THE LOW CARBON REAL ESTATE & CONSTRUCTION SERVICES PLAYBOOK

HOW TO ACCELERATE DECARBONIZATION WHILE GROWING YOUR BUSINESS

A guide for service firms

THE LOW CARBON REAL ESTATE & CONSTRUCTION SERVICES PLAYBOOK

Life-cycle assessment (LCA) is a scientific approach to assessing lifetime environmental impact. For real estate and construction, the objective data and long-term perspective provided by LCA is critical to meeting the industry's low carbon targets.

However, too often, the benefits of LCA are seen purely in the context of gaining certification credits. This narrow focus can result in life-cycle metrics being used too late in a project, when opportunities to make significant cost and carbon savings have effectively been lost.
This resource aims to change that.

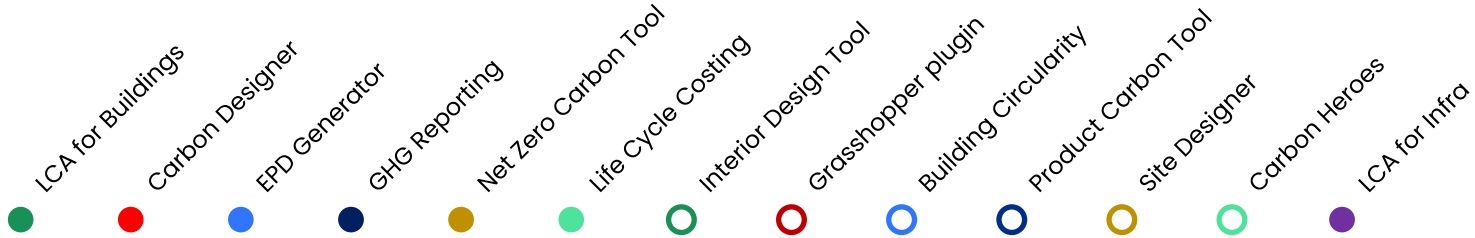
It presents **29 services to decarbonize construction**, grouped according to the customer segment they support: infrastructure and building projects; construction products; real estate portfolios; or cities.

Designed for architects, engineers, quantity surveyors, and real estate, green building or sustainability consultants, it aims to help you expand your service offer while accelerating decarbonization.

TABLE OF CONTENTS

SUMMARY OF SERVICES

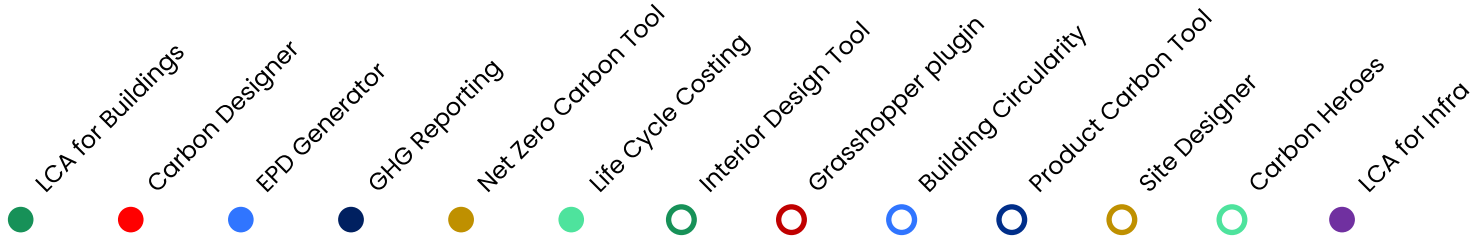
and the solutions to deliver them



Service	Page
1.1 Perform a Whole Building Life Cycle Assessment	7
1.2 Whole Building LCA for Certification or Regulation	7
1.3 LCA for Interior Design	7
1.4 Net-Zero Carbon Design	8
1.5 Comparative carbon and cost optioneering	8
1.6 Early Design Optimization	9
1.7 Parametric LCA Design	9
1.8 Evaluate new construction against refurbishment	9
1.9 Material Selection and Specification	10
1.10 Circularity Assessment	10
1.11 LCA Results Verification	10
2.1 Develop Environmental Product Declarations	11
2.2 Product Benchmarking	11
2.3 Develop Project/Tender-specific EPDs	11

