

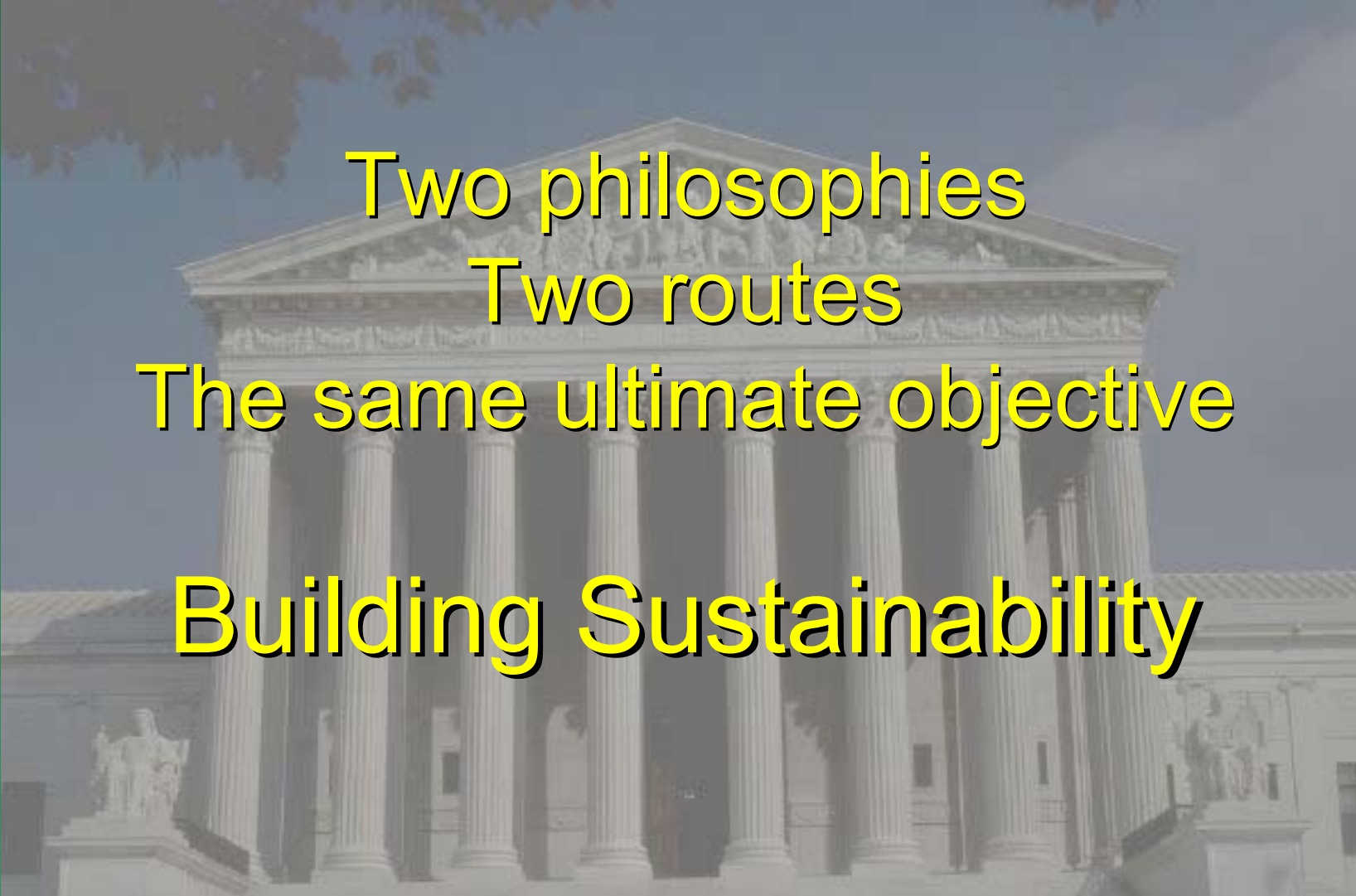
ATHENA and ENVEST

A Tale of Two Systems

ASHRAE Winter Meeting

Atlanta, Georgia

January 2001



Two philosophies
Two routes
The same ultimate objective

Building Sustainability

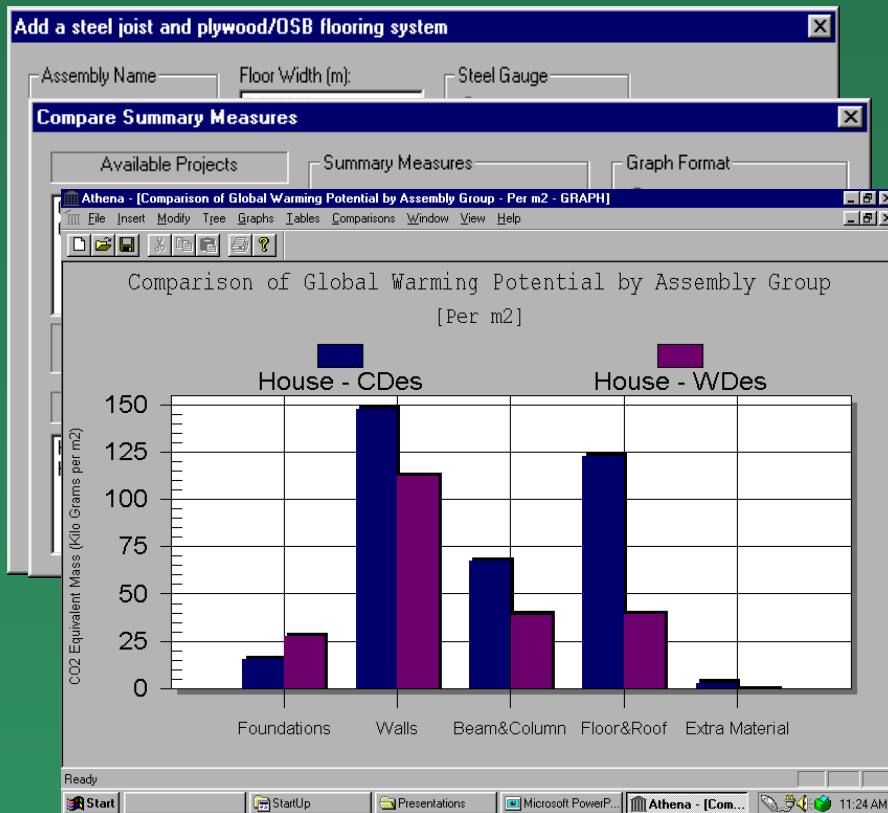
A Few Facts

	ATHENA	ENVEST
Developer	Athena Institute	BRE
Type of tool	Level II	Level II
Target user	architect/engineer	architect
Building types	all types	commercial
Underlying data	Canadian LCI	UK LCI
Current life cycle coverage	cradle through construction	cradle through demolition

