

The Solar Energy that falls on this planet in just 20 Days is equivalent to all the Earth's reserves of coal, oil and natural gas.





Nicholas B. Robson Director-General

The Cayman Institute





All States Use A Great Deal Of Energy And Our Civilization Cannot Function Without It.



IEA releases World Energy Outlook 2011, "Peak Oil is an inevitability"

- The International Energy Agency (IEA) on Nov 9th 2011 launched its eagerly awaited World Energy Outlook 2011.
- Despite the priority in many countries to increase energy efficiency, global energy intensity worsened for the second straight year.
- •Against this unpromising background, events such as those at the Fukushima Daiichi nuclear power plant and the turmoil in parts of the Middle East and North Africa (MENA) have cast doubts on the reliability of energy supply, while concerns about sovereign financial integrity have shifted the focus of government attention away from energy policy and limited their means of policy intervention, boding ill for agreed global climate change objectives.



Fossil Fuel Dependency



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Charting our Future

Definition of Energy Security

Comprehensive energy security at the national, regional, or even global level is different than simple supply security, which can be defined as sufficient supply to meet anticipated demand.

Energy security rests on three pillars:

- Diversification in power generating capacity (fuel-mix).
- Diversification in the transit infrastructure that carries commodities that are ultimately combusted for power or transportation purposes.
- Diversification in the country-of-origin of supply.

Journal of Energy Security Dec 2010 Issue



Failure To Have Energy Security

 When a nation fails to meet its own national energy security objectives by failing to address the diversification issue, markets become susceptible to behavior that is manipulative in nature.



Journal of Energy Security Dec 2010 Issue



IEA releases World Energy Outlook 2011, There are few signs that the urgently needed change in direction in global energy trends is underway.



International concern about the issue of energy access is growing. The United **Nations has declared 2012** to be the **'International Year of Sustainable Energy for** All' and the Rio+20 Summit represents an important opportunity for action.

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The Military and Energy





US Department of Defense, surplus land at four military bases in the Mojave desert in California could be capable of producing up to 7 Gigawatts of solar power

DOD's Energy Challenge as Strategic Opportunity

- Energy is the lifeblood of modern societies and a pillar of America's prowess and prosperity.
- Yet energy is also a major source of global instability, conflict, pollution, and risk.
- Many of the gravest threats to national security are intimately intertwined with energy, including oil supply interruptions, oil-funded terrorism, oil-fed conflict and instability, nuclear proliferation, domestic critical infrastructure vulnerabilities, and climate change. Amory B. Lovins - Chairman and Chief Scientist of Rocky Mountain Institute.
- JFQ / issue 57, 2d quarter 2010



United States





To meet even the conservative growth rates posited in the economics section, global energy production would need to rise by 1.3% per year.

By the 2030s, demand is estimated to be nearly 50% greater than today.

To meet that demand, even assuming more effective conservation measures, the world would need to add roughly the equivalent of Saudi Arabia's current energy production every seven years.







United States Navy in Persian Gulf

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Australian Government

Department of Infrastructure, Transport, Regional Development and Local Government Bureau of Infrastructure, Transport and Regional Economics



Transport energy futures: long-term oil supply trends and projections

Report 117

For the next eight years it is likely that world crude oil production will plateau in the face of continuing economic growth.

After that, the modeling is forecasting what can be termed 'the 2017 drop-off.

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United Kingdom



The Oil Crunch

A wake-up call for the UK economy

Second report of the UK Industry Taskforce on Peak Oil & Energy Security (ITPOES)

February 2010

The Defence Academy of the United Kingdom

Special Series

Climate Change and the Energy Crunch Dr Mark A Smith, Dr Mohammed El-Katiri & Dr Steven J Main



10/13





German Military Braces for Scarcity After 'Peak Oil'

A study [September 2010] by a German military think tank leaked to the Internet warns of the potential for a dire global economic crisis in as little as 15 years as a result of a peak and an irreversible decline in world oil supplies.

