Fibre networks and digital technologies for sustainable development in Germany and Europe

I.   Digitalisation and Sustainability

The COVID-19 crisis has fundamentally changed daily life, work, and the economy, and poses significant challenges for Europe. At the same time, it has revealed opportunities for digitalisation. Many people, companies and public administrations have experienced the **advantages of digitalisation** during the weeks and months ensuing the corona crisis. Now is the time to exploit the manifold opportunities that home office, e-learning, web conferences or digital governance provide, and to use them for sustainable development in Germany and in Europe. We envisage a future in which the economy is in balance with the environment.

It is imperative that we avoid a return to the status quo which existed prior to the COVID-19 crisis. **Digitalisation and sustainability have been high on the political agenda before and need to remain priorities more than ever after the crisis.** The European Commission has declared the "European Green Deal" and the digital transformation to be top EU priorities for the next 5 years. During Germany's EU Council Presidency 2020, Germany intends to promote the themes "digitalisation and sustainability" beyond the national sustainability strategy and the climate goals for 2030. The Federal Environment Ministry has also published its "Environmental Digital Agenda" in March 2020.
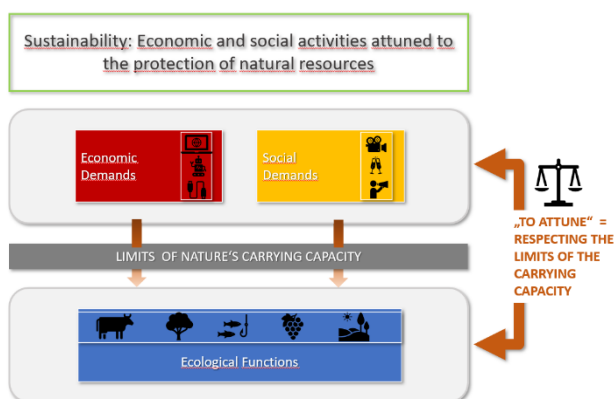

Chart: sustainability concept, modified by Prof. Dr. Gerold Janssen, 2019

The chart illustrates sustainability: economical and societal activities need to be aligned with the protection of natural resources. If nature's carrying capacities are respected, ecological functions can be maintained for the present and future well-being of society.

II.   BREKO's Position: Digitalisation for Sustainability

Digitalisation facilitates daily life for many people and is an essential success factor for the economy. It also plays a **key role in achieving the climate and sustainability objectives** of the European Green Deal, and the transformation to the circular economy. The Intergovernmental Panel on Climate Change (IPCC) emphasised in its recent world climate reports that digital technologies are indispensable for limiting the increase in global warming to below 2°C or 1.5°C.

Digital technologies are better than their reputation: While the data volume has multiplied in recent years, its energy demand has only increased slightly due to enormous efficiency gains in ICT technologies (Northwestern University, Lawrence Berkeley National Laboratory, Koomey Analytics,

Science Magazine, February 2020). ICT technologies can contribute to a seven-fold reduction in the emissions caused by the ICT sector itself, thereby reducing greenhouse gas emissions worldwide by up to 15% (European Commission, February 2020). Accelerated digitalisation can lead to rebound effects, i.e. the increased supply can result in rising demand and associated growing energy consumption. However, the added value for reaching climate and sustainability targets through digitalisation outweighs the rebound effects by far.

Fibre networks are high-capacity and future-proof digital infrastructures. Together with data centres, they are core elements for digitalisation, which in turn enables and drives sustainable development. In both cities and rural areas, fibre deployment improves the livelihoods of all age groups, increases the economic activity, and thus delivers important social and economic co-benefits for sustainable development. Furthermore, fibre roll-out allows public administrations, health facilities, schools and scientific institutions to benefit from the opportunities arising from digitalisation in the long run.

1. How digital technologies contribute to sustainability

Fibre networks enable the ultra-fast data transfer of large data volumes. Many technologies enabling resource efficiency are based on high-performance digital infrastructure. They are applied across all sectors, provide economic opportunities and have a positive impact on people and the environment. **Digital data exchange enables greater independence from material goods,** resulting in less material consumption, relative independence of location and thus reduced transport and traffic. This in turn reduces CO_2 emissions.

Among the many fields of application in various sectors are:

- **Home office, web conferences, e-learning**
  - Home office opportunities do not only lead to reduced traffic emissions from less traveling, but also have social benefits for the family.
  - Web conferences can replace business trips and enable the professional and private exchange with others.
  - E-learning services facilitate digital distance learning, not only during periods of crisis.

- **Augmented and Virtual Reality**
  - AR and VR applied for remote maintenance reduce the need for transport and travelling, which can be used e.g. for machines, telecommunications and energy, and also for advanced trainings and shopping services via virtual showrooms, congresses and fairs.