SUMMARY OF SERVICES

and the solutions to deliver them



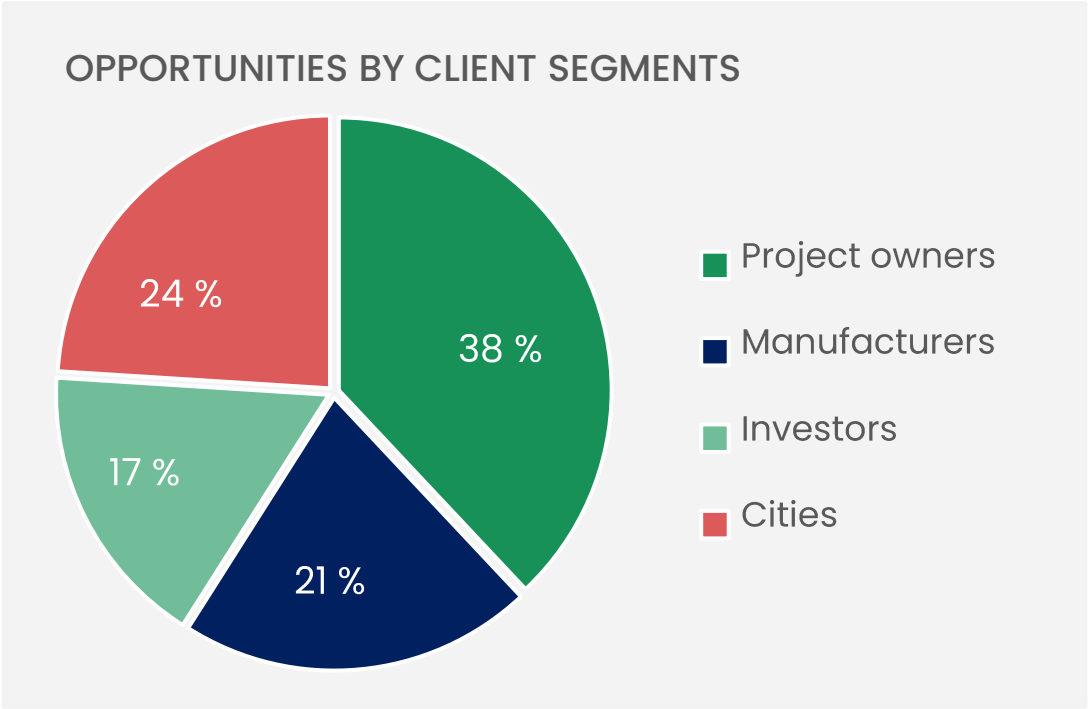
Service	Page
2.4 Greenhouse Gas (GHG) Reporting	12
2.5 Corporate Sustainability Policy Development	12
2.6 Sustainable Product Design	12
3.1 Set Benchmark Levels for Embodied or WLC	13
3.2 Develop and Implement a Climate Strategy	13
3.3 Portfolio GHG Reporting	14
3.4 Establish a Low Carbon Procurement Policy	14
3.5 Develop LCA Specifications	14
4.1 Evaluate Zoning Proposals using LCA & Carbon Metrics	15
4.2 Use LCA Metrics to Evaluate Design Competition Entries	15
4.3 Implement a Green Public Procurement Program	15
4.4 Quantify the Impact of Carbon Reduction Policies	16
4.5 Develop Carbon Incentive Programs	16
4.6 Compare Prefab/Modular with Traditional Construction	17
4.7 Peform Early LCA in Infrastructure Projects	17

OPPORTUNITIES ACROSS CUSTOMER SEGMENTS

1. PROJECT OWNERS

Services can be provided for a single project owner of any type, whether a developer, investor, designer or construction company. Embedding life-cycle perspectives into a project can help project owners to attain regulatory and certification compliance whilst cutting costs by improving materials efficiency and reducing waste.

See Services to decarbonize construction projects, pages 6-9



2. CONSTRUCTION PRODUCT MANUFACTURERS

Construction product manufacturers are looking at how to measure, declare, benchmark and ultimately reduce the impact of their products. There is potential to not only support these clients to develop EPDs but also to help them benchmark their products against others on the market.

