

Cities in Motion



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Green Strategies, Green Transportation, Smart Growth

Green Strategies

Small Communities with Green Transportation

Smart Growth

Presented 2011-06-25

2011 Science and Technology Society Conference

Chang-Hua University, Taiwan

Green Strategies, Green Transportation, Smart Growth

Notes –

Start with an urban community – sustainable

Talk about how urban planning , densification, cycling produces car free retail areas

Talk about other programs involving cycling which reduces car dependency, economic independence , oil independence

Cycling is becoming more and more the in thing for people. As the appetite for cycling grows so does the wave of new thinking, new designs, new technology, and new applications of technology developed for other fields. Take the case of iPad type devices that allow bringing information, trip planning, and search capability to cyclists. No longer is there an experience of cycling down a deserted road with the next contact with people 100 km away. Now one stays in touch through the internet and the mobile phone networks.

New technology and designs develop interest and momentum. People are drawn to cycling by the buzz and appeal factors of the products of that new technology.

Science and technology can be applied to:

- Bicycles and their power trains, including electrical assist
- Trailers for children, pets, work, shopping, traveling
- Carrying capacity on bikes – people, goods
- Handlebar gadgets
- Movement of goods
- Clothing
- Protective covering
- Trip information needs – during the planning, cycling, post phases of a trip
- Recording the trip
- Guiding the cyclist en route and location
- Entertaining the cyclist en route and communications
- Emergency assistance

Green Strategies

Freeing up individual from car-based transportation

Cycling

Public Bike Systems

Part of your transit system, the last section of your trip

Electric –Assisted Bicycles

Tricycles

Folding Bicycles

Bikes with Trailers

Cargo Bicycles

The Family Taxi

Green Strategies

Freeing up individual from car-based transportation

Notes -

Freeing up individual from car-based transportation

Cycling

Public Bike Systems – Part of your transit system - last leg of a trip

Market Segmentation - The customer for PBS

Golden – small communities

Extension of the public bike system

Quality cycling infrastructure first, then PBS – separation

Direction of PBS

- E-bike, trailers, etc

- From an advertising platform to an control centre

 - Trip operations – navigation, road condition messaging, trip recording, emergency calls, video capture of tripod – car behaviour, personal protection

 - Trip support – trip planning, weather info, parking locations, trip video capture

 - Trip information – feed, on-demand searches, retail specials - retail, tourism

Green Strategies

Freeing up individual from car-based transportation

Notes –

Challenges

Hills – e-bikes

Bike Cyclist fit – all sizes and weight

Carrying purchases – baskets, trailers

Helmet legislation – technology design

Bikes an emerging market – new opportunities for technology inventions and design

Bringing information to the cyclists

E-bikes and distances

Helmets

Rain protection

Green Strategies

Freeing up individual from car-based transportation

Notes –

E-Bikes –

Next penetration into the potential cycling market

Reducing barriers for people

Hills

Stamina

Personal handicaps – health, age

Tricycles

Reducing barriers for people

Personal handicaps – health, age, balance

Shopping

Carrying child's bike

Folding bicycles

The use is still not well understood or developed

Convenient for European apartments without elevators, trains, buses, and European touring

Green Strategies

Freeing up individual from car-based transportation

Notes –

Bikes with trailers, Cargo Bikes

Reducing the shopping barriers, carrying purchases home

Proven in the Netherlands and Denmark

Personal trailer

Rent a trailer

Retailer supplied trailers, bike and trailers

E-bike for large purchases or in hilly cities

The Family Taxi

Understood in the Netherlands, Denmark (image – outside of Utrecht)

Not well understood elsewhere

Small Communities with Green Transportation

Transitioning from Motoring to Walking, Cycling, and Transit

What are motivators to change mode of transportation

- Personal financing
- Extensive transit network and service level within Communities
 - Car trip competitive
- Barriers to driving
 - Trip time
 - Incremental or Driving out of pocket costs
- Urban form
 - home, work within catchment area of final destination

Small Communities with Green Transportation

Transitioning from Motoring to Walking, Cycling, and Transit

Notes –

Transitioning of motorists from driving to walking, cycling, or transit is more permanent if people have alternatives that fit their lifestyles. Their image of their own lifestyle may either be real or perceived.

