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Theme - Fossil Fuels: Transition to a Low Carbon Energy System

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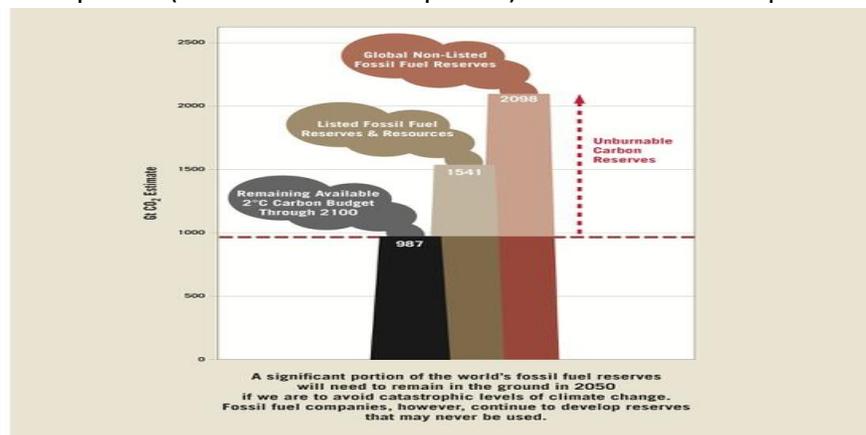
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Centrality of Fossil Fuel Energy : Name one thing around us that is not made in whole or part, or transported in whole or part without the use of /oil/Gas? Large companies and conglomerate dealing with Fossil fuel have 3 times more oil, coal, and gas in known reserves than what climate scientists have determined is safe to burn. So, Can we keep up to 2/3 of fossil fuels underground. A significant portion of the world's fossil fuel reserves will need to remain in the under ground in 2050 if one has to avoid catastrophic level of climate change. Primary Energy resources companies (The Fossil fuel companies) continue to develop reserves that may



ever be used.

Climate Justice and Decarbonisation of the energy system A 'just transition' requires climate stabilisation, climate justice and shift away from coal, oil and gas to renewable,

decentralised energy systems. Achievement of climate justice requires rapid decarbonisation of the energy system.

Current economic model does not support a viable future for the planet : As the top 200 fossil fuel companies spent almost \$700 billion in 12 months on finding and developing new fossil fuel reserves. Known fossil fuel reserves worldwide already far exceed what can be safely burned in order to limit global warming to below 2°C. (Then Why this new investment?)

As said before around 80% of known reserves cannot be burned and need to remain in the ground to avoid catastrophic climate change. And...the fossil fuel companies and institutional investors (pensions as well as speculative hedge funds etc.) are betting/planning that they will be burned.

Energy transition as the flip side of climate change. A 'just transition' requires climate stabilisation, climate justice and shift away from coal, oil and gas to renewable & decentralised energy systems.

Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates

The **fossil fuel subsidies** are defined as fuel consumption times the gap between existing and efficient prices (i.e., prices warranted by supply costs, environmental costs, and revenue considerations), for 191 countries. Globally, subsidies remained large at \$4.7 trillion (6.3 percent of global GDP) in 2015 and were at \$5.2 trillion (6.5 percent of GDP) in 2017. The largest subsidizers in 2015 were China (\$1.4 trillion), United States (\$649 billion), Russia (\$551 billion), European Union (\$289 billion), and India (\$209 billion). About three quarters of global subsidies are due to domestic factors—energy pricing reform thus remains largely in countries' own national interest—while coal and petroleum together account for 85 percent of global subsidies. Efficient fossil fuel pricing in 2015 has lowered global carbon emissions by 28 percent and fossil fuel air pollution deaths by 46 percent, and increased government revenue by 3.8 percent of GDP.

Couple of years back, researchers at the IMF estimated that global energy subsidies, including the social and environmental costs associated with heavily subsidised fossil fuels, are costing the world's governments approximately **\$5.3 trillion per year**, or 6.5% of global GDP.

Despite this, to some a 100% renewable energy economy or divestment looks unrealistic and are not included in mainstream policy.

Is this a political and economic struggle?

Renewable energy needs to be scaled up at least six times faster for the world to start to meet the goals set out in the Paris Agreement.

