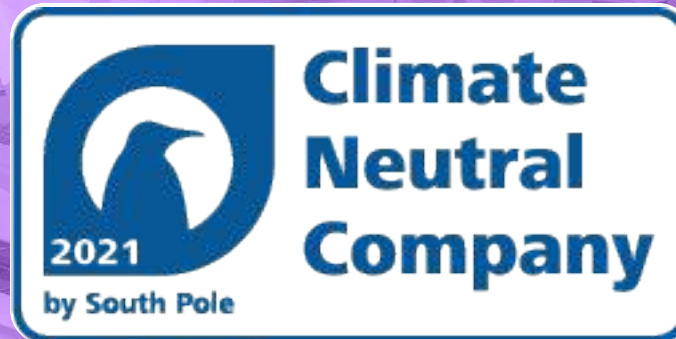


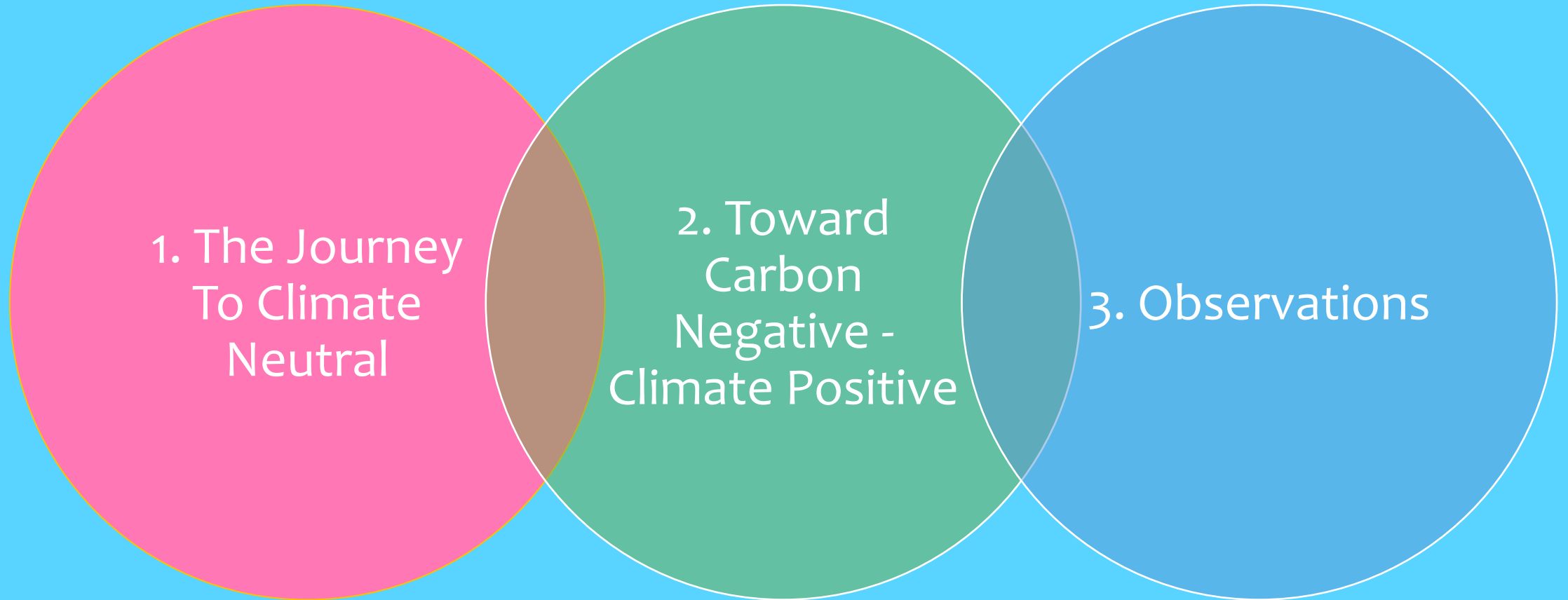


Ficolo DataCenter Forum Helsinki

Climate Neutral Now – What Next? Towards a Carbon Negative Data Center



Agenda



FICOLO DATA & CLOUD DELIVERY CENTERS



THE ROCK
Pori

8500 m2
Whitespace: 4800 m2
Total Power: 11MW
Available: 8MW
Since 2011



THE DECK
Tampere

400 m2
Total Power: 1MW
Available: 0.5MW
Since 2018



THE AIR
Helsinki

13000 m2
Whitespace: 6000 m2
Total Power: 20MW
Available: 15MW
Expandable: 80MW
Since 2020



