Why conscious paradigm shift?

If we want to see a sustainable world, we need to embrace the change.

Dear Ladies and Gentlemen,

I am pleased to be here today and have an amazing chance to share with you my vision on the energy future. We are all having a stake in the huge enterprise called the planet Earth and we can make the world economy a sustainable global home, if we learn to collaborate and share. My intention today is to seed hope that we can go faster in realization of the SDG's, where clean, sustainable and affordable energy is playing fundamental role.

My interest in alternative energy technologies deepen few years ago, when I met Russian scientist Evgeni Sorokodum, involved on the novel RD&D projects, working for long years on the non-linear hydro-aerodynamics and specifically, on the vortex oscillation motion applicable in many technologies, including the energy. After this encounter, we worked together on the promotion of his know-how and I discovered a totally new dimension in science which is encouraging me to say that we are cable of finding and delivering clean, sustainable and affordable energy for all. This story revealed a bunch of barriers that scientists meet on their way before they succeed to reach the market place and raised my interest in the energy innovation as such. The same year, I joined the renewable energy cohort at UNISG and turned my theses work to a kind of investigation to demonstrate that the technological diversity we can have is much vaster. To be able to deliver a new vision, I tried to answer the most burning question: **How can we breakthrough in the 6th wave of innovation, and turn the 4th industrial revolution into the era of the energy breakthroughs?**

Global Seed Vault in Svalbard, Arctic, flooded after permafrost melts in May 2017

Everything is accelerating, and it is no longer the discussion about the need of change as such, but mainly about the change scenarios and our role in this process.

Indeed, this century is going to be determinant for our civilization and already the next decades will demonstrate, if we **break-through or we break-down.** Many scientists and economists, (Stern, Rifkin, Hansen, Ehrlich) already alerted that we are close to the civilizational collapse as we reached many ecological thresholds of irreversibility, meaning the inevitable decline and fall of our world, starting with life supporting eco-systems, if we do not change our habits.

The evolution is a continuous cyclical process and it is inevitable to experience many paradigm shifts throughout the human history, which are all the confirmation that we are evolving as a species, as a civilization. Most of us are already perceiving that the current paradigm has exhausted itself and we need a much more visionary, value- and wisdom-based alternative, because we cannot build a sustainable resilient world on the foundations of the sunsetting model. Higher consciousness is gradually rising within our society preparing the arrival of the change at all levels. And it is also triggered by our nature instinct of survival, as we are greatly perceiving our vulnerability face to major planetary challenges. More and more, we are conscious that it is our well-being which is at stake and that it is in our power to shape the trajectory which will make the next development cycle a general breakthrough. And the weight of the social dimension is making of the current paradigm shift an exceptional historic event. We can already see that new ideas are disrupting the mainstream practices. And it is something we cannot stop, because it is much more powerful than what we can expect. It is a biological need to go beyond explored boundaries and search for a higher purpose in life.

Today we have only one option, is to address the global problems as rapidly and efficiently as possible. And we need truly transformative solutions to regenerate the nature and to re-design human systems (technological, social, economic, financial, energy, etc) consciously and on the basis of new values and beliefs.

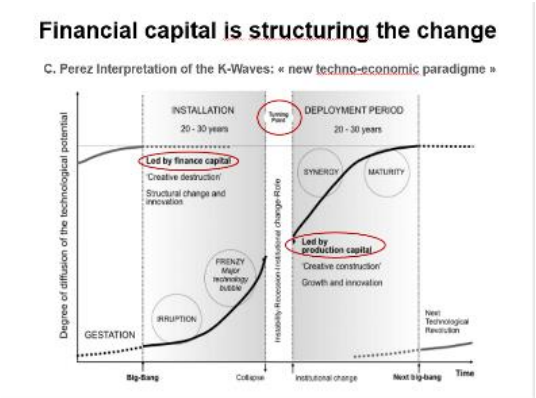
Here are four assumptions to present the main ideas from my past and on-going work from economic, climate, societal and technology innovation perspective. I put the energy at the core of the paradigm shift, because the arrival of novel technologies will change everything.

First assumption:

Everything is cyclical. And If we understand the nature of the innovation and implement «creative destruction» mechanics, we can accelerate the on-going transition in the energy sector.