See Services to reduce products' environmental impacts, p. 11-12

3. REAL ESTATE INVESTORS

Transparency and managing risk are important to investor clients. To comply with Scope 3 GHG emissions reporting they need to document and declare the embodied carbon emissions of their building stock.

See Services for low-carbon policies & decarbonizing portfolios, p. 14-15

4. CITIES

Many cities have set ambitious carbon targets. Integrating life-cycle analysis into construction and infrastructure planning processes will help them to meet their goals. There is also potential to offer services helping them to develop carbon reduction policies.

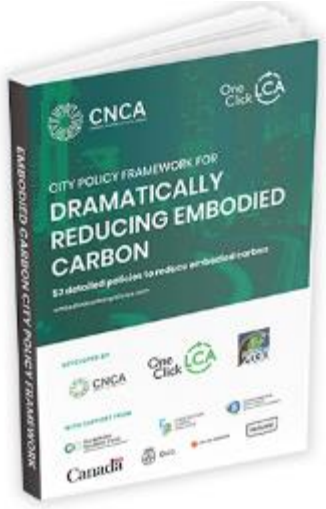
See Services to reduce the embodied carbon of cities, p. 17-19

[Return to service list]

MORE INDUSTRY-LEADING BEST PRACTICE GUIDANCE

Many construction and real estate clients wish to demonstrate their commitment to reducing environmental impact, but are unclear about where to focus. The services presented in this guide reflect industry-leading best practice guidance. The majority of them correspond directly to specific policies and recommendations made in two recent reports, shown below, clearly indicated throughout.

City Policy Framework for Dramatically Reducing Embodied Carbon

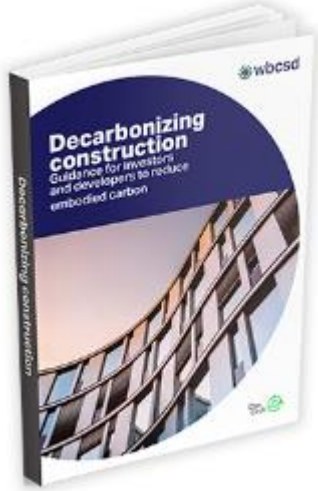


A joint report by One Click LCA and the Carbon Neutral Cities Alliance, this report provides practical policies that cities can enact to reduce embodied carbon in construction.

Referenced in this guide as City Policy Framework followed by the relevant policy number.

Download now

Decarbonizing Construction – guidance for investors and developers to reduce embodied carbon



Written by One Click LCA on behalf of WBCSD, this report gathers over 50 embodied carbon-reduction policies and best practices for developers, investors and project owners.

Referenced throughout this guide as Decarbonizing Construction followed by requirement number.

Download now

[Return to service list]

1 SERVICES TO DECARBONIZE DEVELOPMENT AND CONSTRUCTION PROJECTS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
1.1. Perform a Whole Building Life Cycle Assessment Perform a whole building LCA and demonstrate reductions against a baseline design. [1] See case study: HS2 London Euston Railway Station	Quantify the environmental impacts of the project and recognize inefficiencies or significant changes across life cycle stages. A Whole Building LCA allows for hotspots screening at every design stage and subsequently enables material and design optimization using carbon as the underlying parameter.	One Click LCA for Buildings
1.2. Whole Building Life Cycle Assessment for Certification or Regulation Perform a whole building LCA and demonstrate reductions against a baseline design. [2]	Obtain the credits required by the certification scheme or prove compliance with any local regulatory framework. Read more about certification and regulatory frameworks in the Embodied Carbon Review.	One Click LCA for Buildings
1.3. LCA for Interior Design Quantify and reduce carbon impacts for interior fit-outs, tenant improvements and refurbishment projects.	Throughout a building's service life, interior refurbishments can generate more carbon emissions than the one-offs from the structure and enclosure. An LCA for interior refurbishments can estimate such impacts and provide guidance to support selecting the most suitable materials and construction processes.	One Click LCA for Buildings One Click LCA Interior Design Carbon Tool

1. City Policy Framework R9 Life-cycle Carbon Calculation & Reporting, Decarbonizing Construction A09 Report Embodied Carbon Annually

