SUCCESS

***S**ustainable **U**rban **C**onsolidation **C**entr**ES** for con**S**truction*

Project presentation

RIFKIN ET LA LOGISTIQUE DE LA CONSTRUCTION

Un scénario d'optimisation pour le Luxembourg

Luxembourg City, March 23, 2018

Presented by:

F. FERRERO & C. GUERLAIN

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST

2020 CIVITAS Cleaner and better transport in cities

THE CIVITAS INITIATIVE IS CO-FINANCED BY THE EUROPEAN UNION

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 633338.

Id Card

- SUCCESS (SUCCESS: Sustainable Urban Consolidation CentrES for ConStruction) is one of the few projects focusing on improving freight transport for the construction sector.
- Urban logistics is a key issue for our urban societies: transport in the final link of the logistics chain is clearly visible to the population and it accounts for approximately 20% of the overall cost of transport while representing 1% of distance covered [1]
- According to the European Commission, the construction industry accounts today for 40% of the EU's total energy consumption, which produces about 35% of all greenhouse gas emissions [2] [3]
- Construction is an industry sector scarcely affected by innovation, so the room for improvement is wide. Since 1995 the global average value-added per hour has grown at around a quarter of the rate in manufacturing. According to McKinsey no industry has done worse [4]

Coordinator: Luxembourg Institute of Science and Technology
Total costs: 3,242,848M€
EC contribution: 3,242,848M€
Start date: 1/5/2015
Duration: 36 months

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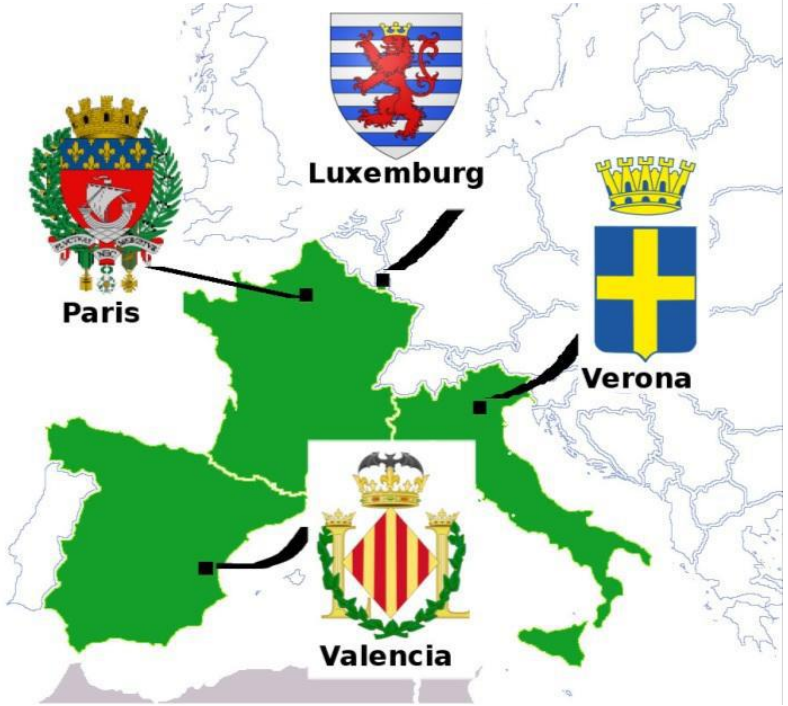
Consortium

Luxembourg Institute of Science and Technology
Fondazione Istituto sui Trasporti e la Logistica
Università degli Studi di Modena e Reggio Emilia
Fundacion de la comunidad valenciana para la investigación, promoción y estudios comerciales de Valenciaport

C.M.B. Società cooperativa Muratori e Braccianti di Carpi
Federacion Valenciana de Empresarios de la Construccion
Tralux Sarl
Vinci Construction France

Association pour le développement de la formation professionnelle dans les transports
Las Naves, Espai d'innovació i creació
Regione Emilia Romagna

4 Pilot Sites:



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Pilot Sites

Luxembourg (Luxembourg)

- 11,400 m²
- 21 M€
- Refurbishment & construction of apartments, shops, offices

Paris (France)

- 55,475 m²
- 230 M€
- Conversion of two buildings into a single complex with offices

Valencia (Spain)

- 7,772 m²
- 16 M€
- Renovation of historic buildings and construction of new ones

Verona (Italy)

