

IT and Environmental Sustainability



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Economic
Prosperity

Social Equity

Environmental
sustainability

Two sustainability approaches

Sustainability *through* IT

- Reduce resource consumption
- Smart Energy
- Smart city
- Awareness technologies

Sustainability *in* IT

- Life-cycle
- Electronic-waste
- Design for repair

Sustainability *through* IT: Sustainable consumption



<http://toogoodtogo.dk/>

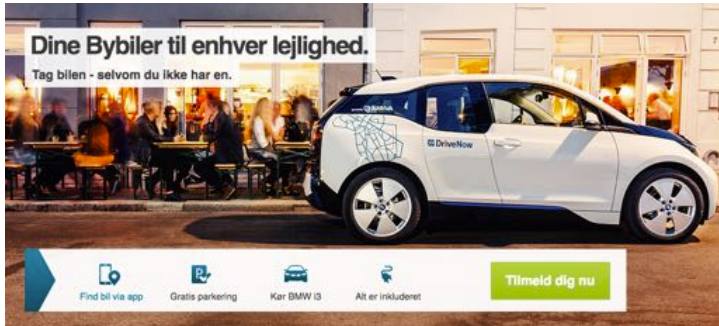
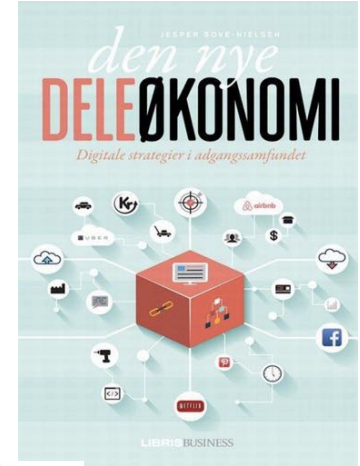


<http://gogreend danmark.dk/>

Sustainability through IT : Sustainable consumption



Sharing Economy Product as service



CONCITO

Deleøkonomiens klimapotentiale



https://concito.dk/files/dokumenter/artikler/deleoe_konomi_endelig_100615_2.pdf

Sustainability through IT : Sustainable consumption

Circular Economy



For side » Projekter » Gen Byg Data

Projekter

Biogas 2020

Gen Byg Data

- Den samlede rapport

- Gen Byg Data video

- Gen Byg Data Power Points

GreenLab Skive



Gen·Byg·Data

En bæredygtig fremtid med mindre ressourcespild, en mere effektiv genanvendelse af byggematerialer og flere lokale arbejdspladser. Det er en del af planen i det nye Skive-projekt, Gen Byg Data, som handler om at sammenkoble og aktivere de allerede eksisterende data om materialerne og forsøge at gøre dem tilgængelige for virksomheder på nye måder.

Formålet med projektet er at understøtte Skive Kommunes grønne omstilling og klimamål gennem mere og bedre genanvendelse af byggematerialer.

Kontaktperson



Gunnar Rønning Sigaard

Skive Kommune

Skive



<http://www.energibyenskiye.dk/projekter/gen-byg-data/>

https://www.ellenmacarthurfoundation.org/assets/downloads/20151113_DenmarkCaseStudy_FINALv02.pdf

