Value Proposition for Reducing the Carbon Footprint

10th December 2008

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What We'll Cover …

- Introduction
- What can be done
- Network Planning
- Demonstration
- Wrap-up

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Changes are the pressing Green issue

Geophysicists: Theory of Global Warming 'Well Established'

The world's largest society of Earth and space scientists has released a new statement on climate change that unequivocally names human activity as the cause of global warming.

Foxnews.com, New York City, 25 Jan 2008

We have consumed 1 trillion barrels of Oil over the last 125 years. We will consume the next trillion in the next 30 years

Cambridge Energy Research Associates, 2005

183 countries ratified the **Kyoto Protocol** to date

Nov 08, United Nations Framework Convention on Climate Change

Barack Obama supports the implementation of a market-based cap-and-trade system to reduce carbon emissions by the amount scientists say is necessary: 80 percent below 1990 levels by 2050.

Obama-Biden Environment Plan 2008

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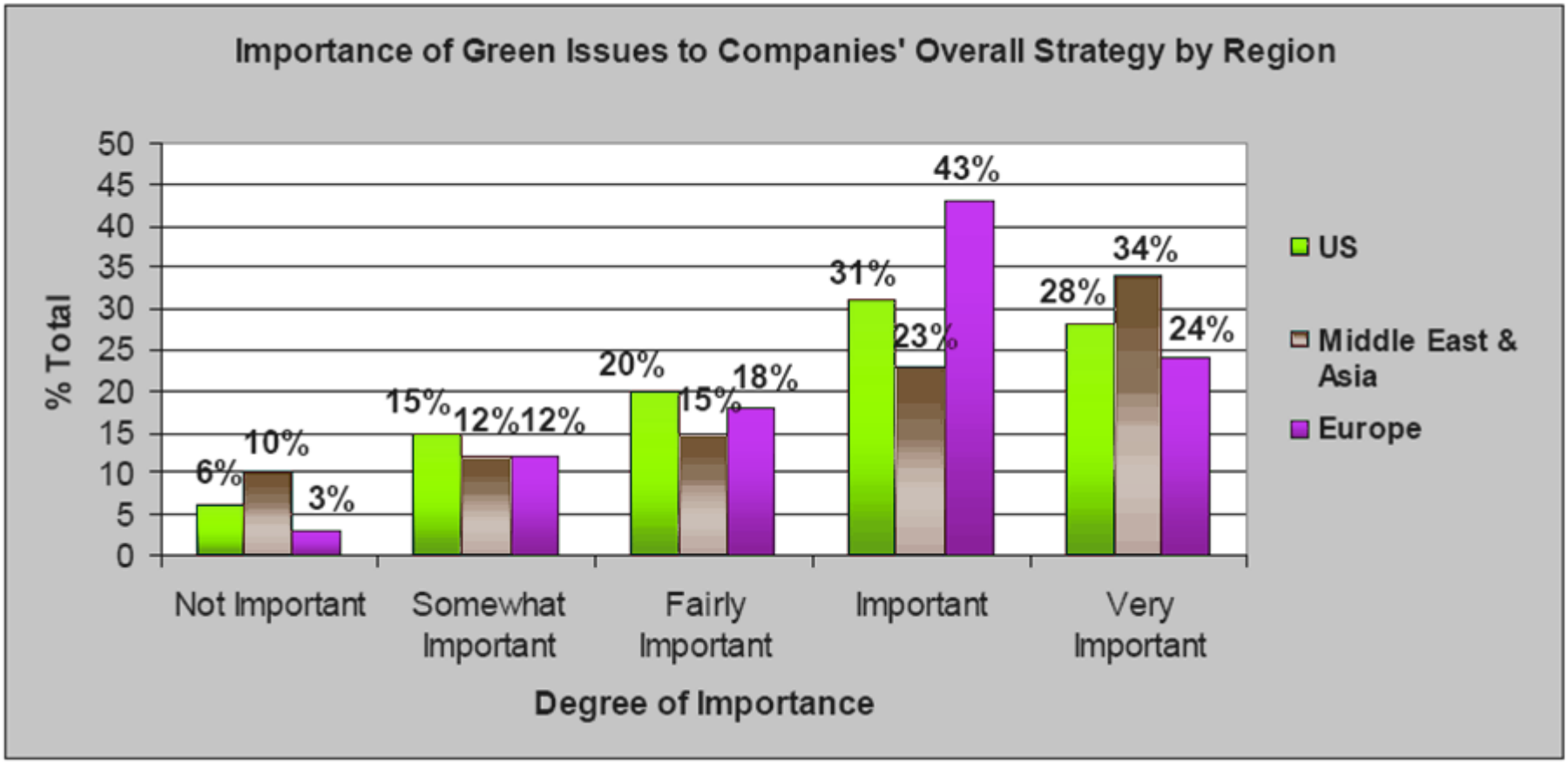
Green SC: Executives are Concerned



Eye for Transport Survey, Nov. 2007

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Pressure Comes

- From Consumers
  - Products we buy should have less carbon footprints
- From Employees
  - Is my company doing the right thing ?
- From B2B
  - From business processes (New rules)

Product Labels

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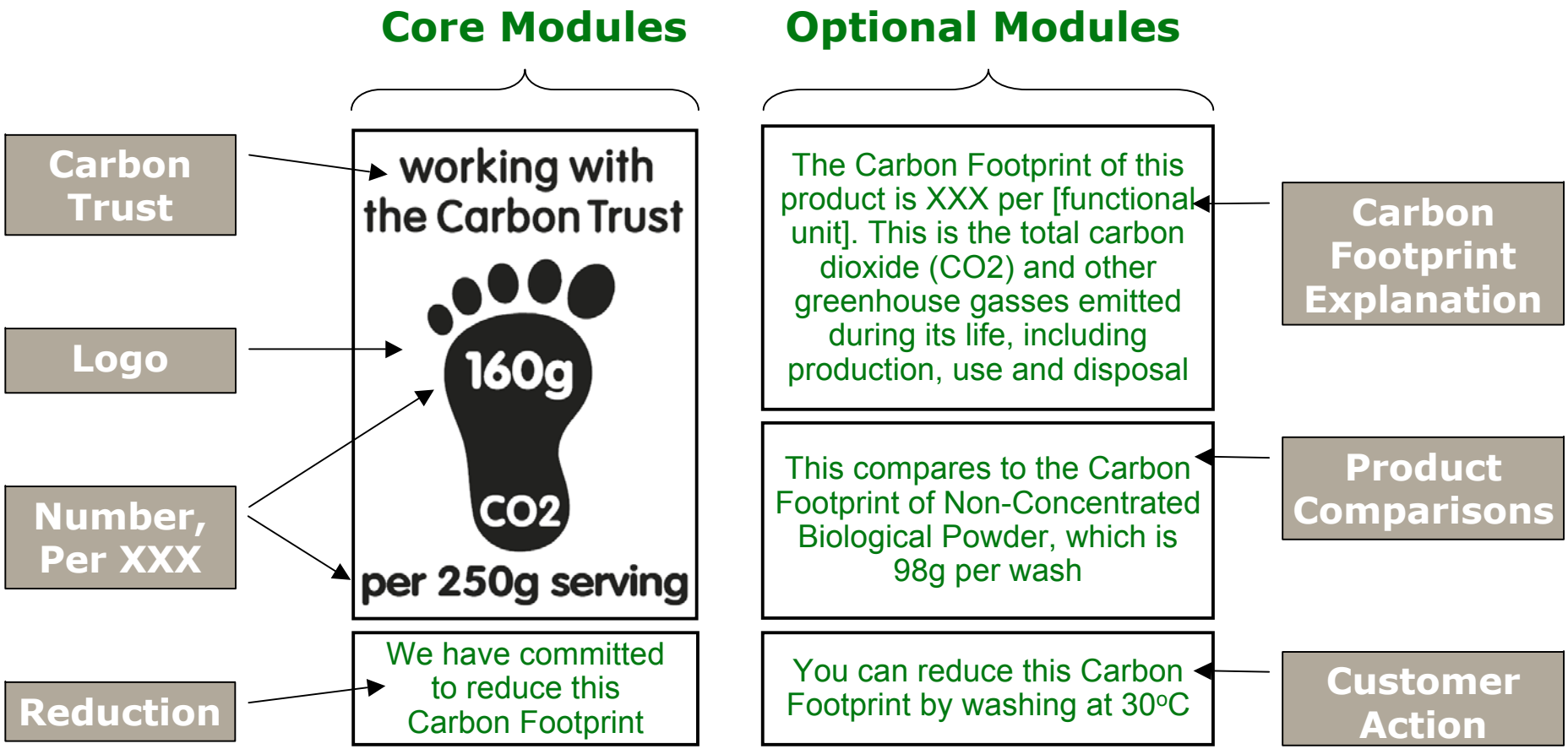
The Carbon Reduction Label

