

BIOECONOMY:

Too good to be true?

11th European Forest Pedagogics Congress.

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DEFINITION



- **THE BIOECONOMY REFERS TO THE SUSTAINABLE PRODUCTION AND CONVERSION OF BIOMASS INTO A RANGE OF FOOD, HEALTH, FIBRE AND INDUSTRIAL PRODUCTS AND ENERGY. RENEWABLE BIOSMASS ENCOMPASSES ANY BIOLOGICAL MATERIAL (AGRICULTURE, FORESTRY AND ANIMAL-BASED INCLUDING FISH) AS A PRODUCT IN ITSELF OR TO BE USED AS RAW MATERIAL** (www.becoteps.org)



CRUX OF THE MATTER: SUBSTITUTE

Use of fossil carbon, energy carrier & industrial raw material (the “black” (coal, petroleum and natural gas) carbon), with carbon fixed by photosynthesis in biomass (“green” carbon).

ENHANCE production of biomass AND the biomass fixation of carbon.

INCREASE generation of renewable energy in general; Photovoltaic, hydropower, wind-power, piezo-electricity etc.

DECREASE general use and increased recycling of metals.

INCREASE energy-& material efficiency; obtain more by more intelligent (and less) use.

REDUCE
waste in general.

A. SOCIETAL BACKGROUND

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- **INTERNATIONAL ECONOMICS**

- **A) INTERNATIONAL TAXATION,**

- petroleum-driven inflation USD-denominated international markets, post 1971. (Trans-Atlantic monetary diplomacy)

- **B) GEO-ECONOMIC**

- Increasing dependence decreasing number of areas & states, (Persian Gulf Region/Russia)

- **C) ENORMOUS CONCENTRATION OF WEALTH –(no industry)**

- Handful of states, companies controlling disproportionate amounts of global economy International capital markets/movements/instability.

- **NATIONAL ECONOMIC**

- Trade-deficits oil-imports
 - Monetary policy;
 - “The dollar-constraint” currency-reserves
 - Industry and labour-markets:
 - employment “peripheral areas”
 - New industries – new employment

B.

SOCIETAL BACKGROUND



- (f.i. Norway, possession world's greatest Sovereign Wealth Fund – prize global petroleum/financial markets inflation; small Norwegian Industry. Middle East same issue – and even worse..)
- Economists might disagree, but:
 - Global economy 1974-2007:
 - Petroleum driven USD-inflation (i.e. a strengthened/increased general inflation in USD)
 - This lead to an USD assets inflation as well 1997-2007.
- Inflations “ordinary” instruments financing wars, international operations in general and indeed entire empires.

BACKGROUND NATURAL



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■ RESOURCES

- Peak *conventional* oil USA, OECD.
- Increasing extraction costs
- Extraction increasingly energy-intensive activity.

■ Climate Change:

- Paris Convention Nov. 2015
 - 2°C goal: (68 % reserves coal/petroleum remain in the ground
 - 1,5°C (to be striven for): 85% reserves coal/petroleum remain in the ground.
 - i.e. *extremely rapid* transition from the black to the green.

BIOECONOMY - WHERE FROM?



- **USA STRATEGY AND ENERGY POLICY:**

- (Formal) Import independence/"peak conventional reserves"

- Alaska (Prudhoe Bay) was USA's (NATO's) "strategic reserve".

- **THE BIOMASS RESEARCH AND DEVELOPMENT ACT 2000.**

- **The energy independence and security act, (2007)**

- US Armed forces R&D and innovation-system

- Technologies

- Products

- Markets (procurement)



Bio-economy

a great systemic shift.

From systems of perpetual (increasing) scarcity, to a system of in principle perpetual abundance.

Since man can sustainably grow biomass

Bio economy goes global



- **2000-2015**
- “bio-economic strategies”
 - Most OECD-countries,
 - India
 - China.
- European countries:
 - Climate change
 - “National economics” – budgets/monetary
 - Reduced exposure global petro-markets
 - Competitive chemical industries
- India & China the same



...it is possible with all these enormous changes (population, agriculture, use of fossil fuels) concentrated into such a short period of time, we might have unwittingly begun a massive experiment with the systems of this planet itself....(and) we have no laboratory in which to carry our controlled experiments”

Lady Margaret Thatcher



AMOUNTS

2013:

9 070137 BARRELS OF
OIL PRODUCED EACH
DAY

EVERY SINGLE DROP
CONSUMED

2010:

1 BILLION CARS ON
THE ROAD GLOBALLY

PETROLEUM:

Ca. 95 % ENERGY
TRANSPORT SECTOR
Ca. 97 % CHEMICAL
INDUSTRY

Black & green strengths & weaknesses



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All products produced by
Black can be made by Green

Green:

Dispersed, variegated
biomass
seasonal variations

Black:

Concentrated few fields (94
%15 00 fields
relatively uniform liquids or
gas

Point is many, varied substitutes....



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No substitutions

1 to 1.

Post-petroleum transportation:
variety energy-carriers and
forms.

