

Transportation without Oil

23 Steps to a Sustainable Energy Future



GUY DAUNCEY



The Solutions Project

THE CLIMATE CHALLENGE

101 SOLUTIONS TO GLOBAL WARMING



www.theclimatechallenge.ca

1

Set clear, bold goals

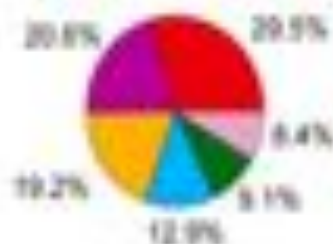
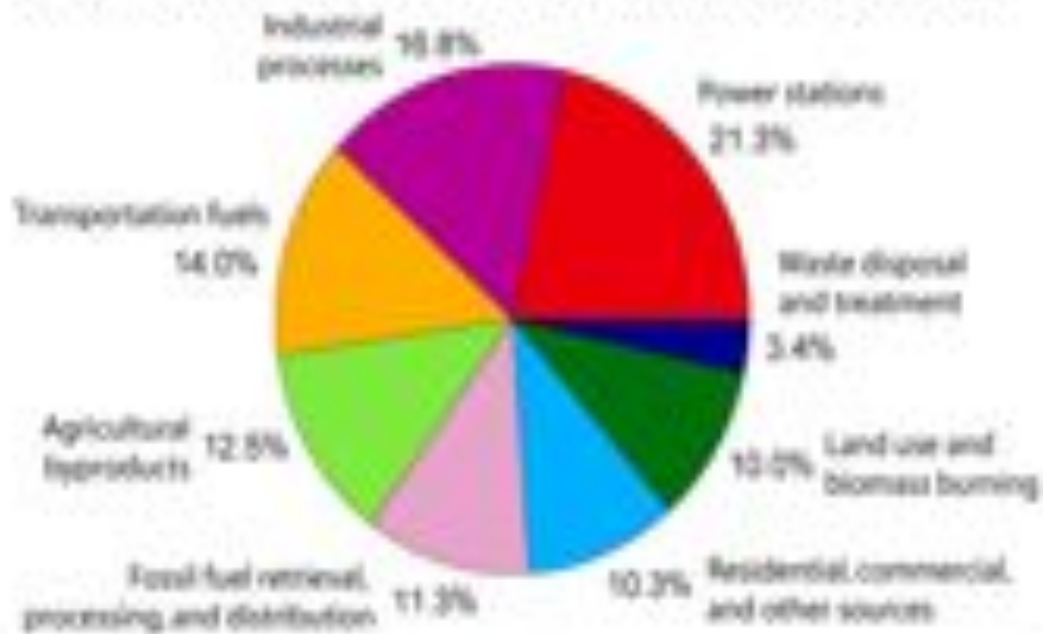
**100% reduction in use of oil for transportation
by 2030, with no loss of mobility**

Benefits:

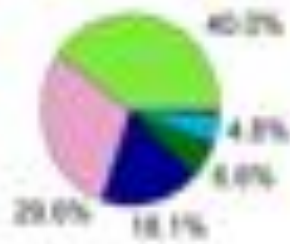
- ❖ Tackle a key cause of global warming
- ❖ Create resilience against peak oil and future price shocks
- ❖ Reduce the risk of oil pollution
- ❖ End most air pollution and noise
- ❖ End traffic congestion
- ❖ Show the world that it's possible



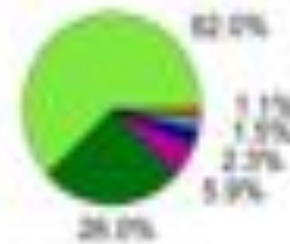
Annual Greenhouse Gas Emissions by Sector



