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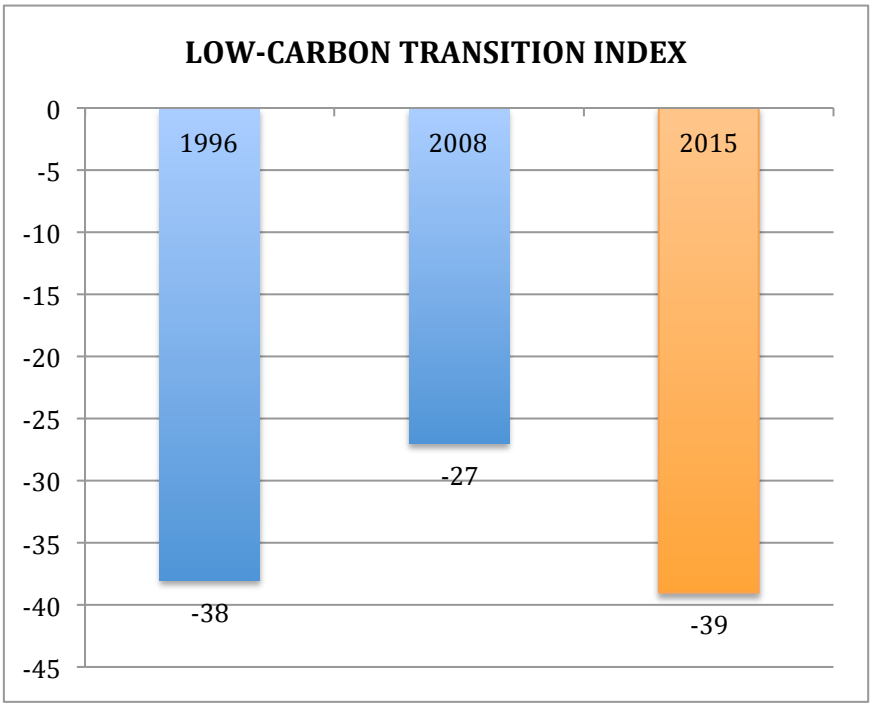
# Zero-Carbon Transition Index (ZTI) 2016




## Historic dominance of fossil companies blocking a low-carbon transition and resistance to transformative change

Fossil and zero-carbon support among the top-50 Fortune Global 500 companies
July 28, 2016
By Dennis Pamlin

## Summary

As the world moves into implementation of the Paris agreement, an agreement that is notoriously vague even by international environmental agreements standards, it is important to understand the broader context for a transition to a zero-carbon society. One of the most important factors that will decide the outcome of the Paris agreement is the kind of stakeholder that will influence the international agenda.

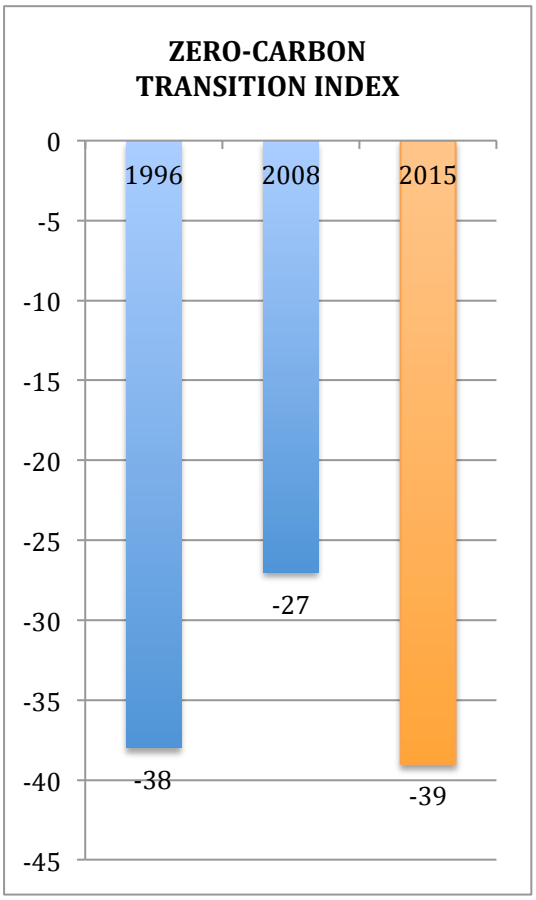
There are many ways that different stakeholders can influence the international agenda in many different ways, but based on historic experience international media, leading policy makers, key academic institutions, international organizations, etc. will act very much in line with the companies that are the most powerful and the agenda they promote.[1] These companies does not only have significant investments in R&D and enormous PR /lobby budgets, they are also overrepresented in key fora, including industry groups and agenda-setting processes such as OECD, B20, and WEF.

Currently, and perhaps surprisingly, the domination by pro-fossil companies among the world's top-50 companies is record high. The situation today is even worse than back in 1996, when the Kyoto protocol was negotiated. In other words, 20 years of negotiations, discussions and actions to reduce global carbon emissions have failed to deliver a new generation of proactive zero-carbon companies on the same scale as the old fossil companies. What we have today is a situation when the top-50 companies on the planet are dominated by fossil friendly companies on an unprecedented scale.

The zero-carbon transition index (ZTI) is a tool to enhance transparency regarding how biggest companies on the planet are likely to use their influence. The ZTI uses the revenue data from Fortune Global 500 to select the top-50 companies in the world as measured by revenue.[2] These companies are then divided into five categories depending on how they invest, communicate and lobby with regards to the greenhouse gas (GHG) reductions needed to avoid dangerous climate change.

The five categories are "very obstructive", "obstructive", "neutral", "supportive", and "very supportive". The companies in the category very obstructive are given the value -100, the obstructive -50, the neutral 0, the supportive +50, and the very supportive +100. The values are added together and then divided by the total number of companies to get the ZTI.

**The ZTI for 1996 was -38, for 2008 -27 and now for 2015 it is -39.**




[1] This is due to a number of factors, not just the economic influence/funding and the revolving door that exists between different key positions in society.

[2] http://fortune.com/global500/

The fact that high-fossil companies, especially those known for skillfully obstructing low-carbon initiatives, dominate the global top-50 companies indicate a potential backlash when it comes to setting concrete targets as well as implementing the policies and measures that are required reach the necessary GHG reductions, i.e. net-zero or even negative emissions as soon as possible.[3]

A backlash can be avoided, or at least minimized, if zero-carbon strategies are based on the facts that fossil companies still dominate the global agenda setting. For example by shifting the focus from international processes, that tends to be dominated by the pro-fossil companies, towards city level initiatives. The backlash can also be reduced through radical increase of transparency when it comes to lobbying in international and national processes.

It should be noted that many companies have improved during the 20 years since the Kyoto protocol was negotiated. The ZTI's for 1996, 2008 and 2015 indicate that 14 companies that exist on multiple indexes have become more zero-carbon supportive, and one company has even moved up two categories. Two companies have become less zero-carbon supportive. Both are fossil companies that for a time moved into more renewables and energy efficiency as well as communicated this to policy makers and the public. Both companies later moved back into a more pure fossil fuel focused business strategy and in this process also changed their lobbying and PR in a more pro-fossil direction.[4]

The reason for the record negative ZTI in 2015 is that old fossil companies stayed on the list while new fossil companies moved into the top-50 category. This increase in fossil companies is mainly due to three things. First, fossil companies have seen their revenues grow very fast compared with other companies. Second, state owned fossil companies have become listed and third, mergers and acquisitions have created large fossil companies.

It is interesting to note that back in 2008, just before the climate meeting in Copenhagen, when the world was close to get a reasonable ambitious and legally binding agreement, the situation was significantly better compared with today. The ZTI was -27 with a few very supportive companies, such as HP and IBM, moving into the very supportive category on the top-50 list.

Around the time of Copenhagen there were also interesting movements among the biggest polluters to shift their business in a sustainable direction, with BP's move towards "Beyond Petroleum" as the best known example.[5] Copenhagen also saw new interesting initiatives with solution providers, but it was difficult for them to get access

[3] The role of technology for achieving climate policy objectives, Stanford Energy Modeling Forum Study 27: https://www.pik-potsdam.de/research/climate-impacts-and-vulnerabilities/projects/project-pages/world-bank-report/publications/emf27-si-kriegler-ooo-cc14.pdf

[4] There are companies that would have received a lower score if they had stayed on the top-50 list. Both HP and IBM for example did more progressive work around Copenhagen in 2008 than they did during 2015 (they are still supportive, but would get a "supportive" grade rather than a "very supportive" grade).

