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-

Introducing Baltics in Space

Baltics in Space (BiS) is a social enterprise

that integrates deep skillsets

over a wide geographical region

to provide a competitive space service

larger than the sum of its parts.

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Why Space ?

Why Baltics ?

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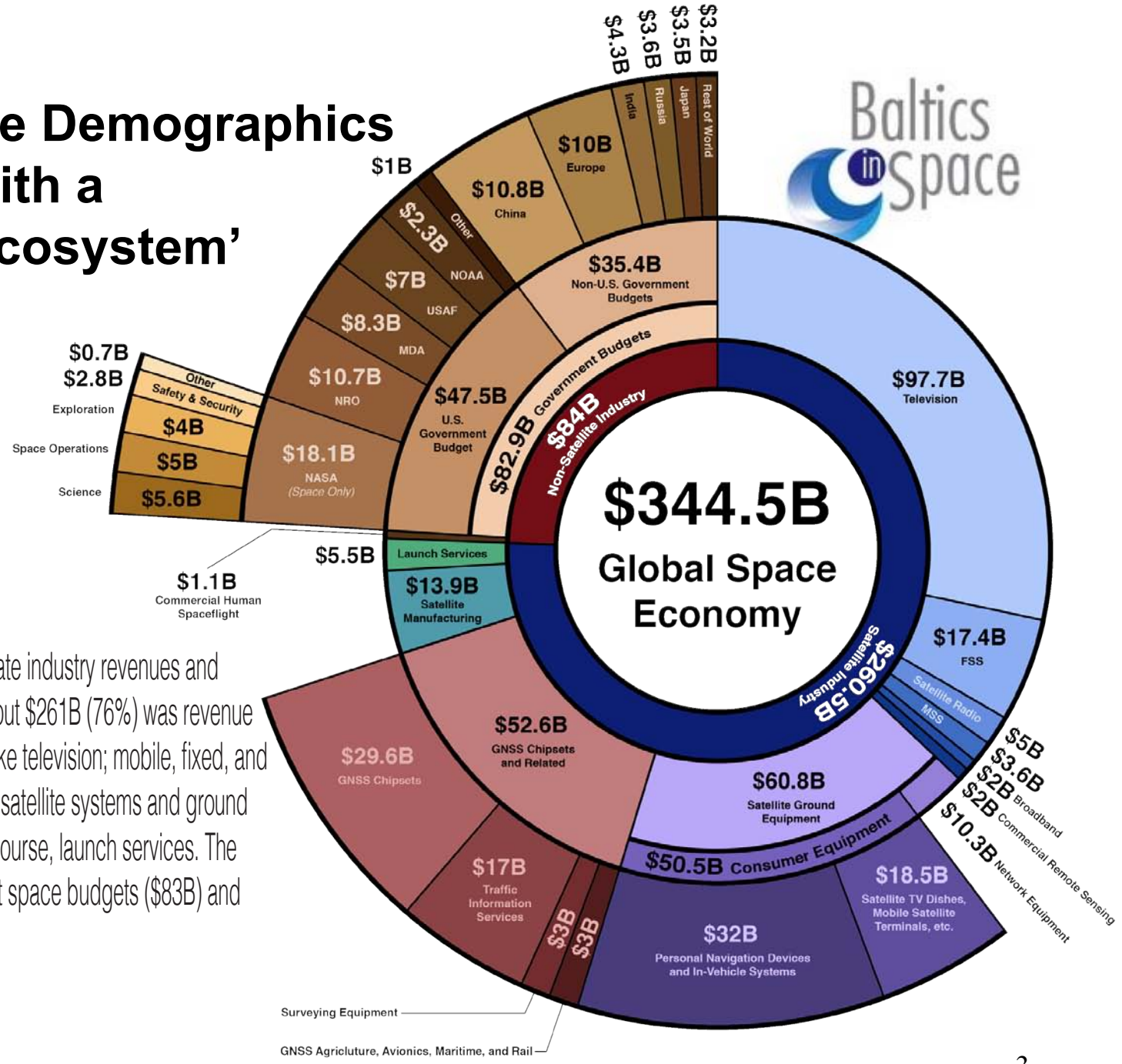
Societal Need:
Baltics Negative Demographics Can Address with a Space Skills 'Ecosystem'



THE SPACE INDUSTRY

The global space economy, consisting of private industry revenues and government budgets, was $345B in 2016. About $261B (76%) was revenue generated by companies providing services like television; mobile, fixed, and broadband communications; remote sensing; satellite systems and ground equipment manufacturing and sales; and, of course, launch services. The remaining $84B (24%) constitutes government space budgets ($83B) and commercial human spaceflight (almost $2B).

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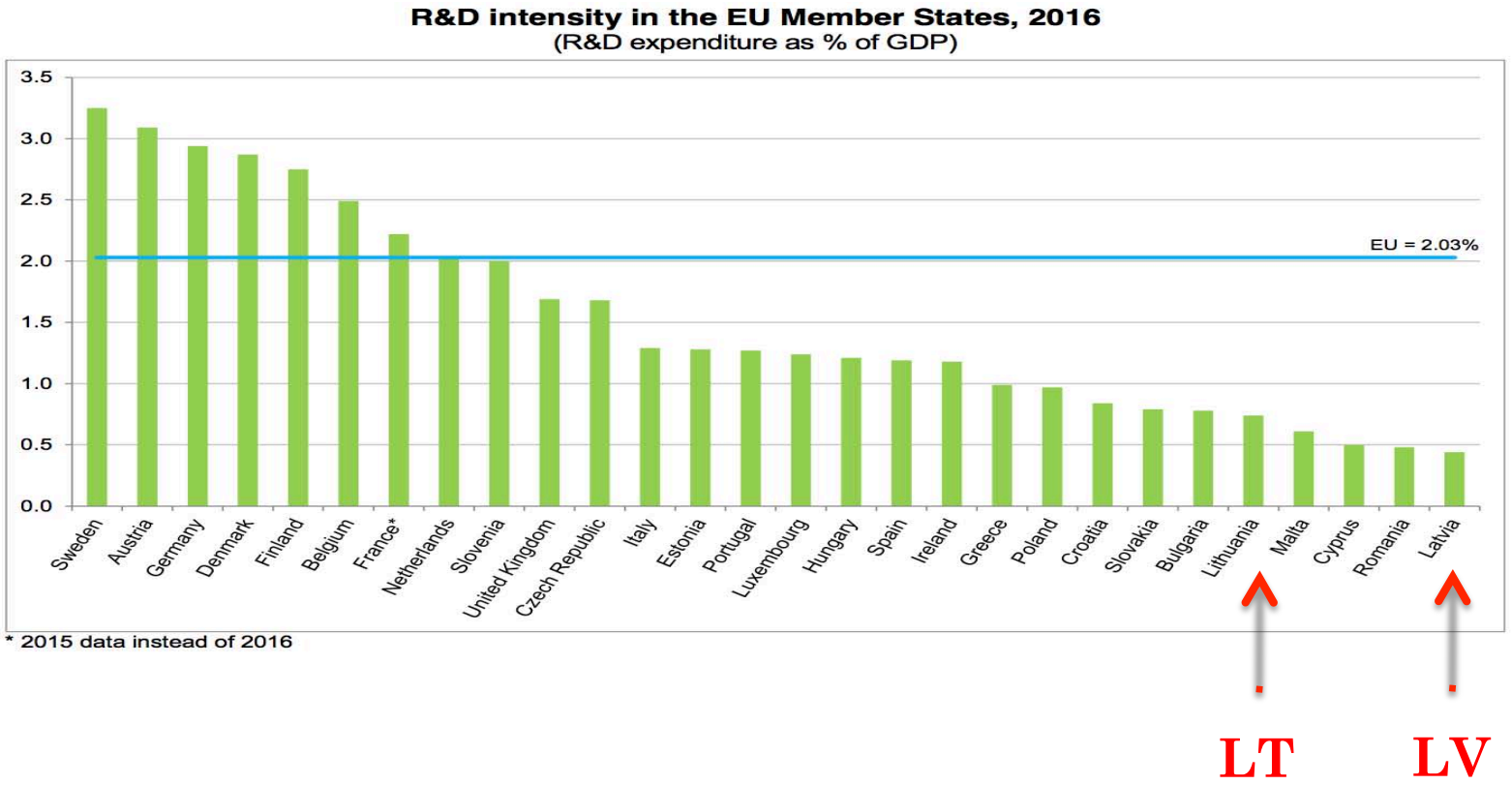
Societal Need:
LV and LT low R&D investment
Can Address with a
Space Skills 'Ecosystem'



We have instead: Latvia's 'hot' economy 3-4% growth.