Critical Similarities

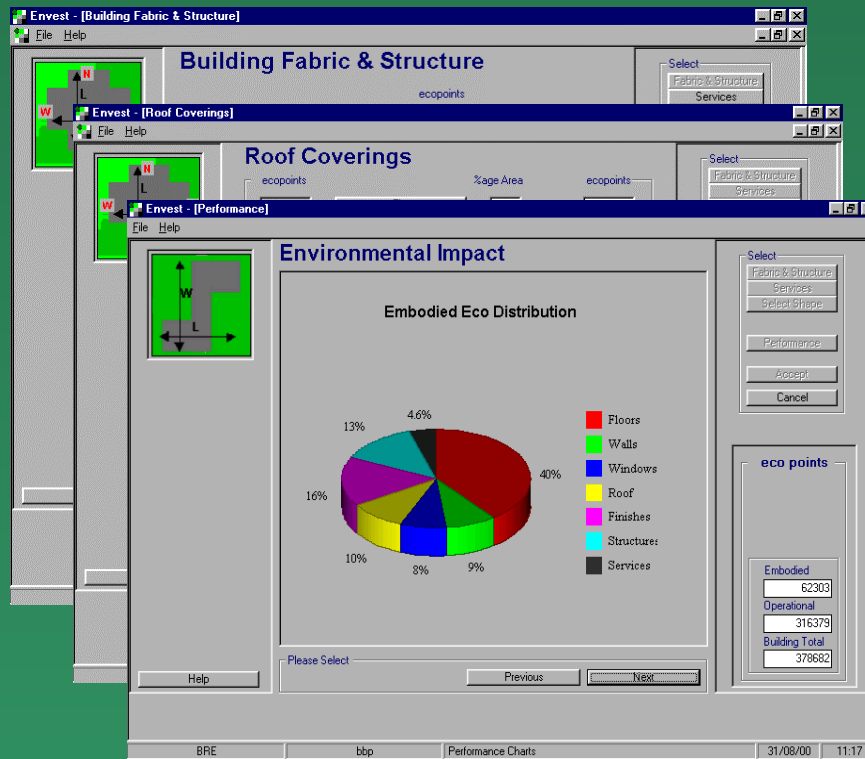
- ◆ Both are founded on purpose-developed LCI data for materials and products
- ◆ Both maintain a level playing field across material and product groups
- ◆ Both are intended for use at the conceptual design stage

ATHENA Philosophy



- ◆ Input design by assembly group/type
- ◆ Focus on characterized LCI results with details available
- ◆ No weighting across effect categories
- ◆ Emphasis on comparing options