[5] Obviously BP's shift also had a large PR component to it, but most people with an inside view would agree that there where signs of real change and that John Browne was making an honest attempt to change BP in a way that challenged the sector. E.g. http://www.desmog.uk/2015/03/21/what-happened-when-former-bp-boss-lord-browne-called-action-climate-change and http://authenticorganizations.com/harquail/2010/06/17/bps-beyond-petroleum-hypocrisy-or-caught-in-the-act-of-learning/#sthash.M4MBiGdb.dpbs

to the established business groups relevant for the climate negotiations, as fossil companies dominated these.[6] For a few years there was an appetite for transformative change among the large companies that is now almost gone, but must be revived again.

In 2015 the ZTI was back below its 1996 level (-38) and reached a new low at -39. The agreement in Paris is also very much in line with what we saw in Rio 1992 and Kyoto 1997, where it was only possible to agree on language that highlighted the urgency to act.[7] In Paris, as in Rio and Kyoto, it was not possible to agree on any concrete targets, goals or compliance mechanisms related to what is needed to avoid dangerous climate change. Compared with Rio and Kyoto there was a stronger voice from solution providers and more focus on transparency in Paris, but nothing that managed influence the actual outcome in any significant way.

The ZTI indicates what kind of companies that dominates the global top-50 list and in order to change this we need to look outside the global top-50. Since 1996 small and medium sized companies working together in clusters have developed many new smart zero-carbon solutions. Unfortunately these small and medium companies are seldom supported by central governments, large NGOs and investors in the way needed for accelerated uptake of zero-carbon solutions. The new smart clusters tend to get acknowledged in competitions and reports, but the overall regulatory and economic framework to support markets for a new generating of solution providers have so far not seen much progress.

A major challenge in the coming years is that few organizations have strategies to address the domination of large fossil companies. The more dialogue driven NGOs focus on the companies are of little importance for the total amount of global emissions and celebrate commitments to reduce direct emissions among such companies, such as shoe companies, retailers, and soft drink companies.

Some dialogue and fundraising driven NGOs, often paid by the companies for their work, are in dialogue with the major polluters, but so far only to ask for incremental changes. If any work is done with solution providers it tends to be on the supply side (renewable energy companies) and not with the broader system change that is needed for accelerated uptake of zero-carbon solutions. For such system changes transformative energy efficiency is the most important part, i.e. doing a lot more with a lot less in new ways (like video conferencing instead of flying), not make current inefficient systems slightly less energy inefficient (like improvements in fossil car engines).[8]

Looking forward to the coming years at least one of two things must happen. The ZTI must move towards zero and then move into positive numbers, and networks of smaller companies must take over the role as implementers, investors and agenda setters in international processes. With current trends neither is however not likely to happen soon enough and if the necessary GHG reductions are to be archived the following should be considered:

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[6] http://www.pamlin.net/new/?p=572
http://www.pamlin.net/new/?p=574

[7] E.g. the Paris agreement includes a reference to a 1,5C° target.

[8] This is not to say that such incremental improvements are always irrelevant, but they often distract from the more significant system changes that are needed. Further, they often result in high-carbon lock-in that make further reductions difficult.

1. Ensure transparency in all relevant processes (national and international) in order to make it easier to see how the large fossil-companies influence policymaking and media coverage. In particular this would help groups working to strengthening democratic processes to show what policy makers, civil servants, journalists and scientists that are affected by fossil influence and in what way. Compared with fossil companies zero-carbon companies tend to welcome transparency and are proud of what they do, so increased transparency would have a double benefit.

2. Support the development of new business models and methods to assess sustainable transitions from fossil based businesses to sustainable businesses. E.g. a shift from product to service is necessary to ensure that improvements move beyond incremental changes in existing systems to transformative change that allow companies to deliver services in ways that are sustainable in an equitable world with more than 10 billion people. Such shifts will only happen through new business models and we need to encourage old companies to make the transition from fossil to sustainable.

3. Focus on implementation on city- and local levels where the influence of the large fossil companies is not as significant as it is on the global and national level. Ensuring successful implementation of transformative zero-carbon solutions on the city level also makes it harder to dismiss similar solutions on the national and international level as unrealistic.

4. Accelerate support for companies that provide sustainable zero-carbon solutions to society. Governments, UN-initiatives, NGOs and academics often expect companies to pay for their help and participation in different initiatives. The result of this requirement for financial contributions is a situation that tends to include companies with large PR budgets and exclude the new generation of solution providers. Current approaches also tends to focus on large companies that approach the reduction of GHG as a traditional risk issue where they look for cheapest way to incrementally reduce their own emissions within their current business model (instead of using the required reductions as a driver for innovation and profit).

5. Governments, NGOs and academic institutions should disclose how much of their work that is financed by fossil companies, how much of their work that aims to address the needs of fossil companies, and how much they support the next generation of solution providers. High-profile sustainability experts could also disclose how much they get speaking at events arranged by fossil companies.

## A Zero-Carbon Transition Index

Back in 1996, during the preparations for COP-7 in Kyoto, it was clear that the proposals put forward by governments and business groups for the Kyoto-meeting were much weaker that those that scientists and policy makers came up with back in 1988 during the first global climate meeting in Toronto. The impact from large business also became evident with the failure at the United Nations Conference on Environment and Development (UNCED) in Rio in 1992 to set any targets for emission reductions.[9]

In Rio the United States, supported by the large business groups, pushed for a delay in setting actual dates or levels, arguing that the countries supporting the timetables did not have credible plans for stabilizing emissions. US, together with the big business groups, also argued that would be unwise to support environmental programs at the expense of the economy. The result was that the UNFCCC was created during UNCED only with guidelines and the target dates for climate action were "as soon as possible."[10]

In order to get an indication of how much and how the largest companies on the planet influence global policy the zero-carbon transition index (ZTI) was developed. The idea was to get an estimation of the aggregated approach to zero-carbon development the largest companies in the world have.

The index was initially called the low-carbon transition index (LCTI), but it became clear that the name became a problem as many misunderstood it as a measure of any reduction of greenhouse gases. The focus is on the reductions needed to avoid dangerous climate change, and that requires zero carbon by 2050 to have a reasonable probability to stay below 2C°.[11] As a 1.5C° target emerging as more appropriate than a 2C° target we need to get to zero, and even have negative emissions, as soon as possible.[12] Any reductions that lock us into a system that is not capable of achiving such reductions is not part of a zero-carbon transition.

The value of an indicator such as the ZTI is based on the, well documented, assumption that the largest companies on the planet have a disproportionally large influence due to their agenda setting capacity.[13] Beside the official channels, where they are appointed to reference groups and provide official input to policy documents, these companies also tend to appoint key staff in influential business groups, within regulating bodies and also set the agenda through lobby/PR initiatives that influence media in ways that are out of the public eye.

Equally important as the lobbying/PR are the ways fossil companies communicate indirectly through their investments. With billions spent on finding, extracting, distributing and marketing more fossil fuel as well as the structures that require the use of said fuel they communicate what kind of future they expect. These companies are well

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[9] The Climate Deception Dossiers (2015), The Union of Concerned Scientists http://www.ucsusa.org/global-warming/fight-misinformation/climate-deception-dossiers-fossil-fuel-industry-memos

[10] http://publications.gc.ca/Collection-R/LoPBdP/BP/bp317-e.htm

[11] http://www.ipcc.ch/report/ar5/syr/ http://www.bbc.com/news/science-environment-29855884

[12] http://climateactiontracker.org/global.html

[13] http://www.greenpeace.org/international/Global/international/briefings/climate/2014/climate-denialism/Annex-A.pdf https://www.icij.org/project/global-climate-change-lobby

aware that if we want to be as safe as possible we should stop emitting any GHG right now and start sucking $CO_2$ out of the atmosphere so that we get back under 350 PPM as soon as possible.[14] The massive fossil investments are a clear signal to policy makers and others that these companies do not expect any meaningful regulations.[15]

A benefit of a global ZTI is that it looks at the dominating companies of the world, not only those who are visible in most western news outlets. The pure revenue perspective helps to identify how the world actually works from an economic perspective, not how it looks like.

