Pioneer Analysis as Tool for Anticipation of Futures Agency

– Case of Surprising Energy Futures

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S7 Creating Resilient Communities
Italy 7th April 2017

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FINLAND FUTURES RESEARCH CENTRE
Turun yliopisto University of Turku
Millennium Project

My Background

- Professor of Futures Research at the Finland Futures Research Centre (FFRC), University of Turku 2007 –
- Previously Chief Research Scientist at VTT (1979-2007)
  - technology foresight, future of cities,
  - sustainable knowledge, innovation
- President of the Finnish Society for Futures Studies (FSFS) 2012 – 2015, Vice-President 2016 –
- Chair of Helsinki Node of the Millennium Project 2001 –
- Member of the Club of Rome 2005 –
- Member of the Finnish Academy of Technical Sciences 2010 –
- Member of the Scientific Board of National Security 2016 –
- Guest Professor at USTC (University of Science and Technology of China)

Structure of Presentation

1. Pioneer Analysis
2. Neo-Carbon Energy Project and
   Its Transformative Scenarios
3. Glocal Insights Looking for Futures Agency
4. Case of Surprising Energy Futures

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1. Pioneer Analysis

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Key Questions on Pioneers

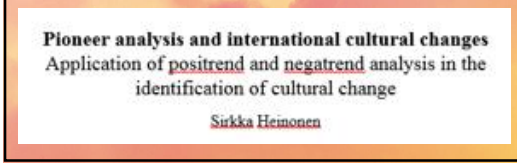
Why study pioneers?

Who are pioneers?

= person who is among the first to explore or settle a new country or area/those who develop or are the first to use or apply new method, knowledge, or activity.

What characteristics?

What relation to weak signals and transformative futures?


Pioneer analysis and international cultural changes
Application of positrend and negatrend analysis in the identification of cultural change
Sirkka Heinonen

Forthcoming in Acta Futura Fennica 10
Finnish Futures Studies Society (2017)

We are living in a world of ever increasing interconnectedness through digitalization, globalisation, exacerbating environmental conditions, severe economic challenges, uneven distribution of wealth, and geopolitical crises.

More emphasis should be paid on the constant systematic identification and analysis of **weak signals** to detect emerging issues and their relevance.

In analogy to weak signals, pioneers can be considered as agents of future creation.

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Outside the mainstream, pioneers are consciously building activities on the **goals they see meaningful and promising for the future.**

A pioneer is **determinately and boldly** looking for an opportunity for change.

Pioneers **are individuals, organisations, communities or even countries** that are ready to tackle all obstacles of adopting new technology or innovations + pioneering new practice

By acting like this, they create space for **new social practices** and demand for new products in the markets, needed for new ideas to spread.

Accordingly, like weak signals, pioneers are identified as paving the way for emerging futures and opportunities.

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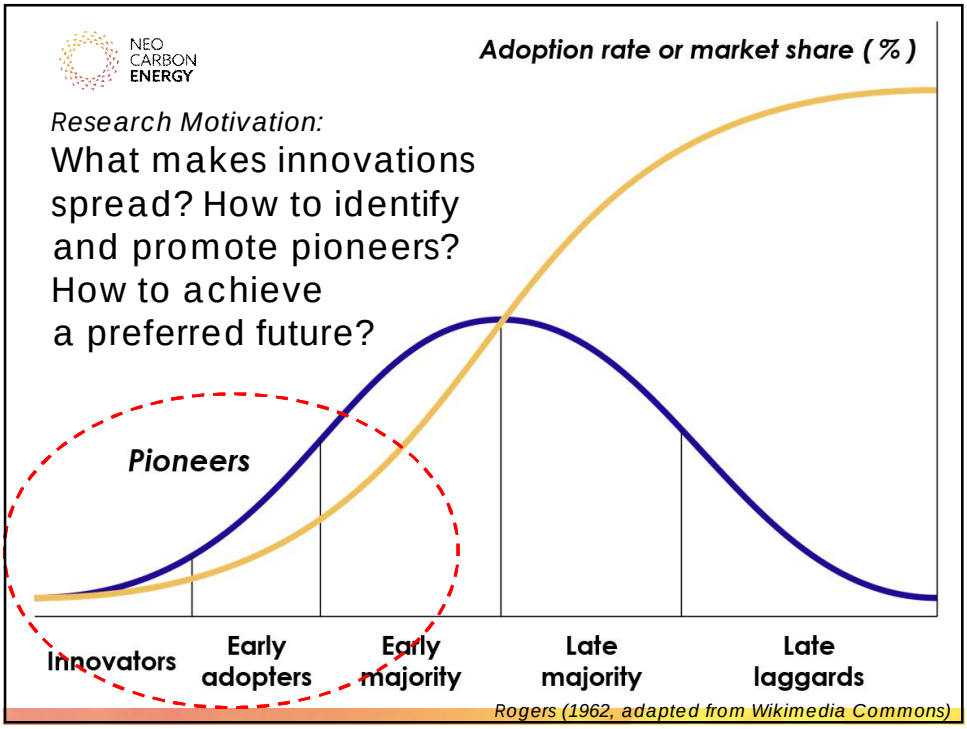
Research Motivation:

What makes innovations spread? How to identify and promote pioneers? How to achieve a preferred future?



2. Neo-Carbon Energy Project and Its Transformative Scenarios

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Neo-Carbon Energy Project

2014-2017

Christian Breyer, LUT,
How to reach a 100% renewable energy system?

- **Horizon scanning**
- **Futures Cliniques**
- **Transformational scenarios on Neo-Carbon Energy Futures 2050**

Business, government and NGOs

Pasi Vainikka, VTT
Project Coordinator

Neo-Carbon Energy is one of the Tekes strategy research openings, carried out in cooperation with the Technical Research Centre of Finland VTT Ltd,Lappeenranta University of Technology LUT, and Finland Futures Research Centre FFRC.

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Millennium Project
José Cordeiro, Singularity University; **Sirkka Heinonen**, Finland Futures Research Centre, Future of Energy Innovations
http://www.neocarbonenergy.fi/

https://www.youtube.com/watch?v=Ww76jNrVHhw&feature=youtu.be

Neo-Carbon Energy project

What is Neo-Carbon?

- In the neo-carbon system, energy is produced by solar and wind technologies and is stored in synthetic methane. Not only energy production, but the whole-of-society will be affected by this new energy system.
- Possible socio-economic consequences and prerequisites of the neo-carbon energy system are anticipated. The future energy system and landscape is affected by changes in socio-cultural aspects such as value systems and people's lifestyles.

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ENERGY IN A NEOCARBONIZED WORLD

SOLAR AND WIND

Solar and wind power are the engines of the future energy system.

NEOCARBONIZATION

All energy consuming sectors will be electrified by solar and wind: transportation, heating, cooling, electricity, industry, food and water production.

ENERGY STORAGE

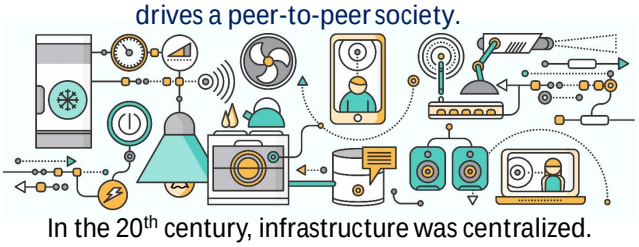
Energy from solar and wind will be stored in various forms.

POWER TO PEOPLE

The transition of the energy system also induces transformation in the ownership basis in energy sector and energy