- **Medical support**
  - Mobile doctors, online consultations and remote operations reduce the need to drive to doctors and hospitals and improve the healthcare services in rural areas.

- **Intelligent traffic control and solutions for the transport transition**
  - Intelligent transport systems manage traffic flows more efficiently, reduce traffic jams, improve vehicle utilisation and reduce emissions.
  - Digital technologies steering autonomous vehicles yield more efficient vehicle use.

- **Elements of the energy transition: optimised energy systems and "smart metering"**
  - Efficient energy flow management leads to net energy savings. "Smart metering" for consumers is an essential component.
  - Through automated control systems which allow the optimal coordination of energy demand and supply, energy can be used more efficiently and aligned with fluctuating renewable energy sources.

- **Smart Farming**
  - Digital technologies for the efficient management of irrigation systems, fertilizers and pesticides contribute up to 70% reduction in water, fertilizer and pesticide consumption while also reducing fossil fuel usage.

- **Smart Cities and Regions**
  - This includes data-based control systems that lead to e.g. improved traffic, waste and energy management. They are based on high-performance fibre networks and data centres.
  - Digital governance with improved data exchange allows access to governmental services from home, leading to reduced material consumption and less traffic.

- **Artificial Intelligence, Automation and Robotics, Industry 4.0**
  - These technologies can increase energy and resource efficiency in a wide range of sectors. As "learning machines", they can continuously self-optimise to become more energy and material efficient.

2. Fibre networks and regional data centres for a sustainable digital infrastructure

Fibre networks enable an almost unlimited transport of data. They are a core component of an energy-efficient and sustainable digital infrastructure, which is the basis for increasing digitalisation and thereby for technologies responsible for energy and resource optimisation. They consume significantly less energy than copper networks over their comparably long lifespan. The results of a **latest expert assessment conducted by the University of Applied Sciences (Technische Hochschule) Mittelhessen,** comparing the sustainability of full fibre networks (FTTH – Fibre to the home) and copper based telecommunications networks (FTTC – fibre to the curb), confirm this assertion. The assessment compares energy demand in operating mode. Based on the electricity consumption per bitrate, the report shows that copper-based networks (VDSL2 vectoring, super vectoring) **consume three to seventeen times more electricity than fibre networks** at 50% to 100% average capacity rate. Consequently, up to 1100 Megawatt (MW) per Gigabit electrical power could be saved with fibre network based coverage all over Germany. To give a comparison, the seventh largest German coal plant „Schwarze Pumpe" has an electrical capacity of 1600 MW.

BREKO's network operators recognise **their responsibility for a sustainable digital future in Germany**. Already now, they are the main drivers for fibre deployment and will continue to make large scale investments into fibre networks over the next years. By doing so, they contribute decisively to the digital transformation enabling a sustainable Gigabit Society. Fibre networks should be fully used by open access agreements to avoid the deployment of parallel digital infrastructures. This approach results in higher efficiency and a decrease in energy and resource use. Fibre networks have a long lifespan and require comparatively low maintenance, leading to less material usage over time.

Moreover, infrastructure and pension funds have taken an increasing interest in **sustainable investments** with a long-term perspective and high investment security. Fibre networks have become highly interesting for investors as they consume less energy than conventional copper networks and are the only future proof digital infrastructure.

Data centres are computing and saving essential data for the digital transformation. Regional data centres not only ensure digital sovereignty, but also have great importance for strategic, political, and economic reasons. Moreover, they are essential for the local energy transition: excessive heat is often used to heat residential areas, or the air cooling of data centres dispenses with additional energy, resulting in a 50% energy reduction. Renewable energy predominates during the operational phase. Regional network operators and data centres create jobs and additional value for the region.

III.   Our Policy Demands

1. **Digitalisation and fibre networks should be recognised as important enabler for the achievement of climate and sustainability objectives: digitalisation for sustainability**

   o *digitalisation and fibre networks should be included in EU and German sustainability strategies;*
   o *sustainability and digitalisation strategies should be aligned.*

2. **Kick-starting a European campaign for digitalisation and sustainability during the German EU Council Presidency**

   o *„Smart Europe": implementing digitalisation processes in public administration, e.g. for speeding up fibre roll-out;*
   o *„Fibre Vouchers" for citizens and companies to stimulate demand and to accelerate deployment;*
   o *support for alternative deployment methods enabling resource-efficient and faster fibre roll-out;*
   o *a European programme to train, attract and exchange skilled workforce for the digitalisation and for the fibre roll-out in Europe.*

IV.   BREKO – Partner for fibre roll-out

The German Broadband Association (BREKO), with around 200 network operators, represents the majority of German telecommunications network operators in Germany. Its members clearly stand for future proof fibre roll-out. The leading German fibre association BREKO successfully promotes competition in the German telecommunications market since its establishment in 1999.