An additional benefit of the ZTI is the long-term perspective. The index is not meant to cover daily changes. Instead the focus is on long-term trends. Such a long-term perspective can help policy makers, NGOs and academics to focus their attentions on long-term trends that are not always easily visible in a time when the latest issues trending on Twitter influence strategic decisions. Since Kyoto many NGOs have focused on the compromises that was a necessary sacrifice to get an agreement. However, if those compromises strengthen incremental reductions resulting in high-carbon lock-in, undermine a new generation of solutions providers, and shift the discussion away from the need to ensure the radical GHG reductions needed, it might be time to revise those strategies.[16]

Current incremental work include projects promoting emission trading, discussions about a global price on carbon, lobbying to get companies to offset their emissions and projects to promote labeling of unsustainable products.[17] Such measures does not have to be bad if they take place in a framework where the primary focus is to first ensure transformative changes that encourage sustainable zero-carbon solutions. However, if they are run in isolation they are likely to contribute to high-carbon lock-in.

The changes needed to deliver sustainable zero-carbon solutions require a broad shift from product to service shift when it comes to business models. A "product to service shift" moves the focus from improvements in existing products/goods – how things have been done so far – to finding new ways to deliver the services needed – allowing for innovation in relation to how a service is provided.

Examples of the kind of shifts needed, and often avoided/ignored by many of the current large companies, as they want to protect current business models, include:

- ⇨ Instead of only setting targets for environmentally labeled vehicles a zero-carbon approach first support a shift towards teleworking, virtual meetings and decentralized 3-D printing.
- ⇨ Instead of only looking at environmental labeled paper a zero-carbon approach first support a shift where documents are digitalized.

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[14] https://en.wikipedia.org/wiki/Carbon_bubble

[15] http://www.institutionalinvestor.com/article/3451671/banking-and-capital-markets-corporations/oil-companies-deliver-mixed-response-on-stranded-assets.html

[16] http://iopscience.iop.org/article/10.1088/1748-9326/10/8/084023/pdf
https://www.sei-international.org/mediamanager/documents/Publications/Climate/SEI-DB-2015-Carbon-lock-in-supply-side.pdf

[17] http://www.carbontradewatch.org/downloads/publications/factsheet02-offsets.pdf
https://fsc-watch.com/2014/06/01/the-10-worst-things-about-the-forest-stewardship-council/
https://stopclimatechange.net/fileadmin/content/documents/move-green/GreensEFA_position_on_electric_mobility.pdf
http://e360.yale.edu/feature/should_environmentalists_just_say_no_to_eating_beef/2599/

- ⇨ Instead of asking companies to offset their emissions a zero-carbon approach first identifies the winners in tomorrows economy and encourage them to provide the zero-carbon solutions that society needs. Offsetting is only used for companies that do things that are bad for society and where it is better the less a company does, e.g. providing unsustainable sugared drinks or fast-food that contribute to obesity and are built on business models with unsustainable low wages.
- ⇨ Instead of promoting red meat with environmental labels a zero-carbon approach first promotes a shift to a healthy and sustainable plant based diet.
- ⇨ Instead of lobbying for a global price on carbon a zero-carbon approach first focuses on transparency and what is needed to deliver.
- ⇨ Instead of promoting rankings of best in sector (e.g. best airlines and best soft drink providers, and best car manufacturers) a zero-carbon approach focus on the best way of providing the sustainable service (e.g. smartest way to collaborate/have meetings, best way to provide nutritious drinks, smartest way to commute, virtually or physically).

Such an approach would result in a situation where the focus would be on zero-carbon solutions, including digital dematerialization, teleworking, buildings that are net-producers of renewable energy and a healthy plant based diet, instead of incremental improvements in fundamentally unsustainable companies.

## Five categories of companies

The value of the ZTI is based on the number of companies in five categories of companies. These categories are: very supportive, supportive, neutral, obstructive, and very obstructive.

1. **Category 1: Very Supportive +100**
   These companies have a significant interest in accelerating the uptake of zero-carbon sustainable solutions. These companies also communicate officially to the public and policy makers, in support for sustainable zero-carbon solutions. These companies also work in business groups and other processes in support for a zero-carbon agenda.
2. **Category 2: Supportive +50**
   These companies have an interest in low-carbon solutions, but often the focus is on incremental reductions, or on reductions in areas that are not very significant. They do not directly provide actual solutions; instead they focus on reducing their own emissions over the value chain. They tend to have ambivalent communication where they talk about the need for radical reductions, but then focus on incremental reductions in existing systems.
3. **Category 3: Neutral 0**
   These companies have a reasonable strong official low-carbon communication, but though investments, business groups and lobbying they are either neutral or obstructive Some of these companies are not in sectors that are very important, neither as solution providers, nor as major polluters.
4. **Category 4: Obstructive -50**
   These companies are companies that tend to talk about climate change as an important issue, but still invest as if there will be no need for significant reductions. These companies tend to talk about the need to reduce emissions somewhere else, use offsetting rather than focus on actual log-term reductions, and promote solutions that have a very low likelihood of ever coming true and if they did they still would not make much of a different (global tax on carbon). They tend to work though business associations that only see problems with rapid GHG reductions.
5. **Category 5: Very obstructive - 100**
   These are companies with significant negative direct impact over the value chain. Many are exploring for, extracting, refining, distributing and marketing fossil fuel. They invest significantly in high-carbon solutions/infrastructure and/or are active in lobbying decision makers to limit actions to reduce emissions. This group of companies Many of these are oil/coal companies and car companies that have done little to prepare for a low-carbon future.

The categorization of the companies is based on a combination of three data sources:[18]

[18] Below are the main sources for the categorization of companies.

- The World's Top 200 Public Companies: Ranked by the Carbon Content of their Fossil Fuel Reserves
  http://fossilfreeindexes.com/research/the-carbon-underground/
- InfluenceMap Scoring Table: Corporations and Influencers on climate change policy
  http://influencemap.org/filter/List-of-Companies-and-Influencers
- Reporting of greenhouse gas emissions and climate change strategies
  https://www.cdp.net/reports
- ET Carbon Rankings

1. Official rankings/lists
2. Reports by academics and groups working on climate change
3. Participations in different groups (both supportive and obstructive)

In addition to this the three data sources the ranking was shared with people working in relevant processes, such as the UNFCCC, IPCC, OECD, World Bank, World Economic Forum. These people provided feedback on the ranking of the companies and helped find relevant data for specific companies. The reason for this was to ensure that credit was provided to companies that allow smaller groups of more progressive people to do significant group, rather than those investing in PR to make themselves look less bad than they actually are.

One challenge is to categorize companies with very mixed agendas, like most large companies have. Ford for example promotes the idea of smart mobility and has many progressive ideas that the company communicates publicly.[19] At the same time Ford makes money from its F-Series truck, which has been America's best-selling vehicle of any type for 28 consecutive years.[20] Focus for the categorizing has been on activities that influence the future, lobbying, marketing, investments, etc., rather than the historical track record. However, policy statements and goals have been discounted for companies with a bad historical track record.

As with any categories there are always those that are close at the extreme ends within each category. E.g. Exxon and Valero Energy are very much at the top end of the very obstructive category and perhaps an additional category with extremely obstructive should be added to highlight those companies that fight the hardest to block a zero-carbon agenda. At the other end of the spectrum is ENI. They are in the very obstructive category, but very close to the obstructive category. To have Exxon and ENI in the same category is the price for an index with only five categories. Still the main purpose with the index is not to track the exact movement of individual companies, but to get an overall indication of how the largest and most influential companies on the planet act.

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https://environmental-tracking.etindex.com/#!/et-carbon-rankings

- C40 Cities awards: showcases climate action success stories
  http://www.c40.org/tags/c40-cities-awards
- What the fossil fuel industry thinks of the 'carbon bubble'
  http://www.carbonbrief.org/what-the-fossil-fuel-industry-thinks-of-the-carbon-bubble
- WBCSD
  http://www.wbcsd.org/home.aspx
- The B-team
  http://bteam.org/team/
- GesI
  http://gesi.org/
- RE100
  http://there100.org/
- We Mean Business
  http://www.wemeanbusinesscoalition.org/
- ICC
  http://www.iccwbo.org/

[19] https://www.wired.com/2015/11/bill-ford-interview-vision-for-world-without-cars/
[20] https://en.wikipedia.org/wiki/Ford_F-Series

## Top-50 selection

The top-50 selection was based on an overview of companies that participate and set the agenda in relevant organizations. The organizations selected are those hosting international meetings, from climate negotiations and the Bretton Woods institutions (World Bank, IMF and also WTO[21]) to agenda setting meetings like the World Economic Forum and producers of thought leadership papers like the OECD.

