

The systemic challenge of circular construction

Pernille Kernel, Capital Region of Denmark

Pictures from Unicon of the construction of Høje Taastrups new Town Hall with recycled concrete

The systemic challenge

Development and implementation of circular economy in urban development and planning and the building and construction industry comprises many different solutions, activities, and steps.

The main challenge in the construction value chain is connecting actors and activities across long-term, large scale projects: linking concerted actions and getting an optimized, effective chain of processes and activities to work together.

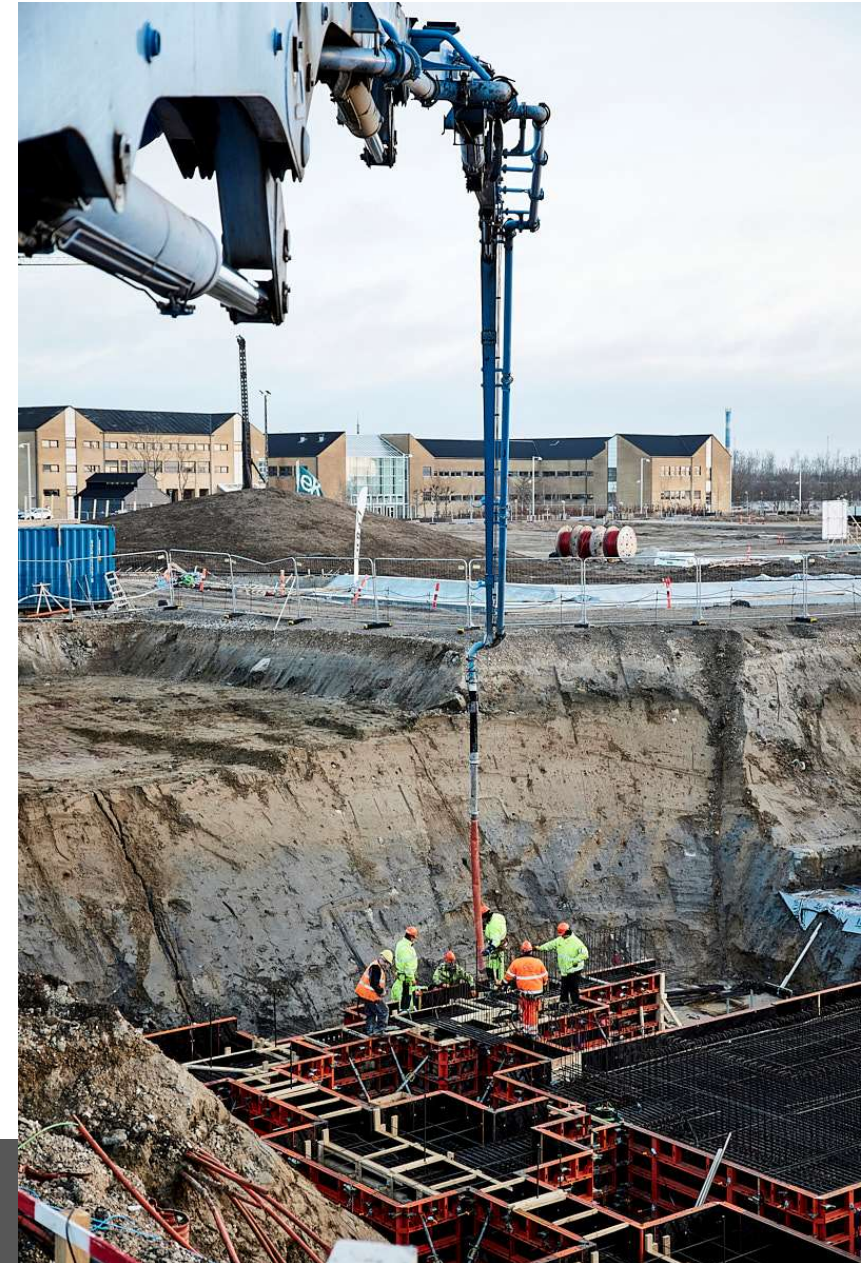


Matchmaking, market and scale

There is a market that exist, but it is not functioning, so it needs to be adapted and matchmaking needs to be made between the different chains in the flows & between the different stakeholders.

