



HACKING FOR SUSTAINABILITY

JORGE L. ZAPICO

@ KTH ROYAL INSTITUTE OF TECHNOLOGY
STOCKHOLM, 2017



JORGE ZAPICO
RESEARCHER IN MEDIA & SUSTAINABILITY

HACKING?

THE HACKER ETHIC:

1. Hands on imperative: Access to computers should be unlimited and total.
2. All information should be free.
3. Mistrust Authority, promote decentralization.
4. Hackers should be judged by their hacking, not by degrees, age or race.
5. You can create art and beauty on a computer.
6. Computers can change your life (and the world) for the better.



1.

DATA DRIVEN SUSTAINABILITY

USING NEW INFORMATION
TECHNOLOGIES AND PARADIGMS FOR
CREATING, SHARING AND
VISUALIZING SUSTAINABILITY DATA
MORE EFFECTIVELY. FOR
UNDERSTANDING THE CURRENT
STATE, PROVIDING FEEDBACK FOR
ACTIONS, VISUALIZING AND
TRACKING CHANGE.

BOTTOM UP

APIS MASHUPS

REAL TIME DATA

DYNAMIC VISUALIZATION

OPEN DATA

OPEN INNOVATION



SITES ABOUT DATA

LOGIN REGISTER

Feedback

www.kth.se

http://www.kth.se

6.9 tons CO₂ for the last 12 months

(or **0.31** gram per visit.)

How exact is this number?

This is equivalent to **39734** km driving a car.

Or **70** hours traveling in an airplane.

Impact Distribution



Server: **943.3** kg CO₂

Visitors: **5.9** tons CO₂

◀ December 2010

Total impact for December 2010

Impact Assessment



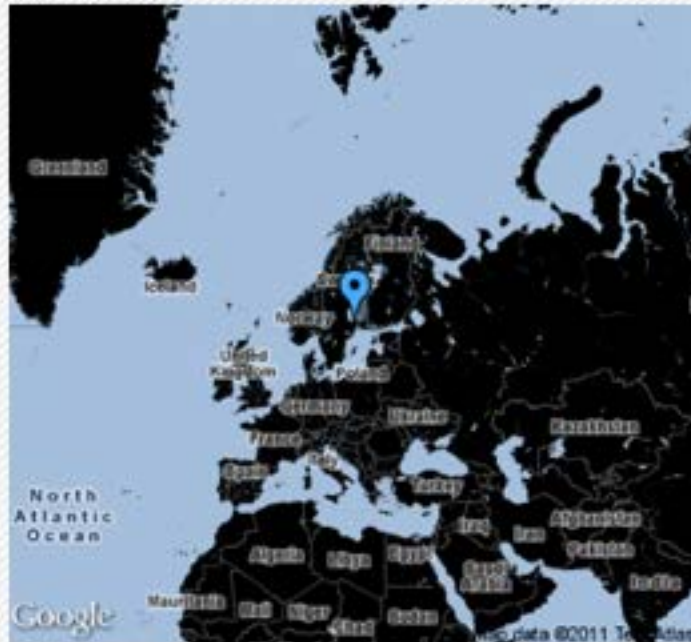
0.8 kg

Category: climate change
Indicator: CO₂e

Applies to

Year: 2011

Geography: Sweden



Reference

Davis, J. Walman. (2011) Emissions of Greenhouse Gases from Production of Horticultural Products Analysis of 17 products cultivated in Sweden

Flows

Total material input:

0.01 kg

Ratio input vs production

0:1

Material inputs breakdown:



0.0042 kg N fertilizer



0.0006 kg P fertilizer



0.0056 kg K fertilizer



0.1 Kilowatthour Electricity for baby plan production



8.6 Kilowatthour Heating



0.2 Kilowatthour Electricity for greenhouse

Total output:

1.76 kg

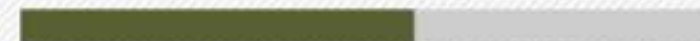
Ratio output vs production

2:1

Material output breakdown:

