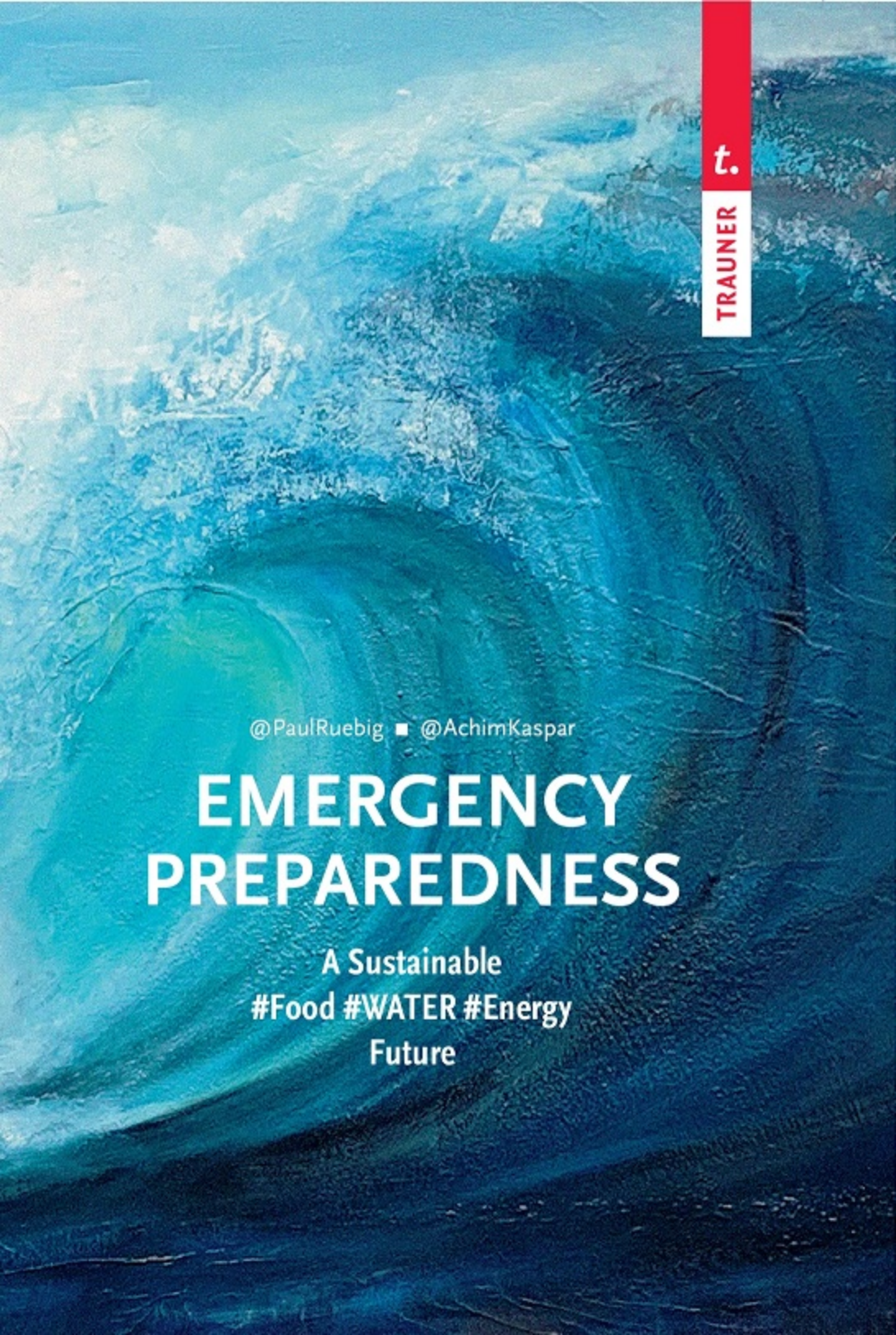
t.
TRAUNER
@PaulRuebig ■ @AchimKaspar
EMERGENCY PREPAREDNESS
A Sustainable
#Food #WATER #Energy
Future

t.
TRAUNER

@PaulRuebig ■ @AchimKaspar

EMERGENCY PREPAREDNESS

A Sustainable #Food #WATER #Energy Future

IMPRINT

Cover image:
"The Wave" von Ulli Perner,
Kunst zwischen den Seen,
Dimension: 100 x 80 cm,
www.ulli-perner.at

Publishing house and distribution:
TRAUNER Verlag + Buchservice GmbH
Köglstraße 14, 4020 Linz
Österreich/Austria

Production:
Druckerei Salzkammergut-Media Ges.m.b.H.
Druckereistraße 4, 4810 Gmunden

PRINTED IN AUSTRIA

ISBN 978-3-99113-867-9
www.trauner.at

@PaulRuebig ■ @AchimKaspar

EMERGENCY PREPAREDNESS

A Sustainable #Food #WATER #Energy Future

ACKNOWLEDGEMENTS

We are grateful to **DI Bruno Lindorfer**, former Chief Research Officer of Siemens VAI Metals Technologies and CEO of the Upper Austrian Innovation and Technology GmbH for his expertise and continuous support throughout the creation of the four EESC Opinions, without which this book would have not come to life.