Scale would also be interesting and innovative – eg big public housing companies, if they start doing salvage jobs

FCRBE, Michael Ghyoot (EU expert within circular construction)



The market today

We could use much more recycled concrete in our fresh concrete than we do today, but we cannot get it in the right and documented quality at the right time.

Furthermore, today the Investor contacts us because they have a building to be demolished, which they would like to recycle into their own new building. Going directly from one building to another is great for demo-projects, but we end up with a individual supply line to every individual customer, and this doesn't work if using recycled concrete is going to become mainstream.

We have to find a more generic and efficient supply chain, to increase use of recycled concrete in fresh concrete.

(Jan Søndergaard Hansen, Unicon)

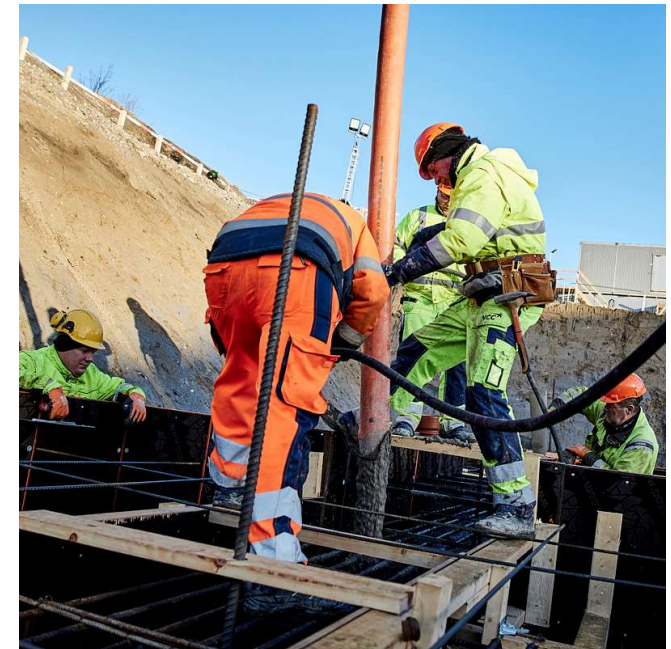


Main gaps

- Connecting actors and activities across long-term, large scale projects and between activities occurring at different system levels and over time.
- Connecting the waste sector and the building and construction sector with respect to legislation, actors and processes.
- Transformation from unwanted waste to needed resources requires specific treatment, quality standards and fulfilling end-of-waste criteria.
- From CDW management to resource management: different flows and logistics.
- Getting from waste economy to secondary resource economy eg functioning business models

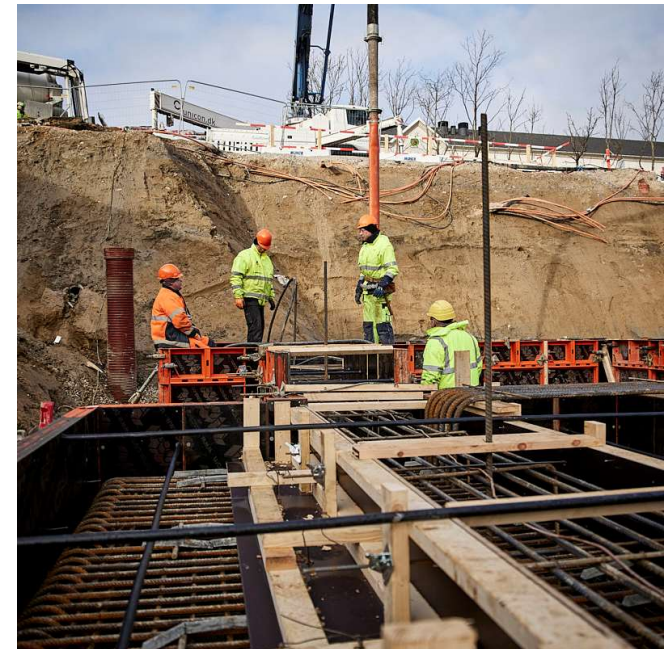
Four levels

- Strategic level (national/regional/municipal): framework conditions
- Tactical level (City/territorial): covering the transformation of the existing city to the future city, implementing circular economy in the building and construction sector
- Operational level (Building): project management of current or upcoming construction or urban development projects
- Resource level (Bricks etc): construction materials being used