ENVEST Philosophy



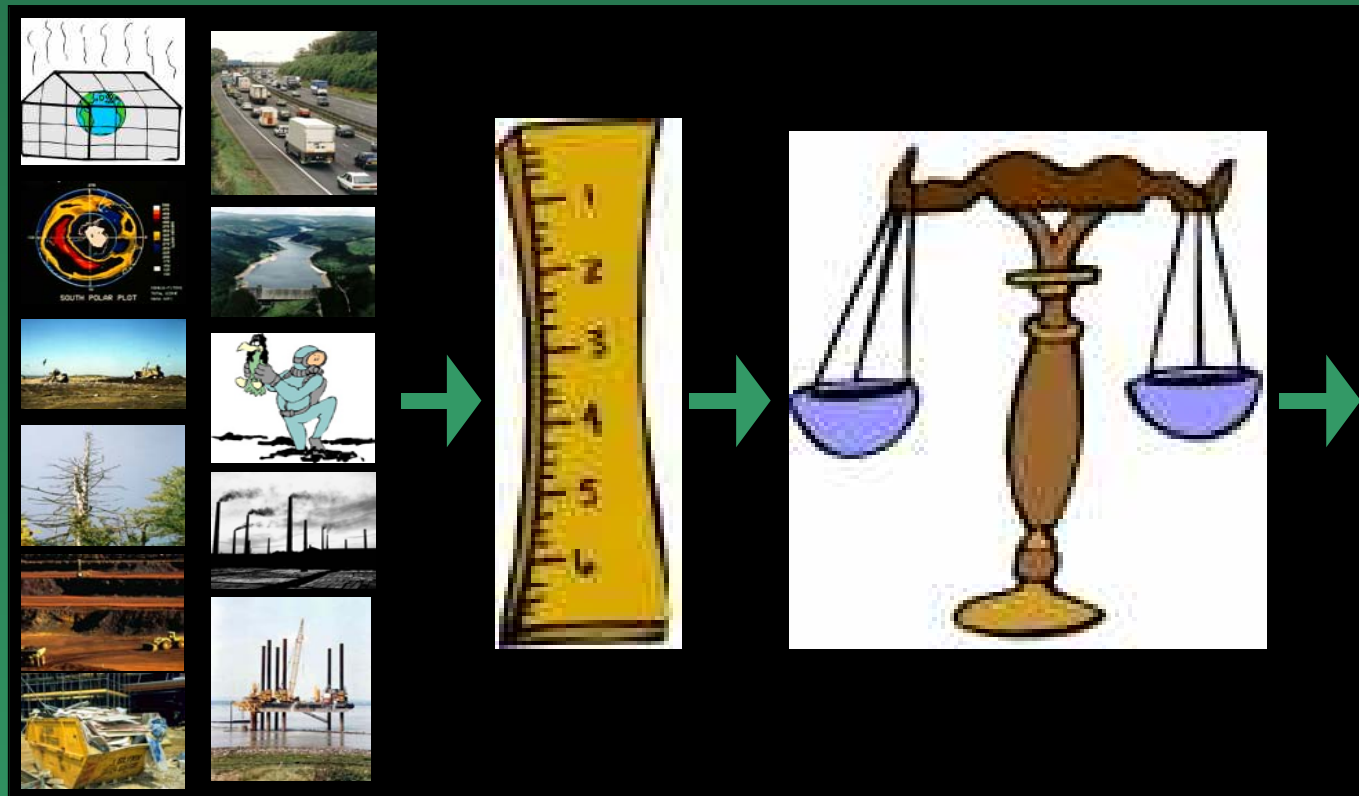
- ◆ Input design by changing building default values
- ◆ Drill down to successive levels of detail
- ◆ Results in the form of single 'Ecopoints' score
- ◆ Emphasis on reducing Ecopoints by modifying design elements

