



# **EMBRACING SUSTAINABILITY**

New Knowledge, Policies & Goals  
for the 21st Century

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**Founder: Joanna D. Underwood, former President of the US national environmental research NGO- INFORM; pioneer in preventive solutions**

**Focus OF UEA: Sustainable Energy and Transportation**

**Role: Advisor To Government, Business, and Environmental Organizations**



# EMBRACING SUSTAINABILITY

## PERSPECTIVES ON PROGRESS & PROSPECTS

- **THE KNOWLEDGE REVOLUTION SINCE 1970 AND NEW GOALS FOR THE 21<sup>ST</sup> CENTURY**
- **POLICIES FOR A NEW ERA**
- **WHAT IS WORKING AND WHAT ISN'T? A CASE STUDY OF TRANSPORTATION**
- **THE MISSING INGREDIENT: BUILDING CITIZEN LEADERSHIP**



# THE KNOWLEDGE REVOLUTION SINCE 1970

What did we know then?

EARTHDAY EXUBERANCE IN THE US!

THE FIRST ENVIRONMENTAL PROTECTION AGENCY – CLEAN AIR  
& WATER LAWS

THE CHALLENGES WE RECOGNIZED:  
INDUSTRIAL AND UTILITY POLLUTION & WASTE  
VEHICLE EMISSIONS

GOALS: HEALTHY AIR BY 1975  
ZERO WATER POLLUTION BY 1982

# THE KNOWLEDGE REVOLUTION SINCE 1970

2006 - WHAT DO WE KNOW NOW? A LOT!

THE CHALLENGE: TO RE-THINK A FOSSIL-FUEL BASED ECONOMY

POWER PLANTS & VEHICLES CAUSING POLLUTION & GLOBAL WARMING

600 MILLION VEHICLES: IN US CAUSE 60-90% OF URBAN AIR POLLUTION, 25% OF GREENHOUSE GASES & URBAN CONGESTION

USE OF PETROLEUM-BASED SYNTHETIC CHEMICALS: 80,000 NEW SUBSTANCES IN CONSUMER PRODUCTS SPREADING TOXIC CONTAMINATION

THE GOAL: CREATING PRODUCTS & TECHNOLOGIES FOR A SUSTAINABLE ERA!

NEW ENERGY SYSTEMS BASED ON RENEWABLE POLLUTION FREE SOURCES

NEW TRANSPORTATION SYSTEMS; EFFICIENT MASS TRANSIT FOR CITIES  
POLLUTION FREE RENEWABLE FUEL SOURCES FOR VEHICLES.

NEW PRODUCTS: MADE FROM NON-TOXIC FEEDSTOCKS, SAFE IN USE,  
REUSABLE, RECYCLABLE AND ULTIMATELY BIO-DEGRADABLE

SHARING KNOWLEDGE FOR MOST RAPID PROGRESS IN A WORLD OF 6.3  
BILLION PEOPLE

# POLICIES FOR A NEW ERA



## ACHIEVING FUNDAMENTAL CHANGE

- SETTING LEADERSHIP GOALS
- MANDATING NEW PRODUCTS & TECHNOLOGIES
- PUBLIC INFORMATION POLICIES
- EXTENDING PRODUCER RESPONSIBILITY
- GREEN PURCHASING POLICIES
- PROGRAMS REWARDING INNOVATION

# SUSTAINABLE TRANSPORTATION

A CASE STUDY:



# A KEY 21<sup>st</sup> CENTURY CHALLENGE



600 Million Vehicles Addicted To Oil!

- New KNOWLEDGE SINCE 1970

THE PROBLEM: NOT JUST AIR POLLUTION AND HEALTH DAMAGE BUT DESTABILIZATION OF THE GLOBAL CLIMATE

RELIANCE ON INDIVIDUAL VEHICLES AT CURRENT PACE INVOLVES UNSUSTAINABLE URBAN CONGESTION

COMPETITION AND TENSIONS WORLDWIDE OVER ACCESS TO THE WORLD'S DWINDLING OIL SUPPLIES

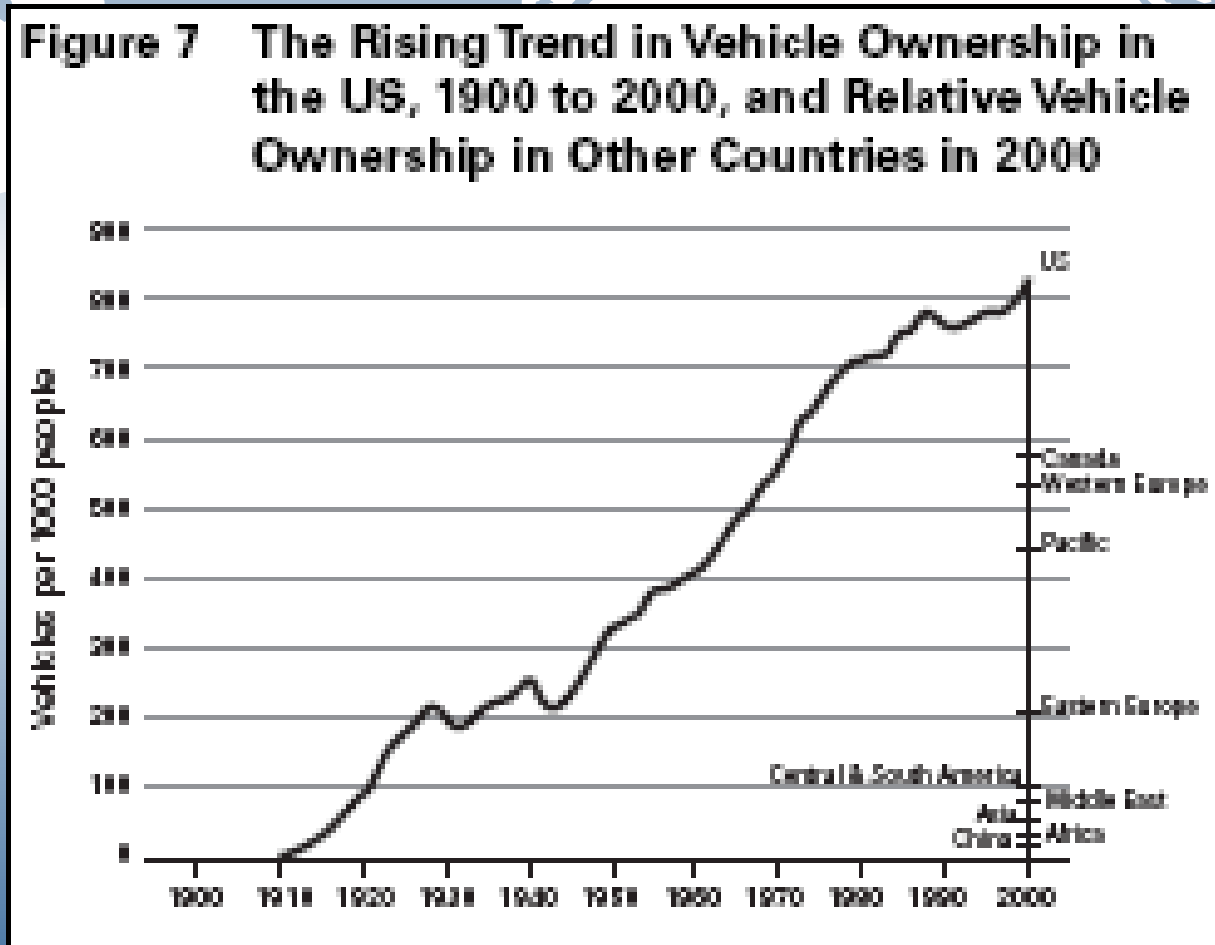
