Sirkka Heinonen & Sofia Zavialova (eds.)

NEO-CARBON ENERGY & THE MILLENNIUM PROJECT AT THE INTERNATIONAL CONFERENCE "FUTURES OF A COMPLEX WORLD"

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NEO-CARBON ENERGY WP1 WORKING PAPER 1/2017

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This is a report of the Neo-Carbon Energy project presentations, as well as related Millennium Project contributions at the "Futures of a complex world" held June 12-13, 2017 at Turku School of Economics in Turku, Finland. The Neo-Carbon Energy project is funded by Tekes new strategic openings programme and carried out in collaboration between Finland Futures Research Centre (FFRC), University of Turku, Technical Research Centre of Finland VTT Ltd (co-ordinator), and Lappeenranta University of Technology (LUT).[1] The Conference was an annual international conference organised by Finland Futures Research Centre (FFRC), University of Turku, in co-operation with Finland Futures Academy, National Foresight Network, Helsinki Node[2] of the Millennium Project, and Foresight Europe Network (FEN). The Neo-Carbon Energy project engaged the international futures studies community by way of multiple presentations, chairing of sessions, and a workshop on the future of work. The conference was attended by almost 330 people from 29 different countries.

The nine instances of Neo-Carbon Energy at the conference reported by the editors for this working paper were:

1. "Surprise as the new normal – Implications for energy security" by Sirkka Heinonen, Joni Karjalainen & Karlheinz Steinmüller
2. "Transition towards long-term sustainability of the Finnish energy system" by Michael Child & Christian Breyer
3. "The postnormality of renewable energy – Complexity, contradictions and chaos in a world of abundance" by Juho Ruotsalainen, Sirkka Heinonen, Joni Karjalainen & Marjukka Parkkinen
4. "Can we overcome complexity with anticipation for climate compatible governance?" by Joni Karjalainen & Juho Ruotsalainen
5. "Clean transformation as a complex endeavour – The case study of Chile" by Noora Vähäkari, Joni Karjalainen & Sirkka Heinonen
6. "Deconstructing survivalism as futures knowledge" by Marjukka Parkkinen
7. FEN workshop on the future of work moderated by Cornelia Daheim, Epaminondas Christofilopoulos, Sirkka Heinonen, Ondrej Valenta, Ole Wintermann & Ibon Zugasti
8. Comments to the keynote speech of Cornelia Daheim on "The Future of Work – Scenarios for 2050 from the Millennium Project and beyond" by Sirkka Heinonen
9. Chairing at session 1 – Special session with a keynote speech: Aging society and urbanization & session 2 – Foresight in technology by Sirkka Heinonen

These appearances of the Neo-Carbon Energy project at the conference "Futures of a complex world" 2017 are briefly described in the following pages, consisting of the abstracts, highlights, links and other relevant information. All abstracts are also included in the Book of Abstracts of the Conference (https://futuresconference2017.wordpress.com/). All the presentations that the speakers made available are at www.futuresconference.fi2017

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[1] See www.neocarbonenergy.fi and http://www.utu.fi/en/units/ffrc/research/projects/energy/Pages/neo-fore.aspx

[2] Helsinki Node of the Millennium Project is Co-Chaired by Sirkka Heinonen (FFRC), Juha Kaskinen (FFRC), Osmo Kuusi (Aalto University, FFRC), Sari Söderlund (Finnish Parliament, Committee for the Future), and Toni Ahlqvist (University of Oulu).

1. SURPRISE AS THE NEW NORMAL – IMPLICATIONS FOR ENERGY SECURITY AT SESSION 4 – INNOVATION IN FUTURE ENERGY

PRESENTED BY **SIRKKA HEINONEN**, **JONI KARJALAINEN** AND **KARLHEINZ STEINMÜLLER**[3]

Figure 1. Joni Karjalainen and Sirkka Heinonen presented the NEO-CARBON ENERGY research on the complexity and unexpected events at session 4 on Tuesday, 13 June 2017. Photo: Sofia Zavialova / FFRC.

CONFERENCE ABSTRACT

We are living in a world of ever increasing interconnectedness through digitalisation and globalisation, exacerbating environmental conditions, severe economic challenges, uneven distribution of wealth, and geopolitical crises. Nation-states claim independence and sovereignty for themselves, but their autonomy is restricted by the tsunami of transborder flows of trade goods and finance, of information, people, weapons, technology, energy, and pollution. The world is a complex system and the rapid change among its sub-systems builds up enormous pressure for any efforts to anticipate change and shape the processes of transformation.

Surprise is an intrinsic aspect of change, in particular when it takes place at an accelerating pace with high degrees of volatility, uncertainty, complexity, ambiguity (VUCA). In foresight, which aims to alleviate uncertainty associated with impending changes, horizon scanning has much focused on the probable or even predictable – surprise-free developments. We assume that more emphasis should be paid on the constant and systematic anticipation of wild cards and black swans. Taleb even claims that the world is most changed by such events.

Energy is a complex issue. Without energy there is no life, neither biological nor economic. Taking into account the huge ecological and social costs of the present energy system, the

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[3] Presentation delivered by Sirkka Heinonen & Joni Karjalainen.

need for a new emission-free, cost-effective, and democratised energy system is obvious. An energy transformation to reach 100% renewable energy is envisioned in four transformational neo-carbon energy scenarios. Energy is no more just an economic or technical issue. It is increasingly a societal and even cultural issue – above all a security issue. As regards energy security, various sudden events and surprises – wild cards and black swans – could play a major role. Therefore, we probe the resilience and anti-fragility of these transformational energy scenarios. We present the results of a futures clinique where the scenarios were tested. This way, we explore the implications of surprises for energy security, as the world increasingly seeks to move towards a renewable energy based society.

Key words: Renewable energy, Transformative Scenarios, Energy Security, New Normal, Complexity, Wild Cards, Black Swans, Uncertainties, Turbulent Times

HIGHLIGHTS

- We are living in a trap of linear thinking.
- The future is too often anticipated through trends only.
- Future is not extension of present – chains of events can break linear development paths and cause surprises.
- The world is VUCA: *volatile* (ever changing), *uncertain* (always challenging to predict), *complex* (with many actors interacting), and *ambiguous* (it is difficult to make sense of).
- When we are imagining a future, as a futures image, or by using scenarios, we have to think of futures unfolding in a non-linear way. By thinking about megatrends, trends, emerging issues and weak signals, and their interconnections, we can think of possible discontinuities that, taken together, could lead to surprising events.
- The present rise of renewable energy and especially solar PVs is an example of a discontinuity without (marked) black swan events. No longer than 10 years ago almost no one anticipated the rapid fall in cost of solar PVs. A major cause for the discontinuity in the price was China - the 1st country to mass-produce and offer cheap solar PV panels. Many other trends converged to tip the solar development off its linear slow path.
- Democratized 100% renewable energy future could be a "preferred" future compared to the world we are living in today. But it implies a transformation from the present to an unfolding future. Consequently, when we expect a transformation to happen, this implies a need to anticipate non-linearities.
- Together with other technological developments, such as automation and AI, increases in (renewable) energy supply and decreases in energy price could steer our world into unknown futures. It is increasingly crucial to anticipate emerging discontinuities and surprises in different sectors of society because they may indirectly or directly have impacts for the renewable energy world
- Energy is not only a technological issue, but cuts across culture, values, economy, power relations, and the environment.
- In an electrified future, electricity is produced with solar, wind (and other renewables) and excess electricity is converted into synthetic end products. With synthetic hydrocarbons the sectors which are difficult to run with electricity (e.g. aviation and freight transport) can be made emission-free.

