



Community Planning for Sustainability at the City of London

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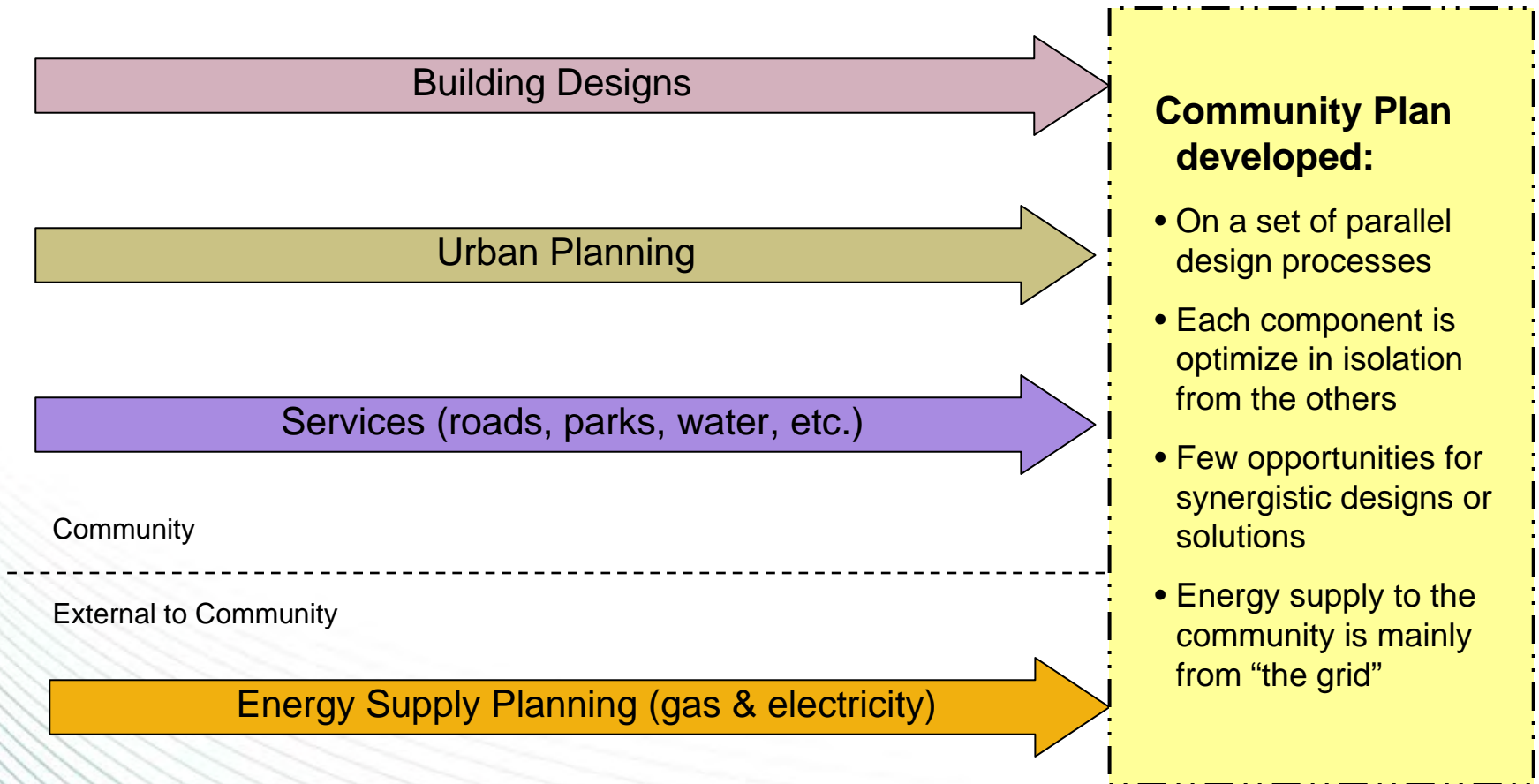


Introduction

- Population of 352,400 (CMA 457,700)
- Clean air and climate change programs
- In 2005, City initiated a series of projects to look at community design
 - *Community design;*
 - *Building design; and,*
 - *Community energy supply planning.*
- Goal - enhance livability and sustainability of future communities in London.