Sustainability through IT: Smart Energy

7 AFFORDABLE AND CLEAN ENERGY



100% RENEWABLE ENERGY BY 2050



H.W. Shelton - CHILDRENS-STORIES.NET



Smart Grid

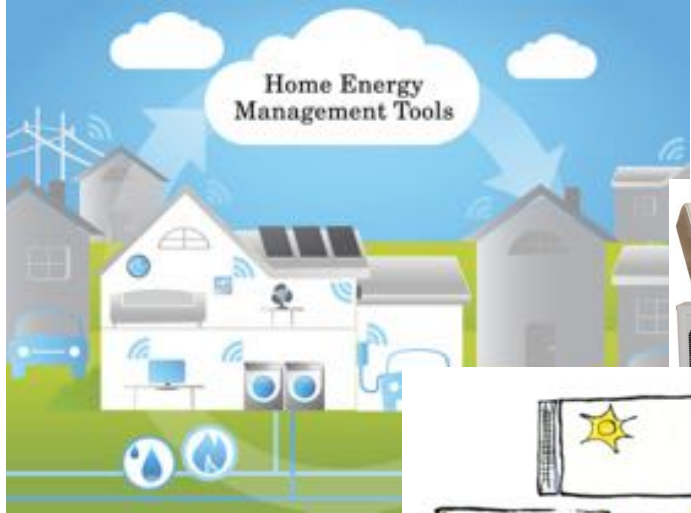
DataHub

DataHub er et centralt og uafhængigt IT-system, som ejes og drives af Energinet.dk. Udover at samle milliarder af oplysninger om kunder, forbrug og priser, håndterer DataHub al datakommunikation mellem aktørerne i elmarkedet.



Sustainability through IT: Energy

Smart Energy Homes



Flexible
energy
consumers



Energy Aware Cord.
Interactive Institute
Stockholm

Video still from Johanne Mose Entwistle,
Alexandra Institute

https://www.youtube.com/watch?v=iX_EM0WD4HY



Off Grid and micro grids



EnergyBlock

EnergyBlock is the test site of Copenhagen Solutions Labs for Decentralised Energy and Blockchain solutions. It will explore the potential of utilising renewable energy sources in an existing urban environment and connecting them to an open blockchain for energy. The ambition is to showcase and demonstrate to citizens, investors and decision makers a proof of concept for scaling in other parts of Copenhagen, as well as other cities.