(Source Carbon Trust)



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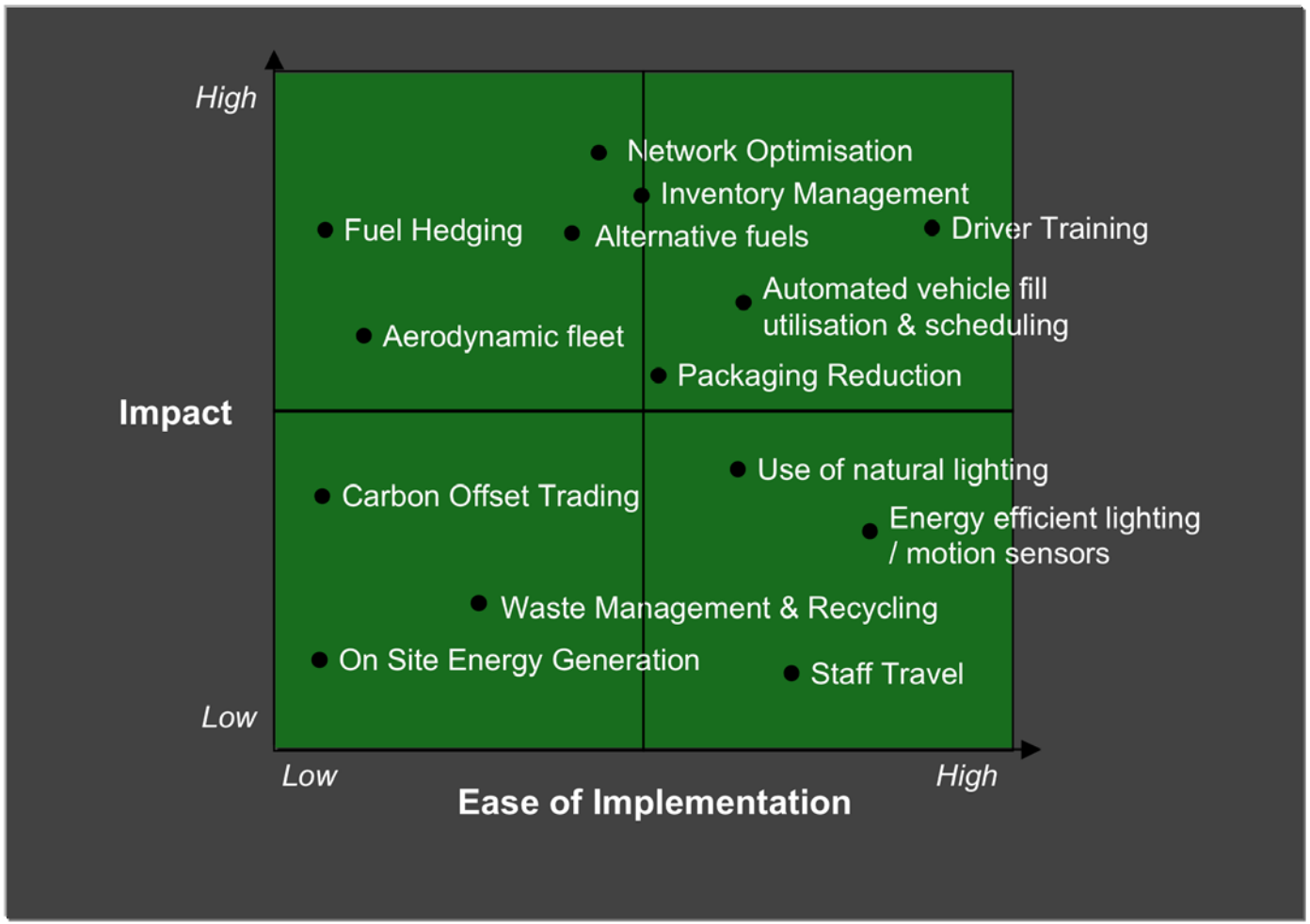
What can be done !



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logistics opportunities

- Network Optimisation
- Improved Inventory Management
- Improved Vehicle Fuel Consumption
- Reduced Warehouse Energy Consumption
- Packaging Reduction

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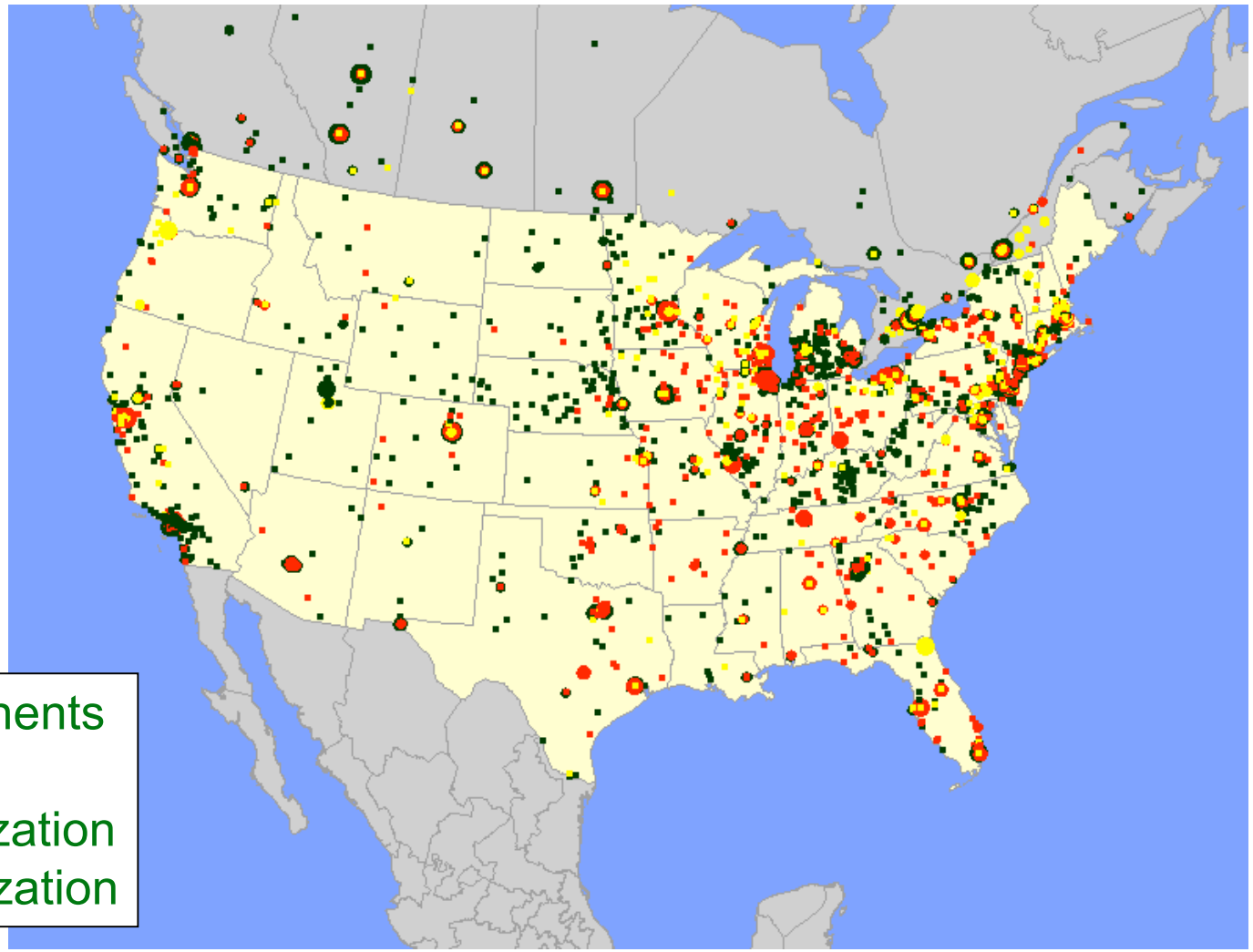
Network Design Introduction



