

**EUNDETRAF**



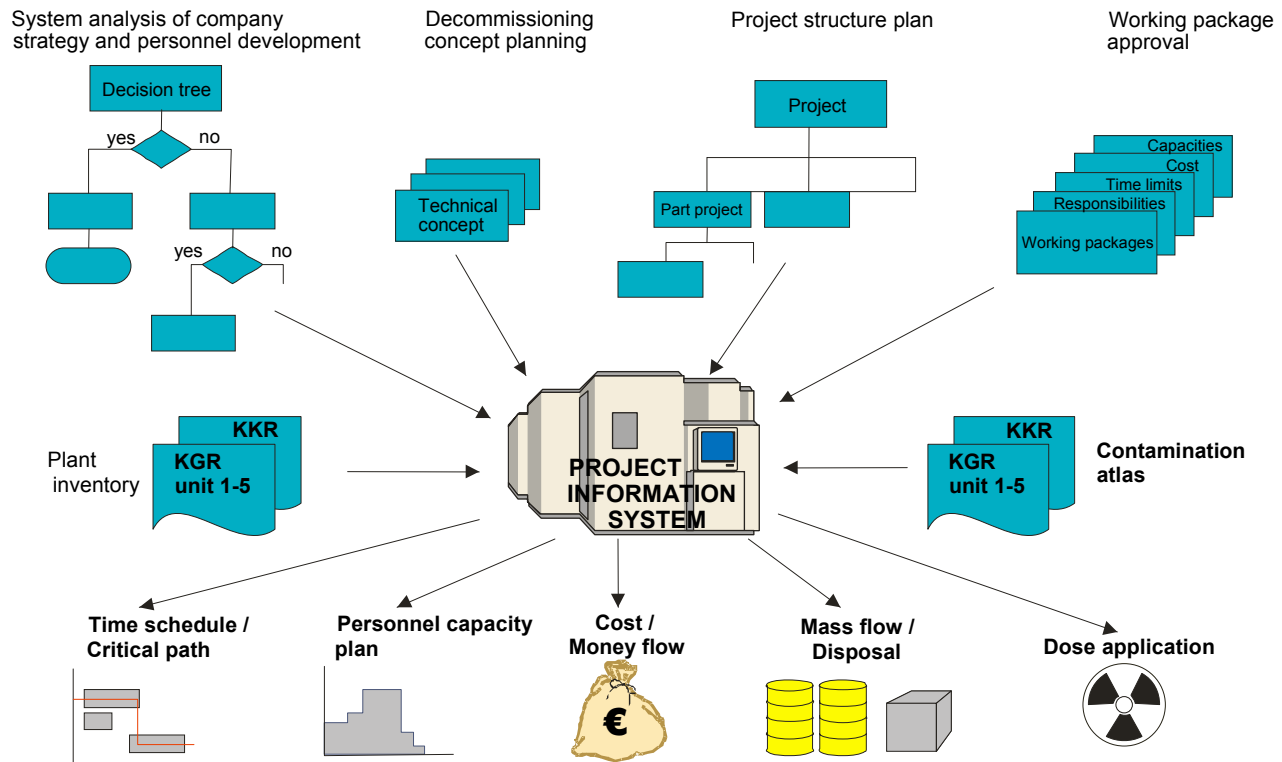
---

# PROJECT MANAGEMENT

**H. Sterner**

**E. Thurow**

Energiewerke Nord GmbH





1. boundary conditions
2. establishment of project strategy
3. project structure
4. project planning/calculation
5. project realisation
6. project controlling
7. summary



# 1. Boundary conditions

---

## **political:**

- acceptance by authority and public
- legal/licensing constrictions
- specific local conditions

## **technical:**

- plant and site conditions
- plant design
- availability of fuel storages
- waste management possibilities and disposal options

## **financial:**

- availability of budget
- cash flow

## **social:**

- personnel age and competence
- personnel strategy
- integration in project
- privatisation strategy

## 2. Establishment of project strategy

---

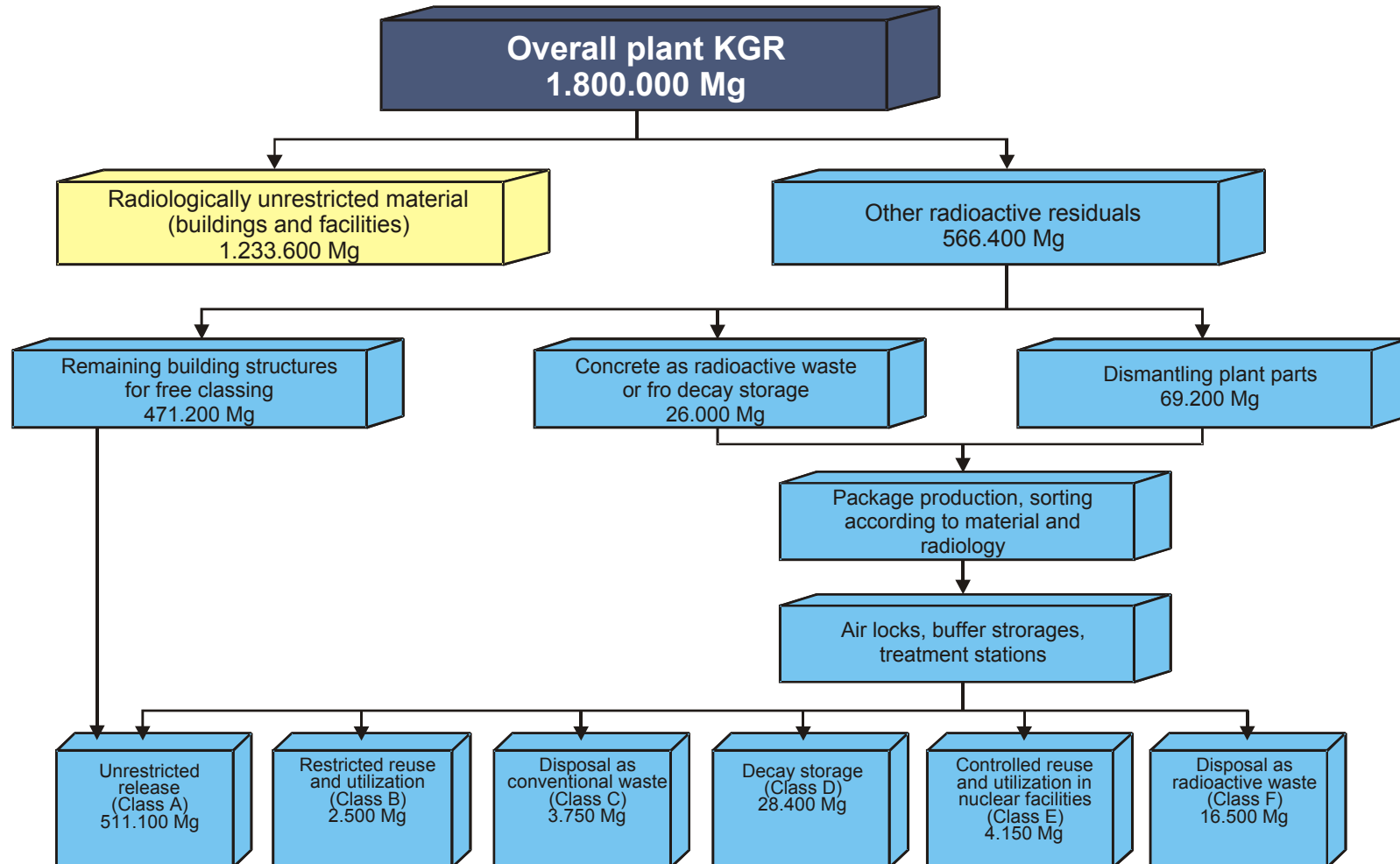


### **Basis**

- Plant inventORIZATION
  - activity
  - material and masses
  - documentation
- Plant condition
  - necessary backfitting
  - presence of fuel and waste
  - buildings
- Company objectives



# Inventory (mass flow)





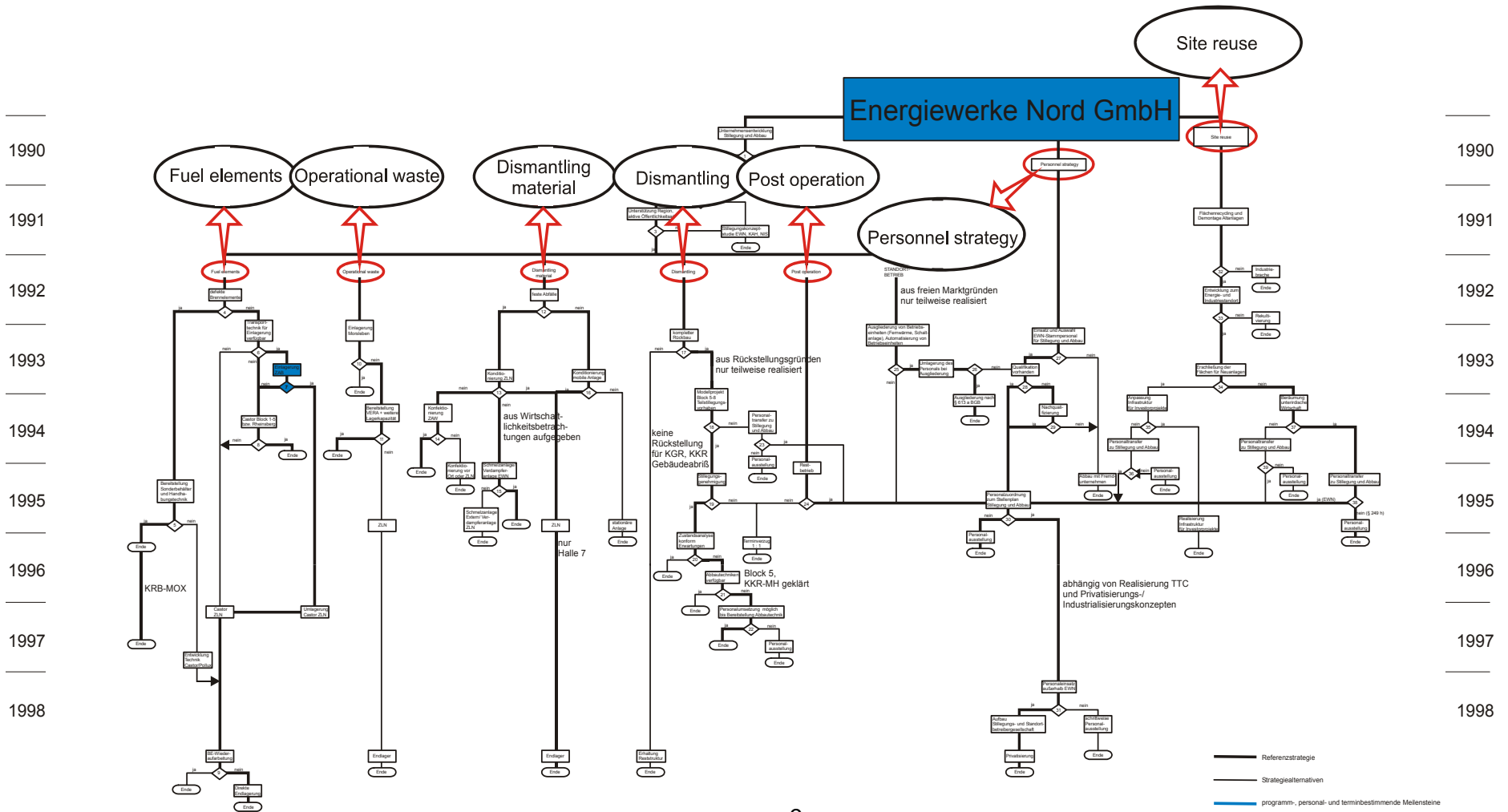
- personnel
- licensing
- project management
- dismantling
- waste management
- site reuse



- fresh and spent fuel management
- waste management
- dismantling strategy
- mass flow logistic
- post operation
- personnel strategy
- site reuse options



- define main dependencies between activities
- define mile stones and overall project life time
- prepare key decision plan (with arguments)