In many of the processes the top-20 companies where very dominating, but in order to capture not just the most dominating, but also the new and upcoming, the top-50 companies were selected.

Just for comparison an index for only the top-20 companies would result in the following values: For 1996: -50; for 2008: - 52,5, and for 2015: -50. The major difference is that the index indicates becomes even more negative, due to higher concentration of fossil companies. This should not come as a big surprise as many of the largest companies on the planet are oil/gas/energy companies and car companies. For 2008 there was also a polarized situation where fossil companies dominated the top-20 more than other years, but more zero-carbon supportive companies made it into the top-50 compared with the other years.

In 2015 the revenues and profit for the top 5 fossil fuel companies were: [22]

- ⇨ Revenues: $2 049 billion
- ⇨ Profit: $68,8 billion

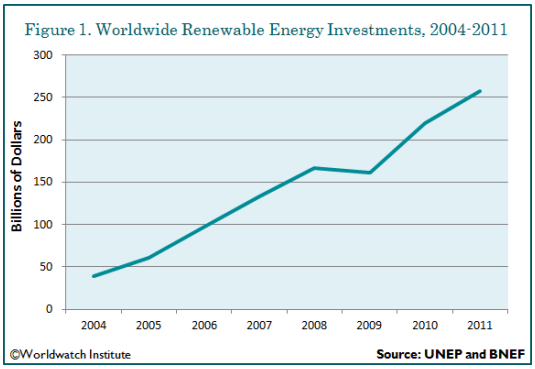
**2015: Top 5 fossil fuel companies ($ billion dollars)**

| Name | Revenues | Profit |
|---|---|---|
| Sinopec | 447 | 1,2 |
| Shell | 431 | 14,9 |
| CNP | 429 | 16,4 |
| Exxon | 383 | 32,5 |
| BP | 359 | 3,8 |
| *Total:* | *2 049* | *68,8* |

The significant dominance by fossil companies is sometimes easy to forget with all the news about the rapid growth in the zero/low-carbon area. However, it is important to remember that the smart solutions are growing from a very low level compared with the old fossil infrastructure.

When looking at a graph like the one below from World Watch Institute the trend for renewables looks promising. Reading the text attached to the graph is also encouraging.

> "Total new investments in renewable power and fuels (excluding large hydropower and solar hot water) jumped 17 percent—reaching $257 billion [in 2001], up from $220 billion in 2010. (See Figure 1.) In a year marked by falling costs for renewable energy technologies, net investment in renewable power capacity was $40 billion greater than investment in fossil fuel capacity."[23]



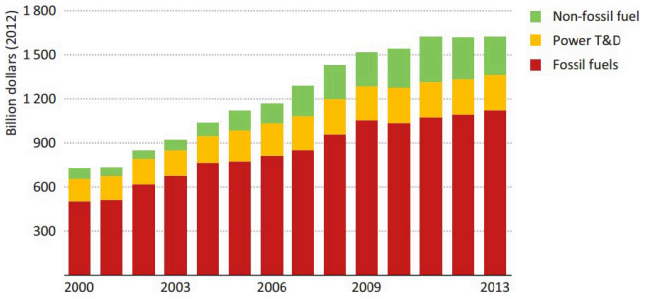

[21] WTO was not an original Bretton Woods institution, but the original Bretton Woods agreement also included plans for an International Trade Organisation (ITO). These lay dormant until the World Trade Organisation (WTO) was created in the early 1990s.
https://en.wikipedia.org/wiki/Bretton_Woods_Conference

[22] http://fortune.com/global500/sinopec-group-2/

[23] http://vitalsigns.worldwatch.org/vs-trend/continued-growth-renewable-energy-investments

When shifting the focus to the graph below from IEA, where both renewable and fossil investments are presented side-by-side, the trend is no longer as promising. Reading the text is also less encouraging.

> "Around 70% of energy supply investment in 2013 was related to fossil fuels, whether in the extraction of oil, gas or coal, their transport to consumers, their transformation along the way (e.g. from crude oil to refined oil products), or the construction of fossil-fuel fired power plants. Estimates in the World Energy Investment Outlook do not show a clear diminishing trend in the share of investment going to fossil fuels since 2000, despite a quadrupling of the volume of investment going into non-fossil fuel energy supply – including all renewable technologies, nuclear and biofuels."[24]



Notes: Non-fossil fuel includes all renewable technologies, nuclear and biofuels. Power T&D is transmission and distribution for the power sector: this cannot be assigned to either fossil-fuel or non-fossil fuel use.

Another question is if also non-listed state-owned and private companies should be included. They have significant influence and can operate in ways that are difficult for listed companies to do. Getting reliable data for these companies is however difficult. Also for a top-50 list only a few would qualify. Those with revenues over 100 billion include the following:[25]

| State owned | Private: |
|---|---|
| 1. Saudi Aramco<br>Revenue: $338 billion<br>2. Kuwait Petroleum Corporation<br>Revenue: $ $252 billion | 1. Vitol<br>Revenue: $270<br>2. Cargill<br>Revenue: $120.4 billion<br>3. Koch Industries<br>Revenue: $115 billion |

Of those companies, Koch is famous for its strong anti-climate work in the US.[26] Of the other companies all other, except Cargill, are fossil companies. Cargill has large stakes in red meat so it is also part of the problem for a zero-carbon agenda. Including these would not make much of different, only making the ZTI slightly more negative for 2015.

[24] https://www.iea.org/newsroomandevents/graphics/investment-in-global-energy-supply-by-fossil-fuel-non-fossil-fuel-and-power-td.html

[25] http://www.forbes.com/pictures/eggh45ejff/top-20-largest-private-c/
https://en.wikipedia.org/wiki/List_of_largest_companies_by_revenue

[26] http://thinkprogress.org/climate/2015/11/24/3725320/exxon-koch-climate-misinformation-polarizing/
https://en.wikipedia.org/wiki/Political_activities_of_the_Koch_brothers

## Changing resistance to and support for transformative change

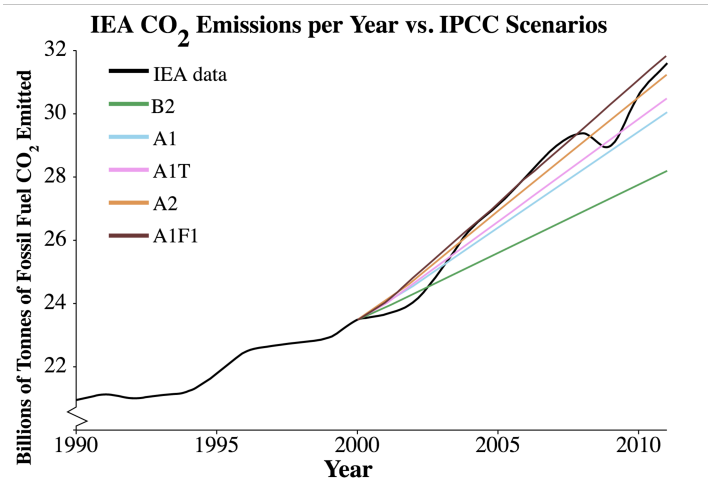
This text include a ZTI for three key years for the global climate work:

1. Just before COP-7 Kyoto (1996)
2. Just before COP-15 Copenhagen (2008)
3. Just before implementation of COP-21 Paris (2015)

The reason for looking at the year before the actual conferences, or when action is needed, is to highlight that the lobbying that affects the outcome is taking place long before the actual conferences and investment decisions when media tend to cover the events. In many cases companies have ensured key roles in governments and established contacts in media that allow them to set the agenda in a way that can be difficult to analyze when the conferences and what happens there is the focus. Looking at the dominating companies a year or two before key decisions will give an indication of what the most likely candidates to influence not only the content but also the very structures that produce the content.