In the near-term, INDUSTRY will need to lead Latvia's R&D and show the needed applications.

Baltic Space Facilities –competencies
Integrate skillsets to build a
4 Country Space Skills Ecosystem

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BiS has access to several commercialisable projects.

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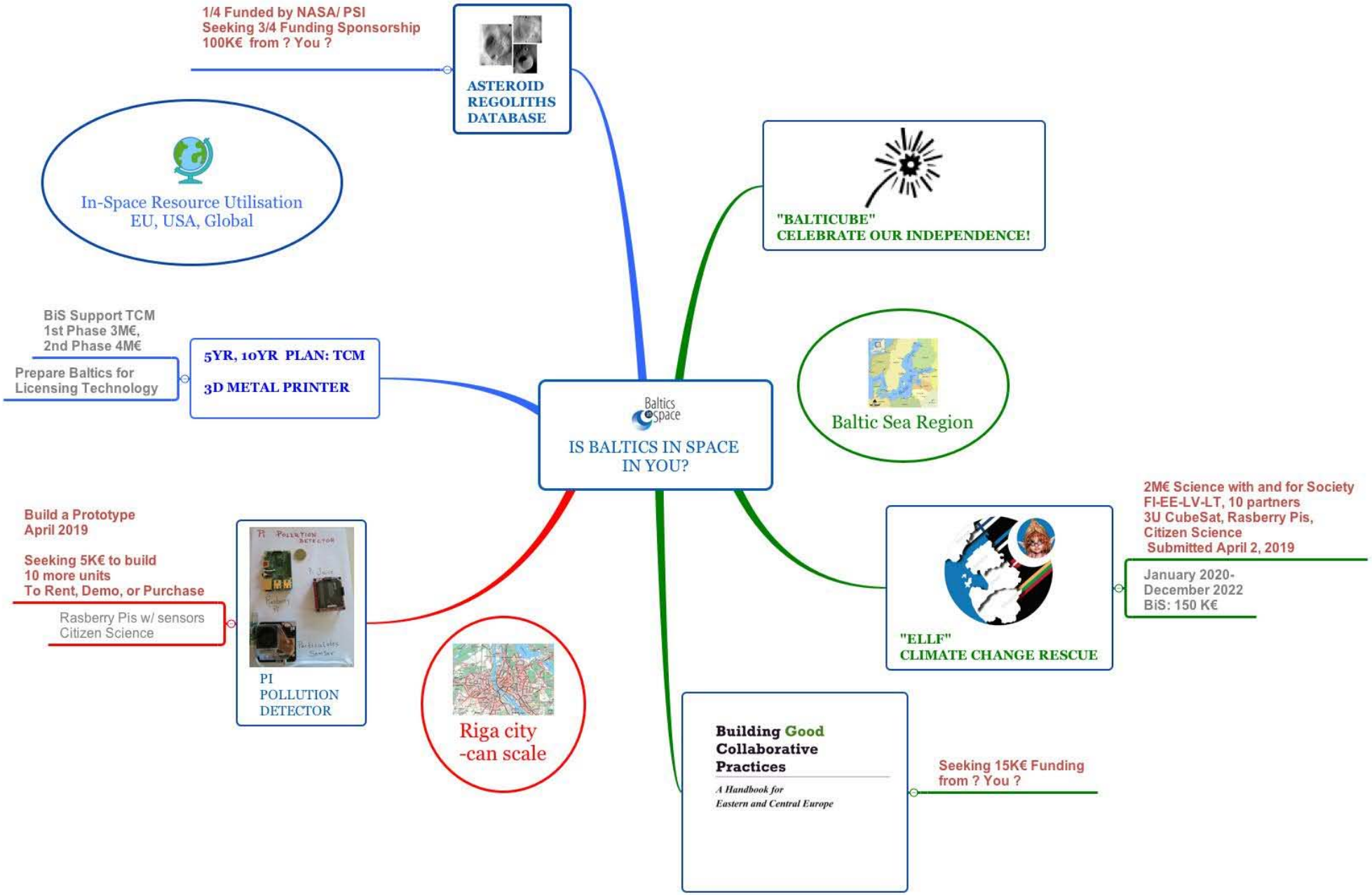

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Book: Good Collaborative Practices

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Introduction:

- **Eastern and Central Europe R&D in Transition**
- **Funding shifts towards soft money**
- **The End of Structural Funds**
- **After 16 years : Where we are at**

Triple and Quadruple Helix Principles

Putting one's R&D in an international context

Networking

- **The Search for Suitable Partners**
- **The Importance of Respect**
- **Communication Strategies**

Care of Intellectual Partner Property

- **The Difference between Copyrights and Intellectual Property Rights**
- **Academic Employment Contracts with IPR**
- **Non-Disclosure Agreements**
- **Friendly non-binding Agreements**
- **CC Licensing**

Grant Support Strategies

- **Communication amongst partners**
- **Digital submission / management systems training**
- **Application Writing**
- **Grant Management**
- **Accounting / Financial Department Support**

What Review Panels Look For

Grievance Procedures

- **Integrating former institutes from Soviet Academy of Sciences**
- **Types of Mediation**
- **Ethical Issues and Effective Evaluation**
- **Reputation Losses and Suggested Repair amongst Triple Helix entities**

Five Case Studies

- Broken Industry Link between key commercial entity and academic partners
- Broken Technology Transfer
- Broken Academic Management: Misappropriation of Funds
- Broken Government Ministry Bookkeeping Link
- Broken Ethics Handling of 2.5 Meuro project in Academic Setting

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Pi Pollution Detector

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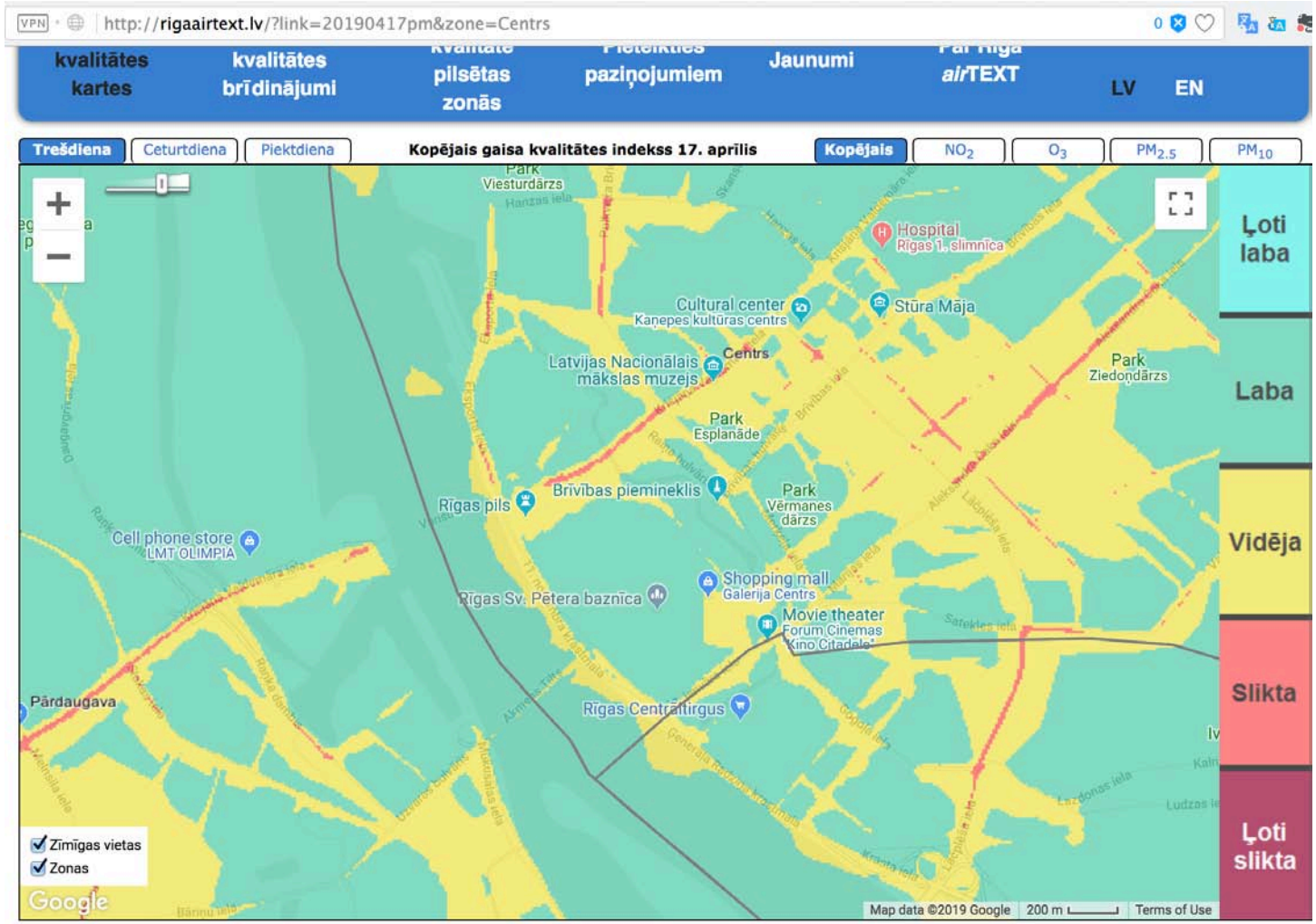
Riga has a pollution problem.