## Key decisions by EWN

---



- direct dismantling instead of safe enclosure
- necessity of a new dry spent fuel storage
- necessity of an interim storage with treatment capabilities for radioactive material from dismantling due to lack of final disposal capacities
- license for decommissioning and dismantling instead of operation license prolongation preferable
- project realisation by own staff instead of contractors
- site reuse for industrial and energetic uses instead of green field recultivation

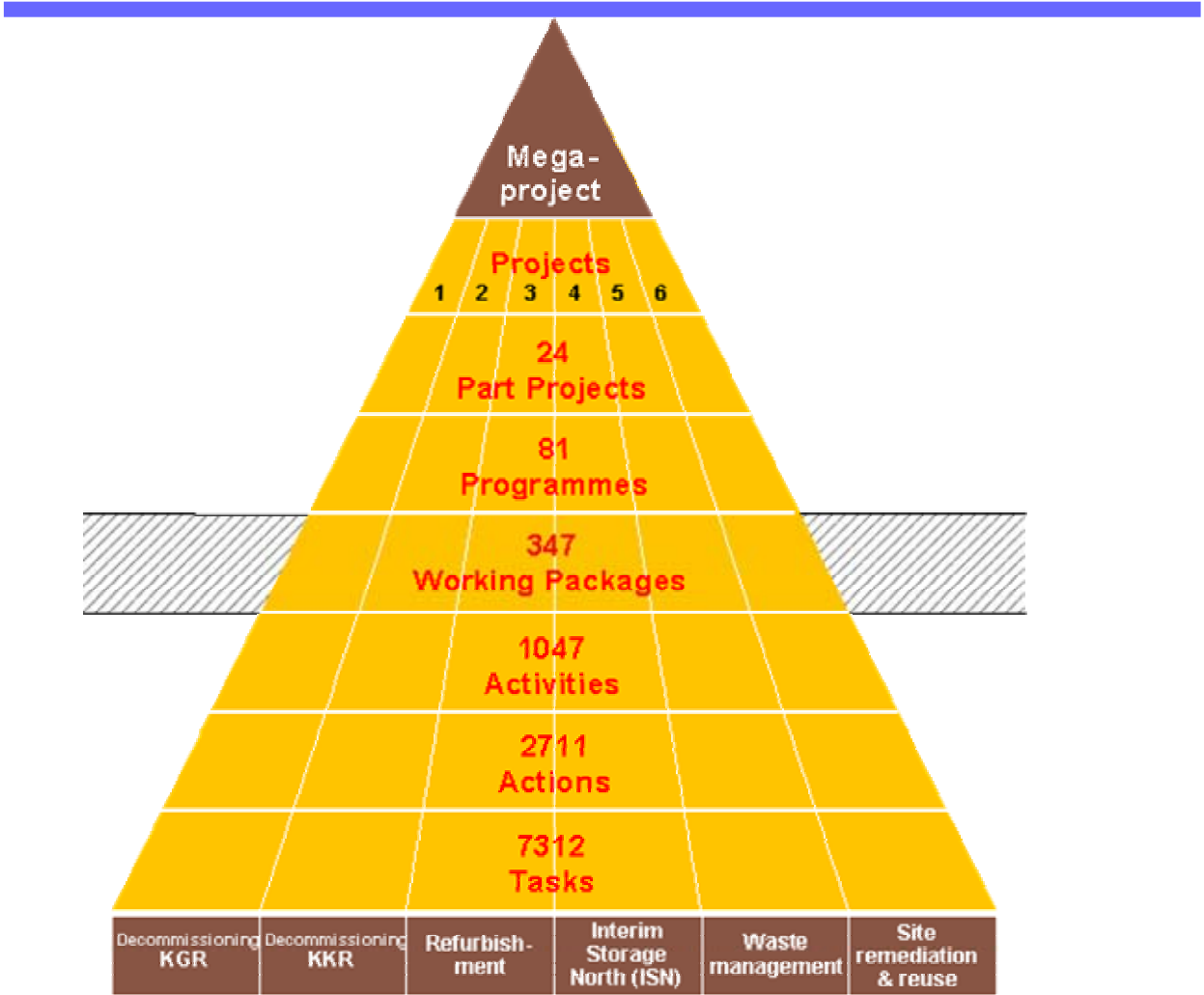
## 3. Project structure

---

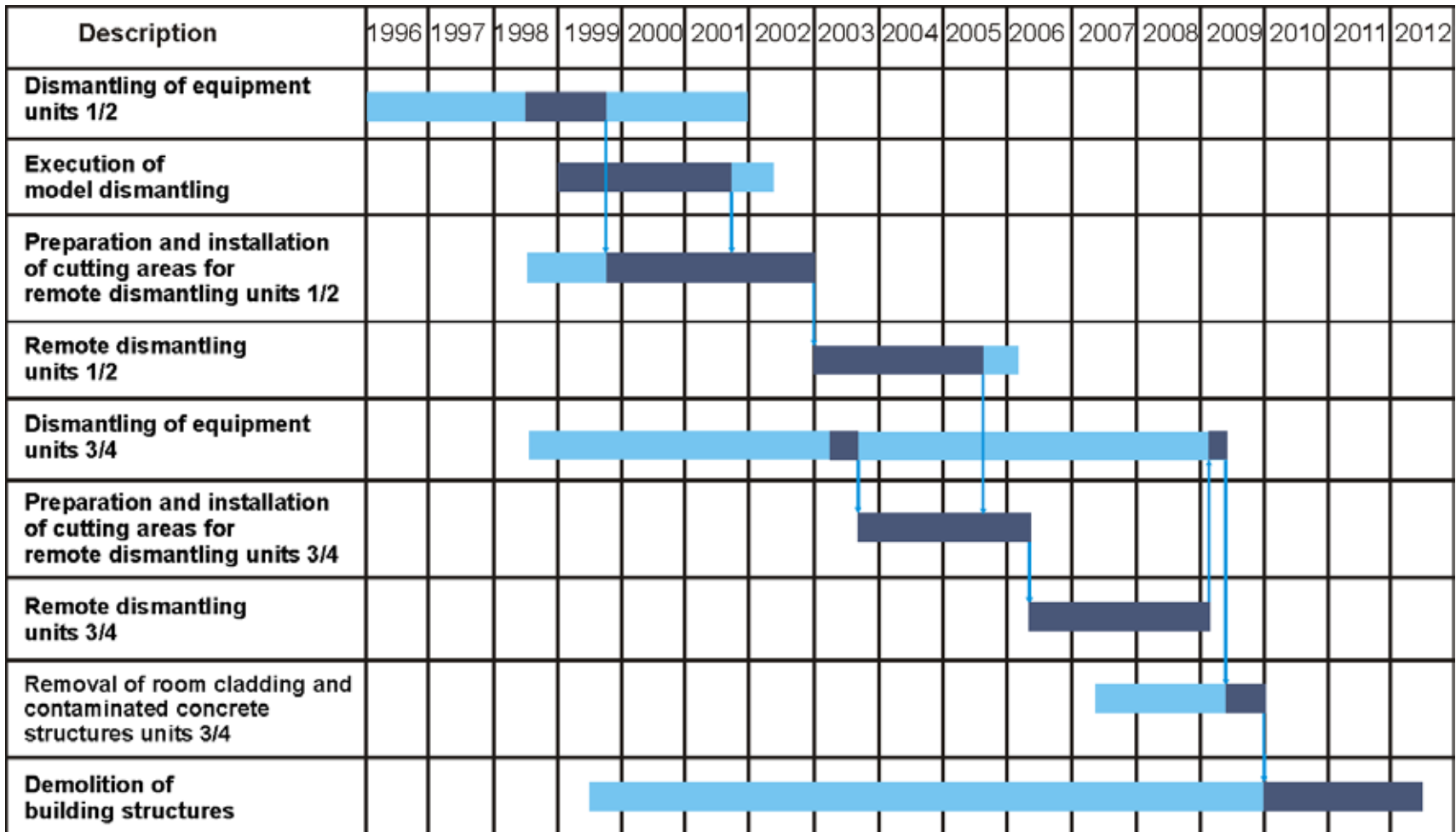


- definition of main project parts
- technical concept
- basic time schedule
- work break down