Over the years the gap between what is required to avoid dangerous climate change and the concrete targets have moved in different directions. The science have shown that the probabilities for serious might be more significant then earlier estimations. One of the main reasons is that IPCC initially excluded areas with great uncertainty, something that many policy makers did not understand.[27] There is also a gap between the scientific papers, that are reasonably good, and the summary for policy makers that most people read. The summary is heavily influenced by large fossil industries and tends to cut out all information about the probability of catastrophic climate change and the need for rapid reductions.[28]

As in all fields of science there are also individual findings that contradict different minor parts, in this case they in different indicate that the climate change might be less serious than expected. Such findings are often reported without context by journalist who confuse being optimistic with being unscientific and turning a blind eye to science.[29]




Still the overall majority of scientific studies show, and the majority of scientists agree[30], that humans are causing climate change. And not only that, but we now see more scientists urging policy makers to realize that we are moving into a very dangerous situation with the probability for

[27] http://www.tyndall.ac.uk/communication/news-archive/2015/ipcc-2%C2%B0c-scenarios-wildly-overoptimistic-commentary-nature-geoscienc
http://www.scientificamerican.com/article/how-the-ipcc-underestimated-climate-change/
http://www.triplepundit.com/2014/04/latest-ipcc-report-shows-climate-impacts-risks-worse-expected/#

[28] https://www.theguardian.com/environment/earth-insight/2014/may/15/ipcc-un-climate-reports-diluted-protect-fossil-fuel-interests

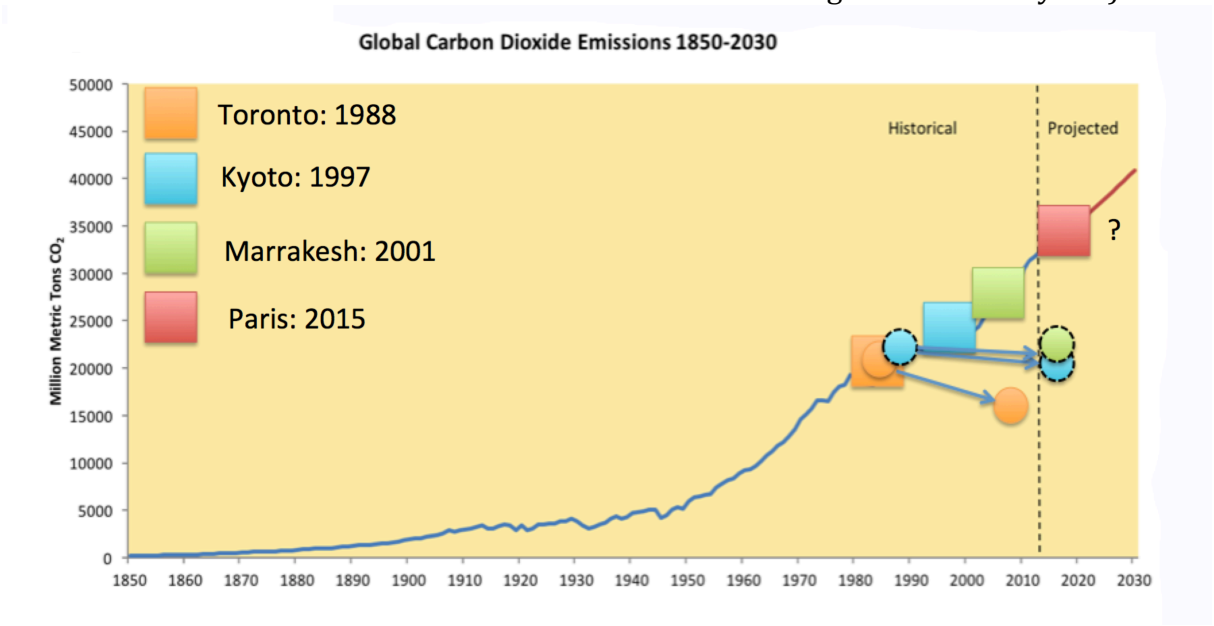
[29] http://www.politico.eu/article/is-un-guilty-of-exaggerating-fears-over-climate-change/

[30] Illustrated with humour in this clip: https://www.youtube.com/watch?v=cjuGCJJUGsg

positive feedback that could result in very high warming's, more than 6C°.[31]

Emissions have also been higher than expected by experts. Since 2005 the emissions have been above or in line with the most extreme negative IPCC scenario, meaning that IPCC has been too optimistic about the interest among/capacity of decision makers to reduce emissions (see image above: "IEA CO2 Emissions per Year vs. IPCC Scenarios").[32]

In parallel with a situation where science that tells us that the climate impact can be much worse than expected, the international political process has resulted in outcomes where the targets for reductions have been less and less in line with what is needed. Since the first international climate meeting 1988 in Toronto, where a target for 20% reduction by 2000 was agreed, the situation has become gradually worse (see image below "Global Carbon Dioxide Emissions 1850-2030 and also Appendix 2 "The gap between what needs to be done for the climate and what is agreed to actually do").




Something that has not been discussed very much is the underlying cause for the lost opportunity the world experienced in Copenhagen, but the ZTI might help.

The ZTI show a much lower value at the time of Copenhagen, compared with earlier and later. During the Copenhagen meeting a global binding agreement with a focus on maximum 2C° warming was within reach for the first time ever. While the proposed deal was far from perfect it was much more ambitious and closer to what science tells us in needed to stay below a 2C° warming than anything before or after.

Instead of only looking at Copenhagen as a failure the ZTI indicate that the conference had a unique opportunity to deliver an agreement that was close to what we need and we could learn from what context that might help us achieve such results again. It is important to understand two things. First, why fossil companies are more dominating among the top-50 companies on the planet – and more against a zero-carbon development today – than they where back in the early 2000's. Second, why we have not managed to get more supportive zero-carbon companies on the top-50 list.

[31] http://helixclimate.eu/home
http://earthstatement.org/statement/
[32] https://en.wikipedia.org/wiki/Global_warming

If we start with the fossil companies few have analyzed why companies like BP and Shell did begin to move in a zero-carbon direction around 2000 and then about ten years later moved back into a strong fossil fuel perspective. This rebound is one of the most important corporate events in the area of climate change and still few have analyzed it.

In the case of BP they moved from a total shift in how they talked, and to some degree invested, to moving backwards in just a few years. It is hard to believe that they only ten years after rebranded themselves "Beyond Petroleum" decided to kill their solar business. In December 2011 the Financial times writes "BP will close the chapter on more than 40 years of history after deciding to shut down its solar business, once regarded as one of its flagship alternative energy divisions."[33] One such 180 degree change is almost unprecedented and especially in the climate area. BP managed to make two 180 degree changes, ending up in the original pro-fossil fuel position once more.

An interesting paper, The climate responsibilities of industrial carbon producers, by Peter C. Frumhoff, Richard Heede and Naomi Oreskes[34], discusses a number of aspects related to the lost opportunities in the early 2000's. The below quote is an example of how they describe the opportunities.

> In 1997, BP became the first company to leave the Global Climate Coalition; Shell Oil (U.S.) left the following year. In 1998, BP established an internal cap-and-trade system reducing internal emissions by ten percent over the next 4 years, and began to invest in solar energy, forming BP Solar in 1999. These measures were touted in a major advertising campaign launched in 2000 to rebrand BP as "Beyond Petroleum." Shell and Chevron also made targeted investments in renewable energy, totaling as much as 2.5 % of each company's annual expenditures during the past decade. In 2007, BP, ConocoPhillips, and Shell became charter members of the U.S. Climate Action Partnership (USCAP), a coalition of business and environmental groups seeking to shape U.S. federal legislation to reduce greenhouse gases. In short, alternative paths were possible, and some leading [fossil] companies took initial steps along them.