The UK Oil Crunch

On 10 February 2010 at the Royal Society, six UK companies - Arup, Foster + Partners, Scottish and Southern Energy, Solarcentury, Stagecoach Group and the Virgin Group - joined together to launch the second report of the UK Industry Task-Force on Peak Oil and Energy Security (ITPOES).

ITPOES predicts Peak Oil will occur within the next decade, potentially by 2015 at less than 95 million barrels per day. (In 2008, production levels were 85 million barrels per day.)

This report was written to inform the British Government.

Richard Branson: An Oil Crunch Is Coming By 2015, And It Will Be Worse Than The Credit Crunch

Gregory White | Feb. 8, 2010, 9:17 AM | 6 5,211 | 9 30 Tags: Richard Branson, UK, Transportation, Oil

Print

Sir Richard Branson is calling on the UK's <u>government</u> to prepare for the worst in the oil market, rather than sit back and allow a crisis to occur.

Branson is warning that slow response in preparation for the coming 'oil crunch,' which he predicts for 2015, could leave the world's economy in an even worse state than the credit crunch did.

"This time, we do have the chance to prepare. The challenge is to use that time well," to prepare for the oil crisis, Branson said.

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Oil is a Finite Resource

Two critical factors will shape the future of oil production and consumption over the next decades.

•The first is accelerating climate change.

•The second is the increasing difficulty in finding secure sources of oil in the world.

•The interaction of these two factors is currently leading the world into a more and more unstable position.

Wind Turbines

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Peak Oil Theory

Originally posited by geologist **M. King Hubbert**

He stated that world oil production will one day reach a natural limit due to geological factors.

Oil Producing Countries Past Peak

Ludwig-Bölkow-Systemtechnik GmbH, 2007 Source: IHS 2006; PEMEX, petrobras; NPD, DTI, ENS(Dk), NEB, RRC, US-EIA, January 2007 Forecast: LBST estimate, 25 January 2007

Twilight in the Desert

THE COMING SAUDI OIL SHOCK AND THE WORLD ECONOMY

MATTHEW R. SIMMONS

•Matthew Simmons (April 7, 1943 – August 8, 2010) was founder and chairman emeritus of Simmons & Company International, and was a prominent advocate of peak oil. Simmons was motivated by the 1973 energy crisis to create an investment banking firm catering to oil companies.

 In his book, Simmons argues that production from Saudi Arabia and especially from Ghawar

 the world's largest oil field – will peak in the near future, if it has not done so already.

•Simmons bases his case on hundreds of internal documents from Saudi Aramco, professional journals and other authoritative sources.

Saudi Oil Reserves

•The most critical question facing the world energy market is whether Saudi Arabia can substantially increase its oil production to meet rising world demand in the years ahead.

•Matt Simmons has created a compelling case that Saudi Arabia 's production will soon reach an apex, after which its production will decline and the world will be confronted with an immense and potentially catastrophic oil shortage.

Solar Thermal

New oil fields saved for future generations: King

Wednesday, 01 December 2010 - 25 Thul-Hijjah 1431 H

WASHINGTON – Saudi Arabia has stopped exploration missions of new oil fields to save the wealth and pass it on to future generations, King Abdullah, Custodian of the Two Holy Mosques, said here Thursday.

http://www.saudigazette.com.sa/index.cfm? method=home.regcon&contentID=2010070377026

Electric Vehicles

Plug-in-Hybrid -Electric-Vehicle

Small Diesel Cars

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Tipping Point

Peter Hughes, a director of Arthur D. Little's global energy and utilities practice, said: "Depending upon how quickly the transportation sector begins its migration away from oil, we could find ourselves at a tipping point in which demand for oil peaks much earlier than the industry currently anticipates, before going into long-term decline."

