



SRRR Pop-Up Workshop
Actions to meet challenges to sustaining our lives on Earth
-Session 3 - A week after COP 28 – What Happened & What's Next
Tuesday December 19,

Video Link [SRRR Workshop Dec. 19, 2023 \(youtube.com\)](https://www.youtube.com/watch?v=...)

Proceedings

Agenda

Welcome and Introduction, David Berry, SRRR

What Happened at COP 28: Myra Jackson, Founder, Global Being Foundation.

Response: Theresa Seidner, Q &A

Climate change & climate policy: perspectives on gaps between what should and what can be done: Bert de Vries, PHD, Professor University of Utrecht, Contributor to the UN IPCC.

Response: Marianna Grossman, Q &A

What's missing on mitigation in the IPCC SPM, Global Stocktake & UNEP Emissions Gap report. Karl Hausker PHD, Senior Fellow, Climate Program, World Resources Institute.

Response Rhonda Kranz, Q&A.

Tackling Climate Challenges. What are the Next Steps? Eva Gladek, Founder and CEO, Metabolic. Response John Wells, Q&A

Open Discussion among the presenters, respondents and questions from the chat

Adjourn

Welcome and Introduction, David Berry, Founder and Director, SRRR

David welcomed the participants and gave brief introductions of the speakers. He explained that this was the third in a series of seven workshops related to resilience in the face of challenges to sustaining our lives on Earth and like the preceding workshops invited an emphasis on actions we can take.

He gave background information on the history and activities of the Sustainable and Resilient Resources Roundtable, founded in 2002 as a federal advisory committee. For the last several years, SRRR has been a 501(c)(3) non-profit corporation. He said that all the participants in the meeting were part of the Roundtable today. No one is merely an observer – the Roundtable is the circle of people at each meeting.

What Happened at COP 28

Myra Jackson, Founder, Global Being Foundation.



Myra, an electrical engineer, has been affiliated with the UN since 2006. She has worked in the UN Major Groups mechanism, the three-year open working group that established the 17 Sustainable Development Goals, has been an expert member of the UN

Harmony with Nature Programme, and a UN Representative on climate change to the UNFCCC and CBD. As founder of the Global Being Foundation, Myra organized the first Global Freshwaters Summit honoring the Mississippi River

in 2021. The next two summits will be in the Middle East/North Africa (MENA) region with a focus on the Nile and Tigris-Euphrates Rivers in 2024 and 2025.

Myra Jackson, began by speaking of the complexities of these times and the need to attend to self-care and community care to enable Earth care. She shared her personal experiences and observations from COP28, highlighting the role of the UAE as a host country given that in August the BRICS countries (Brazil, Russia, India, China & South Africa) had met and nine new members were added including the UAE, Egypt and other countries in the MENA region. Myra works on fresh water issues in the region. This was the 16th COP that Myra has attended. She plays several roles at the conferences, bringing colleges students as do 10 other educational institutions and keeping up to date on changes in law related to protection of the Earth which enables her to advise delegations.

The MENA region planned to work together to maintain stability in crisis and as a bridge between North and South. The last meeting in Egypt had problems but fortunately the UAE learned lessons from the Egyptian experience and the BRICS were able to work together and the UAE ran a well-organized meeting in spite of the outbreak of war between Israel and Hamas. The UAE as co-president, invested money in expert consultants and support of youth participation. Youth delegates were sent to COP pre meetings 18 months before the meeting. A



MENA goal was to follow the Gulf States model of a figurative Majli, a traditional carpeted sitting area with cushions on the floor against the walls the community gather, have tea and open discussion about matters that concerned or impacted them in a circle of trust. These are multi-polarity countries and there was a question of whether they were able to hold together at the COP. In Myra's view, they did.

Getting to the what's next. Myra spent most of her time in the negotiations focusing on non-market approaches. Can we get beyond GDP? She said there were not enough people with ecological, non-economic views in the room.

She also said there were pre-meetings of local communities and indigenous peoples. A concern that to conflate those two groups would undermine the sovereign rights of indigenous nations. It also was a disappointment that the threatened small island states were nudged out of the discussions to arrive at the final agreements and global stock take.

Theresa Seidner, Respondent: Other than the staging of the conference, it is not clear that global powers that be have no interest in actually changing behaviors, they would have asked for advice but they did not. So if that is the case, where do we go from there?

Myra: Your observation is spot on. My students at COP see a system of colonizers who are actively holding out for their own interest. Science and traditional knowledge are telling the same story – that there is harm to Earth's systems, that harm is showing impacts on all life. And emissions from fossil fuels are contributors to that harm.

There was talk that Sultan al-Jaber, President of COP 28, was against the science, but over and over again in the Majli, each and every country admitted that the science is clear. Now that we have that agreement. The question is what enables human beings to become participants and a cooperative force with Nature and the Earth Systems of the planetary being in a way in which we seek to cause no harm and can we allow and accept that there will be assets stranded in the ground? This is an opportunity to re-evaluate the nature of a true asset?

Theresa, your question suggests that the nations have a consultation with Earth Peoples that can help guide humanity back into an understanding of what has true value. These are the conversations that I look forward to having and that will let us know that we are turning a corner.

Anupam Saraph: Was there any thought on what it would take to abandon the three trillion dollars that were invested in fossil fuels in 2023 alone? Was there talk at COP 28 about what kind of incentives would be required to have the fossil fuel companies do this.

Myra: No, in fact just as was the case in Egypt, fossil fuel reps were strongly present at COP 28 and oil deals were made right at the COP. Those who are looking for real solutions are concerned about whether this process can bring an end to emissions. There were 100 thousand overflow badges and so many were held by fossil fuel and other special interest representatives in every room that observers were nudged out. Planetary Emergence Partners have placed a proposal for reform before the COP.

John Wells: Could fossil fuel companies become investors in solar power?

Myra Jackson: Yes, it is possible. Investments have a long shelf life before they payoff – greater than 75 years. That is where the conversation about stranded assets is. They do invest in other energy technologies and assets. I am concerned about people losing access to land if energy corporations buy up all those assets.