- We argue that thinking about the unexpected events of future society can make a 100% renewable energy based scenarios more resilient, and improve the energy security of such futures.
- In a Futures Clinique (which is a creative futures workshop method), participants thought of discontinuities, black swans and their implications to renewable energy. This helped to map issues that can impact the future in a positive or negative way (such as total industrial revolution, revenge of fossil fuel companies, Internet of powergrid collapse, collapse of a major state, shaping of the human-robot relationship, introduction of national energy budgets, and so forth).
- After the Futures Clinique, the most interesting black swans were analysed by the research group and guest experts in a Cross-Impact Session to think both of quantitative and qualitative impacts.

VIDEO

Interview of Karlheinz Steinmüller on VUCA World and Black Swans by Sirkka Heinonen at FFRC. Please see video and transcription of the interview at:
https://sites.google.com/site/futuremediac/videos--presentations

SLIDES & REFERENCES

"Surprise as the new normal – implications for energy security" by Sirkka Heinonen, Joni Karjalainen & Karlheinz Steinmüller

Heinonen, Sirkka, Karjalainen, Joni, Parkkinen, Marjukka, Ruotsalainen, Juho & Zavialova, Sofia (2017). Surprising Energy Futures – Implications for Energy Security. Neo-Carbon Energy Futures Clinique V, FFRC eBook 3/2017.

2. TRANSITION TOWARDS LONG-TERM SUSTAINABILITY OF THE FINNISH ENERGY SYSTEM AT SESSION 4 – INNOVATION IN FUTURE ENERGY

PRESENTED BY **MICHAEL CHILD** AND **CHRISTIAN BREYER**[4]

Figure 2. Michael Child presenting the results of research at LUT in the Neo-Carbon Energy project. Photo: Sofia Zavialova / FFRC.

CONFERENCE ABSTRACT

The Finnish energy system is at a crossroads due to an aging system of power generation and opinions about different modes of low-carbon energy generation. In addition, there are responsibilities to mitigate climate change, worries of fluctuating energy prices, goals regarding national energy security and a wish to both retain a competitive industrial sector and meet the needs of a future society. The purpose of this research is to examine the components of a fully sustainable energy sector for Finland in 2050. A key motivation is to examine the benefits of Power-to-Gas (PtG) and energy storage systems. Naturally, there are several potential pathways towards the future. At the same time, there are a number of technological decisions related to energy use and production that are made years in advance and influence future possibilities for decades to come. Among these are the roles of renewable energy technologies, nuclear power, energy system infrastructure, and storage systems. A cost optimal energy system transition was simulated for Finland for the years 2015-2050 using the LUT energy system model. Our research concludes that a 100% renewable energy system is possible for Finland in 2050. As well, we offer complete transparency of all technological and economic assumptions. Results assure the reliability and sustainability of a 100% renewable energy system at an hourly resolution.

Key words: Renewable Energy, Sustainability, Power-to-Gas, Energy Storage

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[4] Presentation delivered by Michael Child/LUT.

- A 100 % renewable energy system – based on solar, wind, bio-energy, and hydro – is possible in Finland by 2050. It would be cost-efficient and provide all the reliability and stability needed.
- The role of prosumers – citizens, enterprises, even industries – can be rather significant in the future Finnish energy system.
- The energy system in Finland is getting rather old, and many technologies in the system will retire in the next 20-25 years. So there is a good opportunity now to "naturally" replace these elements.
- Main storage technologies would be batteries and gas-storage.
- Fossil natural-gas will be replaced by domestically produced synthetic, sustainable methane.
- The levelised cost of energy (LCOE) in this system is estimated to be 60€/MWh in 2050 – PV-Wind-Gas is the least cost option.
- Obstacle: in Finland people often think that solar and wind cannot do the job
- Heat and mobility sectors are not yet modelled, but will be

SLIDES & REFERENCES

"Transition towards long-term sustainability of the Finnish energy system" by Michael Child & Christian Breyer

3. THE POSTNORMALITY OF RENEWABLE ENERGY – COMPLEXITY, CONTRADICTIONS AND CHAOS IN A WORLD OF ABUNDANCE AT SESSION 4 – INNOVATION IN FUTURE ENERGY

PRESENTED BY **JUHO RUOTSALAINEN, SIRKKA HEINONEN, JONI KARJALAINEN** AND **MARJUKKA PARKKINEN**[5]

Figure 3. Juho Ruotsalainen presents on postnormal times and the implications from renewable energy. Photo: Sofia Zavialova / FFRC.

CONFERENCE ABSTRACT

By 2050 we will be able to satisfy our growing energy needs with renewables. This paper anticipates the futures of energy-related societal development by taking a critical view on the narrative of progress: by 69 potentially increasing the amount of available energy in societies, renewables may also bring about more complexity, contradictions and chaos – defining features of postnormal times as described by Ziauddin Sardar.

Thanks to cheap and often even free energy, a renewable energy system will improve energy security, self-sufficiency and decrease the costs of living and production. This empowers citizens to organise their lives around peer-to-peer communities. The renewable energy system thus enables a power shift from traditional institutions and organisations to self-organising citizens. The decentralisation of social power could increase the complexity of societies and pose novel challenges for current models of governance, as the number of actors affecting societal and economic development would grow. At the same time, social stability could decrease due to the decentralisation of social power, as Erving László claims.

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[5] Presentation delivered by Juho Ruotsalainen.

The paper complements the theory of postnormal times by adding new energy systems as among its defining features. It opens a critical perspective to the "grassroots power" fostered by information and communication technologies. It anticipates new social contradictions and social problems in a future information society of material and immaterial abundance. Along with energy, it deals with robotisation and the future of the internet as causes of increasing chaos, complexity and social contradictions.

Key words: Renewable Energy, Postnormal Times, Complexity, Progress, Power Shift, Information Society

HIGHLIGHTS

- The new, renewable energy system will produce more energy than today and increase energy efficiency significantly.
- The surplus energy allows many new things, such as widespread use of artificial intelligences, robotization, and betterment of living conditions – in a word, progress.
- Decrease in the price of energy, with new technologies, also empowers actors, both big and small – from technology giants to terrorist groups. This upends power relations in societies.
- These changes – increase in energy supply, decrease in energy price, new technologies, and empowerment of actors – promote postnormal times: increased complexity, chaos, and contradictions in society.
- In postnormal times, social and cultural stability decreases – which is both good and bad. But in any case we have to see the energy transition to renewables as a much more complex and multi-sided phenomenon than mere progress as it is often understood.

