



Cost Benefit Analysis for CCCs

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Objectives



Business Models for CCCs:

Identify suitable and feasible business models for the implementation of CCCs

Analyse the potential benefits of each Business Model

Analyse the potential cost of each Business Model

Allocation of the cost & benefits of the different stakeholders of the construction supply chain

Dimensioning and quantification of the cost and benefits

Simulation Outputs

CCC facility dimensioning

CCC operations dimensioning (labor force & machinery)

Estimation of the incomes, savings and cost due to the CCC implementation

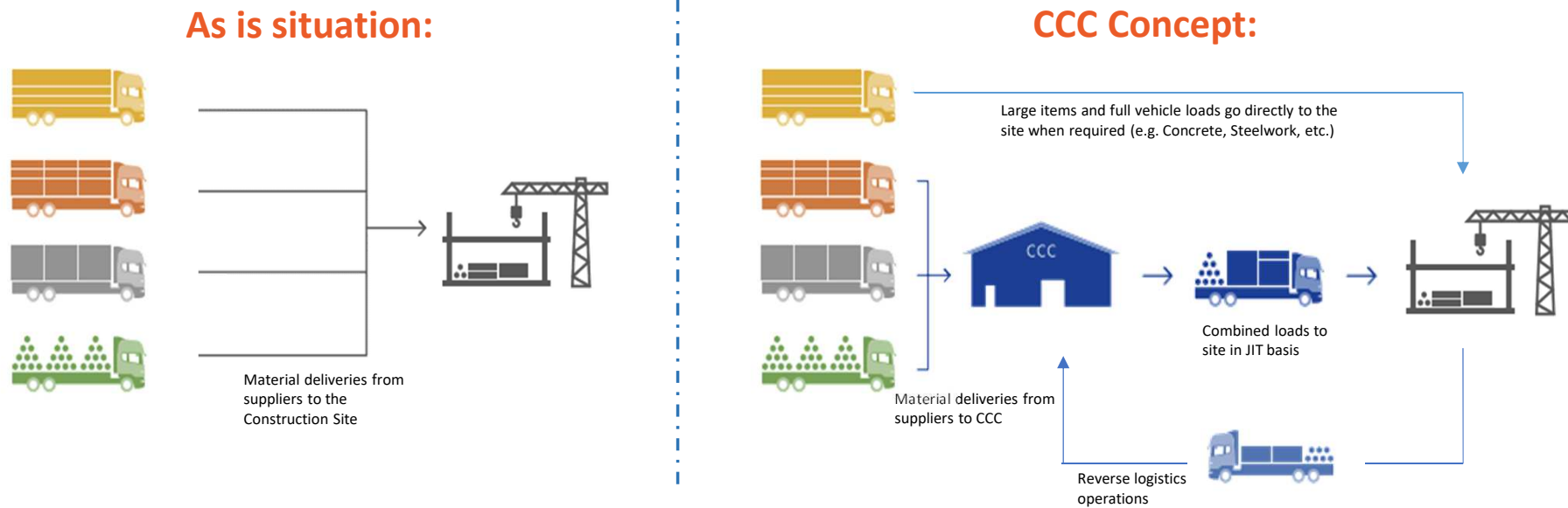
Assessment of the long term feasibility of the CCC



Overview of CCC's Scheme



Point of view of the Construction Company:



Definition:

A **Construction Consolidation Centre (CCC)** is a distribution facility through which material deliveries are channelled to construction sites. The material is handled with appropriate equipment and stored in dry and secure locations. On call off from the site, the CCC operator makes up consolidated loads and delivers them on a Just-In-Time basis.

