



Le Bâtiment Net Zéro



Michel Tardif ing.

Chef d'équipe intérimaire Bâtiments

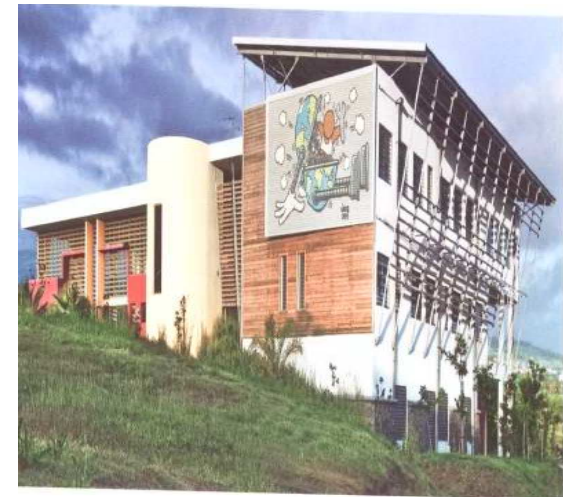
Carrefour Plein-Sud: Le retour du gros bons sen\$ dans l'énergie

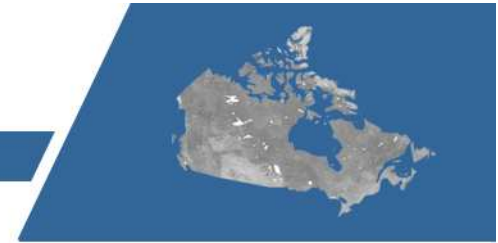




- La vision développée à CanmetÉNERGIE
- Le bâtiment net-zéro au Canada
- Le bâtiment net-zéro à l'échelle internationale
- Les défis à relever
- Le programme de recherche 2012-2016

Bâtiment universitaire
St-Pierre Ile de la Réunion





Une définition...

(tirée de Net Zero Energy Buildings (EnOB))

A zero energy building is defined as an energy-efficient building that, within its annual balance sum, covers its entire annual primary energy demand in connection to the electrical grid and further grids if required, based on a monthly balance via primary energy credits for surplus energy feed-in. On-site energy provision is to prioritize coverage of building self-demand.



- ‘Des bâtiments qui génèrent autant d’énergie qu’ils en consomment grâce à des technologies innovatrices et efficaces ainsi que par l’entremise d’énergie renouvelable seront disponibles sur le marché d’ici 2020’.
- ‘La cible énergétique nette-zéro sera pratique courante pour des bâtiments neufs et rénovés d’ici 2050’

Laboratoire de Ressources
naturelles Canada

MTL-Hamilton





Bâtiments Commerciaux Net-Zéro au Canada en 2012=0?

(Résidences nette-zéro au Canada en 2012 =10?)