Solid Oxide Fuel Cells Bloom Energy

Bloom Energy

Google

The Coca Cola Company

Walmart 🔀

Respected Oil Analyst Forecasts Peak Oil By 2017

Oil analyst and oil industry veteran Charles Maxwell has forecast peak oil by 2017 or 2018

His prediction is not so remarkable, as is **where** he made his prediction. The prediction was in **Forbes**, which has often scoffed at the notion of a near-term peak.

Some of Maxwell's comments:

A bind is clearly coming. We think that the peak in production will actually occur in the period 2015 to 2020.

And if I had to pick a particular year, I might use 2017 or 2018.

Ocean Energy

What Needs to Be Done

Policy Measures To Reduce Reliance On Fossil Fuels And To Encourage Diversification Of Energy Supplies.

At present, the trajectory of global consumption of oil is still rising from year to year, now principally driven by the rapid expansion of demand in the emerging economies.

The market cannot be expected to deliver changes that are needed without active intervention by governments and a sustained effort to engage the public and organizations of all kinds.

Many of the measures necessary to encourage and promote the transformations are already well known, in principle. But everywhere in the world, the range of measures needs to be extended and to be applies more vigorously and urgently.

Climate Change and Energy Insecurity: The Challenge for Peace, Security and Development. Ed. Dodds, Higham & Sherman. Earthscan, London 2009

Ocean Wave Energy

Photo Voltaic & Thermal Panels

The amount of energy from the sun that falls on Earth's surface is enormous.

All the energy stored in Earth's reserves of coal, oil, and natural gas is matched by the energy from just 20 days of sunshine.

International Energy Agency

- Energy security
- Environmental protection
- Economic growth
 - Engagement worldwide

Important To Focus On Alternative Energy Sources, Reduced Energy Consumption

Speaking at the World Energy Council Congress in Montreal, **IEA Chief Economist Fatih Birol** said "the right policies are needed to facilitate the transition to a new energy mix."

He further emphasized that "regardless of when peak oil demand occurs, it's important to continue looking for alternative energy sources and ways to reduce energy consumption.

Fossil Fuel Cost Increases

Accidents

Insurance

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Transport Costs

Adverse Weather

Power Generation

In terms of power generation there will need to be a great effort to expand renewables of all kinds as rapidly as possible. In Europe the targets that have been set for the expansion of renewables are a good beginning; but more needs to be done to carry the different technologies into the marketplace at affordable prices.

International Energy Agency

- Energy security
- Environmental protection
- Economic growth
- Engagement worldwide

Economist Nobuo Tanaka, the IEA's Executive Director

Says a historic "energy revolution" is needed both to ensure energy security and to prevent climate change.

The State That Achieves Energy Security Will Have Established A Strategic Advantage, As Has Happened Throughout History

Age of Sail – Holland & England

Age of Steam England

Age of Turbines – **Oil Greece & United States**

The Future - Age of Solar

http://www.planetsolar.org/index.en.php

Round the World Voyage of Solar Yacht

http://www.planetsolar.org/index.en.php

Solar Energy

The amount of energy from the sun that falls on Earth's surface is enormous. All the energy stored in Earth's reserves of coal, oil, and natural gas is matched by the energy from just 20 days of sunshine.

http://www.ucsusa.org/clean_energy/technology_and_impacts/energy_technologies/how-solar-energy-works.html

Public Transportation

An efficient, low carbon public transportation is needed to allow an energy efficient and economic transportation system.

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Zero

Climate Adaptation

The only successful way out of the climate change crisis will for the global economy to manage a rapid transformation of its energy base away from its current excessive dependence upon the burning of fossil fuels.

The Intergovernmental Panel on Climate Change (IPCC, 2007) has estimated that in order to contain global temperatures to no more than 2°C to 2.4°C above pre-industrial levels, CO_2 emissions will need to be reduced by 50 to 85 per cent from 2000 levels by 2050.

OTEC – Ocean Thermal Technology

The Nuclear Option

Small Toshiba Nuclear

TOSHIBA

4S Current Status

4S: Super Safe, Small & Simple

TOSHIBA Corporation Industrial and Power Systems & Services Company

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What is 4S ?