We extend our utmost gratitude to **Sabine Seidel, MA**, for her outstanding contribution to this book. Sabine's project and author coordination, project management, and tireless efforts were instrumental in bringing this project to fruition. Her dedication, expertise, and attention to detail helped ensure the success of this joint work. Sabine's ability to manage complex logistics and coordinate diverse stakeholders was truly indispensable. Your contribution has made a lasting impact, and we are honored to have had the opportunity to have you onboard this project.

Our sincere appreciation shall also be expressed to **Dr. Horst Heitz**, Executive Director of the SME Europe of the EPP, for his active participation in the developmental process of this compilation. His extensive professional network, expertise in the field and countless vital suggestions throughout the drafting process were invaluable to the project.

THE EDITORS

KR Ing. Mag. Dr. Paul Rübig, fMEP

born in Wels (Upper Austria), entrepreneur and educated as an agricultural engineer in the HTL Steyr, Business Administration JKU Linz, Dean WIFI OÖ (dual education), regional Assembly, national Parliament, member of the European Parliament from 1996 to 2019. He is married and has two children.

In the European Parliament, Paul Rübig was a full member of the Committee on Industry, Research and Energy, and the Committee on Budgets. In addition, he was a substitute member of the Committee on Development and the Committee on International Trade and Co-Chair of the Steering Group of the Parliamentary Conference on the WTO. He was Chairman of STOA (Scientific Technology Options Assessment) – Panel for the Future of Science and Technology, an official body of the European Parliament that is supported by external experts such as universities, scientists, or research institutes. Three time winner of the "MEP of the Year"-Award in 2008, 2013, and 2015, organised by the Parliament Magazine, DodsGroup.

Paul Rübig is very active in the field of small-scale business promotion. He is president of SME Global, a working group of the International Democrat Union (IDU), whose objective it is to support small and medium-sized enterprises (SME) and to improve their business environments.

In 2019 Paul Rübig was appointed to the Advisory Board of Rübig Holding GmbH and he enjoys SDG6 related investments.

In 2022 Paul Rübig was appointed as External Advisor to the Board of Directors of Water Europe and is a member of IWA.

Member of the Governing Board of the European Institute of Innovation and Technology, Budapest.

A new KIC, in the field of Water, Marine, and Maritime Sectors and Ecosystems, is proposed to be launched in 2026, with a call for proposals to be published in 2025.

Member of the European Economic and Social Committee, Brussels.

As member of the Conference on the Future of Europe he supported an EU Competitiveness Test.

Dr. Achim Kaspar

is Member of the Board of VERBUND AG – Austria's leading electricity company and one of the largest producers of electricity from hydropower in Europe. He assumed the role as COO in January 2019 and is responsible for digitisation as well as the VERBUND generation portfolio which includes the oversight of 130 hydropower plants.

Prior to joining VERBUND, he held various management positions in the Utility and Service Provider Industry as well as in the Austrian Telecommunication Industry.

From 2008–2018 Achim Kaspar was General Manager at Cisco Austria / Slovenia / Croatia.

PREFACES

EUROPEAN ECONOMIC AND SOCIAL COMMITTEE OPINIONS

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS 2, 6, 7, 14

TECHNOLOGY, ENGINEERING AND EDUCATION

#EMERGENCYPREPAREDNESS #ERA #INNOVATION #RESEARCH #5MISSIONS

The world is changing every day, and we must find good options for our future. **Options Assessment** with the right **Foresight Strategy** could help to make the right decisions. With **Impact Assessment** studies we can learn how to do better and use **Risk Assessment** for the best solutions. The sustainable development goals need a lot of innovation to have a good return of investment and the people's income. We need food and feed, water and sanitation, wastewater mining, renewable and efficient energy production, and a clean and blue economy ocean.

The European Research Area, the research and innovation strategy together with the five missions, can help to increase awareness of **Emergency Preparedness** and new technologies with higher education, skills, and vocational training. The value chain and **Lifetime Cycles Studies** should promote a global development of sustainability with a SME and **competitiveness Test**. From university to kindergarten, we have to use the existing knowledge in combination with new learning and teaching technologies.