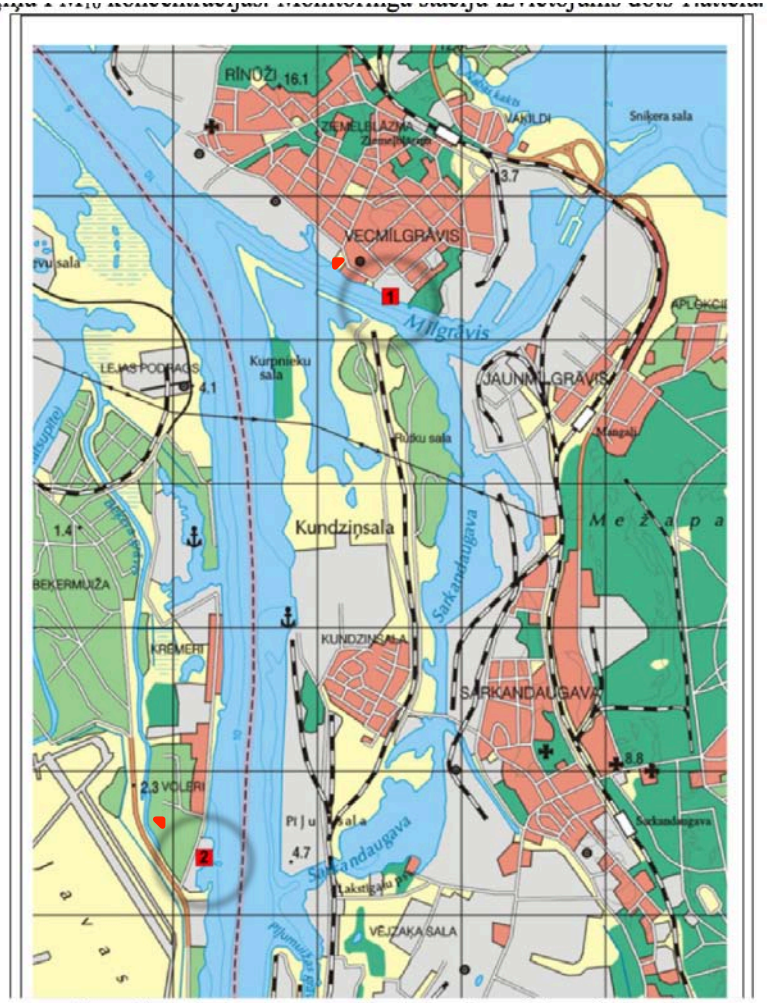
From coal transfer at the Riga Ship Yard



Yet, the particulates reported (*) to the EU for air quality in Riga is **benzene**, not pm2.5 and pm10

(*) Department of Housing and Environment of Riga City Council
https://mvd.riga.lv/nozares/vides-parvalde/gaisa-kvalitate/gaisa-kvalitate-riga-sobrid/

two pm10 monitoring stations



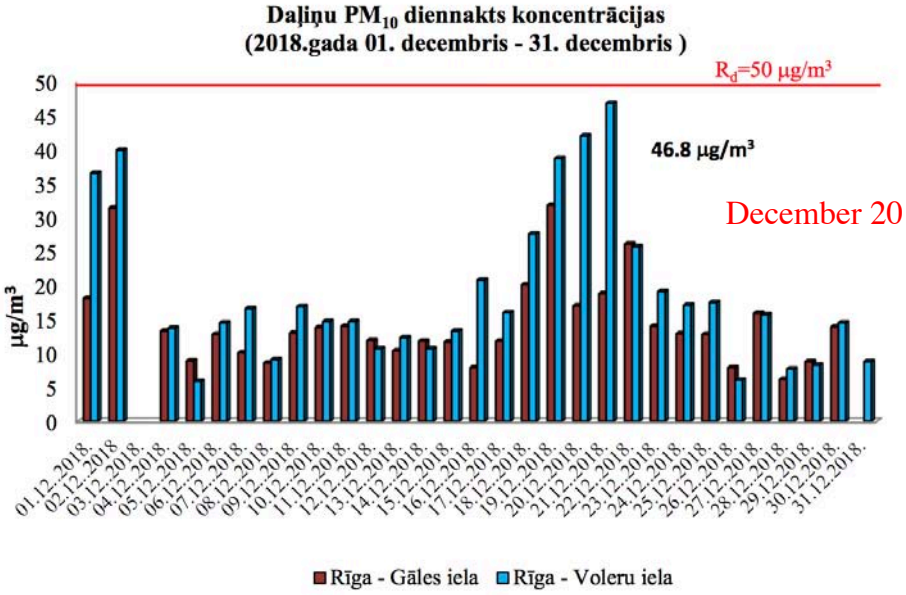
1. attēls. Monitoringa staciju izvietojums Rīgas Brīvostā.

Apzīmējumi:

1. stacija – „Gāles iela"(Gāles ielā 2);
2. stacija - „Voleru iela" (Voleru iela 2).

Daļiņu PM_{10} novērojumu rezultāti.

Novērojumu stacijās „Gāles iela" un „Voleru iela" veikti daļiņu PM_{10} koncentrāciju mērījumi. Augstākās maksimālās diennakts koncentrācijas (stacija „Voleru iela"- 46.8 $\mu g/m^3$ un stacijā „Gāles iela" – 31.8 $\mu g/m^3$) konstatētas 2018. gada 21. decembrī un 19. decembrī. Mērījumu rezultāti visa mēneša garumā doti 2.attēlā.



December 2018 pm10

The Port of Riga reports (*) to the public, monthly, pm10 values and not the more dangerous pm2.5 values. They say their particulate outputs are safe (< 50 micro-g/$m^{3)}$.