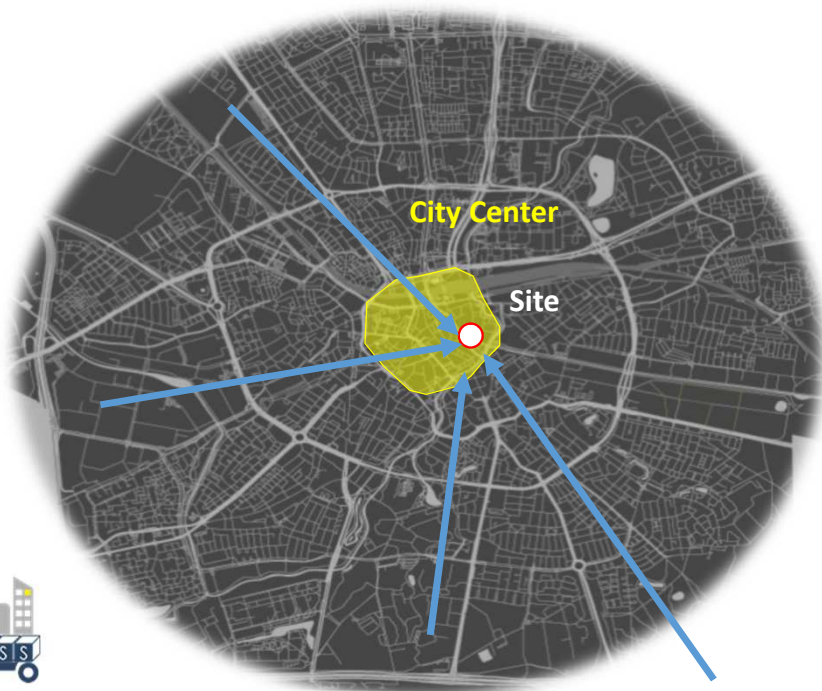


Overview of CCC's Scheme

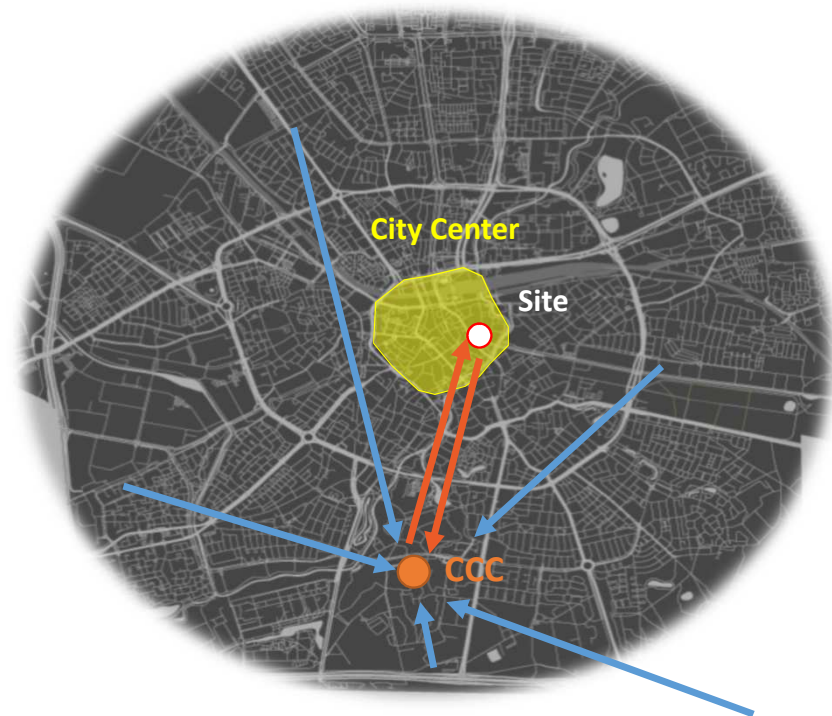


Point of view of the City:

As is situation:



CCC Concept:



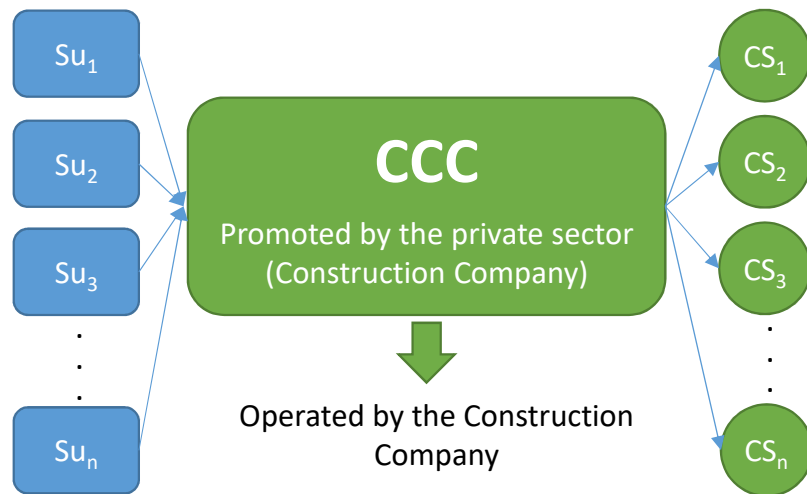
CCC Business Models



Business Model 1

Several **suppliers (Su)** serving different Construction Sites via the CCC

Several **Construction Sites (CS)** of one single Construction Company

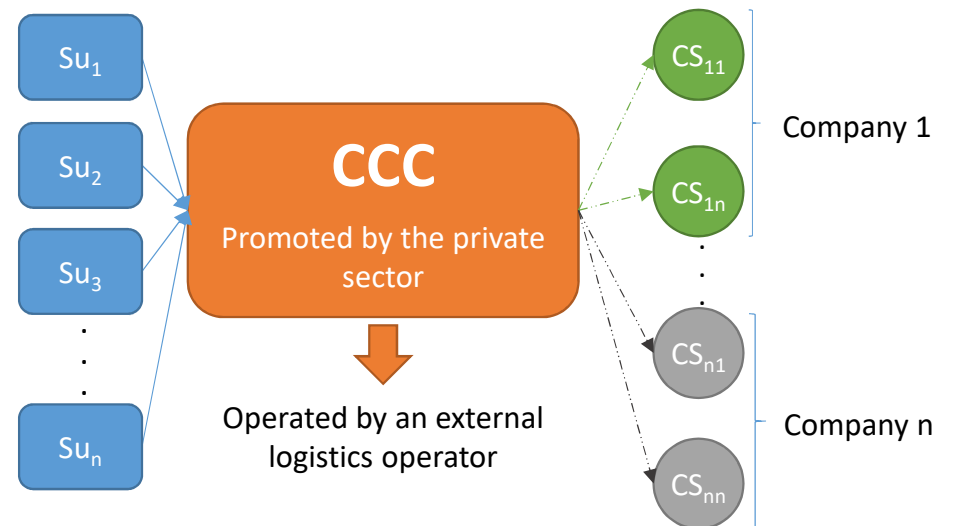


CCC as a Cost Center

Business Model 2

Several **suppliers (Su)** serving different Construction Sites via the CCC

Several **Construction Sites (CS)** of different Construction Companies



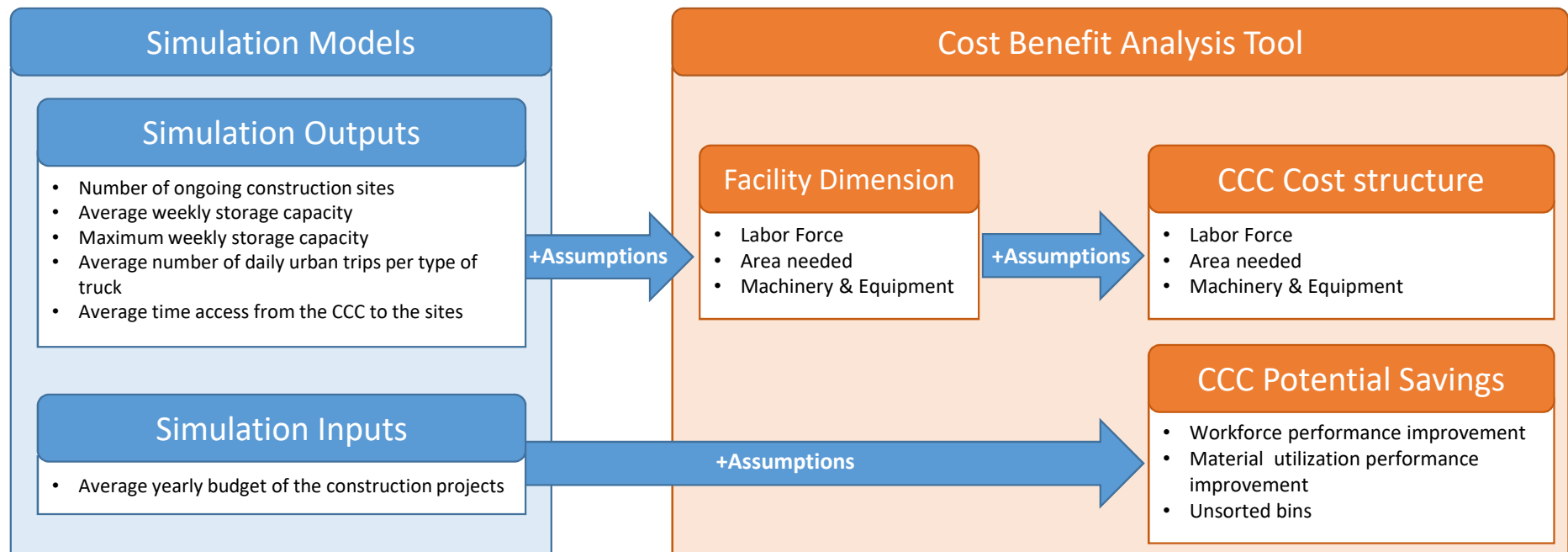
CCC as a Profit Center



Methodology BM 1



Business Model 1: CCC Managed by the Construction Company





Results BM 1



Business Model 1: CCC Managed by the Construction Company

Outputs of the simulation

Number of Construction Sites	11,7
Average daily deliveries per Construction Site	2,7
Average yearly Budget of all the Construction Projects	79.174.737 €
Average Weekly Storage Capacity needed [m3]	698,61 m3
Maximum Weekly Storage Capacity needed [m3]	1.242,17 m3
Number of Trucks	8 Units

Construction Company annual savings

Labor Force Savings [€/year]	1.187.621 €
Total Savings due to better utilization of Materials	1.108.446 €
Annual Savings due Unsorted Bins [€/year]	281.229

CCC Dimensioning:

CCC Facility Dimensioning

Final Facility Dimensioning [m2]	989 m2
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CCC Labor Force and Machinery Dimensioning