Components
-Data
-Optimization
-Visualization

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More and More companies are using Network Design

- Mergers and Acquisitions
- Consolidations, cost reduction and plant rationalization
- Transportation costs
- Production sourcing
- Risk Management
- Carbon emission footprint

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Strategic Network Design

- Allows companies to design & optimize their supply chain network
- Key questions answered:
  - What is the right number, location, size, and handling capacities of depots, hubs, DCs, etc.? Which ones should be closed / opened ?
  - What is the optimal number, location and capacities of suppliers, plants and production lines?
  - What modes of transportations should be used where ?
  - How to best handle different products types?
  - How to best assign customers and products to DC's ?
- Considers at the trade-offs between:
  - Total logistics costs
    - Fixed and variable facility costs
    - Transportation costs (Inbound and outbound, duties, tariffs, etc.)
    - Production costs (in-house, outsourced, suppliers)
    - Inventory costs
    - Carbon emission costs
  - Service level / distance to customer

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Supply & Sourcing Decisions

- Are products being made in the right location?
- How to most efficiently use my factories?
- When and how much should I outsource?
- Should plants produce a lot of products to serve the local market or should a plant produce a few products to minimize production costs?
- Should we close the high-cost plant(s)?
- How to address seasonal demand or large spikes (e.g., at product launches): Should we build ahead? Use overtime? Outsource?

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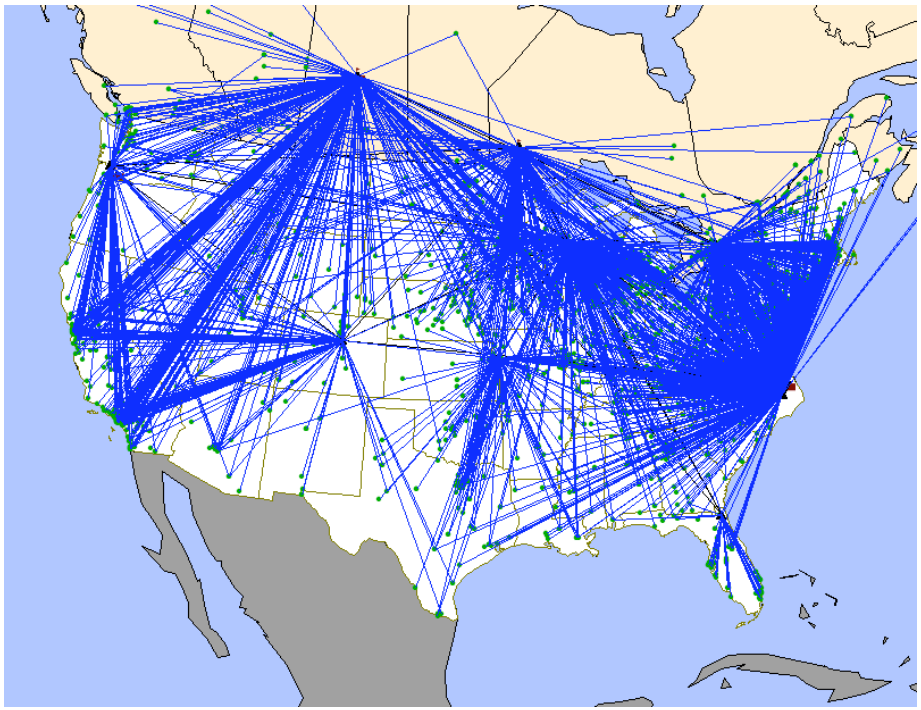
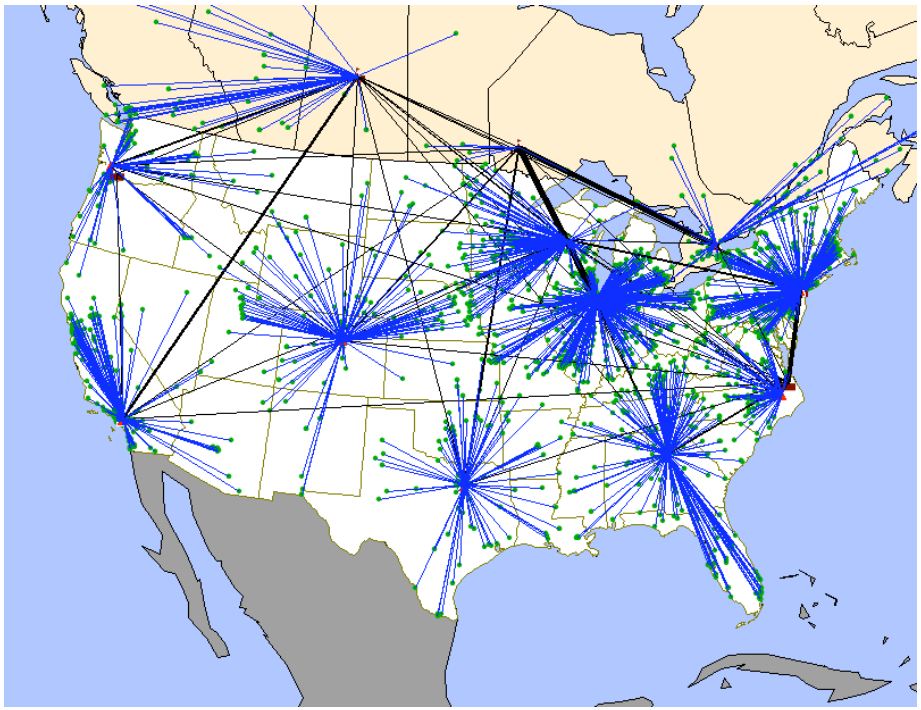
Solution Comparison