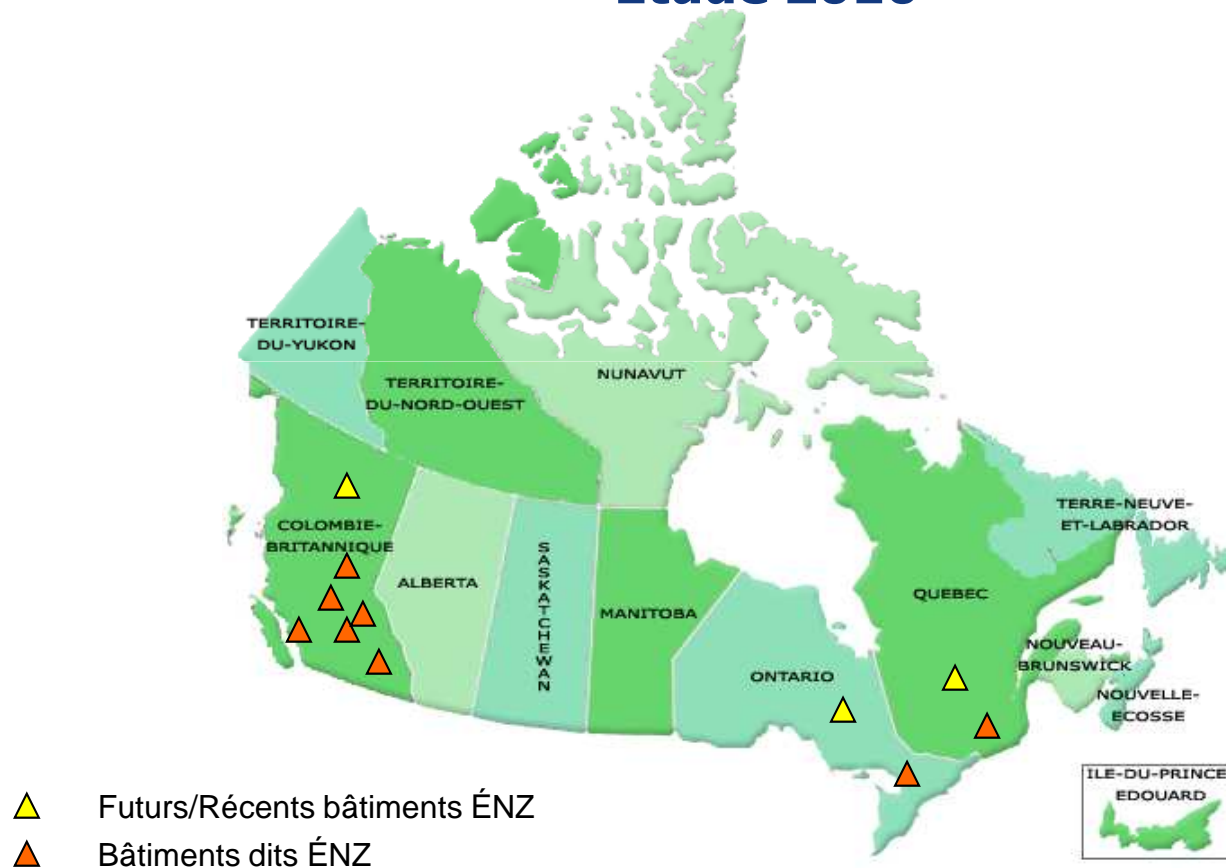
Projet Equilibrium
Riverdale -Alberta



Projet Equilibrium
EcoTerra- Québec



Bâtiments Commerciaux dits Net-Zéro au Canada Étude 2010



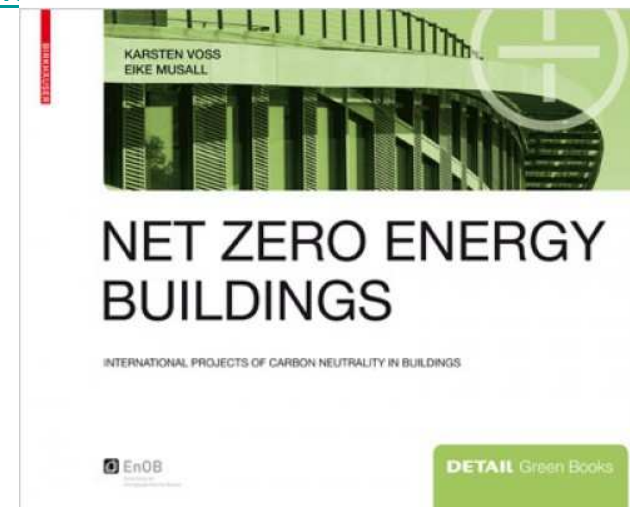


Bâtiments Net-Zéro à l'échelle internationale (variable selon les sources d'informations)