Theresa Seidner: At what point does the whole system of business, money and numbers become redundant. Investments are mainly about money being used to generate more money without actually producing anything.

Myra: A change in metrics is essential. We have lost a sense of what we belong to and what has real value. We have placed value on products and consumption but everything is derived from the Earth. We place value on derivatives but not on the source that provides them – the care, the wellbeing, the viability. Is it thriving is not part of our equation. This separation from the life we are tied to, our interdependent, interrelated, interconnected life, is not a part of what we measure. We don't have metrics for the pristine nature of our watershed.

I have no problem with measuring but let us measure wellbeing – let us know what the optimal states of life are so that when we are looking at any decision we are making we are not hurting that to which we are tied to and depend upon. That is why the language of Mother Earth for some peoples is the relational field – they have a kinship with our relatives - what we call systems of Earth. We don't have that in the modern thinking and modern views that drive the systems that are causing harm. We would benefit from restoring our sensitivity to that and measuring that well-being. We would see things actually change.

For example, fresh waters are the most regenerative system of the Earth, and if we would tend to restoring the pristine nature of fresh waters, we would see a whole change in the biosphere. But we are not thinking like that even though COVID gave us a dip that pointed right to what Earth peoples could do. Yes, there is an answer and this is why consultation with Earth peoples would help us have a turn around.

Theresa: Who are Earth people?

Myra: We are all Earth people. But some of us left the sense of relatedness to being of the Earth, and of the Earth being our larger body. Many of us no longer even think of or know where our water is sourced from. If we are Earth Peoples, in my way of speaking it, we recognize that that is a sub-strata and we are sensitive enough to know when we are harming the Earth.

David Berry: Theresa and Myra, I recall a breakfast in New York City in December, 1992, two days after Thomas Banyacya presented the Hopi prophecy in the UN General Assembly. The impact of what systems science calls overshoot and collapse is described in the prophecy as the Great Purification. Thomas said we would see signs from nature because this was the first time native peoples from all continents had spoken at the UN. The following day, the UN was forced to close, its underground parking lot was flooded, three major highways on the periphery of Manhattan were closed, and several houses were washed into the sea by rains not predicted in weather forecasts. Thomas stirred his coffee and said, "I wish that wouldn't happen." I asked what he meant. "Well, I didn't plan on saying that you'll see signs from nature. Some people think that I made it happen, but I can't do that. Most people no longer experience being part of nature in their own experience in their own mind but the native peoples still are the one part of nature that can speak to humans in whatever their languages. That parallels exactly what you said, Myra. Thomas talked about those humans who still identify as being part of the Natural Field of the Earth, rather than separate from it.

Climate Change & Climate Policy: Perspectives on Gaps Between What Should & What Can Be Done:



Bert de Vries, PHD, Professor, Copernicus Institute of Sustainable Development, Utrecht University, Contributor to the UN IPCC and one of the recipients of the 2007 Nobel Prize.

In introducing Bert de Vries, David mentioned Bert's most recent book: Sustainability Science 2nd edition. The book surveys key concepts, models and findings of various scientific disciplines with respect to the major sustainability issues: energy, nature, agro-food, resource systems, and economic growth. System analysis and modelling is introduced and used as an integrating tool. Stories and worldviews are used to connect the quantitative and the qualitative and to offer the reader understanding of relevant trends and events in

context. www.sustainabilityscience.eu and

<https://www.cambridge.org/highereducation/books/sustainability-science/27C2656362ADBAFA4A92FFC786728B79#contents>.

Bert began his presentation with some reflections:

1. Climate change is occurring – and acknowledged to such an extent that both mitigation and adaptation are on the (global and local) agendas.
2. Extreme events are most visible and direct, hence adaptation easily gets most attention (they make up for sensational narratives, generate issues of justice and damage compensation; besides, there are uncertainties about attribution).
3. Reducing greenhouse gas emissions demands increasingly strong deviations from 'business-as-usual', hence mitigation runs into political resistance and temptations to delay, go for pseudo-solutions or shift the burden.
4. The essential pathway diversion is between (more) equitable and long-term well-being for many with low growth in average disposable income *versus* short-term focus on economic growth and erosion of long-term average disposable income.
5. Climate change should be considered as part of a manifold of stresses, as human populations increase in number and activity level. This was and is also the context for reports like *Limits to Growth* (1972), *Our Common Future* (1987) and *Earth for All* (2022).
6. Therefore, it is necessary to focus more or most on contextual local-regional (perceptions of) problems and solutions, as part of interacting worldviews.

In addition to the question of how to persuade corporations and nations to leave known fossil fuel resources in the ground, there is the challenge of encouraging reductions of demand for energy.

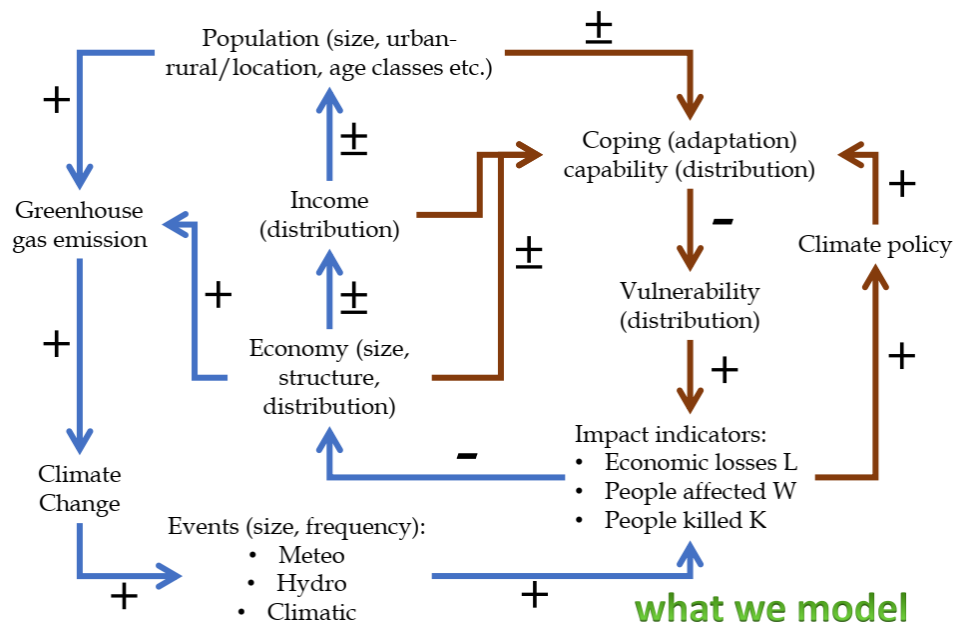
Bert wryly commented that subsidizing fuel bills will not lead to energy conservation – yet, hundreds of millions were spent on subsidies in 2022-23 in the Netherlands to compensate high energy bills, after more than a decade of speculative construction and investment on the housing market instead of making houses of low-income families more energy-efficient.