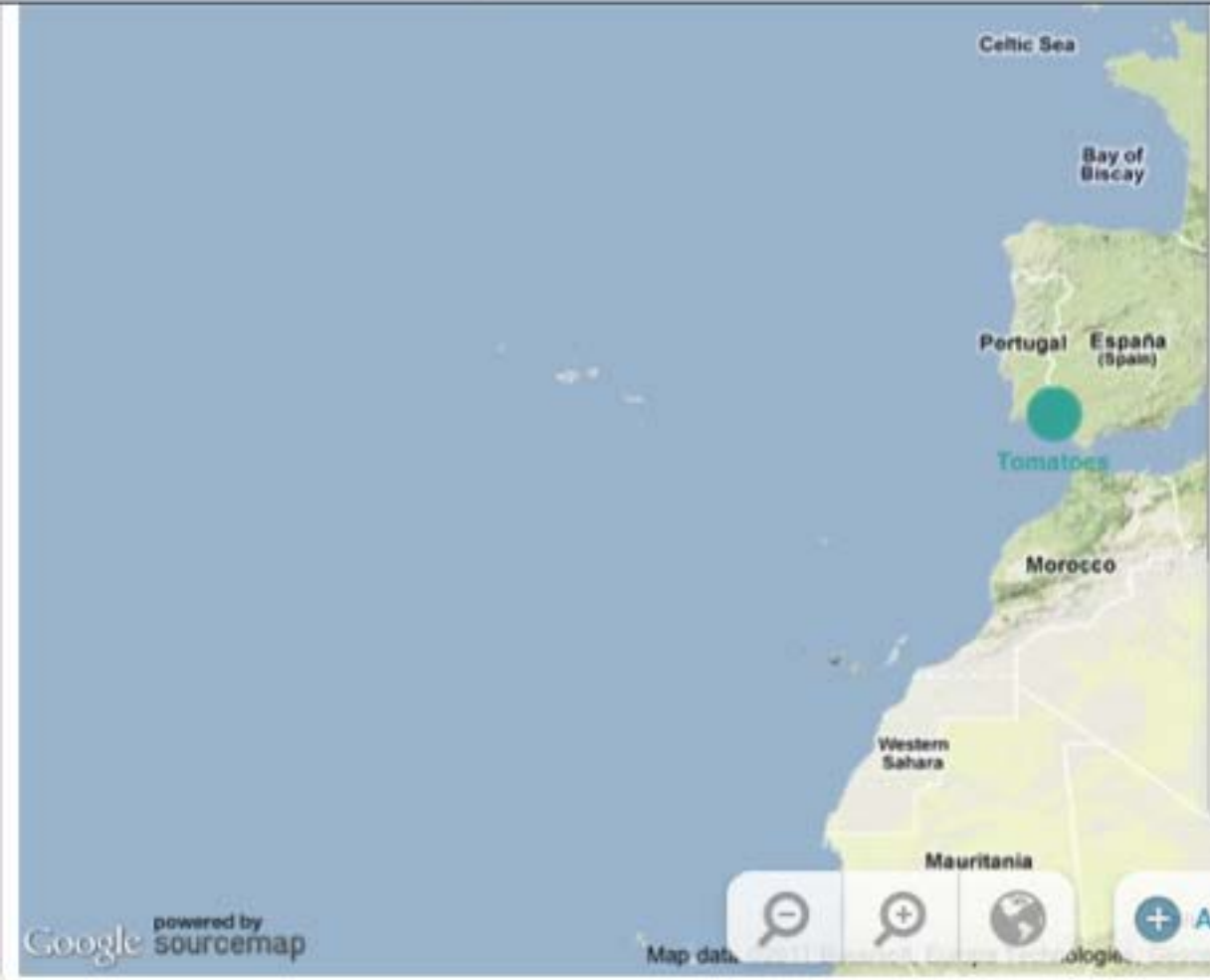


0.76 kg CO₂



1 kg Tomato

More info



Tomatoes [X]

From: Huelva, Spain

Description | Media | **Footprint** | Material Catalog

Quantity	Unit	Factor
1000	Kg	x 1.03294

1.0 t CO2e

[Connect] [Delete]

[Add a Point]

Map data: INEGI, MapLink, ORION-ME, Tele Atlas, Transnatura

Trips 2011 [Edit](#)