SLIDES & REFERENCES

"The postnormality of renewable energy – complexity, contradictions and chaos in a world of abundance" by Juho Ruotsalainen, Sirkka Heinonen, Joni Karjalainen and Marjukka Parkkinen

4. CAN WE OVERCOME COMPLEXITY WITH ANTICIPATION FOR CLIMATE COMPATIBLE GOVERNANCE? AT SESSION 6 – FUTURES OF ENERGY

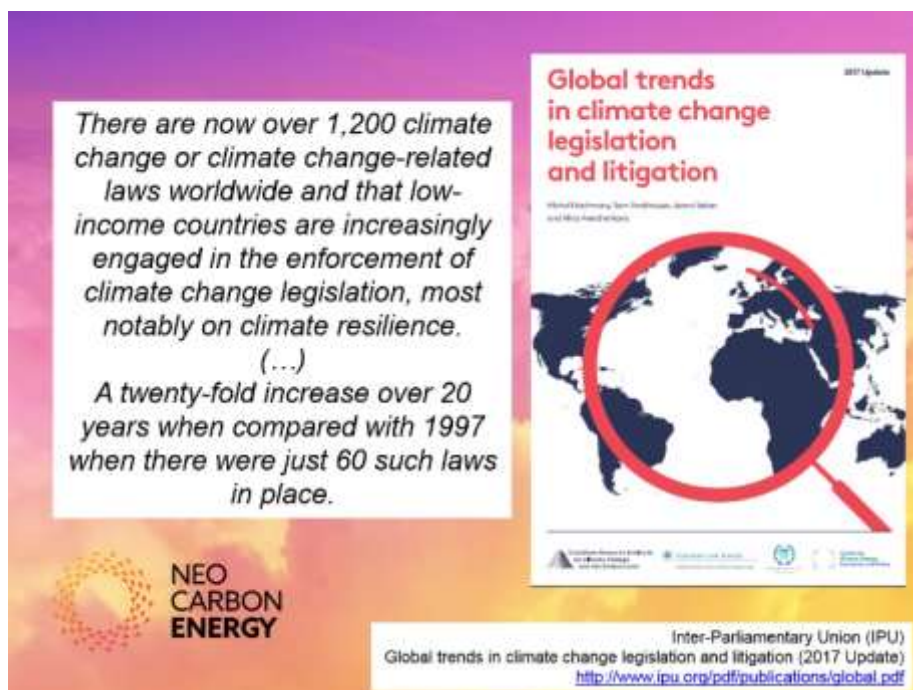PRESENTED BY **JONI KARJALAINEN** AND **JUHO RUOTSALAINEN**[6]

Figure 4. Joni Karjalainen discusses the challenges of complexity and the need for climate compatible governance.

CONFERENCE ABSTRACT

Our ability to understand how society works is evermore challenged. The aim of this contribution is to examine how knowledge about planetary boundaries and climate change is inducing systemic pressures to society and shaping decision-making. The contribution derives from an on-going foresight project that studies energy-society transformation to explore how a renewable energy society could be achieved by 2050. As old dependencies in fossil fuel use are being questioned, novel systemic dependencies between renewable energy, economy, society and politics may emerge to determine when and how energy will be used. The current pathways to reach a 100% renewable energy system assume intermittent renewable energy, smart and interconnected grids, energy storages, and demand-side management. In the future, nature and weather patterns around the world could affect the use and design of energy-related technologies. This may shape related costs, trading prices, and allow energy to be managed in a nano- to milli-second level. Together, this may be seen to add systemic complexity. However, we may also wish to reduce systemic complexity. Emerging off-grid solutions and services increase the independence of actors, and decrease the systemic connections of actors in the energy system. We suggest that for climate compatible governance, a long-term development vision on a 100% renewable energy society may be desirable, but it is worth anticipating these two opposing drivers to counter unexpected and

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[6] Presentation was delivered by Joni Karjalainen.

yet inevitable contestations. Furthermore, to reach renewable energy around the world, energy independence and forms of hybrid governance may deserve further attention in energy policy debates.

Key words: Decision-Making, Governance, Independence, Long-Term Vision, Nature, Off-Grid, Renewable Energy, Systems Thinking

HIGHLIGHTS

- According a 2017 the Inter-Parliamentary Union (IPU) report, Now over 1,200 climate change or climate change-related laws worldwide and that low-income countries are increasingly engaged in the enforcement of climate change legislation, most notably on climate resilience. A twenty-fold increase over 20 years when compared with 1997 when there were just 60 such laws in place.
- When representing systems, they can be divided into simple, complicated, complex and wicked
- New modes of governance seek to overcome the silo effect, recognize power dynamics, inspire people from the bottom up, and conceive power as communicative planning
- Emerging governance approaches cover (at least) multi-level governance, deliberative governance, adaptive governance, reflexive governance, hybrid governance and anticipatory governance
- Anticipatory governance (Guston 2014) is motivated by risk and uncertainty beyond conventional risk assessment. It aspires for people to be able to actively shape technology rather than become shaped by it
- It has been argued that forward engagement, with a whole-of-government (governance) approach to complex issues, can be cultivated as a systemic culture (Fuerth 2009).
- Products of science and technology do not appear magically, they appear in the hands of people (Sarewitz, 2011) through technoscientific imaginaries (Wiek, Foley, & Guston, 2012).
- One means of thinking about different (emerging) modes of governance is through a six-point checklist: 1) does it address complexity 2) is it forward-oriented 3) does it involve engagement 4) does it recognize power 5) is it interested in transformations 6) does it seek to be climate compatible?
- Even policies struggle to acknowledge the complexity of the world. Is this the case also with policy analysis tools? After all, policy analysis claims to be a "systematic evaluation of the technical and political implications of alternatives proposed to solve public problems". Is thinking of policy mixes (Kivimaa and Kern 2016) alone enough?
- Emerging governance theories, as analytical lenses, aim to overcome past theory limitations. These theories seem to have potentially overlapping areas. Governance theories, too, struggle with the long-term: transformation, complexity, and surprises.
- In sum, it is unclear what governance should think about complexity. It was raised as a question, whether it is realistic or even desirable to try and overcome it. Even so, it seems that thinking of alternative futures deserves further attention in governance theory and policy analysis.

"Can we overcome complexity with anticipation for climate compatible governance?"
by Joni Karjalainen & Juho Ruotsalainen

5. CLEAN TRANSFORMATION AS A COMPLEX ENDEAVOUR – THE CASE STUDY OF CHILE AT SESSION 6 – FUTURES OF ENERGY

NOORA VÄHÄKARI, **JONI KARJALAINEN** AND **SIRKKA HEINONEN**[7]

Figure 5. Noora Vähäkari and Joni Karjalainen highlighted the renewable energy transformation potential of Chile, and reported on the results of a Futures Clinique conducted in Santiago by FFRC team.