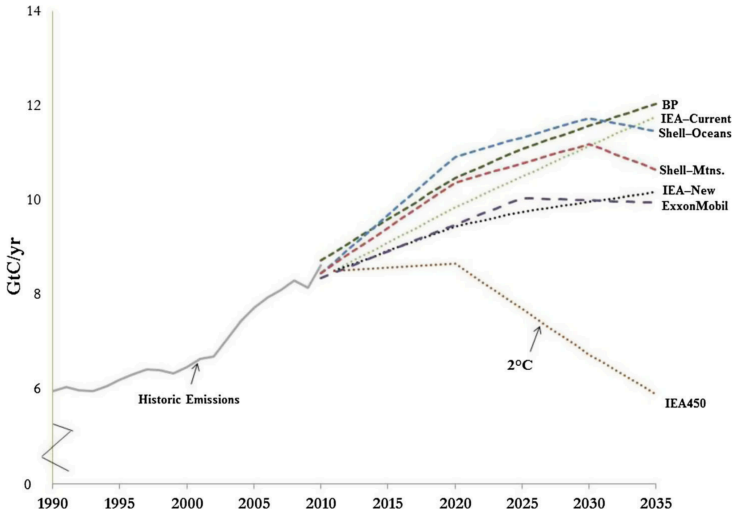
Then the paper discusses the current situation and how all major fossil companies now explicitly are betting against a safe climate future for humanity. How this Russian roulette with our planet and future generations is allowed to continue and how investors/owners (including pension funds and banks talking about sustainability) is not demanding a change will certainly be one of the issues that future generation are likely to hold us all accountable for. Especially as it was clear that it was possible, and interest, to actually change.

> BP, Shell, and ExxonMobil have each developed detailed projections of future energy use. While they differ in their particulars, none anticipates a global price or cap or other strict regulatory limit on carbon for decades. On the contrary, these companies plan for a future in which the world will continue to rely on fossil fuels at levels that will lead to highly disruptive climate impacts. In Energy Outlook: 2035, BP envisions that global CO2 emissions from energy use will continue to grow on average by 1.1 % per year, bringing emissions in 2035 to nearly double levels of 1990 and temperatures towards or above 4 °C by the end of the century, by their own admission "well above the path recommended by scientists…". Shell explicitly acknowledges that the energy futures they envision will have highly disruptive

[33] http://www.ft.com/cms/s/0/80cd4a08-2b42-11e1-9fd0-00144feabdc0.html#axzz4C7gl3oZE
[34] http://www.eenews.net/assets/2015/07/29/document_cw_02.pdf

> consequences, "overshoot[ing] the trajectory for a 2 °C goal". Yet, knowing this, they continue to bank on a high carbon future

The graph to the right shows the difference between how three of the leading fossil companies are planning for the future and what is needed for a 66% probability to stay below 2C°. These companies, ExxonMobil, Shell and BP are number 3, 5 and 6 on the list of the world's largest companies so their visions of the future are more than academic papers, they influence how they, and those who believe in them, invest their resources and what future they will lobby for.




The danger with the failure of the fossil companies to become part of the solutions is not just limited to the energy sector. Other stakeholders, such as the PR industry, that are influencing how people perceive the world and recommend how other companies should approach climate change, are also affected. Below is a quote from 2006 where John Kenney, who worked for the Ogilvy & Mather, the advertising agency that helped BP rebrand, reflect on the lost opportunity.[35]

> "I guess, looking at it now, 'beyond petroleum' is just advertising. It's become mere marketing — perhaps it always was — instead of a genuine attempt to engage the public in the debate or a corporate rallying cry to change the paradigm."

Much indicate that Lord Brown, the former head of BP, and a small group in the fossil industry actually wanted real change, and continue to argue for a transformative shift in the fossil sector[36], and the rest of the world should assess how they failed, and continue to fail, in supporting these zero-carbon leaders.

The challenge is very much alive today and the latest high-profile public failure is that of David Crane, the former CEO for NRG. Crane was fired when he begun to transform his fossil company to a sustainable energy company. He has been very clear that the reason he got fired was not an economic or technical one, it was the lack of understanding of and support for transformative change. He wrote the following a few months after he got fired (the whole article is a must read for anyone interested in a zero-carbon transition).[37]

> We were attempting to transform NRG from brown to green, and from centralized to distributed. Investors didn't like it. Many times, institutional investors would complain to me about the complexity and challenge of what we were trying to do. They would point out to me that if they wanted exposure to "brown" (a.k.a. fossil

[35] http://www.nytimes.com/2006/08/14/opinion/14kenney.html
[36] http://www.ft.com/cms/s/0/697dc8de-7016-11e4-bc6a-00144feabdc0.html#axzz4C7gl3oZE
[37] https://www.greenbiz.com/article/if-i-was-right-why-was-i-fired

> fuels), they could buy Dynegy (DYN). If they similarly wanted "green" (renewables) they could buy Solar City (SCTY), and the portfolio combination of SCTY and DYN was easier for them to carry than NRG.
>
> From an investment perspective, their point has merit. Internal transformation is complex, messy and doesn't occur overnight. Companies highly capable at doing one thing are not innately good at doing something else, even if it is similar. Thus, CEOs' attempts at internal transformation — even when essential — often end badly. Witness the negative outcomes for well-respected CEOs trying to achieve similar transformations at Westinghouse in the 1990s and Vivendi a decade later.
>
> From a societal perspective, this lack of investor appetite for internal transformation is a dangerous inhibitor to corporate change — change which, in NRG's case, was both essential to its long-term viability and highly desirable from a societal perspective. The global fossil-fuel industry is a $6 trillion-a-year business, dominated by giant investor- and state-owned corporations, with vast reserves of hydrocarbons under their control and on their balance sheets. If we consume all of what they have found, the earth melts.
>
> So at some point — soon — we need to ask these folks to dramatically change what they do, or at least how they do it, or else go out of business. Not an easy ask.

The lack of capacity to analyze and reward companies that are beginning to transform from fossil companies to sustainable companies is a significant challenge. Today most organizations and tools focus on incremental improvements among polluters. How such companies can become part of the solution and change their business models is not something that anyone of the leading organizations or tools focus is. The result is that rankings, reporting tools, labels, etc. that encourage incremental improvements might actually be part of the problem when it comes to supporting the companies that want to do what is necessary.

The other challenge we need to address is why there are no new significant zero-carbon champions among the top-50 companies in the world. Beside the lack of understanding among investors and other parts of the financial system it is probably two main challenges that is holding a new generation of solution providers back, tools that makes them visible and money available to purchase transformative solutions.

When it comes to tools most policy makers, and mainstream NGOs, promote a similar set of tools when it comes to promote a low carbon development, incremental price signals, labeling and best in class categories.

Analyzing the different tools is the topic for another paper, but briefly we can note that all of these tools support incremental change, but are either neutral or negative in relation to transformative change.

Price signals in the shape of taxes are great for incremental improvements in existing systems, but without flanking measures they seldom result in paradigm shifts. They assume an equilibrium that can be moved slightly with the help of a price signal. If we want a slightly more energy efficient fossil engine a price signal that makes the fuel slightly more expensive works reasonable well. If we want a shift from fossil cars to teleworking, public transport, smart city planning and a new electric/hydrogen infrastructure to ensure a zero-carbon mobility system such blunt instruments play

almost no role whatsoever.[38] There is also a growing recognition among economists that a focus on a climate tax is not a smart way forward.[39]

This is not to say that a carbon tax is bad, it does support some incremental improvements and, perhaps even more important, it creates increased transparency and recognition of carbon as an issue among those that only look at incremental changes to

Similar challenges to a tax are also applicable to rankings and environmental labels. They take current structures as a given and they ask us to move from the worst to a slight less bad, but they often hide the solutions. Rankings ask us to chose the less bad airline company, but do not help us find the provider of videoconferences.

A company or a city that set a target for how much they should use environmentally labeled products (a quite common target these days) will probably undermine the long-term goal of a zero-carbon society as it does not support the kind of innovation that is needed. This is why environmental labels is even more problematic than a strong focus on a carbon tax. Labels tend to encourage us to buy a green car while ignoring the teleworking opportunity, they tend to promote environmentally labeled paper while ignoring the opportunity to digitalize the document. In many places, including the Swedish parliament, the environmentally labeled lunch option is usually a meat option while the vegetarian option has no label.

Again, this is not to say that rankings and environmental labels are always bad, but currently the vast majority is used in a way where they do not support the kind of transformative solutions needed. Instead most of them are used to exclude the solutions and the companies with the kind of solutions needed for a zero-carbon development.

One of the most significant challenges is that public procurement, probably the most important source of investment when it comes to potential zero-carbon solutions, tends to use best in class or environmental labels to guide low-carbon procurement. As long as this is the case we will continue to see the big fossil companies on the top-50 list without much competition as such investments will not accelerate zero-carbon solutions. Instead we are likely to see continued high-fossil infrastructure lock-in.[40]

In conclusion, even if we will see a rapid growth of zero-carbon companies over the coming years many of the structures have already been created and experts put in place in a time when fossil companies, with a strong opposition towards rapid emission reductions, dominated.