Tradition Planning Approach



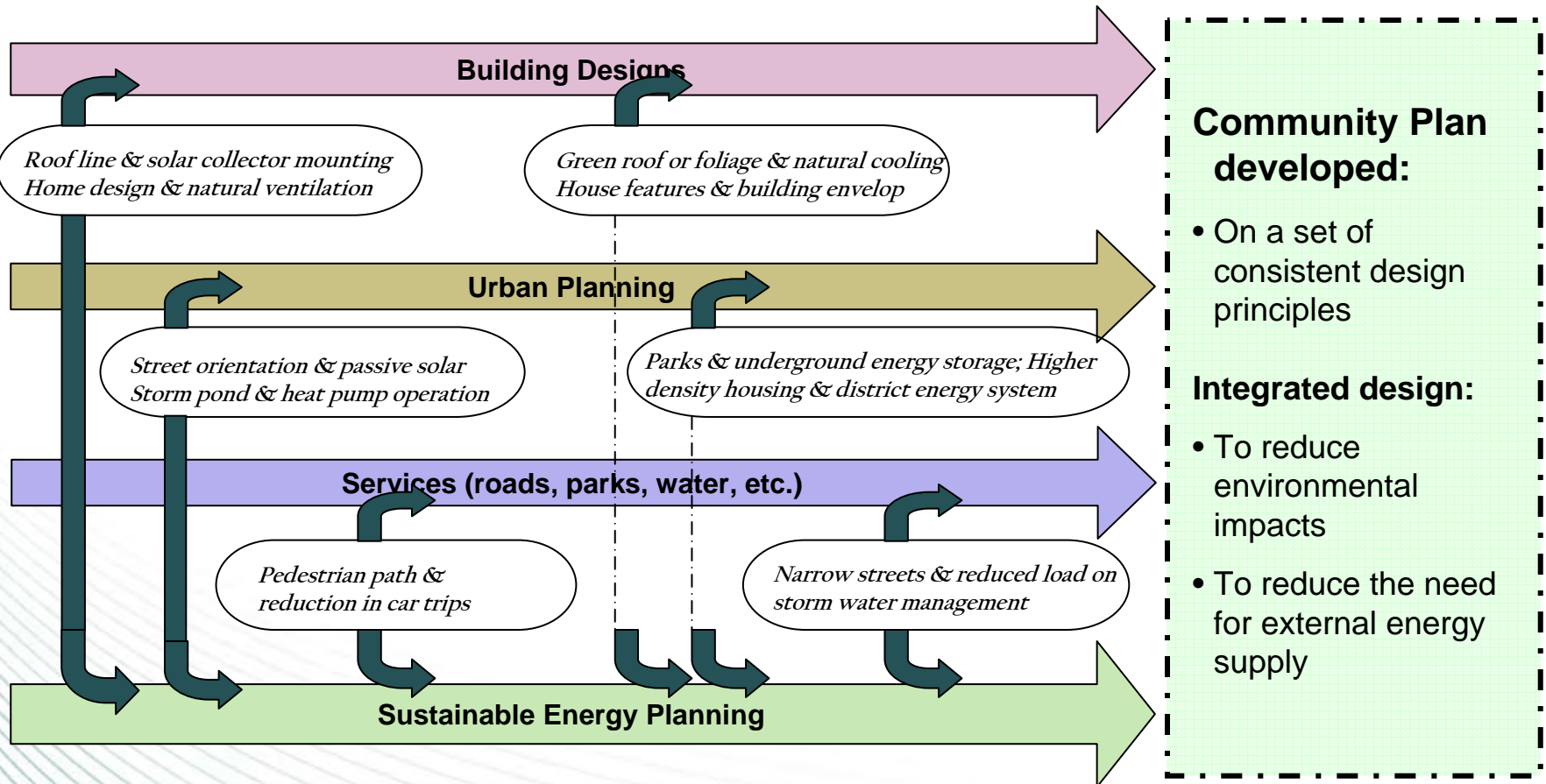


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The End Result



Integrated Planning Approach



Placemaking process involves a number of focus areas with highly interdependent and synergistic relations. Bubble areas are only a few examples of this inter-relationship.