Derivation of Ecopoints

Issues

Measurement

Weighting

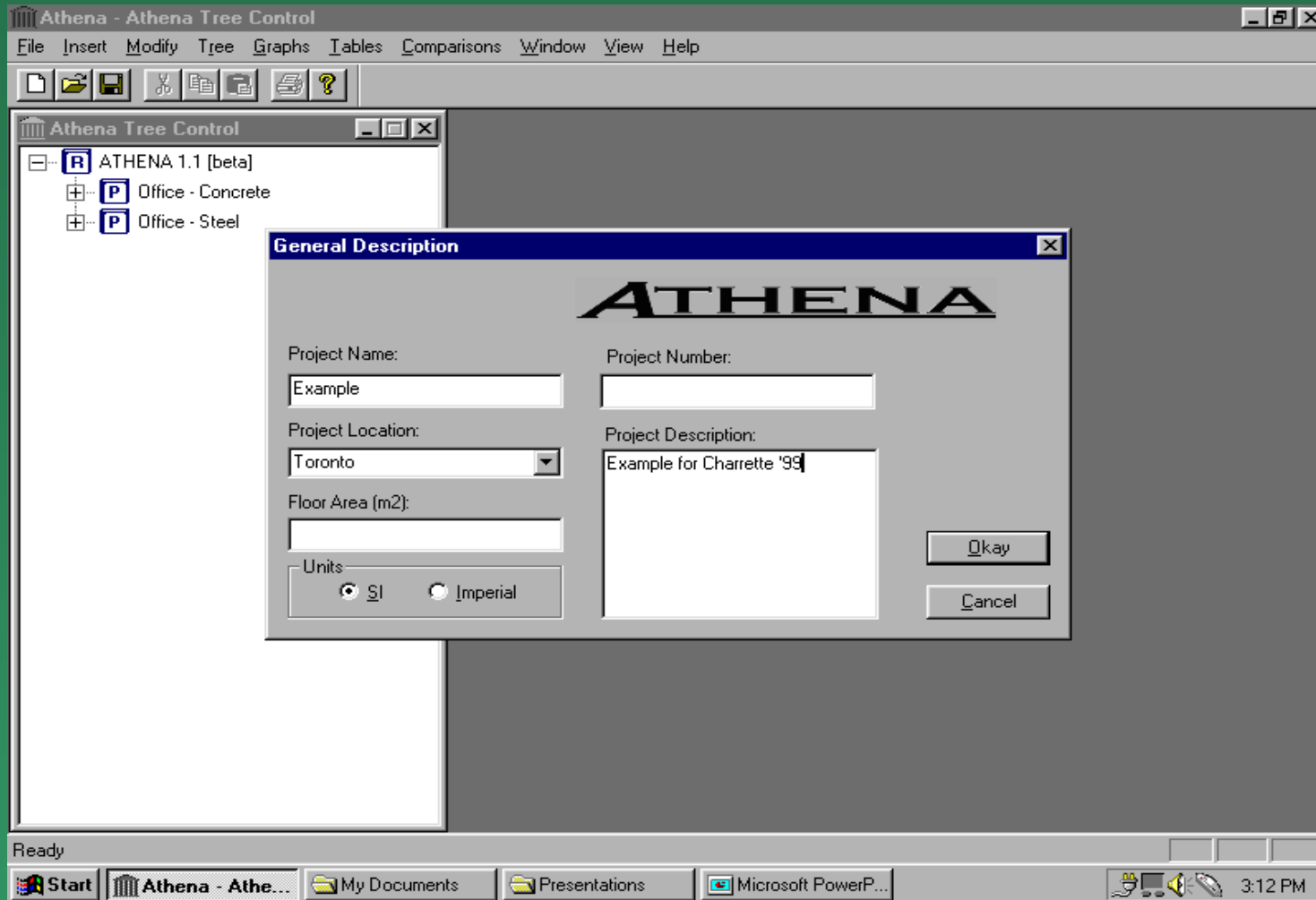


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Ecopoints

- ◆ **100 Ecopoints = Impact of 1 UK citizen for 1 year**
- ◆ 1 Ecopoint is equivalent to:
 - » 320 kWh electricity
 - » enough water to fill 1,000 baths
 - » 15 miles by articulated truck
 - » Landfilling 1.3 tonnes of waste
 - » Manufacturing 3/4 tonnes brick (250 bricks)

Working with ATHENA



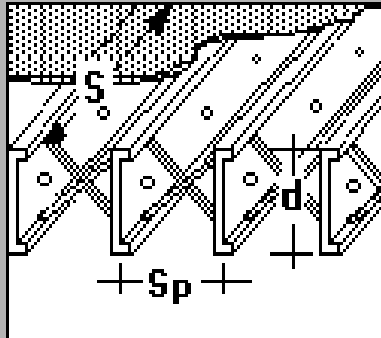
Add a steel joist and plywood/OSB flooring system

Assembly Name

Floor Width (m):

Floor Length (m):

Steel Gauge

 16 18

Decking Type

 None OSB Plywood

Joist Type

 39 x 152 mm 39 x 203 mm 39 x 245 mm 39 x 294 mm

Floor area (m2): 0.00

Units

 SI Imperial

Decking Thickness

 12 mm 15 mm 19 mm

Joist Spacing

 300 mm 400 mm 600 mm

Okay, Add Another

Okay, Done Adding

Cancel

Athena - Athena Tree Control

File Insert Modify Tree Graphs Tables Comparisons Window View Help

Athena Tree Control

- ATHENA 1.1 [beta]
 - Office - Concrete (1.41 TeraJoules)
 - Floors and Roofs (1.03 TeraJoules)
 - Concrete Flat Plate Slab on Columns (1.03 TeraJoules)
 - basement (253.63 GigaJoules)
 - ground floor (258.69 GigaJoules)
 - Second floor (258.69 GigaJoules)
 - Third floor (258.43 GigaJoules)
 - Foundations (188.66 GigaJoules)
 - Concrete Footing (81.74 GigaJoules)
 - Footing to basement (13.86 GigaJoules)
 - Footing to stairs (6.63 GigaJoules)
 - Footings to columns (61.25 GigaJoules)
 - Concrete Slab on Grade (106.92 GigaJoules)
 - Walls (193.54 GigaJoules)
 - Concrete Cast-In-Place Wall (146.84 GigaJoules)
 - Basement Walls (71.97 GigaJoules)
 - Stair walls (74.87 GigaJoules)
 - Steel Stud Wall (46.70 GigaJoules)
 - Infill panels (46.70 GigaJoules)