SMEs and Family Business can play a big role in the development of individual, personalised solutions with services and products which could be chosen by informed consumers. Therefore, we decided to produce a knowledge-driven book with scientists, researchers, and innovative entrepreneurs to help to understand what taxpayers should finance and how citizens can benefit. All institutions and organisations are responsible for delivering the right answers.

Just do it. Let's start a new process with financial engineering, databases, and machine learning to predict a trusted future.

Paul Rübig
(Editor)

THERE IS NO LIFE WITHOUT WATER

A simple chemical compound is the major component of our lives. H_2O is omnipresent in all states of aggregation, solid as well as liquid and gaseous. You can see it, grab it, feel it – and water is able to taste fantastic, too.

The benefits of water resources are manifold. We can use or consume water, but we are also able to contaminate water or to wastewater. Today the only valid position can be a careful and sustainable use of water and a great respect for our water resources. Everybody can and has to contribute. First, everone can optimise their own consumption, and second, they can try to raise awareness and shape opinions for different usage, tasks, and problems in their surrounding or specific field. By presenting a wealth of information about the diverse applications and interconnectedness of water, this book aims to empower readers to take action and make a positive impact on water resources.

You will get useful insights and exciting information about the actual status quo and the next possible and/or necessary steps for sustainable development. Every chapter is a valuable source and all authors deliver an important input for the necessary creation of political awareness and elucidation. After you have read this book, you will have further knowledge in water-related topics such as biodiversity, water security challenges and solutions, and water management. You will also have knowledge about using the energy of hydropower, which is at the core of our sustainable technologies.

Worldwide electricity generation in 2020 measured approx. 26.800 TWh, but only about 28 % of the amount was produced from regenerative resources. In detail, the major part – 58 % – of the worldwide renewable electricity production was produced by hydropower, with an output of 4.347 TWh. Hydropower plants have the highest advantages, qualities, and power spectrum within the renewable family, e.g. sustainability, security of supply, flexibility, system stability. Hydropower generation is also a very important factor to help reach the sustainable development goals of SDG 7 clean energy, SDG 12 responsible production, and SDG 13 climate action by compensating fossil fuels.

H_2O is directly and indirectly the lifeblood for all plants, animals, and humans. It is an integral part of every life and the engine for our climate. Water is our most important and valuable resource. So let´s ensure a sustainable development. Today we have to choose the right paths for the next generation. That means that we have to make appropriate steps to keep the Earth and all of its lifeforms alive.

Achim Kaspar
(Editor)

DEAR READERS,

As President of the European Economic and Social Committee (EESC), I would like to congratulate Paul Rübig. His very timely book, once more, proves his foresight in economic and societal challenges at regional, national, and European levels.

Access to water has been something we have taken for granted in major parts of Europe. In recent years, with the consequences of climate change becoming more apparent, water has become an increasingly political topic of discussion given its impact not only on the planet but also on our economies and societies. Water has become an increasingly scarce resource. Access to water, water quality, water use, and water consumption needs to be given the corresponding political attention.

More than a billion people worldwide still do not have access to drinking water. 80 % of wastewater is discharged untreated into the environment, and more than 90 % of natural disasters are water related. In Europe, 7 people die daily from diarrheal diseases due to unsafe or inadequate drinking water, sanitation, and hygiene. The gap between global water supply and demand is projected to reach 40 % by 2030, if current practices continue.

Natural disasters were prevalent throughout the summer of 2022, when droughts, forest fires, and floods were reported all over Europe. We are currently living in challenging times, with climate change, war in Europe, and the Covid pandemic. The availability and sustainable management of water impacts global health, migration, social peace, and societal as well as economic progress and business.

Water conservation will require a real change in how we live, how agriculture and businesses across sectors use water, and how we set our policies. The EESC has worked on various issues surrounding water, while always keeping the interest of organised civil society at the forefront. The United Nations 2023 Water Conference will take place next year. Goal 6 of the Sustainable Development Goals is to ensure the availability and sustainable management of water. If Europe wants to be a frontrunner of climate change, we have to make this goal a reality!

I wish you an insightful and interesting read.

Christa Schweng
(EESC President)

A BRIEF POLICY COMMENT ON THE GLOBAL IMPORTANCE OF WATER MANAGEMENT

Water is the most precious and essential natural resource. If there is no water, there would be no life on Earth. Like any resource, water can become scarce, especially when demand for water exceeds supply or poor quality limits its use. This particularly affects the valuable fresh water, since only 0.3 percent on Earth is usable for humans.

