Multisolving for people and climate

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Stats for this measure







Coastal cities become uninhabitable

Species go extinct and ecosystems (services) collapse

Young people, especially, will be hit hard. (30-40y delay)





(Sub)tropics become dangerously hot, resulting in wars for food & water





Nine climate "tipping points" where rising global temperatures could push parts of the Earth system into irreversible change

Biodiversity loss • Decreased rainfall •

Impacts

Deforestation and hotter, drier conditions causing dieback of the rainforest and a • shift towards savannah

Tipping points

Amazon-rainforest dieback

Sea level rise (5m) •

Collapse of the ice sheet triggered by persistent grounding-line retreat in one • sector, cascading to other sectors

West Antarctic ice sheet disintegration

Ecosystem change •

An abrupt change in Sahel rainfall, caused by a shift northwards (wetter) or southwards . (drier) in the West African monsoon

West African monsoon shift

Decreased carrying capacity •

The monsoon system could be weakened by higher aerosol emissions or . Indian monsoon shift strengthened by rising CO2 emissions

Ecological change •

Drought .

Abrupt increase in emissions of Permafrost loss . CO2 and methane through the thawing of frozen carbon-rich soils

Greenhouse gas release

Amplified warming

Atlantic meridional Shutdown of the AMOC caused by Regional cooling overturning circulation • an increased influx of freshwater Sea level rise into the North Atlantic breakdown

> **Boreal forest** shift

A shift in boreal forests, seeing expansion into tundra to the north and dieback to the south

Tipping points

Melting

Biome shift

Circulation change

Rising temperatures pushing corals beyond tolerable levels of thermal stress into an • Coral reef die-off alternative state dominated by macroalgae





Digital powe





WEF — Global risks interconnection map 2020





* PERCENTAGES DO NOT ADD UP TO 100 BECAUSE OF ROUNDING.

Carbon law

Halving CO₂ emissions every decade **Complemented by carbon removal**



Source: Rockström et al., 2017

Nutisoving for people and climate

By leveraging cross-sectoral collaboration, it is possible to design and implement projects that improve local health, produce financial savings, and advance long-term climate goals all at once.





Multisolving – one action, multiple solutions

Short-term

Improve health





Variable rainfall

Stronger storms

Impacts of climate change on health

Sea level rise

Fires

Changes in local ecosystems

Increase in extreme heat days



Multisolving at the intersection of health and climate. Climate Interactive, Jan. 2018

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Impacts of climate change on health

Investment in a transition to a lowcarbon economy has benefits for health in the short- and medium-term, especially via changes to lifestyle and the built environment, and in the longterm via the prevention of future climate change related health risks.

advocacy Air & water quality



Multisolving at the intersection of health and climate. Climate Interactive, Jan. 2018



ACTING ON CLIMATE BRINGS MULTIPLE BENEFITS



Working to fix the climate and bring about these benefits is called **MULTISOLVING**. So, how do you multisolve?

PLANTING TREES

Trees absorb air pollution and greenhouse gases while providing cooling shade in the summer and reducing the noise and stress of city life.







Pedestrian-friendly streets lower air pollution and greenhouse gases from cars, increase traffic to local businesses, and help people who can't afford a car.



MULTISOLVING POLICY AREAS

Examples of Benefits (long

Climate adaptation

Increased resilience to extreme events

Urban design

Reduced CO₂ emiss from transportation

Fossil fuel free

Reduced CO₂ emiss from energy genera

Energy efficiency

Reduced CO₂ emiss from built environn

Food and diet

Plant-based foods lower carbon footp

Nature-based solutions

Plants sequester ca and are protective against climate imp

Climate term, global)	Examples of Health Benefits (short term, local)
9	Community-based public health response services also provide benefits during non-emergency conditions
sions n	Increased physical activity from walking and cycling reduces obesity and chronic disease
sions ation	Reduced air and water pollution from mining, refining, and burning fossil fuels reduces asthma and respiratory disease, heart disease, and premature birth
sions nent	More comfortable homes provide health benefits, and reduced home energy costs allow low-income residents greater spending on other needs
have a orint	Reducing the fraction of meat in diets provides health benefits
arbon oacts	Presence of trees and green space reduces air pollution and improves mental health and opportunities for recreation and physical activity

Municipalities are driving the transition



- 2% of surface area
- 70% of CO2 emissions
- Many networks of cities: **Covenant of Mayors, C40, ICLEI**, Eurocities, Energycities, ...