[38] http://www.vox.com/2016/4/22/11446232/price-on-carbon-fine
[39] http://krugman.blogs.nytimes.com/2016/04/28/impurity-in-the-pursuit-of-salvation-is-no-vice/?_r=0
[40] https://www.iea.org/newsroomandevents/pressreleases/2011/november/the-world-is-locking-itself-into-an-unsustainable-energy-future.html

## Trends and developments

Below are six trends that will be important for how the ZTI will evolve and how the top-50 companies will influence the global agenda for a zero-carbon transition.

1. *Companies from (re-)emerging[41] countries*

   One of the most important trends right now is the rapid growth of companies from (re-)emerging countries. How these companies will act in relation to the need for a rapid zero-carbon transition will be crucial.

   There are many new smart companies emerging from China and India that could help a rapid zero-carbon transition, from Broad and BYD in China to ITC Hotels and Suzlon in India. But there are also companies that are very obstructive. Reliance Industries from India for example got the lowest possible score from the InfluenceMap[42] and many companies in China and India continue to heavily invest in coal.

   How this new generation of global companies will invest, lobby and conduct their PR will be of increasing importance over the coming years. These companies are also not very likely to be affected by western media or western NGO's in the same way as their counterparts in EU and US. Legislation and investment pressure in EU and US is also likely to have less of an impact on these companies.

   Much of the ownership of the major coal assets is in China and India. Of the top-ten companies with the largest coal assets seven are in China or India.[43]

   There are positive signs also among a few coal companies. E,g, Adani, the coal company with interests also in oil and gas exploration and logistics, is targeting a solar generation capacity of 3,500 MW by April 2017.[44]

   | | Coal companies | Coal Gton $CO_2$ | Country |
   |---|---|---|---|
   | **1** | Coal India | 57.722 | India |
   | **2** | China Shenhua | 36.807 | China |
   | **3** | Adani | 25.383 | India |
   | **4** | Shanxi Coking | 18.445 | China |
   | **5** | Anglo American | 13.488 | UK |
   | **6** | BHP Billiton | 12.351 | Australia |
   | **7** | Yitai Coal | 12.223 | China |
   | **8** | Datang Intl | 12.206 | China |
   | **9** | China Coal | 12.103 | China |
   | **10** | Peabody Energy | 11.484 | US |

   It is also worth noting that Peabody Energy filed for bankruptcy in April 2016 and many other coal companies are showing significant losses. [45] A situation where coal companies become less profitable will probably result in more aggressive and desperate companies that seek protection from anything that threaten their revenues, but it could also drive companies to embrace the necessary transformative changes and move into zero-carbon energy solutions.

[41] These countries are often called "emerging countries", but from a longer time perspective most of them, especially China and India, are really re-emerging as they where significant players though most of human history.

[42] http://influencemap.org/filter/List-of-Companies-and-Influencers

[43] http://gofossilfree.org/top-200/

[44] http://www.reuters.com/article/us-india-sunedison-inc-adani-idUSKCN0YW1OV

[45] http://www.wsj.com/articles/peabody-energy-files-for-chapter-11-protection-from-creditors-1460533760

2. *Beyond the G7 and old organizations*
   Much of the agenda-setting work still takes place in the old institutions, many of then created after the Second World War. Over the coming years new organizations will become increasingly important and in many of these institutions western companies are not as influential as they are the old organizations. How organizations like ASEAN the Asian Infrastructure Investment Bank[46] will evolve will be crucial for global agenda-setting by the world's leading companies.

   There are also new networks that are becoming increasingly influential as old rigid organizations struggle to address the challenges of today. Currently these networks are often small and focused on specific issues, but they help shape the agenda and priorities for many decision makers, especially in the re-emerging countries.

3. *New clusters of solutions providers*
   It is difficult to see and significant changes in the top-50 in the timeframe needed to deliver the reductions needed to avoid dangerous climate change with any reasonable probability. Significant changes could happen, and it is important to be prepared for such opportunities, but more likely is that most the solutions will come from new clusters of solutions providers. Smart mobility and videoconference solutions are already growing fast, but not driven by big companies.

   Companies with business models with focus on digital opportunities, collaboration and sharing are taking the lead. In the area for energy, much of the work is not happening on the supply side (most official studies and international studies done by the big consulting companies focus on a shift from large scale fossil to large scale renewables). Instead a lot is happening in the area of integrated smart solutions on the demand-side. Good examples of interesting new clusters of solutions providers can be found in many projects where buildings have become net-producers of renewable energy.

4. *Smaller cities, 100 000 to a million, are key innovation hubs*
   When it comes to smart solutions much of the attention has been on large cities. However, the transformative work is taking place on smaller cities (100 000- 1 million) should not be underestimated. For different reasons these smaller cities are often ignored by major media outlets, the big consulting firms, the large multinational companies as well as the major NGOs. The result is that the transformative solutions in these cities are seldom presented in reports or given awards, neither are the networks behind them invited to different conferences.

   With increased use of network-tools and many smart start-ups the rapidly growing smaller cities will have unique opportunities to collaborate to create joint markets that can create economy of scale. Smaller cities also tend to have a stronger focus on comprehensive solutions that address multiple challenges and deliver on multiple goals. This will allow them to support a new generation of solutions that deliver on multiple environmental and social targets.

[46] http://www.aiib.org/

5. *Digital transformations and the IoT*
   Much of what the top-50 companies provide and the business models they have are based on the capacity to provide physical goods that should be unnecessary as soon as possible (coal, oil, natural gas) or should be provided in as small amounts as possible (cars, meat, minerals) in order for us to get to tomorrows smart and sustainable society. The fact that most of them seem incapable of moving beyond a traditional product perspective will make them irrelevant; the question is how fast this will happen.

   The increased connectivity, process capacity, new ways of visualizing data will provide unique opportunity for old companies ready for change to redefine themselves as providers of sustainable solutions. Even more it will allow collaboration and transparency in ways that can trigger fast and radical change though new collaborative approaches.

   The digital transformation works mainly as a catalyst and it can accelerate both unsustainable and sustainable companies. Hence, the disruptions the digital transformation generates can both move us in unsustainable and sustainable directions, often at the same time.

   It is hard to see a sustainable path where digital transformation does not play a major role, and it is also hard to see a development where both sustainable and unsustainable trends are not supported at the same time for the foreseeable future. To distinguish between what is long-term sustainable and what is not will be an important task.

   Beside new companies we also need strategies to transform the fossil companies from centralized supply side providers of unsustainable products (fossil fuels and fossil vehicles) to decentralized providers of sustainable services (energy services and mobility services). This transition is one of the most difficult and important transitions in the fourth industrial revolution.

6. *Value disruptions*
   New values are evolving and emerging fast in a time of rapid change. Things that have been seen as obvious throughout most of modern history can no longer be taken for granted. E.g. owning products is increasingly seen as something unintelligent and unethical among early adopters. It is seen as blocking innovation, locking the user in a specific solution for a long time, and as something resource inefficient. The critique is not the same as earlier ideas about collective ownership of production that still focused on ownership. The question about ownership is just one example of many value disruptions that are growing exponentially among different groups around the world.

   A more fundamental value trend is based on the continued expansion of the ethical horizon that we have seen through history.[47] Instead of only including all living people, the horizon is currently expanding to also include future generations and all other non-human life-forms. It is obviously still a struggle to include all human beings, and this is what most organizations and initiative focus

[47] https://en.wikipedia.org/wiki/The_Better_Angels_of_Our_Nature

on, but this widening of the ethical horizon opens up new opportunities. The more fundamental expansion of the horizon seems to move faster than current organizations capacity to change, so we are likely to see some organizations that becomes part of the problem, while they continue to see themselves as part of the solution, as they see the expansion as too complicated and too ambitious to integrate in their strategies and values.

The growing gap between emerging values and current structures is not just challenging existing structures to become more progressive; it is also resulting in reactionary values and strengthening of old structures. These reactionary values and structures are growing especially strong when the rapid changes trigger a longing for a, perceived, often totally imagined, more stabile and simple society that we have left behind.

Mainstream analysts and traditional methodologies will struggle to differentiate between progressive values looking to move beyond today's outdated values and populists with reactionary values longing for an imaginary golden age. The result is that many experts already today cling to old dichotomies (left-right, companies-governments, humans-animals, etc) as this is what they are used to. The existing mainstream stakeholders will therefore tend to be conservative, in the sense that they want to conserve what we have today.