Innovative and sustainable water management is now more important than ever. Environmental protection as well as climate protection and migration policy are global issues. Thus, water management is becoming a global instrument. Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production, or recreational purposes. Large supplies of water are needed by industries for fabricating, processing, washing, diluting, cooling, or transporting a product. All topics also have a high potential for conflict and are directly or at least indirectly linked to migration and security policy. Whether in Jordan, in the future of the Nile water, in the Euphrates and Tigris, in the Andes, in the Himalayas between China and India, in Africa, or in regard to climate change – the list can go on eternally. In this context is no surprise that there is always a chapter on water in almost every international strategy or agreement.

This short text shows how complex, diverse, and fundamental the topic of water is for us humans. But what does this mean in concrete terms for water management and politics?

Firstly, let's take a look at Europe, which also faces challenges when it comes to water. Around 80 % of Europe's freshwater (both drinking and other) comes from rivers and groundwater, which can also make these sources vulnerable to threats from overexploitation, pollution, and climate change. In some regions of Europe, there has long been a need for investment in their water management and technology. A new extreme case is Ukraine. Due to the Russian attack on this country and the terror against its civil infrastructure, additional investments in the billions are now necessary for reconstruction there alone. Despite all the tragedy, this also offers an opportunity to modernise Ukrainian water management, especially for industrial water and agriculture.

Let us now turn to Africa. The EU wants to move away from classic development policy towards strategic partnerships with associated large-scale investments. The financing of nationwide infrastructure should lead to state stability and economic prosperity – in this way, causes of flight should also be avoided. Investing in the water management of

this continent is of fundamental interest to Europe. The African continent is ecologically very diverse. Climate change will further increase the pressure on water resources, affect biodiversity and human health, worsen food security, and increase desertification. Adaptation to climate change is therefore an urgent necessity for Africa's development. But also in the global fight against pandemics and resistant germs, African regions with weak infrastructure will inevitably come into the focus of the world community and thus also the water industry.

Another part of the world of greatest European interest is the Middle East and North Africa (MENA). This region is the driest area on Earth and has already been affected by desertification, overexploitation of groundwater, and seawater intrusion into aquifers. In addition, the consequences of climate change for the water supply in the MENA region will intensify, and the expected population and economic growth by 2035 will probably lead to an increase in water demand by 47 %. In the MENA region, agriculture accounts for more than 80 % of freshwater consumption. Water conflicts could therefore massively threaten stability there and thus also have direct consequences for Europe.

To complete the global view, let's take a quick look at South America and Asia. The Regulatory Authority estimates that Brazil alone would have to invest at least 4 billion US dollars per year in its water management. Things are no better in neighbouring Argentina, not to mention Uruguay, Bolivia, and Mexico. China and India also have an immense amount of catching up to do and require huge investments – be it in the drinking water supply, sewage management, or irrigation. The situation is no different in most other Asian countries (with a few exceptions).

These global challenges require research, innovation, and entrepreneurship at the highest level. However, this also offers enormous future opportunities for small and medium-sized companies from this sector, especially from Europe. Our SMEs have enormous potential and demonstrate their know-how in a wide variety of projects worldwide. At the same time, this is a task for European politics to continue to maintain and create the best framework conditions in the EU for these entrepreneurs – not only for the European internal market but also with regard to being able to successfully face international competition. The success of the latter also means that these entrepreneurs engage in international and regional networks in order to become part of the increasingly institutionalised global water community and its project landscape. The exchange of knowledge, experience, and contacts should form the basis of such cooperation and is therefore a very important prerequisite for SMEs to be successful in the various regions of the world.

The approach to networking, as in the case of the SME Connect SDG6 group, has a model character for me. At this point, I would therefore like to expressly thank Dr. Paul Rübig for his initiative and commitment to building this SME group. I wish you continued success and will continue to support this project.

Ivan Štefanec
(President SME Europe)

"WATER IS LIFE"

"Water is life" is a sentence we have all heard countless times. Everybody nods in agreement when people discuss the value of water. How though can we separate how valuable we consider water for our lives from our actions to protect it? Availability, quality, and accessibility of water are still too often taken for granted the moment that water is just a limited resource.

Today, floods, droughts, water pollution, and water scarcity make it to the news as the everyday challenges that our planet faces. But these problems are a lot bigger than just headlines. We need solutions to address the rising challenges. We need investments and technological and non-technological innovations. Still, most importantly, we need a combination of all of these. This book is being published at a time when we need to go one step beyond the discussions, the questions, and the whys and dive into the answers to our challenges. The pages that you will go through do exactly that by offering a detailed compilation of the solutions and best practices from experts in the water management field.

No matter whether our well-being, the economy, the environment, or food security is the topic, water is the foundation from which everything starts. "Follow the water" has been one of the guiding principles in the search for extraterrestrial life, so how can we ignore it on our own blue planet?