Strategic level – framework conditions

- Framework conditions, legislation and administrative challenges and opportunities
- Shaped by EU, national, regional and local goals and policies e.g.:
- Territorial and urban development
- Resource management
- CO2emission and climate change
- Partnerships and private-public cooperation
- Job creation



Tactical level value chain: From existing to future city



AREA ASSESSMENT: SOCIAL, ENVIRONMENTAL, ECONOMIC AND TECHNICAL STATE OF THE ART

FUTURE SOCIAL CULTURAL AND TECHNICAL NEEDS FOR SUSTAINABLE CHANGES AND DEVELOPMENT/REHABILITATION

IDEAS, ECONOMIC MODELS, INVESTMENTS, ARCHITECTURAL AND TECHNICAL OPPORTUNITIES AND PROPOSALS

SUSTAINABLE SOLUTIONS, URBAN & LOCAL PLANNING, FUND RAISING, ACCEPTANCE, CE AND CO2 STRATEGIES

INDIVIDUAL PROJECT IMPLEMENTATION: E.G. DEMOLITION AND/OR NEW CONSTRUCTIONS/BUILDINGS PRESERVATION/RENOVATION OF BUILDINGS INFRASTRUCTURE OPEN SPACES EQUIPMENT

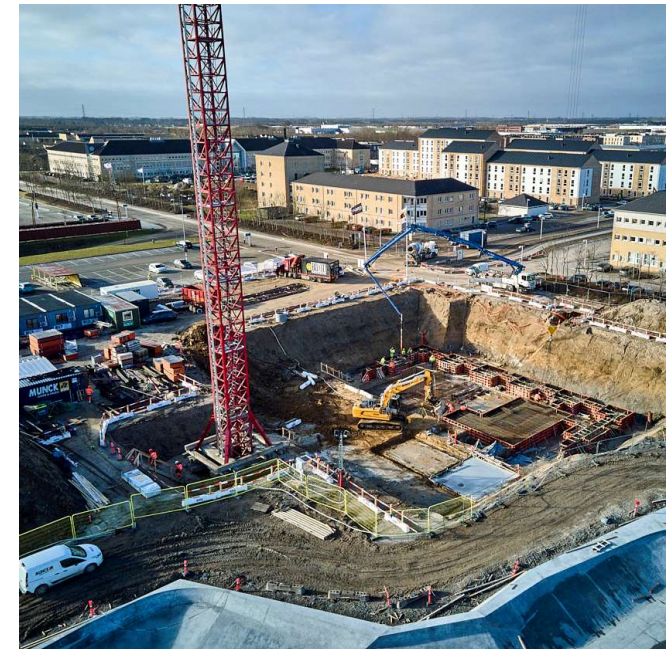
SALE RENTAL MOVING IN CULTURAL DEVELOPMENT SOCIAL SECURITY

SUPERVISION CLEANING REPAIR WORK CULTURAL AND SOCIAL STABILISATION

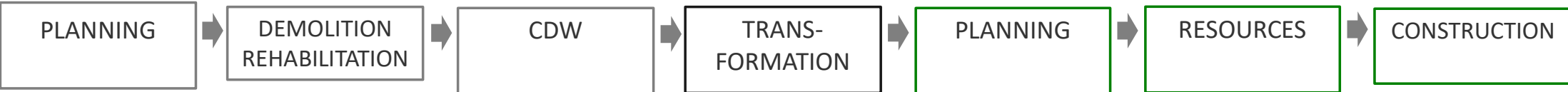
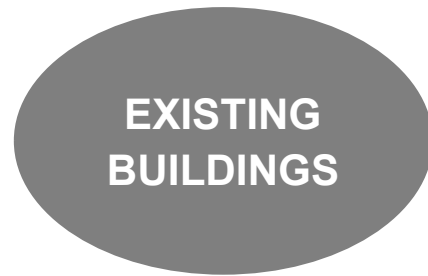
MONITORING SOCIAL AND CULTURAL SUSTAINABILITY AND DEVELOPMENT ADJUSTMENTS

Circular economy concept for the tactical level

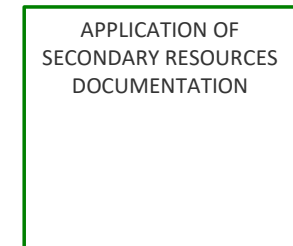
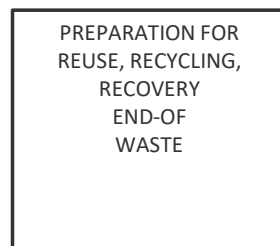
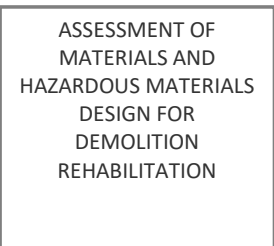
- Public and political commitment, strategy development (framework for planning)
- Planning and decision making: who, when and what knowledge
- Specification of needs and objectives for development in terms of demolition, rehabilitation and new constructions.
- Specifications of circular initiatives and solutions to be integrated in the activities and processes, incl creating jobs.
- Specification of conditions and framework for the projects, including economic budget frame.
- Specification of contributing partners, role and responsibilities.



Operational value chain: From existing to future buildings



ACTIONS:

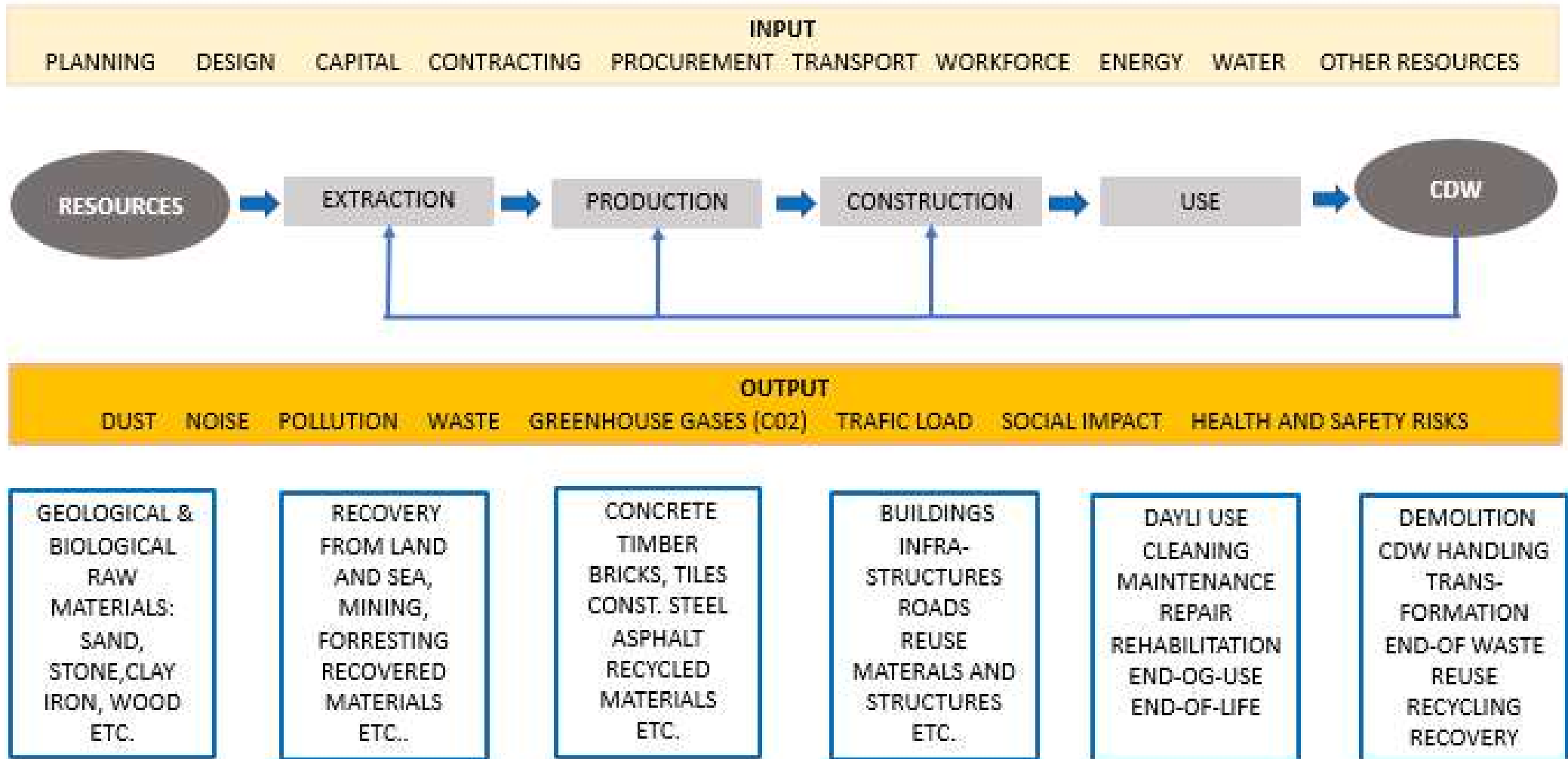


Central challenges at the operational level

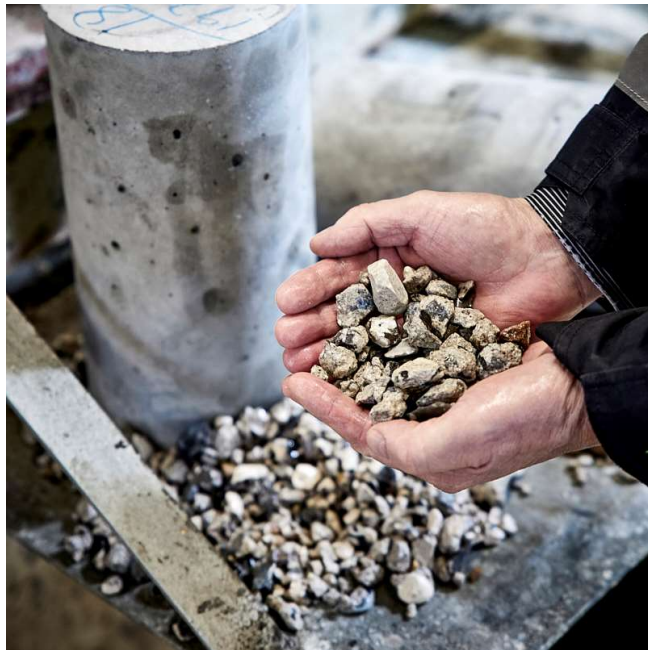
- Coordination of planning demolition and CDW management with planning of preservation, renovation, new constructions and resource needs
- Logistic matching of available reusing and recycling materials with need for resources/products,
- Establishment and management of material banks, markets platforms and other value and market issues including stakeholder and market actor commitment
- Risk assessment and management



Resource level value chain



Central challenges at the resource level



- Minimizing waste of resources during extraction, production, and construction (include this in vision)
- Monitoring and evaluation of resource strategy, access and efficiency
- Ensure clean and qualified (CE-marking) secondary resources and documentation of the streams
- Quality and value assessment of products and documentation
- Value based resource-hierarki regarding reduce/reuse/recycle