



**Measuring the Open and Sustainable  
Technology World**

# Standing on the Shoulder of Giants

Open source is the cooperative, open and global demonstration of technology combined with knowledge transfer and proof.



The scientific consensus on which our prosperity is built upon, uses the same principle.

*"Knowledge is a collective tradition"*

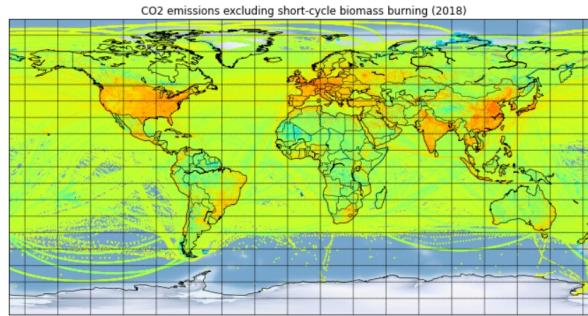
- Vandana Shiva

*"If I have seen further it is by standing on the shoulders of Giants."*

- Isaac Newton



# Truly Sustainable is Open



Emissions Database for Global Atmospheric Research

## Transparency and Trust

Sustainability is massively misused for pure marketing purposes. By publishing life cycle assessments, data sets and models, we can **create an open measure of what is actually sustainable**. Openness is thus the best way to reduce greenwashing.

## Collaborative Innovation

Through the **worldwide exchange of sustainable technology and knowledge** the effects of climate change can be solved on a global scale. Openness means that organizations, individuals and companies worldwide are involved in finding solutions.

# OpenSustain.tech

Renewable Energy  
Photovoltaic and Solar Energy  
Wind Turbines  
Hydro Energy  
Geothermal Energy  
Bioenergy  
Energy Storage  
Battery  
Hydrogen  
Energy Distribution and Grids  
Energy Consumption and Efficiency  
Buildings and Cities  
Mobility and Transportation  
Production and Industry  
Computation and Services  
Energy System Assessment  
Modeling  
Analysis  
Optimization  
Monitoring and Control  
Datasets on Energy Systems  
Emissions  
Carbon Footprint

## Open Sustainable Technology

A curated list of open technology projects to sustain a stable climate, energy supply, and vital natural resources.

"True sustainability is open." - [prototypes](#)

Your ambition is to list all high quality and actively maintained projects worldwide. Your contribution is necessary to keep this list alive, increase the quality and to expand it. Read more about its origin and how you can participate in the [contribution guide](#), [community chat](#), [presentation slides](#) and related [blog post](#). Please contact us to give feedback, hints and ideas for OpenSustain.tech or create an issue.

 [Community Chat](#)



### Renewable Energy

#### Photovoltaic and Solar Energy

- [pvlib-python](#) - A set of documented functions for simulating the performance of photovoltaic energy systems.
- [pvfactors](#) - Open source view-factor model for diffuse shading and bifacial PV modeling.
- [gsee](#) - Global Solar Energy Estimator.

**A curated list of open technology projects  
to sustain a stable climate, energy supply, and vital natural resources.**

# Stop Reinventing the Wheel



Most of the time spent in robotics was reinventing the wheel (slide from Eric and Keenan pitch deck)

*„The Unix philosophy emphasizes building simple, short, clear, modular, and extensible code that can be easily maintained and repurposed by developers other than its creators. The Unix philosophy favors composability as opposed to monolithic design“.* [Wikipedia](#)

# Marketing in Open Source: A Necessary Burden

Many excellent open source projects fail due to a lack of users and contributors.

- Users do not know how to discover high quality open source projects.
- Projects lack marketing experience.
- Many institutions use self-hosted git repository for their projects.
- Active projects are lost in the sheer mass of inactive projects.
- Most open source project can not be cited.
- Many projects are just release open source for reproducibility and transparency.