Bert stressed the importance of mitigating and adapting to climate change on both global and local levels. He reminded participants that there still remain large uncertainties in the causes and

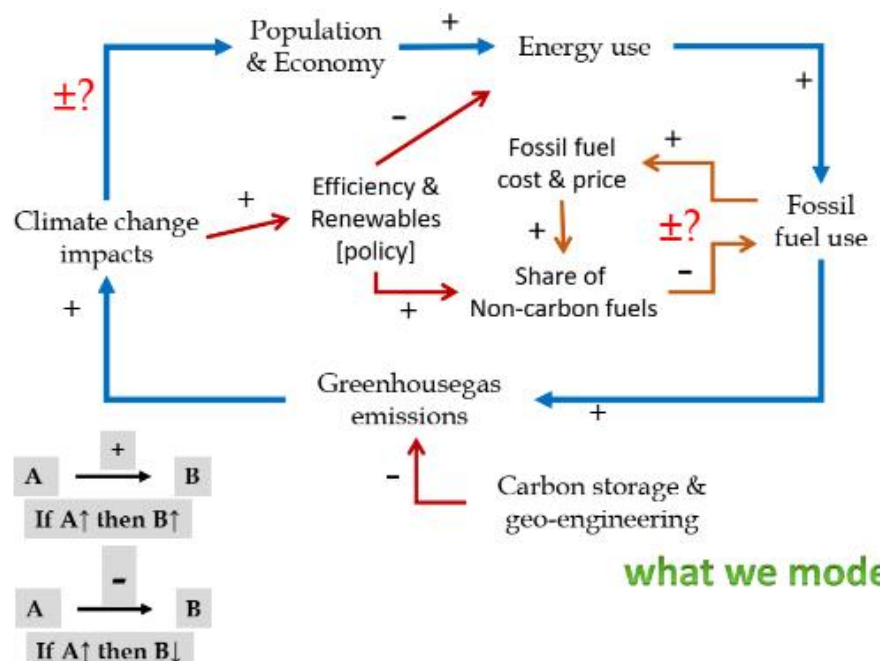


consequences of climate change, the rates and constraints on population and economic growth and the complex interplay among them. He presented system diagrams of the interrelationships involved in mitigation of the impacts of climate change and adaptation to those impacts.

TRANSFORMATION: Causal loop (or influence) diagram (CLD)
of core loops in fossil fuel – climate system: **ADAPTATION**



TRANSFORMATION: Causal loop (or influence) diagram (CLD)
of core loops in fossil fuel – climate system: **MITIGATION**



Bert presented a chart with projections published in 1997 on then future trends in a number of variables (Rotmans and De Vries 1997). What came out of the discussions and modeling simulations was that basically we have two options. One is an individual market-oriented world in which you go for economic growth with short term incentives. The projections for that world was that we would have a high economic growth rate measured in GDP until around 2040 or 2050.

The other option is to start to invest early on to go to more sustainable directions. For some time, there will be a low growth rate but in the future the level of economic output meets and exceeds that of the market oriented approach which by then in is decline. It is difficult to ask people to forgo income particularly if you have inequitable distribution.

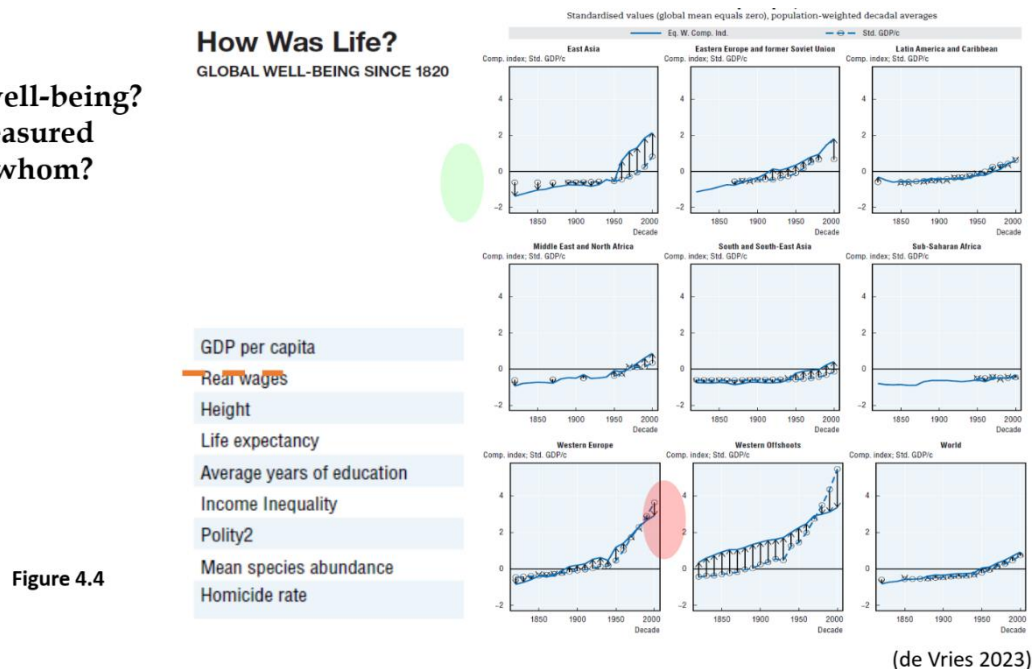


Figure 5 Annual growth rates in the individualist (IND) utopia and the egalitarian (EGA) utopia. of [exogenous] Gross World Product and of Consumption and Services (Cons&Serv), that is, of Gross World Product excluding expenses for medical services and for the supply of food, water.