(*) http://www.rop.lv/lv/par-ostu/vide/vides-monitorings.html

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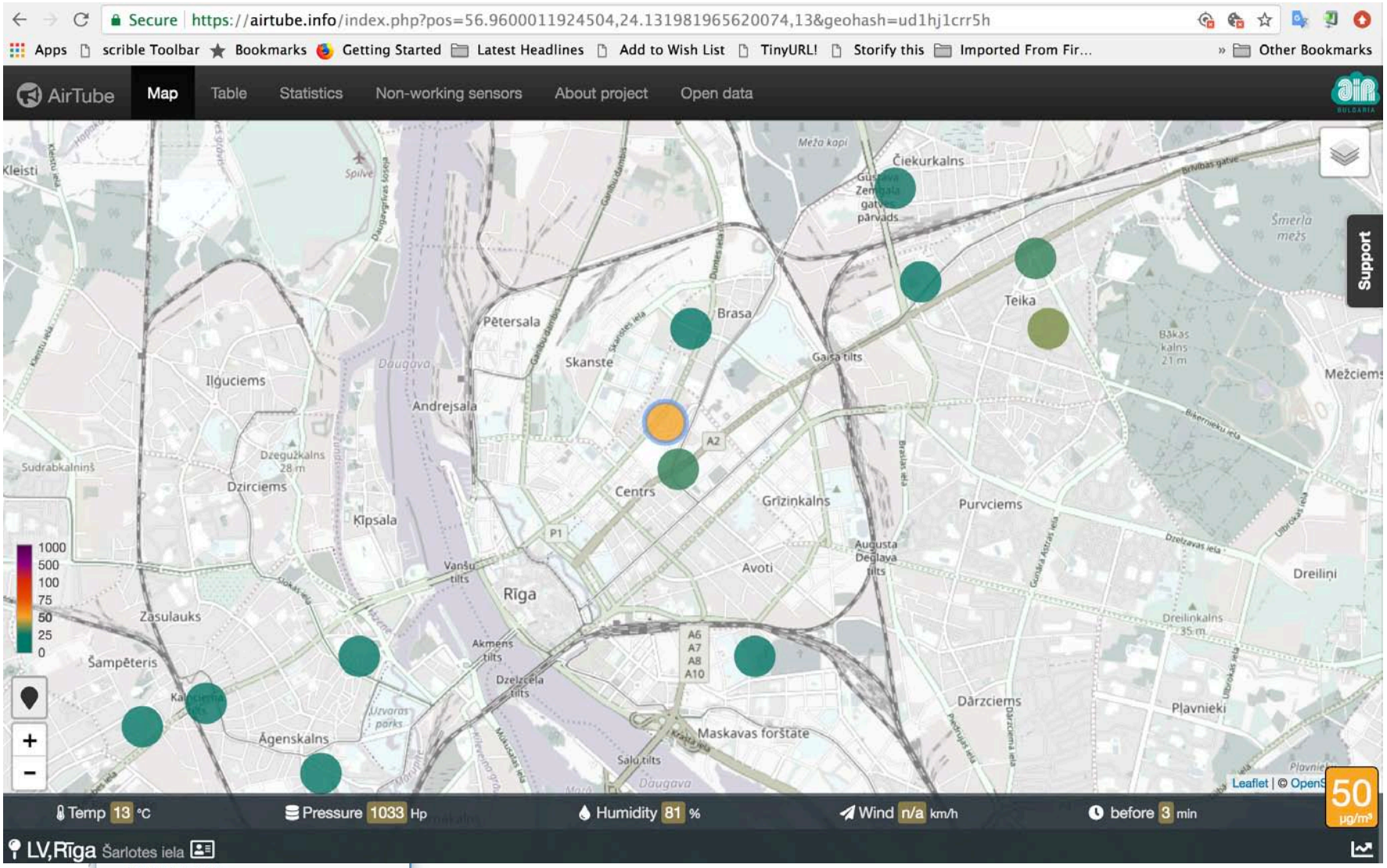

Meanwhile a handful of anonymous environment stations in Riga are recording temperature, pressure, humidity and PM2.5 and PM10 particulate data.

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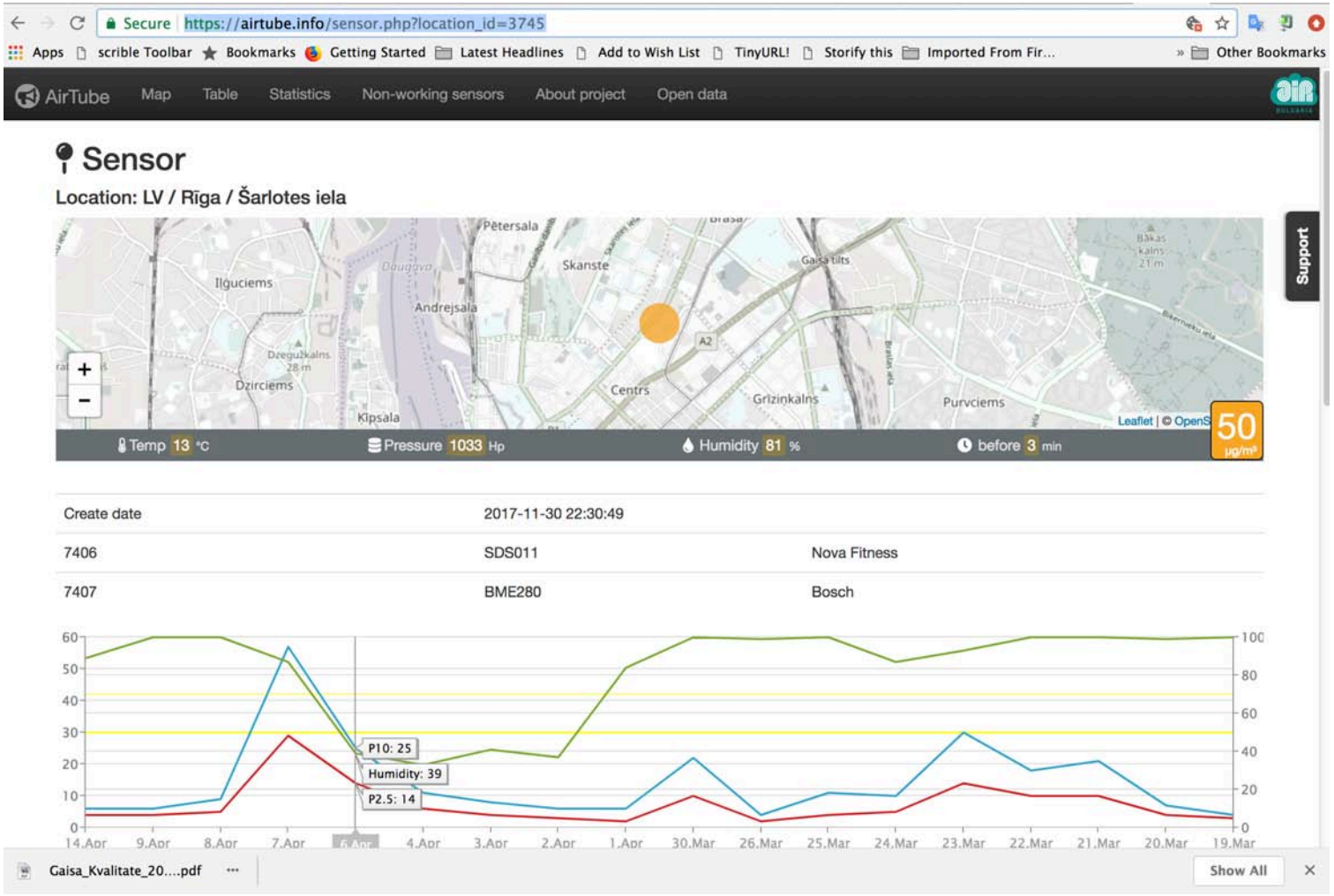
One of the environment stations is relatively near the shipyard and recording pm10 and pm2.5 values.