**Good projects and ideas no longer spread by themselves in a world where everyone is screaming for attention.**

# Simple methods to spread your project

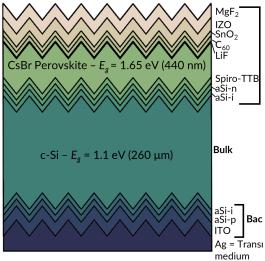
Marketing of Open Source projects is possible **without** investing into advertisement

- Get in touch with other communities.
- Create a recognition effect for your project.
- Write about your project in difference channels.
- Publish your project in a journal.
- Create a professional public appearance with a unique email address and domain name.
- Add your projects to awesome list and other indexes.
- Create a simple community chat, posting guide, and welcome culture.
- Be creative how you do marketing. (A good example: <https://github.com/auchenberg/volkswagen>)

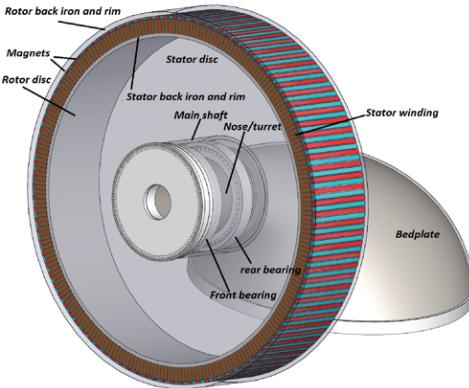


Most open source projects are non startups and grow very slowly, especially in the beginning. Finding the first users and contributors will be the hardest.

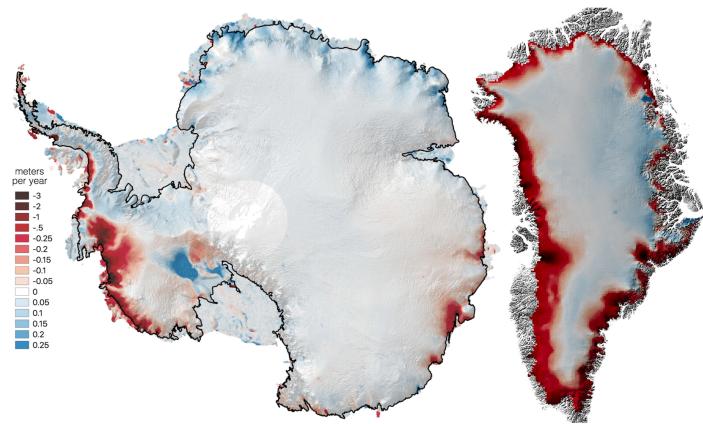
# Finding Hidden Gems



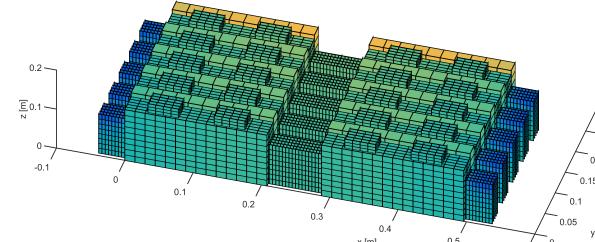
Raytrace Modelling in PV



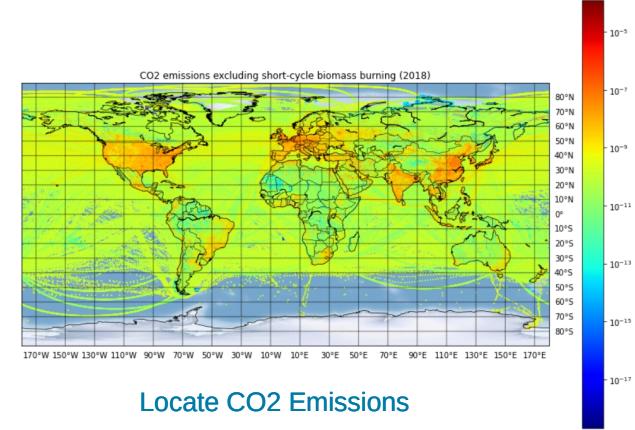
Reference Turbine Standards and Construction Plans



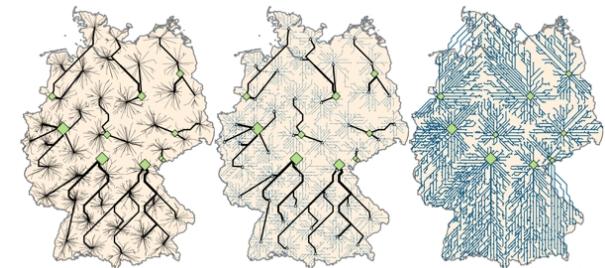
Monitoring the poles



Coupled Electrical-thermal simulations of battery systems



Locate CO2 Emissions



Hydrogen Infrastructure Model

# Next steps for OpenSustain.tech

## 1. Identify new and missing projects

- Growing the community
- Free Marketing for projects that are contributed to OpenSustain.tech
- Technology scouting by projects members
- Planting of 100 trees for every accepted pull request