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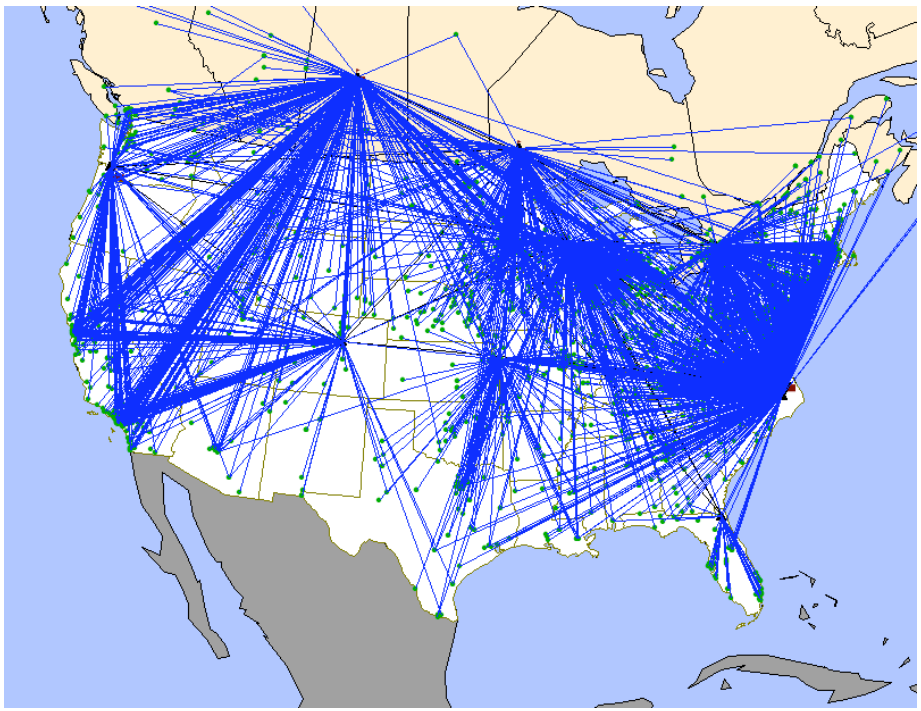
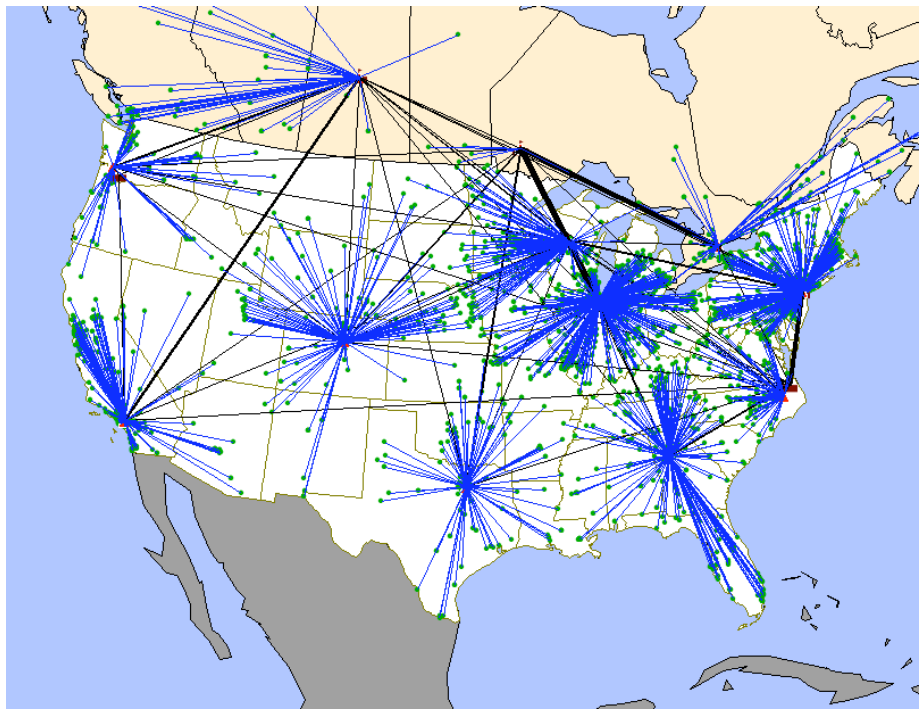
Making the Trade-Off Between Service and Cost

Optimal Network For Cost



Savings: $6 million
Service: 40% next day

Optimal Network For Service



Savings: $3 million
Service: 80% next day

Which is Better?

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LogicNet Plus Carbon Footprint Extension
Used in two ways

Reporting

- User enters various factors used to calculate CO_2 emissions associated with various supply chain activities.
- LogicNet Plus optimizes the supply chain for lowest total cost, or maximum total profit.
- LogicNet Plus reports total Carbon Footprint to be used as an additional factor in decision making.

As a Constraint

- User enters various factors used to calculate CO2 emissions associated with various supply chain activities.
- User enters a maximum total Carbon Footprint (in metric tons) the supply chain is not to exceed.
- LogicNet Plus optimizes the supply chain for lowest total cost, or maximum total profit while adhering to the constraint on Carbon Footprint.

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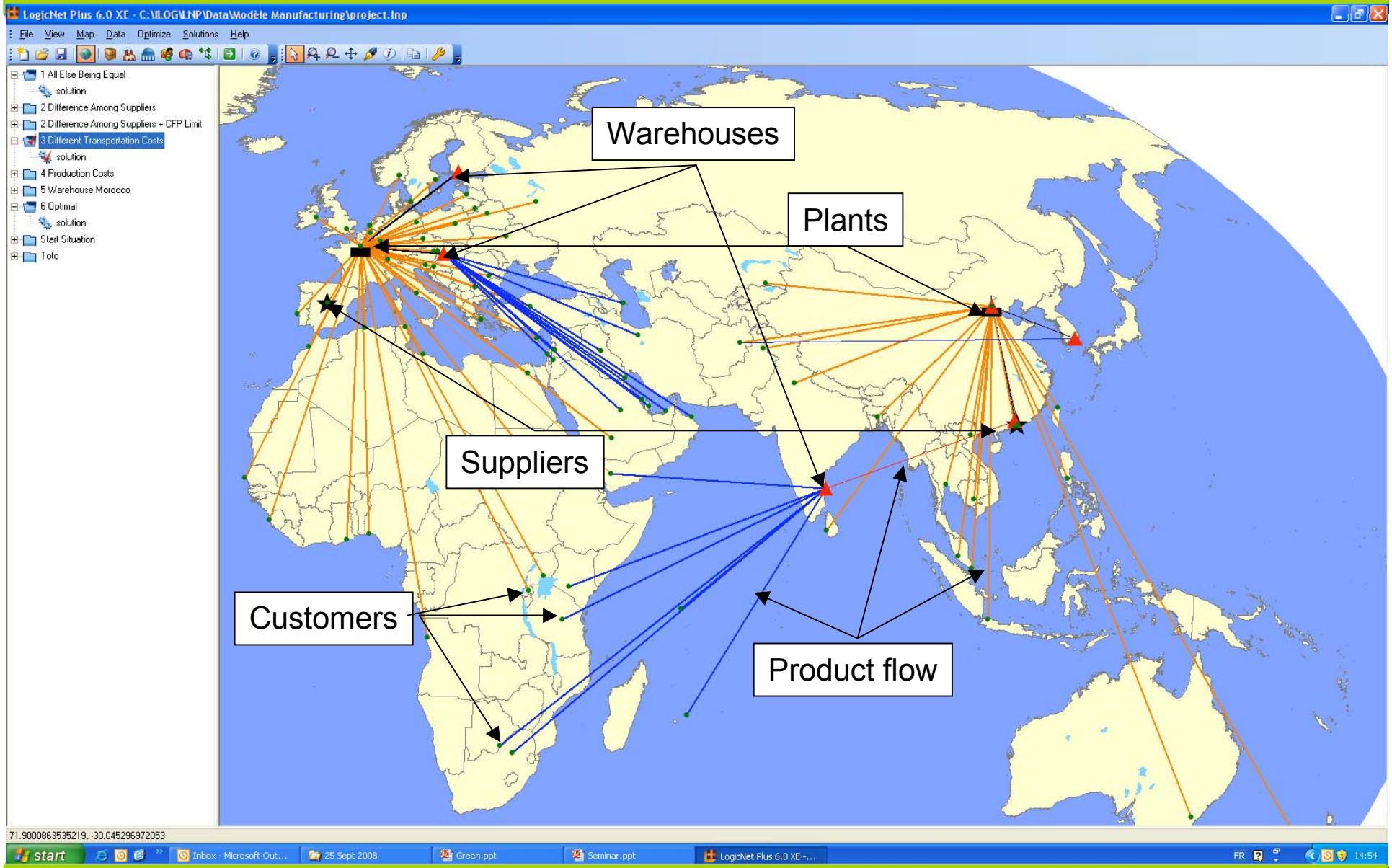
Strategic Network Design