Commit

Assess

Set Goals And Targets

Develop Action Plan

All experiences are different! This is a path of reference that you can adapt to your own situation.

Implement

Monitor And Report

Validate



Driving transitions **S**harc

Excel, powerpoint, conferences, ...







One wo.man show

Focus?

Municipalities reinvent the wheel

Digitaly collaborate with your city team and peers to get your city on a 1.5°C trajectory with FutureproofedCities.

Make it effective, easier, and more rewarding and join the global community.









FutureproofedCities





FutureproofedCities helps in 4 ways



plan



internally

externally





Solar water heaters Households

Measures — overview + return

an 2030 🗸	Tags 🗸			+ New Measu	re i
Impact	Savings	CO ₂ savings	Progress	Created	Status
M 1&2	€5,145,952.5	3,519 t	17%	FP	0
M 1&2	-€460,000	318 t	25%	FP	A
M 1&2	€5,120	16 t	60%	FP	0
M 1&2	€6,150	9 t	100%	FP	
M 1&2	-€640,305	8,328 t	53%	FP	0
M 1&2	-€7,416,377.6	109,676 t	40%	FP	
M 1&2	€6,244,470.75	29,301 t	<mark>54%</mark>	FP	



Climate measures' 3x ROI: carbon, financial, co-benefits

CO₂ savings

FINAL

131,233 ton

13,123 ton

CURRENT

Per year

Per year

Details

Co-benefits

QUALITY OF HOUSING & BUILT ENVIRONMENT

Encourage mixed-income areas, ensure high quality and quantity of public spaces and recreational areas, and improve the affordability and accessibility to good housing for everyone. **★**☆☆

Quality of housing & built environment



★☆☆

INDUSTRY, INNOVATION, INFRASTRUCTURE



Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder



FINAL	CURRENT	
€38,546,000	€3,854,600	
Per year	Per year	Details
EFFICIENT MATERIAL	USE & RECYCLING	★☆☆

CO₂ emissions inventory + prognosis

Evolution of Lund's yearly CO, emissions in kton (disclaimer)





Current CO, emissions by source





Measures — financials

← Roof insulation



Discounted cash flow + split incentives taken into account. Modifiable at any moment by users.

Background Activity Actions Cash flow 300M 200M 100M 0 -100M ~200M 🧶 City 🛛 🗧 Individuals 🛛 — Cumulative cash flow



rs.

Co-benefits & SDGs of climate plan

On top of CO, reduction and financial savings, climate measure positive impacts on other aspects of society. Those are what w benefits". Use them to your advantage when you need more ar convince someone!

Encourage mixed-income areas, ensure high quality and quantity of public spaces an affordability and accessibility to good housing for everyone.

た3 Efficient material use & recycling - ★☆☆

Treat resources (materials, water, food and land) efficiently and sustainably, among o recycling and renewable production.

ቆ Industry, innovation, infrastructure - ★公☆

Develop quality, reliable, sustainable and resilient infrastructure, including regional an economic development and human well-being, with a focus on affordable and equita

			and the second sec
es have broad we call "co- guments to	<u>More info</u>	<u>Dismiss</u>	Add co-benefit
d recreational areas, and	d improve the		Related SDGs:
others by decreasing cor	sumption, increa	sing	: Related SDGs:
nd transborder infrastruc ble access for all.	ture, to support		
			Related SDGs:

Co-benefits & contribution to SDGs

С	Futureproofed ··· City	. Dashboard	Plan overview	Measures	Actions	Analysis	
	Progress	Mitigation cost	Emission and cons	umption	CO ₂ impact by	sector	Cas
		Co-benefits	5				
		The graphs below already been mad	v show which co-be de on measures wh	enefits and Sl lich focus on	DG's are impac the given co-b	ted the mosenefit or SD	st by IG.
		Climate plan 20)30 🗸				
			Co	o-benefits			
				Quality	of housing & built	environment	
				Measur Average Average	es : 8 e match: 🖈 e progress: 38.9%		
				* «	~		
					13		
				H 6 %			
of							

