


Defining the New Green: A Lesson in the First Rule of Engineering





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Role of Academia

Fundamentals: Know what is known
 Research: Discover new knowledge
 Innovation: Create new ideas and solutions
 Development: Contribute useful “things”

Role of Engineering Academic in Green Transport

Knowledge: Thermal Science, Combustion,
Vehicle Design, Mechanical
Engineering, Fuels, Platforms...

Research: What does Green Machine mean?

Innovation: Adaptation & Evolution

Development: Evolutionary Tools and Technologies

Knowledge

- Duty Cycle:
 - Acceleration, Speed, Distance
 - Emissions, Performance, Fuel Consumption

1 hp


240 hp


268 hp


Design of Hybrid Vehicles

- Reduce emissions during duty cycle in
Los Angeles, California




Electric Vehicles

- Duty Cycle
- Plan for NZ going green? When?

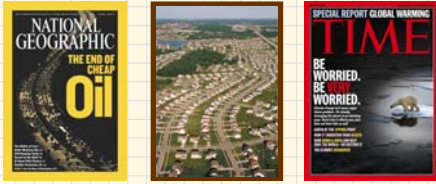
12 hp, 58 km/h, 80 km range


22 hp, 45 km/h, 50 km range


What do we mean by Green?

- Peak Oil – we have to use less fuel
- Climate Change – we have to use less fossil fuel
- Land Use – We have to re-urbanise

Adaptation and Evolution



A Thought Exercise

One thing that would change everything and begin an inevitable evolution toward Green Transport in New Zealand



First Rule of Engineering

- Always know what problem you are working on
- Don't do something stupid
- If it ain't broke don't fix it
- Avoid needless complexity
- Don't reinvent the wheel



The Problem is NOT using less fuel!



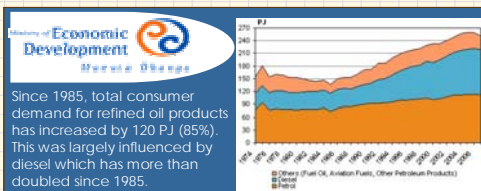
In fact, we did it just last year and everyone managed.

No rational person would say we don't use enough oil!



The Problem is

Every day we spend talking about green cars we burn more fuel!



Since 1985, total consumer demand for refined oil products has increased by 120 PJ (85%). This was largely influenced by diesel which has more than doubled since 1985.

1985 – USDOE funds Ford & GE joint venture to develop AC motor and direct drive power train for ETX-2 electric delivery van.

First Rule of Problem Solving

If a solution seems obvious, try it first



My Thought Experiment Solution:

Oil and Refined Product Import Quotas



The First Rule: 20 by 12

Import quota restriction on oil and refined products

2009 - Freeze on Imports

2010 - 10% Reduction

2011 - Freeze on Imports

2012 - 10% Reduction

2013 - Freeze on Imports

20% Reduction by 2012!

The 1st Rule would NOT have

- Carless Days
- Rationing
- Emission Trading Scheme
- Exempt Sectors
- Biofuel Mandates
- Electric Car Subsidies



What would happen?

- Universal Travel Demand Analysis
- Improved Efficiency, Active Modes
- Reduced Congestion
- Huge Savings on Fuel and Roads Spend



What would happen?

- Innovation
- New Business
- Viable Technologies
- Higher Public Transport Ridership



Why would the 1st Rule be different than a Fuel Crisis?

- Warning
- Planning
- Triggers for Adaptation and Evolution



Why would the 1st Rule work?

- Because it's been proven, it's been done before!

2009 260 PJ NZ did this in 2007

2010 (10% reduction 234 PJ). NZ did this in 2004

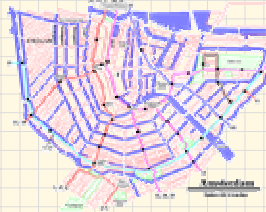
2012 (Further 10% reduction 208 PJ).
NZ did this in 1995

Why would it work?

- People can adapt if they understand the situation and have tools



Even Americans give up their cars in Amsterdam



Why would the 1st Rule work?

- Researchers are developing the TOOLS!



- Fuel Retail Management System
- Travel Behaviour Adaptation Tool
- Risk Assessment Tool for Urban Areas
- Freight Central Logistics Efficiency
- Transition Engineering
- Urban Transformation Modelling

Will the government enact the 1st Rule?

- Of course not!
- The government will also NOT invent a green SUV
- Not find an endless supply of cheap fuel
- Not design a carbon-free urban form...

There are a lot of things the government won't do, so stop waiting for them

People won't give up their lifestyle Technology will come along...



The Wizard's First Rule

People will believe a lie either because they want to believe it's true or because they are afraid it might be true

T. Goodkind 1994