However, other influences need to be present for motorists to finally make those green and sustainable decisions to change their lifestyles and use green transportation instead of driving.

Sometimes conditions need to be setup in communities or happen naturally to be a trigger for lifestyle changes in transportation. These may include:

Changes in personal financing where not driving is an acceptable solution to retaining personal lifestyle

- Job loss or business environment where reduction in earnings is a high probability

- Inflation removes discretionary spending and threatens retaining lifestyle

- Increase in the cost of borrowing money – the interest rate.

Small Communities with Green Transportation

Transitioning from Motoring to Walking, Cycling, and Transit

Notes –

Extensive transit network within Communities with service levels which are competitive with car usage. Trip times need to be competitive with driving. It is suggested that a difference of 10 minutes with green transportation is within the tolerance level of motorists.

In small Communities, bus systems service the local big boxes and shopping centres to the front door. – Port Alberni, BC

Some small communities provide door pick-up by reservation as an alternative to fixed bus stops.

Bike racks on all buses in regions and Communities – B.C.

Extended service into nights and weekend

Barriers imposed to driving which either

Increases driving trip time beyond the tolerance levels of transit or cycling

Road resizing with reduction in driving lanes for cars and increasing bus only or cycling lanes - Seattle

Increases the driving costs beyond the financial and social costs of using transit or cycling

Congestion fee – London

Road or bridge tolling

Small Communities with Green Transportation

Transitioning from Motoring to Walking, Cycling, and Transit

Urban form or transit network is such that homes and places of work are within catchment areas of final destinations, including shopping or transit system with high quality feeder networks for

Walking – usually considered 0.45 km

Cycling – usually considered between 2 km to 5 km

Transit access

By foot – 0.45 km

By cycling – 5 km

These conditions to stimulate change in motorists' transportation habits are opportunities for creative designs and application of new or developed technology.

Small Communities with Green Transportation

Designing for a Compact, Green Transportation Urban Form

Houten NL

A city that grew from 30,000 to 45,000 in 5 years

Guiding principles

- Ring roads system around city
- No direct driving to destination within city, use ring roads
- Direct internal network of pedestrian and cycling paths to destinations
- Train system through middle of city
- Efficient cycling trip time – underpasses
 - Arterial roads, train tracks, roundabouts
- Bike parking at destinations
 - Designated - – formal, road space for informal

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Small Communities with Green Transportation

Designing for a Compact, Green Transportation Urban Form

It is all about integrating urban planning and transportation to develop vital, sustainable, green, and liveable commutes

Houten uses some very basic principles to produce a green transportation network and a very liveable city. Houten's design works so well that a 50% growth in population could be handled within 5 years with the same principles continued through the growth. Houten's population increased from 30,000 to 45,000 inhabitants. A second ring road was built before the expansion in population and workplaces.

The guiding principles to Houten's compact, sustainable urban form with green transportation includes:

A ring road system around the city – about 2 to 3km in diameter

Driving to any two points in the city requires using the ring roads – through traffic is prevented.

Small Communities with Green Transportation

Designing for a Compact, Green Transportation Urban Form

It is all about integrating urban planning and transportation to develop vital, sustainable, green, and liveable commutes

A direct, internal network of cycling paths and walking paths to destinations – trains, shopping, schools, businesses

A train system through the middle of the city

Underpasses of arterial roads and train lines for cyclists, including traffic circles.

Bike parking at destinations, including the train stations (in the thousands of parking spaces)

Green Transportation needs higher density urban form. Both need new designs and technology applications to create environments where people really want to live.