Activity	Community	Q	Public page	Reports	\$ -	S	
th flow	Co-benefits						

your climate plan. The darker inner parts of the graph show the progress that has











Quality of housing & built environment

More comfort and a higher real estate value

Because of building insulation









Health and well-being

Safety & security

More safety, health and better air quality

By having more bike lanes

Every euro invested in a cycle path yields from 2 to 14 euros in health benefits: VITO Considering: less bicycle accidents and more physical activity leading to improved health.





Less dependent, dependent, more silient & cleaner air

Because of local energy production

A grid independent energy source could increase the **resilience** of households and buildings to extreme events when outages occur. (source)

Energy production fueled with coal causes around 23300 premature **deaths** in Europe: (<u>source</u>).







Life on land

Less air pollution & waste

Cooler & cleaner air and space for recreation

Because of more green & nature in the streets

Green roofs reduce mortality attributed to air pollution. Patients with exposure to green areas need <u>30% fewer painkillers</u> <u>in hospitals</u>.





Work and economic growth

More local jobs

In building renovation and renewables

A record breaking 11 million jobs in 2018: as renewables continue to generate employment, policy makers and businesses are beginning to **see beyond the purely environmental benefits** and recognise the broad socioeconomic opportunities and benefits that renewables can bring (<u>source</u>)





Safety & security

Health and well-being

Protection against floods

By dehardening, giving space back to nature, reopening rivers...



Co-benefit



Quality of housing & built environment

Description

Encourage mixed-income areas, ensure high quality and quantity of public spaces and recreational areas, improve the quality of the buildings and improve the affordability and accessibility to good housing for everyone.

Provide better access for everyone to

services in physical and virtual space.

transport, amenities and affordable

Example

Insulation of windows and roofs provides more comfort to dwellers.

Sharing cars opens up the possibilities for more mobility.



Access to transport & other services

Lower the rate of crime and accidents and reduce the risks for the population.

Good **cycling infrastructure** improves safety in the road.



Diversity & social cohesion

Promote diversity, community engagement and social cohesion through shared spaces and activities to increase the sense of community. Creation of water squares for stormwater retention can be a place for people to meet.

ple Related SDGs











Co-benefit

Description

Example



Health and well-being

Improve the quality and accessibility of the public health system for everyone and encouraging a healthy lifestyle, improving the quality of life.

More green in the street cleans the air people breathe.



Less hunger & local food production

Ensure access by all people to safe, nutritious and sufficient food all year round.

Planting **fruit trees** can provide small sources of food to neighbours.



Quality of education & sensibilisation

Improve accessibility and quality of education for everyone, improve awareness on societal challenges.

Passive schools foster education about sustainability among young people.

Energy cooperatives are found to be more woman friendly, increasing the participation of woman in the energy sector,

=

Gender equality

Eliminate all forms of violence against women and girls in the public and private spheres, ensuring access to equal education and opportunities.

Related SDGs





4 QUALITY EDUCATION





Co-benefit

Description

Example



Mitigation & adaptation

Promote synergies between adaptation and mitigation efforts.

PV solar panels abate emissions and make people independent from grid outages due to extreme events.



Affordable &

clean energy

Reduce energy consumption, use waste energy and produce renewable energy.

Renewable energy production being more affordable than fossil fuels.



Life on land

Stimulate biodiversity and nature conservation, combating desertification and restoring degraded soil.

Re opening rivers create more space for nature.



Cleaner water and sanitation

Ensure full water access and improve water quality for everyone.

Disconnecting paved surfaces from sewer systems improves water quality.