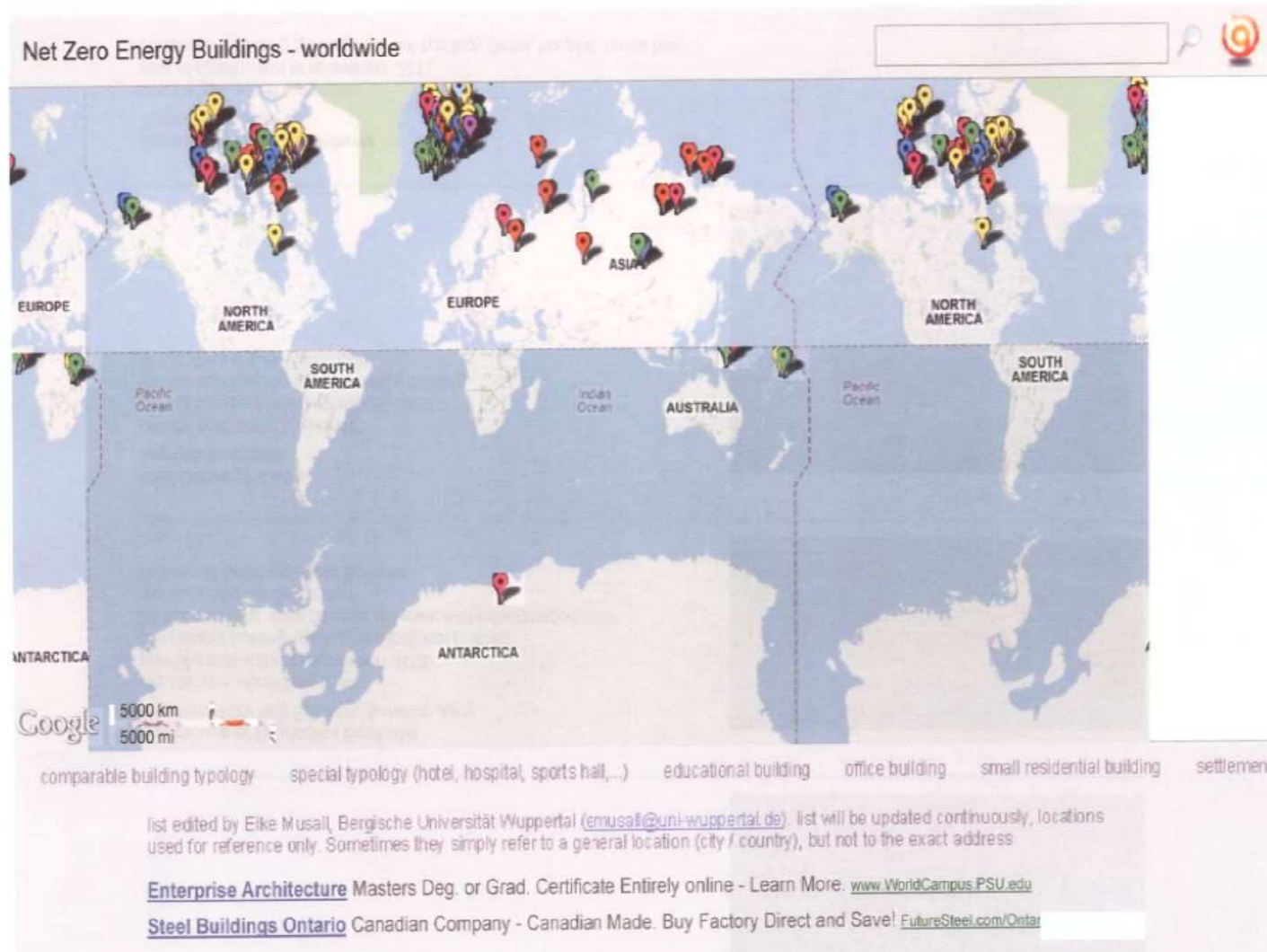
IEA Annex52 Task 40

<http://www.enob.info/en/net-zero-energy-buildings>

<http://zeb.buildinggreen.com>



Net zero-energy buildings – Map of international projects



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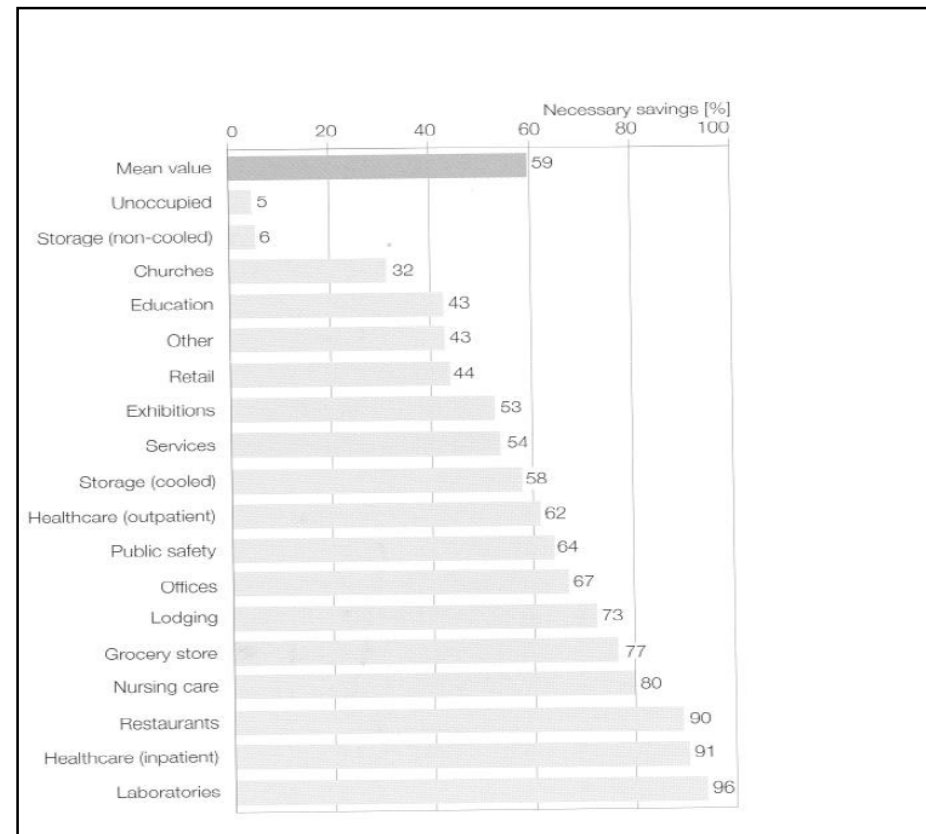


Les défis à relever

- Réduire l'intensité énergétique des bâtiments
 - Moyenne de 408 Kwh/ m²pour édifices à bureaux au Canada 2008
 - Cible de 40 Kwh/m² d'ici 2020 (facteur 10)
- Promouvoir l'approche de conception intégrée
- Cibler les mesures passives afin de réduire les charges de chauffage et de climatisation
- Mieux contrôler les charges aux prises
 - Augmentation de 178% edifices à bureaux entre 1990-2008
- Climatisation en augmentation

Exemple de réduction requise

- Réduction requise en consommation électrique pour les bâtiments existants pour que l'énergie solaire photovoltaïque puisse équilibrer cette consommation



courtesy of Karsten Voss Eike Musall Net Zero Energy Buildings

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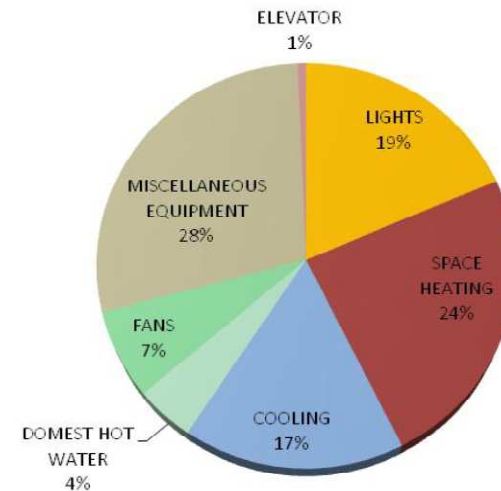
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Charges aux prises

