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Siting, Environmental Factors and Technology Selection

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Siting. Environmental Factors and Technology Selection

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Examples. Poor Engineering Survey (1)

- During engineering survey, the significant concentrations of separate inclusions of chalk (cretaceous) at the depth of 20-30 m had not been discovered;
- The level of the ground waters increased due to operation of the NPP (hydrotechnical facilities like cooling towers, water cooling ponds for safety systems, etc.);
- This resulted in ingress of water into the cretaceous layer, partial dissolution of the layer, and creation of karts;
- Settlement of the buildings was revealed which substantially exceeded the design values and could lead to the problems for safety (bending of structures and components; inclination of safety important equipment, etc.);

Examples. Poor Engineering Survey (2)

- It was decided to make number of wells to inject the liquid glass in order to fix the grounds;
- The works continued for several years. The basements of the NPP buildings were managed to fix, and the wells were retained in order to provide for the injection of the liquid glass if necessary;
- The problem had been able to solve, but it required expenditure of essential material and financial resources.

During design stage of another NPP also the layers of chalk were discovered. After discussion of the problem it was decided to transfer NPP to another site.

Examples. Poor Assessment of External Factors

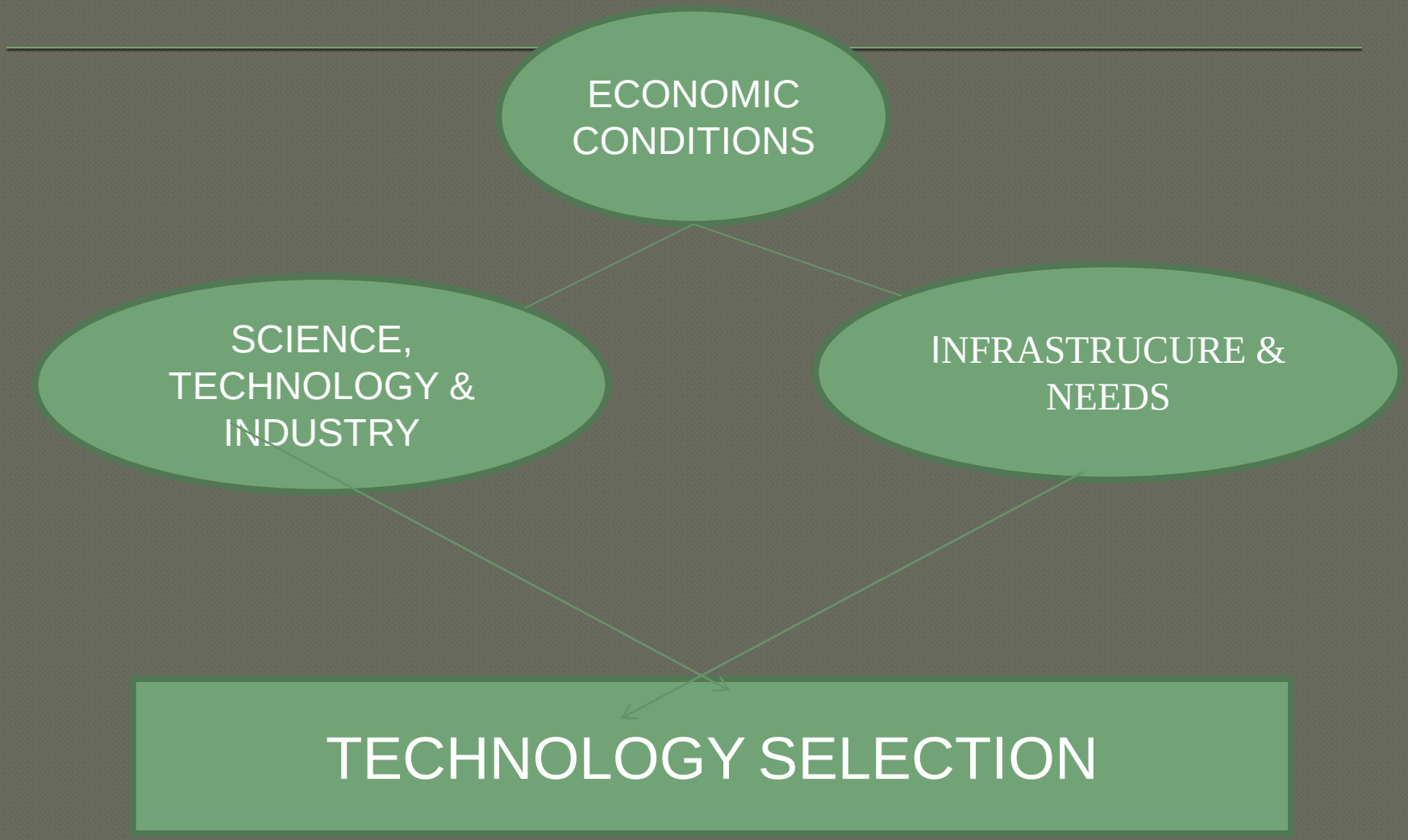
In 80s in the USSR, the designs of two nuclear heating plants (NHP) were developed. These two NHPs were practically built. They had very high indices of safety, since they were located practically within the limits of cities. However, these plants were not commissioned due to the protests of population after Chernobyl accident (the completion terms of construction were 1986 – 1987).

The unsuccessful location of one of NHPs is important as an example of poor assessment of external factors. Approximately in 2 km from it there was a railway line to an enterprise which manufactured armament. After it was decided that the NHP construction would be terminated, two carriages with armament exploded during transportation along this line. The buildings of incomplete NHP were damaged, though the damages were not significant.

Examples. Poor Assessment of External Factors

- In the areas of location of two NPPs in Ukraine there were armament storage facilities;
- At each of them fires took place in different periods. The fires resulted in explosions and blowing up of the armament to substantial distances;
- NPPs were not damaged since explosions and blowing up of the rocket missiles were prevented (they could really threaten NPP);
- All the remaining armament was removed from the storage locations in the emergency manner, the storage facilities were liquidated.

Technology Selection, - bound levels - (1)



Technology Selection, "bound levels" (2)

- Economic conditions to determine the State infrastructure & needs in electricity;
- National Grid – element of the State infrastructure;
- The first NPP capacity should not be more than 10-15% of the Grid capacity due to reliability and safety reasons;
- The state without well developed science, technology and industry could not pretend on more than one type of NPP technology – it will play negative role in terms of safety;
- Quality of human factor & commitment of the Government to maintain nuclear safety in long term perspective – absolutely necessary and rigorous basis to start the nuclear power program