Their recordings show PM10 levels exceeded safety levels five days in December 2018 (*)

(*) Sarlotes iela
https://airtube.info/stats.php?country=LV&city=R%C4%ABga&sensor=3745&date_from=2018-12-01&date_to=2018-12-31&groupby=d

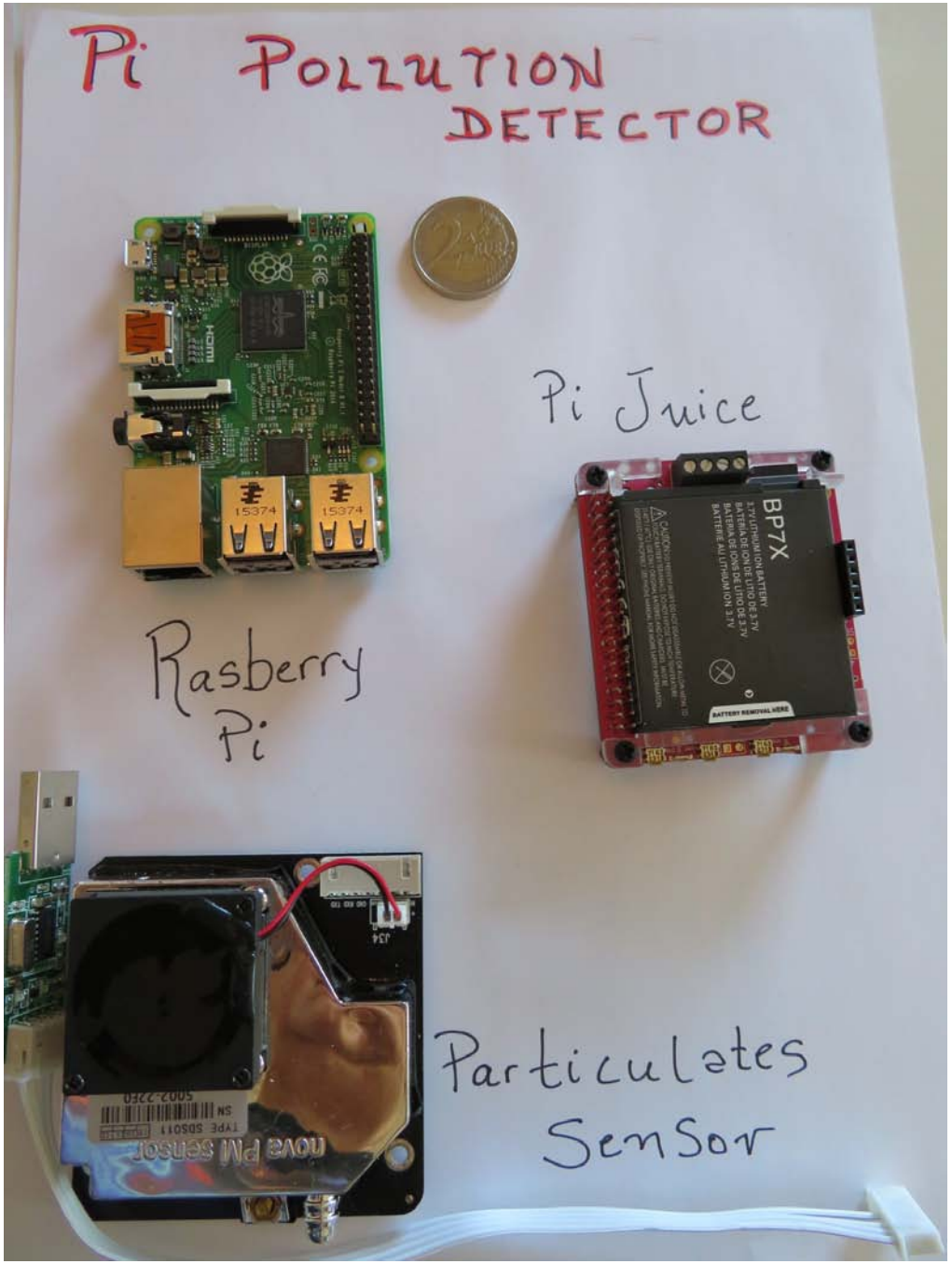
Despite the ‘firm stance’ (*) from Chairman of the Board of Riga Shipyard: Andris Ameriks, that, from January 1, 2019, no coal will be transferred in the city center -

"The Freeport of Riga expresses a firm stance - there will be no departure from the terms of realization of the Russian island project. From January 1, 2019 no coal tons will be treated in the city center anymore, "emphasizes Andris Ameriks, Chairman of the Freeport of Riga Authority.

(*)
http://www.la.lv/nakamgad-oglu-parkrausana-rigas-ostas-piestatnes-pilsetas-centra-tiks-pilniba-partraukta

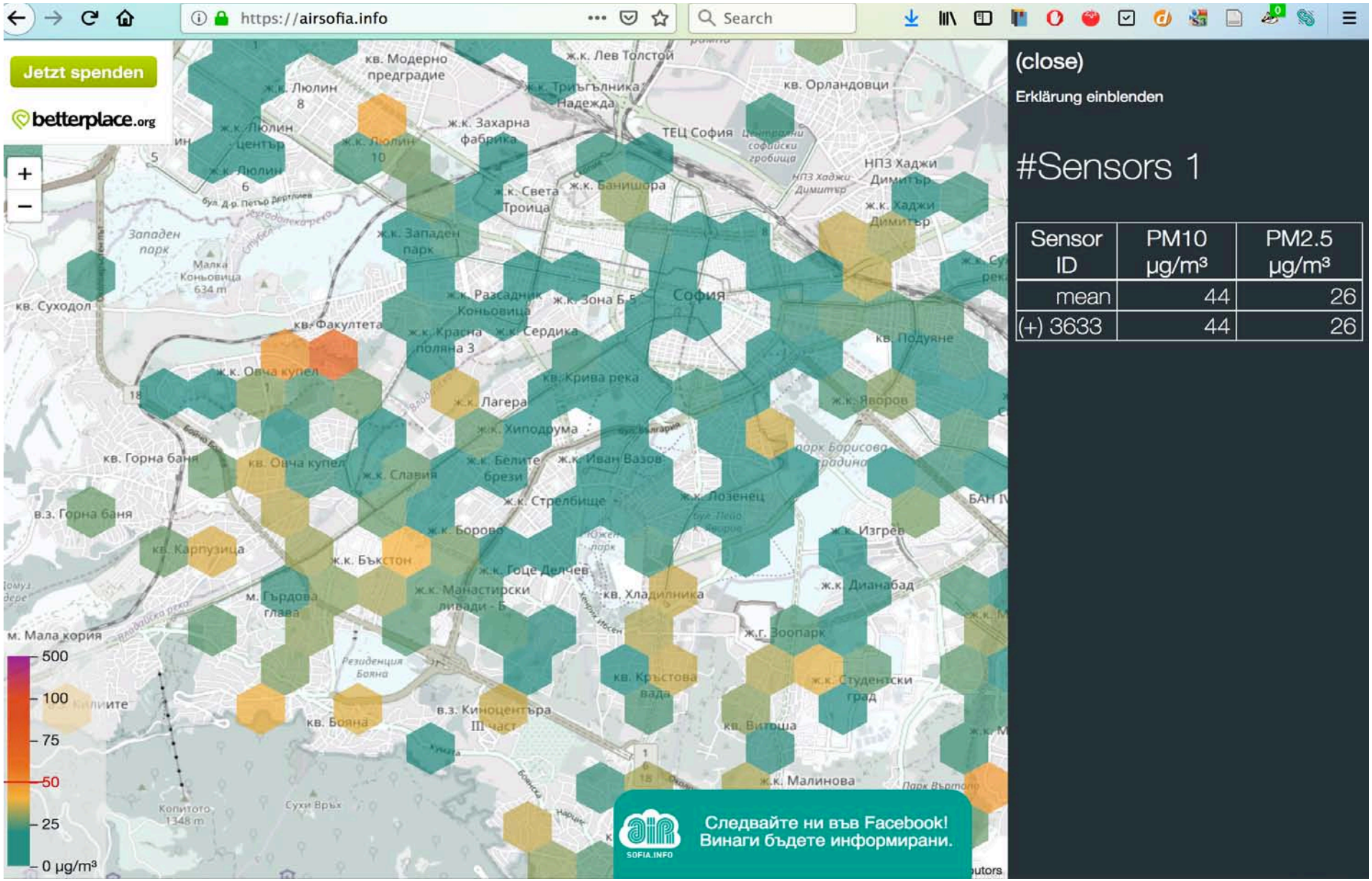
- the environment stations at Sarlottes iela (1), Valdemara iela (2), Daugavpils iela (3), recorded PM10 safety levels breached in January: 8, 3, and 8 days. February showed 5 days more of safety breaches.

(1) https://airtube.info/stats.php?country=LV&city=R%C4%ABga&sensor=3745&date_from=2019-01-01&date_to=2019-01-31&groupby=d
(2) https://airtube.info/stats.php?country=LV&city=R%C4%ABga&sensor=9692&date_from=2019-01-01&date_to=2019-01-31&groupby=d
(3) https://airtube.info/stats.php?country=LV&city=R%C4%ABga&sensor=3776&date_from=2019-01-01&date_to=2019-01-31&groupby=d



Riga needs more particulate data.