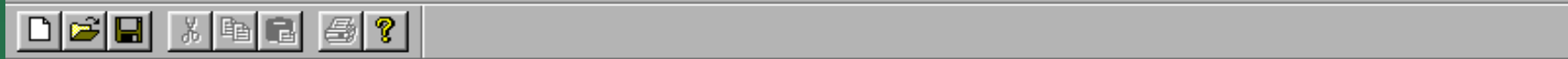
Ready

Start Athena - Athe... My Documents Presentations Microsoft PowerP... 3:19 PM

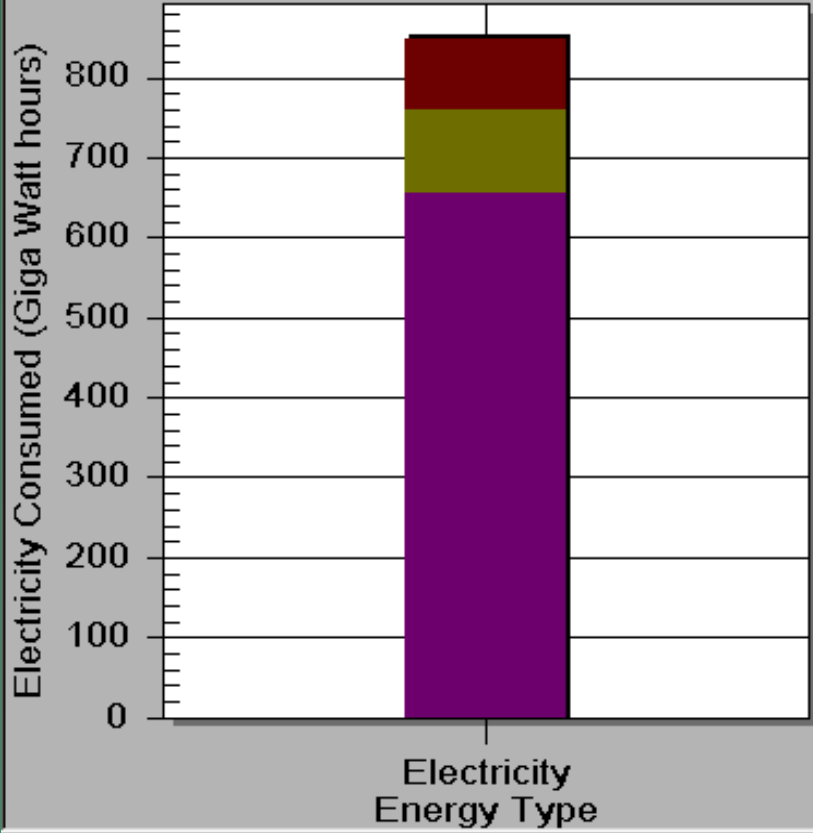
Select Summary Measure

- Energy Consumption
- Solid Waste Emissions
- Air Toxicity Index
- Water Toxicity Index
- Global Warming Potential
- Weighted Resource Use

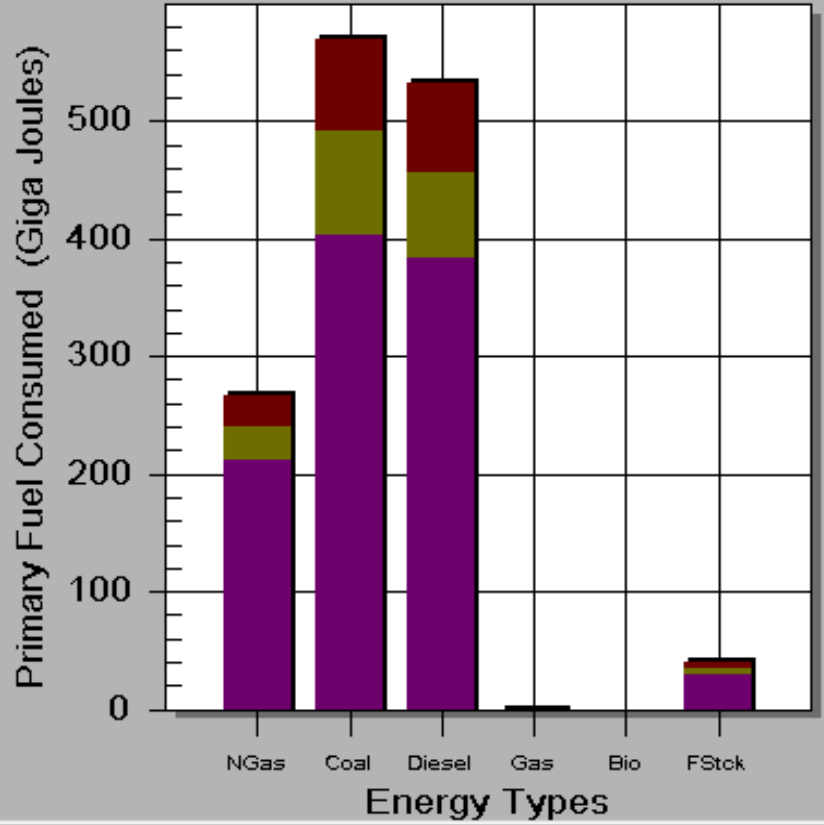
OK Cancel



Electricity Consumption



Primary Fuel Consumption



Compare Summary Measures

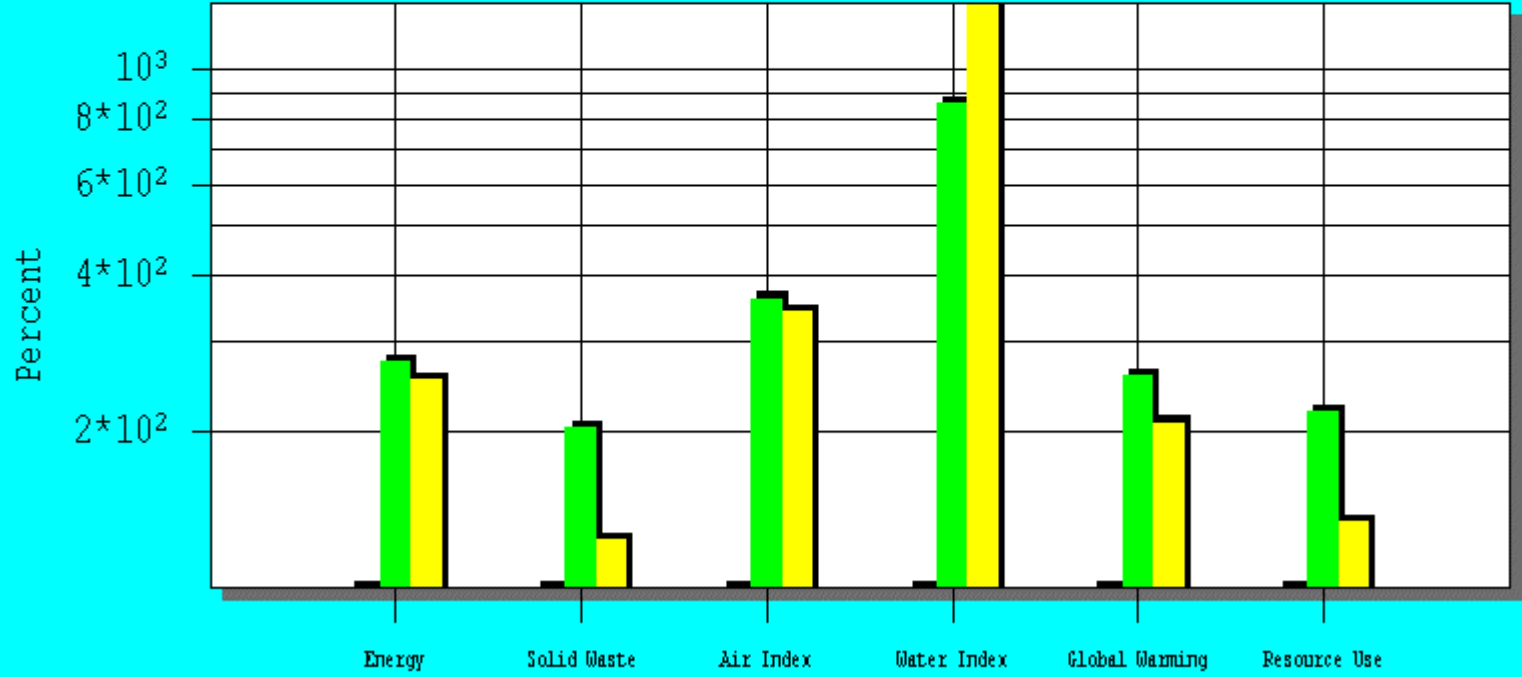
Athena - [Comparison of All Measures - Project Baseline - GRAPH]