- New GOALS

PLANNING CITIES FOR MASS TRANSIT, BICYCLES AND WALKING

MOVING TO THE FUELS AND VEHICLES OF THE FUTURE: THE PATH TO HYDROGEN

# Comparing Global Vehicle Ownership Patterns in 2000

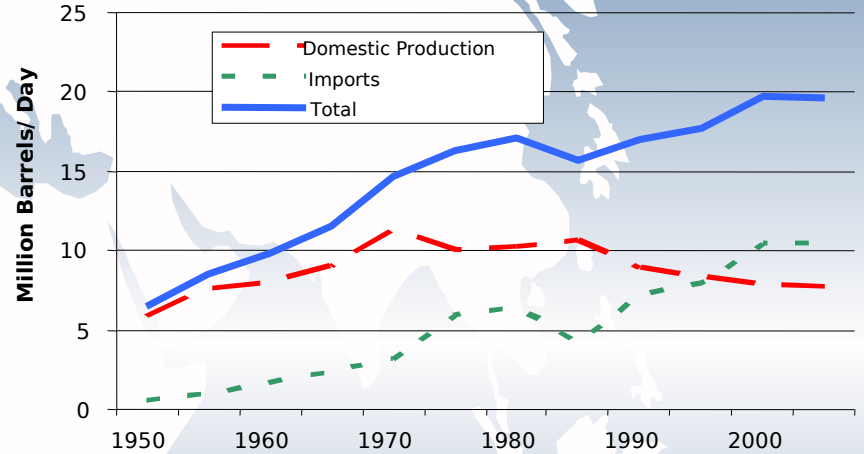
China and India: Where the US was during WWI



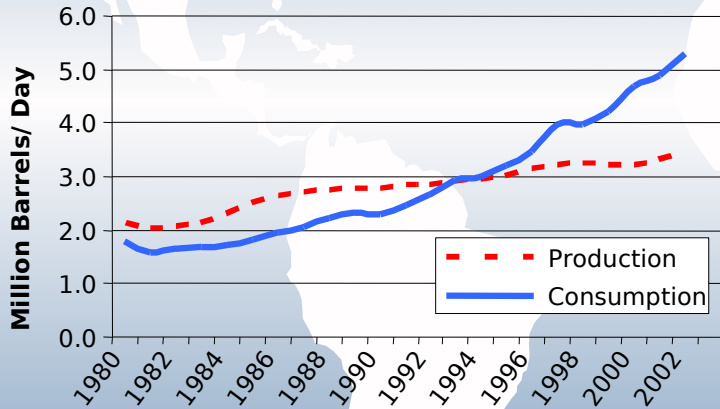
Source: S. Davis et al., *Transportation Energy Data Book*, 2003