Renewable electricity:

Variety of needs use as systems
of generation, transport and
storage

Renewable energy
Abundant and
cheap

Costs:
Knowledge and
manpower – and
rightly so

Biobased raw
materials

Abundant and
cheap

The bio-economy/green economy is



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**Technologically
sophisticated,
knowledge based
high value
high income
full employment-
economy**

Transportation a decisive battle



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The speed of substitution
decided by transportation-
markets.

“Hegemon” on transportations
markets; conqueror other
higher value-markets.



Black & Green old rivalry

One of the most interesting developments of the past decade has been that of the internal combustion engine....The question of profitably substituting in these engines alcohol for gasoline is one enormously controversial, but out of warring testimony there have appeared certain facts that seem unquestionable. Alcohols is produced in the cycle of the seasons: it is absolutely inexhaustible and made out of sunshine and air... Gasoline on the contrary represents a part of the stored energy of the earth...its supply will in the future inevitably fail.

R.K. Duncan, *The Chemistry of Commerce*, (1907)

Alcohol preferred fuel...



Prohibition 1920`ies assured the Oil Companies of their “victory”... but before that....

Nascent car industry envisioned driven by

“much the same as the horse”

Henry Ford:
My car a double renaissance of agriculture and rural America:

Enhanced mobility & additional value-chain agricultural products.



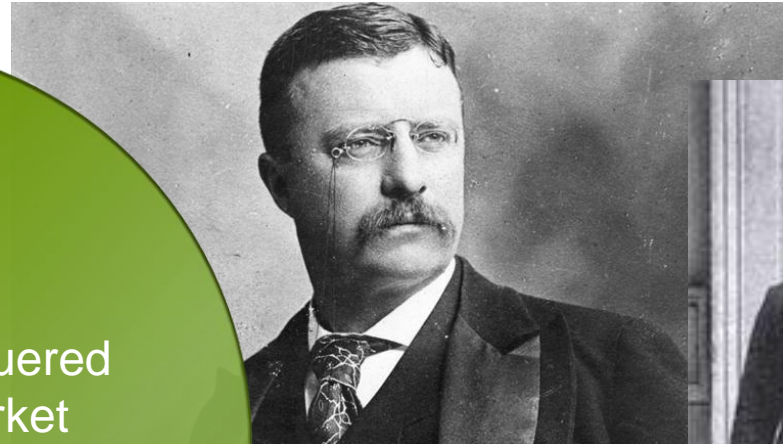
War and diplomacy

Petroleum got “allies”
forestry and agriculture could
not match.

Indeed forestry and
agriculture completely
dependent on
Petroleum
(We eat petroleum)

1907/1912

PETROLEUM conquered transportation market due to “military alliances”.



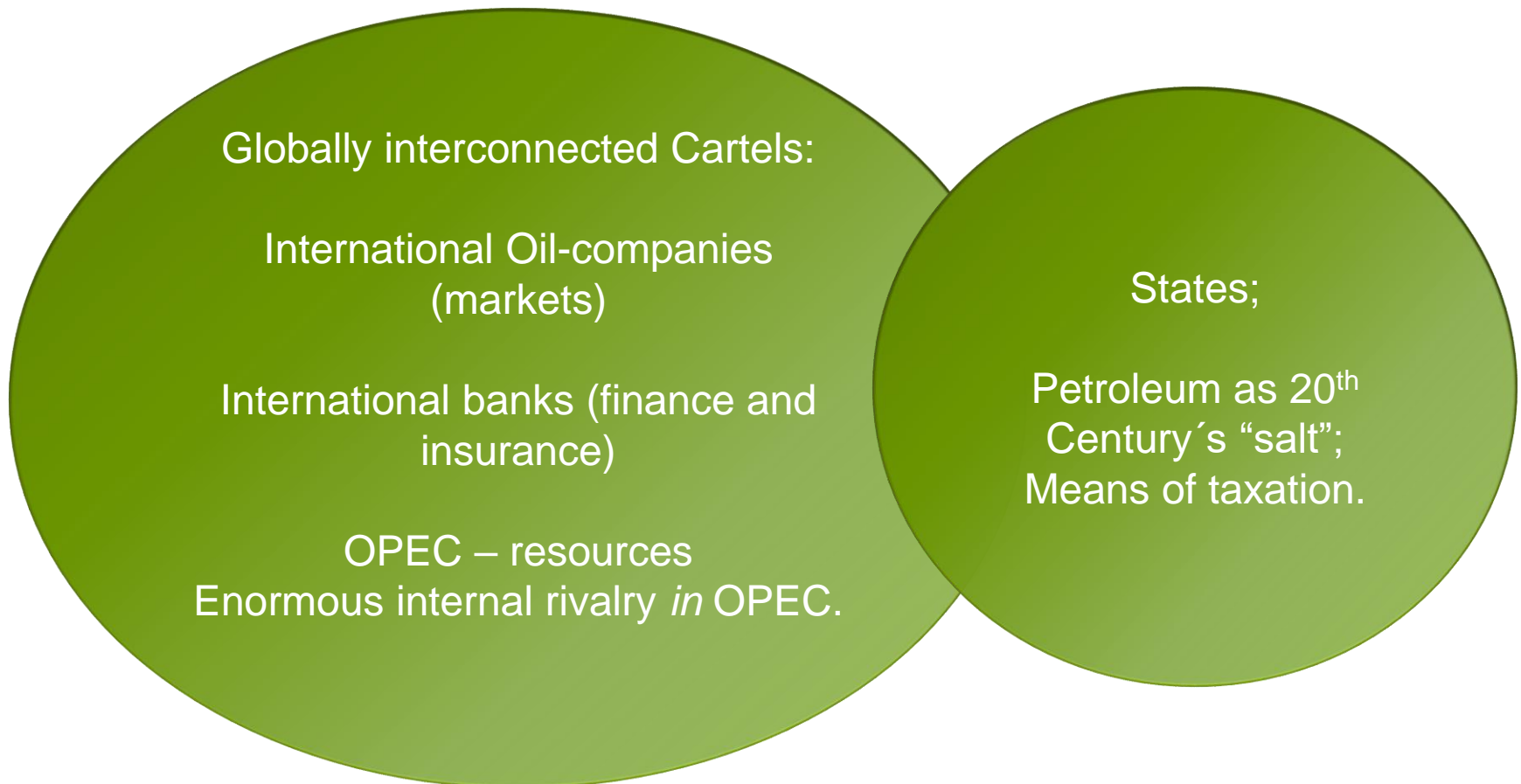
US President Theodore Roosevelt, Converted the US Navy from coal to petroleum (of which US had plenty) and assured independence from British global supplies.