- 83,914 m²
- 126 M€
- Enlargement and renovation of two hospitals

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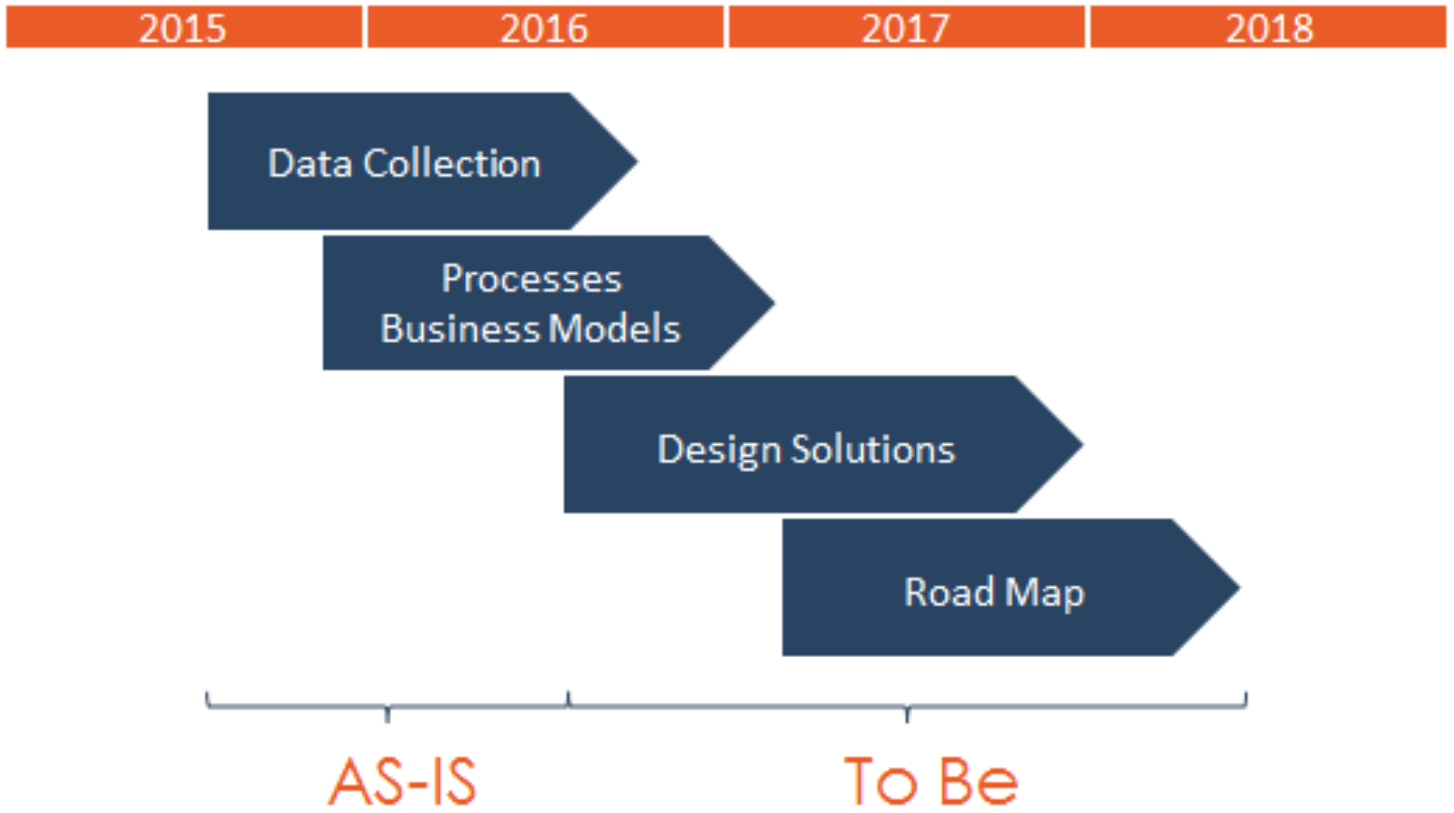
Approach