ILOG Carbon Footprint

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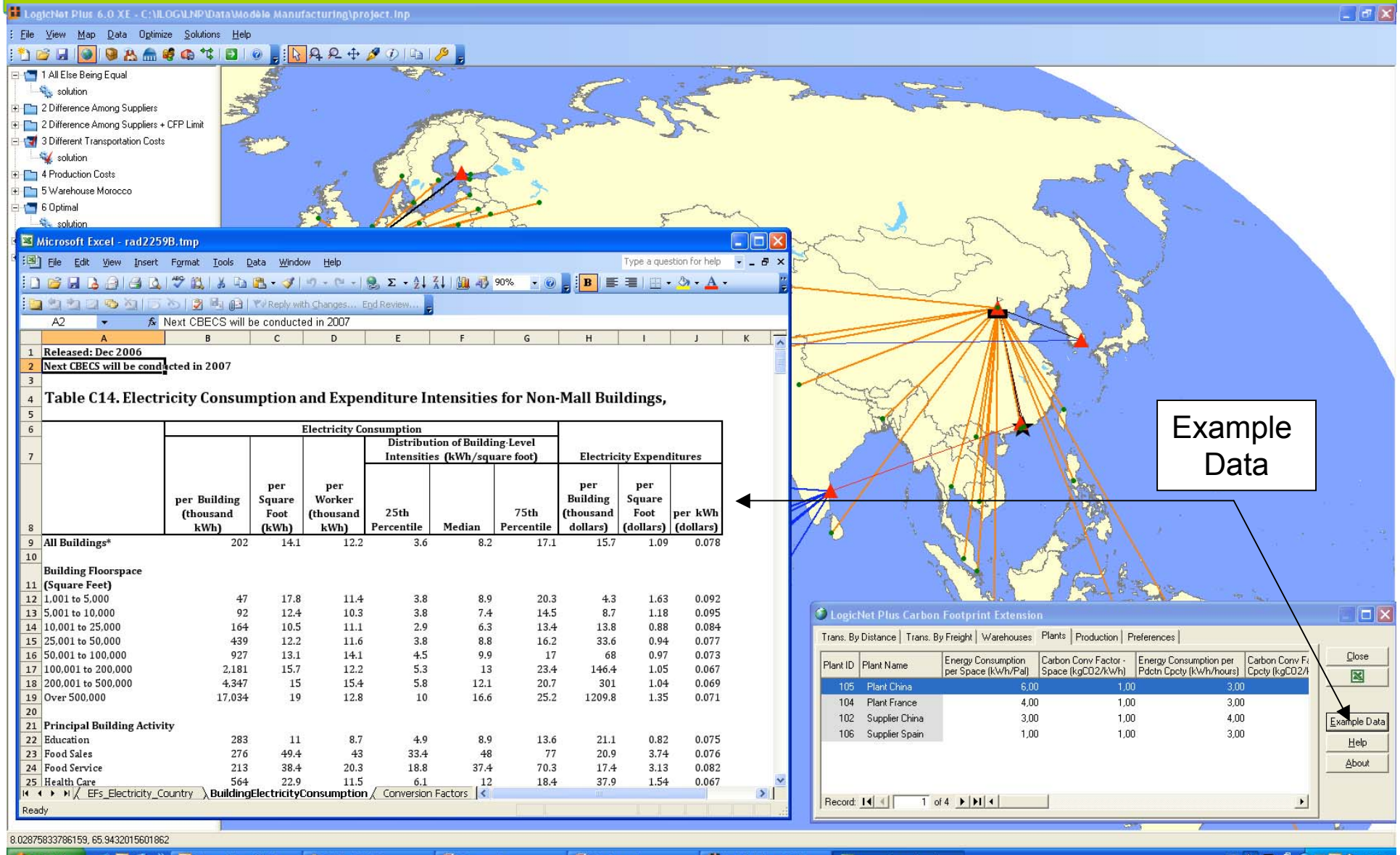
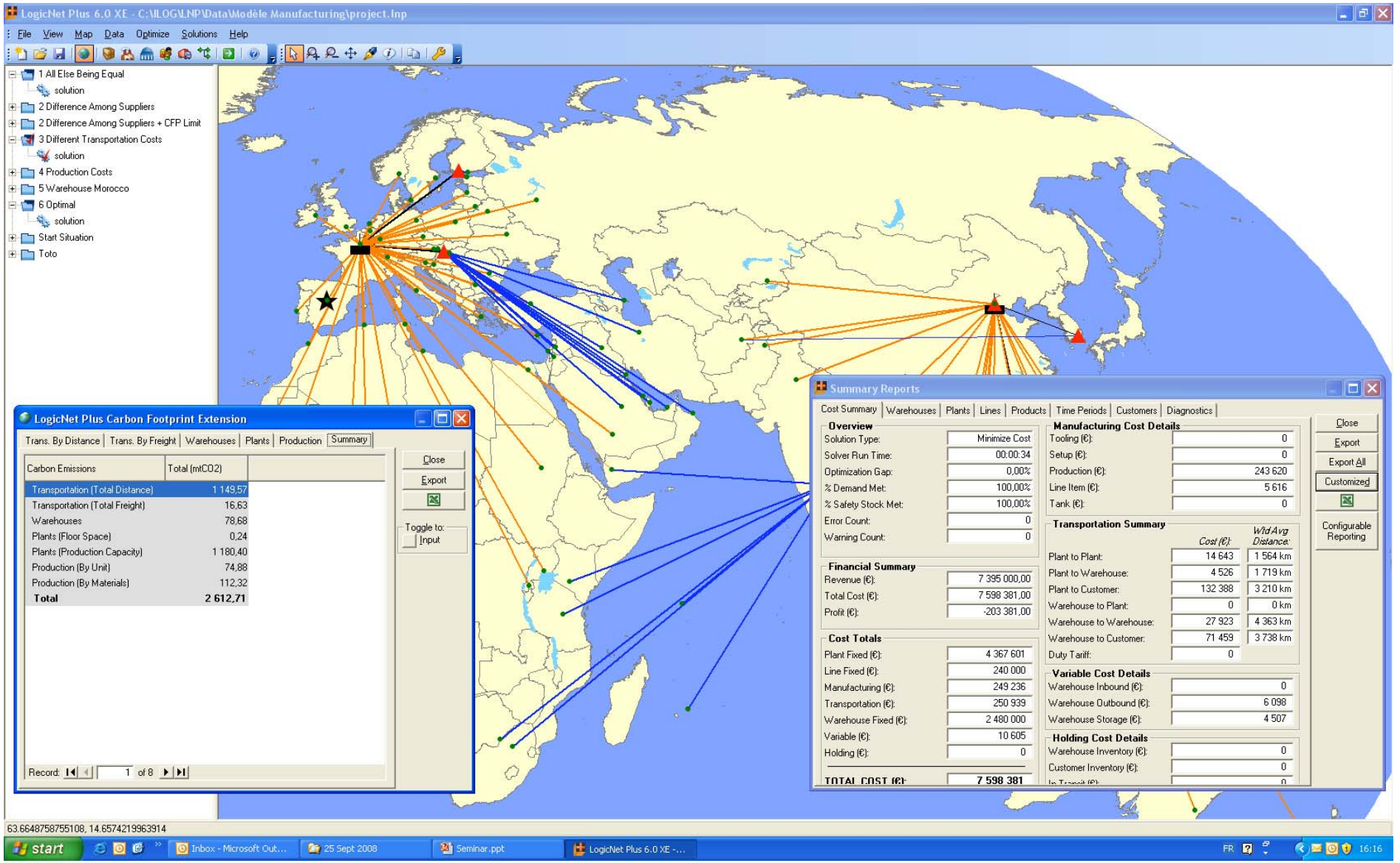
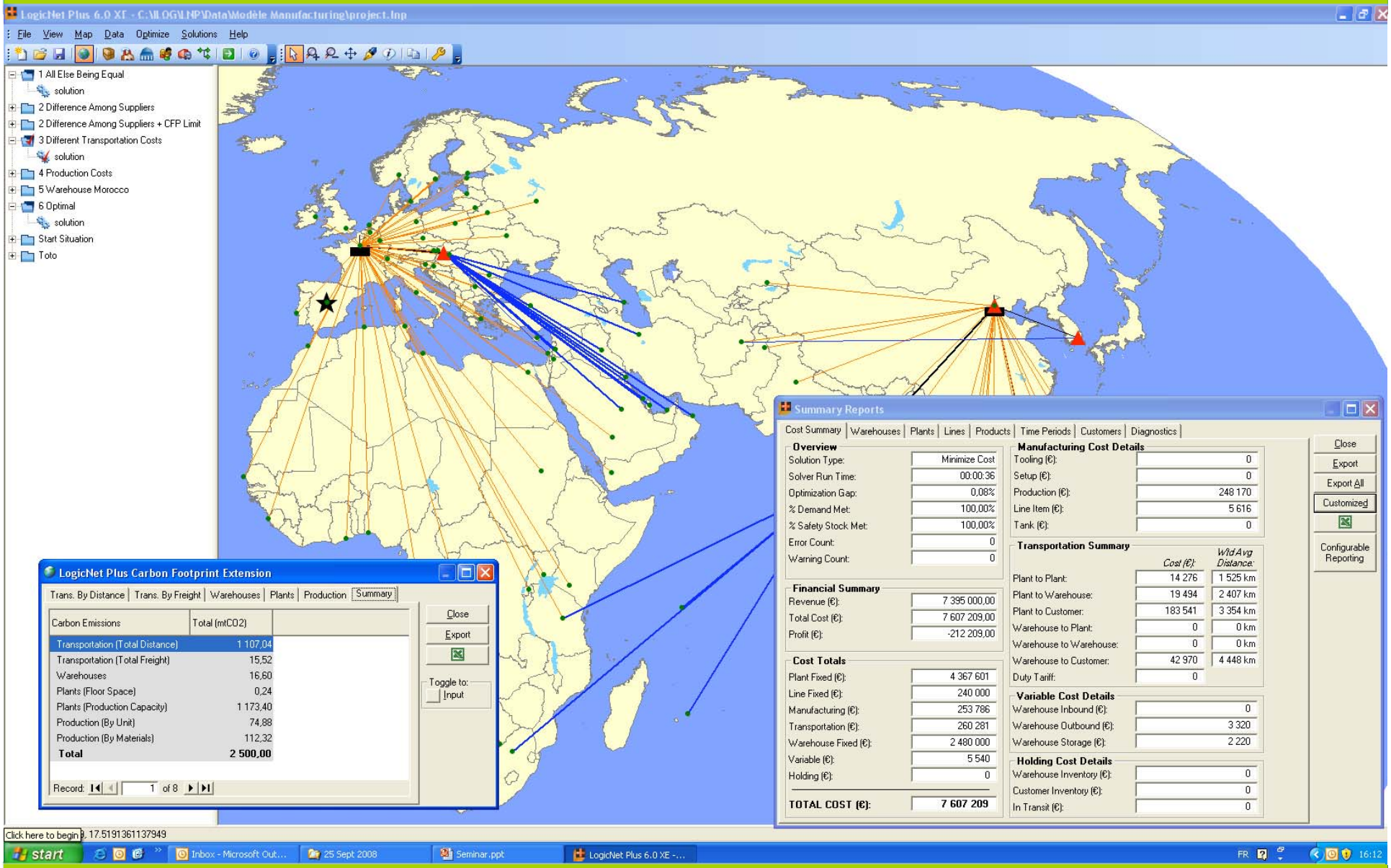