My trips during 2011



Zapico, October 3, 2011 in Travel

Map Options

- Show Weight
- Show Carbon Footprint (CO2e)

1. Select content

web page video

2. Select device

phone tablet laptop pc

3. Select internet connection

wifi & router 3G mobile

4. Viewing/reading time

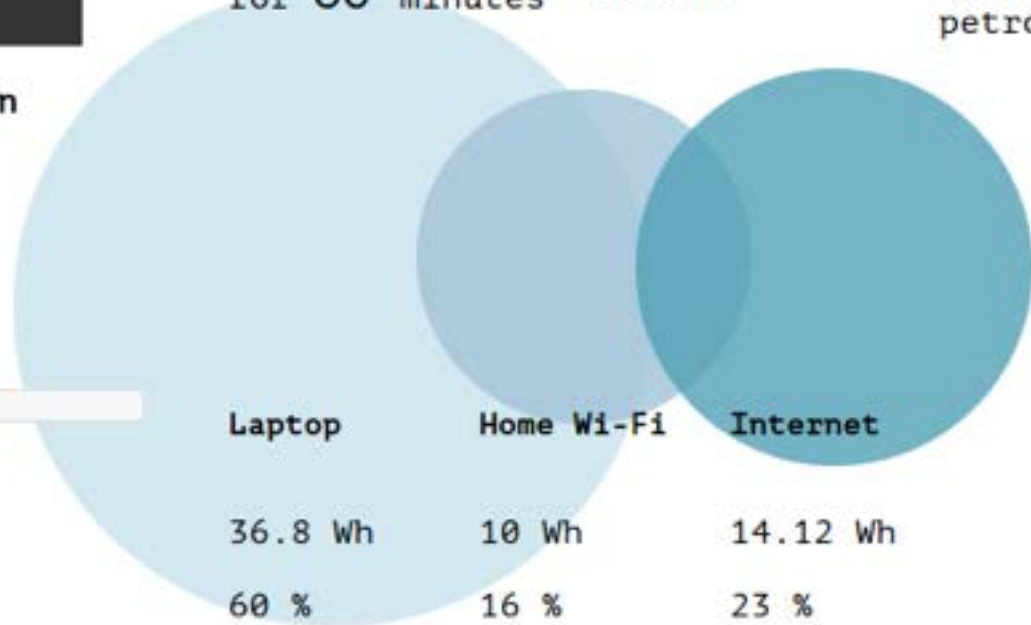
60 Minutes

Restart

60.92 watt hours

Watching video continuously using a laptop computer connected to the Internet by domestic broadband modem and WiFi router viewing for 60 minutes

6 32 153.3
11W light bulbs for 60 minutes grams carbon dioxide meters driving an average petrol car



KILO | WHAT? ^(BETA)

1
kwh

≈

7
days with wifi on

Choose your unit

HEATING SOLAR PANEL COAL TREADMILL LED LAMP NEW FRIDGE LIGHT BULB TV
MOBILE PHONE WASHING MACHINE ELECTRIC BIKE ELECTRIC CAR CAR
HEATING WITH HEAT PUMP HAMBURGER