Manager	1
Operators	6
Drivers	8
Forklifts	3
Pallet trucks	3





Results BM 1



Business Model 1: CCC Managed by the Construction Company

Year	ALTERNATIVE 2 CCC	ALTERNATIVE 2. Using CCC											TOTAL BENEFITS ALTERNATIVE 2 INSTEAD OF ALTERNATIVE 1 (EUROS)
	INVESTMENTS (EUROS)	Additional Cost of CCC					Savings			CCC Summary			
		Facility Rent Costs (€)	Workforce Costs (€)	General expenses CCC (€)	Transport Costs (€)	Maintenance Costs (€)	Labor Force Savings [€/year]	Material Savings [€/year]	Unsorted Bins [€/year]	TOTAL ANNUAL COSTS	TOTAL ANNUAL SAVINGS	BENEFITS	
1	141.000	75.986	696.243	7.599	210.092	3.799	1.187.621 €	1.108.446 €	281.229 €	993.720 €	2.577.296 €	1.583.576 €	1.442.576
2	0	77.506	710.168	7.751	214.294	3.875	1.211.373 €	1.130.615 €	286.853 €	1.013.594 €	2.628.842 €	1.615.248 €	1.615.248
3	0	79.056	724.371	7.906	218.580	3.953	1.235.601 €	1.153.228 €	292.590 €	1.033.866 €	2.681.419 €	1.647.553 €	1.647.553
4	0	80.637	738.859	8.064	222.952	4.032	1.260.313 €	1.176.292 €	298.442 €	1.054.543 €	2.735.047 €	1.680.504 €	1.680.504
5	-6.600	82.250	753.636	8.225	227.411	4.113	1.285.519 €	1.199.818 €	304.411 €	1.075.634 €	2.789.748 €	1.714.114 €	1.720.714

NPV	6.992.957 €
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Percentage of benefits compared to the annual projects budget
1,82%
2,04%
2,08%
2,12%
2,17%