ILOG Carbon Footprint Reporting



Carbon Footprint as a constraint



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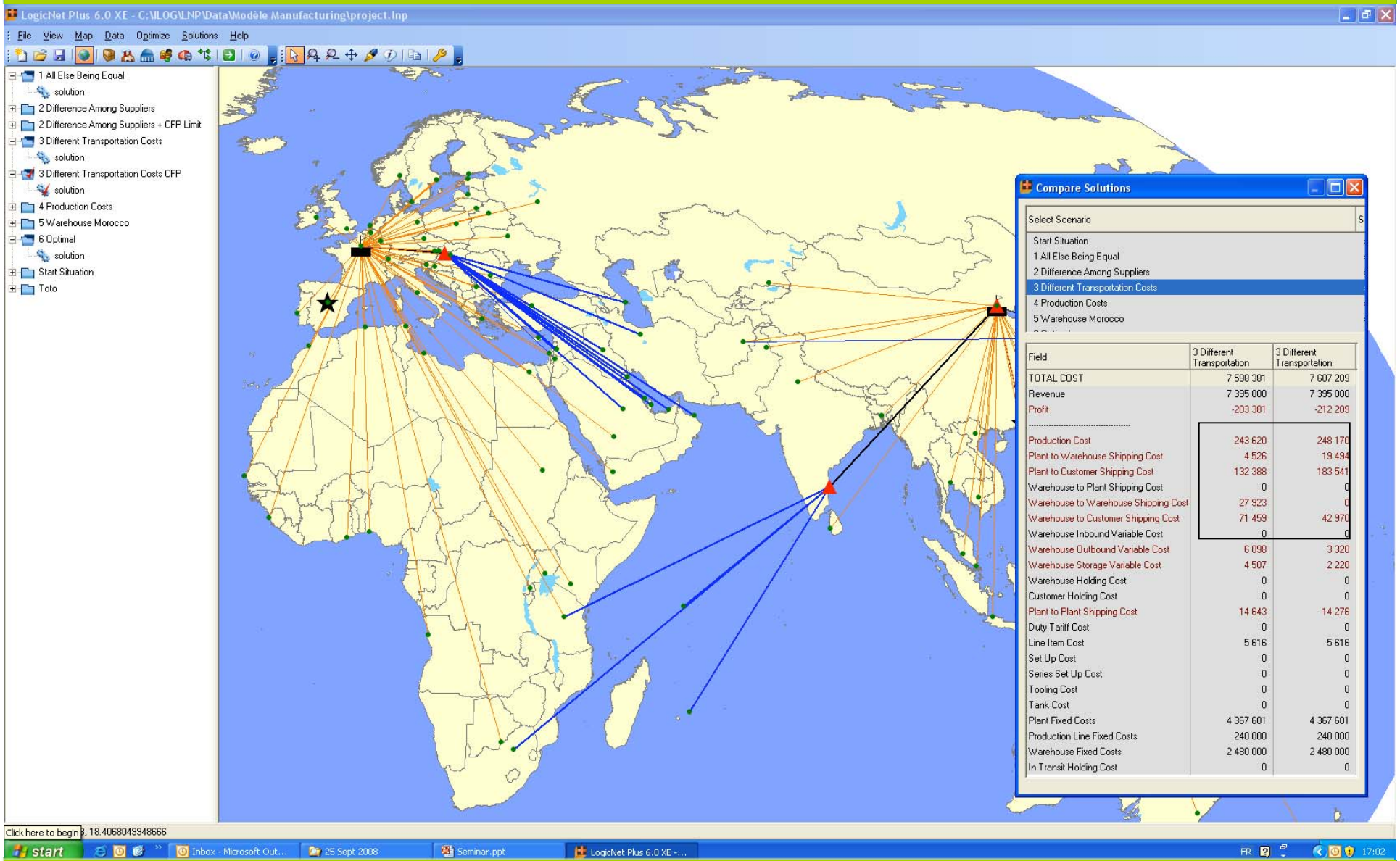
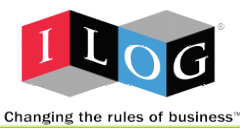