Carbon Dioxide
22% of total



Methane
10% of total



Nitrous Oxide
2% of total

The Uses of Oil

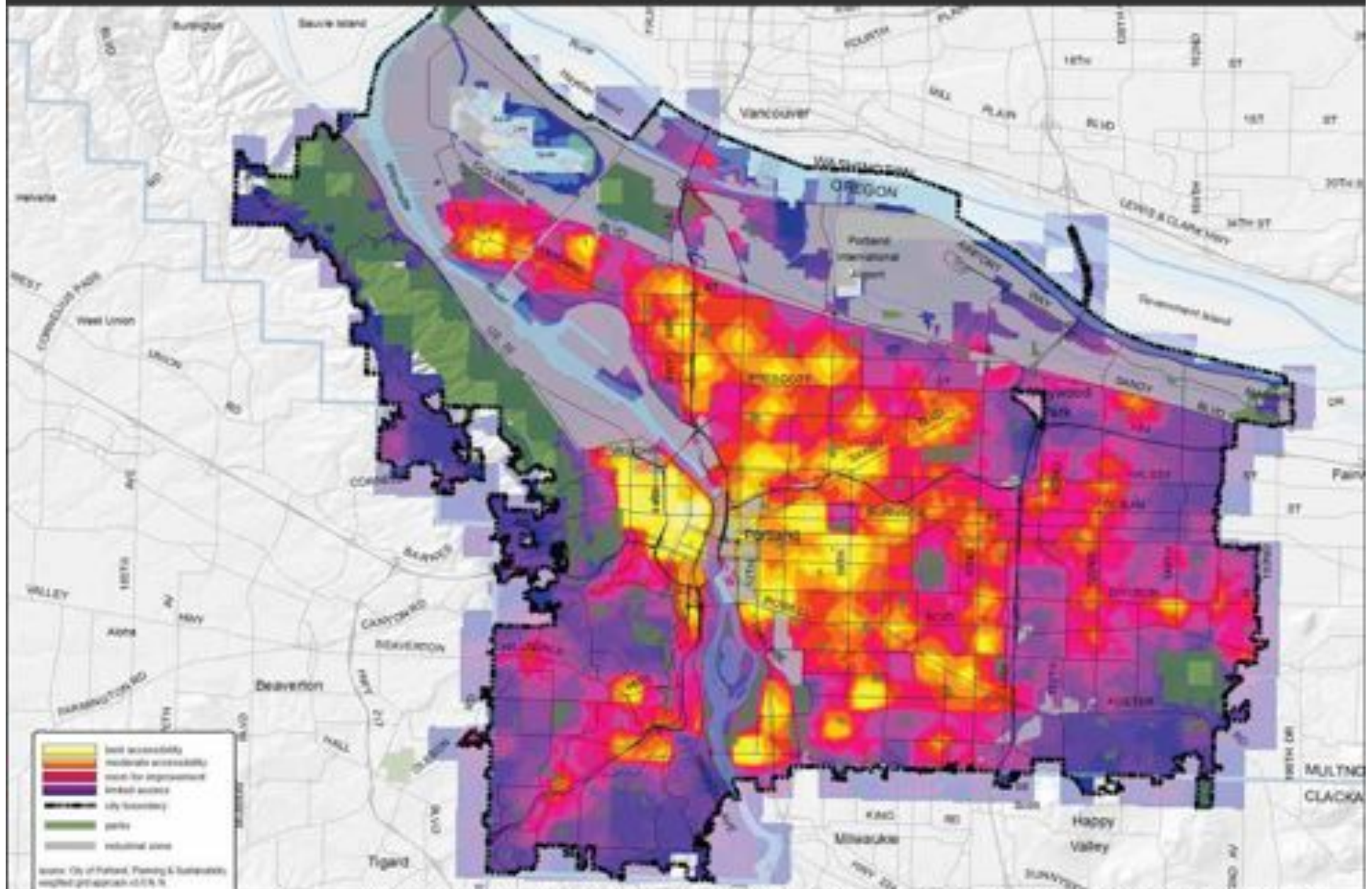
Cars & light trucks	40%
Freight (below)	17.5%
Heavy trucks	13%
Flying	8%
Shipping	2.5%
Asphalt	3%
Rail freight	1%
Recreational	1%
Military	1.5%
TOTAL TRANSPORT	71%
Non-transport uses	29%

2

5% shift to walking



20-minute neighborhood concept



0 0.5 1 2 Miles



September 10, 2009 City of Portland | Bureau of Planning and Sustainability | Geographic Information System

The information on the map was derived from digital data-bases on the City of Portland, Bureau of Planning and Sustainability GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.





Guy Dauncey 2012 Earthfuture.com



A Walking School Bus



Neighbourhood Walkability Audit

www.walklive.org



Street redesign idea from CityStudio, Vancouver

The Journey to Zero Oil

Cars & light trucks

5% shift to walking

= 95% of oil demand

3

15% shift to cycling





**In Holland, 40% of all traffic movement
is by bicycle**



- ❖ Invest in safe bike lanes and routes
- ❖ Invest in good bike parking
- ❖ Invest in cycling education in schools





San Francisco safe protected bike lane



City Bike Sharing

Build a fun cycling culture











School at Assen, Holland



PERSONAL TRANSPORTATION FOR TODAY

Segway provides clean, personal transportation solutions for today's urban congestion and environmental challenges. The Segway PT is optimized for short trips beyond walking distance. Project PUM.A is intended for longer trips that typically require traditional fuel vehicles.



www.segway.com/puma/



The Journey to Zero Oil

Cars & light trucks

5% shift to walking
15% shift to cycling

= 95% of oil demand
= 80% ...

4

15% shift to transit and LRT





Hasselt, Belgium

Free transit included in city taxes
1996-2006 13-fold increase in ridership



Real-time electronic displays





Bus Rapid Transit in Curitiba, Brazil





Stockholm – 200 buses run on biogas From sewage treatment



**Umea, Sweden: Arctic Whisper
Fast-Charging Electric Bus, 18 hours/day
1 – 2 euros for 10-20 kWh electricity to go 10 km
www.opbrid.com**



LRT in Portland, Oregon



Future Government Street, Victoria?

www.islandtransformations.org

Regional Rail?