••• Futureproofed

Related SDGs



7 AFFORDABLE AND GLEAN ENERGY





Co-benefit	Description	Exar
Less air pollution & waste	Decrease waste, noise and pollution (of air water and soils).	More us emissio matters
CO Efficient material use & recycling	Treat resources (materials, water, food and land) efficiently and sustainably, among others by decreasing consumption and increasing recycling and renewable production.	Roof in increase roofs, re materia overall.
Work and economic growth	Improve local employment, opportunities and skills. Develop quality, reliable oner resilient infrastructure to support economic development and human well-being.	Wind an product have the bring lor jobs
Kindustry, innovation, infrastructure	Develop quality, reliable, sustainable and resilient infrastructure to support economic development and human well- being, with a focus on affordable and equitable access for all.	Purchas electric develop renewat projects

ample

use of EV decrease ions of particulate ers.

insulation ases the lifetime of , requiring less rial to be used .ll.

and solar energy ction projects the potential to long-lasting quality

ase of green ricity supports the opment of more vable electricity

Related SDGs











Description



production

Co-benefit

Promote resource efficiency, sustainable infrastructure, and providing access to basic services.



Improve the appeal of the city for residents and businesses.

Increase citizen participation and enhance the active involvement of endusers, the community and professional stakeholders in city developments.

Multi-level and transversal governance

••• Futureproofed

Community involvement & participation

> Increase support for city initiatives by providing city policies and budget at different government levels, increase transversal collaborations.

Energy cooperatives foster a community with common goals

Reducing the energy use in public buildings can create a common understanding for further projects

Mobility budget from the municipality encourages citizens to use public transport more

Example

Related SDGs



A car-free downtown makes the city more attractive to locals and visitors to walk in





1 NO POVERTY



Internationally recognised solution















For a world where we all thrive

The One Planet City Challenge (OPCC) is WWF's invitation to cities to join us on our ongoing mission: the creation of cities that enable people to thrive in balance with nature now and in



Jakarta, Paris, Quito, Louisville, Futureproofed x WWF cities Istanbul, ...



200 cities, representing 80 M inhabitants in **19** countries, emitting 215 Mton CO2e/year collaborate on FutureproofedCities, sharing solutions and working together to tackle the climate crisis in their local communities.

2017 2018



2019

2020

2021



In closing...



"Laundry list" thinking mental model

→

Systems' thinking mental model Effect is also cause

Source: tracing connection (voices of systems thinkers)

Violence

The basics Examples of basic stock & flow models

Stocks represent accumulation of, for example people, things, cars, stress...

Flows represent actions or activities that fill or drain accumulations over time

Connectors show causal relationships that drive the generation of activity

Converters modify flows and other converters. One of their most common uses is to tell how quickly an action happens.

A feedback loop is formed when changes in the stock affect the flow into or out of that same stock.

Source: Tracing connections, sustainability institute

Stocks & flows Rules of grammar

Rule I: Respect unit consistency

All flows into and out of a stock must bear the same units-of-measure as the stock itself, but on a *per time* basis.

Source: sustainability institute; Futureproofed

Rule 2: Respect conservation laws

All physical flows come from somewhere (i.e., deplete some feedstock), and go to somewhere (i.e., fill some repository).

In building a model, you must draw the boundary of the system you want to model.

Source: Futureproofed, Barry Richmont

Models with feedback loops

A range of systems thinking skills

Apply Systems Thinking Skills 95-100%

Source: sustainability institute

There's value to be added at many points along the curve!

Applying systems' thinking

Complex model/interface

"Mother of all Models"

Simple model/interface

"Conversational" use of thinking skills

Effort/Time Expended; Skill Required

Global energy-related greenhouse gas emissions can be reduced to zero by 2050, or sooner, across all energy sectors

Figure KF-4: Total GHG emissions (left) and jobs in the power sector (right) during the energy transition from 2015 to 2050 worldwide.

The sustainable energy system is more efficient and cost-effective than the existing fossil and nuclear system, meets the 1.5°C carbon budget and creates 15m additional jobs.

Human progress is neither automatic nor inevitable.

Martin Luther King Jr.

An interview with Steve Jobs

Choose your future

'Vuile gammele treinen. Stinkende, troosteloze files waar je ziek van wordt. Willen we dat nu echt? Nog altijd?' Milieupoliticoloog Hans Bruyninckx (49), sinds vijf maanden hoofd van het Europees Milieu Agentschap in Kopenhagen, over de oppeppende kracht van schone lucht, helder water en kennis over de opwarmende wereldbol. tekst: Barbara Debusschere

N'i Born ---