THE FICOLO-IX
Helsinki

Connectivity hub
Since 2019



The Air - entrance



The Rock

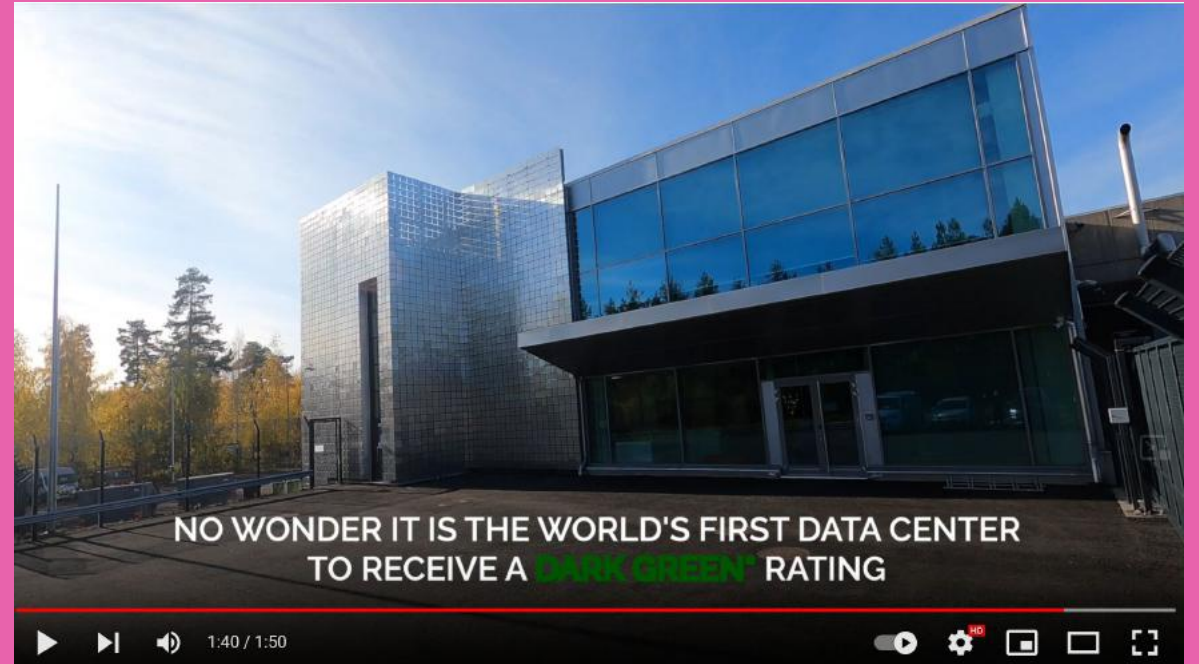
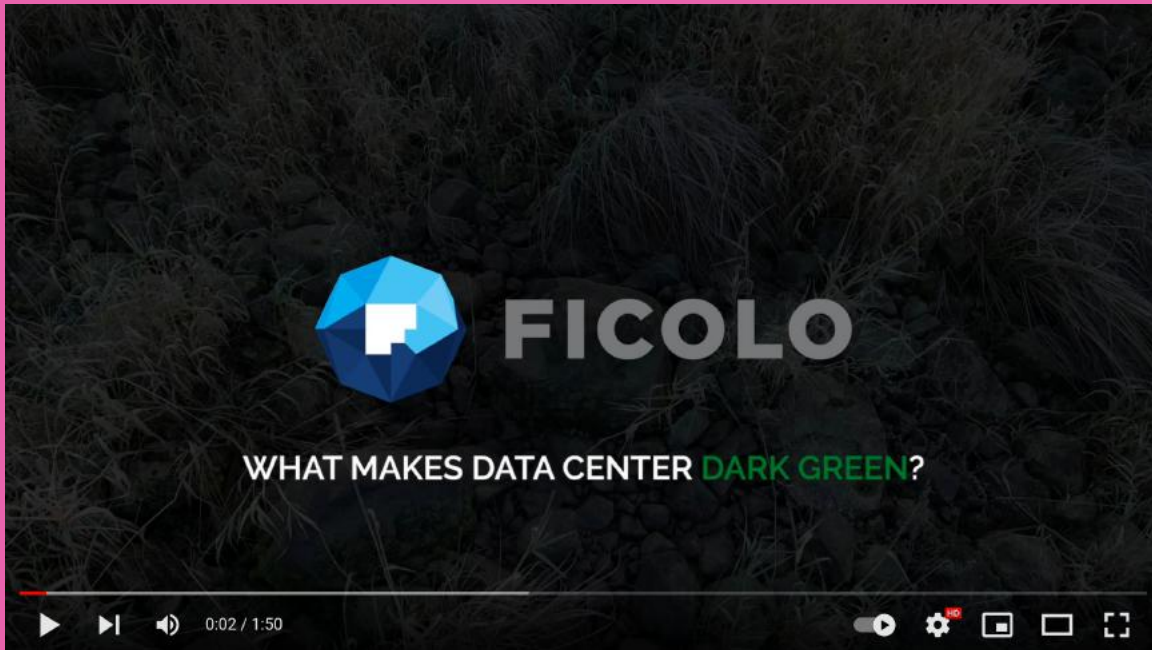
Flagship Datacenters