Sooke to Swartz Bay

Royal Roads
to U-Vic

www.islandtransformations.org



The Journey to Zero Oil

Cars & light trucks

5% shift to walking	= 95% of oil demand	
15% shift to cycling	= 80%	...
15% shift to transit/LRT	= 65%	...

5

5% shift to Telework



❖ Teleconferencing centre in every community of 10,000+ people

The Journey to Zero Oil

Cars & light trucks

5% shift to walking	= 95% of oil demand	
15% shift to cycling	= 80%	...
15% shift to transit/LRT	= 65%	...
5% shift to telework	= 60%	...

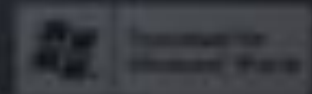
6

5% shift to Ride-Sharing



Avego Real-Time Ridesharing

Share a ride whenever you want, from wherever you are.



AVEGO Real-time ride-sharing
www.avego.com



- ❖ **Guaranteed emergency ride home**
- ❖ **Cash-out parking – get paid for not using your employee parking space**
- ❖ **Rideshare Plus Rewards Book**

The Journey to Zero Oil

Cars & light trucks

5% shift to walking	= 95% of oil demand	
15% shift to cycling	= 80%	...
15% shift to transit/LRT	= 65%	...
5% shift to telework	= 60%	...
5% shift to ride-sharing	= 55%	...

7

5% shift to Car Sharing



500 members share 22 vehicles

www.victoriacarshare.ca



WIN A ZIPCAR
ONE-YEAR MEMBERSHIP



Car-sharing forecast North America 2016: 4.4 million users

David Zhao, automotive research analyst with Frost & Sullivan,

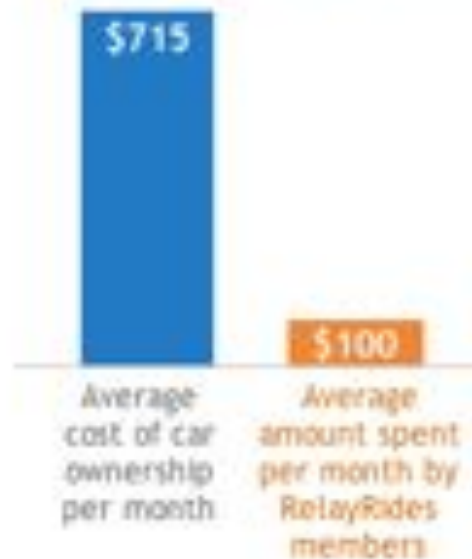


Vehicles owners earn up to \$300 a month



Peer-to-Peer Car-Sharing

Why RelayRides?



The average shared car takes 14 other cars off the road. Talk about breathing easy!



Constructing a new car takes a huge amount of resources. By using pre-existing cars, RelayRides is greener than traditional carsharing services.



By returning money to our car owners' pockets, RelayRides helps you reinvest in your community.

carsharing



Carsharing The Future Of Driving? GM, Ford, Toyota Say Yes

October 26, 2011 by [Deron Lovvick](#)
with 431 views



Earlier this month, General Motors announced it will help millions of GM vehicle owners to rent out their cars. The new peer-to-peer car sharing service—a partnership with a start-up company called RelayRides—is intended to “reduce traffic congestion in America’s largest cities and address urban mobility concerns,” according to... [\[read more\]](#)



The Journey to Zero Oil

Cars & light trucks

5% shift to walking	= 95% of oil demand	
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15% shift to transit/LRT	= 65%	...
5% shift to telework	= 60%	...
5% shift to ride-sharing	= 55%	...
5% shift to car-sharing	= 50%	...



8

Strong Inter-Modal Connections

- ❖ **Single Smart Card for transit, LRT, car-share, ride-share, ferries, rail**
- ❖ **Integrated mobility app for all transport needs**
- ❖ **Good transit/ferry connections**
- ❖ **Good bike-parking at every transit/LRT station**