2. City Policy Framework R1 Life-cycle Carbon Limits For New Buildings, Decarbonizing Construction A08 Use A Green Building Rating System For Embodied Carbon Reductions, B01 Propose a life-cycle carbon or embodied carbon target for the project

[Return to service list]

1 SERVICES TO DECARBONIZE DEVELOPMENT AND CONSTRUCTION PROJECTS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
1.4. Net Zero Carbon Design The net carbon to be offset can be calculated by using a whole building LCA, to estimate emissions arising from all life cycle stages, as well as savings coming from biogenic carbon storage, material reuse and energy export.[1]	Net zero carbon is a requirement in multiple certification and local compliancy schemes. A net zero assessment streamlines the reporting process and gives a clear value on what must be offset.	One Click LCA Net-Zero Carbon Tool
1.5. Comparative Carbon and Cost Optioneering Simultaneously assess multiple solutions examining cost versus carbon reduction potential to derive the most optimal solution.[2]	Reduce time spent in investigating trade-offs between sustainable alternatives and cost effectiveness. Such an analysis serves as the baseline for life-cycle costing. In BREEAM International and BREEAM UK, this could contribute to credits for *Man 02 Life cycle cost and service life planning*. In BREEAM UK it could also contribute to a *Mat 01 Life Cycle Impacts* credit.	One Click LCA for Buildings One Click LCA Life Cycle Costing

1. City Policy Framework R2 Low Carbon Cement & Concrete Policy, R5, Zero Carbon Construction Sites, P1 Carbon Limits For Key Building Materials For City Projects, Decarbonizing Construction A05 Estimate Cost Difference For Delivering Each Project At Net Zero Carbon, B14 Require Landscaping To Consider Carbon Removal Opportunities, D11 Require Contractor To Use Near Zero-emissions Construction Machinery

2. Decarbonizing Construction B08 Develop Alternative Designs & Carbon & Cost Evaluations, C05 Embodied Carbon & Cost Factored Detailed Design Options

[Return to service list]

1 SERVICES TO DECARBONIZE DEVELOPMENT AND CONSTRUCTION PROJECTS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
1.6. Early Design Optimization Develop multiple baseline alternatives without the need of detailed designs. Compare different scenarios using different material assemblies and derive a suggested bill of materials. [1]	The customer gets a report that illustrates viable alternatives in terms of carbon emissions, coupled with a suggested bill of materials that can be used to obtain an estimated construction cost, effectively allowing for better planning.	One Click LCA for Buildings One Click LCA Carbon Designer
1.7. Parametric LCA Design Through One Click LCA and Grasshopper, thousands of iterations can be tested to derive a list of viable design alternatives. [2]	Reduce design and material selection costs from as early as possible by introducing carbon as a parameter in the design process.	One Click LCA for Buildings One Click LCA Grasshopper plugin
1.8. Evaluate New Construction against Refurbishment Evaluate the two options using either detailed data or One Click LCA's Carbon Designer, pinpoint which parts of the scope produce the greatest impacts and adjust it accordingly. [3]	Examine the trade-offs between embodied carbon, operational carbon, and cost from both environmental and financial perspectives.	One Click LCA for Buildings

1. *Decarbonizing Construction B02 Screening-level Embodied Carbon Assessment, B03 Benchmark Building Design Options For Embodied Carbon*
2. *Decarbonizing Construction B08 Develop Alternative Designs & Carbon & Cost Evaluations*

3. *City Policy Framework M6 Renovation Vs. Knock Down & Rebuild Comparison, Decarbonizing Construction A11 Evaluate The Possibility Of Refurbishing Existing Buildings*

[Return to service list]

1 SERVICES TO DECARBONIZE DEVELOPMENT AND CONSTRUCTION PROJECTS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
1.9. Material Selection and Specification Use One Click LCA's database to identify low-carbon materials and manufacturers to specify for the project. Download EPDs to fully document the specification process. [1]	Fully documented low-carbon materials can provide transparency and ease the material specification process in later stages. They also serve as means to demonstrate compliance with regulatory frameworks	One Click LCA for Buildings
1.10. Circularity Assessment Quantify the circularity of materials used during a building's life-cycle using One Click LCA's Building Circularity tool. [2]	A circularity assessment supports the requirements of HQE Economie Circulaire, the London Plan Circularity Statement and the Ellen McArthur Foundation Circularity Indicators, as well as credits in BREEAM Mat 06, 05 and 03, and Man 03.	One Click LCA for Buildings One Click LCA Building Circularity
1.11. LCA Results Verification Examine and verify the results of LCAs performed by external consultants. [3]	Having a third party verifying the LCA results ensures transparency and plausibility while it increases data reliability.	One Click LCA for Buildings