The Air - kinetic façade

The Air Video

- Video https://youtu.be/q400-_7tXHU



Ficolo Positive Climate Impact Highlights

100% Green Energy
from Day 1
2011



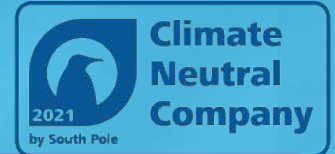
Heat Reuse for
buildings
2012



“Dark Green” rated
Green Bond
2019

CICERO
Dark Green
A world first!

“Climate Neutral”
Certification 2021



2011

2012

2013

2014

2015

2016

2017

2018

2019

2020

2021

Greenpeace “How
Clean is Your Cloud”
Leader
2013



Acquired DC PUE
improvement
2018



District Grid Heat
Reuse at The Air
2019



Solar Power Plant
at The Rock 2019



Customer Benefits

If a customer has a Climate Neutral or footprint reduction requirement:

Ficolo services have a zero footprint.

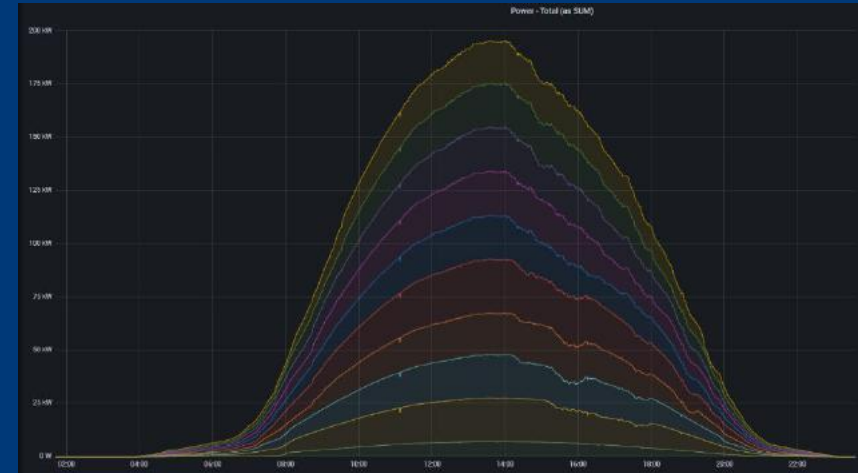
- No need to compensate
- GHG reporting is very simple
- All of the Clouds Climate Neutral in one go

Heat Reuse in District Heating provides additional benefit - actually operationally carbon negative.