Transport London's Oyster Card



Walk



Bike



Transit



LRT



Rail



Ski-lift



Ferry



Fly



Car share



Ride share



Taxi



Park



Skype



Maps



Food



Help



Amsterdam

9

Smart Growth Designs

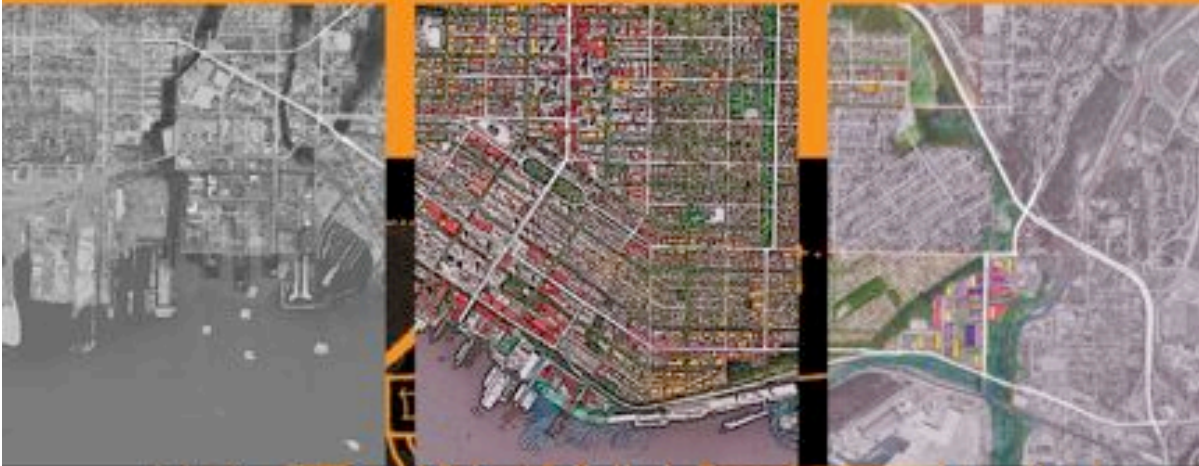


Foreword by Robert Yaro

Seven Rules

for Sustainable Communities

Design Strategies for the Post-Carbon World



Patrick M. Condon







Redesign, Remodel, Reclaim

10

50% shift to Electric Vehicles





Tesla EV Model-X

- ❖ **7 seats. Spacious luggage capacity front & rear**
- ❖ **0-60 mph in 4.4 seconds**
- ❖ **200-285 mile range**
- ❖ **\$67,000 plus incentives**
- ❖ **Delivery in 2014**