Essentially we face a diversion between the path of well-being and the path of economic growth. Bert suggested alternate ways of looking at well-being. An example is a study in which besides income eight other variables are introduced in estimating a quality-of-life index and its change since 1820 in six world regions (real wages, height, life expectancy, average years of education, income inequality, polity2, mean species abundance and homicide ratio). As the graphs show,

there has been no increase in quality of life in the wealthy nations in the last two-three decades; on the other hand, some poorer regions experienced significant increase with this indicator.

Was it well-being?
How measured
and for whom?



Literature

Rotmans, J. and B. de Vries (1997). *Perspectives on Global Change - the TARGETS approach*. Cambridge University Press, Cambridge

Zanden, J. L. van, J. Balen, M. Mira d'Ercole, A. Rijpma and M. Timmer (Eds.)(2014). *How Was Life? Global Well-being since 1820*. OECD, Paris. https://www.oecd-ilibrary.org/economics/how-was-life_9789264214262-en

Marianna Grossman: Mariana said that the time frame in business is very short – two weeks, a quarter, rarely more than a year. For politicians it is usually until the next election – two, four or six years. To address the kind of systemic change you are describing, you need to have a longer time frame and bigger picture beyond self and family to include community and world. How do we move from “just me” to a bigger “we?”

Bert: When I discuss system dynamics with students, I always focus on the notion of a *system boundary*. There are many examples such as people on the street who throw their stuff on the sidewalk and have a very narrow system boundary. If most of us have such a narrow system boundary in space and time, we are going to have very serious problems. Our worst scenario is that when complexity and uncertainty increase, we tend to close down and have even more narrow system boundaries. For that reason, my teaching emphasizes the need for larger system boundaries, particularly for students with an interest in knowledge and leadership in the future. We do have many smart people who can do that and we have inputs from other cultures such as the Seventh Generation idea from American Native Peoples and sources of Eastern Wisdom. The opportunity is there, but in modernity many are focused on the short term. In NGOs there are many with the longer term view. Recent political outcomes, however, suggest a turn towards right-wing politics and more narrow-minded views which is a matter of concern.



What's missing on mitigation in the IPCC SPM, Global Stocktake & UNEP Emissions Gap report.

Karl Hausker PHD, Senior Fellow, Climate Program, World Resources Institute. Karl leads analysis & modeling of deep de-carbonization climate mitigation, electricity market design, and the social cost of carbon. He testifies before Congress, lectures widely on deep de-carbonization, and led the Risky Business study of clean energy scenarios for the U.S. He has worked for three decades in the fields of climate change, energy, and environment in a career that has spanned legislative and executive

branches, research institutions, NGOs, and consulting. Much of his work has focused on the electricity and transportation sectors, and on low carbon, climate resilient development strategies.

Karl began by saying a focus of his presentation is what's missing in the Intergovernmental Panel on Climate Change Summary on Mitigation released in early 2023. His view is consistent with the report in that we need to rely heavily on renewable energy and efficiency. But to get to net-zero emissions Karl says we will also need to include some nuclear energy and carbon capture and storage. Karl said the WGIII full report provides a comprehensive and objective assessment of scenarios to net-zero GHG emissions and meeting 1.5/2.0 goals. The highlights include:

- Deepest ever exploration of demand-side measures to reduce emissions
- Balanced, objective treatment of role of renewables, nuclear, carbon capture and storage (CCS), and other energy sources to replace unabated fossil fuels
- Caveats on use of bioenergy
- Compelling basis for need to develop options for carbon dioxide removal (CDR)

Karl reported, however, that there are important information and findings on scenarios in the full report that did not make it into the Summary Report nor into the Synthesis Report

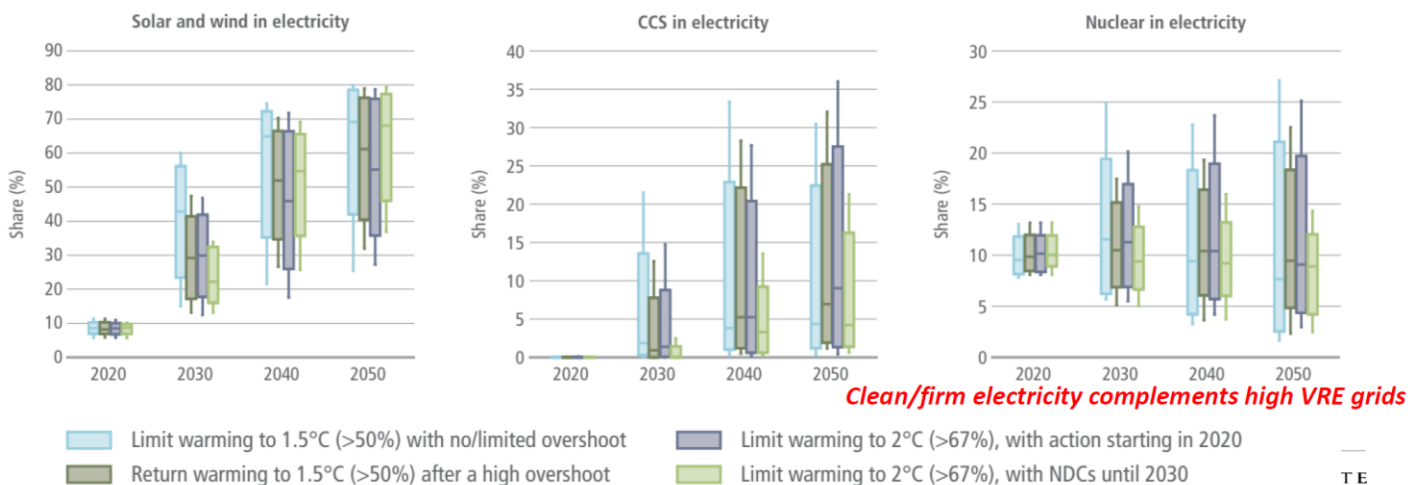
- Lack of clear, quantitative depictions of 1.5/2.0 mitigation scenarios
- Lack of depiction of primary energy decreases in 2030 in the mitigation scenarios
- Lack of clear, quantitative depictions of electricity generation mix
- Near complete absence of any reference to the role of nuclear in the scenarios