By hundreds of volunteers, acquiring data all over the city.



Sofia, Bulgaria

200 volunteer, environment stations

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ELLF C^3 STEM

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What is ELLF C^3 STEM?

Estonia-Latvia-Lithuania-Finland "ELLF "
Climate Change Cubesat "C^3" STEM

Funding Call Horizon 2020 Pillar: Science with and for Society

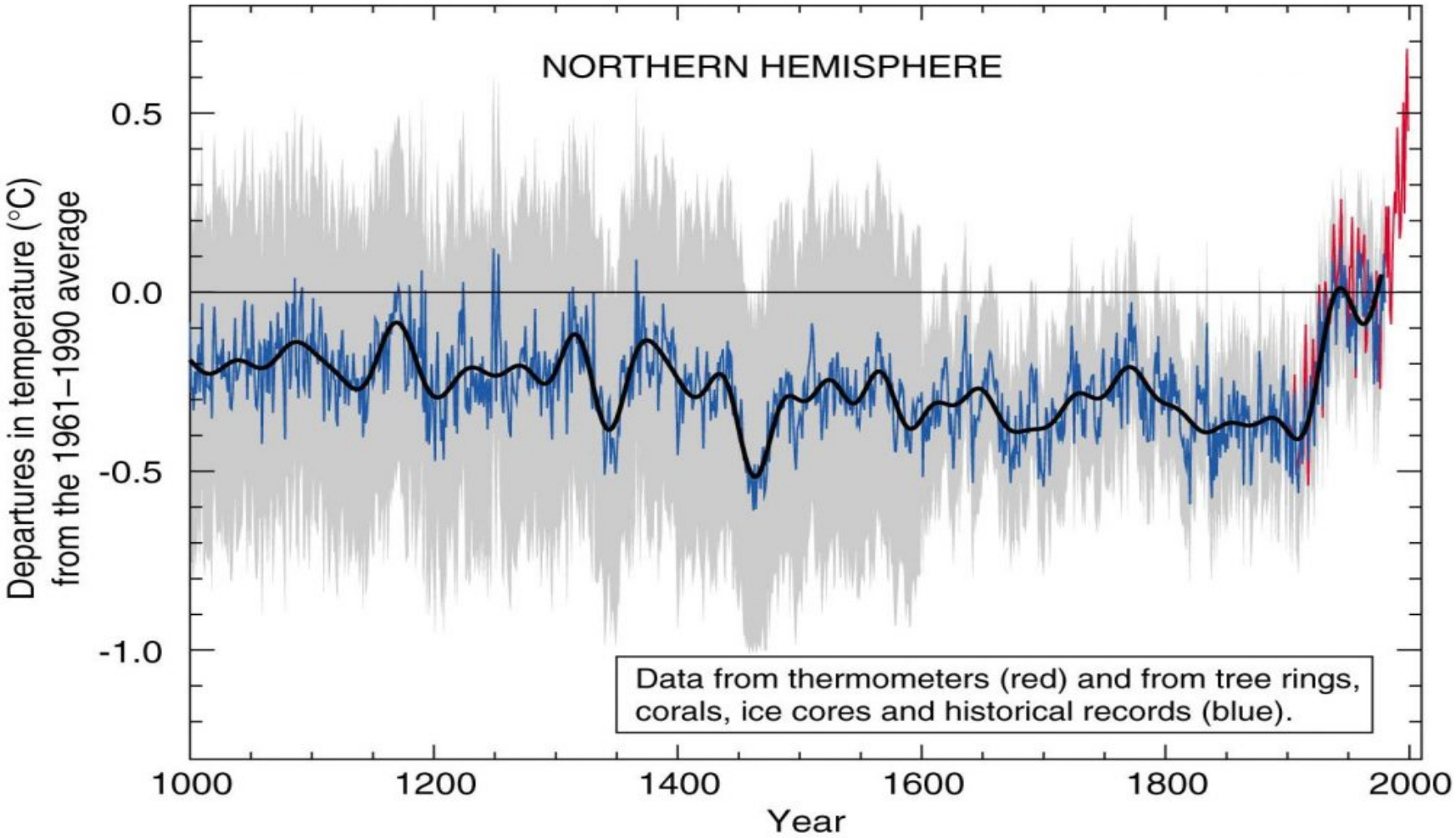
Call: H2020-SwafS-2018-2020
Submitted: 02 April 2019
Contribution: 2 Meuro

Budget: 2 MEuro Funding split between:

16% **launch** (300 KEur)
25% **CubeSat** Development (340 KEur)
40% **STEM Education and Community Engagement Activities** (800 KEur)
18% **Project Management** (360 KEur) + Travel / Material / Facilities

Project Duration: 3 years. Start date would be January 2020.

Societal NeedS – CLIMATE CHANGE

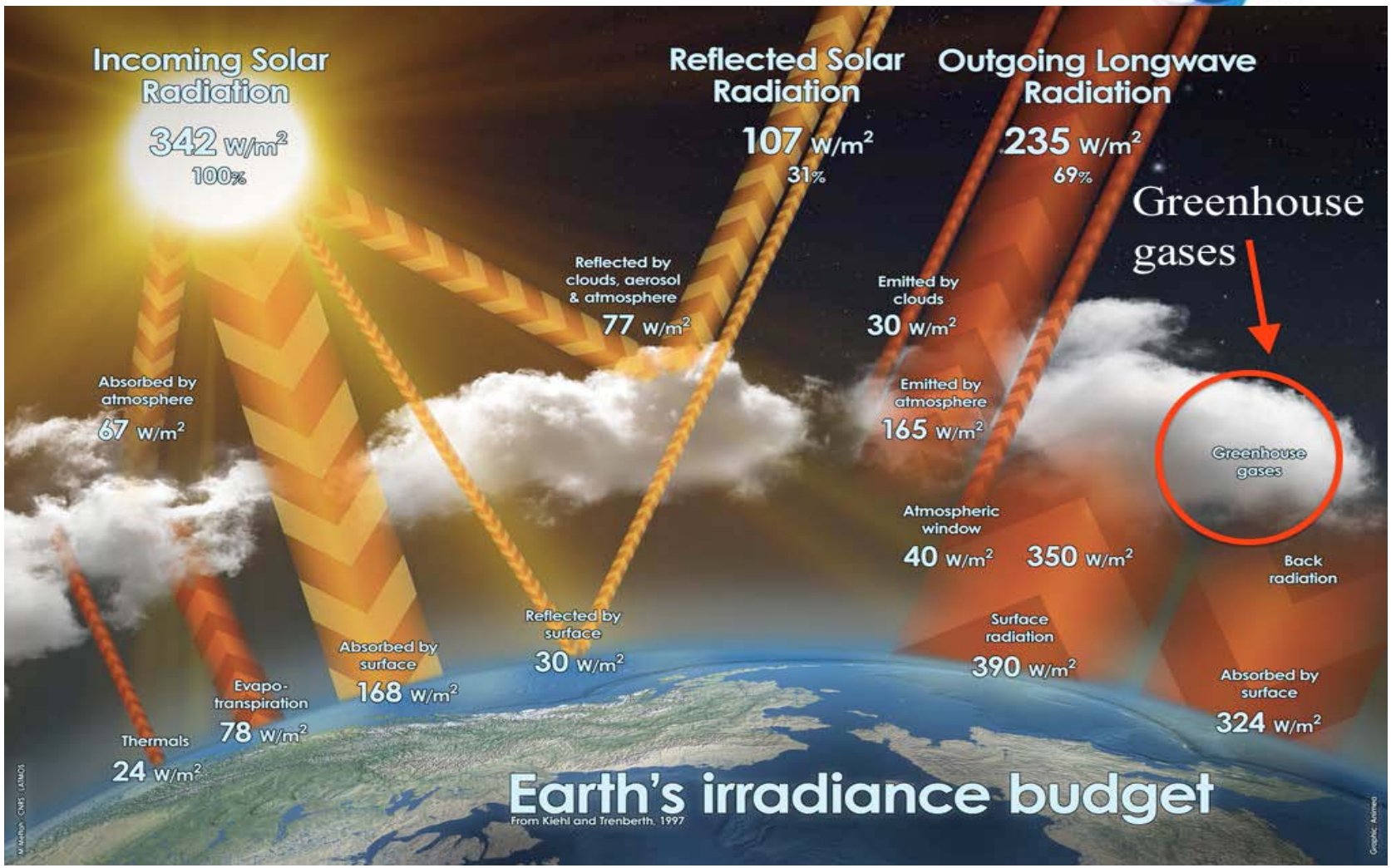


The 'hockey stick' image setting the scene for climate science awareness on 15 March 1999.