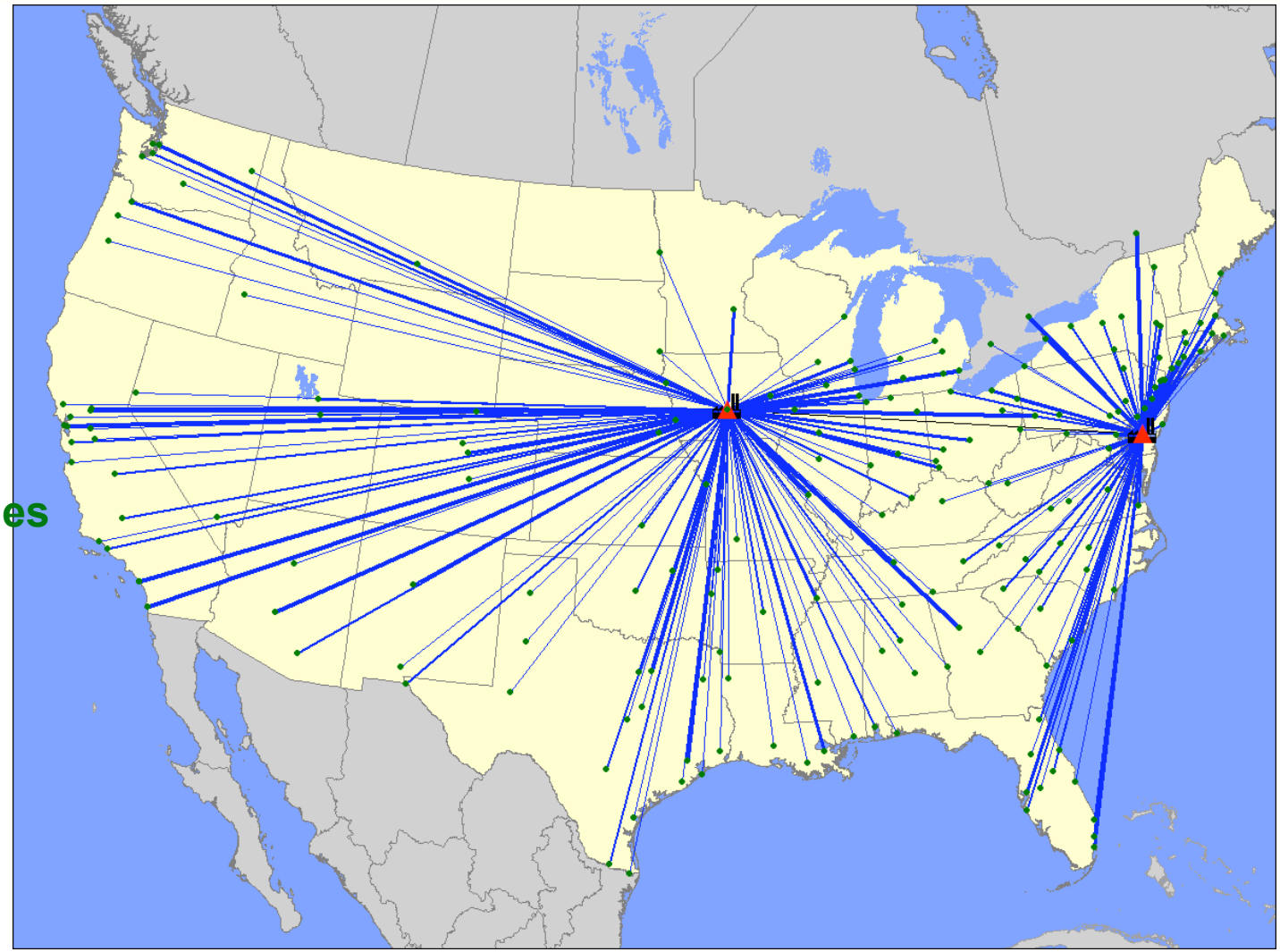
Case Study 1: Supply Chain Design

- Manufacturer of Office Furniture
  - Steel Cabinets
- US based manufacturing & distribution network
  - Manufacturing and distributions from 2 sites- Des Moines, IA and Dover, DE
- Two objectives:
  - Redesign distribution network to reduce costs and improve customer service
  - Reduce Carbon Footprint to align with corporate environmental objectives
- The challenge: Find the appropriate trade-off between reducing cost and reducing Carbon Footprint



Office Furniture Manufacturer Distribution Study

2 Plants
2 Existing DC's
58 Potential DC's
200 Customers
11 Product Families



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Office Furniture Manufacturer Distribution Study

- Apply network modeling to design a distribution network that satisfies customer demand at the lowest possible cost, while considering the Carbon Footprint of the new network

- Consider all logistics costs as well as carbon emission from plants, DCs, and the various modes of transportation.
  - Carbon emission per kWh is different from state to state due to different power generation technology
    - Grid Electricity, Natural Gas, Diesel, Petrol, Coal, etc.