Components of the New Approach

- **Placemaking**
 - diversified land use opens new energy possibilities
- **London Energy Efficiency Partnership (LEEP)**
 - new partnerships with builders to enhance efficiency; accelerate transfer of new technology into buildings
- **Innovative energy supply solutions**
 - integrating the pieces with some new concepts at a community level



Placemaking Principles

1. Adopt a community vision & overall design concept
2. Design for a 'sense of place'; establish community boundaries
3. Create an attractive community
4. Public & private components exhibit a consistent vision
5. Mixed land use – avoid large-scale homogeneity
6. Create high-quality pedestrian environments
7. Understand & design for the existing physical context

Bonus – *Placemaking* creates new options for energy supply



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Examples of Placemaking





London Energy Efficiency Partnership

THE LEEP APPROACH

OPERATING PRINCIPLES:

- In-the-shoes of the Home Builder
- Builders, renovators & municipal staff involved in (lead) all decision making
- Consultants facilitate both study & meetings; speak with a neutral voice
- Consultants provide expert knowledge and support to builders & renovators.



Process Steps:

Industry Engagement; Data Collection; Analysis & Selection; Technology Application



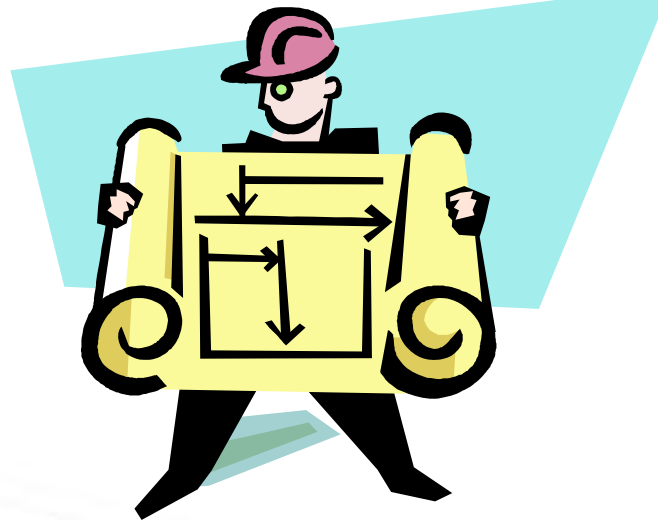
London Energy Efficiency Partnership

Technology Screening – Multiple view-points considered



**Manufacturer /
Technology Status**

**Home builder / Installer
Implementation**



**Home Buyer /
Market Fit**

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The LEEP Process in Action

Preliminary Analysis

>> *Builder-Led decision making* >>

Outcomes & Actions:

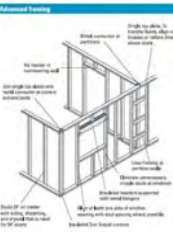
4-page Summary; Builder Workshop

Advanced Framing (EC-2)

Advanced framing is the term given to a set of techniques used in wood framing construction that result in lower labour and material costs and improved energy performance.

OVERVIEW:

Summary Description:
Advanced framing refers to a series of techniques designed to use less lumber in framing a house, thereby reducing material cost and use of natural resources and increasing the level of insulation as a result. The techniques include simple modifications to the framing such as using studs at 24 in. o.c., 2.8" modular design that reduces cut off waste from standard size sheathing building materials, in-line framing that reduces the need for double top plates, building corners with two studs rather than 3 and using thermal insulation in the corner space, using nailing headers over exterior building openings for use as headers for non-load bearing walls. All-mod framing uses engineering principles to minimize material usage while meeting model building code structural performance requirements.