CONFERENCE ABSTRACT

Societies are complex systems where some elements change fast, others more slowly. Our paper studies energy transformation in Chile, a country with plentiful renewable energy resources, and focuses on the energy-society nexus. We explore local pathways for change by using four transformative socio-cultural scenarios 2050 that explore how renewable energy could be harnessed in line with the peer-to-peer principles. The scenarios were reflected with local experts in a futures clinique in Chile in October 2016. Following a semi-backcasting approach, the local experts used the futures wheel and the PESTEC method to analyse opportunities and risks of an energy transformation for Chile. The participants highlighted the need to diversify Chile's economic structure and the democratization of energy. A post-copper era was proposed, in which 'new' wealth and business could emerge from Chile's abundant renewable energy resources, assuming that they are responsibly harnessed. In literature, it has been argued that the politics of energy transformations can be either citizen-, market-, technology- or state-led. However, our findings rather emphasize the cultural, institutional and social dynamics of transformation. Such factors may include trust and civic engagement to build commonly shared values. Community needs would be expected to inspire innovation, public and private investments as well as private-public partnerships. Democracy, too, may have to extend beyond conventional representation to

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[7] Presentation was delivered by Noora Vähäkari and Joni Karjalainen.

ensure opportunities and wealth are equally shared. As conclusions, Chile has the capacity to become 100% renewable energy powered in the future by harnessing its abundant solar and wind resources. In support, a long-term vision and an encouraging business culture where failure is tolerated are required. Increasingly dynamic relations across actors and sectors, more localized management structures, and a collective mindset can further nurture the complex process of energy transformation in Chile's society.

Key words: Chile, Complexity, Diversification, Neo-Carbon, Post-Copper, Renewable Energy, Transformation, Trust

HIGHLIGHTS

- Climate change is driving a transformation of the energy system and society. There are many types of 'low-carbon' energy transformations: carbon capture & storage, nuclear, renewable energy system. This presentation is about a future society based on renewable energy.
- A model of a renewable energy system is a so-called 'neo-carbon energy system' where everything is produced with solar, wind, and other renewables. Synthetic processes are used replace fossil fuel based ones. This makes the system emissions-free. It is also more decentralized than our present energy system – supporting the principles of peer-to-peer society.
- We have to think 'what if': what the implications of such sociotechnical change could be in different places around the world – hence the case study of Chile.
- Chile was chosen as a case study, as it has been considered as a pioneer in Latin America. It has a stable business environment and invests in education, although further social reforms are encouraged. The country had a difficult period in its political history during 1973-1990, which is still remembered. Economically, copper production has been a major economic activity in Chile.
- Chile receives some of the highest solar irradiation on Earth in the Atacama Desert. There is a strong interest in the solar energy in Chile, with media headlines in 2016 stating that "Chile Has So Much Solar Energy That It's Giving It Away For Free". Especially mining companies are already using solar.
- The uptake of solar energy has been enabled by a supportive policy environment and a stable business environment in Chile. This has attracted investments into solar energy.
- Chile also has a long windy coastline, but to date little wind power capacity and considerable untapped geothermal energy resources. Certain hydropower projects have been opposed for environmental and livelihoods/cultural reasons.
- The Government of Chile has set an energy policy target to reach 70% of its energy produced with renewable energy. In May 2017, the National Energy Commission announced that even 100% renewable energy could be possible.
- Typically, energy transformations are studied by using the transitions theory and multi-level perspectives (MLP) framework. Novel technologies are assumed to typically emerge from 'strategic niches'. It is also understood that socio-technical imaginaries shape expectations of future change. Problematically, culture and values have a fairly limited role in such theoretical frameworks. In reality, societal development is a complex endeavour.

- In the foresight part of the Neo-Carbon Energy project, a transformation towards a 100% renewable energy society has been anticipated with the use of socio-cultural scenarios 2050. The scenarios are called *Radical Startups 2050, Value-Driven Techemoths 2050, Green DIY Engineers 2050* and *New Consciousness 2050*. In describing transformation, their key axes are peer-to-peer and ecological consciousness.
- These scenarios were tested in a Futures Clinique in Santiago, Chile in October 2016. In the Futures Clinique, the participants outlined that 1) a peer-to-peer society needs collective trust between fellow citizens, decision makers, companies – i.e. the social structures broadly; 2) hence a fully decentralized energy system as a technocratic solution cannot be taken for granted. 3) It was speculated whether solar energy could become 'the new copper' for Chile – a 'clean' natural resource that provides the country with future wealth in a sustainable manner
- At the moment, infrastructure is being further developed, to interconnect grids better. This would already allows renewable energy to be transmitted from areas where it is produced to where it is consumed inside Chile
- If collective trust and communality are developed, they may support the uptake of a decentralised energy system
- In future, Chile is expected to have enough renewable energy to be exported to other South American countries
- In sum, socio-cultural factors can reinforce technology-driven transition – or hinder it

SLIDES & REFERENCES

"Clean transformation as a complex endeavour – The case of Chile" by Noora Vähäkari, Joni Karjalainen and Sirkka Heinonen

Heinonen, Sirkka, Vähäkari, Noora & Karjalainen, Joni (2017). Neo-Carbon Energy World – What opportunities for Chile? Neo-Carbon Energy Futures Clinique IV. FFRC eBook 3/2017.

6. DECONSTRUCTING SURVIVALISM AS FUTURES KNOWLEDGE AT SESSION 2 – FUTURES OF DEMOCRACY, SOCIETY AND VALUES

PRESENTED BY **MARJUKKA PARKKINEN**

Figure 6. Marjukka Parkkinen opened up survivalism as futures knowledge. Survivalism is a flourishing feature in one of the Neo-Carbon Energy scenarios i.e. DIY Green Engineers.

CONFERENCE ABSTRACT

Survival is in the core of being human, and specifically, it is a question concerning the futures. This research focuses on the socio-individual paradigm of looking at the futures with an aim to survive by pre-paring for it. I analyse survivalism (also known as preparedness) as a futures-oriented approach and knowledge. Survivalism is a very specific, yet under-researched approach towards futures. It is a socio-material futures-oriented practice embedded in every day. According to the hypothesis of the research survivalist knowledge is free of external focal limitations. The lack of restrictions to concentrate on some-thing particular enables peripheral vision and the rhizomatic process of exploring the futures in constant flux offers leverage to meet the challenges set by complexity.

This paper answers the research question: "How are alternative futures observed, constructed and pre-pared for in survivalist discussions?" Causal layered analysis is utilised as a method to deconstruct and critically observe survivalism as an approach to futures. The primary research material consists of Finnish survivalist web forum texts. The purpose of this paper is two-fold, combining empirical and theoretical approaches. The empirical objective of the study is to analyse survivalism as futures knowledge. The second purpose of this paper is to contribute to the critical post structural framework of futures studies as well as the discussion on the epistemological foundations on which the knowledge or assumptions on futures can be based on.

Key words: Survivalism, Preparedness, Causal Layered Analysis, Futures Knowledge, Deconstruction

Survivalism ethos relates well to one of the four transformational scenarios – Green Do-It-Yourself Engineers – of the Neo-Carbon Energy project. An article on the topic is planned to be written within the foresight part of the project.