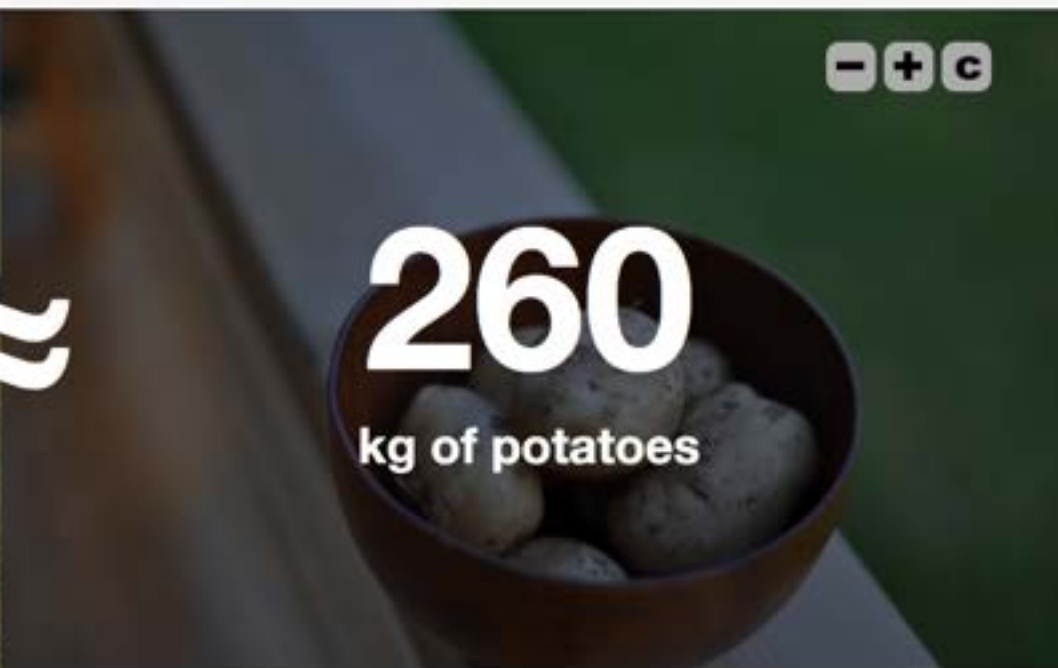
Choose your unit

KWH SOLAR PANEL COAL TREADMILL LED LAMP NEW FRIDGE LIGHT BULB
WIFI MOBILE PHONE WASHING MACHINE ELECTRIC BIKE ELECTRIC CAR CAR
HEATING HEATING WITH HEAT PUMP HAMBURGER

CARBON.TO
food edition



≈



Choose your unit

BEEF CHICKEN PORK COFFEE EGGS BEANS QUORN FISH MILK CHEESE
POTATOES RICE BREAD FRUIT VEGETABLES AIRFREIGHTED FRUIT CO2

Choose your unit

BEEF CHICKEN PORK COFFEE EGGS BEANS QUORN FISH MILK CHEESE
POTATOES RICE BREAD FRUIT VEGETABLES AIRFREIGHTED FRUIT CO2

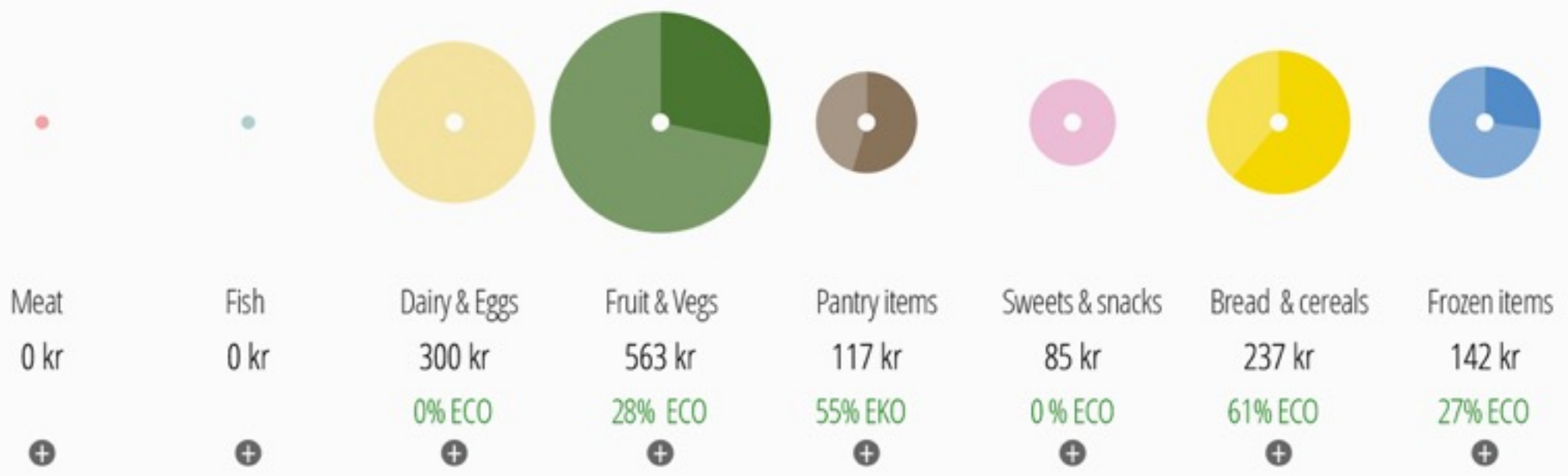


GREEN HACK ATHON

The last twelve months you have bought food for 25805 kr of which 9132 kr was organic