The historic climate accord from 2015 seeks, at minimum, to limit average global temperature rise to "well below 2°C" in the present century, compared to pre-industrial levels. Renewables,

in combination with rapidly improving energy efficiency, form the cornerstone of a viable climate solution.

Keeping the global temperature rise below 2 degrees Celsius (°C) is technically feasible. It would also be more economically, socially and environmentally beneficial than the path resulting from current plans and policies. However, the global energy system must undergo a profound transformation, from one largely based on fossil fuels to one that enhances efficiency and is based on renewable energy. Such a global energy transformation – seen as the culmination of the “energy transition” that is already happening in some of the countries – that can create a world that is more prosperous and inclusive.

The energy system, consequently, requires rapid, immediate and sustained change. The deployment of renewables must increase at least six-fold compared to the levels set out in current plans. The share of electricity in total energy use must double, with substantial electrification of transport and heat. Renewables would then make up two-thirds of energy consumption and 85% of power generation. Together with energy efficiency, this could deliver over 90% of the climate mitigation needed to maintain a 2°C limit.

Emission trends are not on track to meet that goal. Government plans still fall far short of emission reduction needs. *Current and planned policies offer a comparatively slow path, whereby the world would exhaust its energy-related “carbon budget” in under 20 years, in terms of efforts to keep the global temperature rise well below 2°C. The budget for a 1.5°C limit, meanwhile, would potentially run out in less than a decade.* Under current and planned policies, as said the world would exhaust its energy-related “carbon budget” (CO₂) in under 20 years to keep the global temperature rise to well below 2°C (with 66% probability), while fossil fuels such as oil, natural gas and coal would continue to dominate the global energy mix for decades to come.

To meet the below 2°C goal, immediate action will be crucial. Cumulative emissions must at least be reduced by a further 470 gigatons (Gt) by 2050 compared to current and planned policies (business-as-usual) to meet that goal.

Energy efficiency and renewable energy are the main pillars of the energy transition. While different paths can mitigate climate change, renewable energy and energy efficiency provide the optimal pathway to deliver the majority of the emission cuts needed at the necessary speed. Together they can provide over 90% of the energy-related CO₂ emission reductions that are required, using technologies that are safe, reliable, affordable and widely available.

Renewable energy and energy efficiency need to expand in all sectors. The total share of renewable energy must rise from around 15% of the total primary energy supply (TPES) that was in 2015 to around two-thirds by 2050. To meet climate targets, the energy intensity of the global economy will need to fall by about two-thirds by 2050, lowering the total primary energy supply in that year to slightly less than 2015 levels. This can be achieved,

despite significant population and economic growth, by substantially improving energy efficiency.

By 2050, all countries can substantially increase the proportion of renewable energy in their total energy use. It is suggested that renewables can make up 60% or more of many countries' total final energy consumption (TFEC). For instance, China could increase the share of renewable energy in its energy use from 7% in 2015 to 67% in 2050. In the European Union (EU), the share could grow from about 17% to over 70%. India and the United States could see shares increase to two-thirds or more.

Optimistically speaking this is a path of opportunity. It would enable faster growth, create more jobs, create cleaner cities and improve overall welfare. In economic terms, reducing human health and environmental costs would bring annual savings by 2050 up to five times the additional annual cost of the transition. The global economy in 2050 would be larger, with nearly 40 million jobs directly related to renewables and efficiency. Timely action would also avoid stranding over USD 11 trillion worth of energy-infrastructure assets that are tied to current polluting energy technologies.

Energy as a 'socio-technical system

Recognition of energy as a socio technical system, embedded in a complex multi dimensional multi actor and multi-level arena (from global to local government to households), with dynamic properties.

"The key choices involved in energy transitions are not so much between different fuels but between different forms of social, economic, and political arrangements built in combination with new energy technologies. *In other words, the challenge is not simply what fuel to use but how to organize a new energy system around that fuel*". (Miller, Iles and Jones, 2013: 139: **emphasis added**)

Research and Action on Energy Transitions to Low Carbon Energy System.