# Work break down structure EWN



# Basic time schedule – critical path



# Organisational issues

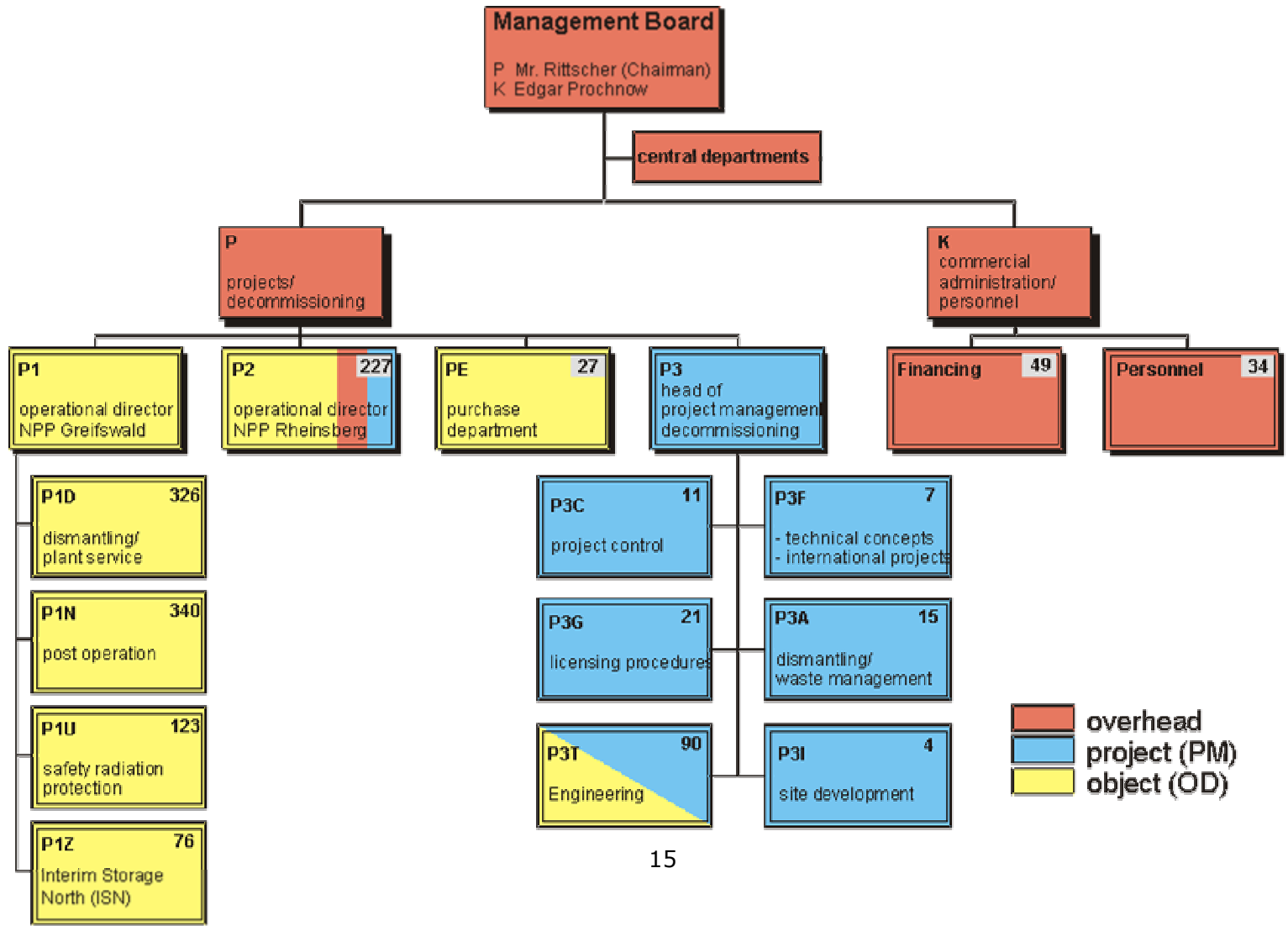
---



- organigram
- main responsibilities
- basic handling structure



# Organigram of EWN GmbH 2000



# Organisation principles – main responsibilities

---



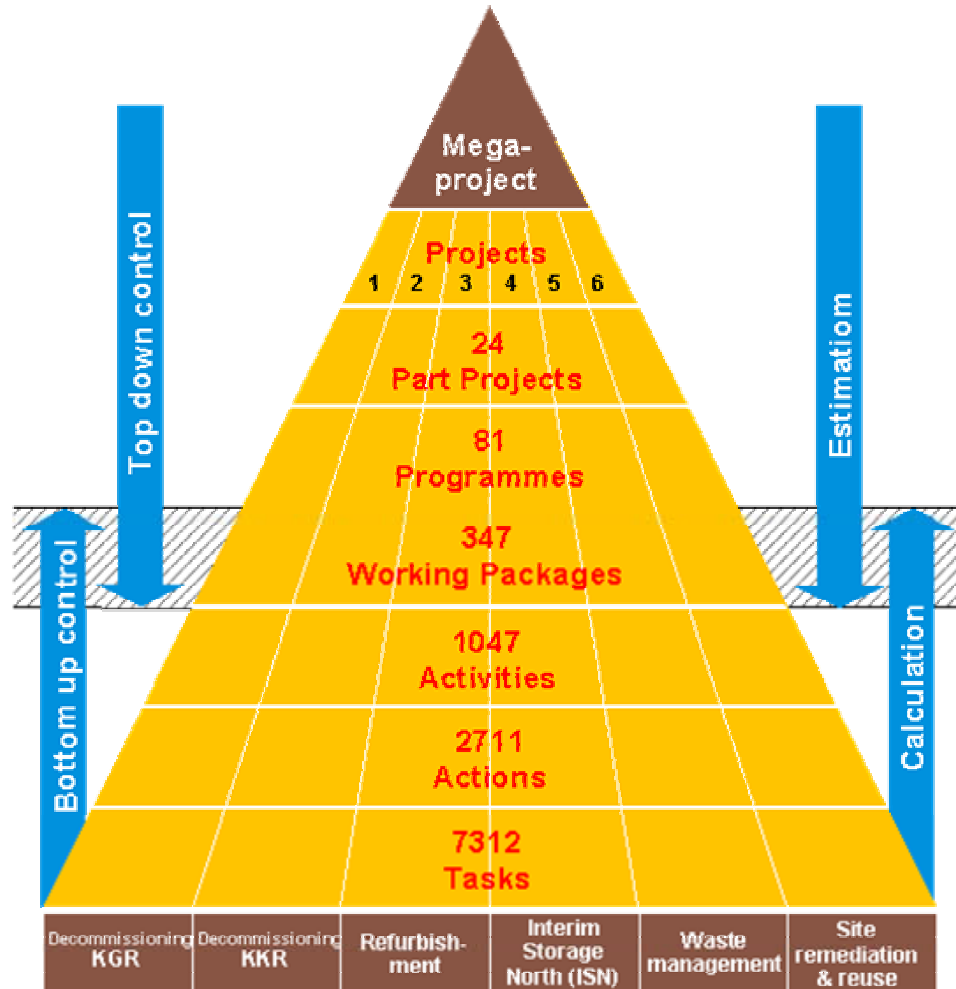
legend:

PM - project management

OD - operational departments

	responsible	assistance
what to do	PM	OD
when to do	PM	OD
capacity planning (how much where)	PM	OD
how to do	OD	PM
who is doing	OD	-

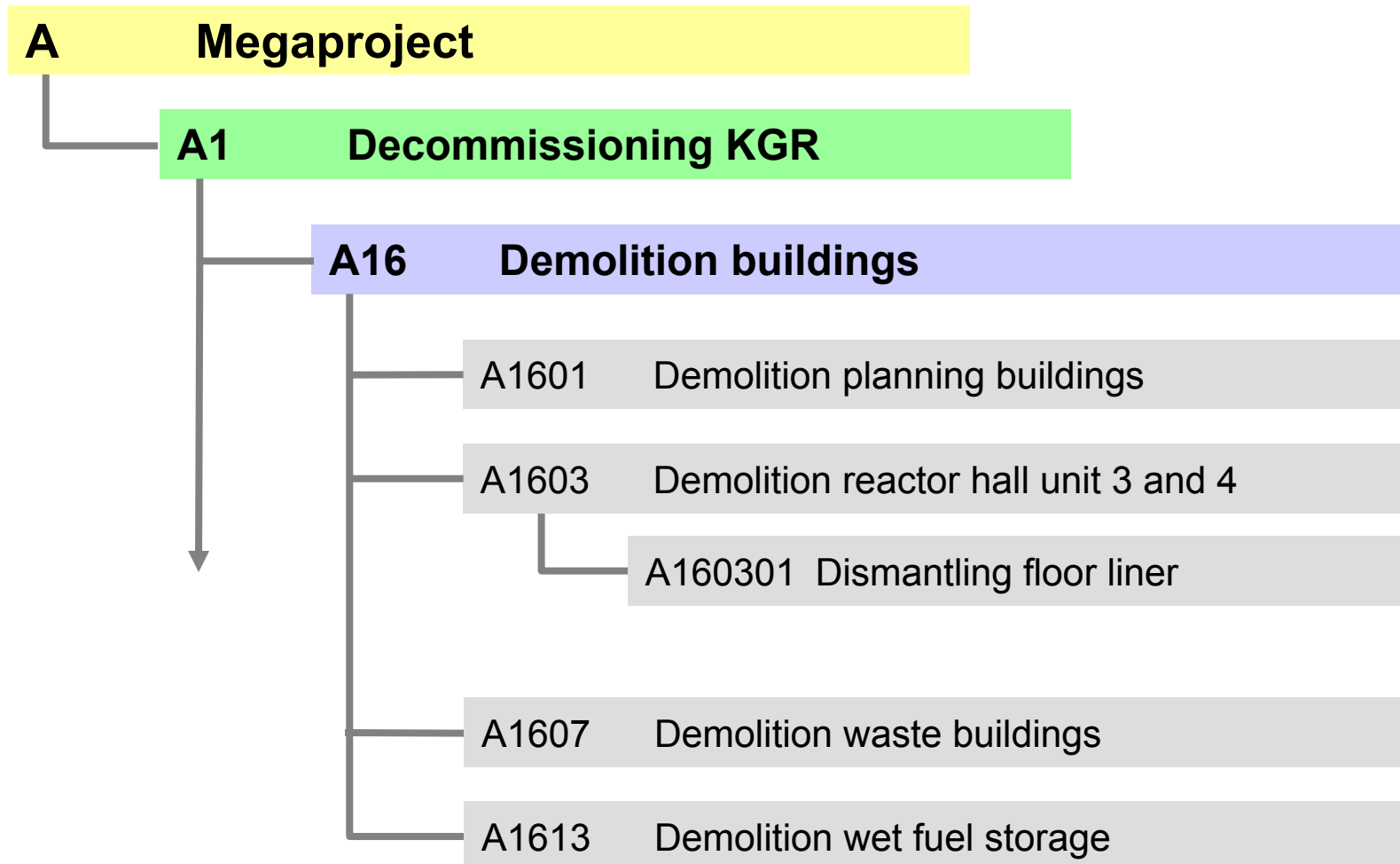
# Organisation principles – basic handling structure