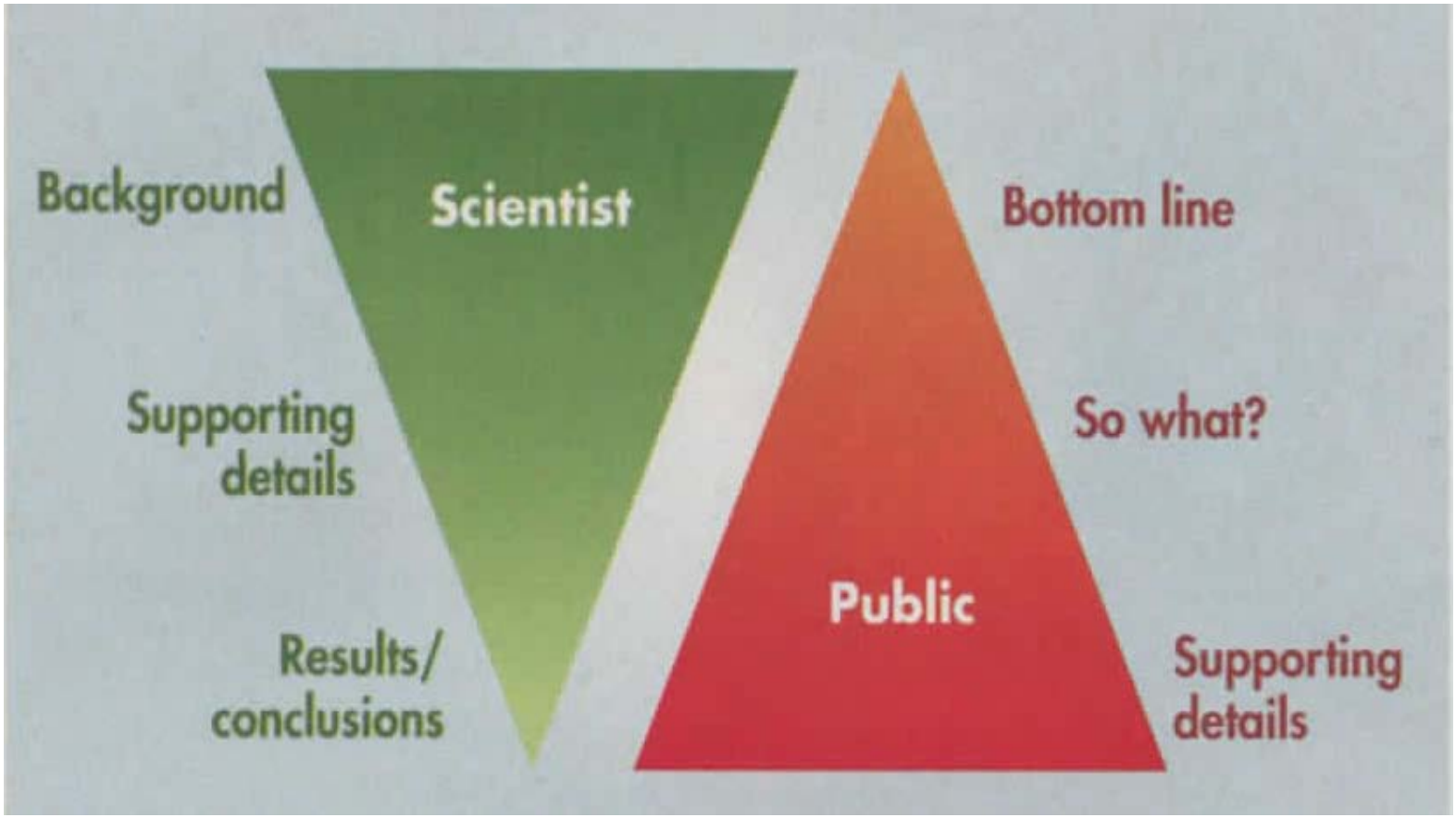
Societal Need – Youths Climate Change Strikes Solution: Engage them in Climate Science

Youth Climate Change Strike. March 15, 2019. Riga, Latvia. Photo: LETA, Paula Čurkste
https://eng.lsm.lv/article/society/society/photos-youth-climate-strike-in-riga.a312878/

Opportunity: Climate Change Crisis
Climate Science Education



Societal Need –
Climate Science Communication
Solution: Engage the Citizen Scientists



More Effective Communication of Climate Change by Scientists with their Societies.

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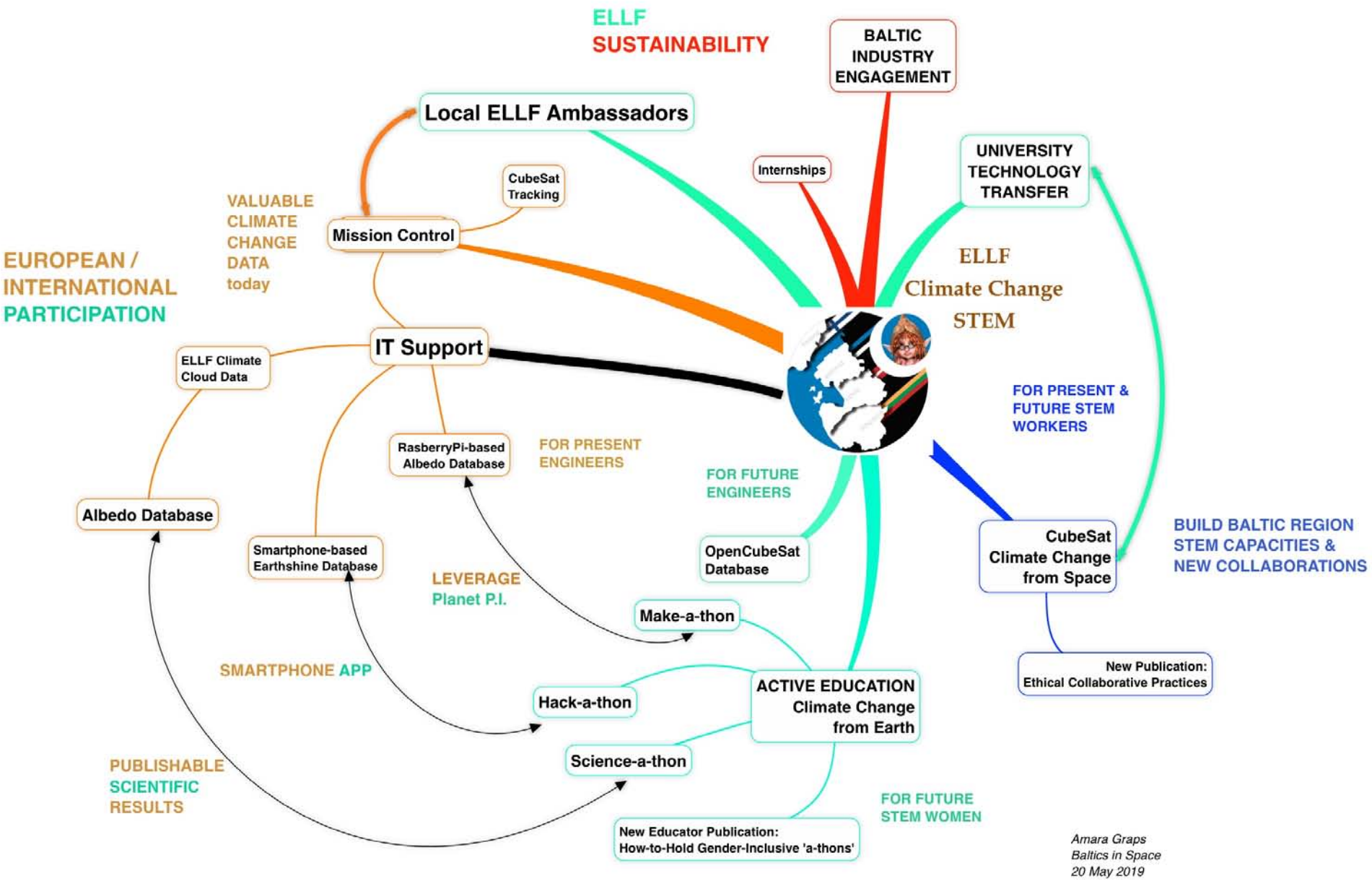
Ten Partners, 4 countries