4S Major Features

(1) No refueling,

(2) Passive safety,

(3) Transportability,

(4) Reasonable cost for distributed power supply.

embedded reactor

4S power station

Turbine building

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What is no refueling ?

No refueling means

- (1) Reducing a load of fuel transportation,
- (2) Lower maintenance requirements,
- (3) Non proliferation,
- (4) Design simplification, ex., no refueling device,
- (5) Zero emission during plant lifetime.

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CO₂ = Temperature Increase = Negative Effects

Major Greenhouse Gasses

•Carbon Dioxide (CO₂) Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement).

Methane (CH₄) Methane is emitted during the production and transport of coal, natural gas, and oil also result from livestock and other agricultural practices.

INNOVATING TO ZERO

Effects of Atmospheric CO2 Buildup in the Atmosphere

Coral bleaching and eventually die-off of fish stocks

Sea Level Rise

Cayman Brac, Cayman Islands

Illustrating sea level during the last inter-glacial period.

Approximately 25' higher than present sea level

With continued Greenhouse Gas output this could happen in future.

Financing

•The Bank of Butterfield, in conjunction with BCQS Quantity Surveyors has now agreed to finance Renewable Energy (RE) equipment for homes in the Cayman Islands.

•BCQS was instrumental in demonstrating that RE enabled homes have additional value over and above identical homes without RE.

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Duty Free Import

Renewable Energy Equipment Now Duty Free

The Governor-in-Cabinet has approved an import duty waiver for renewable-alternative energy equipment. It's one of several steps the Government and Electricity Regulatory Authority are taking to make investing in solar panels or other alternative energy sources more appealing to residents and business owners. The goal is to reduce the Islands' dependence on 50 fossil fuels.

Net Metering

 Net metering is a simple, fair, low-cost, and easily administered mechanism available to consumers in nearly every [US] state to encourage investment in on-site renewable energy such as solar and wind power. •On-site renewable power systems reduce stress on the electric grid, act as a hedge against volatile and rising energy costs, and provide environmental, public health, and economic development benefits.

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Why Energy Security is Important

Escalating Fuel Prices

Interruptions in Supplies

Conflict Over Existing Resources

Negative Strategic Security Impacts

Energy Security is Good Economics

Geopolitics: Conflict In The Persian Gulf?

[T]he mix of incidents and statements during the past week do suggest that a "ratchet effect" is underway, which at the very least prepares the way for a conflict and appears to render it the natural outcome - even if that is not the specific intention. http://www.opendemocracy.net/paul-rogers/america-israel-iran-signals-of-war

Economist Nouriel Roubini said the biggest uncertainty is the possibility of a conflict with Iran over its nuclear program that involves Israel, the United States, or both.

That could lead oil prices now hovering around \$100 a barrel to spike to \$150 per barrel, he said, and lead to a global recession.

ERADICATING ECOCIDE Ending the Era of Ecocide

ec•o•cide ('ekō,sīd) *noun* the extensive destruction, damage to or loss of ecosystem(s) of a given territory, whether by human agency or by other causes, to such an extent that peaceful enjoyment by the inhabitants of that territory has been severely diminished.

Home The Problem - The Solution - The Trial What You Can Do - The Team - Friends Blog

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Ecocide Earth Summit Strategy

This is our strategy for getting world leaders to say "Yes, let's make Ecocide a crime" at the Earth Summit in June.

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PREZI		

Click the play button above to go through the presentation, and click 'more' to see the presentation fullscreen or in autoplay mode

EARTH LAW AT THE EARTH SUMMIT

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New Initiative to Stop Pollution

Cayman Institute Reports

Cayman Islands Energy Security - 2007

Cayman Energy Policy Advisory Report – 2009

Sea Level Rise and its Implications for the Cayman Islands - 2009

www.caymaninstitute.org.ky

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