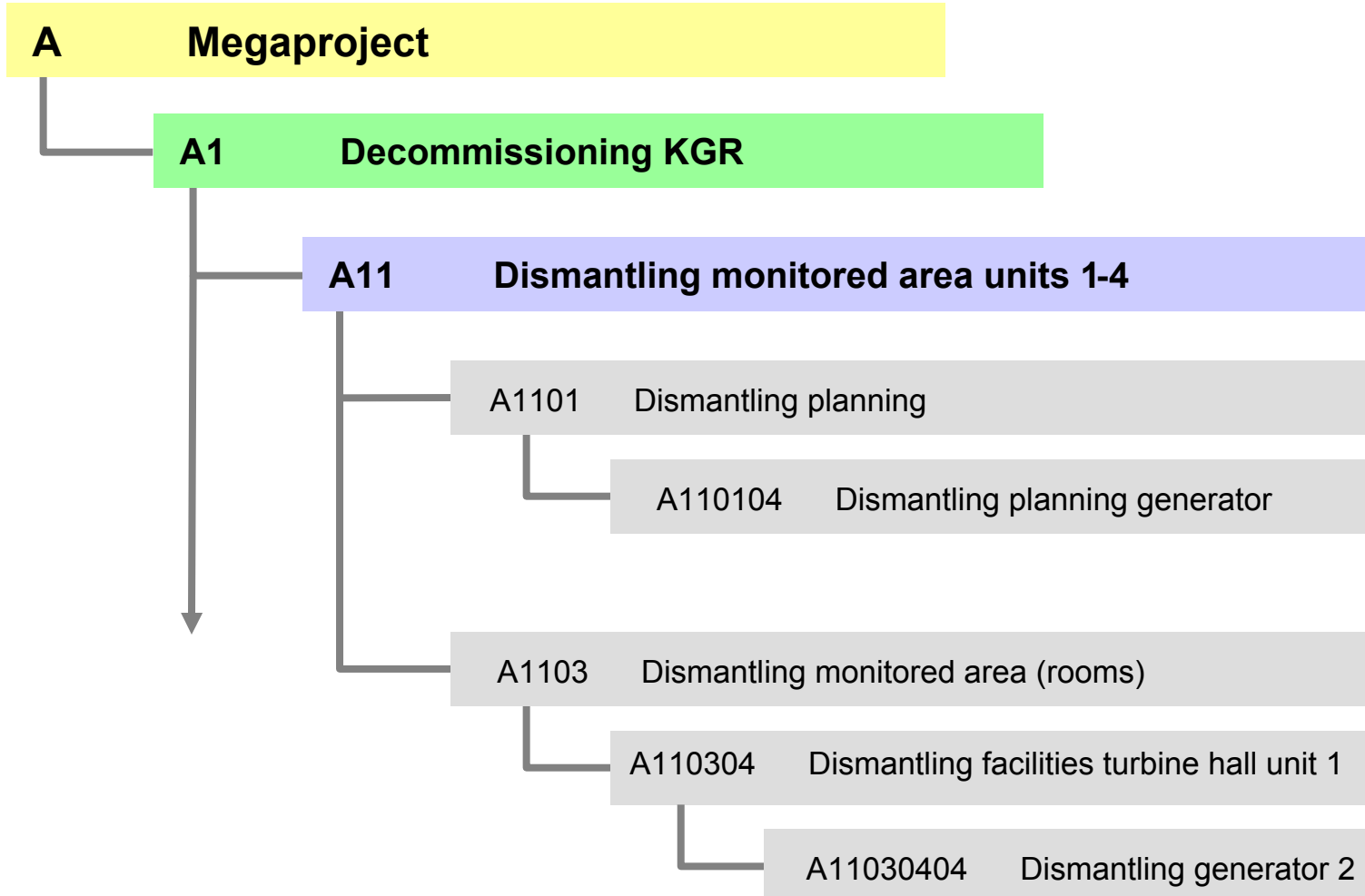
PM -  
responsibility

OD -  
responsibility

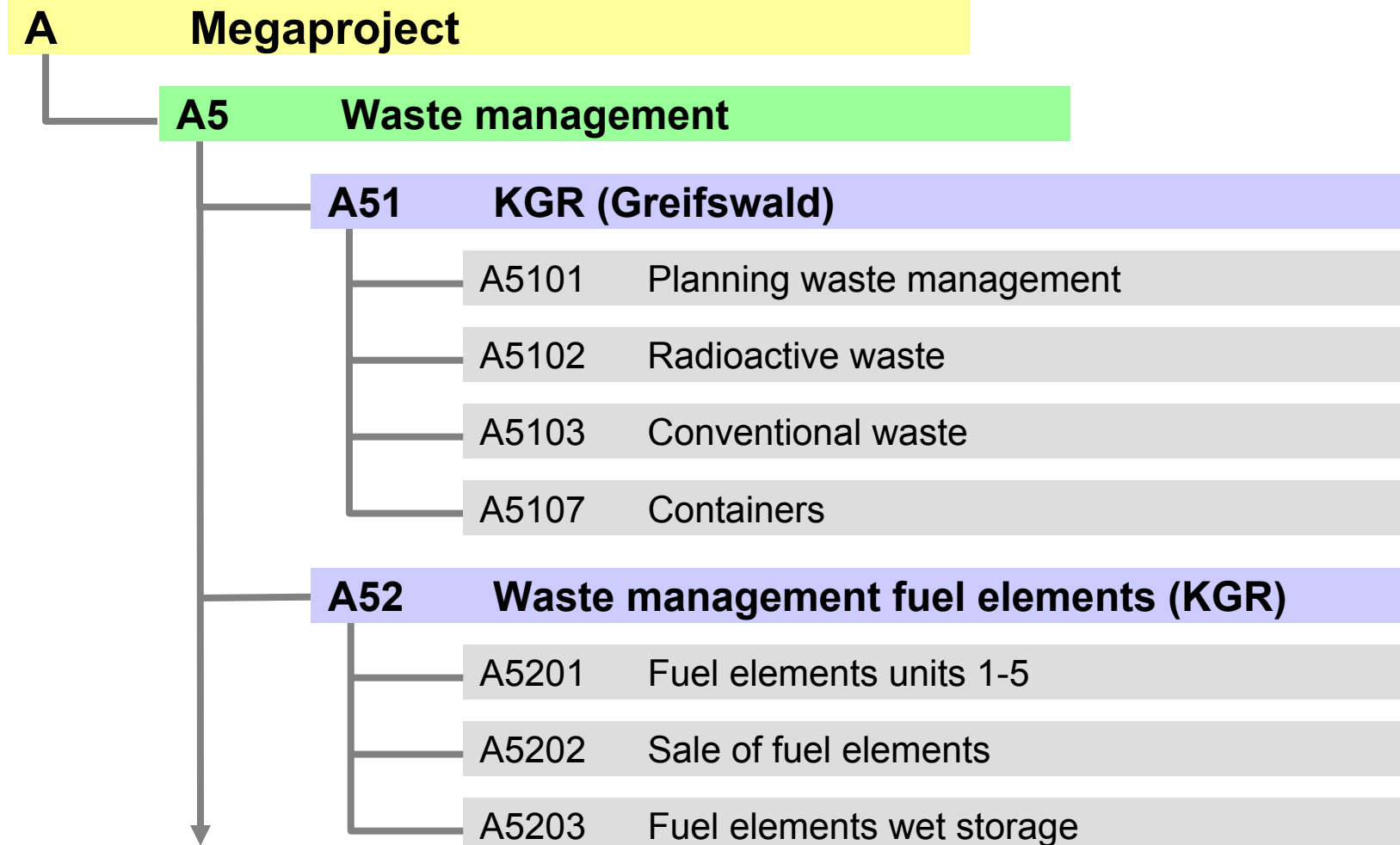
# Project structure list - Work breakdown (extract)



# Project structure list - Work breakdown (extract)



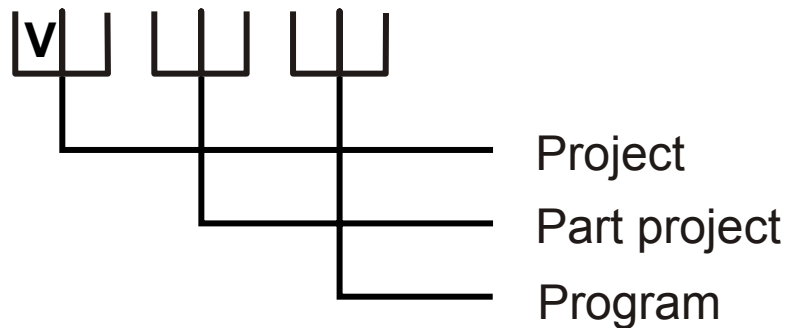
# Project structure list - Work breakdown (extract)



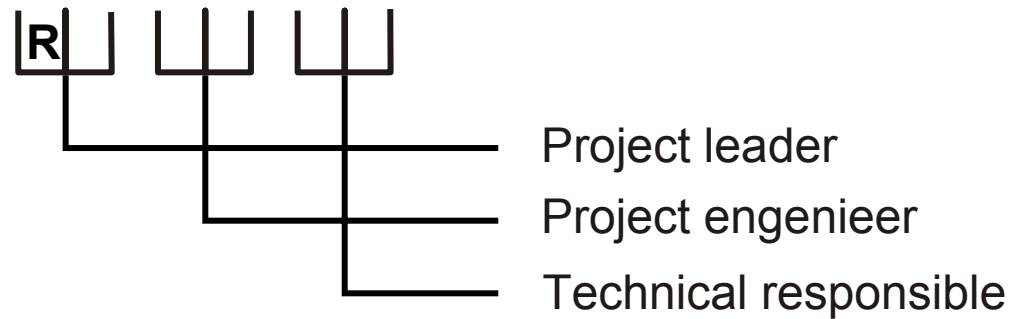
# Interrelated project structures (1)



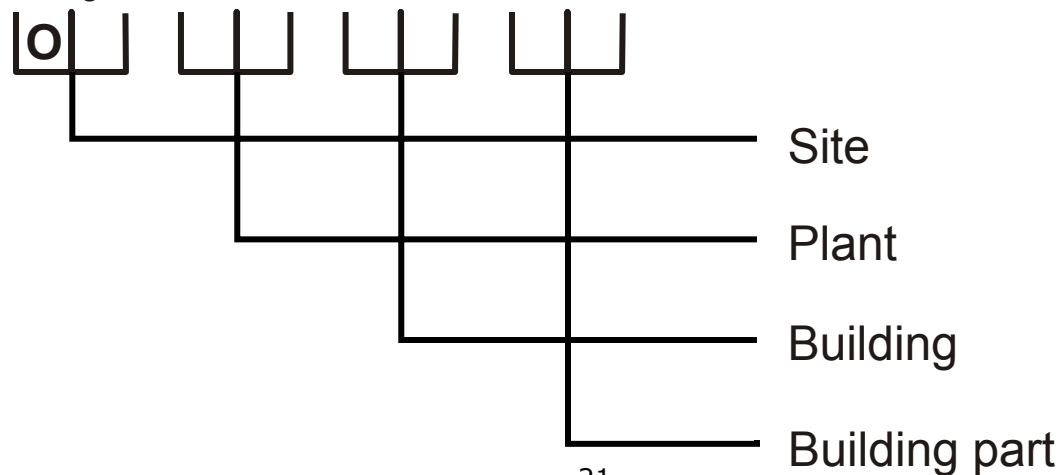
## Work breakdown structure



## Responsibility structure



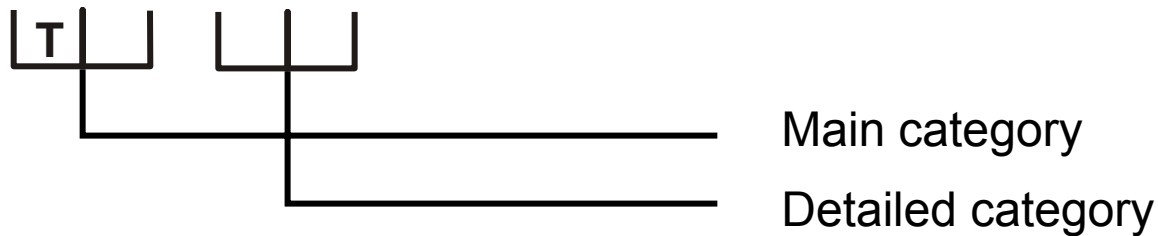
## Object structure



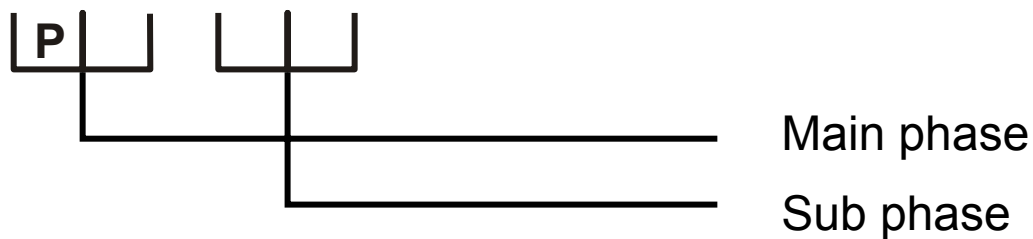
# Interrelated project structures (2)



## Type of work



## Phase structure



## Project information system (Master Planning Tool–MPT)

---



The IT-tool has to support the whole process of the project management with

- precise planning data,
- precise cost calculation data

as well as to realize a careful and complete

- mass flow supervision,
- activity flow supervision,
- project supervision.

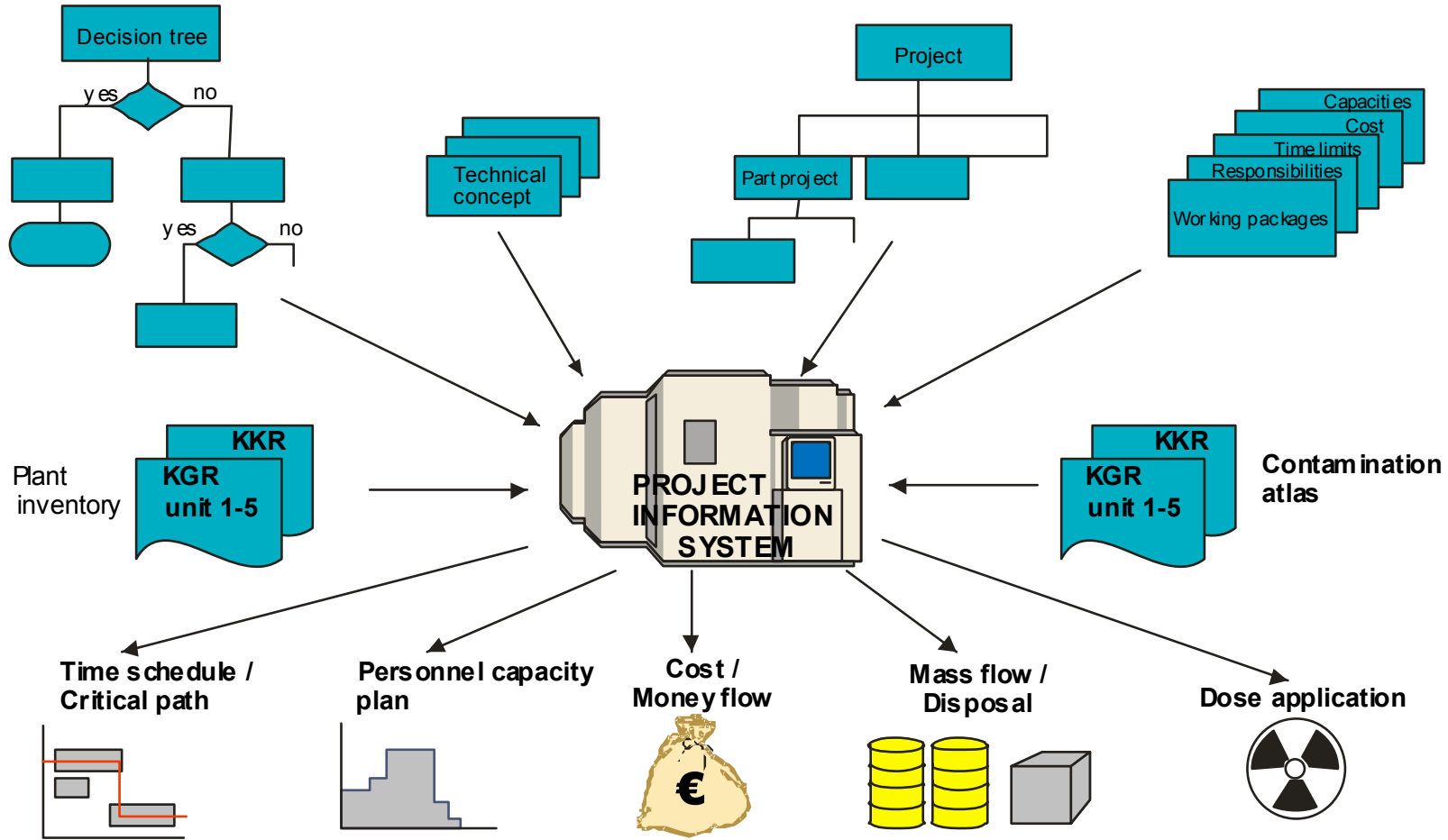


System analysis of company strategy and personnel development

Decommissioning concept planning

Project structure plan

Working package approval





- A** registration modules (inputs)
  - A1** project structure/object structure responsibilities, budget, project live time, connections/conditions
  - A2** inventory
    - 1) mass
    - 2) description
    - 3) geometry
    - 4) origin (room, building)
  - A3** dose rate/contamination
    - 1) dose rate catalogue of rooms
    - 2) contamination catalogue of inventory