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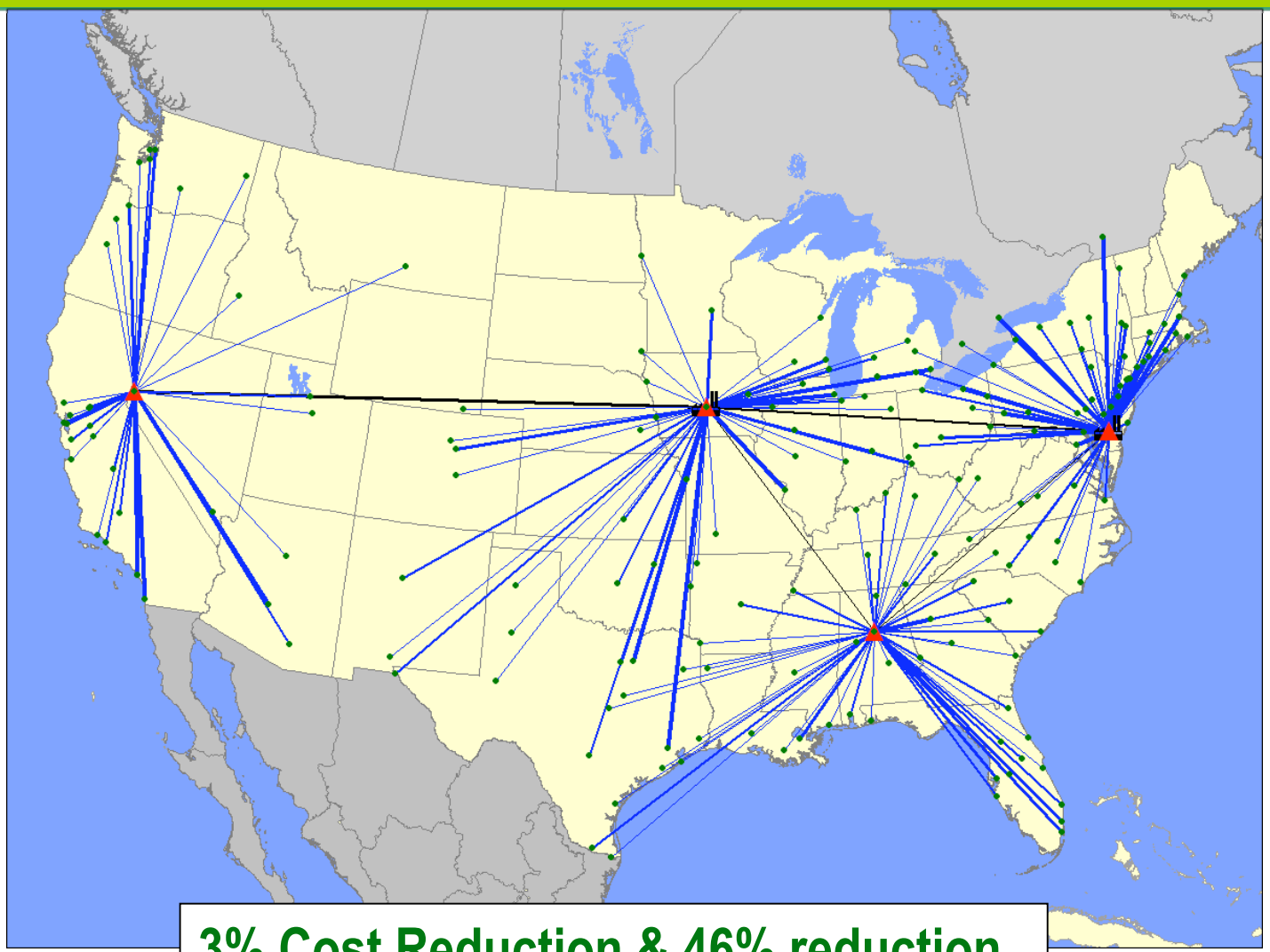
Optimized Network



3% Cost Reduction & 46% reduction in average distance to customer

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Tradeoffs in network

- As additional DCs enter the network, the following occur:
  - DC Fixed Costs increase
  - Outbound Transportation Costs decrease
  - Average distances to customer decrease
  - Carbon Footprint tends to decrease
    - Why?
      - Inbound transportation is mostly rail which has less environmental impact than truck
      - As DC's increase, a greater proportion of total freight is plant-warehouse transportation (rail)
      - Increased CO2 from more facilities does not outweigh reduction in transportation CO2 emissions

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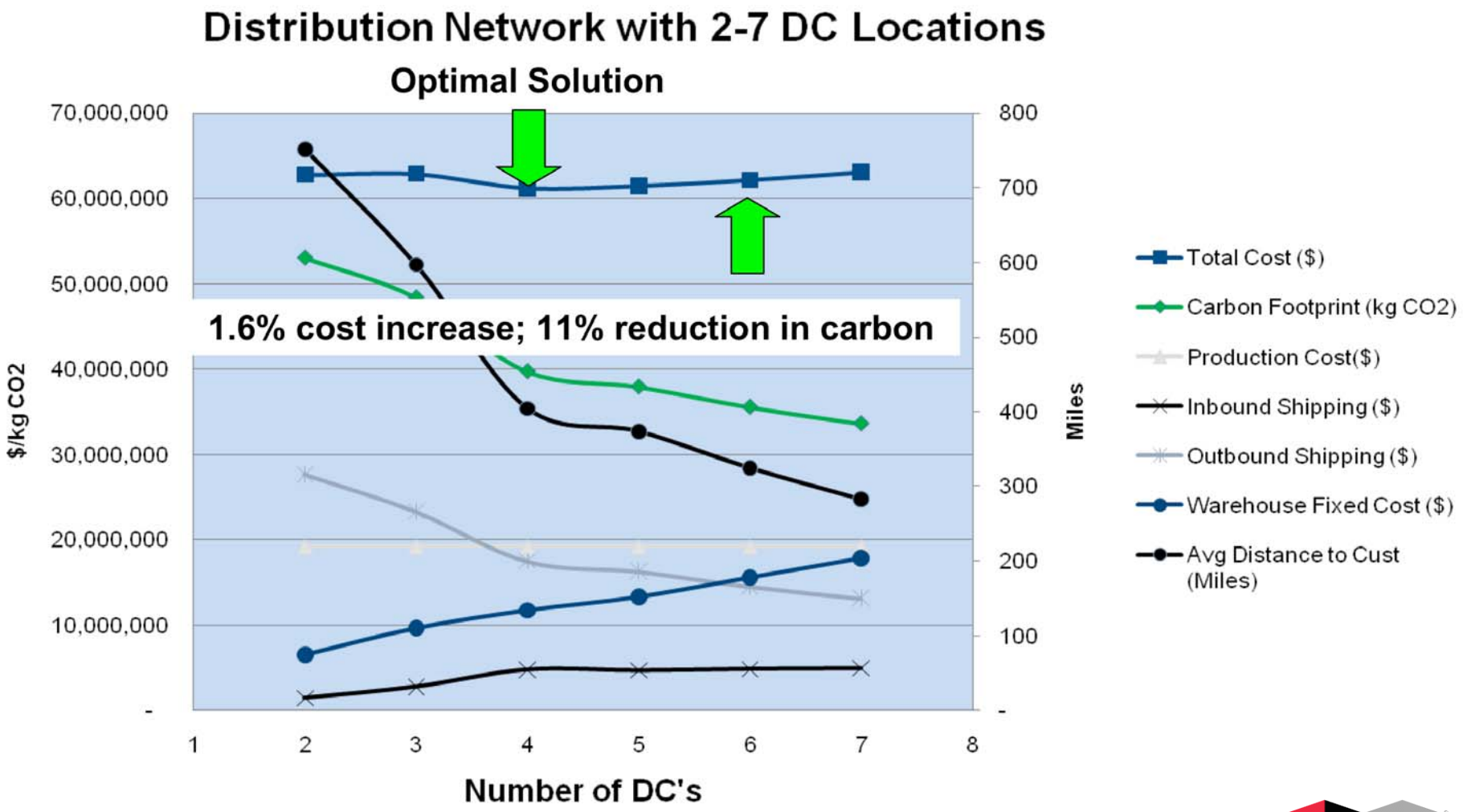
Trade-Off Curve Between Number of DC's, Costs, Service and Carbon Footprint



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Key Points to Take Home

- Growing pressure to become more green
  - Regulation
  - Consumer and customer pressure
  - Waste reduction
- LogicNet Plus provides real value
  - Accurate supply chain assessment
    - Network modeling for cost, service *and carbon emissions*
  - Optimization for better investment decisions
    - ILOG, a leader in optimization for 20 years

http://www.ilog.com/products/supplychain/

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February 3-5, 2009
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