FULL REPORT: DEPICTIONS OF ELECTRICITY GENERATION MIX

- Net-zero carbon electricity grids are critical to meeting 1.5/2.0 goals.
 - Electrification + Production of hydrogen and other fuels + Technological CDR
 - Greatly expanded grids also need to be reliable and affordable.
- SPM has **no quantitative depictions of the mix of electricity generation sources in the 1.5/2.0 scenarios.**
 - The SPM notes the large decrease in solar and wind costs over the past decade, and how grids with high penetration of solar and wind are becoming increasingly viable
 - Some climate activists advocate for 100% renewable grids (plus storage, DSM, etc)
- Figure 6.30 in the WG3 full report has depictions of the generation mix
 - See next slide. The AR6 scenarios are generally consistent with the mainstream conclusion that solar and wind can grow to be more than half the generation mix, perhaps up to 80%.
 - But clean, firm power (hydro, geothermal, nuclear, CCS, etc.) needs to complement heavy solar/wind grids.

Fig 6.30: DEPICTIONS OF ELECTRICITY GENERATION MIX

- Solar and wind grow to be predominant source of zero-C power [55-70%]
- “VRE” does not exceed 80% of total generation in any scenario.
- CCS in electricity shows a wide range of penetration in the scenarios
- Median values cluster in 5-10% range in 2050. [fossil + BECCS?]
- Nuclear also shows a wide range of penetration
- Median values cluster in 10% range, 2030-2050
- Would still roughly double in TWh in 1.5 scenarios



Karl said this key slide shows three groups of low or zero carbon sources of electricity production in the IPCC scenarios: solar and wind, carbon capture and nuclear. In each of these figures you get a decadal snapshot of the share of generation mix for a range of IPCC scenarios in the 1.5°C to 2.0°C range for each option. Even if nuclear remained at its current 10% share generation, it would need to double or triple to be part of a mix to replace fossil fuels. He said there are conflicting narratives over nuclear, carbon capture and technological CO₂ removal:

- Nuclear as a mitigation option
 - Inclusion: Risks are real but manageable. Costs can come down.

- Exclusion: Risks are unacceptable. Costs will never come down. (Renewables are cheap!)
- CCS and technological CDR as mitigation options
 - Inclusion: Risks are minimal. Costs will come down. Essential to net-zero.
 - Exclusion: Risks unknown. Costs too high. “Moral hazard,” (Renewables are cheap!)
- “Exclusion victories” - IPCC SPM, FCCC (“dialogue”), UNEP, media coverage, many NGOs and activists
- “Inclusion victories” – IPCC full report, final COP text, Long-Term Strategies of many governments, expert opinion, some NGOs

In the UNEP November 2023 “Emissions Gap Report,” many IPCC findings are missing. The word ‘nuclear’ appears a single time reporting that Korea is expanding that source. ‘Carbon capture’ receives very little discussion as an emission reduction option. There is a chapter devoted to carbon dioxide removal (CDR), where ‘carbon capture’ appears multiple times but in the context of discussion of bioenergy with CCS (BECCS), Direct Air Carbon Capture and Storage (DACCS).

Karl said the final language of the final COP 28 was disappointing. Although it does mention nuclear and carbon capture and storage, the phrase “transitioning away from fossil fuels is weak.

FINAL COP28 TEXT: FIRST GLOBAL STOCKTAKE

Nuclear and CCS are “back”

“28. Further recognizes the need for deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5 °C pathways and calls on Parties to contribute to the following global efforts, in a nationally determined manner, taking into account the Paris Agreement and their different national circumstances, pathways and approaches:

- (a) Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030;
- (b) Accelerating efforts towards the phase-down of unabated coal power;
- (c) Accelerating efforts globally towards net zero emission energy systems, utilizing zero- and low-carbon fuels well before or by around mid-century;
- (d) Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science;
- (e) Accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilization and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production;”

UNFCCC summary documents highlight pledge to triple RE and double EE, but don't mention nuclear and CCS

Respondent, Rhonda Kranz; Your presentation makes us think about nuclear and carbon capture as options. We know nuclear has a long way to go until it is safe and cost effective. During that period do we not also have the opportunity to make improvements on renewals, battery issues and other issues?

Karl Hausker let us know that in 1978 he took a bus to Washington to protests nuclear power after the Three Mile Island accident but since then his views have changed. He considers climate change an existential issue that could our globe into a tailspin for humans and all life on Earth.

He agrees that renewables, efficiency, and batteries should be prioritized, In the context of climate change there should also be a focus on R & D on other power sources such as nuclear, carbon capture, and advanced geothermal. I don't think it's prudent to bet everything on one or two technologies. We should do everything we can think of to develop clean, firm power to keep the lights on and reduce emissions.

Tackling Climate Challenges. What are the Next Steps?



Eva Gladek, Founder & CEO, Metabolic. Eva is an international expert in sustainability, Eva Gladek is the founder and CEO of Metabolic, an Amsterdam-based group of organizations working together to drive systems change and build a sustainable and circular economy. With her passion and stubborn optimism, she has helped organizations in nearly every economic sector become leaders in their transitions, including progressive cities, NGOs, and corporations. As one of the Netherlands' most prominent sustainability influencers, she is always in high demand as a public speaker. Eva welcomes the most complex sustainability questions with an approach grounded in science and

systems thinking.

Eva began by introducing the missions of her organization, Metabolic as to transition the global economy to a fundamentally sustainable state where people and nature thrive. They are a group of organizations working together to drive systems change and build a sustainable economy. The participating organizations advise the public and private sector, research sustainable solutions, build software tools, scale impactful ventures, and empower communities on the ground.