- It is said that most futures studies done by organisations is defined by a focus on something particular. However, at the same time there is a demand to see far beyond an exact focal point, as it is exactly the unexpected events that have the greatest impacts on the society. There is an interesting balance between what can be known about futures and what on the other hand is left beyond our focus.
- **Survivalism** is taken as an example of one way of seeing the futures from a different viewpoint. According to the hypothesis, it is not confined by external focal limitations in a similar way than organisations are. The research question of the paper is: "*How are alternative futures anticipated and prepared for in a contemporary survivalist context?*"
- **Surviving** can mean many things, such as simply remaining alive, to enduring, outliving, carrying on and even prospering. To survive means to continue existence despite different circumstances.
- **Survivalism** is a movement based on surviving, and can be described as a philosophical and practical approach to man-made, natural or supernatural disasters of different scale. Survivalist efforts commonly focus on collecting items for defence, safety or eating, as well as improving mental, social, and physical skills that they consider necessary for surviving. Many survivalists believe that the social, economic or ecological world we are living in is coming to an end.
- According to the preliminary results, survivalist approach is to a large extent free from external limitations to speculate any kind of futures possible. For example, the scenarios may consist simultaneously of climate change and coffee makers or terrorist attack to divorce.
- Survivalist approach can be described as rhizomatic, which is a philosophical concept by Gilles Deleuze and Felix Guattari. Instead of fixed and rigid models, rhizomatic knowledge is directed in all directions, and everything can be connected to everything.
- However, in general there are three large themes that can be said to frame contemporary survivalist discussions. Survivalist approach is negotiated between the dimensions of 1) communal and individual (*Who are surviving?*), 2) universal & personal (*Of what one survives from?*) and *3)* material & speculative (*How does one survive?*)

"Deconstructing survivalism as futures knowledge" by Marjukka Parkkinen

7. FEN WORKSHOP AT SESSION 6 – THE FUTURE OF WORK: AN INTERACTIVE WORKSHOP ON PERSPECTIVES AMONG EUROPE

MODERATED BY **CORNELIA DAHEIM, EPAMINONDAS CHRISTOFILOPOULOS, SIRKKA HEINONEN, ONDREJ VALENTA, OLE WINTERMANN & IBON ZUGASTI (MILLENNIUM PROJECT NODE REPRESENTATIVES)**

Figure 7. FEN workshop participants. Photo: Marjukka Parkkinen / FFRC.

Figure 8 & 9. FEN workshop in the process: brainstorming and presentations. Photos: Marjukka Parkkinen & Sofia Zavialova / FFRC.

CONFERENCE ABSTRACT

The Millennium Project, an international think tank on global future perspectives (http://millennium-project.org/), has developed long-term scenarios on the future of work and technology 2050. This workshop moderated by Cornelia Daheim, Chair of FEN (Foresight Europe Network)[8] and the German Node of the Millennium project, brings in different perspectives on the scenarios and the question how work might develop, by contrasting different national or regional perspectives and facilitating an interactive discussion.

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[8] FEN = FORESIGHT EUROPE NETWORK – the new joint initiative of the European Millennium Project Nodes Initiative (EuMPI) & the European Regional Foresight College (ERFC) was established in Paris, October 24, 2014. See http://www.feneu.org/en/news/

These perspectives are provided by representatives of different countries, mostly chairs of the regional Nodes of the Millennium Project and members of the Foresight Europe Network. They share what is specific in their national or regional discourse on the topic, e.g. from national workshops or studies on the thematic under discussion. The session is organized as a participatory workshop, i.e. it will feature short presentations as a starting point, but will afterwards enable an interactive, yet systematic discussion. Exemplary questions are: Could the synergy of automation, digitalization and robotics replace a major share of jobs in Europe (and other world regions)? What are upcoming changes in skills demands, which new occupations might emerge? How does the trend towards new organizational forms (agile work, teams "without" hierarchy as in holocracies etc.) bring about new demands on the education system? How can public and private institutions prepare for and answer to the potentially disruptive changes in the work landscape?

Thus, the discussion will focus on how participants expect work, jobs and skills demands to change in the next decades, and what actions should be pursued in order to deal with potentially disruptive developments in the field.

Key words: Future of Work, Jobs and Skills, Automation & Technology, 2050, Scenarios, Europe

INTRODUCTION TO BRAINSTORMING IN THE FINNISH TABLE

As a table facilitator, Sirkka Heinonen, Chair of the Helsinki Node of the Millennium Project, gave a presentation based on the results from the futures clinique "Fuzzy Futures of Work" (Ruotsalainen et al. 2016) organized by the Neo-Carbon Energy research project at Finland Futures Research Centre[9]. The results are embedded in the vision of "Peer-to-peer Work in Digital Meanings Society 2050" and its seven elements, which are overlapping and intertwined, but focus on specific subtopics. Sirkka Heinonen was assisted by Sofia Zavialova, Millennium Project Intern at Finland Futures Research Centre (FFRC), University of Turku.
The workshop on the Future of Work was run in three rounds. Participants in all five Tables (Czech, Finland, Germany, Poland and Spain) were organized according to the rotation principle. For each round different groups were formed. In the Finnish Table the seven themes / elements that together compose a vision of the desirable future of work in the digital meaning society 2050 were presented (Fig. 1). Each group was invited to answer the following questions:

- Which of these following elements do you find the most interesting?
- What would you like to add or comment?

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[9] See https://www.utu.fi/en/units/ffrc/research/projects/energy/Pages/neo-fore.aspx. See also journal paper by Ruotsalainen et al 2016b.

Fig. 10 The seven themes of peer-to-peer work in the digital meaning society 2050.

Characteristics of the seven elements of peer-to-peer work in the digital meaning society 2050 are the following:

Hybrid Companies – Work as a place for creativity and self-actualisation
In hybrid companies, no sharp division between work and leisure would exist, and a person would be seen as an individual and a human being also when he or she is working – not as a presenter of certain work role. Companies would function as "free enterprises", as concentrations of intellectual and social capital, rather than the profit-maximizing entities of today. This element of the desirable future of work can be described by the dominance of immaterial needs and values. Work in such companies would require workers to self-define their jobs. Management would be replaced by self-management. The function of human work would be to offer a place for workers' self-expression. Work would be meaningful, creative, and purposeful – products would be "authentic" expressions of workers' individuality.

Intimacy Economy – Work and communities
In the "intimacy economy", traditional organisations would be replaced by work-communities as communities of passion. Workplace relationships would be more personal than professional. Customers would also be part of community. Mutual co-creation between producers and consumers would take place. In this sense, the whole society would function as an organic whole. Demand would define supply in much more intricate ways than today. Platforms that connect people with similar interests and enable working flexibility across industries would exist. At different stages of life an individual could be an employee, an employer, a freelancer, and everything in between.

Tribes of Meaning – Community and identity
Communities would allow individuals to construct identities in a meaningful way and to be part of something larger than themselves. Identities, meaning and purpose would be based first and foremost on different communities, and on work done at these communities. Culture

would become much more diverse than today with the freedom to choose one's own way of life as a guiding principle. The ability to "know thyself" and consequently life-coaching would become immensely important. Peer-to-peer world would be more chaotic and more in flux than the present world. This could lead to the emergence of "closed bubbles" of like-minded people as a psychological coping mechanism against the chaos, or, on the contrary, to a "global village" that would replace local communities as a kind of new world religion.

Condition of Hybridity – Networked work
If communities were the basic units of new work, the general organisation model for work could be provided by networks. Organic, porous network structures would replace rigid bureaucracies, and different communities would be linked together by interlocking networks. Networks would merge different values, individuals, worldviews and practices together. They would ensure that individuals retain the freedom to choose for themselves and are not embraced by their communities too dearly. On the other hand, networks would dissolve stable social structures such as nations, and their loss could make people want to belong to "closed" communities that set more or less strict constraints in the behavior of the individual.