<http://cphsolutionslab.dk/energyblock-2/>

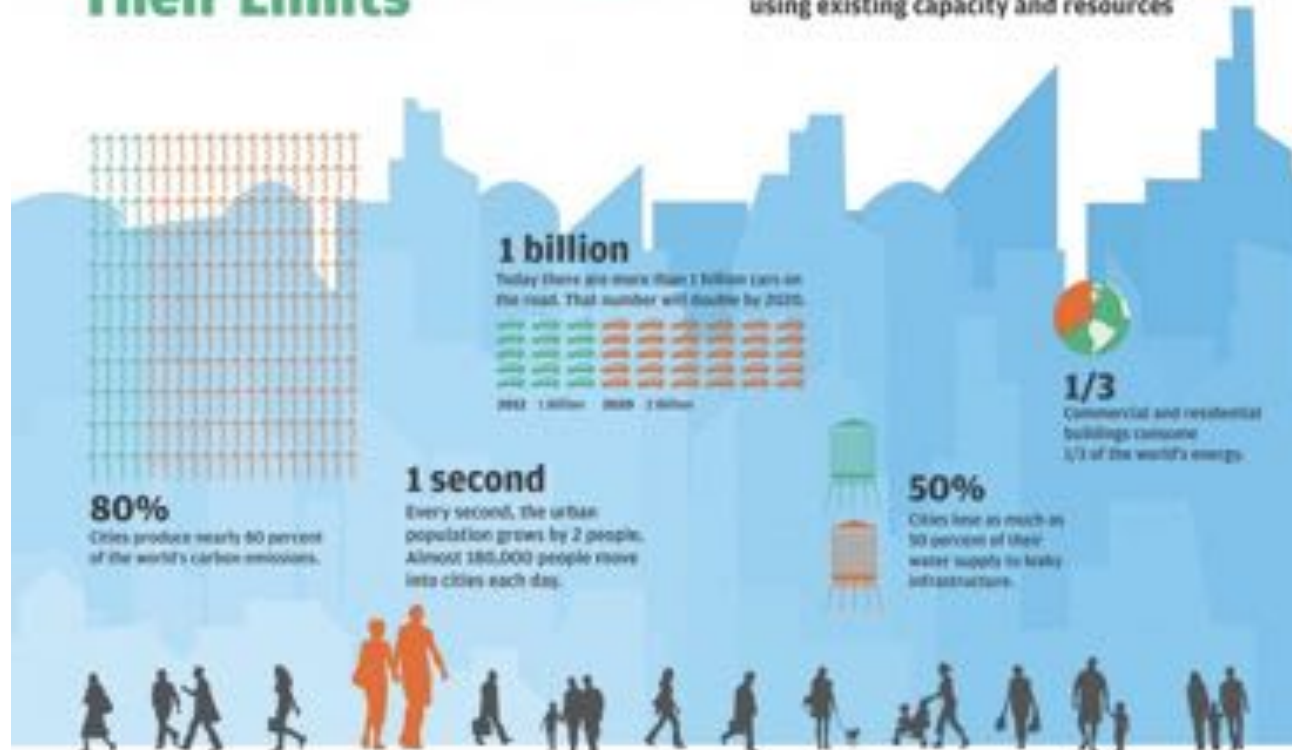
Sustainability *through* IT: Smart City

11 SUSTAINABLE CITIES AND COMMUNITIES



Cities are Reaching Their Limits

Cities must become smarter about using existing capacity and resources

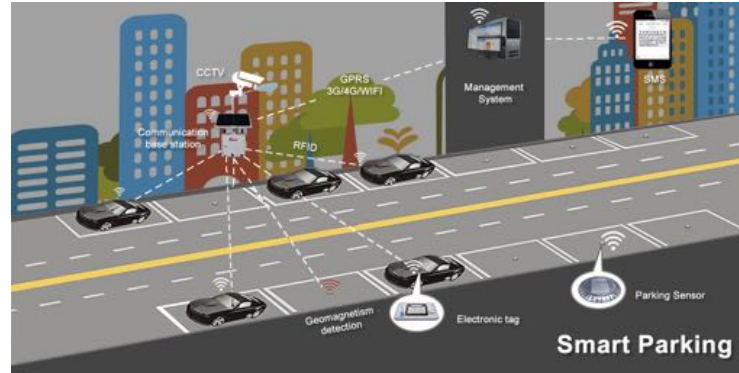


IBM

Sustainability through IT: Smart City



Smart Lighting



Smart mobility



Air quality sensing



Could self-driving cars stall sustainable transportation?

Jocelyn Timperley
Wednesday, July 6, 2016 - 12:45am



How will self-driving cars interact with public transit?





the guardian

football opinion culture business lifestyle fashion environment tech travel

columnists letters editorials

Google wants to run cities without being elected. Don't let it

Jathan Sadowski

A new initiative will see Alphabet - the parent company of Google - take charge of redeveloping a waterfront district in Toronto. Here's why that's troubling



© If the Toronto development goes as planned, it will be one of the largest examples of a smart city project in North America. Photograph: Alamy