Mitsubishi MiEV

- ❖ 5 seats
- ❖ Top speed 130 kph
- ❖ 150 km range
- ❖ \$25,000 after rebates

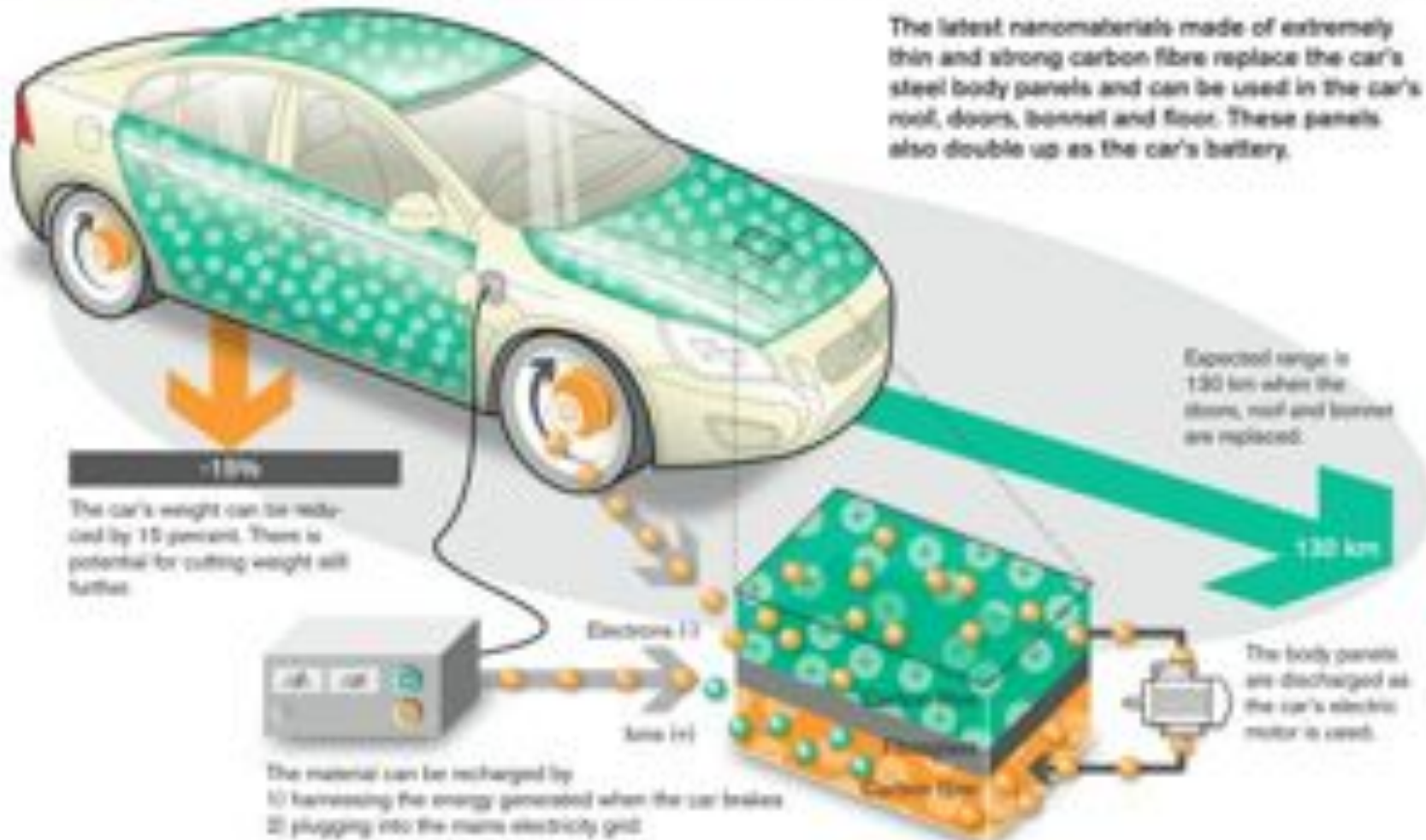


Renault Twizy EV

- ❖ 2 seats
- ❖ 97 km range
- ❖ 90 kph max speed
- ❖ \$9,700 + \$60/month battery lease

The car's body panels serve as a battery

The latest nanomaterials made of extremely thin and strong carbon fibre replace the car's steel body panels and can be used in the car's roof, doors, bonnet and floor. These panels also double up as the car's battery.



V-2-G





**Chevrolet EN-V Concept Car
Electric Networked-Vehicle
2010 Shanghai World Expo**

The Journey to Zero Oil

Cars & light trucks

5% shift to walking	= 95% of oil demand	
15% shift to cycling	= 80%	...
15% shift to transit/LRT	= 65%	...
5% shift to telework	= 60%	...
5% shift to ride-sharing	= 55%	...
5% shift to car-sharing	= 50%	...
50% of vehicles are electric	= 25%	...

11

50% shift to Hybrid EVs



80% of average mileage is on electric drive

The Journey to Zero Oil

Cars & light trucks

5% shift to walking	= 95% of oil demand	
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15% shift to transit/LRT	= 65%	...
5% shift to telework	= 60%	...
5% shift to ride-sharing	= 55%	...
5% shift to car-sharing	= 50%	...
50% of vehicles are electric	= 25%	...
50% vehicles hybrid EV 80%	= 5%	...

12

Light-weight design



Ultralight vehicle design
50% fuel reduction
Mercedes Biome concept car

Evonik Unveils Elise-E; The World's Lightest Electric Sports Car

PUBLISHED FEBRUARY 14, 2012

1 tweet 6
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Evonik Elise EV
Toyota Prius V
Average car

950 kg
1,485 kg
2,000 kg



Volkswagen XL1 (1-litre) 2012
Diesel plug-in hybrid
Weighs 795 kg

The Journey to Zero Oil

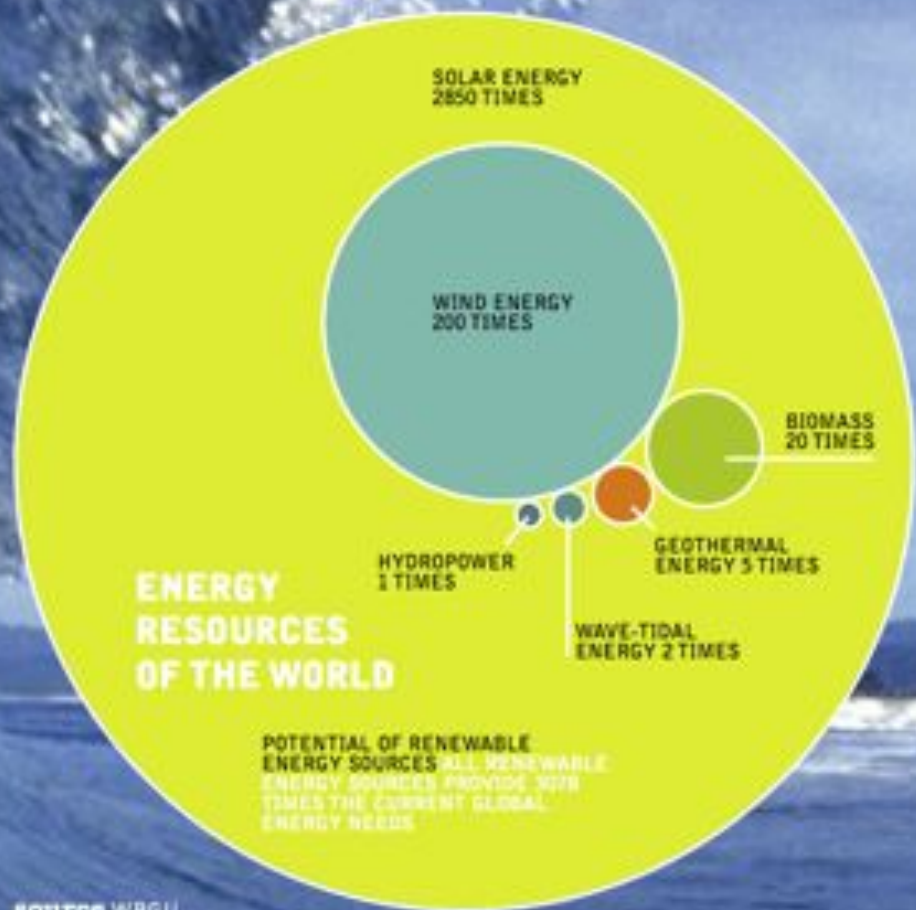
Cars & light trucks

5% shift to walking	= 95%	of oil demand
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15% shift to transit/LRT	= 65%	...
5% shift to telework	= 60%	...
5% shift to ride-sharing	= 55%	...
5% shift to car-sharing	= 50%	...
50% of vehicles are electric	= 25%	...
50% vehicles hybrid EV 80%	= 5%	...
Lightweight design saves 50%	= 2.5%	...

