

The role of ICT in
looking after our habitat

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1. Publication(s)

[1] Wu, J., Guo, S., Zeng, D, Li, J. Big Data Meet Green Challenges: Big Data Toward Green Applications. IEEE Systems Journal (2016) 10:3, p. 888 - 900

[2] Laves, J. The role of Big Data in accelerating SDG Action. Responsible Business Forum on Sustainable Development 2017, Singapore. <https://youtu.be/mxq1lShNUpw>

[3] Booman, G., Craelius, A., Deriemaeker, B., Landua, G., Szal, W., Weinberg, B. Regen Network Whitepaper. 2018. <https://regen-network.gitlab.io/whitepaper/WhitePaper.pdf>

[4] Craelius, A. Regen Network System Architecture. 2018. <https://regen-network.gitlab.io/whitepaper/Architecture.pdf>

Part I: Context

2. ICT

Information Communication Technology

2. ICT

Information Communication Technology

= data (not necessarily useful)

2. ICT: *Big* data

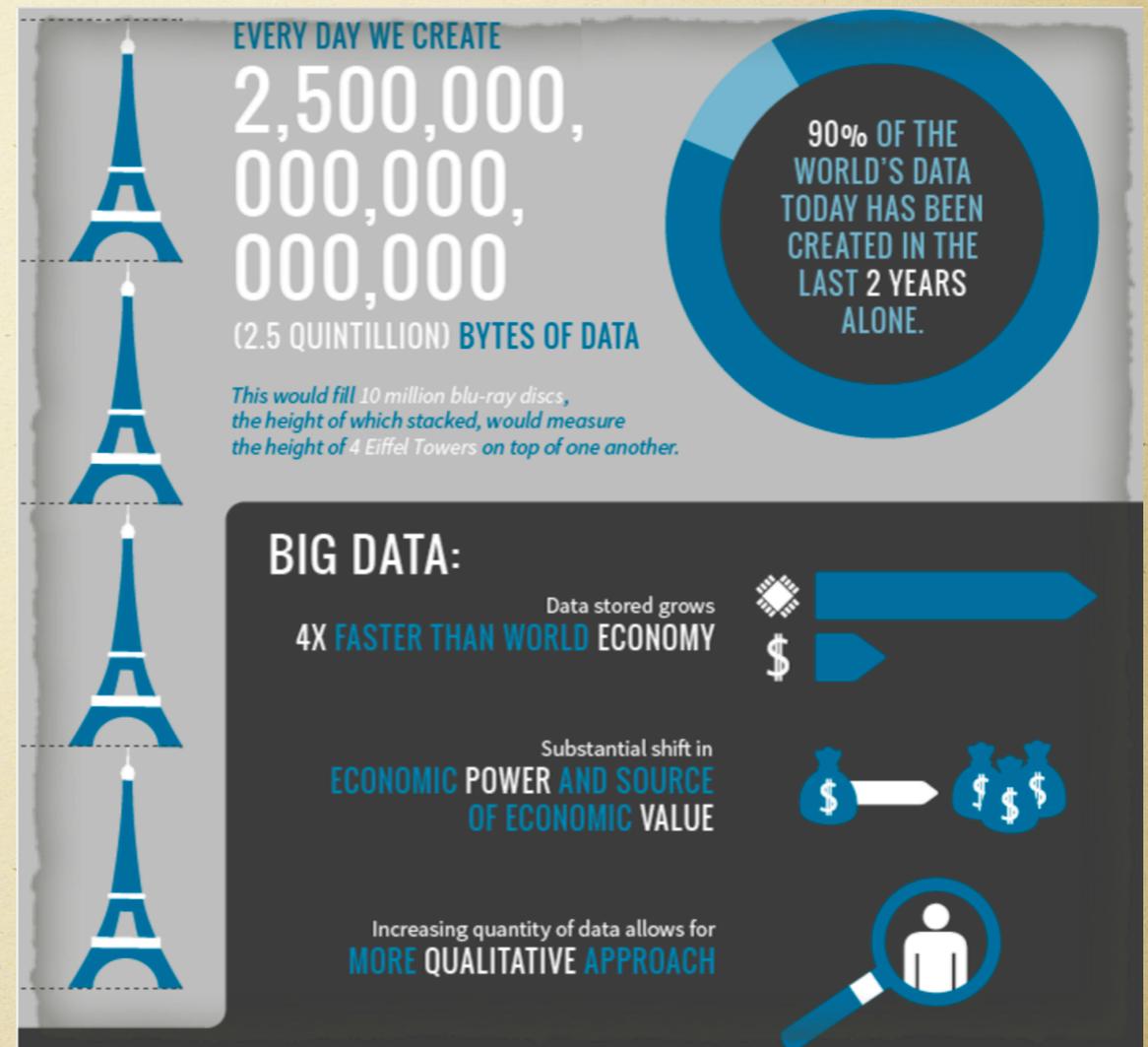
Per day:

2.5 quintillion bytes

= $2.5 * 10^{18}$ bytes

= 2 500 000 000 Gb

= 2.5 Eb (Exabytes)



Source: vouchercloud

2. ICT

Information Communication Technology

=> process data into actionable knowledge

i.e. Computation

2. ICT

Information **Communication** Technology

=> deliver actionable knowledge to someone
(or everyone)

2. ICT today



Information Communication Technology

+

Big data

=

We can compute (know) almost anything

3. “sustainability”

- Business perspective: sustain increasing efficiency
- Ecological perspective: preserve nature
- Social perspective: maintain (increase) human welfare
- My perspective: the earth is our house



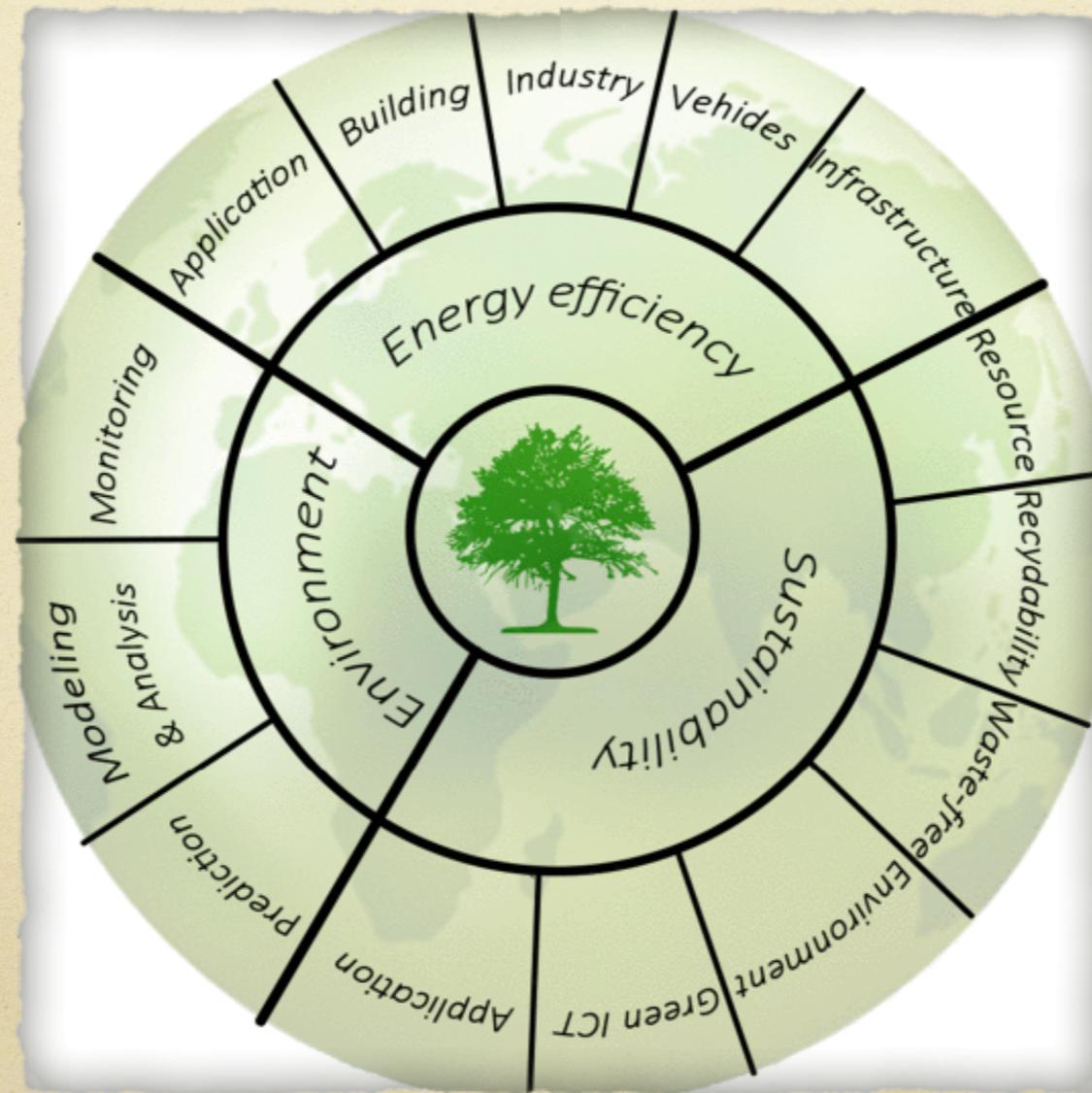
3. “sustainability”