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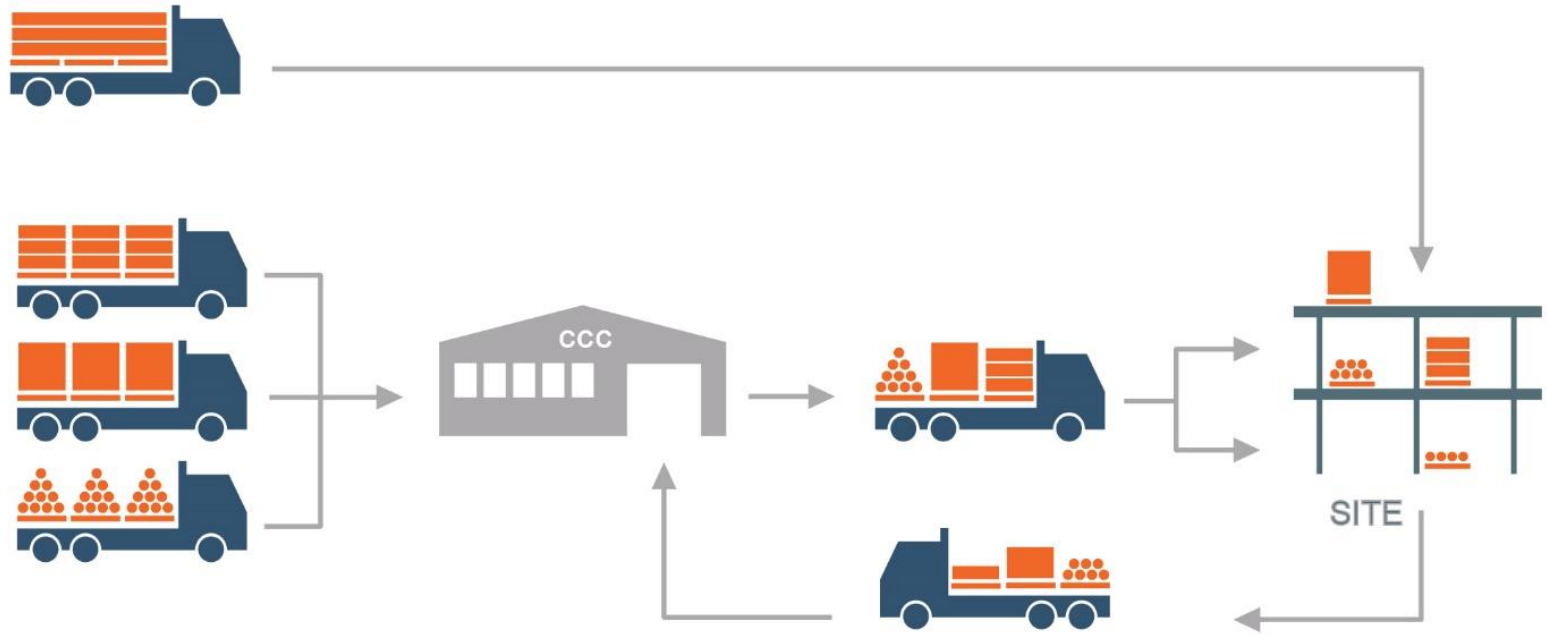
The CCC: A Potential Solution?

- A UCC serving one or more construction site(s)
- Temporary or permanent
- Offers services to one or several construction companies
- Used on a voluntary or compulsory basis
- Operated by a logistics operator or construction company



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Services

Basic services:

Cross docking → Consolidation → Transport to site

Value added services that can be sold to the users:

- Warehousing
- Work packing/Kitting
- 24 hours service
- Quality control
- Reverse logistics
- Express deliveries
- Manage reception on site
- Off-site assembling (pre-fabricated)
- Rent equipment
- Mock-up space

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LCCC

London Construction Consolidation Centre

- London (UK), South of City of London Airport, 40 min drive to central London
- Permanent CCC (from 2008)
- Voluntary scheme
- Operated by Wilson James, a construction logistics provider
- Multi-users and Multi-sites
- Constraint environment with the LEZ and the congestion charging zone
- Gold FORS accreditation and CLOCS Champion
- Services at the CCC: warehousing (fees after 30 days), quality control, 24/7 security, pre-assembly, waste removal
- Services on site : security, traffic management, welfare, forklift driver

15,000m² (of which 2,000m² open air)

Up to 250,000 pallets per year throughput

8 people at LCCC, 1 site manager, 42 people on site, of which 7 waste operators and 7 materials handling operators

5 bio-diesel vehicles

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Hammarby Waterfront Logistic Centre

- Stockholm (Sweden), CCC adjacent to the site area
- Temporary CCC (2001-2004)
- Mandatory scheme
- Operated by a subcontractor
- Multi-users and Multi-sites
- Support of the public authorities for the CCC implementation and operations (funding support)
- Services at the CCC: JIT deliveries, warehousing (fees after 5 days), work pack creation, labelling

7,500m²

10 people

8 Euro IV vehicles

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Benefits

For construction companies

- Improves **productivity**
- Improves **trucks' punctuality**
- Reduces **time dedicated to logistics activities**
- Reduces **material cost**
- Reduces the **cost of unsorted bins**
- Improves **safety**
- Reduces **congestion on construction sites**

For suppliers/carriers

- Reduces journey time
- Increases flexibility
- Increases **construction site punctuality**

For local authorities

- Reduces **pollutant emissions (CO_2, PM, NO_x…)**
- Reduces **congestion in the urban areas**
- Reduces **rate of obstructing vehicles**
- Improves **safety**

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Impact of a CCC in the 4 cities

Expected benefits	Indicators	Average quantified impacts in the pilot sites	Simulation results	Luxembourg	Paris	Valencia	Verona
Reduction of congestion	Daily number of freight vehicles both for direct and reverse logistics	-40%	-42%	Up to 48%	Up to 42%	Up to 48%	Up to 54%
Reduction of transport related pollutant emissions	CO_2 emissions NOx emissions PMx emissions	-40%	-13% -8% -23%	Up to 33% Up to 41% Up to 30%	Up to 13% Up to 8% Up to 23%	Up to 31% Up to 39% Up to 26%	Up to 19% Up to 22% Up to 19%
Vehicle use & route optimisation	Kilometres / day travelled by vehicles	-20%	-20%	Up to 42%	Up to 20%	Up to 34%	Up to 23%
	Small deliveries (fewer than 4 pallets)	-50%	-100%	100%	Up to 100%	Up to 100%	Up to 100%
Maximise load factor	% Increase load factor	30%	+52%	Up to 41%	Up to 52%	Up to 44%	Up to 220%
Economic savings	Payback			Year 1*	Year 1	Year 1	Year 1