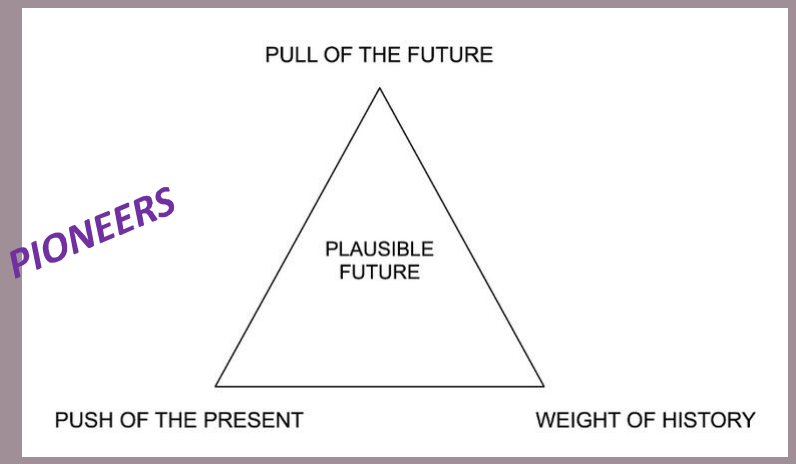
In the neo-carbon world, everything is produced emissions-free with solar, wind, and other renewables. Synthetic products replace oil (generated by the electricity from renewables).

In the 21st century, decentralized energy system drives a peer-to-peer society.



In the 20th century, infrastructure was centralized.
In the 21st century decentralization proceeds.

Empowered Emission-free World



Climate Change

Fossil Era

Futures Triangle by Sohail Inayatullah (2007)

Transformational Scenarios

We constructed all our four neo-carbon scenarios to represent the "Transformational" category in order to not to be too cautious or conventional in exploring futures.

Deep ecology	**RADICAL STARTUPS** Society is business-oriented, but economy is driven by a multitude of small-scale startups known for their "radical" values and approaches. Environmental problems are solved commercially. Businesses are drivers of new, ecologically oriented lifestyles. Peer-to-peer approaches take place within startups and their networks.	**NEW CONSCIOUSNESS** Threat of an ecological collapse and ubiquitous information&communication technologies have led to a new kind of consciousness. Human beings are deeply intertwined with nature and with each other. Environmental problems are not seen as practical issues but called for deeper changes in values and mindsets.
↑ *Ecological awareness* ↓		
Pragmatic ecology	**VALUE-DRIVEN TECHEMOTHS** Peer-to-peer approaches are practiced within global technology giants called "techemoths". Techemoths provide solutions for environmental issues and are developers of cutting-edge energy technologies. Markets take care of environmental issues.	**GREEN DIY ENGINEERS** The world has faced an ecological collapse. Engineer-oriented citizens have organized themselves as local communities to survive. Environmental problems are solved locally, with a practical mindset.

Corporate *("Centralized" peer-to-peer)* ← *Peer-to-peer* → Neo-Communal *(Distributed peer-to-peer)*

Connecting the pioneer analysis with scenarios

Pioneer analysis was used to examine the pathways towards a future 100% renewable energy society.

The key idea and hypothesis in this survey is that futures knowledge can be obtained by identifying these forerunners and learning from them proactively.

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3. Glocal Insights Looking for Futures Agency

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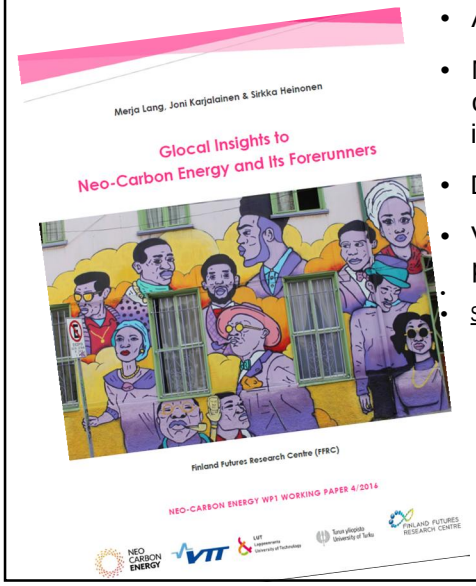
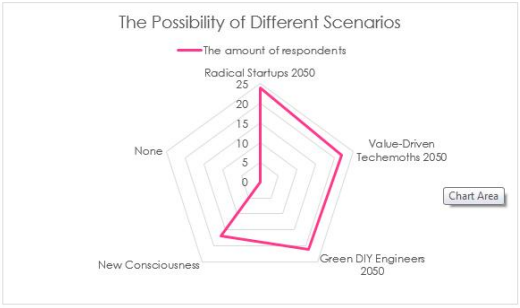
Tailor-made expert survey on the Neo-Carbon Scenarios 2050