- Elles représentent près de 25% de la consommation d'édifice à bureaux

Percent Energy Consumption by End Use Before Energy Conservation Measures



Graphique tirés de Sustainable Solution Conferences Mark Lyles

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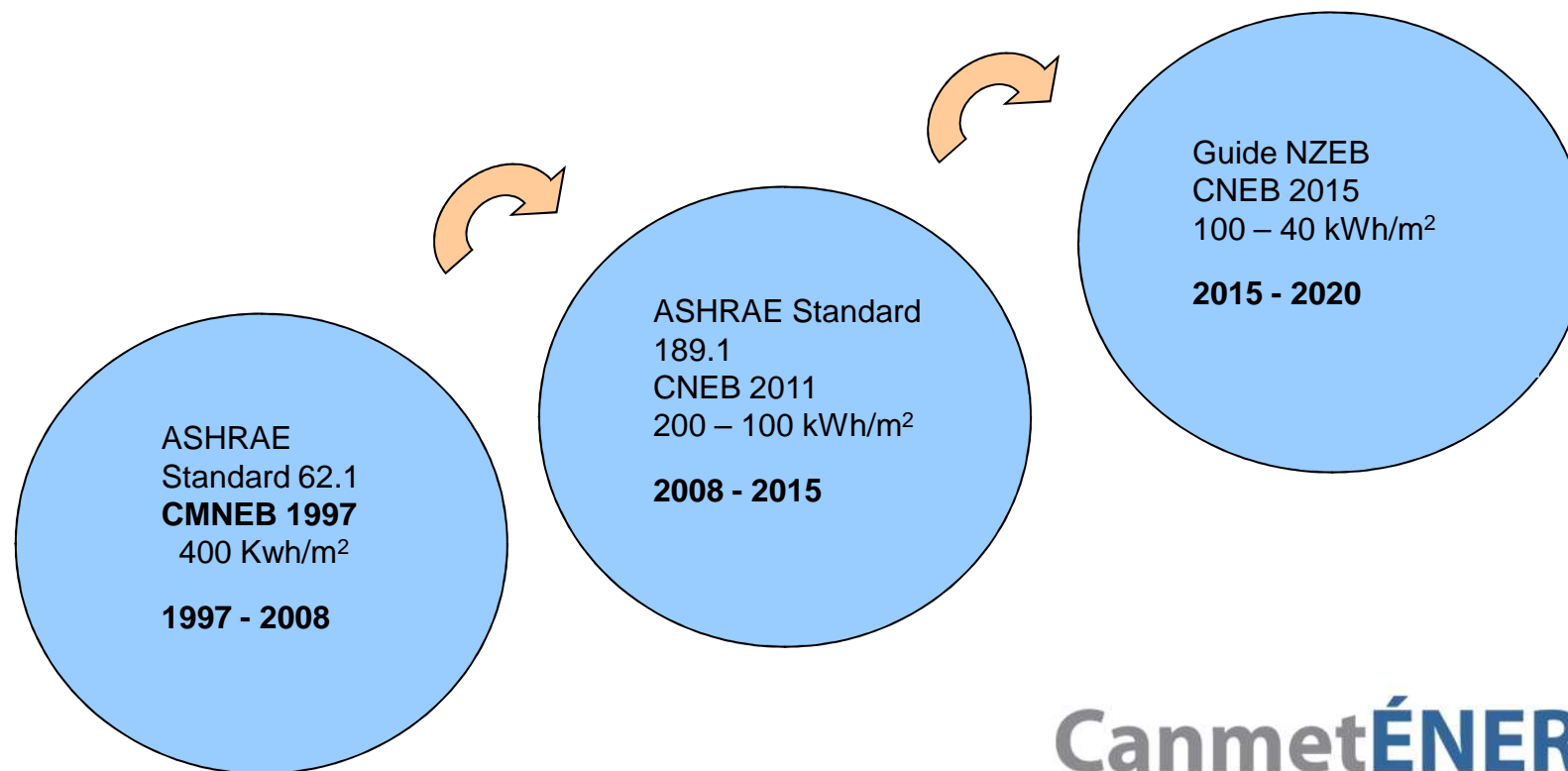


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Une évolution vers de nouveaux standards