* Under specific conditions

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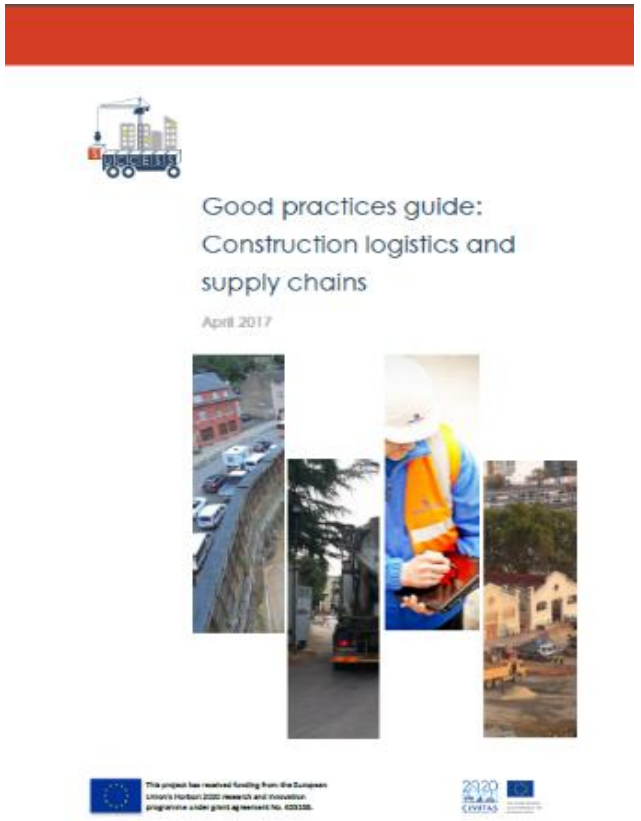
Methodologies and tools

- A CBA tool for a CCC
- A CCC location tool
- A solution selection tool
- A handbook on good practices
- A decision support system for a smarter and more sustainable construction logistics



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Step 1 — Urban complexity profile

Step 2 — Site complexity profile

Step 3 — Logistics profile

Step 4 — Action plan

Which kind of logistics profile is your construction project ?

The test provides both local authorities and construction companies a framework for making the construction logistics and supply chain more efficient.

It is designed to assess the logistics complexity of a construction project and explore solutions adapted to your profile among 75 solutions to address the logistics challenges.

Follow the 4 step approach.

Take the test

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SUCCESS - Demonstration platform

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Step 1 — Urban complexity profile
Step 2 — Site complexity profile
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Step 4 — Action plan

Where is the site located?

- in the suburbs of a small city
- in the centre of a small city OR in the suburbs of a medium city
- in the suburbs of a large city OR in the centre of a medium city
- in the centre of a large city
- don't know

How is the neighboured environmental sensitivity?

- low (e.g. industrial area of a city)
- moderate (e.g. suburbs)
- high (e.g. residential area)
- very high (e.g. touristic area with historical heritage or cultural value)
- don't know

How regulation constrain freight activities in the city?

- low (e.g. height limitation)
- moderate (e.g. restriction on unloading zones)
- high (e.g. time-window regulations)
- very high (e.g. very strict time-window regulations, congestion charge)
- don't know

What is the maturity level of local authorities?

- extrelely mature (e.g. the city dematerialises contact points)
- moderately mature (e.g. a single contact point, an e-form for each service)
- slightly mature (e.g. several contact points)
- not at all mature (e.g. lack of a clear contact point)
- dont know

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Step 1 — Urban complexity profile
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Urban area logistics profile

is taking place in an urban area:

Slightly complex | **Moderately complex** | Very complex | Extremely complex

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CIVITAS

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Step 1 — Urban complexity profile
Step 2 — Site complexity profile
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Step 4 — Action plan

What is the construction turnover?

- ○ < 20 M€
- ◉ between 20 and 50 M€
- ○ between 50 and 100 M€
- ○ > 100 M€
- ○ dont' know

What is the building size?

- ○ < 10.000 m²
- ○ between 10.000 and 25.000 m²
- ◉ between 25.000 and 50.000 m²
- ○ > 50.000 m²
- ○ dont' know

What is the storage capacity on the site?

- ○ < 0.3
- ◉ between 0.3 and 0.7 and storage not fragmented or located on the same level
- ○ between 0.3 and 0.7 and storage fragmented or located on different levels
- ○ > 0.7
- ○ dont' know

How fast do you have to deliver the project?

