the economy of South Africa

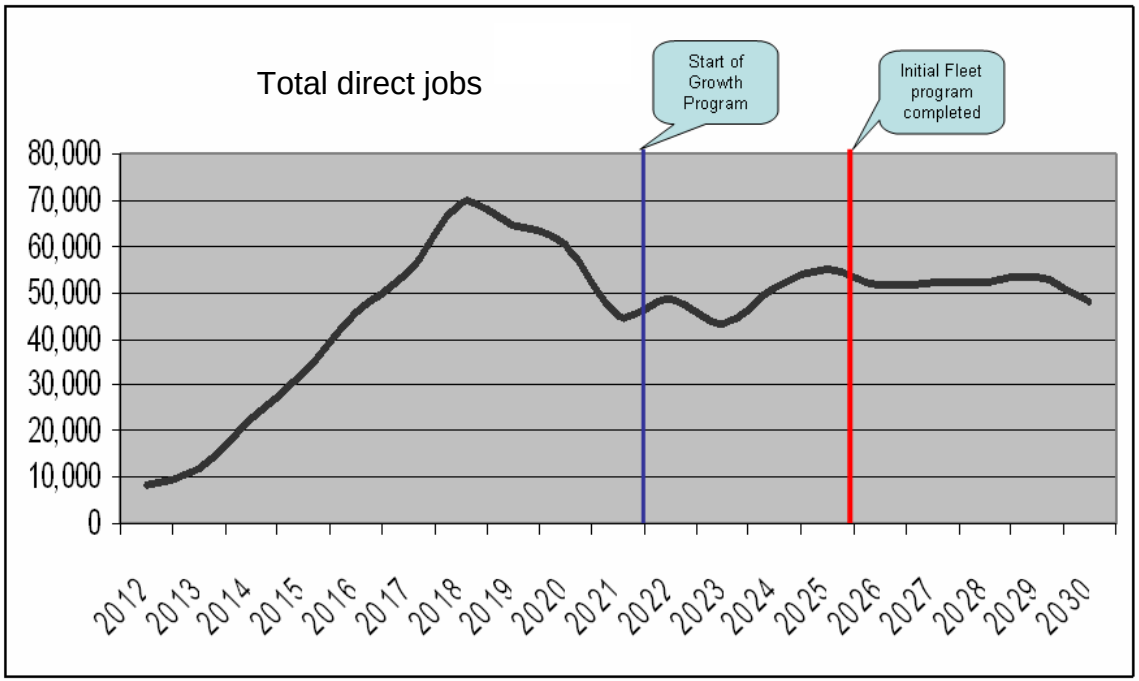
- **Going forward with the South African nuclear program**:
  - 20 000 MW nuclear built in SA within 15 to 20 years
  - Nuclear industrial development
  - Supply chain localization program
  - Access to export markets

- **A powerful catalyst for the national industry growth with global economic impacts**:
  - Expansion of industries specializing in the supply chain and spin-off industries,
  - Employment growth and permanent jobs,
  - Substantial economic activity in all sectors,
  - Tax revenues,
  - Economy diversification,
  - Community involvement, …

Significant and sustainable impact on jobs creation

➢ **Direct Jobs** to build and operate power plants:

- **70 000** at peak of construction
- **50 000** permanent



➢ **In various sectors** such as:

- construction >40%,
- manufacturing >40%,
- operation & maintenance >15%,
- engineering>5%,

➢ **Jobs are highly skilled and well compensated**

➢ **Induced jobs** in the community are at least:

- **x 2** during construction phase of power plants
- **x 5** over the operation phase of power plants