Durk Krol
(Executive Managing Director of Water Europe)

EMERGENCY MANAGEMENT

At the European Parliamentary Research Service (EPRS), the Think Tank of the European Parliament, I had the pleasure of pioneering foresight. At EPRS, we could do so with and due to the enthusiastic support of the political side of the European Parliament, especially from Dr. Paul Rübig, who was the Chair of European Parliament's Science and Technology Options Assessment (STOA) Panel. He became a persuasive foresight ambassador.

In today's fast changing world, we see more and more that science has its limitations. Not all technological developments, however promising, are unconditionally welcomed by everyone. Not all of them are good for society overall; not all of them are good for individual human beings. Therefore, responsible policymaking should not only be directed by science. It has to consider the possible impact of new developments on society. Foresight methods allow us to balance scientific evidence with the societal context. And I am glad that foresight-based methods for policy analysis have been gaining attention in European institutions. With a growing awareness for citizens' hopes and fears, we have moved from evidence-based policymaking to foresight-based policymaking, which—in my view—makes policy more human.

Dr. Rübig applies such foresight methods to his daily work at the European Economic and Social Committee and to his activities on emergency preparedness, while addressing the United Nation's Sustainable Development Goals. He focuses on emergencies—such as water shortages, power outages, and cyberthreats—using a foresight-based approach, while considering the possible impact of the events on a wide range of actors and mapping the vulnerabilities of the different players within the society. He develops proposals for handling the entire range of phases of emergency management—namely prevention, preparedness, response, mitigation, and recovery—on different time horizons in order to tackle crises.

Water resilience, the main topic of Dr. Rübig's book, is the most important issue of emergency preparation, which has also been highlighted as a major global risk in the European Parliament's "Future Shocks 2023" report.

This book will be a valuable read for policymakers dealing with emergency management.

Lieve Van Woensel
(Former Foresight Advisor, European Parliamentary Research Service)

EUROPEAN ECONOMIC AND SOCIAL COMMITTEE OPINIONS

INT/989

OPINION EUROPEAN ECONOMIC AND SOCIAL COMMITTEE EMERGENCY PREPAREDNESS

Paul Rübig

Members: Pietro Vittorio Barbieri (IT-Gr. III) (Rule 86(2) – Rodert), Giulia Barbucci (IT-Gr. II) (Rule 86(2) – Mone), Dimitris Dimitriadis (EL-Gr. I), Panagiotis Gkofas (EL-Gr. III), Thomas Kattnig (AT-Gr. II) (Rule 86(2) – Reisecker), Thierry Libaert (FR-Gr. III), Aurel Laurențiu Plosceanu (RO-Gr. I) (Rule 86(2) – Muresan), Christophe Quarez (FR-Gr. II) (Rule 86(2) – Meynent), Wautier Robyns de Schneiderauer (BE-Gr. I), Ferre Wyckmans (BE-Gr. II), Advisor: Bruno Lindorfer

1. Conclusions and recommendations

1.1 The European Economic and Social Committee (EESC) asks the European Commission and Member States to urgently develop a plan to substantially increase the EU's single market autonomy regarding energy generation facilities, food and water production and the mining of the necessary raw materials, including sovereignty for the technologies needed. This EU sovereignty must consist of the respective R&D, material processing, design, manufacturing, installation, start-up and maintenance of the facilities within the EU single market so as to avoid energy poverty and unemployment among EU citizens and consumers. The most efficient preparedness for emergencies is based on resilience, be it technical or social. Continuous improvements in the resilience of energy systems towards natural, political or any other threats should be integrated into all energy policies.

1.2 The EESC recommends that the EU define short-term measures for building energy production facilities within the EU single market as a matter of urgency with a view to achieving the EU's goal of autonomy.

1.3 Widespread and long-lasting European energy shortages can be prevented by taking the following actions:

- strengthening and developing the European single market;
- enhancing cooperation and coordination with like-minded partners;
- pursuing an ambitious trade policy and the diversification of supply;
- tackling labour market mismatches;
- improving communication and raising awareness;
- accelerating innovation and digitalisation;
- facilitating access to finance;
- ensuring sufficient investments (to facilitate the green transition, etc.);
- ensuring that policies are realistic. For example, in the field of energy and climate we must reassess the Fit for 55 package in order to strike a balance between delivering on the goals for 2030 and 2050 and finding a pathway through this transition that is economically and socially bearable.

1.4 We therefore need to reconsider the timelines for the Green Deal and to implement realistic energy policies. The assessment procedures for the EU's Green Deal and energy policy should include not only the impact of the measures on the climate, but also the impact on the purchasing power of EU consumers and the impact on the competitiveness of the EU economy, thus safeguarding jobs in the EU.