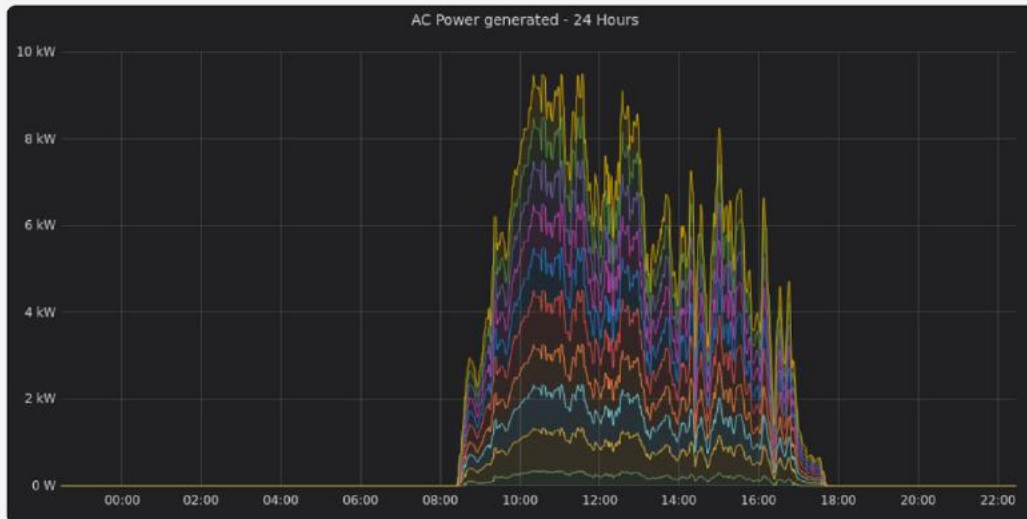
Highly Optimized Energy Usage – Lower cost.

Solar Panels at The Rock

- Live view: <https://solar.ficolo.net/>
- Works best in summer months...
... When cooling is most needed



Power generated - last 24 hours



Total energy generated overall

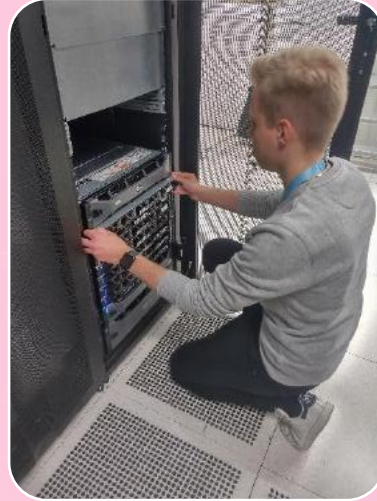
275 MWh

Areas Causing Emissions



Commissioning

Planning &
Construction
Capital goods (DC
infra)