The following list of innovations forms part of the advanced framing system:

- 16" and 24" On Center Framing combined with modular layout and single top plate for added economy.
- Modular Layout: Building to a 24" module and using 24" on-center wall and floor framing to the outside of framing.
- Single Top Plate - Exterior and Interior Walls - by stacking the wall, second floor and roof framing, (3rd plate or steps are used to maintain continuity of the plate in the absence of a second, overlapping plate).
- Single Top Plate - Interior Non-Bearing Partitions: (Framing is needed to steady and plumb recently erected walls. This framing should be left in place until the floor or roof above the walls is completed, try the structure square).
- Right-Sized Headers: requires bracer to pay attention to place instead of simply using a standard header size.
- No Headers in Non-Bearing Partitions: Some method of ending partitions on the plate will help the layout bracer in determining which openings need headers, and what size (see Right-Sized Headers).
- Ladders at T-Intersections: Cutting and nailing three pieces of blocking require approximately the same labour as nailing two studs. Thermal insulation at the "T" prevents blocking for the framing.
- Open-Corner Framing: the extra stud can be 2x4 in a 2x6 wall - whatever is needed to receive the gypsum board.
- Doubling the Rim Joint in Line of Header: the joint framing into the structural member must be shortened.

Benefits Summary:

Homeowner / Occupant Benefits

- Lower heating & cooling costs

Home-builder / Contractor Benefits

London Energy Efficiency Partnership | 1 January 10, 2007

Technology Application Workshop



- Builder Demos planned
- LEEP Technology "toolkit"
- Training requirements identified
- Building component approve issues identified (additional savings)



London Energy Efficiency Partnership

Final set of builder-selected technologies

For further study and to explore

potential field trials:

- Advanced framing
- Insulated concrete forms
- Structural insulated panels
- Built-in high-efficiency lighting
- Geothermal heat pumps
- Landscape for energy
- Tankless water heaters
- Zoned air handler
- Integrated mechanical systems
- Micro CHP

Useful and already familiar to builders:

- Drain water heat recovery
- Automated switches
- Ceiling fans with efficient lighting
- Basement under-floor insulation
- Vacation-ready breaker panels

Remarks:

- Solar thermal and photovoltaic technologies are ones that builders know about and will consider there is a market demand; No need to devote additional effort at this time.
- Longer-term interest in community energy systems but need other stakeholders to participate.



Innovative Energy Supply Solutions

Community Energy Systems

Key components:

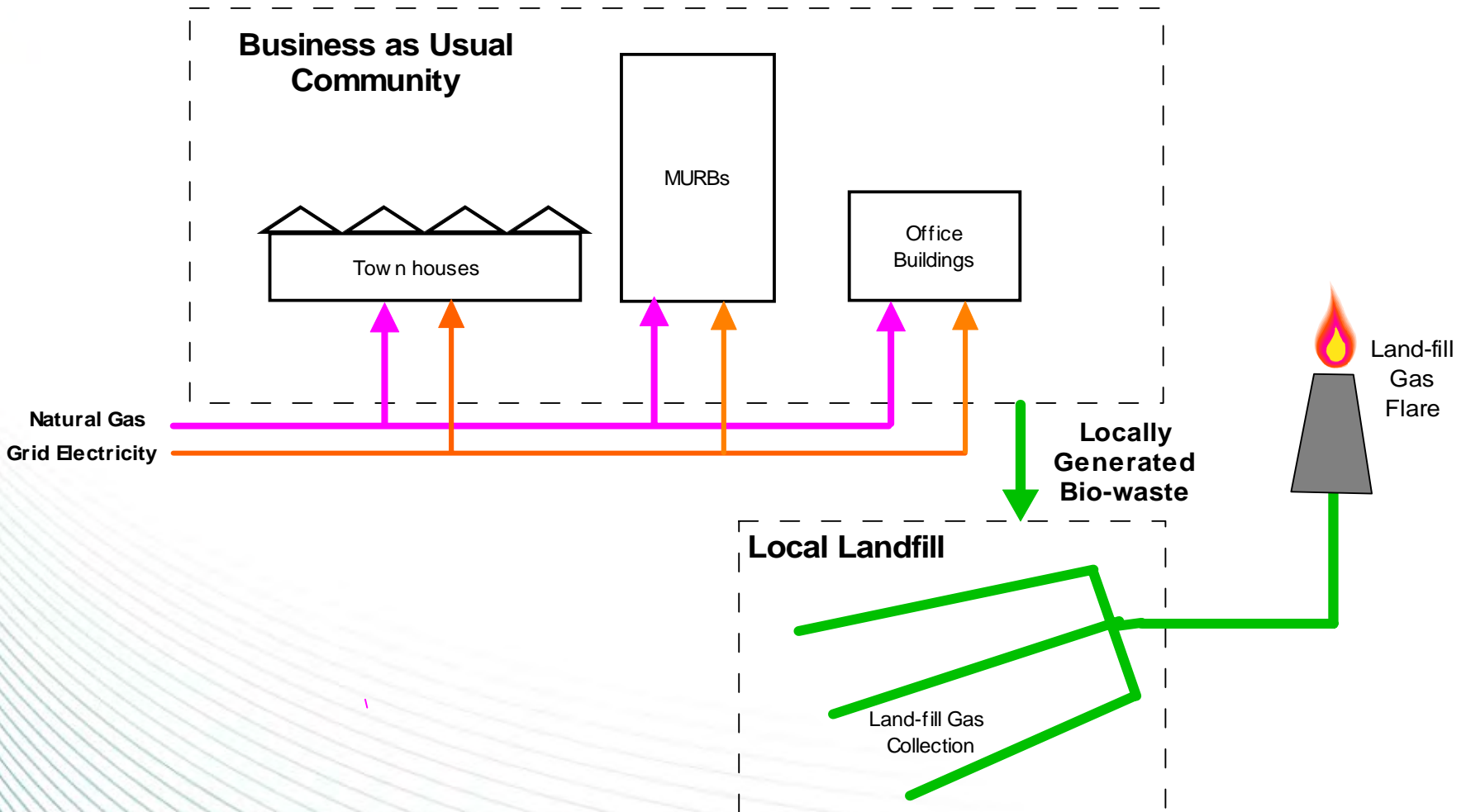
- District energy, on a smaller scale
- Community sources of energy
- Complementary building profiles
- Seasonal energy storage underground
- Heat pumps, biogas, and solar thermal