- Sustainability ... the ability to sustain something
- Nachhaltigkeit^[2] ... Principle, according to which no more can be consumed, than each regrow, regenerate, in the future can be provided again

Part II: Computation &
Nachhaltigkeit

4. Examples

Big Data Meet Green Challenges: Big Data Toward Green Applications



4. Examples

Big Data Meet Green Challenges: Big Data Toward Green Applications

- “investigate the opposite directional relation between the trend of big data era and that of the new generation green revolution via a **comprehensive and panoramic literature survey on how to use big data as tools to achieve various other green objectives.**
- environmental issues:
 - serious air, water, and soil pollution problems ... climate change ... in some regions
 - address the potentials in **applying the big data into these environmental challenges** to make a green and sustainable world.”



4. Examples: Big Data for Environmental Issues

- **Pollution: U-air:** When urban air quality inference meets big data
- **Climate:** A big data guide to understanding climate change: The case for theory-guided data science
- **Degradation/deforestation:** University of Maryland and Google have jointly developed a high-resolution interactive mapping tool measuring the impact of deforestation
- **Waste:** European ICeWater project: food waste (ICT infrastructure for efficient water resources management: Towards harmonization of a fragmented field)

4. Examples: Big Data Applications for Improving Energy Efficiencies and Energy Managements

- **Appliances:** Effectiveness of an energy-consumption information system on energy savings in residential houses based on monitored data
- **Buildings:** Classification of energy consumption in buildings with outlier detection, Simulation and big data challenges in tuning building energy models
- **Infrastructure:** A cloud-based architecture for big-data analytics in smart grid: A proposal
- **Systems and user devices:** Sustainable assemblage for energy (SAE)' inside intelligent urban areas—How massive heterogeneous data could help to reduce energy footprints and promote sustainable practices and an ecological transition

4. Examples: Big Data for Sustainability

- Renewable resources: Solar Energy Evolution and Diffusion Studies (SEEDS) program
- Recycling: Joint Lab between the United Nations Development Programme (UNDP) in China and Baidu
- Sustainable transportation: Leveraging big data for the development of transport sustainability indicators
- Industry: Towards sustainability assessment: Reference data model for integrated product process supply chain design
- Sustainability management: M2M platform-as-a-service for sustainability governance

4. Examples: Data and Blockchain

Regen.network

“... we propose a remedy to ecological degradation and climate change.”

4. Examples: Data and Blockchain

Regen.network

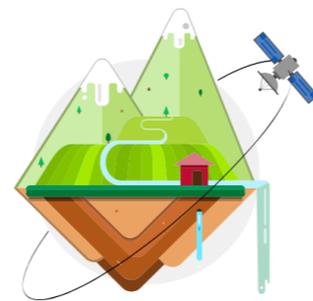
Catalyzing regeneration

There may be nothing of more critical importance today than the regeneration of the world's ecosystems. Regen Network is a global community and platform focused on ecological monitoring and regeneration. By improving our understanding of the state of our land, oceans and watersheds, and enabling rewards for verified positive changes, Regen Network catalyses the regeneration of our ecosystems.



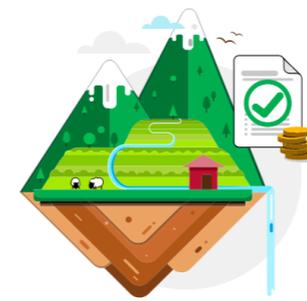
Ecological State

Regen Network monitors on-the-ground conditions and generates trusted attestations about the ecological state of a piece of land.



Verified Change of State

Network members assess the impact of their ecological actions on the land using Ecological State Protocols.



Direct Rewards

Ecological Contracts allow organizations to allocate funds and distribute them according to specific verified outcomes.

Source: regen.network

4. Examples: Data and Blockchain

Regen.network

- Regen Ledger: a domain-specific public permissioned **blockchain**
- Data sources:
 1. Raw remote sensing data (optical, near infrared, SAR, and LiDAR)
 2. GIS datasets
 3. Bioregional sensor networks with large sets of data-points that act as training and validation datasets
 4. User-collected ecosystem data

5. ~~Discussion~~ Questions

The right answers only follow asking the right questions.

3.8Kb vs 3Gb



“What are we using our tools [for] today?”

–Joachim Jake Layes (Global Director, Market Development
Sustainability, Autodesk)

Earthrise, taken on December 24, 1968, by Apollo 8 astronaut William Anders.

How should we use **our technology**
to take care of **our house?**



Which information to
connect with whom?