Focus areas

We are driving forward six transitions that need to take place in human systems and institutions. By transitioning these six interconnected systems, we can address over 80% of critical negative environmental and humanitarian impacts.



Food and Land Use



Cities and Regions



Products and services



Finance



Governance



Mindset

Eva shared her insights from the COP 28 Conference and showed a sketch she called the COP Onion of the various levels of access, activities and events that happen at the conference. The Green Zone was more active this year than in some other years. Most were open to everyone and so there were opportunities to interact and influence the negotiations in the Blue Zone.

Eva stressed the importance of science based, systemic approaches to tackling climate challenges:

1. Radical collaboration & symbiotic partnerships for systems transformation.
2. Re-architecting the financial system to accelerate meaningful climate finance.
3. Place-based initiatives and landscape transformation; empowering communities.
4. Portfolio and supply-chain based transformation to transform hard to abate sectors.
5. Enablers: developing new narratives and leveraging digital technologies.

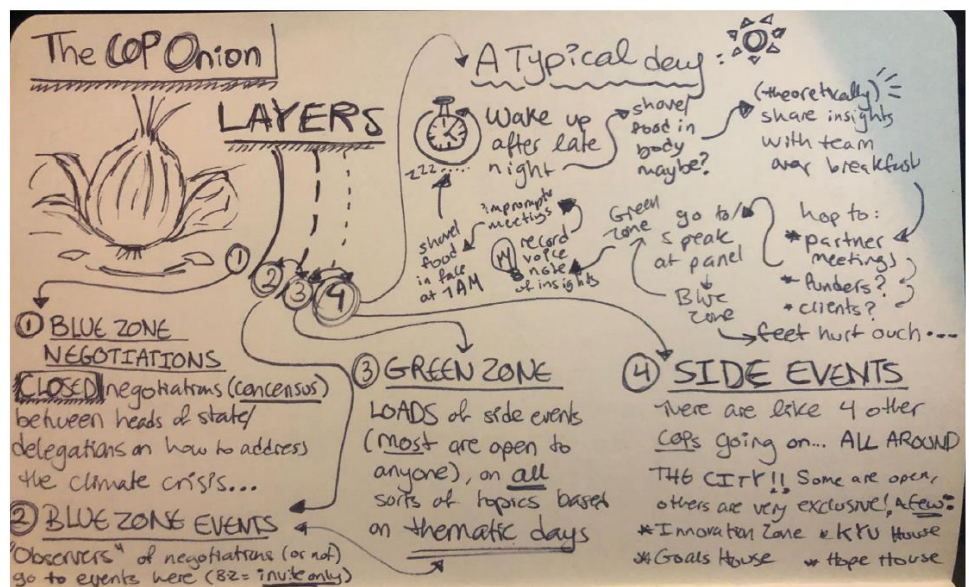
For radical collaboration & symbiotic partnerships she said there are four key commitments:

Mitigation Outcome: 40 gigatons of avoided or drawn down CO₂-eq emissions globally by 2040, amounting to approximately 10% of the 1.5 C - aligned global carbon budget at the start of 2023.

Regeneration and Restoration Outcome: 35 million hectares of degraded ecosystems

restored, amounting to approximately 10% of currently degraded land globally.

Adaptation and Resilience Outcome: Rapidly improve resilience to impacts of climate change for 1 billion people through behavioral change, adaptation, and environmental regeneration.



Narrative, Mindset, and Paradigm Outcome: Building and deploying a widely adopted positive narrative that sustainable, equitable living, and meeting human needs can be achieved by using less energy, less materials, and less resources, and in respect of nature.

Amsterdam North: a Decade of Transformation



Eva also discussed the challenges of collaboration, the financial system initiatives to address climate change, the necessity of challenging the neoliberal capitalist model, and their work in portfolio and supply chain based transformations, the Circular Building Coalition and enabling new narratives and applications of digital technology.

Response John Wells: John said that we learned to make things small so that we could understand them whether it was in science or other fields but now we are learning that simplifying will not help us solve the problems because everything is connected to everything else. One example is discount rates in financing. I think perhaps we should not be discounting the future. The future may be more valuable today rather than less valuable so we should perhaps use a negative discount rate. How would you add that to your financial system? How do we get to scale across communities? How do we tell more effective stories? I've learned over the last 20 years that stories drive people's thinking. In the US politics, we have people captivated by stories that have proven to be lies but it doesn't matter they still believe them because they are well told and the media is manipulated. question to you is, given all of this,

world we are facing, what are the key leverage points to bring the political, economic and social systems to a place where they make some sense and that will get us to sustainability.

Eva Gladek: That's great – You're asking "What is the answer to everything?"

We know that there are no silver bullets. Even the narrative around leverage points is a bit mythologized because in reality there are not a set of simple places where you can intervene and suddenly these problems unlock and unfold and everything is solved. I think we need to be working concurrently at multiple scales. One of the things we are seeing is that to transform a system, in the end all of its parts need to be acting differently.

When we are talking about urban systems for example, it is not enough to work at the community level and have the community set up businesses, value chains and community centers. That's one layer. But other layers are the policy environment and educational environments that enable and support those communities in transforming in different ways. There is the business layer that changes over time, there's the physical infrastructure etc. So really to drive systems change you need to figure out how to drive a coordinated shift across all of those layers in a sequence that makes sense.

When we are talking about the global system, that is why we are focusing on driving transformation across so many different pressure points. We focus on policy where we are seeing the hardening of the left and the right and the breakdown in communication that is occurring and threatening democracy is really concerning. It is partly driven by a feeling of a lack of security because even though people may not understand the circumstances that we are facing, they are starting to get a feeling that everything is breaking down. That lack of security translates into tribalism. It is also combined with misinformation that is being spread on the Internet. There are all these different layers.

So, how do we counteract that? There are ideas about creating positive future visions in narratives and embedding them with the right politicians starting in areas that are at risk such as European nations that have at risk elections. We can make sure that the policies that are being put forward are holistically looking at a well-being economy across multiple variables, not in just one area. That's an approach in the policy area and once that's done then we have to export that to the US where I am originally from.