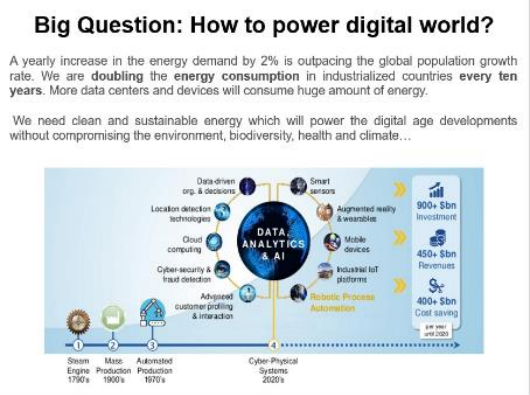
We can see from the graph that we are at the door of a new development cycle. These are the long waves of Kondratieff which were used to explain the cycle-like phenomena in the industrial world economy. Each wave ranged from 40 to 60 years and consisted of alternating periods between high and slow growth. **Right now, we are in a winter time meaning that we must be preparing the ground for the next wave and give the priority to the structuring investments.** We can also see that cyclical dynamic is something we cannot escape, as it is literally controlled by the markets and financial system. Each previous wave brought new industrial revolution and each revolution was using new energy source. **And we are already experiencing the enfolding 4th IR which is fully oriented on the ICT and cyber-physical systems.** Additionally, we find the confirmation that we are operating beyond the planetary boundaries, and the only way to decouple the growth from consumption is the circular economy.

On the next slide, we see the mechanics of the creative destruction, to explain how the paradigm shift in happening in the economics. Well-known economist Carlotta Perez continued the research on the K-waves in our time and saw more complex interactions between the elements of two systems. The new and the old one, continue to coexist until a certain moment of time. During *the gestation period*, new technology starts to challenge the dominant system. *The feasibility of new technology,* demonstrated in its possible application to products and processes, is the first part of *the irruption phase.* Then comes the *explosive take-off phase* and brings turbulent changes to industrial structure and the regulatory regime.



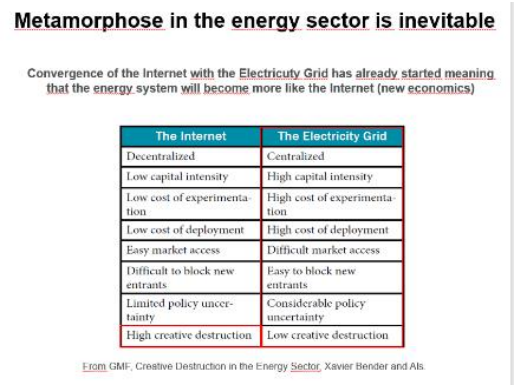
The upswing is led by financial capital, and it is the phase of the innovation, where scientists and entrepreneurs are the key players enabling the arrival of new breakthroughs.

Right now, we can see that the excess of financial capital is played in financial markets instead of being invested in the real economy to create the backbone of new system. That happens for obvious reason: mid-long-term structuring investments are not replying to expectations of the investors oriented on high returns. **The change in the financial industry must literally anticipate the major change we are all now seeking.** And there are premises that investment community is undergoing such change, gaining progressively in consciousness and responsibility and choosing impact finance instead of conventional practices.



More pressure is coming from the 4th IR, which brings exponential technologies, more data centers and multitude of devices which are already consuming huge amount of energy. **And massive digitalisation, which is rather about the distribution than centralization, needs more flexible, reliable and Internet-like energy system.** Huge investments will be spent on the 4th IR, making the gap in development of many countries only wider. And it is not decided yet how this revolution will be powered. **So, can we really call it a revolution, if we plug new digital world into an old energy concept?**

The metamorphose in the energy sector is necessary and inevitable. **And convergence of the Internet with the energy systems is making shift happening faster.** They're totally different if we look at their characteristics, and the innovation or even disruption is hidden in small scale projects, off-grid solutions which are using innovative technologies and disruptive business models to compete in the market.