1. Decarbonizing Construction C08 Evaluate Alternatives For The Top Ten Highest Carbon Products, D08 Ensure Contractor Uses Products That Comply With Restrictions Set
2. Decarbonizing Construction C03 Design Materials Installation Practices To Allow For Their Future Reuse
3. Decarbonizing Construction D02 Require Independent Third-party Verification Of Carbon Performance

[Return to service list]

2 SERVICES THAT CAN REDUCE PRODUCTS' ENVIRONMENTAL IMPACTS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
2.1. Develop Environmental Product Declarations Map down manufacturing processes, perform a product LCA and evaluate the product's environmental impact through a standardized process. [1]	Get your products in front of designers, specifiers and builders seeking low-carbon solutions. Having an Environmental product Declaration (EPD) serves as a market differentiation tool.	One Click LCA EPD Generator
2.2. Product Benchmarking Perform an LCA and benchmark the product's performance against the competition and subsequently identify hotspots to reduce the environmental burden. See case study: Peikko DELTABEAM® Green	Benchmark against the competitors and develop/optimize processes to reduce the impacts of the products.	One Click LCA EPD Generator
2.3. Develop Project- or Tender-specific EPDs Develop a product LCA based on a specific project or tender requirements.	An increasing number of tenders, especially for public projects require EPDs as a means to prove low-carbon compliance. By developing a tender/project specific EPD can ensure that a product will be specified from the pre-sales stage.	One Click LCA EPD Generator

1. Decarbonizing Construction D03 Require Environmental Product Declarations For Key Products

[Return to service list]

2 SERVICES THAT CAN REDUCE PRODUCTS' ENVIRONMENTAL IMPACTS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
2.4. Greenhouse Gas (GHG) Reporting Analyse the product manufacturer's key upstream and downstream activities. Define the GHG protocol scope(s) and map emission factors to the collected data.	Greenhouse Gas Reporting increases transparency in a company's operations and serves as a mean to identify hotspots and reduce carbon emissions. Can Support EU ETS and taxonomy requirements.	One Click LCA GHG Reporting Tools One Click LCA Product Carbon Tool
2.5. Corporate Sustainability Policy Development One Click LCA's GHG Reporting tools can be used to quantify baseline emissions, set carbon targets and implement a carbon reduction program.	Lead the market transformation efforts by developing a sustainability strategy to reduce environmental impacts in tandem with responsible manufacturing processes and offer competitive solutions.	One Click LCA EPD Generator One Click LCA GHG Reporting Tools
2.6. Sustainable Product Design Evaluate various product manufacturing processes by developing multiple design alternatives and optimizing the product's recipe and manufacturing process.	Implementing ecodesign principles in the company's manufacturing process to differentiate from the competition and safeguard against future compliance regulations.	One Click LCA EPD Generator

[Return to service list]

3 SERVICES FOR CREATING LOW-CARBON POLICIES AND DECARBONIZING PORTFOLIOS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
3.1. Set Benchmark Levels for Embodied or Whole-life Carbon Evaluate archetypal projects for the investor using example existing projects as the baseline. Create common baseline for each major project type. [1]	Specific benchmarks can be a climate strategy baseline, which serves to steer projects, demonstrate reductions and climate aligned construction practices.	One Click LCA for Buildings One Click LCA Carbon Designer One Click LCA Carbon Heroes Benchmark
3.2. Develop and Implement a Climate Strategy Define and assess the baseline and set the carbon reduction pathways. [2]	Lead the market transformation efforts by setting science-based targets and through them support a climate change mitigation strategy to secure projects and investments.	One Click LCA for Buildings One Click LCA Carbon Designer One Click LCA GHG Reporting Tools

1. City Policy Framework R1 Life-cycle Carbon Limits For New Buildings, Decarbonizing Construction B03 Benchmark Building Design Options For Embodied Carbon
2. Decarbonizing Construction A01 Create Embodied Carbon-related Requirements For All Projects