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Innovative Energy Supply Solutions

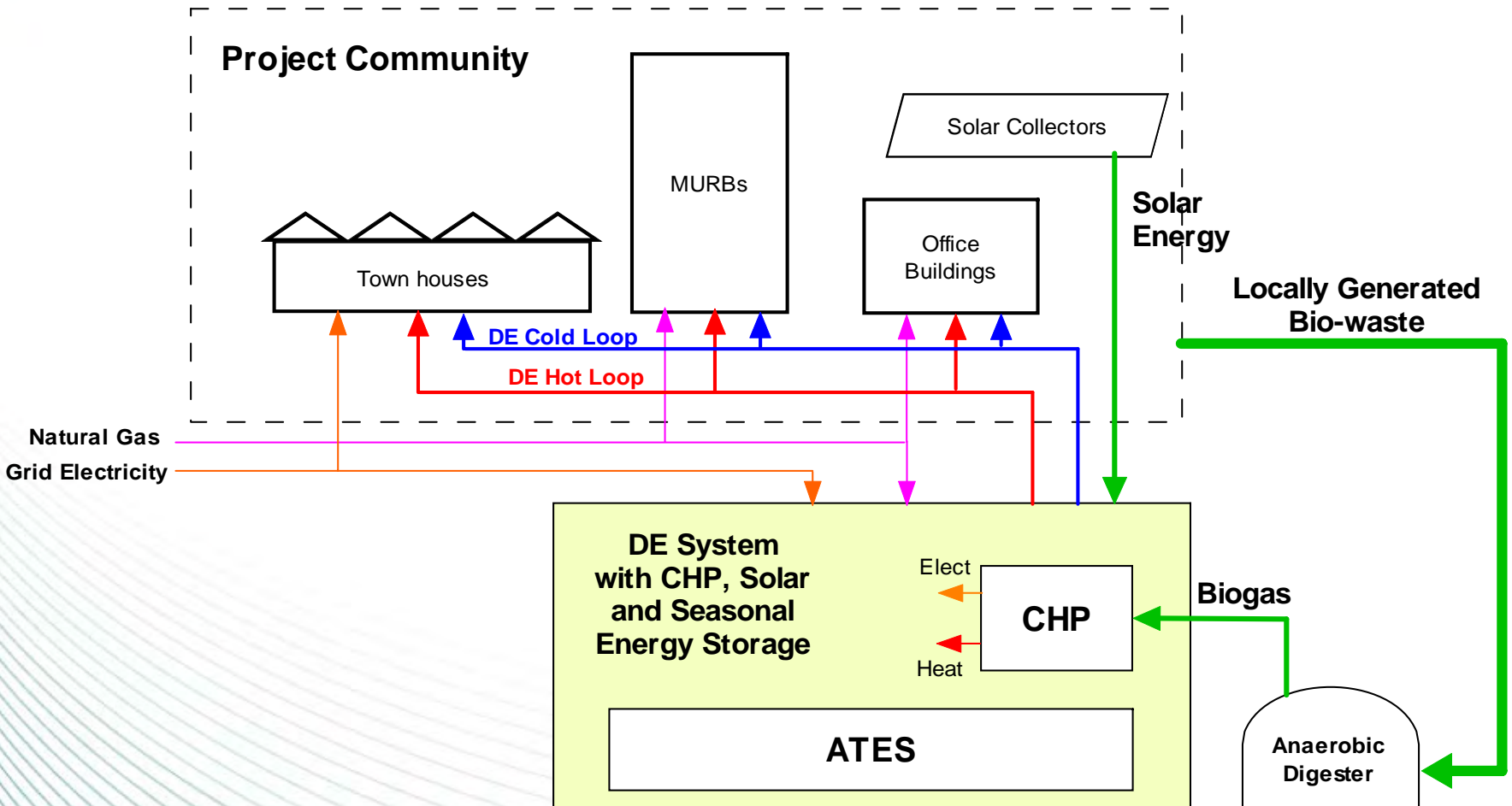
Traditional Community Design





Innovative Energy Supply Solutions

Sustainable Community Design





Innovative Energy Supply Solutions

Comparison of Business as Usual (BAU) vs Sustainable Approach

BUILDING LOADS:*	BAU Design	Integrated CES Design	Change (MWh)	Change (%BAU)
Heating Loads (MWh _{thermal})	1,328	1,328	0	0%
Cooling Loads (MWh _{thermal})	853	853	0	0%
EXTERNAL ENERGY INPUT:				
Natural Gas Input (MWh)	1,897	201	-1,696	-89%
Grid elect input (MWh)	284	124	-160	-56%
GHG EMISSIONS:				
Equivalent emissions (t _{CO2e})	466	65	-401	-86%

* Both Community Designs were based on EnergyStar® & LEED® qualified buildings



Community Planning for Sustainability

Summary: – Multiple layers working together

Integrated Community Planning Approach

Placemaking

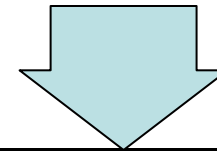
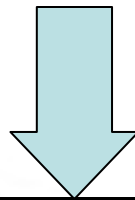
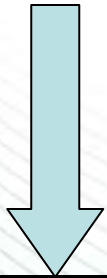
Building Efficiency

Community Energy Planning

- Walkability
- Intensification
- Diverse building types

- Efficient Building Designs
- *Technology Evaluation Process* established for future enhancement

- Community heating & cooling loops, with building heat recovery
- Community-Scale Seasonal Energy Storage (ATES)
- Renewables, Waste-2-Energy, and CHP System

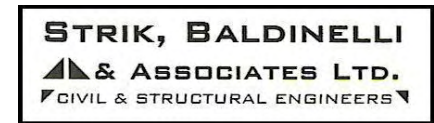
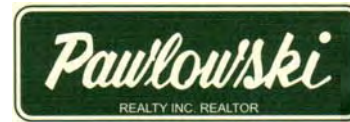
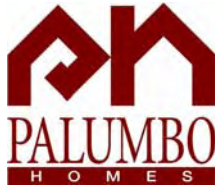


Sustainable Community Design



Acknowledgement

Project Participants



Natural Resources
Canada

Ressources naturelles
Canada





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Questions ?