GREEN INDUSTRIAL REVOLUTION WELCHE INVESTITIONSBEDINGUNGEN BRAUCHEN ERNEUERBARE ENERGIEN UND ENERGIEEFFIZIENZ? – EIN BLICK AUF DEUTSCHLAND UND IN DIE WELT



Asset Management

Delivering Sustainable Value

Moving assets from the old linear fossil-fuel-powered profitably to the new green circular economy to allow for sustainable growth

Jochen Wermuth STIFTUNG UMWELTENERGIERECHT Würzburg, 11. October 2016

Outlook on climate change

CARBON EMISSIONS MUST DROP DRAMATICALLY





Outlook on climate change

Leeuwarden

Sneek,

Almere Stad

Netherlands

Eindhoven

Rotterdam

Antwerpen o

oBrighton , 67m water level Source: <u>www.floodmap.net</u>, 67 increase (7m Greenland, 60m A

Norwich

Cambridge

London

ainam

neffiel

gham

ester

Belgium

Heist-op-den-Be

Esbjerg Denmark

Odense

-Flensburg

Rostock

Stade **O**Hamburg

Lubeck

Kiel

Bremen

Bielefeld Hanover o Braunschweig

Germany

Esser

usseldorf

Cologne

Bonn

3 Zwickau

Leipzig

Halles



Outlook on power generation

.....

WORLD **EU25**



SPACE NEEDED TO SUPPLY THE WORLD WITH SOLAR POWER...



Cost of power generation 1/2

THE ELEPHANT IN THE ROOM: SOLAR BELOW GRID PARITY



Cost of power generation 2/2

SOLAR POWER FELL FROM \$600 TO \$30/MWH OR \$5/BARREL OF OIL

Dubai set a global benchmark in Dec 2014: at 5.84 US cents per kWh, the bid for Dubai Electricity and Water Authority's 200 MW solar PV plant was cheaper than oil at US\$10/barrel and gas at US\$5/MMBtu



New records in 2016 so far: PV @ 2.99 US cents per kWh Competitive to oil at \$5/barrel

\$3.4 TRILLION DIVEST

Wind @ 5.2 € cents per kWh Competitive to oil at \$10/barrel









Combustion motors no longer competitive

ELECTRIC CARS USE ONLY 1/3 THE ENERGY WITH 0 EMISSIONS AND 1/3 OF MAINTENANCE COST ...



Combustion motors no longer competitive

EV BATTERY REVENUE WHILE CAR IS PARKED & PLUGGED IN

Revenue and profit potential from EV battery in Germany for a single car (in €/EV/a)





Source: The Mobility House, see footnotes, end of document

A NEW INDUSTRIAL REVOLUTION IS UNDER WAY

1900: WHERE'S THE CAR?





1913: WHERE'S THE HORSE?



Source: Rocky Mountain Institute

GGF2 / REEF

ADDRESSABLE MARKETS 2016-2025

- Information technology enabled resource efficiency 1
- power generation technologies/ applications 1
- energy storage 1
- distributed/off-grid power generation, smart grids 1
- industrial resource efficiency, e.g. decentralized point of 1 sale production and servicing
- mobility/transportation, e.g. autonomous car sharing 1
- built environment, e.g. smart buildings 1
- agriculture / soil remediation
- (waste) water treatment systems
- urban mining 1

WERMUTH Asset Management Delivering Sustainable Value



CO2 INTENSIVE FUEL COMPANIES AT RISK

"CONSERVATIVE INVESTMENTS" IN GERMAN UTILITY STOCKS LOST 75%



- -MSCI Germany / Utilities
- -MSCI Germany
- Dow Jones Wilshire Global Oil and Gas Index

CARBON BUBBLE EXCEEDS MORTGAGE BUBBLE BY 50% ALREADY SHORT STRANDED CARBON ASSETS: \$21 TRILLION TO BE WRITTEN OFF





Stranded carbon assets at risk to have to be written off, end 2014

Fossil fuel related assets in 2014

US mortgage backed securities in 2008

15

20

25 Trillion US\$



What we do today

OUR COMMITMENT: GREEN GATEWAY FUND 2...



- provides growth/buy-out private equity to
 EU SMEs with >€10m in revenues which make
 their clients more resource efficient
- target net returns >20%pa, >2x



- improves the environment
- assists EU firms to sell to growth markets locally & globally, eg, where energy/GDP >4x EU levels
- benefits from right timing and low competition

THE MOBILITY HOUSE: IMAGINE THE FUTURE NOW!