Operations

Energy
Efficiency
Operations &
Maintenance

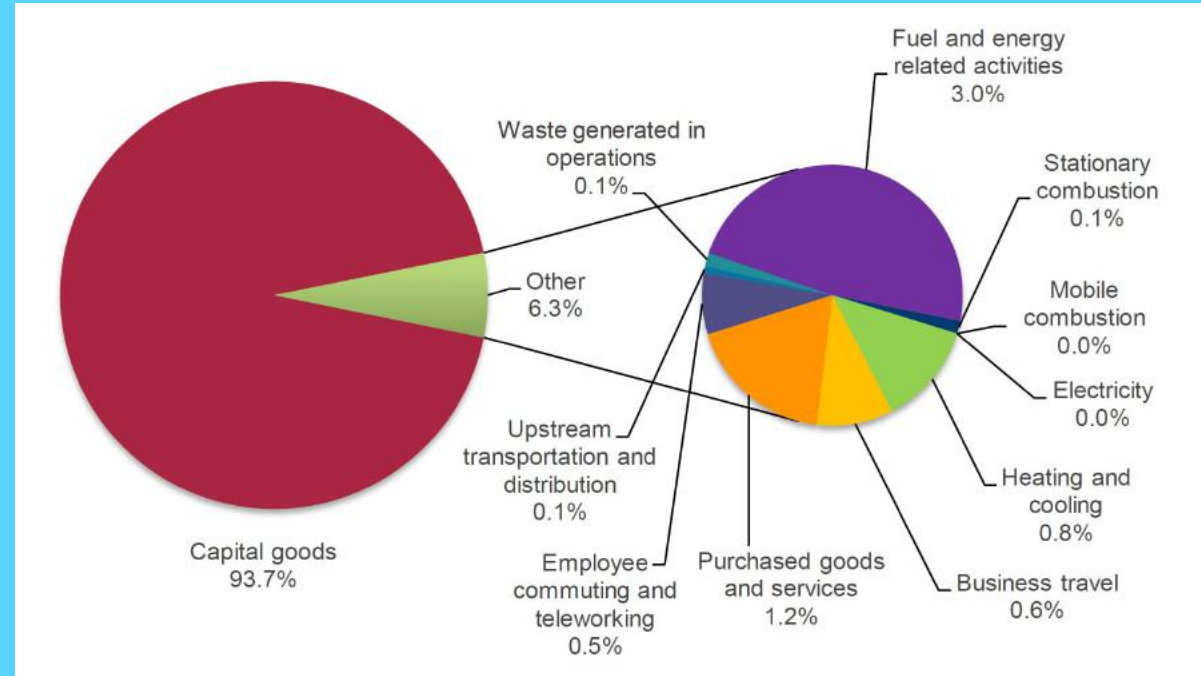


Decommissioning

Demolishing
Recycling rate
E-waste

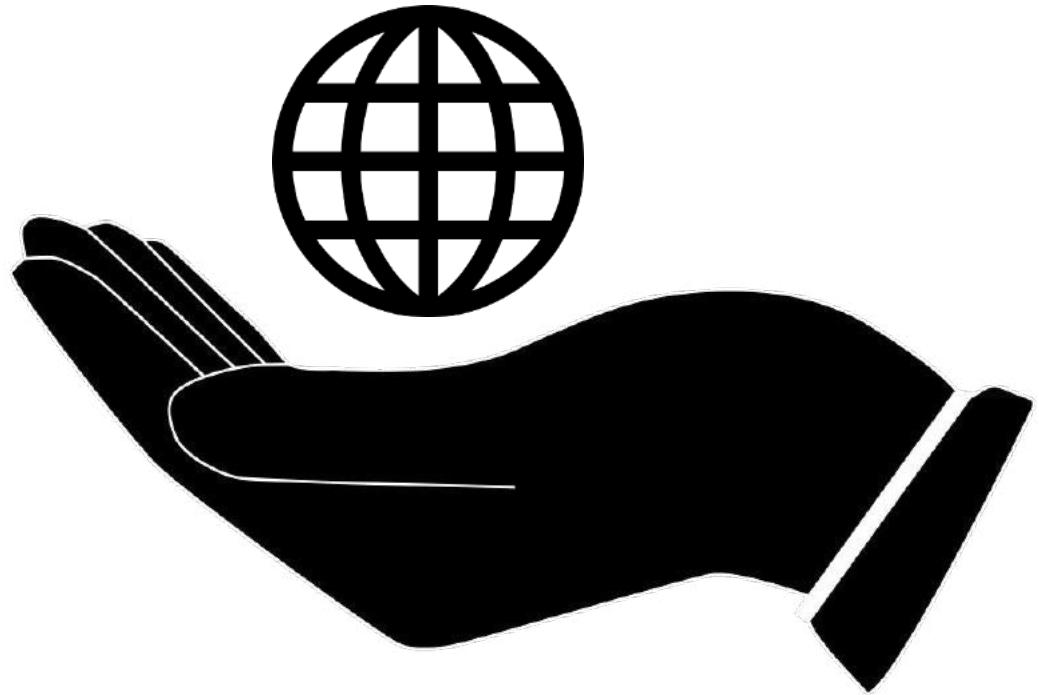
A look at the footprint

Scope		% of Total
Scope 1	Direct GHG emissions	0.1 %
Scope 2	Indirect GHG emissions from purchased electricity, heating and cooling	0.8 %
Scope 3	Other indirect GHG emissions	99.1 %
Total GHG emissions		100.0 %



- Operational emissions are practically zero – almost all indirect emissions from construction and DCI
- Ficolo has always used ‘brownfield’ buildings, existing tunnel network, existing buildings for expansion
 - -> Significantly lower footprint than constructing new buildings

Footprint vs Handprint



- Definition by VTT Technical Research Center of Finland:
 - Footprint - negative impact – reducing emissions
 - Handprint – positive impact – e.g. reduce customer carbon impact

Footprint to Handprint: Step 1 minimize footprint

- Scope 1 and 2 are already virtually zero
- PUE minimal, WUE currently not very relevant
 - WUE needs to be taken into consideration in future
- Scope 3 must be minimized
 - Generators
 - From diesel to greener energy
 - Energy storage solutions
 - Sustainable concrete
 - Made from waste
 - E-waste
 - Work with suppliers committed to sustainability
 - Use third parties who recycle and dispose with minimum impact



Step 2: Maximise Handprint

- Essentially no limit to positive impact
- No standardization – how to calculate
 - Will the developers of GHG or ISO standardize?
 - South Pole have an internal working group
- Opportunities
 - Increase supply of green energy
 - Solar
 - Heat reuse
 - Sell for Reuse: servers, equipment, maybe building materials
- Help customers
 - Optimize energy use
 - Automate clouds
 - Increase e-waste recycling ratio



“Digitalization already saves more energy than it consumes”

Heat Reuse – Example 1MW HPC

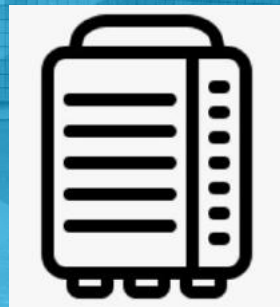


100%
GREEN
ENERGY



THE AIR

1MW HPC
(ACTUAL USAGE)