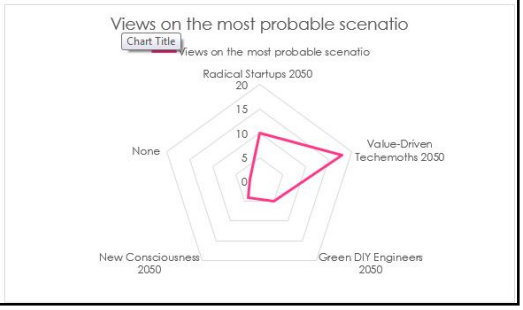
- Aim: To identify forerunners
- Millennium Project, Club of Rome and other experts from case countries invited
- Descriptive, not statistical analysis
- Views: which scenarios are possible, probable and preferred and why?
- Sample questions:
  - What would need to change in your country for radical startups to flourish?
  - What would make the large companies in your country develop products and services based on renewable energy?
  - How can society support these DIY engineers?
  - What local issues drive new consciousness in your country?

THE RESPONDENTS

- Link open 21.7.–8.8.2016
- 160 experts worldwide, 39 answers (~24%),13 different countries
  - China 4 (+Hong Kong 1); South Korea 2; Kenya 8; Tanzania 5 ; South Africa 2
  - Australia 9; Argentina 2; Finland 1; USA 2; Switzerland 1; Spain 1; Latin America (as a whole) 2
- Report published as WP1 working paper
- The results are used to modify and deepen the global meta-scenarios, and to contextualise them in different countries



Graph x: The viewed possibility of different scenarios among the respondents



Radical Startups

Who is radical?

- A technology company whose products relate to renewable energy: batteries, solar panels, mini-grids, solar tiles for roofs, portable biogas units for organic waste treatment, energy efficient drinkable super meals.
- Companies that produce materials or biofuels: fertilizers, nutrient recycling, RE consultancy
- Services with "a new angle": eg. mobile internet developers
- Social experiments / movements

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What is radical?

- Majority of respondents emphasised the radicality of the technology or innovation the company produces or offers.
- Others saw
  - Radicality in the innovative business models (e.g. M-Kopa Solar in Kenya)
  - The impacts on society as being radical.
  - New thinking that comes along with their actions: pioneers live and lead by example, bring people and experts together

What would make Radical Startups flourish?

- An enabling environment must be accomplished.
- Action is needed from *the government, private investors, customers and the companies themselves.*
- *The role of government is that of an enabler*:
  - less regulation and taxation,
  - ending the dependence on coal,
  - more incubating and real acceleration programs,
  - pricing carbon,
  - opening the national grids,
  - offering economic incentives,
  - making data open,
  - making wise education policies
  - overall visionary policy-making.
    - *Several respondents criticised governments for the lack of foresight and vision in their innovation and energy policies.*

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"(In Australia), they already flourish, provided they succeed in prototyping and have some worthy of investment" (Respondent #22).

"Policies need to change as fast as the innovation happen", a Kenyan respondent (#25) states.

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Value-Driven Techemoths

Who is value-driven?

- *Business around renewable energy, but core business elsewhere:* GM, Ford, Toyota, Exxon, Boeing, Huawei, Lenovo, Samsung, LG, BHP Billiton, Unilever, Google, IBM, and Phillips.
- *Traditional energy producers & distributors, but core business is non-renewables* Neste Oil, Origin Energy, Powershop, Energex and Ergon, Shell, PJM, Exxaro, Kenya Power Company, Edeanor and ISA.
- *Local renewable energy companies as value-driven techemoths*: Panax Geotherm, Sky Solar Holding Co, Epuron, M-Kopa, Gamesa, Mumias Sugar Company, D-light Solar Company and Mobisol.
- *Telecommunications companies* mentioned particularly by many African respondents

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How do values show in the companies work?