13

Renewable Energy Grid

figure 9: energy resources of the world



“All renewable energy resources provide 3,078 times the current global energy needs”

**WBGU
German Advisory Council
on Global Change**

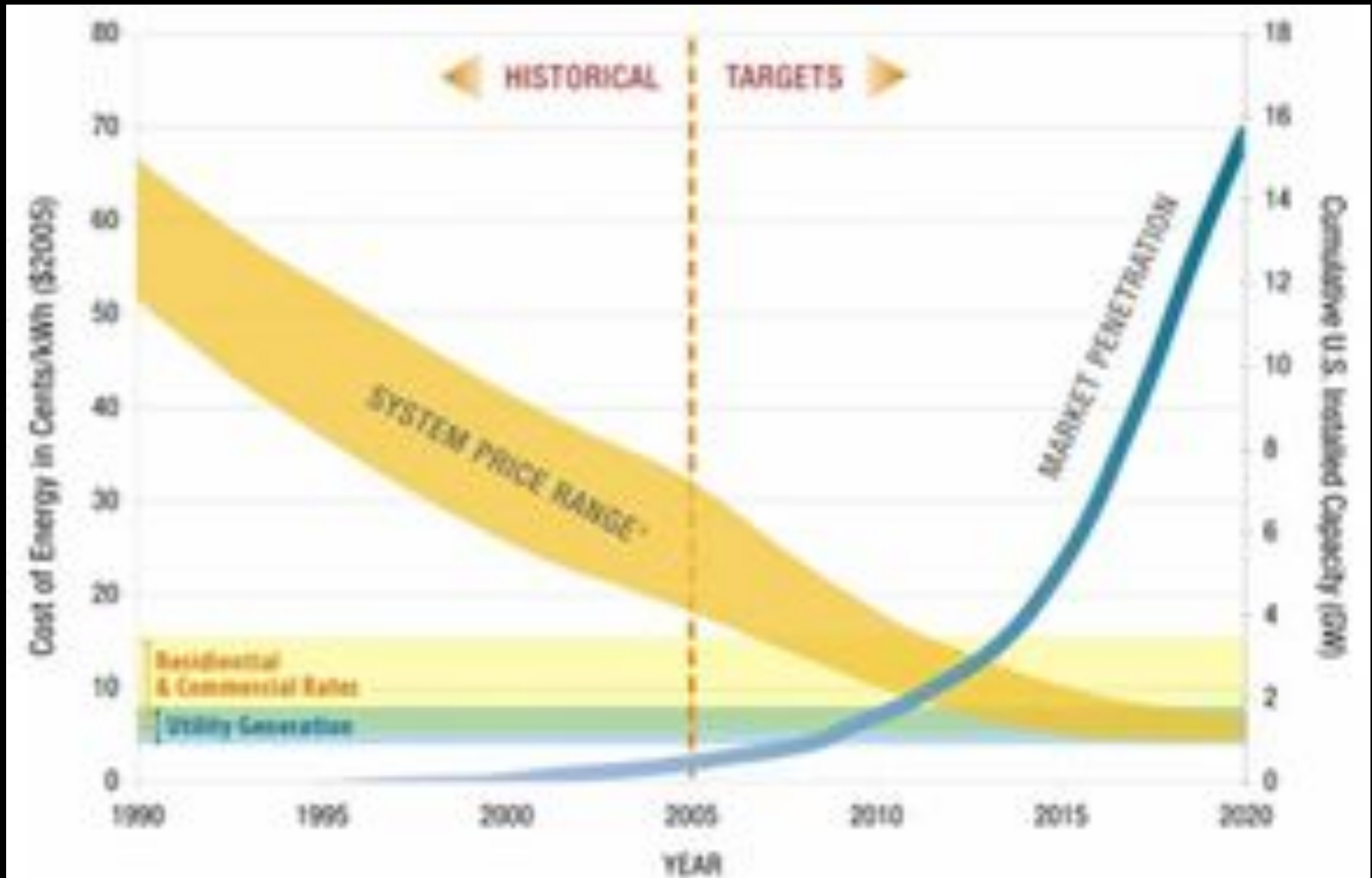
REINVENTING FIRE®

**BOLD BUSINESS SOLUTIONS
FOR THE NEW ENERGY ERA**

BY AMORY LOVINS
AND ROCKY MOUNTAIN INSTITUTE



www.rmi.org/ReinventingFire



Solar market penetration



PV for EV

**As a minimum in North America
1.5 kW of solar PV
produces 1,500 kWh a year**

**Electric car: 15 kWh = 100 km
10,000 km = 1,500 kWh**



1.5 kW solar PV

\$12,000 today

\$6,000 tomorrow

5% mortgage on \$12k = \$70/month

on \$6k = \$35/month

Gas @ \$1.20 litre = \$60/month

14

Parking Solutions

- ❖ End free parking at shopping malls
- ❖ Allow urban home-owners to buy and rent out on-street parking spaces
- ❖ Increase parking fees dramatically at hospitals, colleges where it costs as little as \$2 a day.
- ❖ Allow free parking 'cash-out', surrender of space in exchange for cash or green perks
- ❖ Increase bike parking, especially at stations
- ❖ Free parking for car-share vehicles
- ❖ 1/2 sized parking spots for Smart Cars

Victoria Transport Policy Institute



[Home](#) [Our Approach](#) [TDM Encyclopedia](#) [Documents](#)

Search:

Online TDM Encyclopedia

Updated January 2011

Transportation Demand Management (TDM, also called Mobility Management) is a general term for strategies that result in more efficient use of transportation resources. This Encyclopedia is a **comprehensive source of information about innovative management solutions** to transportation problems. It provides detailed information on dozens of demand management strategies, plus general information on TDM planning and evaluation techniques. It is produced by the **Victoria Transport Policy Institute** to increase understanding and implementation of TDM.