Age of Empathy – Networks, sharing and the common good
Thanks to automation, people would have universal income that guaranteed basic standards of living. This, in turn would create a basis for altruism, sharing and solidarity. Empathy would be the guiding principle of interaction in the society. Knowledge and ethical goals would replace monetary compensation and all these would lead to decline of the accumulation of private profit. Individuals would seek spiritual and social fulfillment instead of material rewards. Sharing economy and volunteering work could become a substantial part of work routine.

The Robot Revolution Succeeded by the Human Revolution – The rise of humaneness
In the age of high-tech, society would be highly technologized, but technology would be "discreet" and invisible. Relationship with technology would be more intimate and effortless, i.e. technology would become more independent so that it would work in the background without a need for human intervention. Humans would be freed to use and develop their human skills, those that machines would not yet possess. Creativity and social intelligence would become even more pivotal than today. Humans would ask questions, set goals, and invent new needs, whereas the role of robots would be to help implementing these plans. This would be a kind of a technology-assisted "back to nature" future in which humans would cultivate those attributes that make us humans.

Immaterial Competition – Communities, conflicts and inequality
Nevertheless, this future society might also have its own social problems. The dominance of immaterial values could place people in unequal positions, as some would have more cultural capital and social than others. Despite of material and energy abundance, there still could be competition between companies, marginalization and sociocultural inequality. As a result of shattered public sphere, expert knowledge, and authorities can lose their power and status. Each community and network could have their own notions, knowledge, and morals. Together with chaos and insecurity cased by fragmentation of culture and values, religious fanatism could become alluring for many.

During the workshop, the following three themes were chosen by voting in each rotation group, accordingly. Each participants had one vote. The 1st rotation group chose **age of empathy** (4 votes), the 2nd rotation group voted for the **robot revolution succeeded by the human revolution** (3 votes), and the 3rd rotation group **hybrid companies** (4 votes). Further in the working phase, participants opened up the chosen theme, discussed it, and came up with new ideas, often reflecting their own country situation and future prospects. All the ideas given and discussed were written and added to the poster (see below Fig.).

The participants in the 1st group were: Amos Taylor, Karolina Mackiewicz, Marjukka Parkkinen, Miki Kuribayashi, Reyhan Huseynova, Sari Söderlund and Sofi Kurki. The participants in the 2nd group were: Tero Villman**,** Robin von Euler**,** Nadezhda Mikova**,** Otto Tähkäpää**,** Erica Bol**,** Reyhan Huseynova and Piero Dominici. The participants in the 3rd group were: Camilla Barragán**,** Martha Laura Montemayor, Marrama Zorrilla Vicente, Miriam Vilageliu, Odelot Capdevila Karen, Piero Dominici and Reyhan Huseynova.

Figure 11. Several ideas were proposed and discussed concerning the chosen three elements. The groups' ideas are presented below in the text. Photo: Sofia Zavialova / FFRC.

1 AGE OF EMPATHY

In the age of empathy, the main change can be traced in the shift from welfare state to empathy state, where even the cities are planned according to the "empathy model". Negativity is seen as a disease to be cured. Expertise is shared freely so that everyone benefits. The prestige status of work is at the backstage, and all types of labour are treated equally. Prosuming trend is growing into massive passion that drives the economy. This can be demonstrated by the emergence of prosumeristic fashion 7.0. (i.e. influencers' fashion is massively consumed). Empathy is extended to the world of robots and to nature as well. People are seen as deeply mutually dependent, and empathy is considered as one of the key qualities that is trained and taught at special courses or through 3D games. At the same time, there are also outsiders in such a society who are not willing or not capable to empathize, share and volunteer and this is still an issue to concern in the future. Besides, empathy may

also be seen as a pretense of instrumental reasons. If empathy is seen as currency, it is subjected to have this kind of instrumental value, instead of the original "deep" value.

Documentation of ideas in group "Age of Empathy":

- Negativity as disease to be cured
- Expertise sharing
- Mutual dependence
- Understanding different kinds of work -> valuing the work equally (increasing tolerance)
- Hologram
- Empathy
- Engineer
- Environmental empathy
- From welfare to empathy state
- Empathy trainings?
- The outsiders of empathy society?
- Empathy model city
- What are the mechanisms for defining the common good?
- Does everyone have something to share / does everyone have an opportunity to volunteer?
- New generation with robots having empathy
- Learn through the 3D game
- Empathy as pretense for instrumental reasons?
- Prosuming Passions. Fashion 7.0.

2 THE ROBOT REVOLUTION SUCCEEDED BY THE HUMAN REVOLUTION

The "robot revolution" in title of this group refers to widespread use of robots and automation, which both enables and creates demand for "humane" values. In the time of robot revolution and the rise of humaneness, dimensions of such traditional terms as 'robots' and 'human' are reconsidered. New legislations, policies, ethical codes and overall common understanding are emerging. Global governance is needed to level equality. Each country that wants to be a forerunner in robotisation should have a national vision and road map. These changes have a great impact on the education system as well. Robots are involved in tackling societal problems. Robots are, for instance, used as part of retirement plans. Ethical discussions are constantly needed in order to yield common understanding of human/robot interaction. New human-machine interfaces emerge. Robots become humanized and their rights are taken into consideration and are legally protected.

Documentation of ideas in this group "The robot revolution succeeded by the human revolution":

- Humanizing robots
- New human-machine interfaces
- National visions & road map
- Global governance to level equality
- Ethical discussions and common understanding

- Robots rights (not only human rights)
- We have to realize human revolution. We must recover the dimension of humaneness
- Rethinking education
- Values -> Policies -> Laws
- Robot as retirement plan (when I get old I want my own robot (income)).

3 HYBRID COMPANIES – WORK AS A PLACE FOR CREATIVITY AND SELF-DEVELOPMENT

In the third theme, the leadership structure is going through considerable transformations. The change in communication culture is taking place as well, especially at organizaional and educational levels. The sense behind the act of communication has a deeper meaning than simply extending connections, networking and marketing. More open-minded approach starts dominating also at the public level. "Free enterprises" are emerging thanks to sufficiently flexible framework. The state realized the importance of fit between creative potential of the labour forces and the work opportunities that they get, therefore it took the leading role in coordinating even distribution of working places according to people's preferences and capacities. Continued education programs that are focused on interdisciplinary team-work are available. Education is oriented on peace and conflict management, and developing emotional intelligence is one of the most appreciated goals.

Documentation of ideas in group "Hybrid companies":

- High level of IT development
- Change the leadership structure
- Facilitate. Have a sufficiently flexible legal framework to allow for these 'free enterprises' to emerge.
- Open-mind approach for self-development
- Administration must offer their jobs to everyone
- Continued education programs
- Interdisciplinary team-working
- Help identify all personal talents & develop them
- Experience validated as much as academic studies
- Open-minded. What we can do before?
- A new culture of communication
  - o communication VS connections
  - o communication VS marketing
- Developing emotional intelligence
- Education for peace / conflict management

Finally, a summary of the discussions was presented by Sirkka Heinonen in the end of the workshop, as was done for the other four tables as well by their moderators. The work done in this session can be fed into the reflections on Future of Work and Technology 2050 if feasible.