- B** planning/calculation modules
- B1** work estimates (mh), work preparation
- B2** personnel planning (departments)
- B3** cost estimation (calculation, planning)
- B4** scheduling/mile stones/dismantling planning



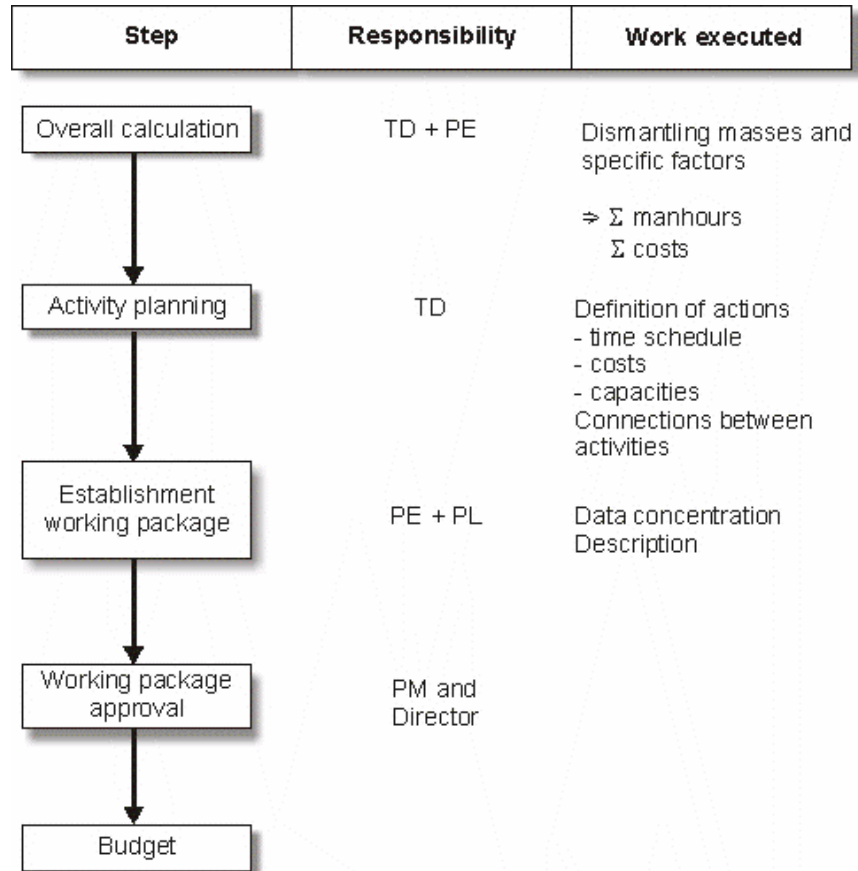
- C** supervision modules
  - C1** mass flow
  - C2** demands on manpower (within) and contracting (outside), claim of deliveries and performed work per activities
  - C3** comparison - nominal/actual
    - 1) time (%)
    - 2) cost (€)
    - 3) manpower (mh)



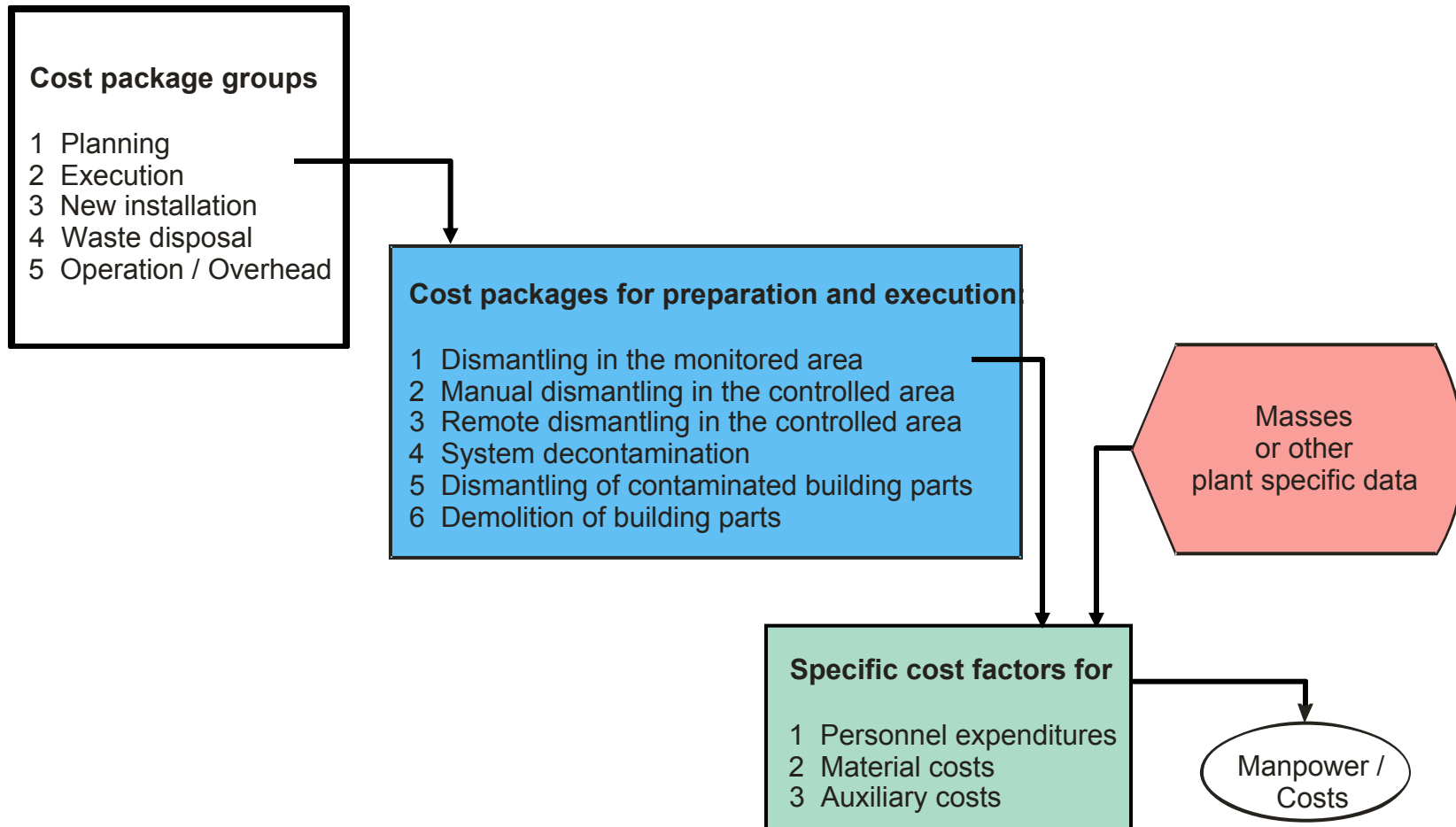
**D** information modules **D1** documentation

**D2** reports (data concentration,  
actual situation, estimation for future)

## 4. Project planning/calculation



TD=Technical Department  
 PE=Project Engineer  
 PL=Project Leader  
 PM=Project Manager





## Cost package groups

### CPG 1: Planning

- 1.1 Dismantling planning
- 1.3 Demolition planning

### CPG 2: Execution

- 2.1 Dismantling monitored area
- 2.2 Dismantling controlled area
- 2.3 Remote dismantling
- 2.4 Decontamination

### CPG 4: Waste management

- 4.1 Radioactive waste
- 4.3 Containers, transport and handling equipment
- 4.4 Free release / conventional dump



## primary process of calculation

$$\begin{array}{|c|} \hline \text{dismantling mass} \\ \hline \text{[kg]} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{cost specific} \\ \text{factor} \\ \hline \left[ \frac{\text{Mh}}{\text{kg}} \right] \\ \hline \end{array} = \begin{array}{|c|} \hline \text{dismantling capacity} \\ \text{needed} \\ \hline \text{[Mh]} \\ \hline \end{array}$$

## secondary process of calculation

$$\begin{array}{|c|} \hline \text{dismantling capacity} \\ \text{needed} \\ \hline \text{[Mh]} \\ \hline \end{array} \times \begin{array}{|c|} \hline \text{specific} \\ \text{factor} \\ \hline \text{[%]} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{capacity} \\ \text{needed} \\ \hline \text{[Mh]} \\ \hline \end{array}$$

# Cost calculation-specific factors example 1

## Monitored area



Factor		Correction factor	
name	size	name	size
<b><u>1. manpower</u></b>			
preparation VPU1	2%		
preparation VPU2	5%		
execution VPU1	2%		
working place preparation	2%		
removal of insulation	0,05 Mh/kg		
dismantling (execution VPU2)	0,022 Mh/kg	dismounting, i.e. no dismantling	0,86
		lack of space	1,20
internal transport	7%		
radiation protection	6%		
documentation	2%		
<b><u>2. direct costs</u></b>			
consumables	0,08 €/kg		
contractor	0,03 €/kg		
tools	0,03 €/kg		
special tools	case by case		

# Cost calculation-specific factors example 2

## Controlled area



Factor		Correction factor	
name	size	name	size
<b><u>1. manpower</u></b>			
preparation VPU1	3%		
preparation VPU2	10%		
execution VPU1	10%		
working place preparation	4%		
removal of insulation	0,16 Mh/kg		
dismantling unit 5 (execution VPU2)	0,026 Mh/kg	dismounting, i.e. no dismantling	0,86
dismantling unit 1-4	0,036 Mh/kg	lack of space	1,1 - 1,2
internal transport	12%		
radiation protection	12%		
documentation	2%		
<b><u>2. direct costs</u></b>			
consumables	0,11 €/kg		
contractor	0,04 €/kg		
tools	0,18 €/kg		
special tools	case by case		

# Project management – calculation step: example for manpower



**12050224 - Dismantling reactor hall unit 1/2 - room group 04 - 2**

**CPG 2.2**

**Dismantling mass: components/facilities: 500 Mg**  
**isolation: 50 Mg**

**step 1:**

dismantling - components/facilities	500 000 kg	x 0,036 Mh/kg =	18 000 Mh
removal of isolation	50 000 kg	x 0,16 Mh/kg =	8 000 Mh
			<b><u>26 000 Mh</u></b>

**step 2:**

preparation VPU1	26 000 Mh	x 3 % =	780 Mh
preparation VPU2	26 000 Mh	x 10 % =	2 600 Mh
internal transport	26 000 Mh	x 12 % =	3 120 Mh
radiation protection	26 000 Mh	x 12 % =	3 120 Mh
documentation	26 000 Mh	x 2 % =	520 Mh
			<b><u>10 140 Mh</u></b>

**$\Sigma = 36 140 \text{ Mh}$**

Project management – calculation  
step: example for direct costs



**12050224 - Dismantling reactor hall unit 1/2 - room group 04 - 2**

**CPG 2.2**

**Dismantling mass: components/facilities: 500 Mg**  
**isolation: 50 Mg**

1. consumables	550 000 kg	x	0,15 €/kg	=	84 363 €
2. contractor	550 000 kg	x	0,04 €/kg	=	19 684 €
3. tools	550 000 kg	x	0,26 €/kg	=	140 605 €
4. special tools	————		————		————