1.5 No measures should be ruled out in the response to this crisis.

1.6 Implementing the EU SET plan (**S**trategic **E**nergy **T**echnology) and the REPowerEU plan:
- Improving energy efficiency and promoting circularity.
- Implementing the REPowerEU plan to end the EU's dependence on Russian fossil fuels.
- Increasing gas storage and coordinated refilling operations; monitoring and optimising electricity markets; channelling investments towards energy systems and enhancing connectivity in the immediate neighbourhood through Acer[1], Berec, ENTSO-G, ENTSO-E and the European Institute of Innovation and Technology's knowledge and innovation communities (KICs) on InnoEnergy, Raw materials and Manufacturing.

1.7 Consumers should invest in their own energy production and efficiency. This means that tax incentives are needed.

1.8 The EU should build new transport infrastructure for the transmission of energy and energy resources (pipeline from North Africa to Spain) and for renewable energy sources like hydrogen, biomethane and ammonia (Campfire).

1.9 Short-term measures:
- Safeguard other sources, especially oil, coal, gas, uranium, water, food and animal feed.
- Develop plans and concepts for saving and rationing energy in all 27 EU Member States:
  - Rationing should have clear priorities, e.g. negotiating plans for rationing and shutting off energy with energy-intensive industries, and negotiating new WTO trade agreements with new priorities for food, feed, water and sanitation;
  - Prioritising electricity and gas storage and supply for hospitals, medical care, emergency services and care for older and vulnerable people.
- Issue rules for safeguarding sufficient oil and gas reserve levels.
- Promote energy savings and new sources of energy.
- Step up EU R&D on energy research, especially alternative energies, fusion energy, energy storage, hydrogen and ammonia technologies, energy efficiency of energy-intensive industrial processes and consumer appliances.
- Accelerate public approval procedures for new projects that provide additional energy in the short and medium term, such as hydrogen unloading stations in EU harbours, pipelines and harbour facilities for re-gasification of liquified gas (LNG).

1 EU Agency for the Cooperation of Energy Regulators.

– Ask all firms in the EU that produce or provide products and services needed in emergency situations to secure their emergency electricity supply, update their emergency plans and organise periodic emergency training, etc. (for instance, companies involved in telecommunications and broadcasting, emergency services, public IT servers and electricity providers).

1.10 Medium- and long-term measures

1.10.1 The EESC asks the European Commission to develop plans and to undertake the following EU-wide coordinated measures and actions:

– Simplify and streamline EU regulations that slow down the procurement of critical energy infrastructure.
  - The new EU Water Framework Directive. Priority must be given to securing a quick energy supply, not to 10-year environmental impact assessments.
  - The EU's new supply chain regulation has to be simplified. The focus should be on securing a sustainable supply of critical raw materials and goods to the EU, not on overdesigned rules that dictate from which countries the EU is allowed to purchase materials (freezing 450 million Europeans in the coming winter).
– Reinforce production chains and transport systems to offset possible future disruption to the availability of critical raw materials for EU firms (industry and trade).
– Reduce dependence on imports of critical materials and prefabricated products.
– Focus on the EU's technological sovereignty/autonomy.
– Develop a cross-border power network infrastructure (380 kV or higher).
– Secure the production of transformers for electricity voltage change (high/low, AC/DC).
– Restart the thousands of energy production projects (hydropower, geothermal, hydro storage, etc.) that have been sidelined for years either because they had a bad pay-back ratio (due to cheap gas from Russia) or due to decades-long environmental impact assessments.
– Explore new exploitation technologies. There are several regions within the EU with substantial natural gas reservoirs which can be extracted using new technologies recently developed by European universities. In light of the EU's target for energy sovereignty/autonomy, the EU should seriously look into these new technologies and encourage the regions to try them.

1.10.2 Stepping up vocational training and skills for electricians and farmers and creating jobs in water stewardship are crucial in this transition.

1.10.3 Countries in Asia have substantially increased their numbers of physics (STEM graduates (STEM = **S**cience, **T**echnology, **E**ngineering, **M**athematics), ICT and engineering students, whereas the numbers of European STEMstudents remain stagnant.

1.10.4 In order for the EU to reach its technological sovereignty goals, hundreds of thousands of additional engineers are needed.

1.10.5 It is important to keep the purchasing power of EU citizens and consumers high by focusing on the EU's technology sovereignty and thus reducing its dependence on imports (technology and energy imports) and increasing the number of hightech jobs in Europe, rather than in Asia.

1.10.6 In an article published in May 2021[2], Dr Lukas Höber from the University of Leoben, Austria, calculated that to reach global decarbonisation goals (which most countries in the world pledged to achieve in the 1995 Paris Climate Agreement), around 7 million wind turbines in the 5 000 kW class would have to be built worldwide, along with large areas of photovoltaic systems.