SLIDES & REFERENCES

Ruotsalainen, J., Heinonen, S., Karjalainen, J., Parkkinen, M., Laurén, L. M., & Salminen, H. (2016). The Fuzzy Futures of Neo-Carbon Work. Neo-Carbon Futures Clinique II. Finland Futures Research Centre eBook 11/2016, 72. http://www.utu.fi/fi/yksikot/ffrc/julkaisut/e-tutu/Documents/eBook_11-2016.pdf

Ruotsalainen, J., Heinon en, S., Karjalainen, J., & Parkkinen, M. (2016b). Peer-to-peer work in the digital meaning society 2050. *European Journal of Futures Research*, *4*(1), 10. https://link.springer.com/article/10.1007/s40309-016-0092-2

8. COMMENTS TO THE KEYNOTE SPEECH OF CORNELIA DAHEIM ON "THE FUTURE OF WORK – SCENARIOS FOR 2050 FROM THE MILLENNIUM PROJECT AND BEYOND" AT PLENARY SESSION

BY **SIRKKA HEINONEN**

Figure 12. Cornelia Daheim giving her keynote speech on the future of work. Photo: Juho Ruotsalainen / FFRC.

Figure 13. Sirkka Heinonen commenting the keynote speech of Cornelia Daheim. Photo: Juho Ruotsalainen / FFRC.

At the conference "Futures of a complex world" held on 12-13 June 2017 in Turku, Professor Sirkka Heinonen was invited to give her comments to the keynote speech of Cornelia Daheim, a foresight expert and consultant, chair of the Foresight Europe Network (FEN) of the Millennium Project, and founder and principal of Future Impacts.

After welcoming the audience and expressing her pleasure in discussing the speech of Mrs. Daheim, Professor Heinonen pointed out that future of work occurs to be a hot topic nowadays, since work is so close to our hearts, lives, and livelihood, and therefore, is a serious issue to be tackled.

Primarily, Heinonen talked about the similarities between two sets of scenarios on the future of work. There are several scenarios constructed on the future of work, and here closer attention is given to the scenarios produced by the Millennium Project (MP) and the transformative scenarios made within the Neo-Carbon Energy Project. The comparison of the two sets revealed the existence of quite many similarities between them even if the MP has three scenarios and Neo-Carbon Energy project four. According to Heinonen, the found similarities raise the key issues very well.

Heinonen noted that the important challenge emphasized by Daheim was a big need in positive narratives. Everybody knows all the risks, threats and negative sides that cannot be ignored – such as high rate of unemployment and the threat of robots replacing human jobs. However, these problems should not just be bemoaned over but they ought to be seriously tackled, in order to create the preferred future. In relation to that, Heinonen highlighted the intriguing concept of *hybrid futures* and opened it up more in detail. Typically, hybridity happens in many sectors of life and there is nothing new about it. 'Hybrid' means a combination of two or more things, but it is not just a simple combination; there is something more in these kind of hybrid entities. Of course, in biology the term 'hybrid' refers to an animal that has been produced from two different types of other animals. In ancient mythology, a lot of hybrid figures were used and they usually had some kind of superpower (e.g. snakes with several heads causing havoc or Centaur with positive power). Perhaps, this metaphor of hybridity with added value (positive power) can be applied to modern day and the future of work.

Further, Heinonen challenged the audience to inquire what hybridity in work would mean. It would mean several combinations. Combinations of physical, virtual, digital work, techniques, spaces, practices, contents. But it could also mean that we focus our attention to hybridity of organization, companies and the networks. It would also refer to combination of public and private sectors, technology, culture and art. In addition, it would mean different activities in life - working not as a separate activity but in the mélange of housing and leisure. To this respect, Heinonen mentioned 'bleisure', the term that was coined by one of the participants in the futures Clinique "Fuzzy Futures of Work", meaning hybridity of business and leisure. She also referred to Daheim who said that in the future, work would not be perceived as just income and status thing, but would be associated more with our identity, social connections and meanings.

According to Heinonen, apart from paradigm shifts in the field of work also transformations in the field of energy should be taken into consideration, because there are similarities therein as well. From societal perspective, the most radical consequence of the renewable energy transition that we are in, may be rapidly the falling marginal costs of energy. On the other hand, as physical production is being automated, the marginal costs of physical products are also decreasing. Hence, according to Heinonen, we may be entering an automated and robotized *"post work" society*, where collaborative and cocreative models of organisation replace traditional organisations. To this respect, prosumerism (consumers = producers) and sharing economy increase, and they are undoubtedly important in changing both the paradigm of work and of energy.

Work or paid labour salary work as we know it today is ending and something else is needed instead. Based on her research, Heinonen proposed that peer-to-peer production model as a possible answer to this kind of a quest for a positive narrative. Both from the point of energy transition and also form the point of paradigm of changing work and production. She advocated this *"peer-to-peer work in digital meaning society by 2050"* to be a preferred future vision of the future of work. This digital meaning society means that we have digitalisation which is related to automation and robotisation but we should not aim at digitalisation as such. It is just an enabling platform for digital products and digital services. The main idea and focus in the concept of digital meanings society is on work as redefined as *meaningful activity*. Heinonen talked about an initial workshop of the last year where the MP scenarios were used. The results from the futures clinique were documented in the report "Fuzzy futures of work" and in a journal paper that are available online as well. Heinonen and her research group studied future of work in the world of automation and distributed low-cost renewable energy. Five groups were invited to tackle the question of what the future of work would look like in their scenarios. As a result, the key themes were clustered and classified into seven categories. As a result, a vision of "Peer-to-peer work in the digital meaning society" with these seven key elements was elaborated. It was organised as an initial "warm-up" workshop for a national workshop to discuss MP scenarios later. This of course requires one or two stakeholders to take charge of this task.

Heinonen mentioned a very interactive workshop that was moderated in the FFRC conference by Daheim just before this keynote session. During the workshop five tables were invited to present their considerations, reflections for the future of work.[10] The results will give further feedback to the MP scenarios.

Moreover, Heinonen opened up and described one of the above mentioned seven key elements of peer-to-peer work in digital meanings society 20150, i.e. *hybrid companies* – work as a place for creativity and self-actualisation. According to this element, in the future work will be seen as a place for creativity and self-actualisation. This idea intervenes directly with the same kind of contents that MP scenario "Self-Actualized Economy" has. There is no sharp division between work and leisure and more focus is paid on immaterial needs and values. Companies are truly functioning as "free enterprises". They are mainly seen as concentrations of social and intellectual human capital, which is their asset. They are not just profit-maximising units. Undoubtedly, this characteristic is an ideal preferred future - it is not automatic but this is the key element of this kind of vision, i.e. self-defined job, self-

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[10] For results, see Chapter 7 in this working paper.

management and constant learning. The function of human work is to offer a place for workers' self-expression. Therefore, the work is meaningful, creative and purposeful. Products are "authentic" expressions of workers' individuality. Together with technological developments, such as robotisation, automation, and artificial intelligence, increases in search for meanings and social capital in work and on the other hand, decreases in energy and automation / production costs could steer our world into unknown – complex and hybrid futures.