File Edit Insert Review/Modify Tree Graphs Tables Comparisons Window View Help

Conc Steel
Double
Wood
Steel
Conc
Sum

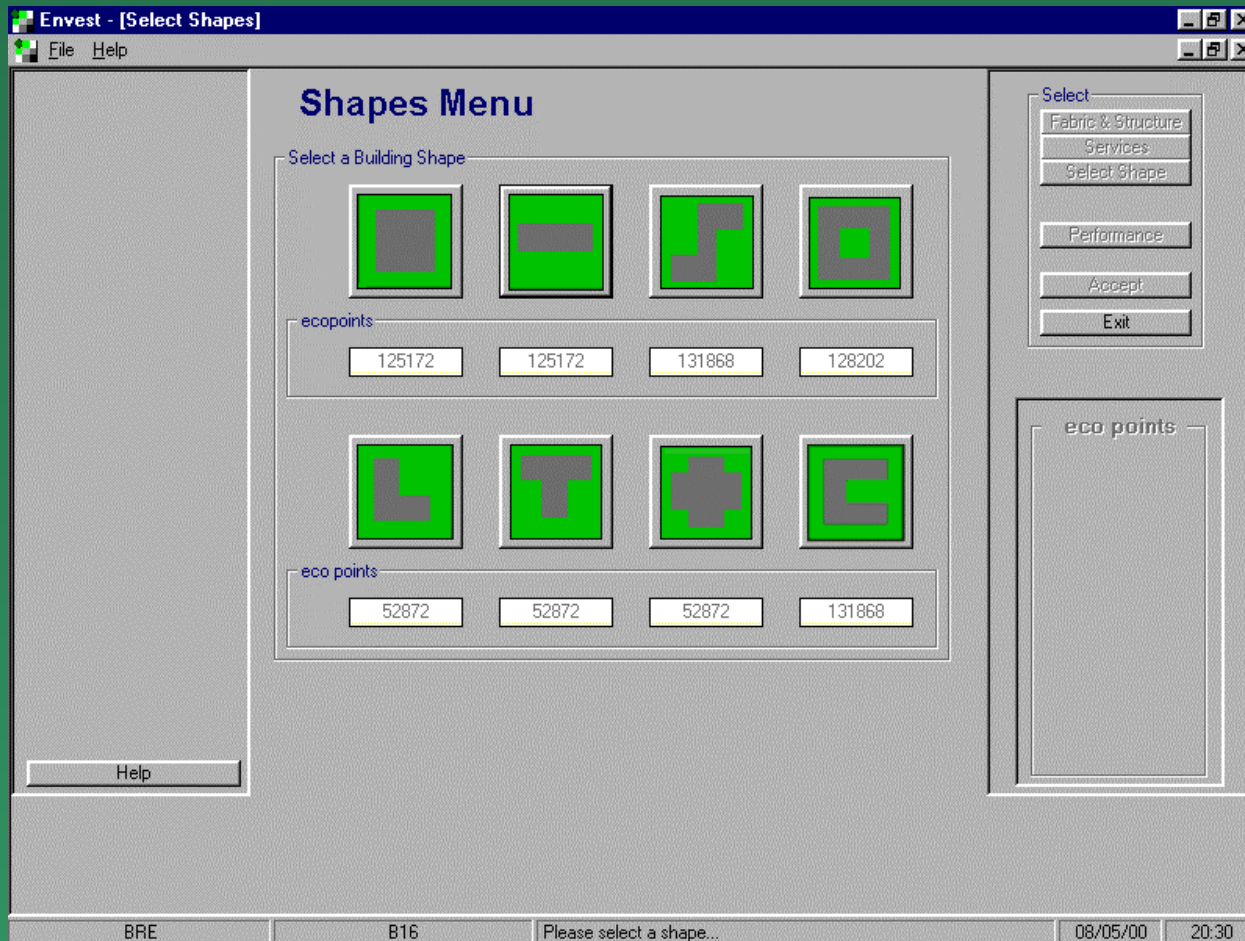
Comparison of All Measures [With Wood House as Project Baseline]