Source: The Mobility House AG

10-10



THE MOBILITY HOUSE VEHICLE-TO-GRID =>

THE MORITY HART



A €20 000 ELECTRIC CAR

LEAF **CAN EARN €2000 A YEAR**

... STILL \$ 35 TRILLION NEEDED TO STOP CLIMATE CHANGE

Cost of global energy transition in 35 years: US\$1 Trillion annually $\leq 1,5\%$ of global GDP creating about 20M jobs worldwide



Average savings on fuel cost: **US\$1** Trillion annually Plus savings on climate damage rising to US\$14 Trillion annually by 2050 \triangleq 20% of global GDP

HOW TO MOVE FROM DIVEST TO INVEST? CO₂ PRICING!



Tally of carbon pricing instruments



- ETS implemented or scheduled for implementation
- Carbon tax impemented or scheduled for implemention
- ETS or carbon tax under consideration
- ETS and carbon tax implemented or scheduled
- (I) ETS implemented or scheduled, tax under consideration
- Carbon tax implemented or scheduled, ETS under consideration

The circles represent subnational jurisdictions. The circles are not representative of the size of the carbon pricing instrument, but show the subnational regions (large circles) and cities (small circles).

Note: Carbon pricing instruments are considered "scheduled for implementation" once they have been formally adopted through legislation and have an official, planned start date.

What we want to do

REEF: THE RESOURCE EFFICIENCY AND ENERGY FIRM AN EVERGREEN STRUCTURE PROFITABLY MOVING ASSETS TOWARDS A CIRCULAR ECONOMY

REEF

DIVERSIFIED ASSET ALLOCATION ACROSS ALL ALTERNATIVE ASSET CLASSES



REEF

CUT 3% OF GLOBAL CO₂ EMISSIONS WITH €20BN OF EQUITY

3750 -				
3000 -	■€bn investm		nents • mt CO ₂ emission cut	
2250 -				
1500 -				
- 750 -				
0	20 8	10	170	200 81
U	REEF equity	EIB first loss debt	other project debt	total project investment





=> CUT GLOBAL EMISSIONS WITH 0.2% OF GLOBAL ASSETS!

THINK FOR A MOMENT:

Is your money where your values are?







THINGS WILL ONLY CHANG 1.5% OF OUR INCOME OR WE ARE ALL INVESTORS WE NEED TO

WE NEED TO TAKE CONTROL TIME FOR CIVIL CAPITALISM

THINGS WILL ONLY CHANGE IF WE CHANGE THEM 1.5% OF OUR INCOME OR 0.2% OF ASSETS IS ENOUGH.







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END NOTES

With regard to slide 15:

Smart sourcing:

Exploit wholesale price spread for electricity Source electricity for customers below normal market price by shifting demand for EV-charging to low-price times

Ancillary services:

Frequency regulation and stabilization of high voltage grid. Established market organized by Transmission System Operators (TSO) - there are 5 in Germany

There are currently three kinds of balancing powers that are used by the TSOs in Germany: 1. PRL = Primary control reserve: supports the grid by alleviating frequency deviations (limited

backup required);

primary reserve is the most challenging for (conventional) power plants (reaction time 30 seconds); most profitable product and causes very limited battery wear. reserve capacity to alleviate frequency deviations that exceed primary reserve measurements (short period of backup needed). Already more difficult to realise by (conventional) power plants (reaction time 5 minutes); energy delivery plays a role, market relatively competitive, but batteries could play a role. 3. MRL = Tertiary control reserve: provides reserve capacity to alleviate frequency deviations that exceed primary and secondary reserve measurements (longer period of backup needed); relatively easy to realise by (conventional) power plants (reaction time 15 minutes); energy delivery substantial, fees low, thus batteries not really competitive

Peak shaving: Batteries can shave peak loads of predictable load curves of industrial sites

Industrial customers pay grid connection costs based on the maximum load within a year Costs can be reduced by shaving this peaks

2. SRL = Secondary control reserve: provides



Intraday / Arbitrage trading:

Store and release energy according to shortterm trades on the energy markets (e.g. EEX) The exploitation of price spreads can generate value for a swarm of EVs Two markets are available: Intraday (1/4h

products) and spot market (hourly products)

Voltage quality and stability:

Similar as the ancillary services but on the distribution grid (level below the transmission grid) managed by the distribution system operators (DSOs) - > 800 in Germany Short-term power cuts, voltage imbalances can be balanced through batteries