Most popular



Robert Mugabe makes first public appearance since military takeover



Elon Musk unveils Tesla electric truck - and a surprise new sports car



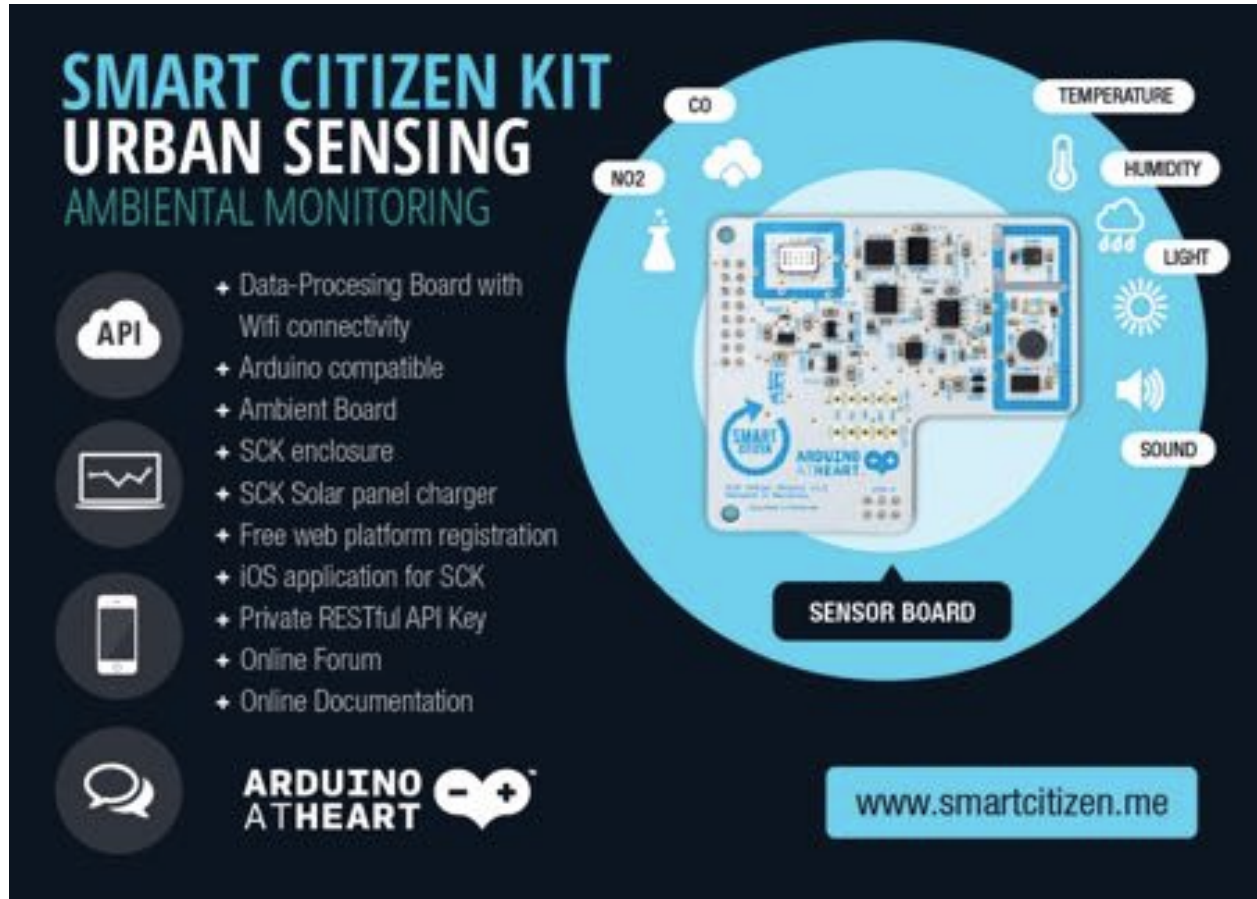
Donald Trump tweets about Al Franken sexual harassment: 'Where do his hands go?'



Robert Mugabe's vast wealth exposed by lavish homes and

<https://www.theguardian.com/commentisfree/2017/oct/24/google-alphabet-sidewalk-labs-toronto>

Sustainability *through* IT: Smart CITIZENS



SMART CITIZEN KIT
URBAN SENSING
AMBIENTAL MONITORING

- + Data-Processing Board with Wifi connectivity
- + Arduino compatible
- + Ambient Board
- + SCK enclosure
- + SCK Solar panel charger
- + Free web platform registration
- + iOS application for SCK
- + Private RESTful API Key
- + Online Forum
- + Online Documentation

API

CO

NO2

TEMPERATURE

HUMIDITY

LIGHT

SOUND

SENSOR BOARD

ARDUINO ATHEART

www.smartcitizen.me

The advertisement features a central image of the Smart Citizen Kit sensor board, which is an Arduino-compatible board with various sensors and components. The board is surrounded by icons representing the sensors it can monitor: CO (Carbon Monoxide), NO2 (Nitrogen Dioxide), TEMPERATURE, HUMIDITY, LIGHT, and SOUND. The board itself has a 'SMART CITIZEN' logo and 'ARDUINO ATHEART' branding. The background is dark blue with light blue accents.

Sustainability *through* IT: Visibility & awareness

13 CLIMATE ACTION



5 Mobile Apps that help you GO GREEN!



Sustainability through IT: Visibility & awareness

CO₂CONTANT



CONCITO
Danmarks grønne tænketank



http://concito.dk/sites/concito.dk/files/dokumenter/contant_a4.pdf

Transparency in environmental and social effects



Games and climate education



YOU ARE HERE: [HOME](#) / [BLOG](#) / 19 CLIMATE GAMES THAT COULD CHANGE THE FUTURE

19 Climate Games that Could Change the Future

MARCH 15, 2012 BY [ELLIE JOHNSTON](#) — 12 COMMENTS

The prevalence of games in our culture provides an opportunity to increase the understanding of our global challenges. In 2008 the [Pew Research Center](#) estimated that over half of American adults played video games and 80% of young Americans play video games. The vast majority of these games serve purely to entertain. There are a growing number of games that aim to make a difference, however. These games range from those that show players the complexity of **creating adequate aid packages and delivering them to places in need to games that require people to get out and work to improve their communities** to do well in the game.