Example of universities doing work on energy transitions, low carbon energy research etc... this needs to be connected to the call for divestment. Divestment should be aligned and integrated into a new energy transition leadership partenering Renewables / Universities for Fossil Free campaign by way of New research initiatives and innovation. (So Partnership – New Research – Innovation in the areas of Energy Efficiency and Energy System transition.

Further on Energy system transition – innovation and abandonment

Delegitimizing Fossil Fuels

Moving the focus future up the fossil fuel supply chain to highlight the human rights abuses and environmental devastation caused by extraction of fossil fuels

That is, its not just burning fossil fuels that is the problem. Stressing the geopolitical instability – wars and invasions for fossil fuels, wars in gulf, such as Iraq in 2003 – that is the high price paid for a carbon-based, globalised energy system.

Accelerating the end of the fossil fuel era through reframing carbon as having now passed the point where their continued use is destructive, biophysically and ecologically unsustainable, and perpetuates injustice, secrecy and geopolitical tensions. Part of the broader transition process to ‘unlock’ the energy system from fossil fuels.

We must recognizing that carbon as too valuable to burn/waste

There are literally millions of products that are manufactured using carbon as a base.

The following is a short list of products made from Coal, Petroleum and/or Natural Gas:

Refrigerants; Aerosols; Antifreeze; Detergents; Dyes; Adhesives; Alcohols; Explosives; Weed killers; Insecticides; Insect repellents; Synthetic fibers such as Nylon, Rayon, Dacron, Orlon; many other Polymers such as Polystyrene, Polyethylene and Synthetic rubber; Fertilizers; Medicines; Paints; Gasoline; blending agents; jet fuel; kerosene; light fuel oils; diesel; lubricating oils and greases; naphtha; paraffin; Carbon black; Asphalt; liquefied refinery gases; Petroleum solvents; Waxes; Petroleum coke; Road oil; Still gas; Benzene; Toluene; Xylene; Microcrystalline Petroleum Waxes; Bituminous or Asphaltic concrete; Roofing Asphalts and Pitches; Coatings and Cements; Saturated felts and boards for non-building use; Coke oven and Blast furnace products; Ammonia; Fuel briquettes; Petroleum pitches; Plastics of all types.

So reframing carbon as something not to be used as fuel ,We should call them ‘fossil resources’ not ‘fossil fuels’ .

Carbon –too useful to burn “Protecting the use of increasingly valuable fossil raw materials for the future is possible by substituting these materials with renewables. Every day that this is delayed and fossil raw materials are consumed as one-time energy, creates a future usage loss of between \$8.8 and \$9.3 billion US Dollars. Not just the current cost of various renewable energies, but also the costs of not using them need to be taken into account.”

Energy transitions as political struggles

“Socio-Political struggles with fossil fuel companies and other incumbent firms (e.g. electric utilities, car companies) will be crucial in the case of low-carbon transitions. In fact, *politically inspired regime destabilization may be necessary to create opportunities for the wider diffusion of renewables, which now face uphill struggles against resistant regimes*”. (Geels, 2014: 37; emphasis added).

Political struggle against fossil fuel interests - from corporations to fossil fuel cultures such as consumerism, orthodox economic growth.

The sustainable energy transition is therefore one of decarbonisation, divestment, politically motivated transition/destabilisation of the incumbent energy and economic system i.e. carbon fuelled capitalism.

Climate Justice, Divestment and the Political Economy of the transition from Fossil Fuels

UN climate chief calls on investors to pull their money out of fossil fuel funds

'The continued and dangerous rise in greenhouse gases in the atmosphere is in large part the direct result of past investments in energy and mobility systems based on the use of fossil fuels. New investments must now assist in reversing this unsustainable trend, and quickly if the world is to have a chance of staying under a 2°C temperature rise.' - Christiana Figueres, UN climate chief.

Divestment and Reinvestment as risk management

Key issue in energy transitions – financing it

Hence importance of divestment – reinvestment

It's a risk management issue (as well as reputational) to stay 'locked into' carbon energy investments ('stranded assets' argument)

Community/citizen – state – business coalition around low carbon energy transition – *German Energiewende example.*



Example 1: Trades Unions for Energy Democracy and a 'Just Transition'

A global, multi-sector initiative to advance democratic direction and control of energy in a way that promotes solutions to the climate crisis, energy poverty, the degradation of both land and people, and responds to the attacks on workers' rights and protections.