**$\Sigma = 244 653 €$**

# Development of specific factors - example



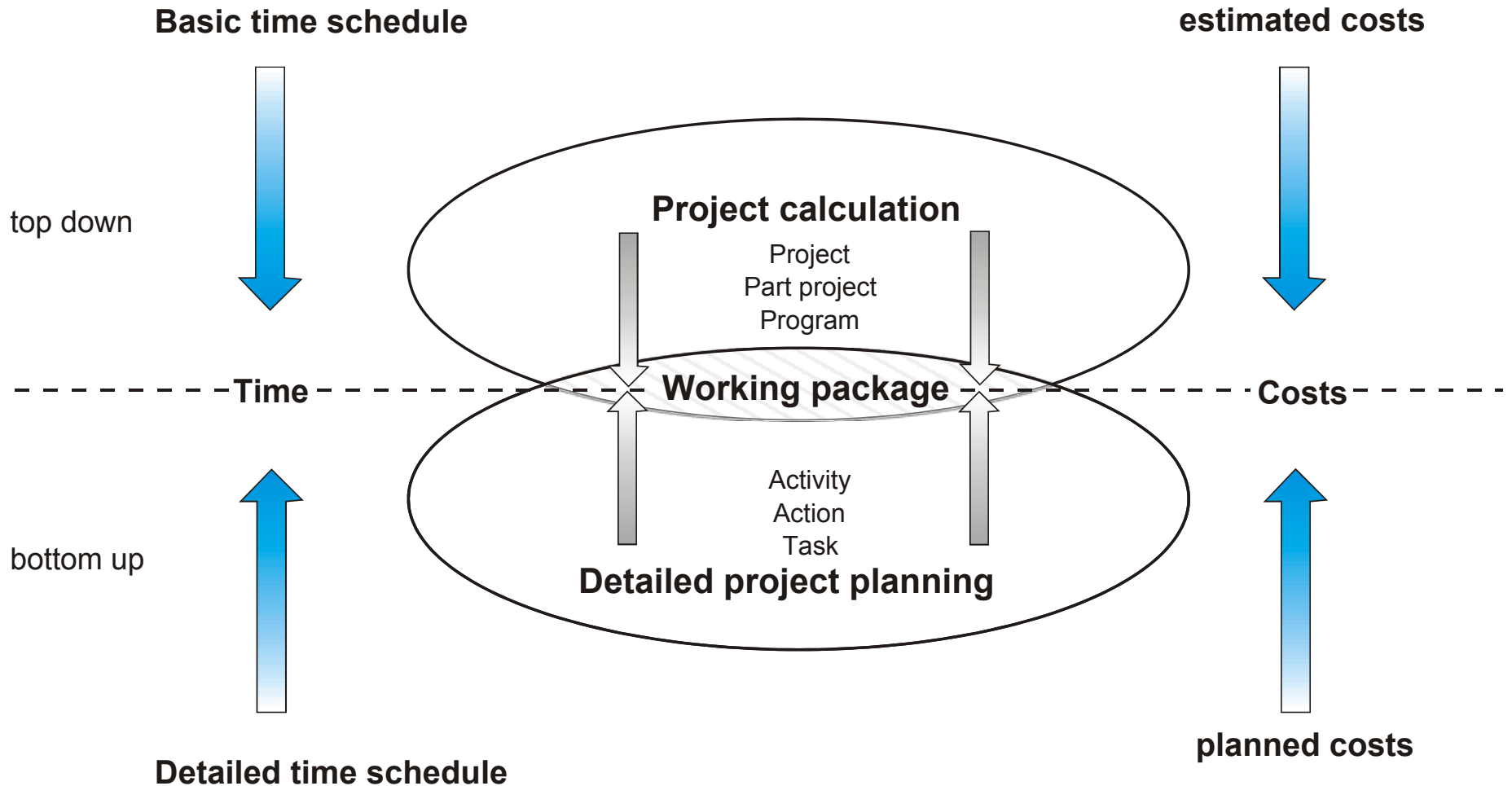
## 1. Controlled area

specific factor	1995		1998		2002	
	Mh/kg	kg/Mh	Mh/kg	kg/Mh	Mh/kg	kg/Mh
dismantling unit 5	0,04	25	0,026	38,5	0,026	38,5
dismantling unit 1 - 4	0,04	25	0,036	27,8	0,025	40,0

## 2. Monitored area

specific factor	1995		1998		2002	
	Mh/kg	kg/Mh	Mh/kg	kg/Mh	Mh/kg	kg/Mh
dismantling	0,028	36	0,022	45,5	0,02	50

# 5. Project realisation – key position of working packages

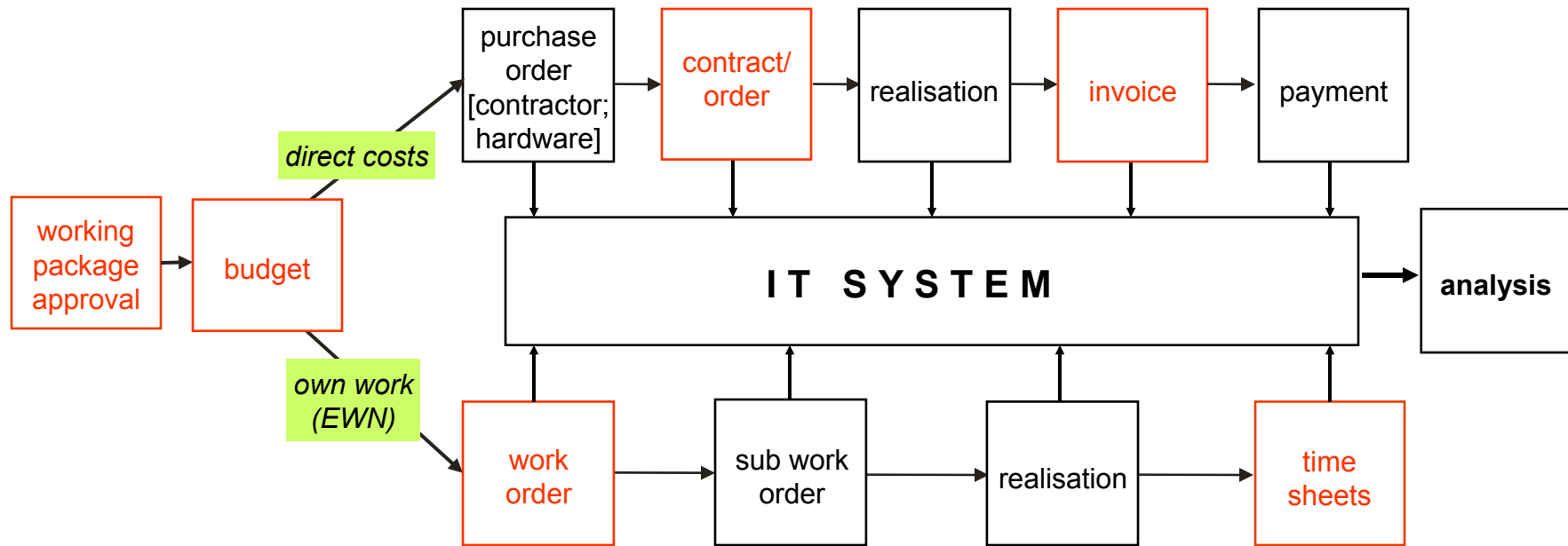


## Project realisation - approval procedure for performing of working packages

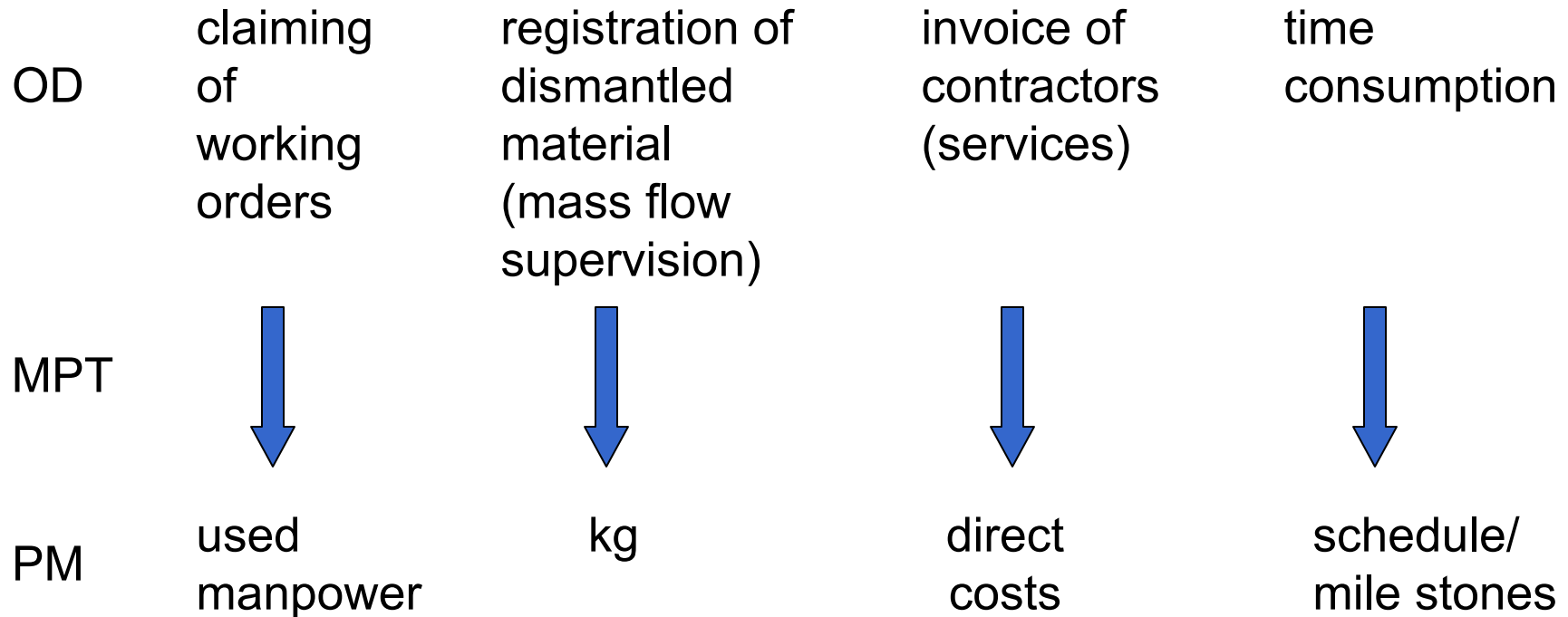
---



- I. check of (by PM) - meeting the starting conditions
  - budget control
  - availability of own personnel capacities
- II. commitment for realization by PM
- III. PM orders:
  - subcontractors
  - investments  
(through the commercial department)PM releases:
  - manpower and life time/mile stones  
(to the operational departments)