Ratio of the gross floor area (expressed in m²) to the duration of the project (expressed in month).

- ○ < 500m2/month
- ○ between 500 and 1.000m2/month
- ◉ between 1.000 and 2.000m2/month
- ○ > 2.000m2/month
- ○ don't know

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Step 1 — Urban complexity profile
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Construction site logistics profile

is a construction site:

Slightly complex | Moderately complex | **Very complex** | Extremely complex

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Step 1 — Urban complexity profile

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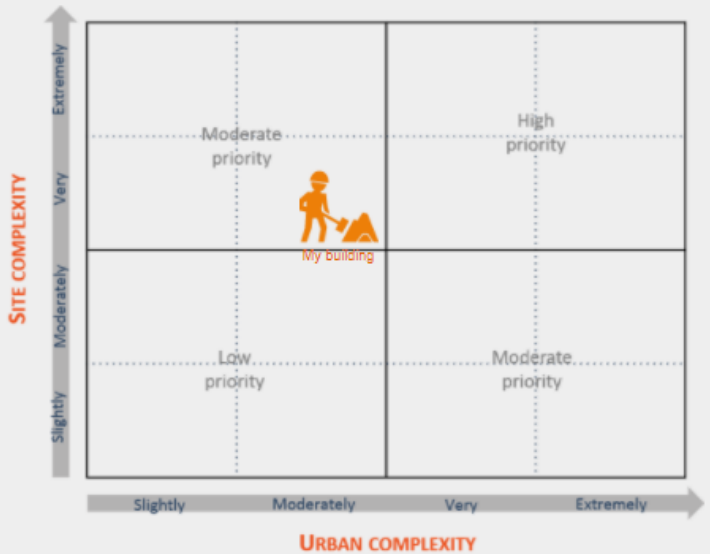
My building: Moderate priority

Plan your actions

My building is **a moderately complex** construction site in **a very complex** constraint city.

Register to receive your result by email.



Plan your actions (all sites)

Add a site

- [x] **Safety**
  - [x] Increase safety on the construction site
  - [x] Increase safety outside the construction site — *Priority:* − 1 +
- [ ] **Security**
  - [ ] Reduce damaged materials
  - [ ] Reduce stolen or lost of material and equipment
- [ ] **Organisational and economic efficiency**
  - [ ] Reduce congestion
  - [ ] Improve SC efficiency
  - [ ] Improve logistics efficiency
  - [ ] Reduce material stored on site
  - [ ] Increase the level of control and reliability of the deliveries schedule
- [ ] **Compliance**
  - [ ] Social compliance
  - [ ] Environmental compliance
- [ ] **Environment**
  - [ ] Decrease noise generated by the deliveries
  - [ ] Reduce dust pollution in and outside the construction site
  - [x] Reduce transport emissions — *Priority:* − 2 +
  - [ ] Reduce waste

Step 1 — Urban complexity profile

Step 2 — Site complexity profile

Step 3 — Logistics profile

Step 4 — Action plan

Solutions adapted to your context

Choose your solutions

	Cost	Time	Difficulty	Resources	Pre-requisite	Management	Control	Global
☑ Construction Logistics Plan (score: 6)	★☆☆	★★☆	★★☆	★☆☆	★★☆	★★★	★★★	★★★
☑ Construction Consolidation Centre (score: 3.6)	★★★	★★★	★★★	★★★	★★☆	★★★	★★★	★★★
☑ Off peak time for deliveries (score: 3)	★★☆	★☆☆	★★☆	★☆☆	★☆☆	★☆☆	★☆☆	★★☆
☐ Speed limits inside (score: 2.86)	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★★☆	★★☆	★★☆
☐ Manoeuvring guide (score: 2.25)	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★★☆	★★☆	★★☆
☐ Centralisation of waste collection (score: 2)	★★☆	★★☆	★☆☆	★☆☆	★☆☆	★★☆	★★☆	★★☆
☐ Speed limits outside (score: 2)	★☆☆	★☆☆	★★☆	★☆☆	★☆☆	★★☆	★★☆	★★☆
☐ Recordkeeping and reporting damages, injuries and illnessess (score: 2)	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★★☆	★★☆	★☆☆
☐ Consolidation (score: 1.8)	★★☆	★★☆	★★☆	★★☆	★☆☆	★★☆	★★☆	★★☆
☐ Entry / exit Gate (score: 1.8)	★☆☆	★☆☆	★☆☆	★☆☆	★☆☆	★★★	★★★	★★☆
☐ Housekeeping plan (score: 1.5)	★☆☆	★☆☆	★★★	★☆☆	★☆☆	★★★	★★★	★★☆
☐ Authorisation to use public space for storage / delivery (score: 1.33)	★★☆	★☆☆	★★☆	★★☆	★★★	★☆☆	★☆☆	★★★