With the financial system, a lot of this needs to happen in parallel because a lot of the policy blockages are happening because we are stuck in a neo liberal capitalist model that prioritizes economic growth at the expense of everything else. So how do we start to break that down. The Missing Trillions Event Series is around investigating the trillions of dollars in climate change pledges. Can we break it down from inside the system? Unlikely but maybe there are some pathways. Or can we patch the way things are working within the system through new mechanisms. Or can we break it down from outside the system?

So in the end we've organized our work across six transitions I mentioned in the presentation. The underlying one is the Mindset Transition. Then on top of that we have Governance and then Finance. And then we have Cities and Regions, Agro-food & Biodiversity, and Products & Services. Those are transitions of human systems and we are working across all of those in different collaborations and partnerships to drive meaningful transition.

John Wells: Amazing, thank you.

David Berry: Well done! Eva, I think you have given an answer to everything.

Eva Gladek: I hope not. That's not an easy answer.

David Berry: It's an ongoing process, It's an ongoing question. We've all been learning that it's much better to live in the question and watch what flows than to cling to an answer, because the answer expires quickly in many cases or never was good. So that was a very good answer.

Open Discussion

David gave the floor to Karl Hausker to respond to a question from Rhonda about energy solutions for the haves and the developing have nots in the world. Karl said that one narrative put out by renewable advocates is that renewable energy is cheaper than fossil fuel – full stop. This is simplistic in that it may be true for electricity but it is not for all uses of energy. And while solar and wind may generate energy cheaply, solar typically is generating 20-25% of the time and wind 30 to 40% of the time. To run a grid, you need other sources of energy to fill in the gaps until better energy storage is available. In response to Rhonda's question, some advocates suggest that developing countries skip fossil technologies and go right to renewable. They can't yet deliver reliable and affordable electricity with only renewables to growing urban populations in developing countries.

Karl also raised concerns about safety, waste disposal, and proliferation risks if the US and Europe completely withdraw from nuclear and carbon capture technologies. There will be other countries willing to export nuclear reactors to developing countries with growing power needs. I worry about safety, waste disposal and proliferation, with those technologies from some countries. Russia right now is a major exporter of reactors. We need to work with the world as it is, and not expect ideal conditions,

Bert said he appreciated the way Karl posed the different positions about nuclear energy. In our making scenarios we need to consider the way in which decisions are made. You didn't mention that most scenarios implicitly assume a goal of growth of economic activity and often it is not discussed but rather is a base idea about growth as usual. What you described as "energy needs" is the kind of thing we derive from GDP extrapolations. The other remark is that when we tried to introduce nuclear power into the scenarios, we had no mechanism which economists could give us because of the huge financing requirements, long construction times and high liability issues of nuclear power. The consequence is that for nuclear power you need more government not less government and for the last 25 years, more government has not been very popular. Do you agree that perhaps we have to change minds if we go for such top down options?

Karl agreed, highlighting the need for government planning and coordination for large nuclear systems. That might change for small modular systems but perhaps not. Also I agree with the points in your talk, I don't think we can get to net-zero energy systems through pure market systems. Net zero systems need to fit together – what is called in Europe sector coupling - and need a role for government planning and coordination. This would also be true for hydrogen systems and major expansions of the grid.

John Wells shared his experience meeting a Chinese delegation in Minnesota. He spoke to them about the State Water Plan and State Land Use Plan and all the things they wanted communities to do. A member of the delegation asked him "Why don't you just tell them to do it and make it happen like we do in China?" This raises questions about whether democracy is the right model and the alternative can go in a radically wrong direction, too. I don't know how to handle the need

for governance in different societies. the appropriateness of their governance model, expressing concerns about democracy.

Karl said that 10 years ago he thought we would just be fighting to fix climate change but instead we are fighting for our lives to preserve both a safe climate and democracy and a free press around the world, and avoid adopting the Chinese model of decision making.

Ron McCormick said that the ecology of complex systems tells us that when you change scale you change type and therefor there are different questions and different factors. Eva, I understand that you are intervening at the mind set layer but as you scale up the projects that you have done this far, all of the contexts and issues and most of the questions are going to change. So how are you using mind set narrative to deal with change in scale and change in type?

Eva Gladek: Unfortunately, I don't have the answer to your question. Ron. When it comes to the transitions that we have organized with the mind set piece, it is an area in which we are still doing a lot of investigation ourselves on how to approach and use this as a lever in the work we are doing. Part of our effort now is to develop new political narratives. It is an experiment and we are getting a lot of input from stakeholders that are normally not spoke with and seek to create something that is much more broadly appealing. It remains to be seen how well this lands are the level of the European Commission and whether it needs to be changed or tweaked for individual nation states. Right now with the use of the Internet, information spreads like a virus and gets replicated, mutated and distorted. It is a tool that can be used to generate narratives and manipulate them. On our side of the fence we are always very careful about being Machiavellian but there is information that right wing groups are paying for bots to spread information to control for example the outcome of elections. Ron, if you have ideas related to your question Ron, I would like to hear about them because we are exploring how to do this.

Ron: I am in the same boat. Just as the Anthropocene dissipation of energy, there is now an entire system that dissipates ideas. Narratives are very useful but a question is how are we going to distribute them beyond a group that understand the information already. Complex ideas are hard to get out. That is what SRRR has been dealing with for the 14 years that I have been dealing with them and I applaud you for trying.

Eva: Maybe we are being too abstract and too complicated. Maybe we need to make things a lot simpler and focus on what people care about – their health, their security, their families and communities and couch things in the context of what is meaningful to people. But it seems that conspiracy theories and the most nefarious things that get spread and replicated, I do wonder if we can crack the puzzle of how to get positive narratives and true narratives to spread, rather than all these falsehoods that are out there, Maybe people like doom and gloom better than they like fantasizing about a happy future.