⇨ **Sustainability for decades in the induced economical life**

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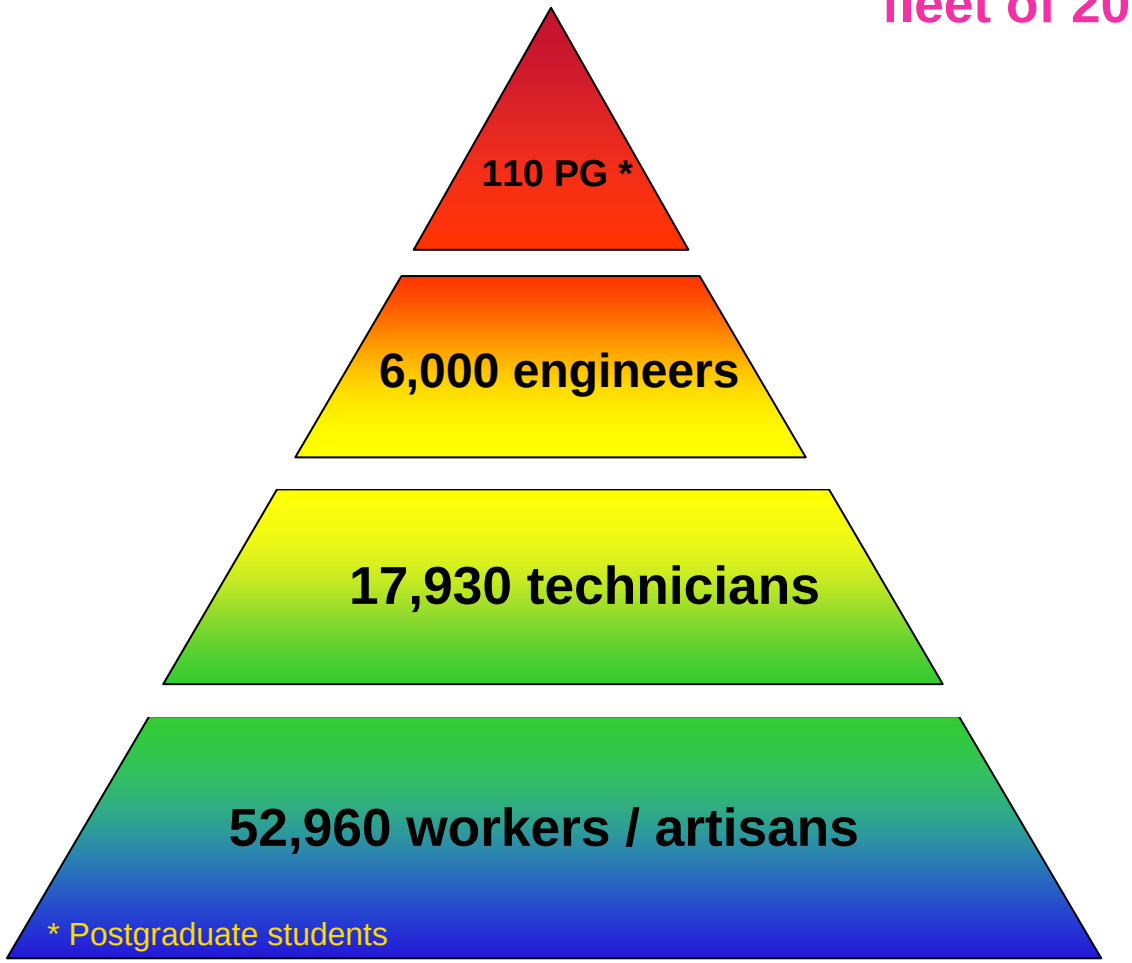
Nuclear projects are a stimulus or the economy of South Africa

- **Direct jobs include**:
  - Design and construction of the plants,
  - Manufacturing based on purchases by the plant contractor and second tier suppliers,
  - Operation and maintenance at the power plants,
  - Turn-around at the power plants,
  - Nuclear industry new facilities,
  - Regular expenditures to local manufacturers and service organizations.

- **Induced jobs include**:
  - Jobs created in the nearby communities to support the in flux of new residents i.e. doctors, teachers, local municipality workers, policemen, firemen, workers in all other local businesses (supermarkets, restaurants, housing, etc…)

Development of critical skills to power and sustain the economical growth (1)

77,000 South Africans will be trained for the South African nuclear fleet of 20,000 MWe



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Development of critical skills to power and sustain the economical growth (2)

- Breakdown of skills development by activity:
  - construction = 30 000 persons
  - manufacturing = 30 000 persons
  - operation and maintenance = 17 000 persons
- Quality requirements of nuclear industry necessitate highest skills in all competencies
- Skills developed for the nuclear industry will benefit to other technology intensive and specialized industries
- Skills development in partnerships with universities will also lead to more R&D capacity in South Africa

Enter the global energy market and improve the balance of trade

The nuclear program will benefit to major local industries by:

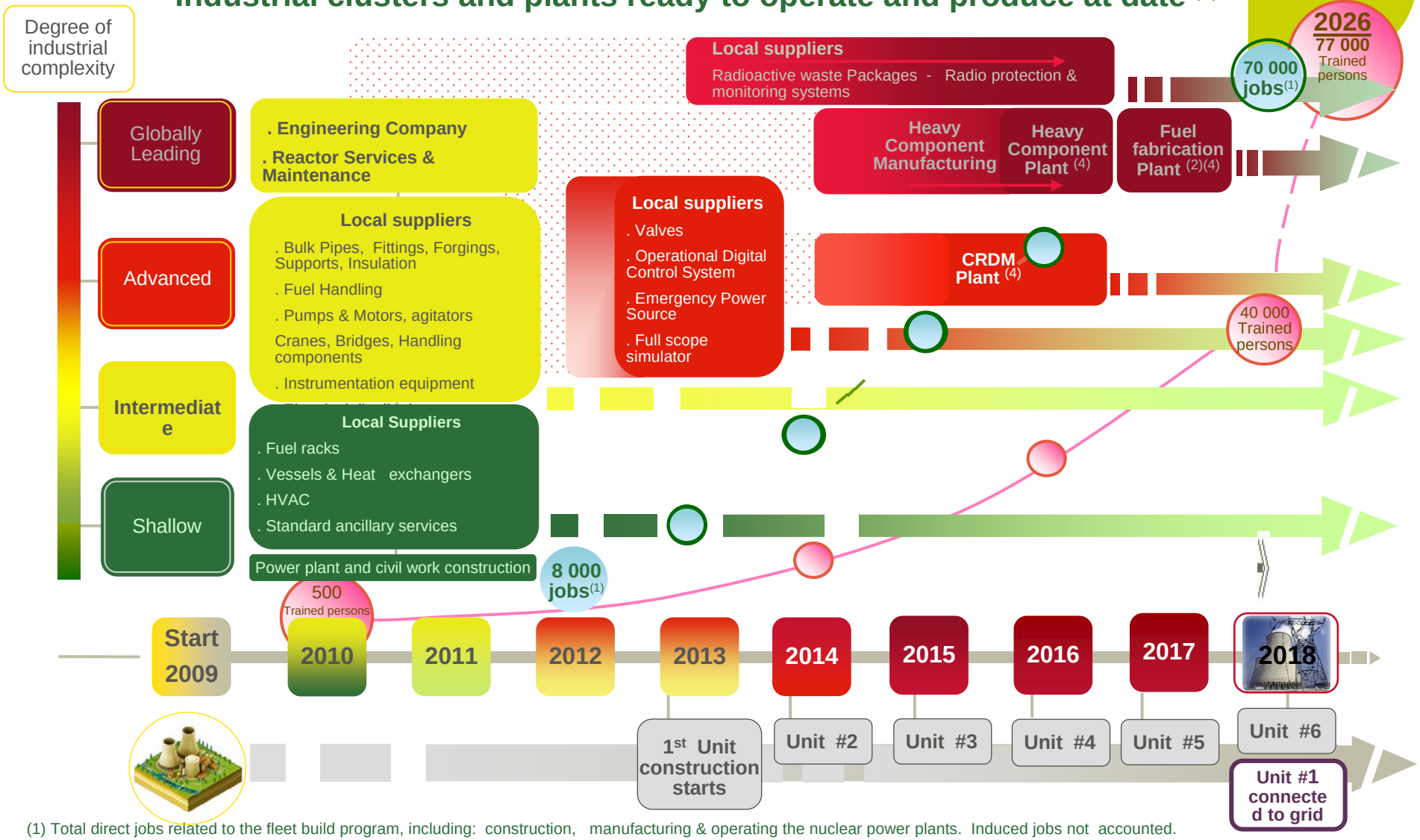
- increasing their manufacturing capacities
- enhancing the quality and competitiveness of their products permitting:
  - access to new export markets, then South Africa can become a global player in the nuclear industry
  - manufacturing locally many products that are currently imported

A nuclear program is a true Opportunity for South Africa

- to boost growth at times of economic downturn
- to create hundreds of thousands of permanent jobs
- to develop vibrant, high-tech industries and research capacities
- to improve balance of trade from value added products
- to meet future electricity demand in an environmentally friendly, affordable way.

South African Nuclear Industry development

Industrial clusters and plants ready to operate and produce at date (3)



(1) Total direct jobs related to the fleet build program, including: construction, manufacturing & operating the nuclear power plants. Induced jobs not accounted.

(2) Assuming that construction and nuclear license have been obtained from RSA authorities – Fuel plant full capacity attained in 2022

(3) Industry clusters are operational from date providing prerequisites and, where necessary, Government interventions are satisfied. (4) Fleet of reactors is a prerequisite to JVs implementation and cluster viability. Advanced & Globally leading industries will advance their operation date provided a ramp-up phase can be started at the earliest.

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We are already committed to South Africa …

…, and we are ready to partner for much more and help South Africa grasp this opportunity

AREVA Resources
Ryst Kuil, project

Support to social development initiatives

Nuclear Services

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A Partnership for Energy Certainty

Transport & Distribution of Electricity

Research Reactor Fuel: CERCA

KOEBERG Nuclear Power Plant

Skills development

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Why the Industry need a Governmental decision now for nuclear Fleet programme in RSA?

- **Because:**
  - NNR needs time to review the dossier
  - If the Industry is already existing for Balance of Plant, Civil work (BOP and CI), the Industry is not existing yet for the “Nuclear Island” part.
  - The transfer of know-how or Technology will take time
  - Partnership need to be created between the selected Vendor and the local industry but more complex and longer is the hundreds of partnerships to be created with small and medium companies part of the worldwide Supply Chain of the selected vendor
  - We need the Industry ready ASAP for a real implication in the fleet project

Thank you!

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