Democratise energy production and ownership via transition to a 100% renewable energy economy

And trade union backed politics for a 'just transition' – eradicating energy poverty, ensuring green and decent jobs.

Example 2: The Pope's Encyclical *Laudato 'Si*

"The climate is a common good, belonging to all and meant for all. .. Humanity is called to recognize the need for changes of lifestyle, production and consumption, in order to combat this warming or at least the human causes which produce or aggravate it. ...The problem is aggravated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide energy system....

The human environment and the natural environment deteriorate together; we cannot adequately combat environmental degradation unless we attend to causes related to human and social degradation.

[Ecological citizenship now includes] a critique of the "myths" of a modernity grounded in a utilitarian mindset (individualism, unlimited progress, competition, consumerism, the unregulated market)"

Good critical analysis of the unsustainability of contemporary carbon fuelled consumer capitalism, therefore possible coalition partner for the political struggle against fossil fuel and climate change ... but what action has followed since its publication last summer?

Educate, Agitate, Organise'

"There is a word of the philosophy of reform. The whole history of the progress of human liberty shows that all concessions yet made to her august claims have been born of earnest struggle. ...

If there is no struggle there is no progress. Those who profess to favor freedom and yet deprecate agitation are men who want crops without plowing up the ground; they want rain without thunder and lightning. They want the ocean without the awful roar of its many waters"

Frederick Douglass, freed slave and anti-slavery activist, 1857

Paris Agreement Ratification Means No New Fossil Fuels and managed decline of fossil fuel production

Unsustainable and ecocidal carbon subsidies

Researchers at the IMF estimated that global energy subsidies, including the social and environmental costs associated with heavily subsidised fossil fuels, are costing the world's governments approximately **\$5.3 trillion per year**, or 6.5% of global GDP.

Despite this, those who push for a 100% renewable energy economy or divestment are dismissed as unrealistic, romantic, polemical, and by and large, not included in mainstream policy.

UN climate chief calls on investors to pull their money out of fossil fuel funds - 'The continued and dangerous rise in greenhouse gases in the atmosphere is in large part the direct result of past investments in energy and mobility systems based on the use of fossil fuels.

New investments must now assist in reversing this unsustainable trend, and quickly if the world is to have a chance of staying under a 2°C temperature rise.'

Christiana Figueres, UN climate chief, 15th January 2015

"Thus far, the only demonstrated and verified option for substantial decarbonisation in the energy sector is a **staged, systematic, and structured retirement of fossil-based electricity generation** and replacement with renewable energy technologies.

This approach needs to be complemented by energy efficiency and conservation, and by avoiding electricity consumption whenever possible.

Activities to achieve this transition can be scaled up using commercially available sustainable energy technologies, and intensified research and development of key, yet immature, infrastructure such as smart grids and storage technology".

UNBURNABLE CARBON

"If it's wrong to wreck the planet, then it's wrong to profit from that wreckage."

- Bill McKibben, 350.org

CONCLUSION

The technical and economic characteristics of an accelerated energy transition to 2050, to use new datasets for renewable energy. Analysis indicates that energy efficiency and renewable energy technologies are the core elements of that transition, and their synergies are likewise important. Favorable economics, ubiquitous resources, scalable technology, and significant socio-economic benefits underpin such a transition. Renewable energy can supply two-thirds of the total global energy demand, and contribute to the bulk of the greenhouse gas emissions reduction that is needed between now and 2050 for limiting average global surface temperature increase below 2 °C. Enabling policy and regulatory frameworks will need to be adjusted to mobilize the six-fold acceleration of renewables growth that is needed, with the highest growth estimated for wind and solar PV technologies, complemented by a high level of energy efficiency. To ensure the eventual elimination of carbon dioxide emissions by applying new technology and innovation, notably for the transport and manufacturing sectors, which remain largely ignored in the debate. Looking rationally on

subsidies, More attention is needed for emerging infrastructure issues such as charging infrastructure and other sector coupling implications, and, also to dodge new investment in upstream oil exporting companies.

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