Online TDM Encyclopedia
Todd Litman
www.vtpi.org/tdm

15

Freight Solutions - Trucking



Renault Radiance



Dutch concept electric truck

- ❖ **Average 18-wheeler 6.5 mpg**
- ❖ **Super-efficient designs 9 mpg**

15

Freight Solutions - Trucking

- ❖ **Super-efficient designs save 35%**
- ❖ **Electric plug-in to eliminate idling saves 8%**
- ❖ **Slower driving saves 8%**
- ❖ **'Empty miles' shipping saves 5-15%**
- ❖ **Combined innovations could save 60%**

**BUT...increased demand could
wipe out all the gains.**



Smith Electric Trucks

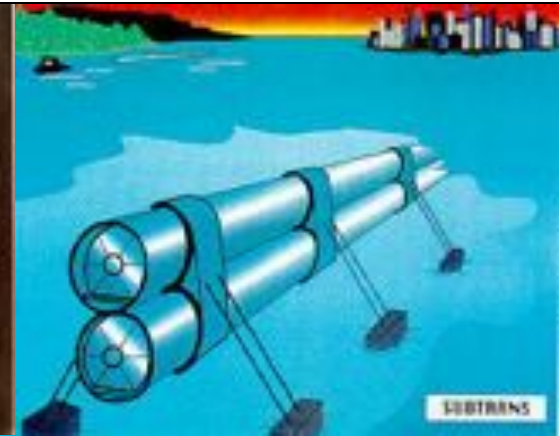
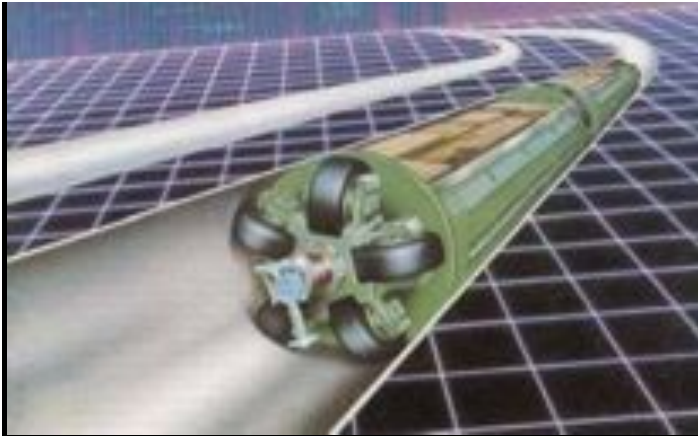


www.cargohopper.com

Cargohopper

- ❖ 3 tonnes max
- ❖ 60 km range
- ❖ 20 kph top speed
- ❖ Urban deliveries
- ❖ Holland





**Solar Electric Induction
Freight Tube**

**Vancouver – San Diego
5 hours**

**1994 US Federal Highway
Administration study**

In this cutaway view of a freight tube, the vehicle is shown in the process of being loaded. The vehicle is a small, four-wheeled truck with a flatbed. The freight tube is a large, cylindrical structure with a white interior. The tube is shown in a cutaway view, revealing the interior structure and the vehicle. The tube is supported by a grid of steel beams. The vehicle is being loaded with yellow boxes. The tube is shown in a cutaway view, revealing the interior structure and the vehicle. The tube is supported by a grid of steel beams. The vehicle is being loaded with yellow boxes.