# Project realisation - registration of actual data



checking period: bi-weekly / monthly  
checking level: activities

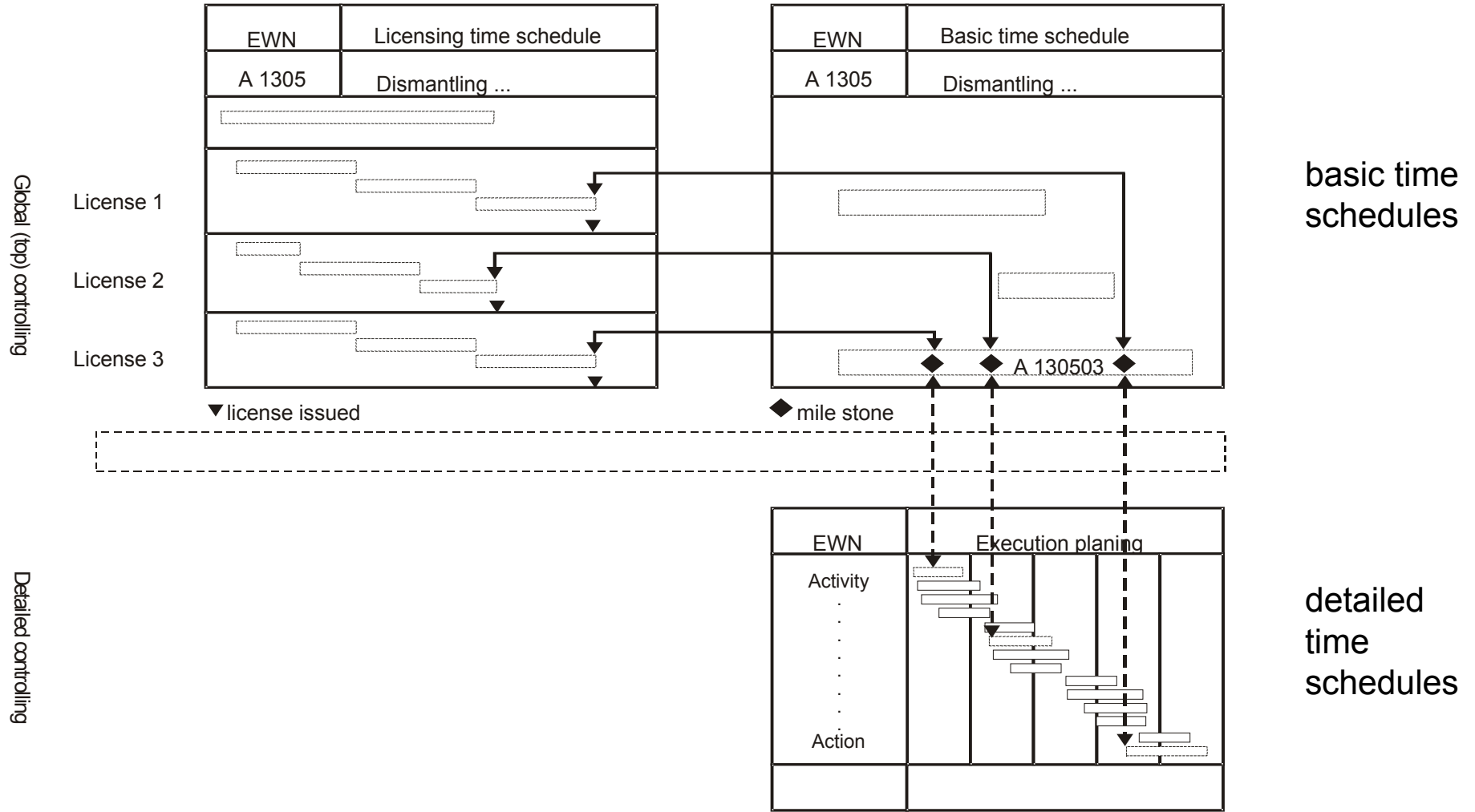
## 6. Project management - controlling tasks

---

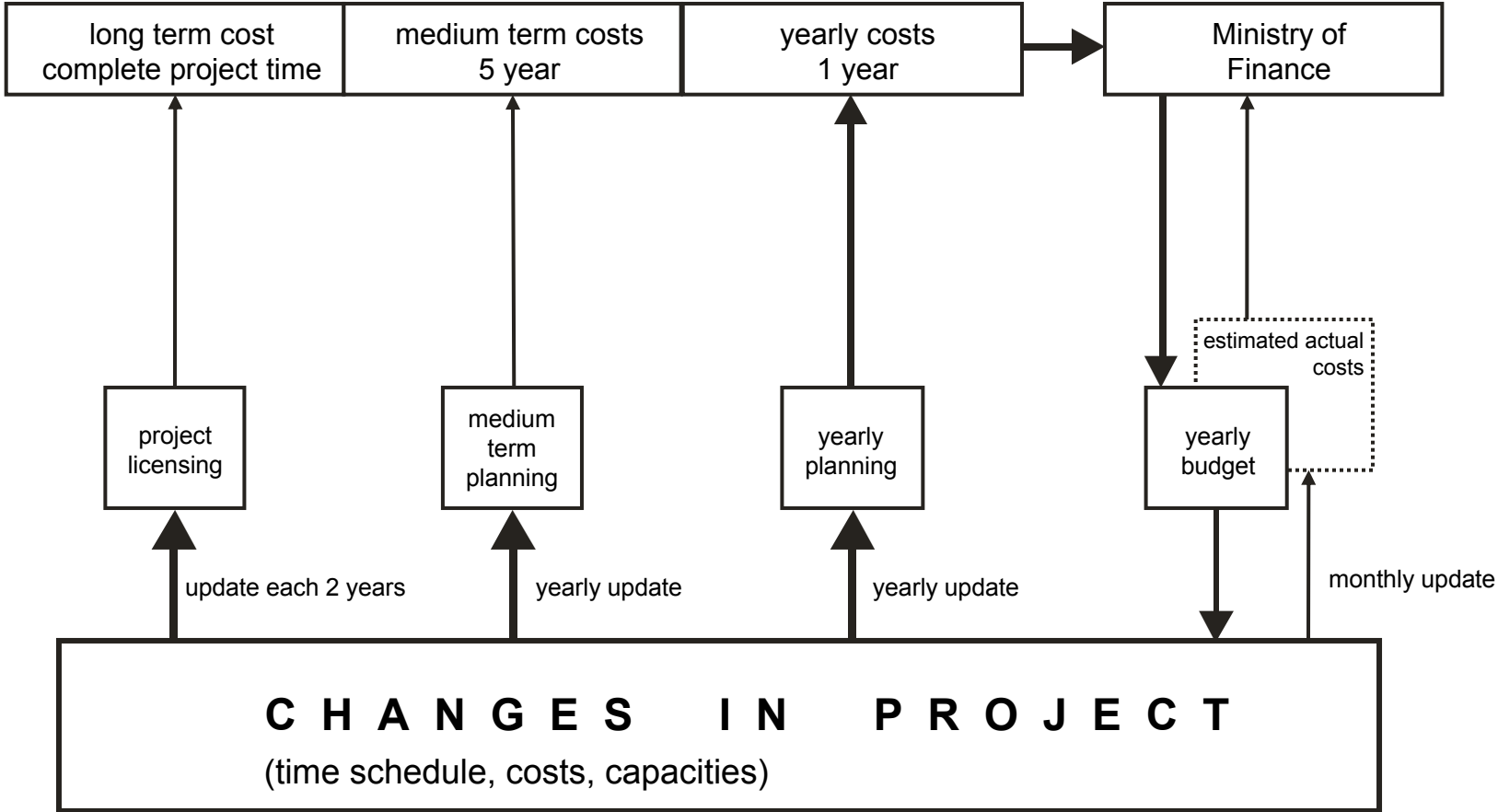


- assessment of differences between actual and nominal data
- adaptation of cost specific factors and correction factors
- control of the exploitation of manpower capacity (mh) and dismantling productivity (kg/mh)
- feedback of correlated factors into the planning tool of the MPT (project information system)
- shifting of working packages outside the critical path on time (smoothing of capacity peaks)

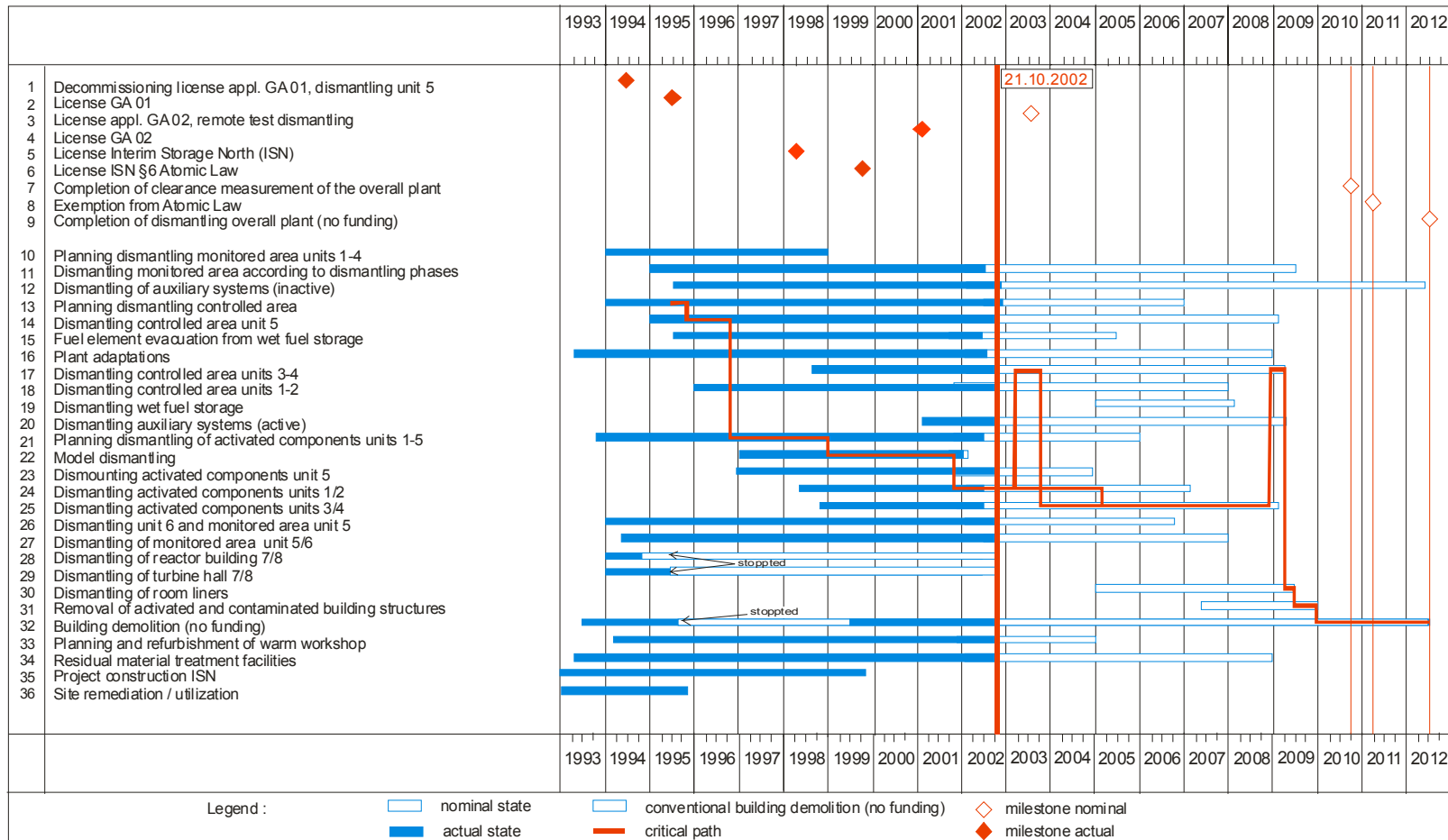
## Project management - controlling: time schedule