NEGATIVELY:

- Lobby: block climate change legislation, protect their market position,
- Operate across the world, but sustainability reports are written in the headquarters,
- They control all energy distribution in a given country.
  → How to get them on board and how to shift their cultures?

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VALUES:

1. *internal values*: nice, corporate *working conditions* (might nickname their employees.)
2. Many companies *show an interest in the sustainable energy production*
3. The way they operate with their customers or the surrounding communities
4. a value-statement in itself that the company chosen to contribute to the renewable energy transition
5. the impact of the company with its values

What would make large companies develop products and services based on renewable energy?

The role of governments as enablers and supporters is seen as essential

The role of the public: more significant in the case of techemoths than startups: social pressure, customer pressure, change in attitudes, more demand, higher awareness.

Circumstances: increase in oil price, realism about the climate change, awarness of megatrends, technological advances, global demand for green economic development and finally: energy scarcity.

One "circumstance" is business logic: profit, low development cost, saving costs, economic viability, return calculations, strong financial returns for shareholders – all would motivate these companies.

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"Though being traditional the company is reinventing itself to take advantage of new technology"

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Green Do-It-Yourself Engineers

Who is "green DIY"?

1) *Non-governmental organisations (NGOs) and Think and Do Tanks,*
2) *alternative experiments or communities,*
3) *universities and other schools or research institutes,*
4) *DIY renewable energy producers (individuals)*
5) *companies (and their representatives)*
6) *cultures*

What motivates Green DIY Engineers?

- *DIY as mentality,*
- *DIY as activism*
- *DIY as learning*
- *DIY as a statement*
- *DIY as business*
- *DIY as fun*
- *DIY as a necessity*

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How can society support Green DIY Engineers?

1) Also DIY engineers expect *governmental support*:
   - stop fossil subsidies, open energy sector, motivate actors, remove obstacles, create relaxed & free environment to develop, recognise achievements, learn from what works, reduce red tape, invest in technology transfer & technology development.
2) Society as a whole: Create demand
3) Education:
   - higher education in engineering, better linked education and business sectors, RE in curriculums
4) Leave us alone!
   - How can society adopt new innovations?

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"Kariuki Kiragu is an architect 'who believes in creating closed loop communities that generate their own energy, food and economic systems' ".

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New Consciousness

What drives new consciousness?

- Environmental degradation
- Economy: save costs, scarcity of biomass, oil price spikes
- Politics: driving and slowing factor
- Diffusion of technology
- Cultural reasons

- Counter-argument: there is no new consciousness in sight, even though, theoretically, they feel it should already be there.

Who pioneer new consciousness?

- *Individuals*
- *NGO's*
- *movements*
- *spiritual communities (e.g. churches)*
- *universities and research communities*
- *interest groups*
- *the media*
- *state*
- *business*

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How can citizens express their lifestyles through energy solutions?

1) citizens can reduce energy consumption in their energy choices and everyday decision-making points on traffic, waste etc.;

2) citizens can consume green products and services: products of factories that run on renewables, that help to save energy or even private investment.

3) Citizens can "go solar" and produce the energy they use by themselves;

4) being politically active and vote for those that drive change; and

5) expressing values by joining NGOs or interest groups or by being active on social media and building networks.

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"Being tired of living just to pay bills, being tired of living stressful life, being tired of just functioning and not living". (Respondent #8)

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Summary of Survey Results

- Value-Driven Techemoths 2050 scenario was seen as the most probable scenario, whereas Radical Startups 2050 and New Consciousness 2050, both based on deep ecology, were seen as the preferred scenarios.
- The spirit described in the Startups scenario can be found in other types of organisations: an entrepreneurial mind is needed also when starting a social experiment or a movement.
- Some respondents discussed cross-sectoral linkages from renewable energy (such as solar and wind eg. in linkage with the constructions and transport sector) or mentioned novel energy services that are emerging from digitalisation.