Baltics in Space

* Finnish Meteorological Institute (Managers / Climate Education) --FI
* Tartu Observatory / (now part of University of Tartu) (CubeSat education)--EE
* EstSat/ EstCube (CubeSat builder) --EE
* NewTime (IT company) --EE
* Garage48 (for Smartphone Earthshine app Hack-a-thons, Launch Event) --EE
* Baltics in Space (Deputy Project Manager) --LV
* Institute of Environmental Solutions (for Science-athons) --LV
* Ventspils International Radio Astronomical Center with Univ Lat Satellite Laser Ranging
(16 m ground station and satellite tracking with prism) --LV
* Zinoo (Rasberry Pi Make-athons, "Misson Control" for the public) --LV
• Moletai Ethnocosmological Museum (ELLF Ambassador lead) –LT


ELLF
SUSTAINABILITY
BALTIC
INDUSTRY
ENGAGEMENT
Local ELLF Ambassadors
Internships
UNIVERSITY
TECHNOLOGY
TRANSFER
CubeSat
Tracking
VALUABLE
CLIMATE
CHANGE
DATA
today
Mission Control
EUROPEAN /
INTERNATIONAL
PARTICIPATION
ELLF
Climate Change
STEM
IT Support
ELLF Climate
Cloud Data
FOR PRESENT &
FUTURE STEM
WORKERS
RasberryPi-based
Albedo Database
FOR PRESENT
ENGINEERS
FOR FUTURE
ENGINEERS
Albedo Database
Smartphone-based
Earthshine Database
OpenCubeSat
Database
CubeSat
Climate Change
from Space
BUILD BALTIC REGION
STEM CAPACITIES &
NEW COLLABORATIONS
LEVERAGE
Planet P.I.
Make-a-thon
New Publication:
Ethical Collaborative Practices
SMARTPHONE APP
ACTIVE EDUCATION
Climate Change
from Earth
Hack-a-thon
Science-a-thon
PUBLISHABLE
SCIENTIFIC
RESULTS
FOR FUTURE
STEM WOMEN
New Educator Publication:
How-to-Hold Gender-Inclusive 'a-thons'
Amara Graps
Baltics in Space
20 May 2019

Opportunity: 16-m VIRAC Radio Telescope as a CubeSat Ground Station. Latvia's First satellite: Venta-1 failing. Build attention in LV for CubeSat Engineering Education

Photo by Amara Graps

https://space.stackexchange.com/questions/22654/what-are-the-absolute-maximum-dimensions-of-a-proper-6u-cubesat-does-asteria-co

Opportunity –Earthshine + Smartphone Apps Gather Earth's Albedo by the thousands Citizen Science Albedo Education

Earthshine photo by Siti Sarah Nordin. Telok Kemang Observatory, Port Dickson, Malaysia. 7 February 2019, 8:04 pm. MYT.

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Opportunity –Earth's Albedo + Rasberry Pi
Gather City Albedo / build STEM skills
Citizen Science Albedo Education

Ziedondarzs Park, Riga, Latvia

Dallol, Ethiopia, hottest place on Earth

Example of a Rasberry Pi augmented with climate sensors and used for field measurements. This example shows one with a temperature and pressure and humidity sensor, from the Europlanet-RI2020 "Planet P.I." outreach prototype, built by ELLF Consortium member A. Grapa.

Opportunity: DSCOVR Satellite at L1 measuring whole disk Earth Albedo. Misson Short lifetime.

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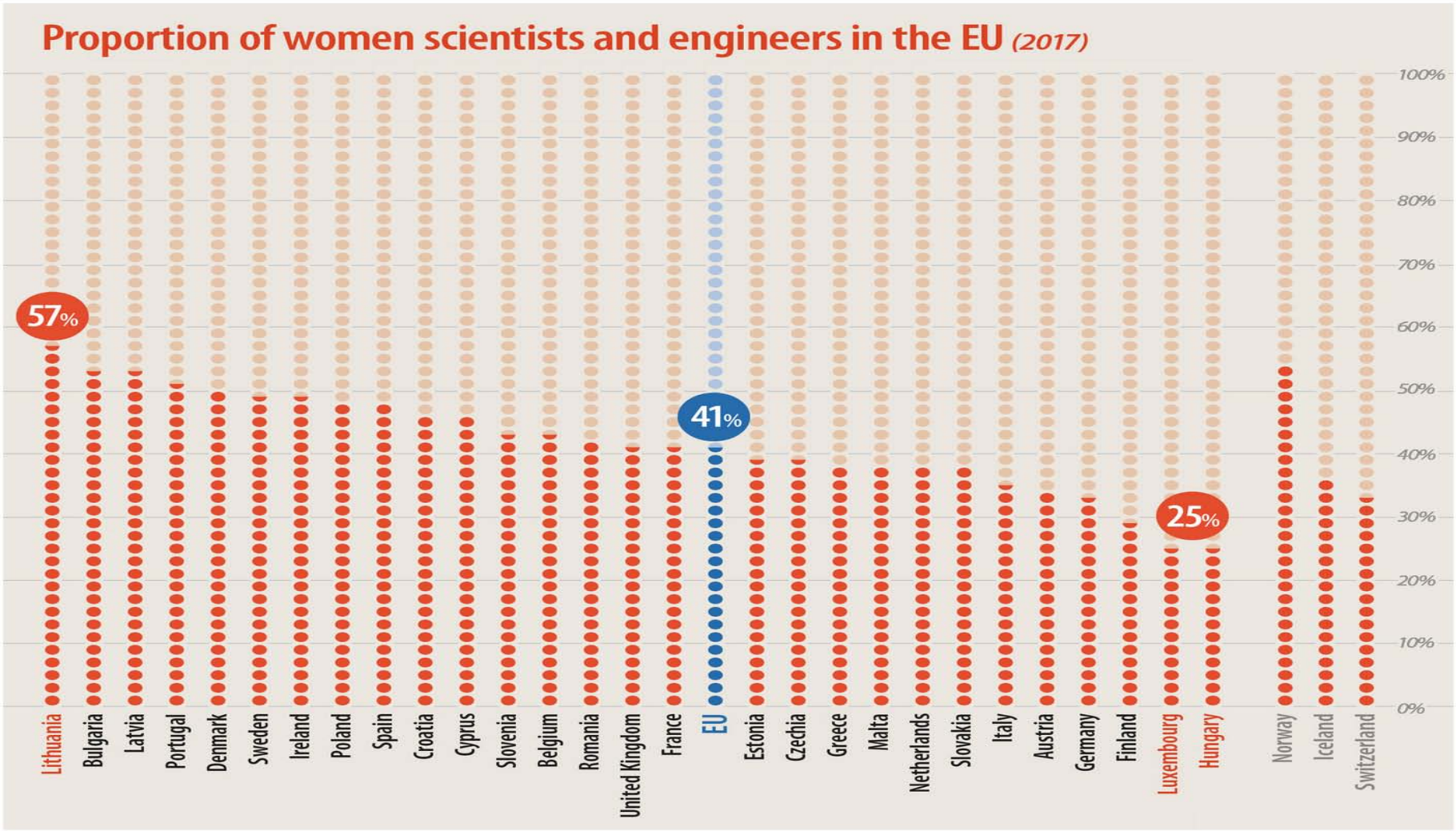
Societal: Women-in-STEM.
LT+LV can help EE+FI



Proportion of women scientists and engineers in the EU, per country.

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Paldies!