16

Rail Solutions



France's TGV 574 kph



Biogas Train, Sweden
Running between Linköping and Västervik
on the southeast coast since 2005

US High Speed Rail Association





48% of rail freight capacity is used to carry coal

**As we phase out coal,
this will all become available**

17

Shipping Solutions



2.5% of global oil use



- ❖ **Slowing from 25 to 20 knots – saves 50%**
- ❖ **Slowing from 23.5 to 20 knots - saves 25%**
- ❖ **Skysails on slow boats (10 knots) - saves 20%**
- ❖ **Ecospeed coating and underwater cleaning – saves 20%**
- ❖ **Underwater propellor polishing – saves 2%**
- ❖ **Black carbon elimination through cleaner fuel**

**BUT...increased demand could
wipe out all the gains.**



18

Flying Solutions



8% of global oil use

Latest designs save 20%

BUT...20% increased demand would wipe out all the gains.



Proposed EADS VoltAir lithium-air battery aircraft
Superconducting electric motors
Paris Airshow, 2011
Up to Mach 4, Paris – Tokyo in 2.5 hours

19

Alternative Fuel Solutions

Biofuel made from...

- ❖ **Farm and forest wastes**
- ❖ **Sewage and urban organic wastes**
- ❖ **Cultivated algae using waste CO₂**
- ❖ **Cultivated seaweed**

Other fuel made from...

- ❖ **Carbon monoxide and industrial wastes**
- ❖ **Green hydrogen**
- ❖ **Green methanol, made from hydrogen and waste CO₂**



Microbial process ferments industrial waste gases and converts them into ethanol.

If 65% of world's steel mills were retrofitted with LanzaTech and all waste gases were used:

= 30 billion gallons of ethanol a year

= 15 billion gallons of jet fuel

= 19% of global aviation fuel

www.lanzatech.co.nz

Alternative Fuel Solutions

Will there be enough?

For US, Rocky Mountain Institute estimates 84% total fuel-saving potential = 3.1 million barrels a day

2005 USDA-DOE analysis concluded that US farmland could sustainably provide enough dry collectable biomass wastes to produce 3 million barrels a day of fuel.

+ Forest wastes = 1.3 million bbd

20

Strengthen Local Economies







www.ThinkLocalFerne.ca

LOCALLY OWNED BUSINESS

SPEND \$100 AT A LOCAL BUSINESS



NONLOCALLY OWNED BUSINESS

SPEND \$100 AT A NONLOCAL BUSINESS



GREEN = Money Staying in Your Community
For every \$100 spent locally, \$73 remains in the local economy.

RED = Money Leaving Your Community
For every \$100 spent nonlocally, \$43 remains in the local economy.

www.localfirst.com

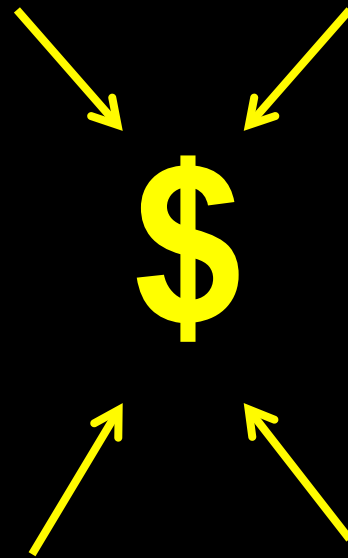
21

Integrated Transportation Governance

Governance for cycling, transit, rail, LRT and highways investments under one democratically elected integrated government unit.



Integrated Cost Analysis



Cost of a traffic lane

\$300,000 to \$500,000 per km 800 vehicles per hour

Cost of a 1.5 metre bike lane

\$5,000 to \$10,000 per km for re-striping

2,000 trips per hour

= 75 to 250 times more cost-effective

\$35,000 to \$150,000 per km when road widening required

= 5 to 35 times more cost-effective

Ministry of Transportation of Ontario, Ontario Bikeways Planning and Design Guidelines, pg. 8-34, March 1996.

Cost of a separated bike lane

\$100,000 per km

= 7 to 12 times more cost-effective

22

New Sources of Revenue



- ❖ Carbon Taxes
- ❖ Feebates
- ❖ Road tolls
- ❖ Utility Public Service Charges

Click a band to see our Used Cars listed by Co2 Rating



UK Vehicle tax by CO2 emissions

Electronic Road Pricing



Road-pricing on the Malahat





30,000 vehicles a day
\$2 one-way toll = \$60,000 a day
= 250 luxury coaches
= up to 10,000 people a day



**Victoria Airport Interchange
\$24 million**

= 240 km of separated bike lanes

23

Build strong grassroots activism





Making the right connections





Guy Dauncey

www.earthfuture.com



BC Sustainable Energy
ASSOCIATION

Together, we can change the world.

More questions? Contact us: info@bcsea.org

If you've been inspired today, would you consider joining the BCSEA, or making a donation?

You can find us here:

www.bcsea.org/join