Define during the planning process for the construction work how the project will be run and managed to improve freight vehicles' movement to and from construction sites and storing construction materials and removing waste in a safe, efficient and environmentally friendly way. See Good Practice PO1 – Construction Logistics Plan in deliverable D6.1 for further details and examples

Step 1 — Urban complexity profile

Step 2 — Site complexity profile

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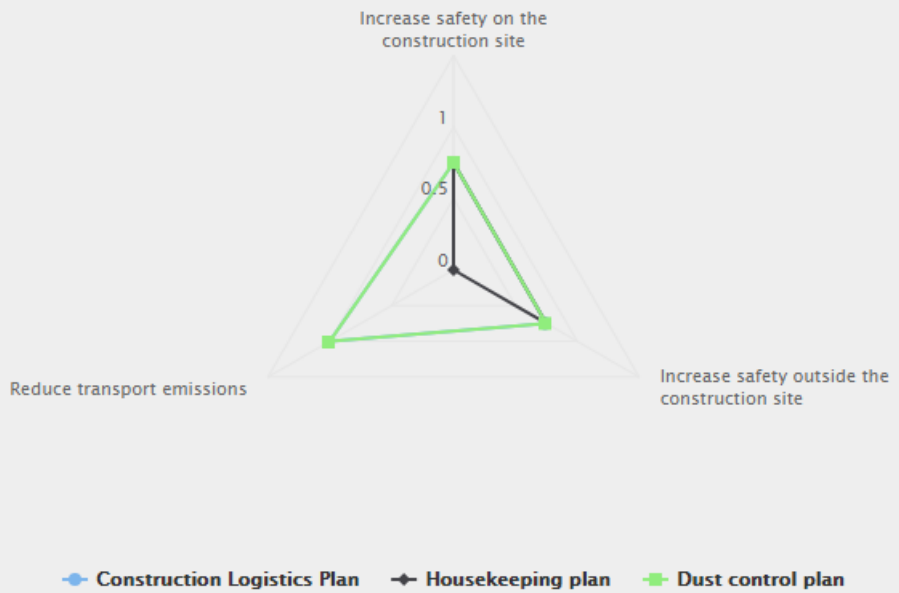
Your personalised report



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Sign In | Register

CCC Concept — Select your Profile — Results

EN | ES | FR | IT

Select your profile

Construction Company

Logistic Operator

Material Supplier

Public Authority

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CCC Concept — Select your Profile — Results

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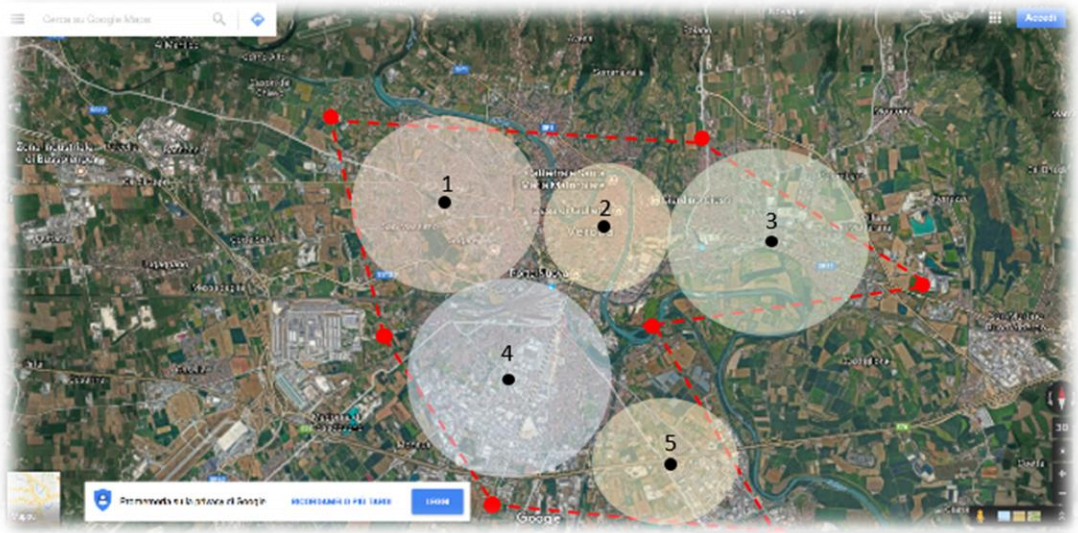
Definition of the Urban Area

Future Construction Sites



Area	Type of building	Quantity	Size
1	Offices and shops	5	Medium
1	Offices and shops	1	Large
2	Apartments	15	Medium
2	Offices and shops	2	Small
…			

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Construction Consolidation Center

Specific Input data – Scenario 1 & 2

		Units
	Budget of all the projects served via CCC	(€)
	Percentage of labor force cost compared to the total budget of the projects	(%)
	Percentage of materials cost compared to the total budget of the projects	(%)

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Construction Consolidation Center