[Return to service list]

3 SERVICES FOR CREATING LOW-CARBON POLICIES AND DECARBONIZING PORTFOLIOS

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
3.3. Portfolio GHG Reporting Track down all GHG emitting sources from a customer's operations and provide a breakdown of the most carbon intensive hotspots.[1]	Reporting the GHG emissions from the customer's operations and assets, allows for the establishment of baseline metric values upon which carbon reduction and climate change mitigation policies can be drawn.	One Click LCA GHG Reporting Tools
3.4. Establish a Low Carbon Procurement Policy Benchmark materials for the investor and establish a database of baseline carbon values per material type.[2]	The customer will have a detailed report of available materials that can be pushed towards designers & specifiers to ensure that only low carbon materials are chosen.	One Click LCA for Buildings
3.5. Develop LCA Specifications Draft the specification to be used on all projects, defining the data and scope of the LCAs.[3]	Standardizing the LCA methodology to be able to have a portfolio view of the carbon performance and steer the climate strategy.	One Click LCA for Buildings

1. Decarbonizing Construction A09 Report Embodied Carbon Alongside Other Carbon Emissions Annually
2. City Policy Framework P1 Carbon Limits For Key Building Materials For City Projects, Decarbonizing Construction C01 Demonstrate Meeting Embodied Carbon Targets With Updated Quantities
3. Decarbonizing Construction A01 Create Embodied Carbon-related Requirements For All Projects

[Return to service list]

4 SERVICES TO REDUCE THE EMBODIED CARBON OF CITIES

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
4.1. Evaluate Zoning Proposals using LCA and Carbon Metrics Identify embodied carbon targets for zoning process and land use change. Determine density, massing, and height constraints.[1]	Zoning decisions have a significant and irreversible impact on carbon emissions from materials, energy, as well as transport. Underground and infrastructure embodied carbon impacts are locked in zoning.	One Click LCA Carbon Designer One Click LCA Site Designer
4.2. Use LCA Metrics to Evaluate Design Competition Entries Identify limits on the maximum embodied or whole life-cycle carbon that new buildings can emit during their defined lifetime and use them as evaluation criteria for tender entries.[2] See case study: Finnoo municipal area	Setting requirements ensures that developers and investors implement them in their design briefs. In turn, this ensures that designers start working towards those from the early design, thus avoiding high carbon solutions.	One Click LCA Carbon Designer One Click LCA for Buildings
4.3. Help implement a Green Public Procurement Program Develop a green public procurement scheme that includes embodied carbon requirements simplifies municipal project requirement setting.[3]	Consolidating different building sustainability requirements to a comprehensive green public procurement policy simplifies management and administrative costs.	One Click LCA for Buildings

1. *City Policy Framework Z1 Embodied Carbon Targets For Zoning Process, Decarbonizing Construction A15 Evaluate Zoning Carbon Impacts & Consider Rezoning If Necessary*
2. *City Policy Framework M3 Use Carbon As A Criterion For Design Competitions*
3. *City Policy Framework P2 Green Public Procurement For Public Buildings*

[Return to service list]

4 SERVICES TO REDUCE THE EMBODIED CARBON OF CITIES

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
4.4. Quantify the Impact of Carbon Reduction Policies Set carbon intensity limits for key materials for the major construction material groups (concrete, steel, glass etc.) for all city projects and implement in public procurement.[1]	Having prescriptive carbon requirements forces the construction supply chain towards more transparent practices by developing data and products that declare environmental performance.	One Click LCA EPD Generator
4.5. Develop Carbon Incentive Programs Develop a framework upon which cities can offer either property tax rebates up to a certain percentage for a number of years or funds for property owners that meet specified embodied carbon criteria or follow low-carbon practices.[2]	By providing a significant financial incentive to property owners to reduce embodied carbon in projects on their properties, the jurisdiction can accelerate embodied carbon reductions and support low-carbon construction projects that may serve as models for local innovation.	One Click LCA for Buildings One Click LCA Carbon Designer One Click LCA Carbon Heroes Benchmark