To conclude, Heinonen stated that in order to attain decent future for work, hybridity as well as the vision for peer-to-peer work in digital meanings society could be used as a lens for optimal combinations in the nature, organising, practices and meanings for work. Futurists should foster debate about alternative options. She suggested to redefine work as meaningful activity and systematically trying to find solutions through that in order to achieve this goal. Lastly, she asked Daheim to comment this proposal.

Daheim responded to the question by providing an example of digital learning apps that were developed by young people in Germany as one of the alternative ways to tackle the refugee crisis and to help refugees to learn German language and to adapt to the new environment. Different start-ups and new forms of cooperation were formed in order to work on this digital solution. That was evidence and an illustrative example of digital meanings society.

SLIDES & REFERENCES

Ruotsalainen, J., Heinonen, S., Karjalainen, J., Parkkinen, M., Laurén, L. M., & Salminen, H. (2016). The Fuzzy Futures of Neo-Carbon Work Neo-Carbon Futures Clinique II. Finland Futures Research Centre eBook 11/2016, 72. http://www.utu.fi/fi/yksikot/ffrc/julkaisut/e-tutu/Documents/eBook_11-2016.pdf

Ruotsalainen, J., Heinon en, S., Karjalainen, J., & Parkkinen, M. (2016b). Peer-to-peer work in the digital meaning society 2050. *European Journal of Futures Research*, *4*(1), 10. https://link.springer.com/article/10.1007/s40309-016-0092-2

9. CHAIRING AT SESSION 1 – SPECIAL SESSION WITH A KEYNOTE SPEECH: AGING SOCIETY AND URBANIZATION & SESSION 2 – FORESIGHT IN TECHNOLOGY

BY **SIRKKA HEINONEN**

At the Conference, two Sessions were chaired by Sirkka Heinonen, leader of the foresight part of the Neo-Carbon Energy Project and Chair of the Helsinki Node of the Millennium project. In both of these sessions there was a presentation by NISTEP representative from Japan (Mr. Naoki Saito, and Dr. Miki Kuribayashi, see below). In April 2017 Sirkka Heinonen had been at NISTEP, Tokyo to give a foresight lecture on hybrid methods, using material and results from the Neo-Carbon Energy project.

Figure 14. Sirkka Heinonen chairing at Session 1 on Aging Society and urbanization while Naoki Saito is speaking. Photo: Anne Arvonen / FFRC.

Figure 15. Naoki Saito giving his keynote speech on matured aging society and foresight in Japan. Photo: Anne Arvonen / FFRC.

Session 1 was a Special Session on Aging Society and Urbanization. At this session, chaired by Sirkka Heinonen, three reports were presented. A plenary speech "Towards multi-generational cohabitation in the era of matured aging society, from the perspective of S&T foresight in Japan" was given by Naoki Saito. Nourhan Hegazy talked about "Critical futures of aging in society-enabling futures of intergenerational knowledge creation" and Christopher D. F. Rogers introduced his research about "Engineering future cities – The value of extreme scenario methodologies".

Figure 16. Sirkka Heinonen, Nourhan Hegazy, Naoki Saito / NISTEP & Christopher D. F. Rogers. Photo: Aleksej Nareiko / FFRC.

At session 2, in the section of "Foresight in Technology", the following presentations were given: "Participatory foresight and the future internet: Buliding futures through communication" by Mario Guillo, Ana Bossler and Enric Bas, "The strategic transformation for future societal vision – Japan's innovative approach" by Miki Kuribayashi/NISTEP, "To understand creativity in virtual work: identification of leadership toward creativity in different types of companies" by Iris Humala, and "The capability of strategic foresight – a cultural approach" by Stefan Josef Marquart and Michael König.

Figure 17. Iris Humala, Miki Kuribayashi, Sirkka Heinonen, Ana Bossler & Stefan Josef Marquart. Photo: Sofia Zavialova / FFRC.

Heinonen, Sirkka (2017). Hybrid Methods for exploring transformative futures -the importance of identifying pioneers and black swans. Visiting expert lecture at National Institute of Science & Technology Policy (NISTEP), at the Ministry of Education, Culture, Sports, Science & Technology (MEXT), organized by Science and Technology Foresight Center (STFC), NISTEP "Human Information Technology Ecosystem" project by RISTEX, 24th April 2017, 67 ppt slides.

Video of the lecture: https://sites.google.com/site/futuremediac/videos--presentations

Heinonen, Sirkka (2017). New Directions for Japanese Futures Studies (in Finnish). Newsletter of the Finnish-Japanese Association KOKORO 2/2017, p 24-26.

CONCLUSION

Like in 2015, this year the Neo-Carbon Energy project contributed to the annual conference "Futures of a complex world" (12th-13th June 2017) organised by Finland Futures Research Centre, University of Turku. Its input consisted of mainly six presentations directly from the Neo-Carbon Energy project, two events in particular from the cooperation with the Millennium Project (MP). MP was represented by Ms Cornelia Daheim and Professor Sirkka Heinonen, German and Finnish MP Nodes respectively. Together with Daheim, Heinonen moderated a workshop where results from the futures clinique "The Fuzzy Futures of Neo-Carbon Work" were introduced to the audience and further elaborated. Heinonen also chaired two sessions and commented the keynote speech of Daheim, where similarities between the two sets of scenarios resulting from MP and NCEP were demonstrated.

The abstracts and highlights of presentations from the Neo-Carbon Energy project are included here. Additionally, the report contains the summary of the workshop on the future of work as contribution from the MP. The two sessions Heinonen was chairing are also presented here since there are methodological and foresight activities co-operation under planning between Finland and Japan. In both of those sessions there was one representative from NISTEP (National Institute for Science and Technology Policy in Japan), and in addition Heinonen had been earlier lecturing at NISTEP.

Next year's conference "Energizing futures – sustainable development and energy in transition" organized by Finland Futures Research Centre will take place in Tampere, 13th-14th of June 2018. The forthcoming conference will focus on the future of energy and sustainable development. The conference will address such topics as renewable and non-renewable energy sources, energy transition, energy markets, energy efficiency and policies, energy end-use patterns and consumer behaviour. For the 2018 conference, the Neo-Carbon Energy project will have further results and findings – finalised scenarios and case studies from Argentina, China, Africa and Australia – to share with the expert audience in order to get feedback, provoke further thinking, and research development processes.

Overall, these presentations contribute to the internationalisation goal of the overall project by disseminating information and tentative results, exploring possible applications, as well as inviting comments and perspectives from beyond the project team. Neo-Carbon Energy project team members also made new contacts within the futures research and foresight community, growing the project's international network. These global networks, notably the Club of Rome and the Millennium Project, would play a key role if the world's energy economy is to be transformed into an emission-free Neo-Carbon system. We do this work not only for Finland's future, but for the well-being of all of Earth's inhabitants. The elaborated Neo-Carbon Energy scenarios, under development at the time this report was prepared, will be published when completed by the end of 2017. Professor Sirkka Heinonen and her project team – Joni Karjalainen, Juho Ruotsalainen, Marjukka Parkkinen, Sofia Zavialova – at Finland Futures Research Centre invite readers of this working paper to share their own insights and perspectives in the spirit of shaping a bold new vision for renewable and emission-free energy in Finland and the world.

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