Wood House Concrete House Steel House



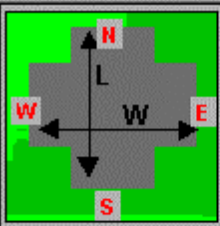
Ready

Working with ENVEST



Invest - [BUILDING DATA]

File Help



Actual Building Details

Main Dimensions

Length: 36.00 m
 Width: 40.00 m
 Plan Depth: 15 m

No. of Storeys: 3
 Storeys Height: 4 m

Building Type

Building is a Head Office
 Air conditioned
 Catering Facilities on site

Percentage Cellular space (0 if open plan): 0 %

Glazing Area

North: 20 %
 East: 20 %
 South: 50 %
 West: 20 %

Window Grouping

Grouped in Rows

Occupancy

12 m² /person

Operational Life: 60 yrs Location: Thames Valley

Soil Type: Rocky

Building Data

Ground Floor	915.00 m ²	Roofs	915.00 m ²
Upper Floors	1830.00 m ²	Internal Walls	686.00 m ²
External Walls	1330.00 m ²		
Windows	494.00 m ²		

Select

Fabric & Structure
 Services
 Select Shape

Performance

Accept

Cancel

Help

BRE B16 Accept or edit Actual building details: 08/05/00 20:31

Ervest - [Building Fabric & Structure]

File Help

Building Fabric & Structure

ecopoints

Floors

Ground Floors	1622	Reset
Upper Floors	2762	Reset

Walls

External Walls	2208	Reset
Internal Walls	258	Reset

Windows

Windows	232	Reset
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Roofs

Roof Structure	660	Reset
Roof Covering	285	Reset

Finishes

Floor Finishes	2790	Reset
Wall Finishes	133	Reset
Ceiling Finishes	138	Reset

Structures

Superstructure	1566	Reset
Substructure	554	Reset

Select

- Fabric & Structure
- Services
- Select Shape
- Performance Comparison
- Accept
- Cancel

eco points

Embodied	14013
Operational	77631
Building Total	91644

Help

BRE | B16 | Building Fabric and Structure | 08/05/00 | 20:34

Invest - [Roof Coverings]

File Help

Roof Coverings

ecopoints	Type	%age Area	ecopoints
1732	Flat	0	0
285	Pitched	100	285

Details

Pitched Roof

Covering:

Insulation:

<input type="text" value="Rock wool"/>	Thickness (mm)	<input type="text" value="200"/>	<input type="button" value="Use default"/>
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- Polyurethane
- Expanded_polystyrene
- Foamglass
- Glass wool
- Rock wool
- Cork
- Extruded_polystyrene

Select

eco points

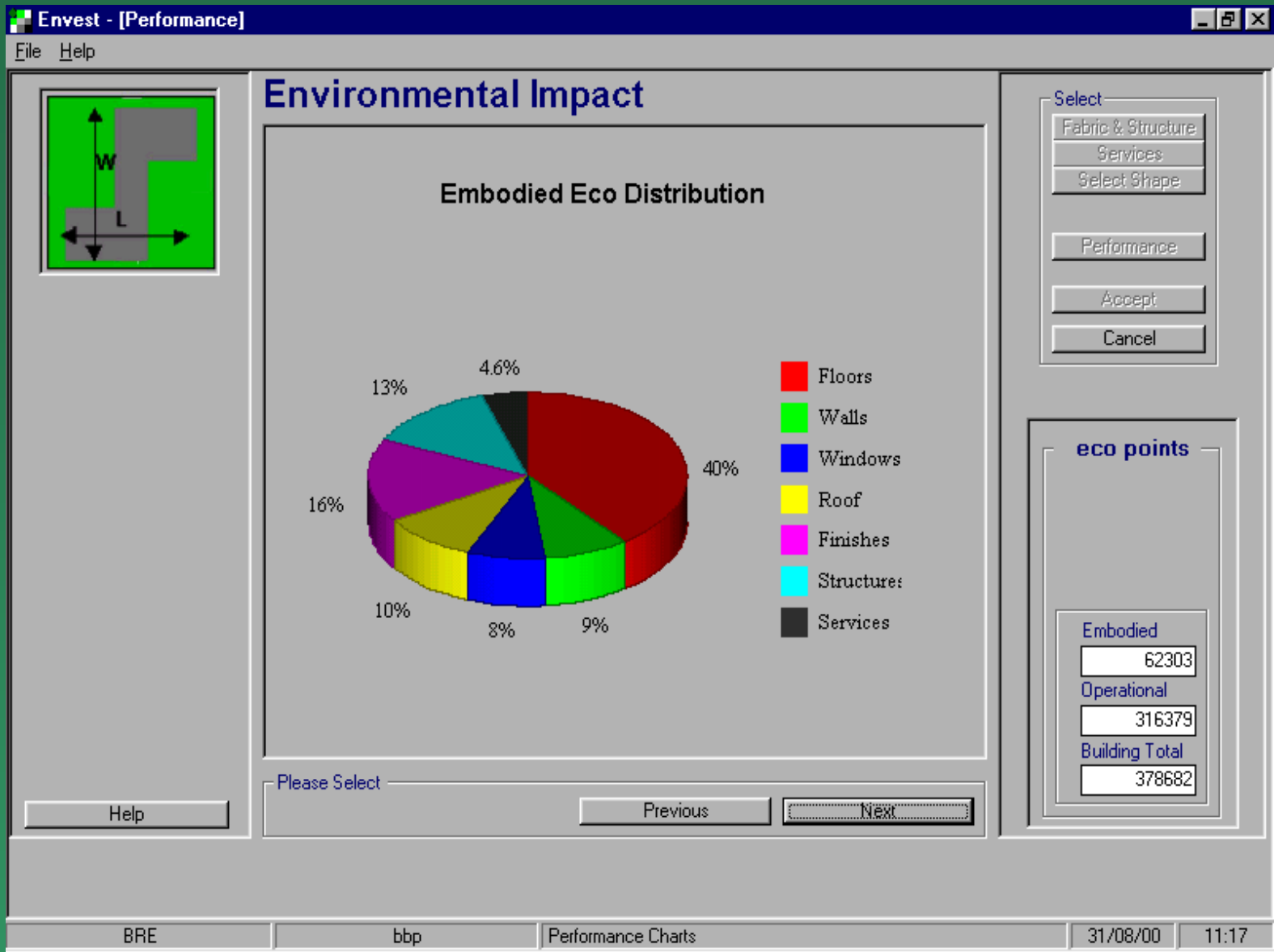
Selected Element (embodied)