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Reflections on connecting scenario-building and pioneer analysis

- Actors that resemble those in our Neo-Carbon Energy scenarios, already exist to some extent in today's societies. Therefore, they can be considered pioneers of these futures images who are paving the way into a sustainable Neo-Carbon future.
- Because actions and decisions are made by characters in real-life, eventually these (and other) pioneering actors in society can make transformative scenarios to be realised.
- They can also provide futures knowledge of the potential systemic implications that stem from the adoption of the innovations and practices proposed by the pioneers.
- Further planned work: *how to contextualise the role of pioneers even further in the study of energy transformations,* considering local circumstances and institutional context*?*

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4. Case of Surprising Energy Futures

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Surprising Energy Futures

Weak Signals

Pioneers

Discontinuities

Black Swans (wild cards)

→ **TRANSFORMATIVE FUTURES**
Neo-Carbon Energy Scenarios

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Surprising Energy Futures - Testing Resilience of Renewable Energy World with Black Swans

- **Futures Clinique of the Neo-Carbon Energy Project at Sitra, Helsinki, Finland 17th May 2017** (if interested please contact S. Heinonen)

- The keynote speaker is Dr. Karlheinz Steinmüller (Z_Punkt)/Millennium Project
- Commentary by Dr. Jarno Limnell (Aalto University), professor of cyber security

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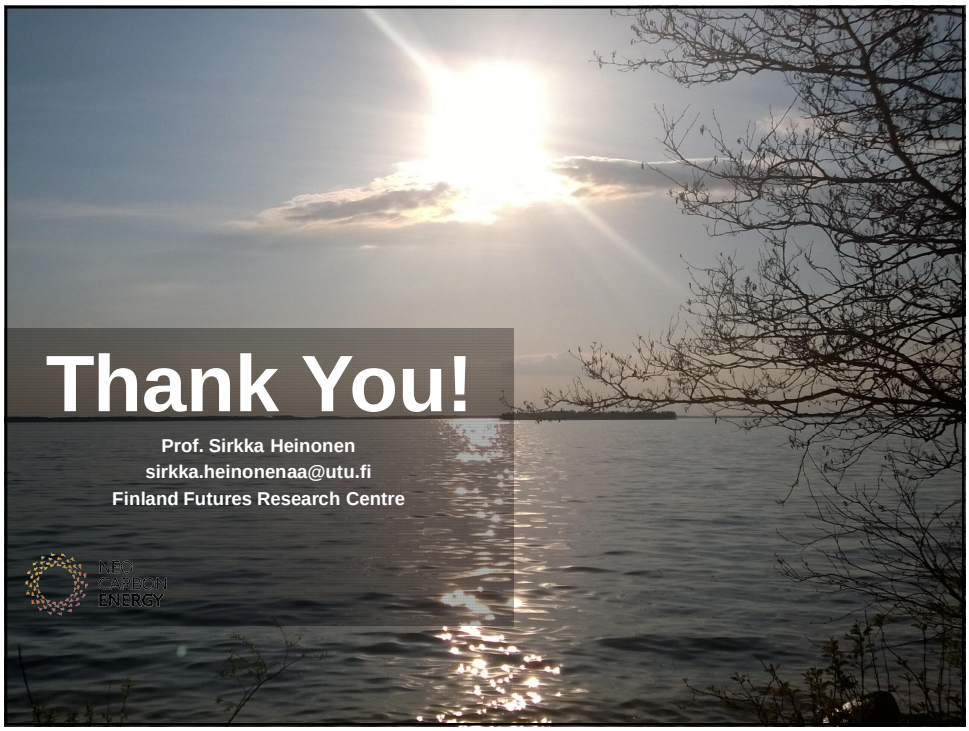
DISCUSSION

- Is the analogy of pioneers and weak signals as pointing the way to possible futures valid?
- How to identify, analyse and contextualise pioneers?
- How to analyse their motivations?
- Can they be engaged in anticipation intuitively?

Or through their entrepreneur spirit?

- Can analysis of pioneers help us in our efforts for understanding how the future evolves?



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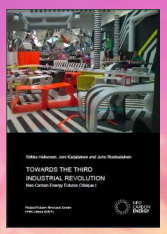

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"We have the science, the technology, and the game plan to make it happen. Now it is a question of whether we will recognize the economic possibilities that lie ahead and muster the will to get there in time."