Looking at the climate change challenge there are a number of games and interactive tools to broaden our understanding of

<https://www.climateinteractive.org/policy-exercises-and-serious-games/19-climate-games-that-could-change-the-future/>

Sustainability through IT: Visibility & awareness



Nuage Vert, Helsinki 2008
By HeHe



Particle Falls, COP21 Paris 2015
By Andrea Polli

Sustainability *in* IT: life-cycle

12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



IT sector
emits 2% of
 CO_2
=
all air traffic



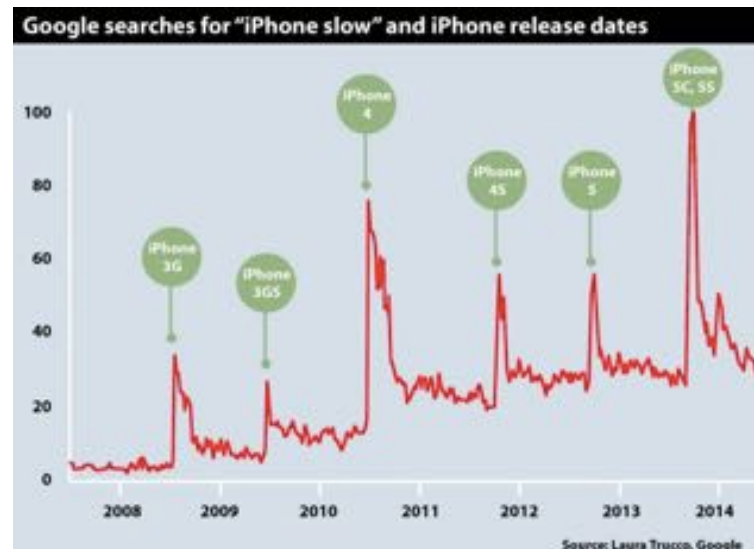
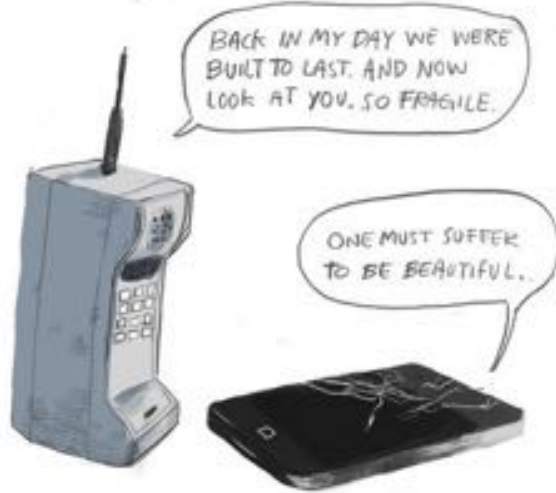
Sustainability *in* IT: Electronic-waste



20-50 tons



Sustainability *in* IT: Designed to break



Sustainability in IT: Cloud computing

Company Scorecard

	Final Grade	Renewable Energy	Waste	Water	Carbon	Energy Transparency	Renewable Energy Commitment & Siting Policy	Energy Efficiency & Mitigation	Renewable Procurement	Advocacy
Adobe	B	33%	37%	25%	11%	B	A	B	B	A
Alibaba.com	D	24%	3%	67%	3%	F	F	C	F	D
Amazon.com	C	17%	24%	30%	38%	F	D	C	C	B
Apple	A	82%	4%	5%	5%	A	A	A	A	B
Box.com	F	34%	3%	67%	3%	F	F	D	F	F
Facebook	A	67%	7%	15%	3%	A	A	A	A	B
Google	A	96%	14%	15%	19%	B	A	A	A	A
HP	C	40%	17%	27%	5%	D	B	C	B	C
IBM	C	30%	28%	27%	15%	C	B	C	C	F
Microsoft	B	32%	22%	31%	19%	B	B	C	B	B
NAVER	C	2%	19%	38%	21%	B	B	B	D	D
ORACLE	D	5%	28%	38%	25%	D	D	F	D	F
Oracle Cloud	B	42%	12%	16%	15%	B	A	C	B	B
SAP	D	11%	18%	25%	21%	C	D	C	D	C
Tencent Inc.	F	24%	3%	67%	3%	F	F	D	F	F