# THE WORLD OIL CRUNCH!

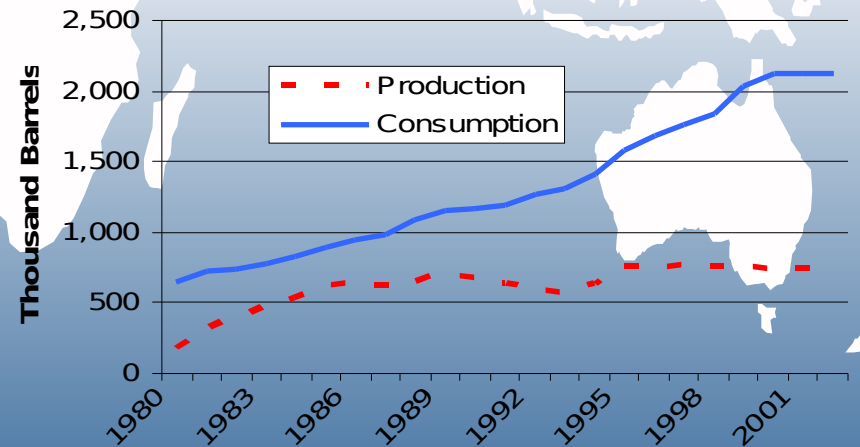
USA



CHINA



INDIA

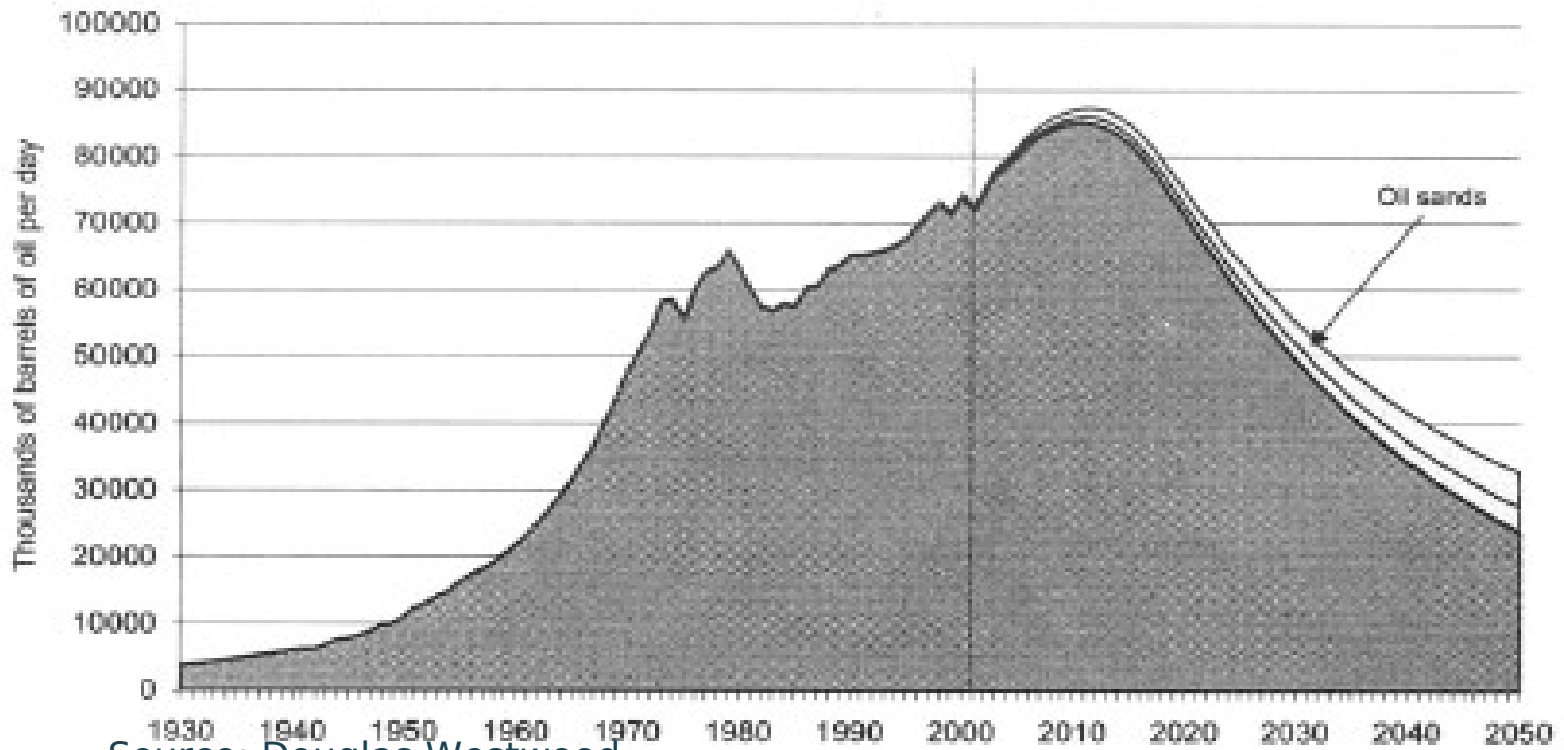


Source: EIA

# WORLD OIL

## Extraction Rate Near Peak

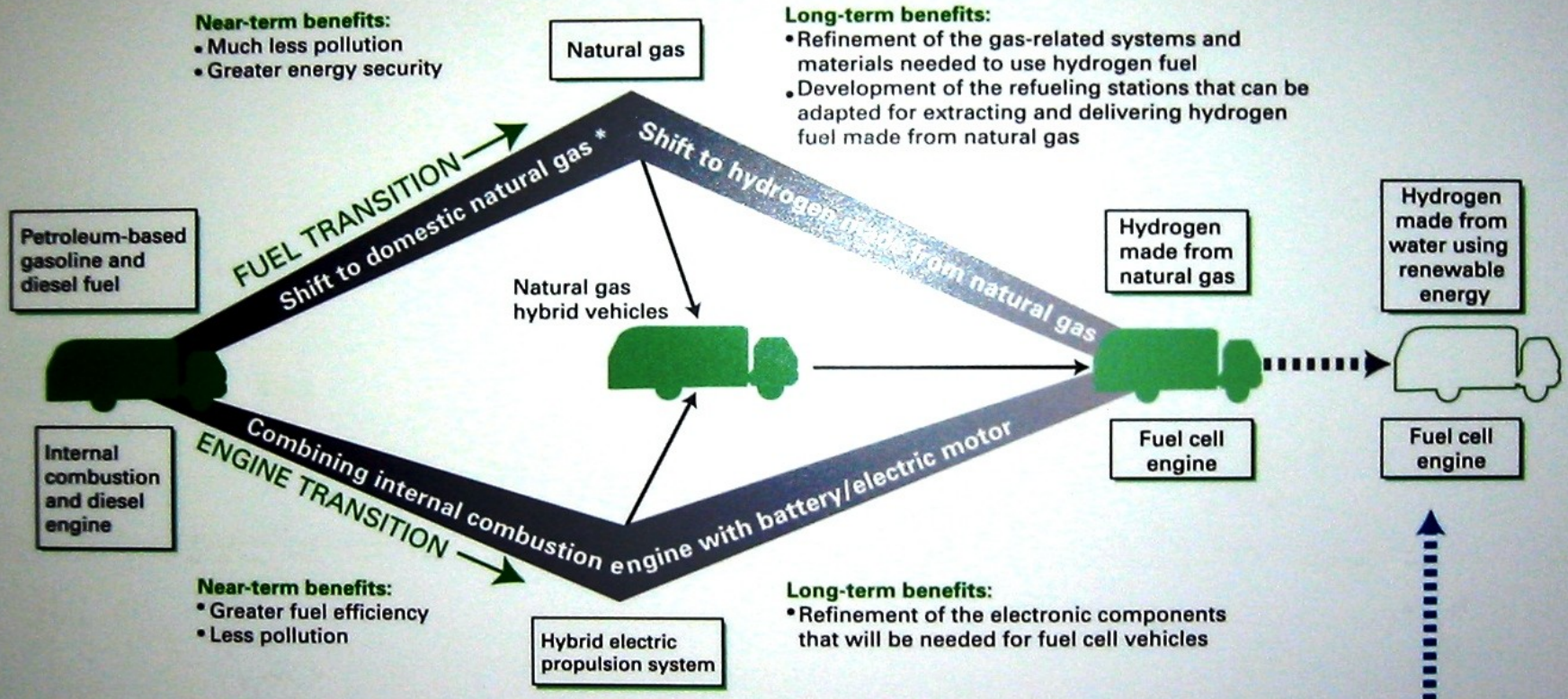
### Recent Oil Production Forecast



Source: Douglas Westwood

# GOAL FOR THE 21<sup>ST</sup> CENTURY

## Viable Path To Hydrogen



\*Especially in urban fleet vehicles

Taking this final step will require a stronger focus today by the Department of Energy on research and demonstration of distributed solar and other renewable energy resources so that, in one to two decades, renewable energy will be available as the power source to generate hydrogen by splitting the water molecule.

# The Transition to Hydrogen

## Where are we Now?

✓ **Many pieces are in place!**

**30 years of extracting Hydrogen from natural gas for US space program**

**Splitting hydrogen from water feasible**

**NGV use – refining gas using technology & building gas refueling stations**

**hydrogen fuel cell vehicles being tested – from Ford Focuses at the Los Angeles Airport to buses in**

# NATURAL GAS VEHICLES

## Heading for 5 million – A START!

Country	NGV's 2003	NGV's 2006
Argentina	1,000,000	1,457,118
Brazil	550,000	1,011,206
Pakistan	350,000	700,000
India	137,000	222,222
United States	135,000	140,000
China	69,300	97,200
Egypt	44,064	62,702
Germany	15,000	27,200
Bangladesh	13,000	1,314
<b>Global Total</b>	<b>2,949,438</b>	<b>4,782,720</b>



# EMBRACING SUSTAINABILITY THE MISSING INGREDIENT

## **Building Citizen Leadership**

Environmental Education  
For Families, Communities &  
Children -- Tomorrow's Leaders

...By Learning!

....By Seeing!

....By Doing!

A light blue world map is centered in the background of the slide. The continents are shown in a darker shade of blue, and the oceans are a lighter shade. The map is slightly faded and serves as a backdrop for the text.

For further information, articles & reports,  
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