1.10.7 The material requirements for the enormous number of wind turbines needed to reach the decarbonisation goals for electricity production exceed the annual global production of copper by a factor of 14 (25 million tons versus the 350 million tons needed), the annual global production of aluminium by a factor of 7.2, and the annual global production of the special steel needed for wind turbines by a factor of 3.9. Solar panels are mainly produced in China.

2. General comments

2.1 Definition of "emergency management": "emergency management" means the organisation and management of the resources and responsibilities for dealing with all humanitarian aspects of emergencies, i.e.:

- prevention
- preparedness
- response
- mitigation
- recovery.

2.2 As of March 2022, no one knows how long this brutal war will last, how much infrastructure will be destroyed, or how many millions of Ukrainian refugees will flee to the EU Member States – adding millions of new consumers to the single market.

2.3 The war in Ukraine will certainly have dramatic consequences for the EU, since the EU heavily relies on fossil fuels and raw materials imported from Russia and Ukraine.

2 https://www.profil.at/wissenschaft/erneuerbare-energien-warum-die-rechnung-nicht-aufgeht/401375021.

Investment into own mining and production facilities for power is urgently recommended to achieve autonomy – one of the EU's main goals.

2.4 In 2021, some European countries imported 100% of their natural gas imports from Russia, and some imported around 70% of their oil imports from Russia.

2.5 Consequently, the risk of massive job losses in the EU is increasing. According to EUROFER, the EU steel industry directly employs 330 000 highly-skilled people, and indirectly supports up to 2.2 million more. The aluminium, cement, paper and glass industries also directly and indirectly employ hundreds of thousands of people. Within the single market, the production facilities for energy production could provide hundreds of thousands of new wellpaid jobs, and therefore increase the purchasing power of EU consumers.

2.6 Food security: European countries will systematically seek to become less dependent on the supply of wheat from Ukraine and Russia. We need to look into fertiliser subsidies, set aside land for food and feed production and use agri-food waste to produce biogas.

3. Disaster preparedness[3]

3.1 Are our societies sufficiently prepared to manage and deal with situations that cause disruptions to the everyday functioning of society?

- Power outages (blackouts) caused by technical failures, cyberattacks, etc. that could affect:
  - communication systems;
  - sanitation systems, water supply and wastewater treatment;
  - industry business continuity.
- Electricity and gas rationing plans for EU consumers and EU industry. This risk has increased dramatically since the war in Ukraine.
- Disruption to the availability of raw materials due to production chain or transport system breakdowns (e.g. the traffic jam involving 400 large cargo ships in the Shanghai harbour in April 2022 due to Shanghai's COVID-19 lockdown).
- Cyber threats or incidents: how could the EU build business resilience and ensure business continuity to safeguard the supply needed for EU consumers?
- Other attacks: enterprises must be equipped to withstand and rapidly recover from attacks. Has the EU implemented solutions to ensure infrastructure availability and reliability?

3 https://ec.europa.eu/echo/what/humanitarian-aid/disaster-preparedness_de.

What are the challenges and costs for consumers and businesses in the event of such incidents, and how can they be mitigated to allow companies to continue their daily activities?

3.2 Emergencies and disasters emphasise the importance of the UN's 17 Sustainable Development Goals (SDGs)[4]. Disasters can be natural disasters[5], disasters caused by industrial or technological accidents (man-made machinery, ABC disasters), war and political and civil disasters[6], epidemics and famines, and the impact of food and feed production.

4. Important organisations within the European Commission:

- DG ECHO (European Civil Protection and Humanitarian Aid Operations)[7].
- ERCC (Emergency Response Coordination Centre)[8].
- UCP (Union Civil Protection) Knowledge Network[9].
- European Union Civil Protection Mechanism (UCPM)[10].

5. The five most serious emergencies and disasters for the EU's single market

5.1 Breakdown in the fossil energy production supply chain (coal, oil, natural gas, uranium). In 2021, fossil fuels made up approximately 80% of all primary energy used in the EU, the majority of which had been imported.

5.2 Power blackouts and subsequent communication breakdowns caused by technical failures, cyberwar or terror attacks. Renewable electric power production is erratic: the wind does not always blow and the sun does not always shine when the EU needs high amounts of energy, thus any increase in wind and PV-power generation capacities within the EU has to be accompanied by a buildup of huge energy storage facilities.

5.3 The ability to secure critical raw materials supplies (copper, lithium, cobalt, rare earth elements, etc.) through new EU single market strategies on mining, recycling, etc.

4 https://sdgs.un.org/goals.