In 1912 Royal Navy followed suit.



The petro-system



1914-1918.

WWI:

Motorisation of the cavalry, air-
forces – subsequent
“petrolification”
warfare, strategy, global economy
and diplomacy.

1936/39 - 1947.

WWII:

The first global
“petroleum war”



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Friedrich Bergius,
Nobel Prize
Chemistry, 1931

Holz als
Universal-
rohstoff!

Hermann
Göring's
the War of
the Woods



Forests and the bio-economy

Forests

Greatest terrestrial “green carbon source”
Captures 43 %
of annual carbon fixation.

Contain 89% standing
biomass carbon

Forests

Grow where cereals do not

Create/recreate soil &
climate-systems

**Sustainable forestry
mankind’s
“Salvation”**

21ST Century's tall transition; black to green.



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- Present crisis – financial, economic and monetary – substantially a “petro-economy” - created and driven
- **Crisis medium of change**
- New energy-systems, renewables and “green” carbon industry is the crisis-solution
- alternative to*

financial and political cataclysms.
- Transition difficult without comprehensive & consistent strategies
 - *State*
 - *Forestry*
 - *Agriculture*
 - *Industry*
- On
 - *R&D – Innovation*
 - *Finance*
 - *Industry*
 - *Trade policy*



Bio-economy

Assets – too good to be true!

- Decentralized raw-material base (“everywhere”)
- Few cartels
- However, highly oligopolized (and conservative) industry.

but

- Possibility increased importance “serious” markets.
- New global trade-flows
- New foundations international power hierarchies

Obstacles:

- enormous investments fossil energy.
- Miniscule investments “green alternatives”.
- No/weak, international leadership(s)
- considerable resistance International & National Oil Companies, International Banks.



Literature, further reading...

A few suggestions:

Paul Stevens:

International Oil Companies the death of the old business-model,
Chatham House, London, May 2016. (Crucial for today's financial
markets & the future of the industry *Free on the net!*

<https://www.chathamhouse.org/sites/files/chathamhouse/publications/research/2016-05-05-international-oil-companies-stevens.pdf>)

....readings

Forest and Wood – history and future:

Egon Glesinger, *Nazis in the Woodpile*, New York 1942.
The Coming Age of Wood, London 1947 – A classic!!)

Oil history:

US Senate, *The International Petroleum Cartel*, Washington 1952

Tom Bower: *Oil, money, politics and power in the 21st Century*, New York 2010.

Michael B. Stoff: *Oil, war and American Security*, Yale, 1980

David S. Painter: *Oil and the American Century*, Johns Hopkins 1986 (Both Stoff&Painter fundamental understand 20th Century economics and history)

Daniel Yergin: *The Prize*, New York 1991

The Quest, New York, 2011 (Both superb!)



-----readings:

Bio-economy and chemistry:

Donald L. Klass, *Biomass for the renewable energy, fuels and chemicals*, Academic press, New York 1998 (certainly – many similar works lately – and lot of titles various products: chemistry, fuels, construction!)

Finance, monetary....

Mohamad A. El-Gamal, Amy Meyers Jaffe, *Oil, dollars debt and crisis, the curse of black gold*, New York, 2010 (Very good!!)

Liaquat Ahamed, *Die Herren des Geldes*, FinanzbuchVerlag, München 2010, (focus Goldstandard, but you'll see "the shadow of oil")

David S. Spiro, *The Hidden Hand of American Hegemony, petrodollar recycling and international markets*, New York 1999. (To the point!)

Renewable fuels:

Hal Berton, William Kovarik, Scott Klar, *The forbidden fuel*, Nebraska Univ Press, 2010. (Very important and entertaining!)