General Benefits for Construction Companies

- ✓ Productivity improvement of the labour force
- ✓ Better material use due to fewer stolen and damaged materials
- ✓ Better delivery reliability and punctuality
- ✓ Increase safety conditions on site due to the reduction of material handling
- ✓ Just In Time benefits applied to the construction industry
- ✓ Reduce stock on site
- ✓ Less vehicles on site and better delivery planning
- ✓ Waste reduction and possibility to use round trips for reverse logistics

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Construction Consolidation Center

Results Scenario 1 & 2 – Economic Savings

Annual Labor force savings

[ ] €/year

Annual savings of materials wasted, damaged and stolen

[ ] €/year

Annual savings due to unsorted bins

[ ] €/year

Annual savings due to other performance improvements on site

[ ] €/year

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Construction Consolidation Center

Results Scenario 2 - Dimensioning

Facility Dimensioning

- ☐ Storage Surface Needed in the CCC [m2]
- ☐ Facility Surface Needed [m2]

Fleet Dimensioning

- ☐ Number of 2 axes trucks (7.5 tones)
- ☐ Number of 3 axes trucks (15 tones)
- ☐ Number of vans (3.5 tones)
- ☐ Number of articulated trucks (40 tones)

Labor force and Machinery Dimensioning

- ☐ Manager
- ☐ Operators
- ☐ Drivers
- ☐ Other Personnel
- ☐ Forklifts
- ☐ Pallet transporter

Note: This results have been obtained based on assumptions. Please, use this results as a reference.

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Construction Consolidation Center

Results Scenario 2 – CBA Analysis

Year	ALTERNATIVE 1 No CCC	ALTERNATIVE 2 CCC		ALTERNATIVE 1. CURRENT SITUATION	ALTERNATIVE 2. Using CCC											TOTAL BENEFITS ALTERNATIVE 2 INSTEAD OF ALTERNATIVE 1 (EUROS)
					Additional Cost of CCC					Savings			CCC Summary			
	INVESTMENTS (EUROS)	INVESTMENTS (EUROS)			Facility Rent Costs (€)	Workforce Costs (€)	General expenses CCC (€)	Transport Costs (€)	Maintenance Costs (€)	Labor Force Savings [€/year]	Material Savings [€/year]	Performace Savigns [€/year]	TOTAL ANNUAL COSTS	TOTAL ANNUAL SAVINGS	BENEFITS	
1	0	757.816		0 €	151.200	730.643	37.800	40.625	8.280	708.522 €	474.715 €	144.913 €	968.548 €	1.328.150 €	359.602 €	-398.214
2	0	0		0 €	154.224	745.255	38.556	41.438	8.446	722.692 €	484.209 €	147.811 €	987.919 €	1.354.713 €	366.794 €	366.794
3	0	0		0 €	157.308	760.160	39.327	42.267	8.615	737.146 €	493.893 €	150.767 €	1.007.677 €	1.381.807 €	374.130 €	374.130
4	0	0		0 €	160.455	775.364	40.114	43.112	8.787	751.889 €	503.771 €	153.783 €	1.027.831 €	1.409.443 €	381.613 €	381.613
5	0	0		0 €	163.664	790.871	40.916	43.974	8.963	766.927 €	513.847 €	156.858 €	1.048.387 €	1.437.632 €	389.245 €	389.245
6	0	10.800		0 €	166.937	806.688	41.734	44.854	9.142	782.266 €	524.124 €	159.996 €	1.069.355 €	1.466.385 €	397.030 €	386.230
7	0	0		0 €	170.276	822.822	42.569	45.751	9.325	797.911 €	534.606 €	163.196 €	1.090.742 €	1.495.713 €	404.970 €	404.970
8	0	0		0 €	173.681	839.279	43.420	46.666	9.511	813.869 €	545.298 €	166.459 €	1.112.557 €	1.525.627 €	413.070 €	413.070
9	0	0		0 €	177.155	856.064	44.289	47.599	9.701	830.146 €	556.204 €	169.789 €	1.134.808 €	1.556.139 €	421.331 €	421.331
10	0	-23.285		0 €	180.698	873.185	45.174	48.551	9.895	846.749 €	567.328 €	173.184 €	1.157.504 €	1.587.262 €	429.758 €	453.043

NPV	2.300.887 €
IRR	93,7%

Click here to download the complete analysis

Note: This results have been obtained based on assumptions. Please, use this results as a reference.