Smart Growth

10 Principles of Smart Growth

- Affordable Housing
- Compact Communities
- Healthy Communities
- Economic Development
- Infrastructure
- Transportation
- Agriculture Land
- Climate Change
- Natural and Cultural Heritage
- Community Engagement

Smart Growth

10 Principles of Smart Growth

In approaching the “Smart Growth” topic, it seemed appropriate for this presentation to be guided by the 10 principles in the Smart Growth British Columbia website.

(

<http://www.smartgrowth.bc.ca/AboutUs/SmartGrowthPrinciples/tabid/133/Default.aspx>)

By definition, "Smart growth" is a collection of land use and development principles that aim to **enhance our quality of life, preserve the natural environment, and save money over time**. Smart growth principles ensure **that growth is fiscally, environmentally and socially responsible and recognizes the connections between development and quality of life**. *(from SmartGrowth BC website)*

Smart Growth

10 Principles of Smart Growth

**Vision and
Policies**

Lead to

**Design and
Technology:
Innovation,
Adaption, and
Solutions**

Leads to

**Innovator
Cities**

Followed by

**The Norm for
Communities**

Smart Growth

10 Principles of Smart Growth

Life is changing. It is time for creativity if we are going to move towards sustainable cities and communities – new strong and dedicated leadership, new looks, new ideas, new approaches.

As cities adopt policies of sustainable and green cities, innovative solutions will follow which will eventually be adapted as the norm in all sizes of communities.

These principles of Smart Growth cannot be implemented without creative scientific and technology thinking and solutions. As we said, new approaches will be needed. Technologies from other fields will need to be adopted.

Travel provides an opportunity see a variety of local city and community approaches in various stages of moving towards vibrant, liveable, sustainable, green and Smart Commutes. For each of the Smart Growth principles, some observations will be given. Hopefully, this may trigger in you some more opportunities of technology applications.

Smart Growth

Affordable Housing

Creative designs for urban form are key.

Smart Growth housing focused municipal policies

the impetus for:

- Laneway housing – Vancouver
- Student, elderly suites – Vancouver
- Developments and buildings
 - Mixture of - for-profit, market, and non-market housing – Vancouver, Charlotte
 - Funding through development levies and rezoning – Vancouver

Smart Growth

Compact Communities

Mix land uses

Homes, retail, business, and recreational opportunities.

Work, shop and play in close proximity.

Walking paths, cycling paths, and transit are close by

- Low-rise, medium rise buildings with ground floor retail – 7 stories
- Mixed land use in same building – homes, retail, commercial
- Narrow streets focusing on walking, cycling
- Housing and other buildings overhanging sidewalks or cycling lanes

Smart Growth

Healthy Communities

Foster a unique neighbourhood identity. Each community is unique, vibrant, diverse, and inclusive.

Smart Growth

Economic Development

Utilize smarter and cheaper infrastructure and green buildings. Green buildings and other systems can save both money and the environment in the long run.

- Bike use for business
- Cargo bikes
- Public bike systems
- Technology applied to cycling

Smart Growth

Economic Development

Utilize smarter and cheaper infrastructure and green buildings. Green buildings and other systems can save both money and the environment in the long run.

Bike use for business

- Airports

- Parks maintenance

- Graffiti removal

- EMS services

- Policing

Cargo bikes

- Bidders

- Home delivery system

Bike share – repair persons uses bike share for service call

Technology – GHG and air quality counters – Freiburg, Odense

Smart Growth

Infrastructure

Encourage growth in existing communities.

Investments in infrastructure

Used efficiently

Developments do not take up new land.

Smart Growth

Infrastructure

Infrastructure

Encourage growth in existing communities. Investments in infrastructure (such as roads and schools) are used efficiently, and developments do not take up new land.