The Internet	The Electricity Grid
Decentralized	Centralized
Low capital intensity	High capital intensity
Low cost of experimentation	High cost of experimentation
Low cost of deployment	High cost of deployment
Easy market access	Difficult market access
Difficult to block new entrants	Easy to block new entrants
Limited policy uncertainty	Considerable policy uncertainty
High creative destruction	Low creative destruction

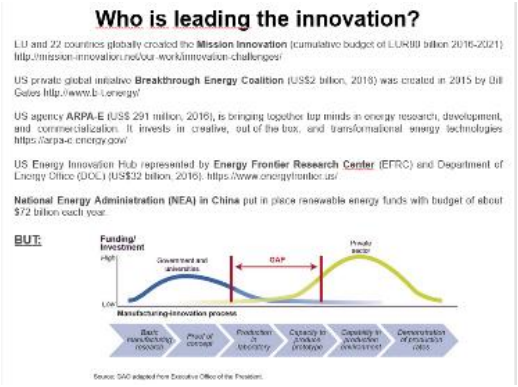
Here are the trends we must already consider in our decisions and actions:

- The entire industrial infrastructure built on fossil fuels is aging and will sunset (it is no longer profitable and morally acceptable to pollute)
- Efficiency of old technologies will remain low, even if connected into smart grids
- The ways how we produce, sell, and consume energy are changing (prosumers market)
- Transmitting lines will soon be over similarly to landlines in telecommunication
- Developing countries are going to leapfrog into new paradigm faster
- Non-energy players are disrupting traditional business models of utilities (agility)
- Breakthrough in low-cost electricity storage is a game change

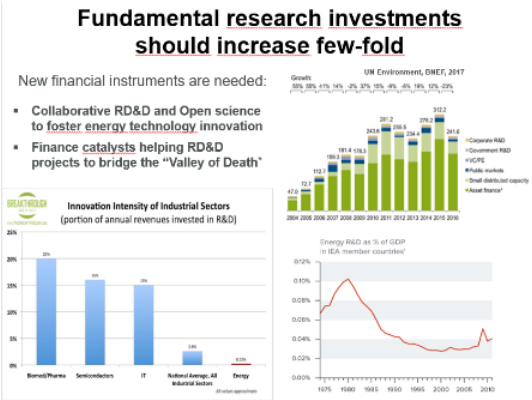
- Investments into stranded generation assets are less accepted (World Bank, divestment mood)
- Energy is no longer a simple commodity, consumers search for value
- The "Internet of Things" (IoT) is already disrupting the Capitalism bringing the hybrid economy of sharing and zero marginal cost.
- **Bottom-up dynamic (communities) is driving the next energy revolution (many examples of cooperatives and local investments)**

If we dive deeper into details of the RD&D, we can find out that the energy sector is facing many challenges since long decades. There is a lack of transparency in the expenditures, of collaboration between private and public sectors and scientific circles.

Statistics show that the energy transition is led by Europe, US and China. However, we do not know, if there are any breakthroughs in the pipeline. They are never mentioned. So far, they exist.

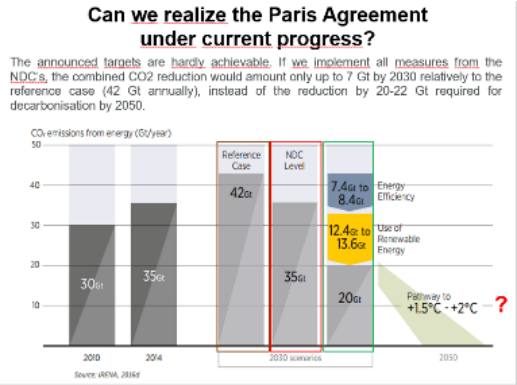


On the next slide, we can see that fundamental research public and private investments should increase few-folds. **The energy innovation is heavily outpaced by lucrative industries (pharma, semiconductors, IT), and in recent years money are going mostly into ready scalable renewables energy technologies (assets finance group).** The fundamental research is almost invisible on this graph. And the right bottom graph says a very hard truth: we invest most when we are at war or preparing the war (it was the case of the nuclear power in the 80th). In our current situation, we must find a totally new motivation to bring new energy technologies to the game.



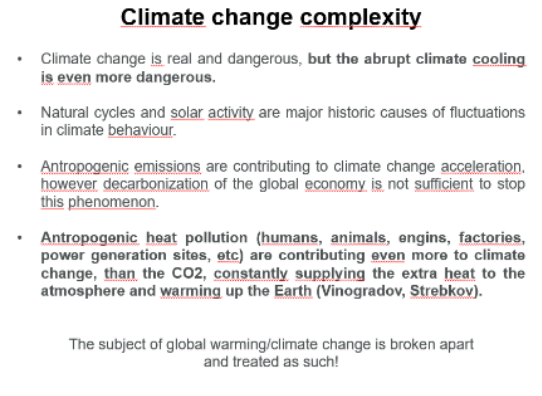
2nd Assumption:

If we investigate complex climate change in an unbiased collaborative manner, we will create more room for innovation to mitigate efficiently global warming and gain in resilience.