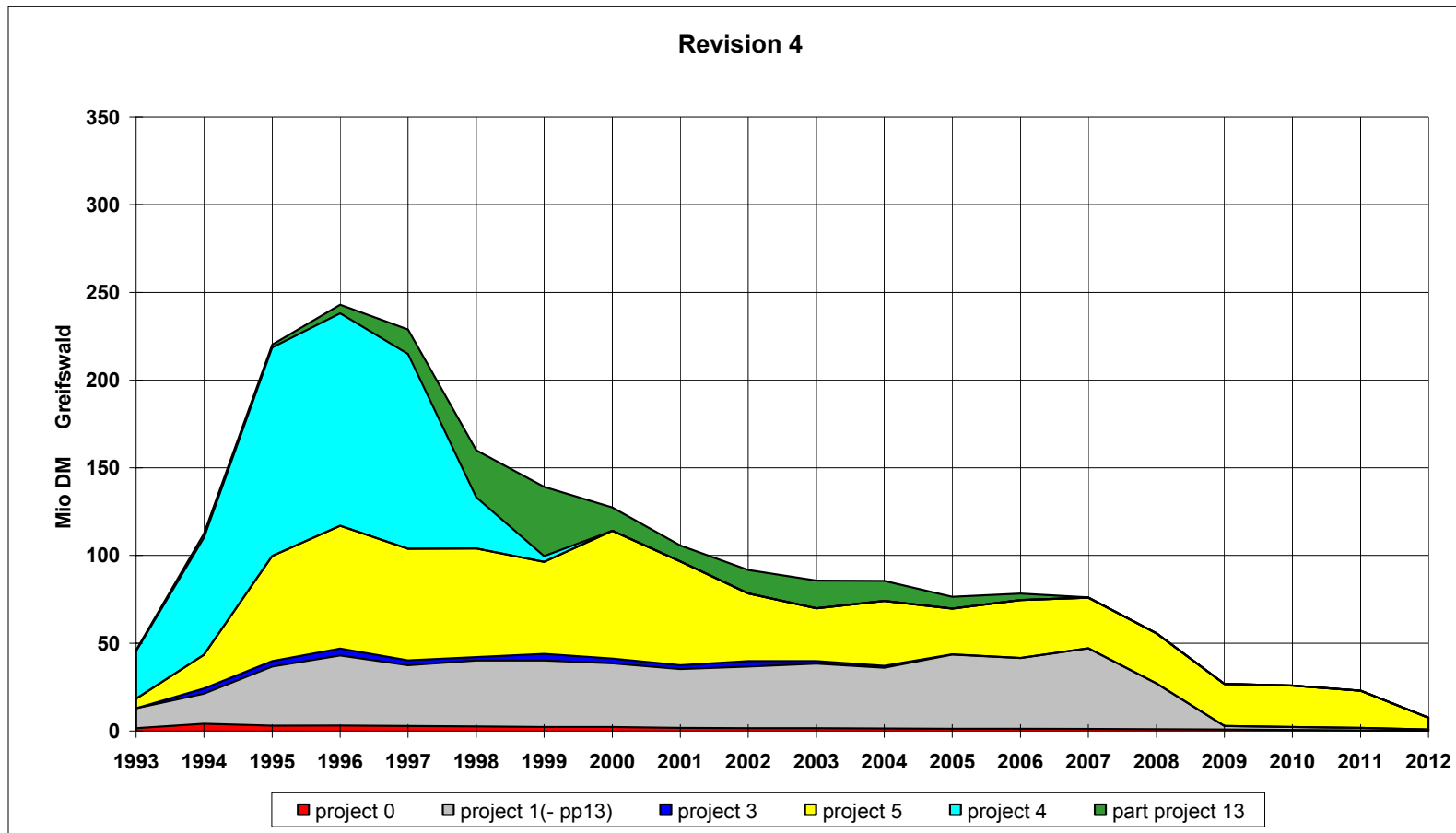
# Basic cost controlling - example EWN -



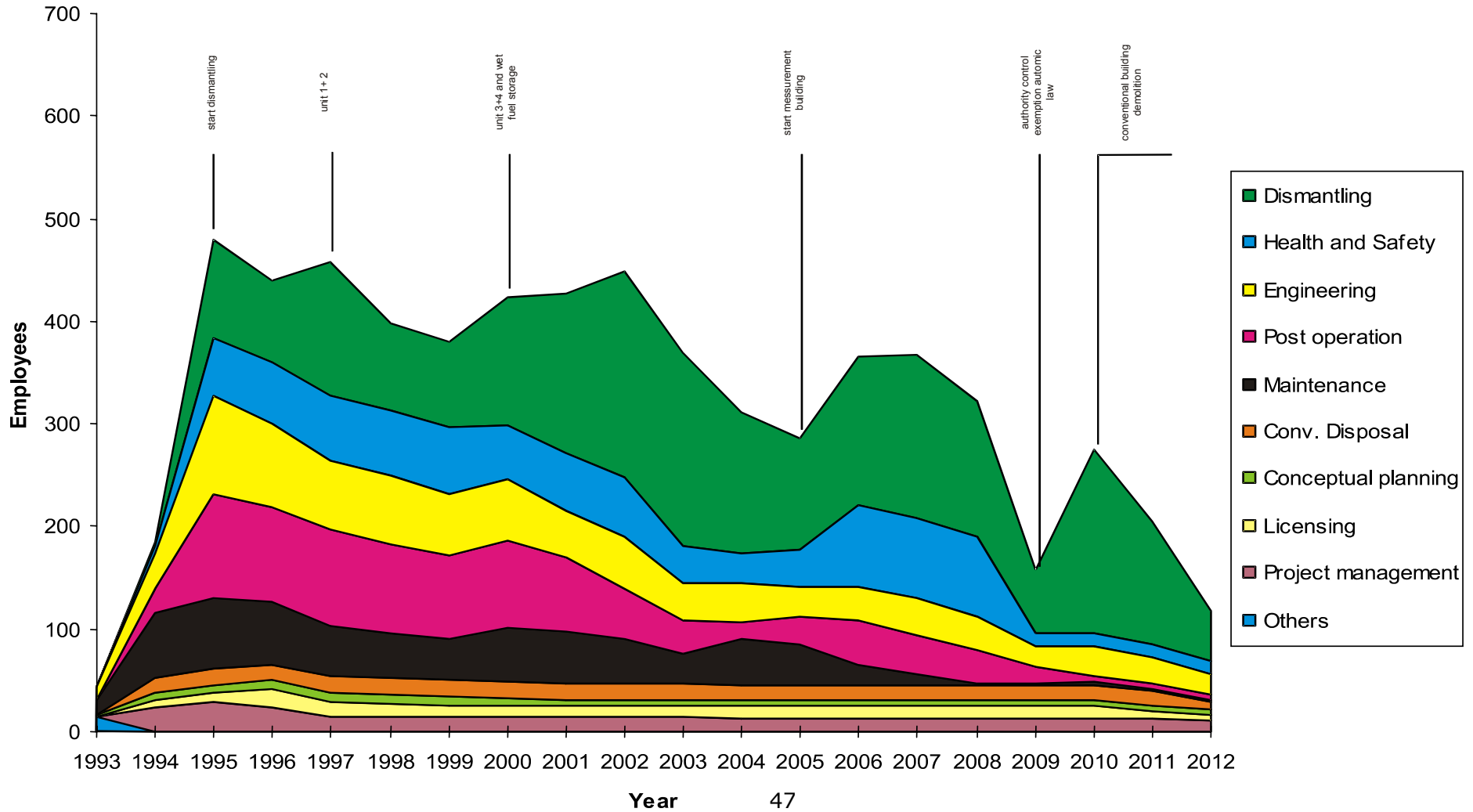
## Basic time schedule (extract) EWN



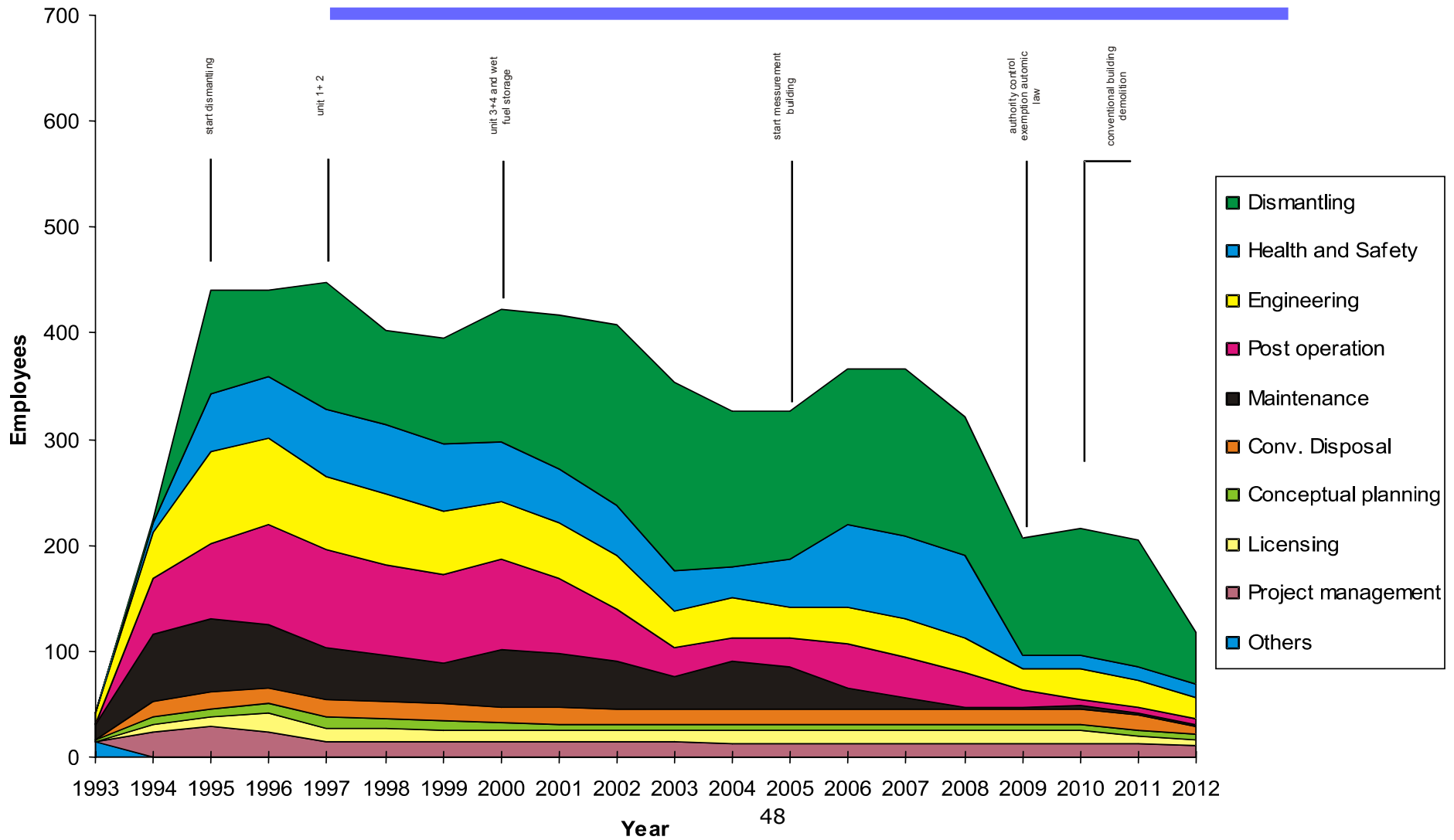
## Yearly project costs



## Project management – controlling: personnel capacities and categories – 1<sup>st</sup> calculation



## Project management – controlling: personnel capacities and categories – 2<sup>nd</sup> calculation



# Project controlling; meeting basics



---

<u>Category</u>	<u>Frequency</u>
<b>PL-meeting</b> <ul style="list-style-type: none"><li>• operative issues</li><li>• Project Leader, Project Engineer</li></ul>	daily
<b>PM-meeting</b> <ul style="list-style-type: none"><li>• operative issues</li><li>• Project Manager, Project Leaders</li></ul>	weekly
<b>Time schedule</b> <ul style="list-style-type: none"><li>• critical path issues</li><li>• PM, PL, Techn. Dept., purchase</li></ul>	bi-weekly
<b>Cost-meeting</b> <ul style="list-style-type: none"><li>• costs &gt; 50,000 €</li><li>• PM, PL, TD, purchase, finance</li></ul>	monthly
<b>Company-meeting</b> <ul style="list-style-type: none"><li>• strategical issues</li><li>• as above + costs, personnel and directors</li></ul>	semi-annually



Programme



Instructions

- |   |  |   |   |   |                         |
|---|--|---|---|---|-------------------------|
| 1 | Organisation                                 | 2 | Planning  | 3 | Procurement and storage |
| 4 | manufacturing, installation<br>commissioning | 5 | Post operation<br>site operation<br>decommissioning<br>waste management | 6 | Maintenance             |
| 7 | Treatment of deficiencies                    | 8 | Documentation   | 9 | Audits                  |



Systematic executing of procedures for purchasing material, equipment and services needed for the project, in time and cost effective.

- Establishing procurement criteria and procedures
- Interaction with the project scheduling and budgeting activities
- Pre-qualification procedures
- Standard documents for proposals, tender calls, contract conditions and purchase orders
- Assessment of bids
- Administration of contracts
- QA System

# Reporting / documentation by PM

---



- preparation of management decisions (to change the project strategy)
- reports on actual status of project performance
- estimation of project performance (forecast)
- preparation / justification and issue of a new revision of the project performance (each two years)

## 7. Summary of main issues

---



- decommissioning plan and inventory
- project analysis for key decisions
  - spent fuel and operational waste management
  - mass flow logistic from dismantling
  - plant adaptation for operational cost reduction / investments
- clarify operational and decommissioning modus with licensing authority
- project work break down
  - clear and easy structures, connections and conditions
- project planning
  - necessity of project manual
- project controlling
  - continuous registration of actual data and feed back