1. *City Policy Framework P1 Carbon Limits For Key Building Materials For City Projects*
2. *City Policy Framework F1 Tax Rebates For Low Carbon Developments, Decarbonizing Construction A02 Provide A Financial Incentive For Improving Final Embodied Carbon*

[Return to service list]

4 SERVICES TO REDUCE THE EMBODIED CARBON OF CITIES

SERVICE	BUSINESS BENEFITS FOR THE CUSTOMER	SOLUTIONS
4.6. Compare the Impact of Prefabricated or Modular Construction with Traditional Methods Develop a framework that evaluates the impacts of modular construction practices versus traditional methods.[1]	Modular and prefabricated buildings generate much less material waste during construction phase. They also allow the building elements or modules be disassembled once the building is no longer needed in that location and be used in another project, avoiding landfilling and treatment as well as demand for virgin raw materials and construction products.	One Click LCA Carbon Designer
4.7. Perform Early LCA in Infrastructure Projects Infrastructure projects can reduce both materials use and carbon significantly. As projects vary, targets must be set on project-by-project basis. They can be set as part of early design. The later design and construction must then meet these auditable targets.[2]	Cities often have oversight over the construction of public works, transport systems, parks and water and sanitation services. By setting carbon targets early in the design phase, cities can have a major impact in reducing the emissions of these projects.	One Click LCA for Infrastructure

1. *City Policy Framework Z6 Prefabricated Or Modular Construction Priority*
2. *City Policy Framework I1 Early Design Carbon Targets For Infrastructure*

[Return to service list]

CASE STUDY

Planned HS2 London Euston Railway Station. Credit: HS2

CASE STUDY: HS2 London Euston Railway Station, UK

One Click LCA was used to was used to create a baseline Whole Life Carbon Footprint of the HS2 London Euston Railway Station over a design life of 120 years.

A variety of design options were then tested against this baseline, allowing a 14% reduction in Whole Life Carbon emissions to be developed by the end of RIBA Stage 2.

Return to Services to decarbonize construction projects

Image credit: Peikko

CASE STUDY: Peikko DELTABEAM® Green

Peikko, the Finnish concrete connection and composite beam manufacturer has developed a steel beam composed of over 90% of recycled steel: DELTABEAM® Green.

Peikko used One Click LCA to develop an EPD for the product and to benchmark it against other options on the market.

The benchmarking revealed that CO_2 emissions are 50% lower than competitor products.

They feature this data in their marketing and, most importantly, enable their clients to reduce the environmental footprint of their buildings.

Return to Services to reduce products' environmental impacts

CASE STUDY

Djupsundsbacken, a planned residential area of finnoo. Credit: espoo.Fi

CASE STUDY: Finnoo municipal area

One Click LCA was used to facilitate a competitive process for Finnoo, a new urban area of more than 1 million m² in Espoo, Finland. Zoning plans were imported into a district level 3D model and uploaded to the One Click LCA platform.

Comprehensive simulations were performed to discover the impact of planning measures and other requirements on the district's energy balance. The most powerful measures were identified and ranked for cost efficiency and reliability. The outcome is a balanced mix of measures that ensures both competitive life-cycle cost, and very low energy consumption and life-cycle emissions.

Return to Services to reduce the embodied carbon of cities

HOW ONE CLICK LCA CAN HELP

In this guide we have presented a range of decarbonization services that could enhance your service portfolio and your clients' outcomes. With governments, investors, owners and tenants increasingly seeking low carbon construction solutions, there has never been a better time for service providers to develop a market position based on expertise in decarbonising construction.

At One Click LCA, we can help you to do this. Get in touch to find out how.

READY TO FIND OUT MORE?

Get in touch to learn how we can help you offer your clients more, so they can go further in their decarbonization journey.

BOOK A FREE CONSULTATION

ABOUT ONE CLICK LCA

One Click LCA Ltd (formerly Bionova Ltd) is the developer of the world-leading construction decarbonization platform: One Click LCA. The One Click LCA software is used to decarbonize building and infrastructure projects, to generate Environmental Product Declarations (EPDs) and benchmark low-carbon products, and to create corporate or real estate portfolio greenhouse gas reports.

One Click LCA is used in more than 100 countries, includes the world's largest construction sector database and supports over 50 standards and certifications.

For more information visit: www.oneclicklca.com.

[Return to service list]