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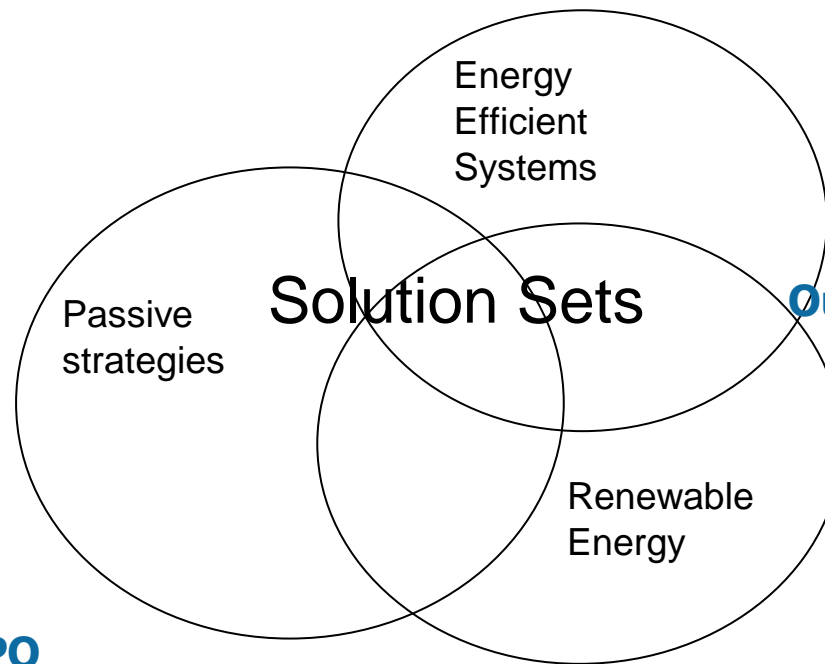
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Approche préconisée

Processus de conception intégrée



Outils de conception améliorés

Validation et ÉPO

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Le programme de recherche 2012-2016

- **Output 1 Determination of criteria to enable Net or Near Net Zero Energy Building**
- *This output will investigate about the different factors that should be considered as part of the decision process when a project is targeting Near or Net zero Energy Consumption*
- *Task 1 Spatial Analysis*
- *Task 2 Design*
- *Task 3 End-Users & Economics*
- This investigation will be a combination of literature review, simulation and case study assessments.
- The determination of basic criteria as part of a go-no go decision will be useful not only to the design community but also to assess the outputs of this project.

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Output 2 “Modeling Tools and Solution Sets in Support of Near and Net Zero Energy Buildings”

Task 1 “Enhanced Building Archetype Simulation to Produce Net Zero options”

“Baseline archetypes CANQUEST & EnergyPlus”
“Canadian Energy Conservation Measures Project
/ “Practical Tools for Optimizing Energy
Conservation Measures for Building”

Task 2 NZEBpotential Tool for NZEB

Task 3 “Conceptual Design Tools that Enhance Current Building Simulation Tools which include Renewable and Storage”

Task 4 “Infiltration Models for BEM”

Task 5 “Practical Tools for Optimizing Energy Conservation Measures for Building Retrofits”

- Modeling examples and software tool integration approaches that can be used by designers and project managers. Increase modelling awareness in the design community.

Knowledge that new and innovative technologies are viable.

- Use of the tools, data, methodologies by the design community for high-performance retrofit candidates with near net zero energy performance targets.
- Wide-scale adoption of the tools to design new and retrofit existing high performance and net zero energy buildings

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Output 3: Validation and Monitoring of High Performance Buildings and Equipment”

Task 1 “Post Occupancy Evaluation of low energy MURBS”

Task 2 “Detailed Monitoring Protocol for Near/Net Zero Energy Buildings to Determine Performance Characteristics Including Environmental Quality”

- **Development of a methodology to evaluate these technical and non-technical issues; qualitatively and quantitatively.**
- Implementation of these methodologies in a sample of high performance buildings/Near Net zero Energy buildings
- Analyzing the results of the monitoring and validation activities and transferring this knowledge and recommendations to other outputs under this PERD project and to other PERD projects

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Output 4: Guides, Preferred strategies and Case Studies in Support of Near and Net Zero Energy Buildings”

Task 1 “Compendium of Net Zero Energy Building Solution Sets for Small Buildings in Different Climate Zones”

Task 2 “Integrating Passive Technologies for Energy Efficient Buildings”

Task 3 “Low-energy, Passive Design Strategies for low-rise MURBs through the Optimized Integrated Design Process”

Task 4 “Retrofit Strategies in MURBS”

Task 5 “IDP for Modelling”

Task 6 “Outreach & Workshops”

Availability of worked examples of building archetypes and monitored existing buildings showing quantified end use energy consumption for near and net-zero energy performance.

Additional knowledge and tools that developers and designers have available to increase the stock of high performance and net zero energy commercial buildings.

Presence of Near/Net zero energy commercial buildings in the building stock.

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Merci



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