Summary of the Results: BM1



Business Model 1: CCC Managed by the Construction Company

	Annual Budget	Nº of Construction Sites	Nº of daily deliveries per site	Average Weekly Capacity	CCC Size	NPV **
Luxembourg*	10,4 M€	1	3	120m ³	200m ²	<0
Paris	148 M€	3	4,6	760m ³	1080m ²	14,8 M€
Valencia	71,8 M€	8	3,14	1227m ³	1737m ²	5,23M€
Verona	17,6 M€	24	0,25	109m ³	155m ²	<0



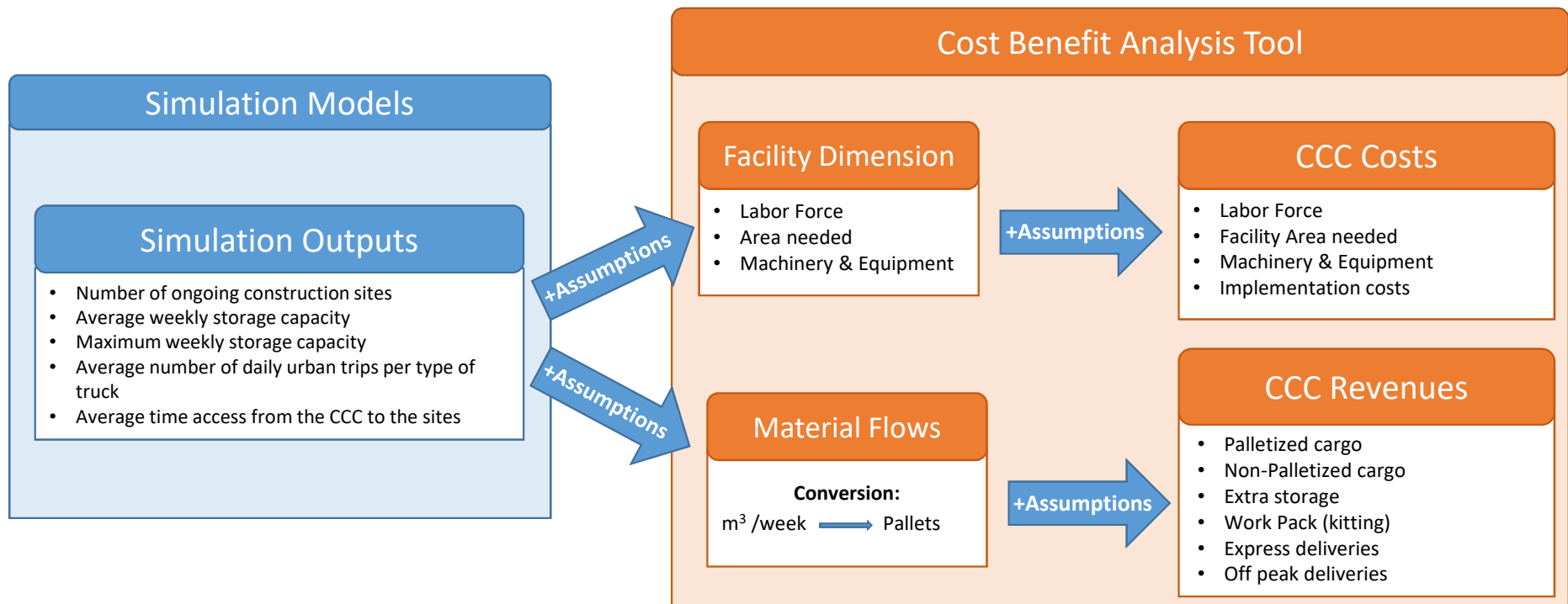
* SC2 for the Luxembourg case

** NPV after 5 years of CCC operations. 2 years for the Luxembourg case

Methodology BM 2



Business Model 2: CCC Managed by a Logistics Operator:





Results BM 2



Business Model 2: CCC Managed by a Logistics Operator:

Outputs of the simulation & assumptions

Average Distance from CCC to Construction Sites [km]	6,53 km
Number of Working days per year	255 Days
Number of Construction Sites	19 sites
Daily Average Deliveries per Construction Site	2,66 Deliveries
Average Weekly Storage Capacity needed [m3]	1.904,37 m3
Maximum Weekly Storage Capacity needed [m3]	3.486,43 m3
Price per Standard Pallet Moved [Euros/pallet]	10,0 €/Pallet
CCC Rental Cost [Euros/m2/month]	6,4 €/m2/month
Operational Transport Cost [€/km]	1,52 €/km

CCC Dimensioning:

CCC Facility Dimensioning	
Storage Area Needed [m2]	1.111 m2
Facility Dimensioning - Total Area Needed [m2]	2.896
Final Facility Dimensioning [m2]	3.620 m2
CCC Labor Force and Machinery Dimensioning	
Manager	1
Other Personnel	2
Operators	11
Drivers	8
Forklifts	5
Other Machinery	5



Results BM 2



Business Model 2: CCC Managed by a Logistics Operator:

Year	Alternative 1: Current Situation Without CCC	Alternative 2: CCC Implementation									TOTAL BENEFITS ALTERNATIVE 2 INSTEAD OF ALTERNATIVE 1 (EUROS)
	Investments	Investments	Vehicles Operational Costs (Euros)	CCC General Expenses (Euros)	CCC Rental Cost (Euros)	CCC Personnel Costs (Euros)	Total Revenues (Euros)	TOTAL ANNUAL COSTS	TOTAL ANNUAL REVENUES	BENEFITS	
1	0	640.467	133.879	41.704	278.025	906.975	1.749.408	1.360.583 €	1.749.408 €	388.825 €	-251.642
2	0	0	136.557	42.538	283.586	925.115	1.784.396	1.387.795 €	1.784.396 €	396.602 €	396.602
3	0	0	139.288	43.389	289.258	943.617	1.820.084	1.415.551 €	1.820.084 €	404.534 €	404.534
4	0	0	142.073	44.256	295.043	962.489	1.856.486	1.443.862 €	1.856.486 €	412.624 €	412.624
5	0	0	144.915	45.142	300.944	981.739	1.893.616	1.472.739 €	1.893.616 €	420.877 €	420.877
6	0	20.656	147.813	46.044	306.962	1.001.374	1.931.488	1.502.194 €	1.931.488 €	429.294 €	408.638
7	0	0	150.770	46.965	313.102	1.021.401	1.970.118	1.532.238 €	1.970.118 €	437.880 €	437.880
8	0	0	153.785	47.905	319.364	1.041.829	2.009.520	1.562.882 €	2.009.520 €	446.638 €	446.638
9	0	0	156.861	48.863	325.751	1.062.666	2.049.710	1.594.140 €	2.049.710 €	455.570 €	455.570
10	0	-39.200	159.998	49.840	332.266	1.083.919	2.090.705	1.626.023 €	2.090.705 €	464.682 €	503.882

NPV 2.660.188,14 €



Summary of the Results: BM2



Business Model 2: CCC Managed by a Logistics Operator:

	Nº of Construction Sites	Nº of daily deliveries per site	Average Weekly Capacity	CCC Size	NPV *
Luxembourg	14	3,86	3266m ³	6075m ²	3,95 M€
Paris	10	4,6	2295m ³	4324m ²	2,4M€
Valencia	14	3,14	2963m ³	5528m ²	10,5 M€
Verona	32	0,25	455m ³	1008m ²	<0



* NPV after 10 years of CCC operations

** Constant price per pallet moved in all cities (10€/pallet)

General Conclusions



- ❑ CCCs could be a feasible solution, but they are not **THE** solution.
- ❑ There isn't any generic formula for the assessment of CCCs feasibility → Needs an **ad-hoc study**
- ❑ Different approaches and business models to implement a CCC:
 - Own CCC (cost center) → Strategic decision for the company
 - CCC as a service → New actor in the supply chain → New paradigm for the industry?
- ❑ CCCs are not applicable to all type of construction projects and scenarios
- ❑ The feasibility highly depends on the possibility to reach economies of scale to compensate the extra cost, thus:
 - Big construction sites under certain conditions
 - CCC serving several sites in long-term basis
- ❑ Difficult cost/benefit allocation but also non-monetized benefits (i.e. punctuality)

Thank you for your kind attention!