## 2. Statistics of listed projects via the Git API

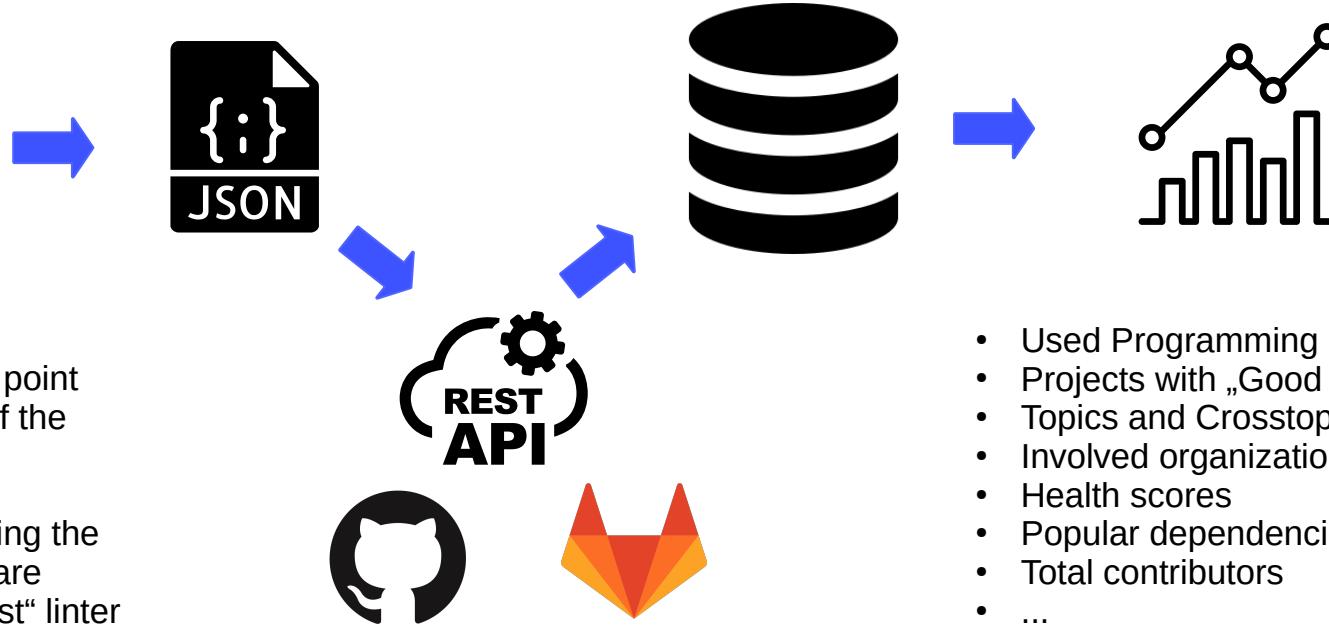
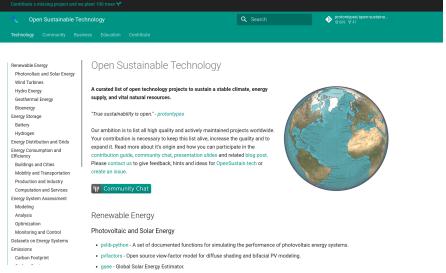
- Measure the health of a project
- Discover interrelations between projects
- Analysis the growth of a project

## 3. Improved user experience

- Create a database with improved search functionality
- Enable clustering of projects based on used defined criteria



# Measuring Open Sustainability



- Links on OpenSustain.tech point directly to Git repositories of the projects.
- All markdown files for creating the OpenSustain.tech website are checked by an „awesome list“ linter to enable automated processing.

- Used Programming languages
- Projects with „Good First Issues“
- Topics and Crosstopics
- Involved organizations
- Health scores
- Popular dependencies
- Total contributors
- ...

# Open Carbon Offset (OCO)

Measure Power Consumption and Efficiency



Scaphandre

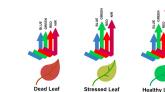


Carbon Intensity and Energy Mix for your Location



Green Cost Explorer    GlobalEnergyGIS.jl

Forestation Opportunity Assessment for Carbon Capture



Plant new trees and protect existing forests.