5 https://www.conserve-energy-future.com/10-worst-natural-disasters.php.

6 https://www.samhsa.gov/find-help/disaster-distress-helpline/disaster-types/incidents-mass-violence.

7 https://ec.europa.eu/echo/index_de.

8 https://erccportal.jrc.ec.europa.eu/.

9 https://civil-protection-knowledge-network.europa.eu/.

10 https://ec.europa.eu/echo/what/civil-protection/eu-civil-protection-mechanism_de.

5.4 The ability to secure a competitive single market for half-finished product supplies (e.g. the EU auto industry has seen a severe shortage of Ukrainian-produced cable looms since the war in Ukraine started).

5.5 Massive fossil fuel supplies are urgently needed until a sufficient amount of production facilities for renewable energy installations has been built in the EU.

5.6 The Russian invasion of Ukraine has shone an unforgiving light on the extreme vulnerability of the EU's energy system, and its lack of own production facilities within the single market.

6. Response

6.1 Given the magnitude of the EU's energy consumption, the EU's green transition will take roughly two decades. The Council meeting in Versailles recommended that the transition be accelerated, which would prove a very challenging task.

6.2 The major bottleneck preventing a faster transfer is not about money, but rather the materials needed for the approximately 700 000 large 5 MW wind turbines needed across the EU, and the millions of photovoltaic installations, fusion energy, waterpower and energy storage facilities. In addition, geothermal facilities and hydrogen and CO2 storage facilities will have to be built. In order to distribute the massively increased amount of decentralised electric power generated, highvoltage and medium-voltage power transmission lines will have to be expanded on a colossal scale.

6.3 Each of these 700 000 large 5 MW wind turbines (which typically produce 12.5 GWh of electric energy p.a.) has a height of around 200 metres, a foundation of around 2000 tons of reinforced concrete, requires approximately 600 tons of special steel, 20 tons of copper and a supply of very scarce rare earth materials which have to be imported mainly from China or Russia. If these tons of materials required are multiplied by the approximately 700 000 wind turbines needed within the EU, it becomes clear that we will need huge amounts of concrete, steel, copper and other materials – the production of which would emit huge additional amounts of CO2. For rare earth elements (for the electric generators and batteries), neodymium, dysprosium, etc., the shortage problem is even more dire, and would be very difficult to solve by 2050.

7. Mitigation

7.1 To achieve the Green Deal targets, Germany alone has to build approximately 70 000 new large 5 MW wind turbines by 2050 (or even faster). This means commissioning 2 500

new wind turbines per year, or seven every day until 2050 in Germany alone. In 2021, Germany built approximately 450 new wind turbines. Therefore, if Germany continues to build wind turbines at 2021 rates, building the 70 000 wind turbines needed for the Green Deal would take 160 years.

7.2 In addition to the material shortages for building the 700 000 wind turbines, in the EU there is also a massive shortage of electricians and engineers to implement the Green Deal by 2050. Austria, for example, has ambitious expansion targets for photovoltaic systems by 2040; however, according to Austrian experts, there is a shortage of thousands of qualified electricians to install the PV systems needed to reach this target.

7.3 To summarise, many engineers claim that achieving the Green Deal goals by 2050 is very challenging and perhaps not even feasible, and not for lack of money but due to materials shortages (rare earth elements, copper, steel, etc.), and a massive shortage of electricians and engineers in the EU.

8. Prevention

8.1 Many energy-intensive industries are to be converted to renewable green hydrogen or ammonia produced by renewable electric power by 2050, including the steel industry, the chemical industry and the cement industry. Many people are unaware that transitioning all these energy-intensive industries requires approximately 10 times more renewable electric power than the transition to e-mobility and decarbonising the steel industry.

8.2 Iron and steel production accounts for a quarter of all global industrial CO_2 emissions. Around 1 870 million tons of steel were produced worldwide in 2020; approximately 57% of that was produced in China, and 7% in the EU. Of the 1 870 million tons of steel produced globally, around 1 300 million tons (65%) are made via the integrated blast furnace route, where iron ore is reduced with coke, generating very high CO2 emissions (approximately 1.4 tons of CO2 per ton of steel).

8.3 Within the EU 27 Member States, approximately 150 million tons of steel are produced p.a., approximately 90 million tons thereof via the blast furnace route. To switch the production of these 90 million tons of pig iron (reduced in the blast furnace with coke) to renewable hydrogen green iron, around 360 TWh p.a. of renewable electricity would be needed (by 2050). 360 TWh p.a. is a huge amount of renewable energy! It is more renewable electricity than that needed for the electrification of all passenger cars in the whole EU. No less than 30 000 large wind turbines will be needed to produce this renewable electricity for the EU's steel industry.