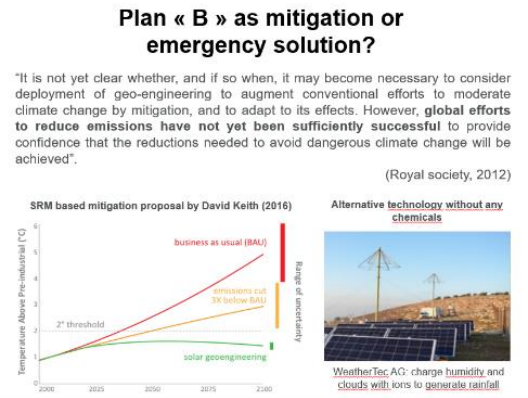


Most ambitious energy transition strategies and climate policies are debating **how to fit +2C° scenario** with known renewables, geo-engineering and carbon-capture technics, forgetting transformational potential of new energy technologies meaning also the potential of science.

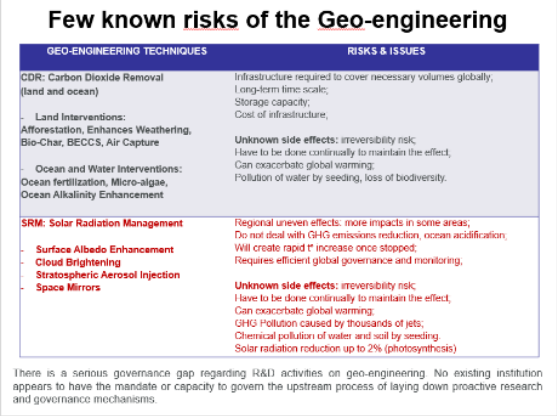
These goals are not achievable for two reasons: we are late in our mitigation actions, and we are not understanding whole complexity of the climate change, so do not consider all the factors to mitigate the global warming. Quick overview of the most important facts, which should spark the discussion on the need of a much more ambitious climate and energy agenda.



- Climate change is real and dangerous, but the abrupt climate cooling is even more dangerous.
- Natural cycles and solar activity are major historic causes of fluctuations in climate behaviour. Feedback loops and cascading effects cannot be modelized.
- Anthropogenic emissions are contributing to climate change acceleration, however decarbonization of the global economy is not enough to stop this phenomenon. We are not having all the answer about this dangerous phenomenon.
- Anthropogenic heat pollution (humans, animals, engines, factories, power generation sites, etc) are contributing even more to climate change, than the CO2, constantly supplying the extra heat to the atmosphere and warming up the Earth (Vinogradov, Strebkov).
- Geo-engineering practices at regional level and globally add new risk of total climate deregulation and massive pollution!



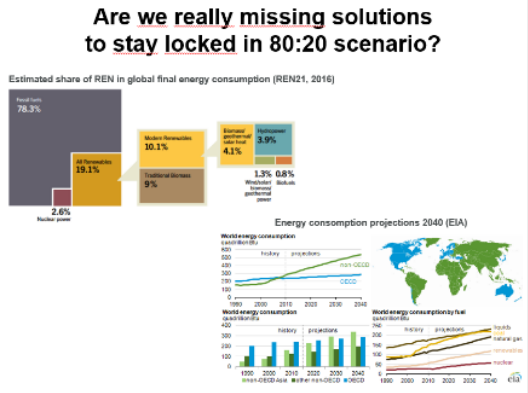
Indeed, the plan B is now here. And it is something we cannot prove or hardly can prove, but it is very harmful for the environment and humans. The SRM, the cheapest and fastest options to stay below +2C° was proposed by scientists who argue that we need it anyway as a backup option if we fail to mitigate. **And there are of course numerous risks which were never really discussed.** Certainly, there are much more friendly solutions using "good science" and we are in need of breakthroughs like that. (eg. The rain without cloud seeding).