- Jeremy Rifkin -

NEO-CARBON REPORTS

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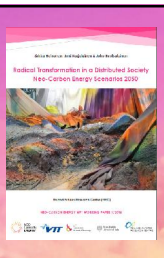

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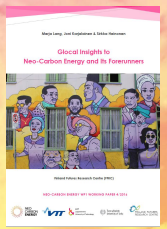

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Tulevaisuuden tutkimuksen seura
Sällskapet för framtidsstudier
Finnish Society for Futures Studies

FORTHCOMING:
A COLLECTION OF
FUTURES RESEARCH METHODS

Acta Futura Fennica 10
How Do We Explore Our Futures?
Acta Futura Fennica 10

How Do We Explore Our Futures?

- This book comprises **20 leading Finnish futurists** revealing their **practical and theoretical knowledge of futures studies**. The texts are a cross-section of twenty years of futures research. The writers present methods and their practical applications, demonstrating various interactions between futures research and other fields of science.
- It samples a large variety of modern futures studies' methodology including sections on evolutionary and systems thinking, expert-based knowledge evaluation and time-series based methods like Delphi and Causal Layered Analysis (CLA). The book also deals with communicative futures methods such as futures workshops and scenario work. In addition, it includes three chapters focusing on newer methods such as the anticipation of Weak Signals and Black Swans.

How Do We Explore Our Futures?

Editorial Board: Osmo Kuusi, Sirkka Heinonen & Hazel Salminen
Publisher: The Finnish Society for Futures Studies (www.futuressociety.fi) **Series**: Acta Futura Fennica 10

Content

- Foreword by Sirkka Heinonen and Osmo Kuusi

Introduction

The fundamentals of futures knowledge

- Pentti Malaska: About futures awareness and futures knowledge
- Ilkka Niiniluoto: Futures studies – an art or a science?
- Matti Männikkö: Futures research and history research
- Olavi Borg: Future studies – the identity of a science and its relationship to other sciences

How Do We Explore Our Futures?

Evolutionary and systems thinking

- Jyrki Luukkanen: The role of systems models in research and planning. Constructing a novel dialectic comprehensiveness
- Jarl-Thure Eriksson: Chaos theory and the controllability of complex systems
- Mika Pantzar: The evolution theory as a methodology of futures studies
- Osmo Kuusi: Mathematical economy models as tools for studying the futures

How Do We Explore Our Futures?

Scenario thinking

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- Vuokko Jarva: Scenario drama as a gender-sensitive tool for learning from the futures
- Tarja Meristö: Scenario work as a tool for strategic management
- Timo Sneck: The functional paradigm of futures studies

How Do We Explore Our Futures?

Futures workshops as methodology

- Juha Nurmela: The futures workshop and a sample of novel workshop-based futures methods
- Marja-Liisa Viherä: We create the future – About the communication camps and know-how-workshops

Expert-knowledge based evaluation

- Osmo Kuusi: The Delphi method
- Sirkka Heinonen: The pioneer analysis and national cultural changes. Posi- and negatrend analysis as an identifier of radical cultural change
- Anita Rubin: Causal Layered Analysis (CLA)

How Do We Explore Our Futures?

The creative recognition of new opportunities

- Elina Hiltunen: Weak Signals
- Sirkka Heinonen and Juho Ruotsalainen: Black Swans
- Petri Kylliäinen: Role game scenarios

Price: Pre-orders 40 euro + postage (discounted price 35 euro for members of the Finnish Society for Futures Studies). NB! Once the book is published (2017), the price will go up.

Pre-orders: Please contact Hazel Salminen at the Finnish Society for Futures Studies, Finland: **toimisto@futurasociety.fi. No cheques accepted, only international bank transfers. You will not be billed until you receive the published book.**

WELCOME to the 18th International Futures Conference of the Finland Futures Research Centre (FFRC), University of Turku

FFRC celebrating its 25th Anniversary

See program at https://futuresconference2017.wordpress.com