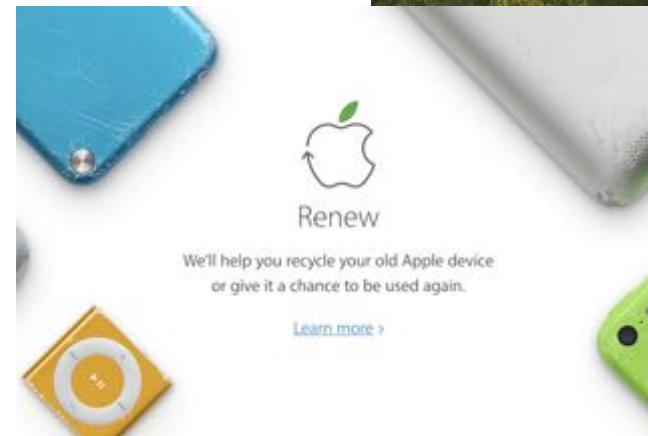
Please see Appendix 3 (Methodology page 62) for explanation of scoring methodology and basis for calculation of these energy scores and company energy data.



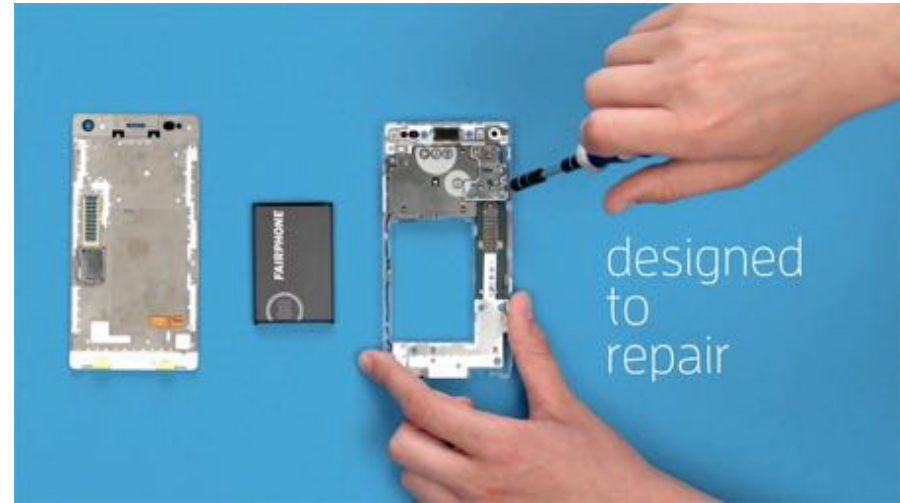
Sustainability *in* IT:

– Corporate Environmental Responsibility (CER)

- Aims for a 100% renewable energy – currently on 96%
- Aims for a closed-loop supply chain
- Say they aim to make more durable devices!!
- Have a reuse program



Sustainability *in* IT: new production approaches



**Sustainability
through IT**

**Sustainability
in IT**

Thank you

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References:

Tjoa, A. M., & Tjoa, S. (2016). The Role of ICT to Achieve the UN Sustainable Development Goals (SDG), 3–13.

Blevis, E. (2007). Sustainable interaction design. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems - CHI '07*, 503.

Mankoff, J. C., Blevis, E., Borning, A., Friedman, B., Fussell, S. R., Hasbrouck, J., ... Sengers, P. (2007). Environmental sustainability and interaction. *CHI '07: CHI '07 Extended Abstracts on Human Factors in Computing Systems*, 2121–2124.