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Construction logistics & circular economy

- Materials can make up to 30% of the tons carried in cities

The World Bank, Laetitia Dablanc

- Material costs represent 30-40% of the total construction costs

SUCCESS project

- Transport accounts for 10-20% of construction costs

Building Research Establishment

- C&D waste is the largest waste stream in the EU (30%)

European Commission

- Opportunities for the urban mining with the increase of refurbishments

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A better logistics

- better sorting (better waste management)
- better material storage
- secure place
- decrease transport impact
- reverse logistics

Bins at each floor
Source: Vinci Construction France

New provisional locked door
Source: TRALUX

Waste team sorting the waste
(Source: Tralux)

(source : Delta Partners)

River transport to deliver a worksite in Paris
Source: Coalis website

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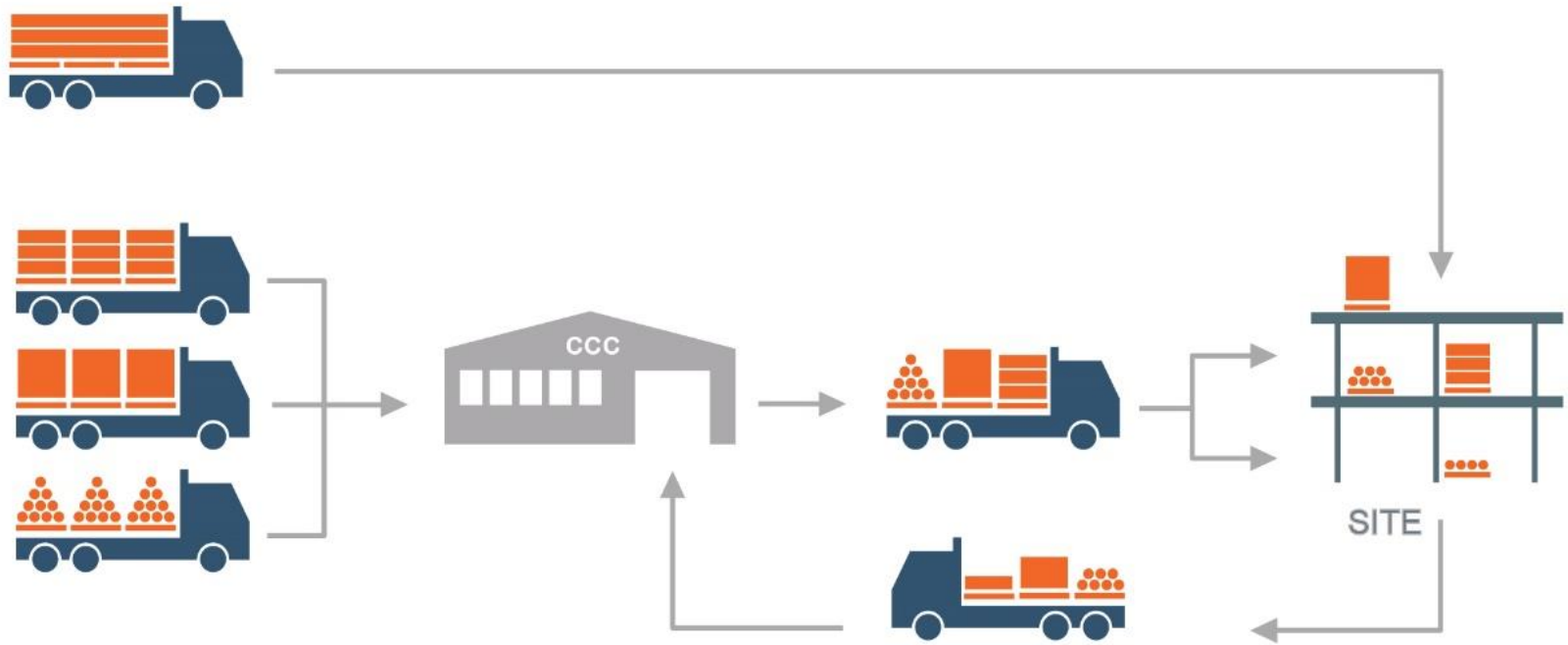
CCC: support to the circular economy

The CCC offers better conditions to reduce the environmental impact of transport



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CCC: support to the circular economy

The CCC offers better conditions to reduce waste with a reverse logistics

- Recycle

Source : WRAP

- Repair
- Reuse (in situ or not)

Source : Rotor

Source : Louis De Waele & NAD

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CCC: support to the circular economy

The CCC offers better conditions to reduce waste with a reverse logistics

- Recycle

Source : WRAP

Need for storage, transportation, distribution, packaging and processing

- Repair
- Reuse (in situ or not)

Source : Rotor

Source : Louis De Waele & NAD

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CCC: support to the circular economy

The CCC offers better conditions to reduce the quantity of construction materials

- less damage
- less loss
- less thief
- less over-ordering

The CCC provides

- appropriate handling equipment
- secure and dry storage
- dedicated logistics team

Source : Sainsbury' s CCC

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Next event

CIVITAS Urban Freight Conference

Practical info

Date : 23-24 April 2018

Venue : La Tricoterie | 158, rue Théodore Verhaegen | 1060 Brussels

Language : English

Registration fees : Free but registration is mandatory

Contact : event@list.lu

Register on www.polisnetwork.eu

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Thank You for Your Kind Attention!

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