< MARCH >



A high-angle, black and white photograph of a person's hands using a vintage computer mouse and keyboard. The person is wearing a dark, long-sleeved shirt. The mouse is a large, rectangular, two-button model with a scroll wheel. The keyboard is a standard QWERTY layout. The background shows a desk with various cables and a chair leg. The overall tone is dark and moody.

2

A HACKER APPROACH

ICT IN SUSTAINABILITY IS SEEN AS A TOOL TO BE USED OR A SYSTEM TO BE STUDIED. BUT BOTH SUSTAINABILITY AND ICT EMBED NORMATIVE VALUES AND CULTURAL COMPONENTS.


IN THE PRESENTED TOOLS, THE SOLUTIONS ARE NOT ONLY A TECHNICAL INNOVATION, BUT A NEW WAY OF THINKING, WORKING WITH INFORMATION AND INNOVATING.

OPENESS

OPEN SOURCE, OPEN DATA, CC, HAVE SHOWN THAT THERE ARE ALTERNATIVES OF DEALING WITH COMMONS BASED ON COLLABORATION AND COMMUNITY, AND THAT CAN BE MORE EFFICIENT. SUSTAINABILITY NEEDS THAT. OPEN DATA ABOUT THE STATE OF THE PLANET AND EMISSIONS, OPEN KNOWLEDGE AND INNOVATION FOR KEY SOLUTIONS

HANDS-ON APPROACH

“THE BEST WAY TO PREDICT THE FUTURE IS TO INVENT IT”. THIS FOCUS IN DOING THINGS IS VERY RELEVANT TO SUSTAINABILITY. WE NEED TO CHANGE HOW SOCIETY WORKS, WE NEED TO IMPROVE TECHNOLOGY, WE NEED TO MOVE FROM TALKING TO DOING.



3.

DATA BLINDNESS

TRUSTING ONLY IN QUANTITATIVE
DATA CAN BE MISLEADING WHEN
WORKING WITH A NORMATIVE
PROBLEM SUCH AS SUSTAINABILITY.

TRUSTING TOO MUCH IN
QUANTITATIVE DATA INCREASES
THE NEED FOR IDENTIFYING AND
COMMUNICATING UNCERTAINTIES



4.

OVERDOING AND OVERESTIMATING

**“WITH A HAMMER EVERYTHING
LOOKS LIKE A NAIL.”**

A BACKSIDE OF THE HANDS ON
APPROACH IS OVERDOING, USING
TECHNOLOGY WHERE IT IS NOT
NEEDED.

NEED FOR APPROPRIATE TECH. OR
NO TECH AT ALL.





“EAT YOUR CHIP”

ANOTHER BACKSIDE FROM HOW
COMPUTERS CHANGED THE WORLD
IS OVERESTIMATING ITS
IMPORTANCE.



IN A NUTSHELL

ICT AFFECTS HOW WE WILL WORK WITH SUSTAINABILITY AND HOW WE INTERACT WITH THE WORLD. IT MAKES INVISIBLE THINGS VISIBLE AND ACTIONABLE IN A MORE OPEN, DYNAMIC AND REAL TIME WAY. THESE CHANGES ARE NOT ONLY TECHNICAL BUT PARADIGMAL.

IT ALSO CREATES A BIAS TOWARDS MEASURABLE THINGS THAT WE HAVE TO BE AWARE OF.



THANKS!

MORE INFO AT

[HTTP://JORGE.ZAPI.CO/PHD](http://jorge.zapico.phd)

CONTACT AT

[ZAPICO@KTH.SE](mailto:zapico@kth.se)