We entered the unchartered zone, and there is a serious governance gap. **No existing institution appears to have the mandate or capacity to govern this process and so to offer governance mechanisms.** Also, we do not have the unbiased international scientific community working on the climate change issue in an unbiased and transparent manner, so we can have more scientific evidence.

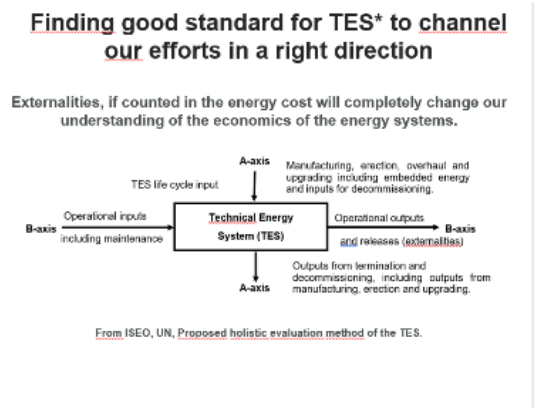
3rd Assumption:

If we maintain the consistent debate on the energy breakthroughs and demonstrate the achievements, we will get chance to mature them, so they can power the 6th wave of innovation with better and cheaper electricity or fuel from clean and sustainable sources.



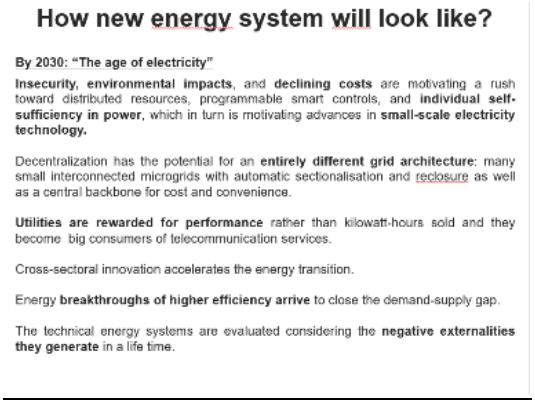
Time is just perfect to reopen the debate on the energy breakthroughs. We need to demystify them, to bring them closer to the international community, we must create the confidence around that they are credible and can support the development path. We know that tackling the negative environmental effects of the global energy system has never been more pressing. And to cause the change, we must first willing to change.

These slides are often used to show that we are locked in 20-80 scenario world, and we will remain the same, because we are still living in the era of fossil fuels, which are outpacing altogether the investments in renewable capacities**. However, the innovation, if its full potential is unleashed, can totally redesign the reality and very fast.** So far, we need to bring to live not only a better technological diversity, but also make sure that we are creating a better sustainable energy system which are evaluated considering all negative externalities to prevent new evil. It is similar to the GDP. A wrong interpretation of the need can lead to an undesired outcome.



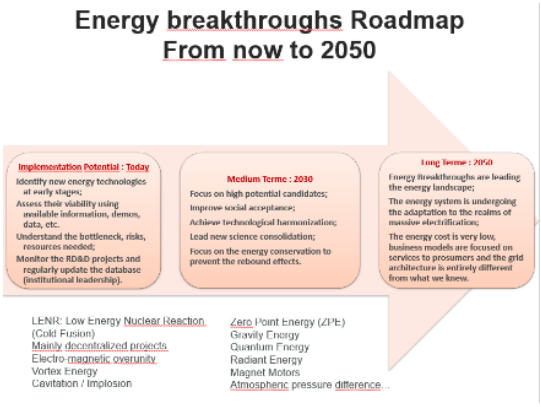
ISEO president developed this simple two-axis scheme to ask important questions about the energy systems and we must continue to elaborate on that. **We have the duty to find the *evaluation methodology* and *testing protocols*, more *sophisticated measurement tools* and *technical standards* to evaluate the performances and decide which energy technologies are responding best the criteria of an "ideal energy": fossil fuel free, omni present, free, available in quite environment 24/7, doesn't depend on wind, currents, close to consumer, do not depend on geographies condition, can be supplied to consumer 24/7, not causing any environmental harm, the methods and devices to extract and convert it can be designed today and the physics are understood.**

Let's have a quick trip now. How new energy system will look like? By 2030, we will enter most probably "The age of electricity" which will encourage individual self-sufficiency in power, small-scale electricity technology, an entirely different grid architecture. Utilities will be rewarded for performance rather than kilowatt-hours sold and they become big consumers of telecommunication services.