Myra Jackson: I have a full appreciation of what has been brought forward today about other ways of thinking and being. I'm an old systems thinker. The "bottom of the U" is a place I spend time contemplating but most important, we are human beings who have created systems that no longer align with or speak to the language of a living Universe. I am interested in how we find our way back into relationship. I realize that's not an answer to a question for the moment we are in, in that we feel like the systems we are locked into are so dominant. But in my real view, we are seeing how the Earth itself is breaking down, and that will impact us. It will take us out of our theoretical conversations into engaging with what is happening in the present moment. What's wonderful about being human is we can be creative. We can be inspired to create together something new.

We can in special moments, go outside of the boundaries of our thinking - of our dominant thinking perceiving structures. We need that now. To me it's like a moment in which Einstein's equation $E=MC^2$ needs to follow the full extrapolated theorem: bring people and their perspectives, P, into the equation. It's a whole different dynamic. It has always been present there but we haven't paid attention to it. We haven't given it time.

I have managed nuclear energy. Even in talking about nuclear energy, part of the conversation that's not being had is that we can't bring people up to speed with the science that we actually have access to and with the technologies that are in the defense domain. Those are national security conversations for many countries. The dominant countries in this conversation have information they protect. We need to be adults about that and understand that.

Carol English: Listening to the people today and to other brilliant presentations on the Internet, I wonder how all this translates into action. Everyone on this call are financially in the top percentiles in the world and have some choice in their lives. I'm thinking about the people who are just surviving and who understand they need to change their behavior but have no means to do it. I'm curious about what people think because I feel this huge gap and I don't know how it can be bridged. I know government policies need to be changed but I feel at a loss about how we can possibly figure ourselves out of this situation.

Theresa Seidner: We are not in this situation all of a sudden. We've been in this not just for 100 or 150 years. This is a very long ongoing system problem that we are living in. This crisis may or may not be the culmination or not – we don't know. While the problems may seem insurmountable, human beings have a lot of resilience and a lot of strength to overcome obstacles. We've done it before and I think it's really important to have a sense of – I won't call it hope but of foresight and creativity to overcome obstacles that are in front of us the way we have always done. Bad things are going on and yet a lot of the negative narratives are in our minds.

Eva Gladek: Metabolic is now an organization of around 120 people. Many of them are young and a lot of them get depressed about the future. It is challenging to continue fighting the good fight, putting on a smile or at least showing up every day to do this work in the face of what seem to be insurmountable odds. There is a group called Global Optimism, founded by Christiana Figueras, one of the architects of the Paris Agreement, advocates for global optimism. We try to share this with our team. What else is there to do? We can give up, eat all of the sushi there is, watch Netflix and then wait to fade away. That is not very satisfying to anyone. That is why, Carol, we are treating it as a kind of puzzle, figuring out ways to game the system, and ways to reroute this capital so that it does reach those people at the bottom of the pyramid. How do we create pathways out of the system? A lot of that is reclaiming land. I was concerned Myra when you said that land is being collateralized against debt. I think that we collectively keep up the faith and transform the systems that we have inherited.

Alexandra Sokal: Eva covered some of what I was going to say. We are working on a local level with communities where we engage face to face across numerous different pathways. We are working to implement more use of electric vehicles and bicycles, more walking and bicycle paths for example. When engaging the public at a localized level we try to ripple the effect and turnkey that effect from community to community rather than say, tackling all of Los Angeles all at once. We need both scales. I have been doing a lot of study over the last two years on civilization decline and breakdown. We need new systems and I am constantly trying to connect with those thinkers who have different ways that we can pivot from monetary thinking.

It is a huge task. If we balance the data and negative fear with positive solutions, then we get more traction with what we are doing. When you look at historical collapses, those who survived were pockets of people who went on to rebuild. Easter Island is a great example of what didn't work. To look at a positive note, we are seeing a lot of young people building intentional communities and living off grid. So a question is, how do we connect the hope and positive things to our existing governments? If you have a government, like China, that tells the people what to do, you can move things more quickly – often in the wrong direction as well. It's the combined effort across the macrocosm and the microcosm that can find the middle way to find solutions. The biggest challenge is going to be revamping an economic system that no longer works.

John Richardson said the discussion of making complex ideas accessible brings to mind a challenge that Gerhart Bruckmann, Donella Meadows and he had to present when they were trying to win approval for global modelling from the International Institute for Applied Systems Analysis Board of Directors. This was as difficult a challenge as what we now face. Some of you may have seen that we took a very radical route writing a book titled "Groping in the Dark, the First Decade of Global Modeling," which included prayers and cartoons.

David acknowledged John as an early pioneer in sustainability and systems and his contributions over many decades in North American and Singapore and elsewhere.

Theresa Seidner urged the participants to harness our collective indignance and creative fury. This is not a time to bow our heads and feel sad and hopeless. There is always more and it ain't over until it's over. Thanks for a great talk today everybody.

Neni Stamati spoke about transformative learning, saying that education is mainly intellectual and just as John Richardson used unique methods to communicate complex ideas. a more holistic approach to education involves hands-on experiences and other methodologies.

David Berry: A key to not slipping into depression, or into a sense of impotence due to being overwhelmed, is to maintain the flexibility to choose a scale at which you have some influence. And you have the possibility of reaching out and a team or pod or group to work together. I hope that participating in this roundtable reminds you that, however alone you seem to be in the moment, you are part of a community and many other individuals around see some of the problem and at least question what to do, and then aspire maybe dig deeper and start acting. Individuals and little groups eventually become a movement. One evening over dinner I spoke to Dennis Meadows about this. I said, "Fifty years ago only thousands of people were aware of this conversation and then hundreds of thousands and now millions. If this trends continues it will be billions and 8 billion is all of us." Can we collectively disseminate information and enroll people who are truly troubled with good reason rather than judge them and argue with them? If so, we can keep expanding the circle. We are in a sacred race against time. Can the circle of people seeing the challenges and acting on them grow fast enough to offset some of the inevitable breakage of the necessary transformation? I'm not a pessimist - we already see a lot damage. You can clearly say what's already happening is inevitable because it's occurring.

Thank you for being part of this Roundtable. Thank you to our speakers and respondents. We look forward to further conversations.

Adjourn