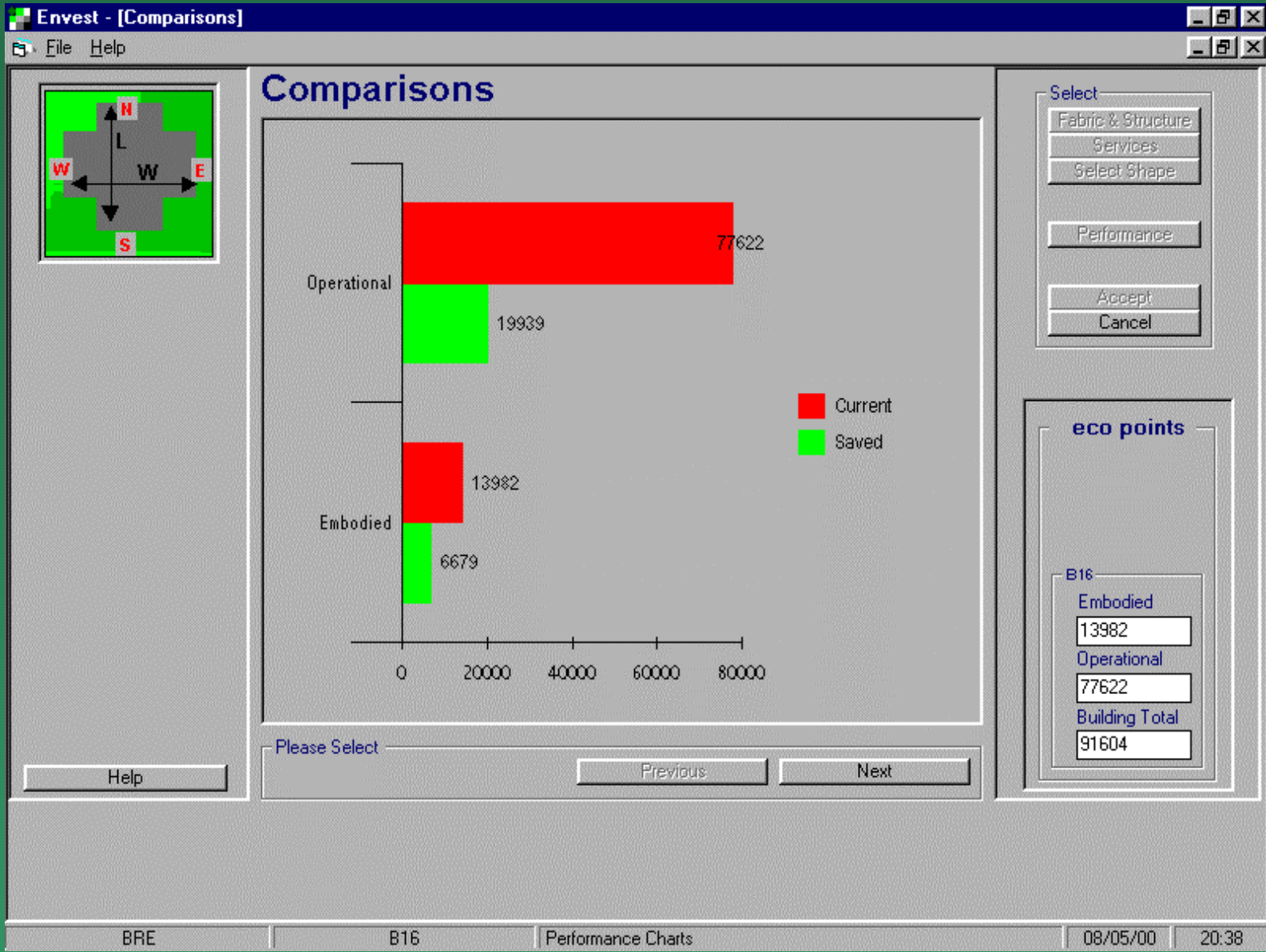
Embodied

Operational

Building Total

BRE
B16
Roof Covering
08/05/00
20:35





Comparative Strengths

ATHENA

- ◆ Design flexibility — building types and elements
- ◆ Visually tracks design elements
- ◆ Results at varying levels of detail
- ◆ Allows comparison of several design options
- ◆ Diagnostic capability

ENVEST

- ◆ Shapes library and easy entry of new design
- ◆ Building occupancy and use details
- ◆ Easy to communicate Ecopoint results
- ◆ Coverage of building elements & life cycle stages
- ◆ Benchmarking capability