What companies that will benefit from what values will be crucial to understand, as elimination of GHG is only one aspect of sustainability that will be valued in the 21st century. Other environmental aspects, as well as equity and animal rights together with emerging issues such as digital rights, are already beginning to shape how new stakeholders work.

## Possible next steps

Looking forward the ZTI must either move towards zero and then move into positive numbers, or network clusters of smaller companies take over the role as investors and agenda-setters in international processes. With current trends this is however not likely to happen very soon and if the necessary GHG reductions are to be archived fast enough the following should be considered:

1. Ensure transparency in all relevant processes (national and international) in order to make it easier to see how the large fossil-companies influence policymaking and media coverage. In particular this would help groups working to strengthening democratic processes to show what policy makers, civil servants, journalists and scientists that are affected by fossil influence and in what way. Compared with fossil companies zero-carbon companies tend to welcome transparency and are proud of what they do, so increased transparency would have a double benefit.

2. Support the development of new business models and methods to assess sustainable transitions from fossil based businesses to sustainable businesses. E.g. a shift from product to service is necessary to ensure that improvements move beyond incremental changes in existing systems to transformative change that allow companies to deliver services in ways that are sustainable in an equitable world with more than 10 billion people. Such shifts will only happen through new business models and we need to encourage old companies to make the transition from fossil to sustainable.

3. Focus on implementation on city- and local levels where the influence of the large fossil companies is not as significant as it is on the global and national level. Ensuring successful implementation of transformative zero-carbon solutions on the city level also makes it harder to dismiss similar solutions on the national and international level as unrealistic.

4. Accelerate support for companies that provide sustainable zero-carbon solutions to society. Governments, UN-initiatives, NGOs and academics often expect companies to pay for their help and participation in different initiatives. The result of this requirement for financial contributions is a situation that tends to include companies with large PR budgets and exclude the new generation of solution providers. Current approaches also tends to focus on large companies that approach the reduction of GHG as a traditional risk issue where they look for cheapest way to incrementally reduce their own emissions within their current business model (instead of using the required reductions as a driver for innovation and profit).

5. Governments, NGOs and academic institutions should disclose how much of their work that is financed by fossil companies, how much of their work that aims to address the needs of fossil companies, and how much they support the next generation of solution providers. High-profile sustainability experts could also disclose how much they get speaking at events arranged by fossil

## Appendix 1

# Global Fortune Top 50 Zero-Carbon Transition Index (ZTI)

| 1996 ZTI: -38 | 2008 ZTI: -27 | 2015 ZTI: -39 |
|---|---|---|
| **+100** | **+100 (2)** | **+100** |
| **+50 (4)** | HP | **+50 (5)** |
| IBM | IBM | Stategrid Corp of China |
| Deutsche Telekom | | Axa |
| Allianz | **+50 (4)** | Allianz |
| NEC | NTT | AT&T |
| | HSBC | Verizon |
| **0 (18)** | Allianz | |
| Hitachi | AT&T | **0 (19)** |
| Nippon Life Insurance | | Berkshire Hathaway |
| NTT | **0 (20)** | Samsung |
| AT&T | Toyota | Apple |
| Matsushita Electric Industrial | Fortis | McKesson |
| Tomen Corporation | Axa | ICBC |
| The Dai-ichi Mutual Life Insurance | Citigroup | China Construction Bank |
| Metro Holding | Dexia | CVS Health |
| United States Postal Service | Stategrid Corp of China | Hon Hai Precision Industry |
| Philip Morris | Deutsche Bank | UnitedHealth Group |
| Daewoo Group | Bank of America | Agricultural Bank of China |
| Sumitomo Life Insurance | Berkshire Hathaway | Japan Post Holdings |
| Unilever | UBS | Toyota |
| Nestle | JP Morgan | BNP Paribas |
| Sony | Assicurazioni Generali | Honda Motor |
| Union Des Assurances de Paris | American International Group | Bank of China |
| IRI | The Royal Bank of Scotland | Amerisource Bergen |
| Prudential Financial | Siemens | Assicurazioni Generali |
| | Samsung | Societe Generale |
| **-50 (14)** | McKesson | Fannie Mae |
| Mitsubishi | HBOS | |
| Itochu | Hitachi | **-50 (8)** |
| Sumitomo | Tesco | Walmart |
| Marubeni | | Volkswagen |
| Toyota | **-50 (13)** | EXOR Group |
| Nissho Iwai | Walmart | General Motors |
| General Electric | ING group | E.on |
| Nissan | General Electric | General Electric |
| Volkswagen | Ford | Ford |
| Siemens | Volkswagen | China State Construction Engineering |
| Toshiba | BNP Paribas | |
| The Tokyo Electric Power Co. | Carrefour | **-100 (18)** |
| Nichimen | ArcelorMittal | Sinopec |
| Kanematsu | Honda | Shell |
| | Nissan | China National Petroleum |
| **-100 (14)** | E.on | Exxon Mobile |
| Mitsui & Co. | Shell | BP |
| General Motors | BP | Glencore |
| Ford | | Total |
| Exxon | **-100 (11)** | Chevron |
| Shell | Exxon Mobile | Daimler |
| Walmart | Chevron | Philips 66 |
| Daimler-Benz | Total | ENI |
| Mobil | General Motors | Gazprom |
| BP | Conoco Philips | Petrobras |
| Chrysler | Daimler | Valero Energy |
| Fiat | China Petrochemical Corp. | PDVSA |
| Veba | China National Petroleum | Trafigura Beheer |
| Honda | ENI | Lukoil |
| Elf Aquitaine | OAO Gazprom | Pemex |
| | Valero Energy | |

Companies in green have moved up a category. 14 companies have moved up a category and one has done it twice. Companies in red have moved down a category: Two companies, both came from -100 in 1996 moved up to -50 in 2008 and then back to -100 in 2015.

## Appendix 2

# The gap between what needs to be done for the climate and what is agreed to actually do

***1988***

**Goal:** **Reduce $CO_2$ emissions to 20% below 1988 levels by 2005.** [48]

Event: The Changing Atmosphere: Implications for Global Security

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***1992***

**Goal:** **Stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.** [49]

Event: United Nations Conference on Environment and Development (UNCED)[50]

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***1997***

**Message:** "We acknowledge that a number of positive results have been achieved, but we are deeply concerned that the overall trends with respect to sustainable development are worse today than they were in 1992." [51]

Event: Earth Summit Plus 5: Special Session of the UN General Assembly[52]

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***1997***

**Goal:** **Reduction GHG emissions in rich countries (Annex 1) to 5,2% below 1990 levels by 2008-2012 (including six gases, "flexmex", "hot air" and sinks)**

Event: COP-3: Kyoto Climate Change Conference[53]

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***2001***

Actual goal: **Reduction GHG emissions in rich countries (Annex 1) to 1.8% below 1990 levels by 2008-2012 (Excluding US, including six gases, "flexmex", "hot air" and sinks)**[54]

Event: COP-7: Marrakech, Seventh session of the Conference of the Parties[55]

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**2015**

**Goal:** **No actual targets for CO2 or GHG emissions were agreed, instead the following was agreed:**

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48 https://www.academia.edu/4043227/The_Changing_Atmosphere_Implications_for_Global_Security_Conference_Statement_1988?auto=download

49 https://unfccc.int/resource/docs/convkp/conveng.pdf

50 http://www.un.org/geninfo/bp/enviro.html

51 http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/S-19/2

52 http://www.un.org/en/events/pastevents/earthsummit_plus_5.shtml

53 http://unfccc.int/meetings/kyoto_dec_1997/meeting/6378.php

54 http://lawdigitalcommons.bc.edu/cgi/viewcontent.cgi?article=1887&context=lsfp

55 http://unfccc.int/cop7/

- **a long-term goal of keeping the increase in global average temperature to well below 2°C above pre-industrial levels;**
- **to aim to limit the increase to 1.5°C, since this would significantly reduce risks and the impacts of climate change;**
- **on the need for global emissions to peak as soon as possible, recognising that this will take longer for developing countries;**
- **to undertake rapid reductions thereafter in accordance with the best available science**[56]

Event: COP-21: Paris, Twenty first session of the Conference of the Parties[57]

[56] http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf
[57] http://www.cop21.gouv.fr/en/