Olympic Village, a leading model of sustainability in North America – Vancouver

- Forward-thinking Infrastructure – road, city services
- Strategic energy reduction, neighbourhood energy system, sewage heat recovery. - Recovery of sewer heat for heating homes and buildings – Vancouver
- High-performance buildings – minimum LEEDS standard
- Easy transit access – rapid transit, buses, streetcars in the future, harbour ferry services
- Cycling infrastructure to internally service the village, three high-volume bike routes, feeder system to transit
- Urban agriculture
- Rainwater management, harvesting and recycle water (50% water usage reduction)
- Green roofs
- Island and inter-tidal habitat
- Seaside greenery and bikeway

Smart Growth

Transportation

Variety of transportation choices.

Neighbourhoods are attractive

safe infrastructure for walking, cycling and transit, in addition to driving.

Smart Growth

Transportation

Transportation

Provide a variety of transportation choices. Neighbourhoods are attractive and have safe infrastructure for walking, cycling and transit, in addition to driving.

- Separated bike lanes network – Sevilla, Spain
- Bike underpasses under arterial roads, Car movement restricted to arterial roads – Malmo, European cities
- Traffic signal timing smart-controlled by approaching traffic including cars, cyclists, pedestrians – Towns in mid-USA
- Pedestrian and cycling activated traffic signals on local streets intersection arterial and collector streets – Vancouver
- Digital information signs on streets of car parking locations and number of free spots – European cities – Lyon, Munster
 - Cars today, cycling tomorrow – reducing driving to search for spots
 - Car parking lots and garages today, monitoring of on-street parking with electronic meters, pay stations, and cell phones tomorrow
- BusBike - Buy a transit ticket to end destination, not a bus ticket, bike waiting at end station to complete trip – Sevilla, Spain
- Bike stations at rapid transit stations and business areas – Basil, Munster, Groningen
 - Businesses have bikes at stations for their employees – go to work go to business meetings - Sweden

Smart Growth

Agriculture Land

Supporting urban farming and reducing transportation distance for food from the producer to homes.

Urban containment boundary

Smart Growth

Agriculture Land

Supporting urban farming and reducing transportation distance for food from the producer to homes.

Protect and enhance agricultural lands. A secure and productive land base, such as BC's Agricultural Land Reserve, provides food security, employment, and habitat, and is maintained as an urban containment boundary.

- Resurgence of farmers markets – Peterborough, Vancouver
- Urban gardening on
 - Traffic circles on streets – Vancouver
 - Street shoulders by curb – Vancouver
 - Community gardens – Europe, Vancouver, Toronto
 - Rooftop gardens
 - bees and herbs for the kitchen – Fairmont Hotel, Vancouver

Smart Growth

Climate Change

Built form and patterns of our communities have strong links to the climate change impacts and adaptation scenarios that they elicit

Smart Growth

Climate Change

Climate Change

Choices we make regarding the built form and patterns of our communities have strong links to the climate change impacts and adaptation scenarios that they elicit.

- Carbon tax and other forms of reducing demand
- Congestion and usage charges (bridges, highways) leading to payment system technologies
- Congestion leads to right choice for mobility – reducing road lanes – Seattle WA
- Windmills at small towns – common in Europe, US prairie towns
- Solar power
 - Path lights – Kelowna BC
 - Garbage bins on streets replaced by solar-powered compactors – Vancouver
- Street lights turned on by motion detectors – Weingarten, Germany
- Site treatment of run-off water – street side swales – Pickering, ON
- Returning rainwater runoff to ground infiltration from sewer system – Toronto ON

Smart Growth

Natural and Cultural Heritage

Natural and Cultural Heritage

Preserve open spaces, natural beauty, and environmentally sensitive areas. Development respects natural landscape features and has higher aesthetic, environmental, and financial value.

Smart Growth

Community Engagement

Nurture engaged citizens.

Places belong to those who live, work, and play there. Engaged citizens participate in community life and decision-making.

Community Engagement

Nurture engaged citizens. Places belong to those who live, work, and play there. Engaged citizens participate in community life and decision-making.

- Public processes - Stakeholders and community involvement in government processes – Vancouver
- City advisory committees, region stakeholders, design charades, public lectures, breakfast and lunch networking and lectures, open presentations t council, public presentation nights