The further we move, more we see the trend that energy has the potential to become a public good, meaning that it will be available everywhere and almost for free. That is why it is also a people project to make that change happen. And of course, to consolidate new wave of the energy innovations, we need to grow innovators, who have very different mindsets and consider the impact assessment, as something obvious.

My meeting with WEF in April was very interesting and revealed that such organisations are watching for novel technologies to evaluate their potential. They are keen to advice on their finance. And they asked me if we could design the energy breakthroughs roadmap, so organisations like WEF can start thinking about that? I came back home and designed this simple timeframe with basic goals, which can be used as the baseline to position the energy breakthroughs.

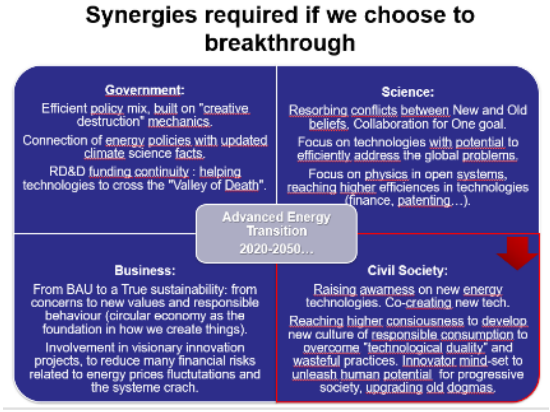


Without clear plan we cannot reach our goals. And without enabling key actors, we cannot move ahead as one society. So why my fourth and last assumption is:

4th Assumption:

If we learn to collaborate efficiently, as nature does, and develop stronger synergies united by one goal, we will have greater chances to breakthrough.

This final "matrix" is a kind of a big picture of what is needed to bring the energy breakthroughs to the negotiations and make the energy transition, an advanced one.



The conflict of interests can be resolved if there is a clear "Why" and actors understand what they will gain from it and what they lose if they do not get engaged into the process at the right time. Civil society this time is the revolution driver, entrepreneurs are the game-changers, government is facilitator and science is a new reality creator. The advanced energy transition it is the project of co-creation. "In order to change what exists, we must create from a new perspective." Our goal is to find and deliver to global community the technological innovations harvesting clean, abundant, decentralised, efficient and cheap energy to secure the entire civilisation needs. There are many of them in the pipeline: Cold fusion, Electromagnetic over-unity, Water as fuel, Zero-Point Energy, Vortex generators, Cavitation, Magnet Motors, etc., are just few of what we can develop. And some of them are now in the market: E-Cat, Minato motors, Brilliant Light Power (sun cell) and are totally changing the

economics of the energy businesses and offering new vision for the energy future. Breakthroughs are not esoteric science, they are hard science we will one day see as something obvious.

Conclusions:

To summarize, here are main conclusions. We are at the edge of a big change and we have the chance to breakthrough, but also a growing risk to breakdown. It's never been more important for scientists to work together on the big issues such as climate change or the energy technologies innovation. We must better connect isolated groups of experts and plug the gaps that prevent faster conversion of basic research to commercially feasible projects.

We must provide better support to capital-intensive innovation areas and encourage collaboration in the precompetitive stages through an independent international fund that pools RD&D investment from countries, companies and philanthropists.

We must develop new forms of partnering, develop instruments for co-investment of public RD&D grants with venture capitalists to better target grant recipients, lower administration requirements of grant applications, create collaborations between public and private capital sources and enable better timing of grant availability. We need co-defined novel energy technology roadmap to fast-track developments from their early stages, identifying bottlenecks, helping to preempt risks, and shortening the time to market through appropriate resource mobilization.

And here is my last sharing which is a very nice discovery, brought by Jeane Manning. The Universal Trust is the organisation which is already engaged into the paradigm shift, meaning that change is here. Mike Upstone is working on few distinctive areas to create new opportunities within communities and on top of the novel technologies.

The biggest truth I discovered behind many technologies I investigated is that we cannot impose the impossibility to physics. Accepting that, we will be moving faster in the direction of a more abundant future, where conflicts for energy resources will no longer exist.

Once more, remember that the way how we harvest, store and use the energy is defining our development level. Science can help us to breakthrough, if we support science and share the knowledge for the highest good of humanity.