HEAT PUMPS
PRIMING +
ENERGY 25%
ADDITIONAL, ALL
GREEN



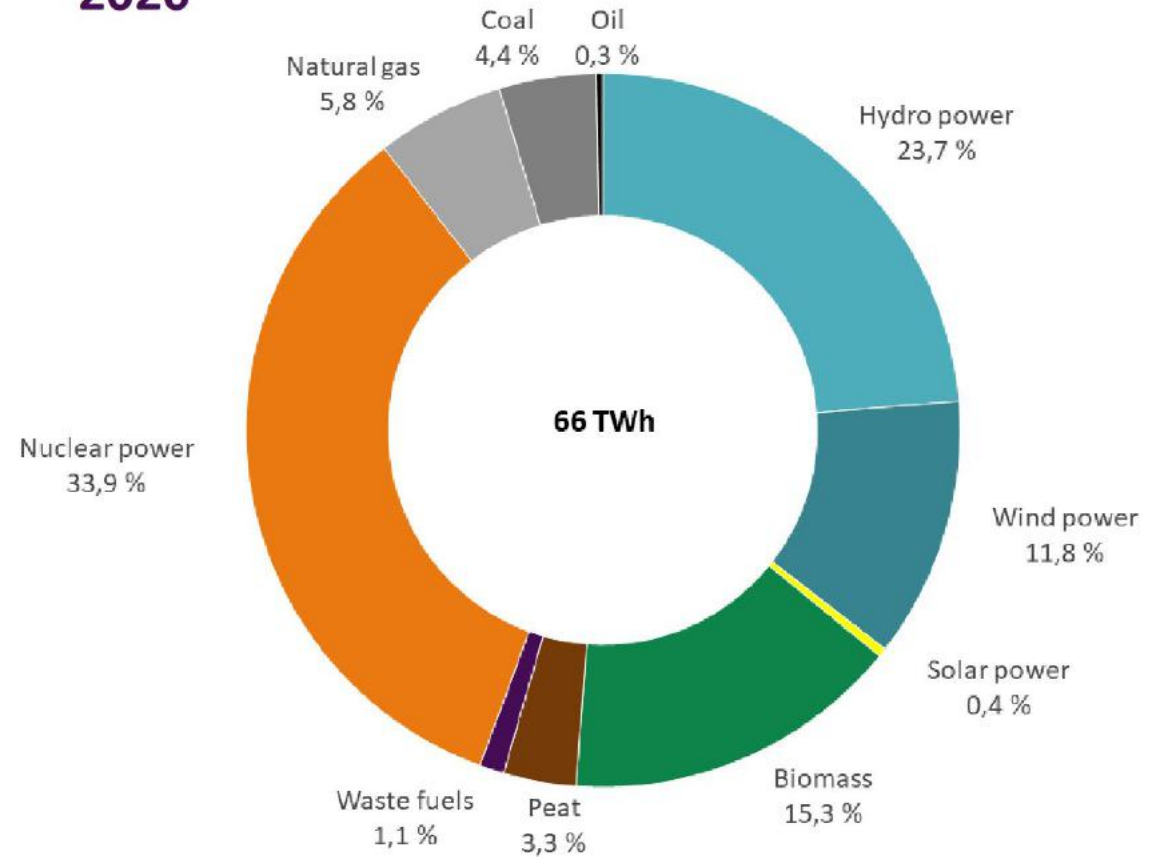
ENERGY REUSE - DISTRICT HEATING

SELL 1.25MW HEAT (HOT WATER)
TO ENERGY COMPANY
TEMPERATURE DEPENDS ON WEATHER
AROUND 95-100°C
-CLIMATE POSITIVE IMPACT

Waste Heat Replaces Other sources



2020

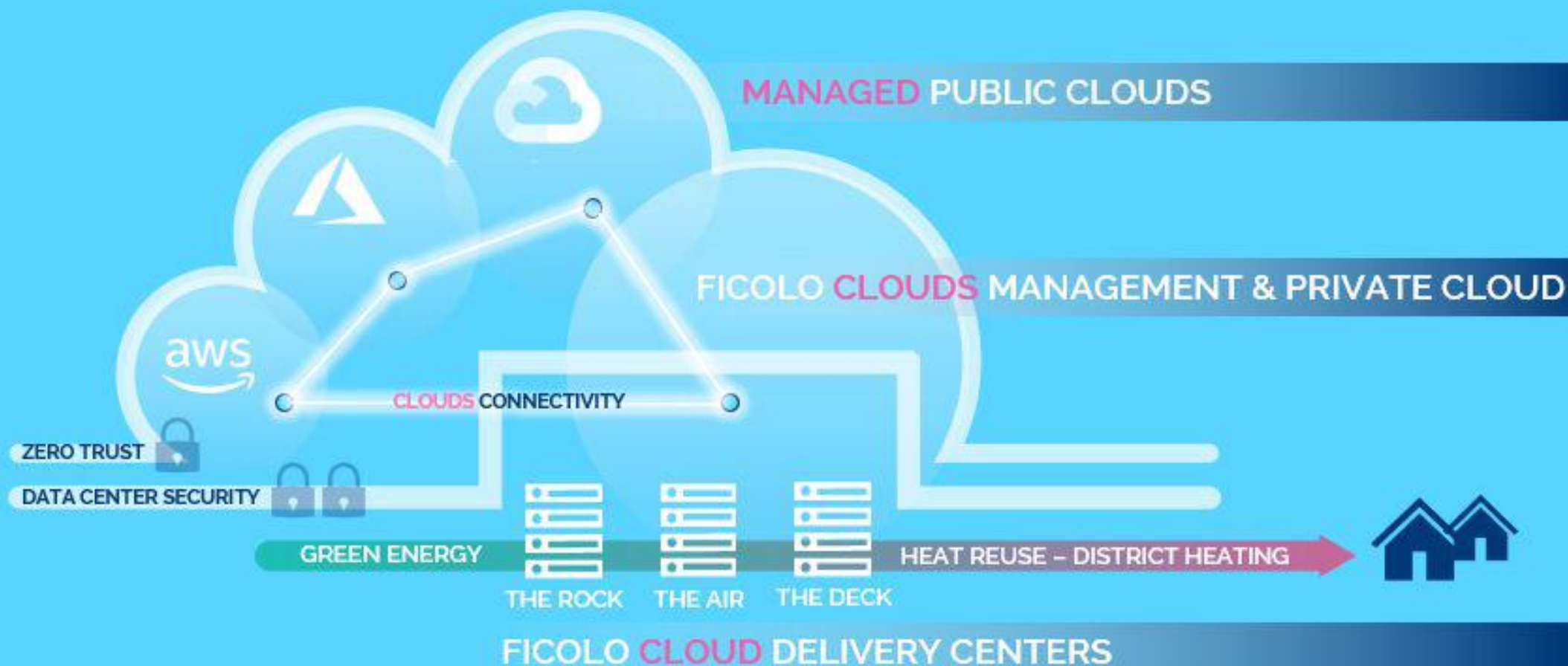


Vantaan Energia district heating emissions: 247g/kWh (2018)
However: Fossil-free by 2026, Carbon Neutral 2030 – with the help also of Waste heat
Up to 14MW waste heat once The Air current building full -> 120 000MWh/pa



FICOLO

CLOUDS AND COLOCATION - the best of both worlds



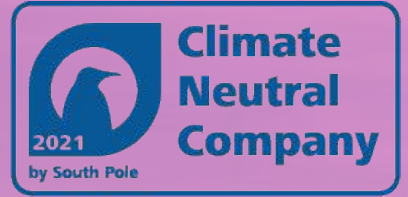
Observations on moving to 'Climate Positive'

- No clear standards available to show carbon negativity.
 - GHG lacks mechanism to deduct positive impact from heat reuse or e.g. carbon removal
 - ERF, Energy Reuse Factor reflects how much energy conveyed out of DC
 - EU legislation planned in 2023
 - Workgroup at South Pole
 - Risk of being stamped greenwashing if no neutral third party certification
 - If you use 100% green energy, current methods of calculating GHG do not take into account efficiency enhancement as an improvement
 - Even though the impact is positive, not reflected in GHG accounting – we are even more green but it does not show in the reporting
- > It's not just about GHG, energy savings and customer impact are critical, too
- Many technologies still in early phase (carbon removal, fuel cells, power grid load balancing)
 - These will play important part in moving to full lifecycle carbon negative



Toward Positive Impact

- Ficolo is built to stay climate neutral, even at scale
- Next steps – towards carbon negative
- The bigger the capacity, the larger the climate positive impact
- Thus we help customers reach carbon neutral targets



THANK YOU!

OVERALL SATISFACTION RATE ON FICOLO'S SERVICES



" The more we are using other DataCenter companies, the more we are realizing how much you (Ficolo) spoil us with your services.

We are getting used to your services, we just assume them for other companies only to learn they don't do nearly as much as you do.

Not only do you make us feel like a valued customer, but you pay attention to detail, offer simple solutions to insignificant things that in the end make your service just that much nicer to work with.

You guys just think of things from your customer's perspective and find good ways to solve those issues.

In other words, you guys are the best DC company I have ever dealt with, and only keep surprising me with how much better you are to all your competitors.

So thanks for being awesome!
And keep it up!"