Digital Humanit

60 % efficiency

0.200 kg CO<sub>2</sub> per kWh

20 kg CO<sub>2</sub> per tree per year

1 \$ per tree

10000 kWh / year

→ 2000 kg of CO<sub>2</sub> / year

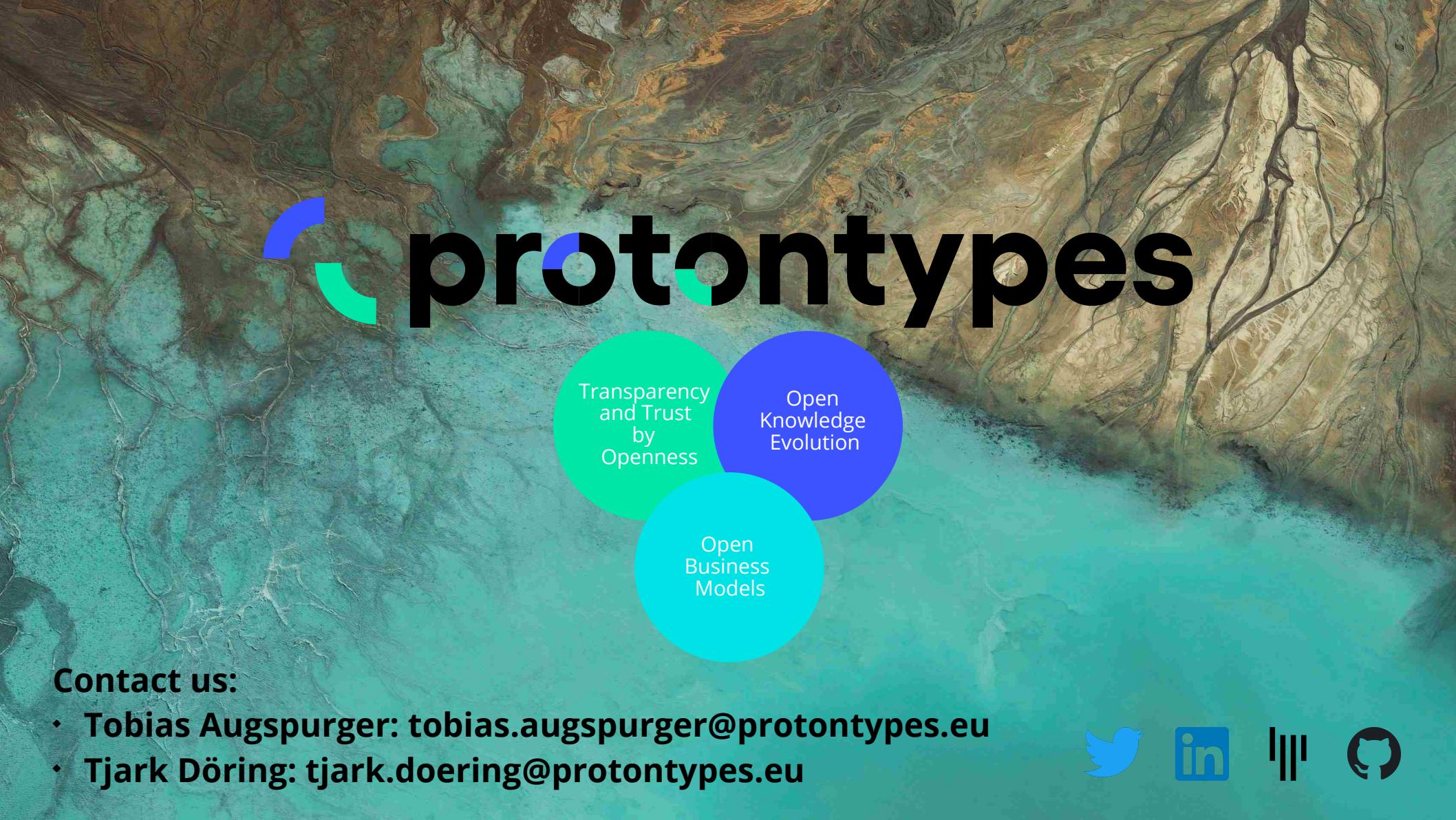
→ 100 trees / year

→ 100 \$ / year

# Goals of OCO

1. Open and reproducible framework to measure carbon offset.
2. Standardization of how carbon neutrality is measured.
3. An open community for collaboration and discussion between organizations and communities.
4. Connecting projects and communities of different sustainable topics.
5. "Standing on the Shoulder of Giants" by example.





# prototypes

Transparency  
and Trust  
by  
Openness

Open  
Knowledge  
Evolution

Open  
Business  
Models

## Contact us:

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