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Speaker: Max Körbächer

Company: Liquid Reply

## The Role of Open Source in Environmental Sustainability

# Max Körbächer - Co-Founder @ Liquid Reply

My work is all about

**Kubernetes Consultancy & Cloud Native Advisory**

- Former Enterprise Architect, yet design and build hyper converged infrastructures and cloud agnostic solutions
- CNCF TAG Environmental Sustainability Co-Chair, Contributed 2,5y to the Kubernetes release team and related K8s technologies

 maxkoerbaecher

 mkoerbi



# The Challenges



## Global Data Centers

Consuming around **2%** of the global energy.

Expected to grow within the next couple of years by **additional 2%**.

Some forecast assume a peak of **12%** of the consumed energy by 2024

\*treat this numbers with care, studies to this are old



## Data, Distribution and Digitalization

The explosion of **data generation, connecting everything and the digital opening** of not yet well connected countries will lead to an **exponential growth**.

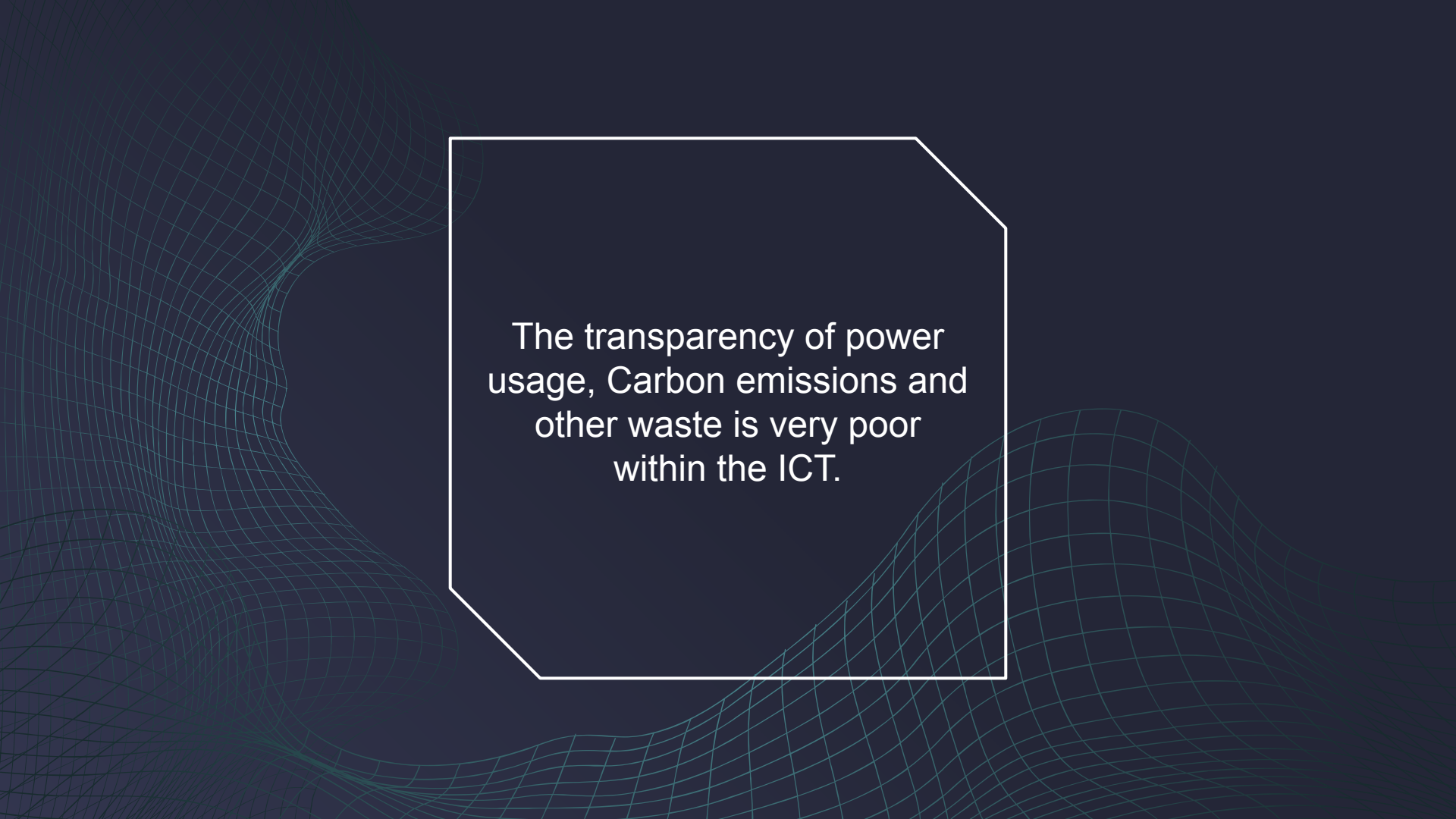
Old systems and hardware as well as data center are not very efficient.



## Carbon emissions are everywhere

Carbon emissions are caused in **any step of the production** of products and services.

This also counts for IT. The **major part** of carbon emissions are caused by the production of chips, server and other hardware components.



The transparency of power usage, Carbon emissions and other waste is very poor within the ICT.

# The Cloud Native “Can and have to”

## Can do\*

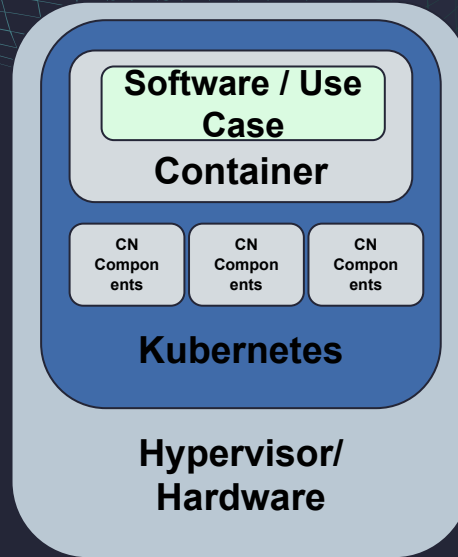
Optimize Container Images

Schedule containers for high density

Scale containers to zero

Scale clusters to zero

Optimize nodes, HW (e.g. ARM based) and OS



## Have to\*

A future without container?

Schedule based on carbon data

Scale based on carbon data

Design architectures for sustainability

Improve power management

\*selection of topics that are obvious



A missing link:

Data about energy  
consumption

TO

Data on caused CO<sub>2</sub>  
emissions per kWh

The super power of Kubernetes relies in its capability to

- run nearly anywhere
- effectively manage workload
- being an extensible platform
- strongly integrates with hypervisors and cloud providers

and therefore,  
being a perfect target for optimizations

For sure, K8s also can be an overhead solution, but I believe it is possible to define the break even point for sustainability, performance and efficiency.

## What could Kubernetes and Cloud Native do?



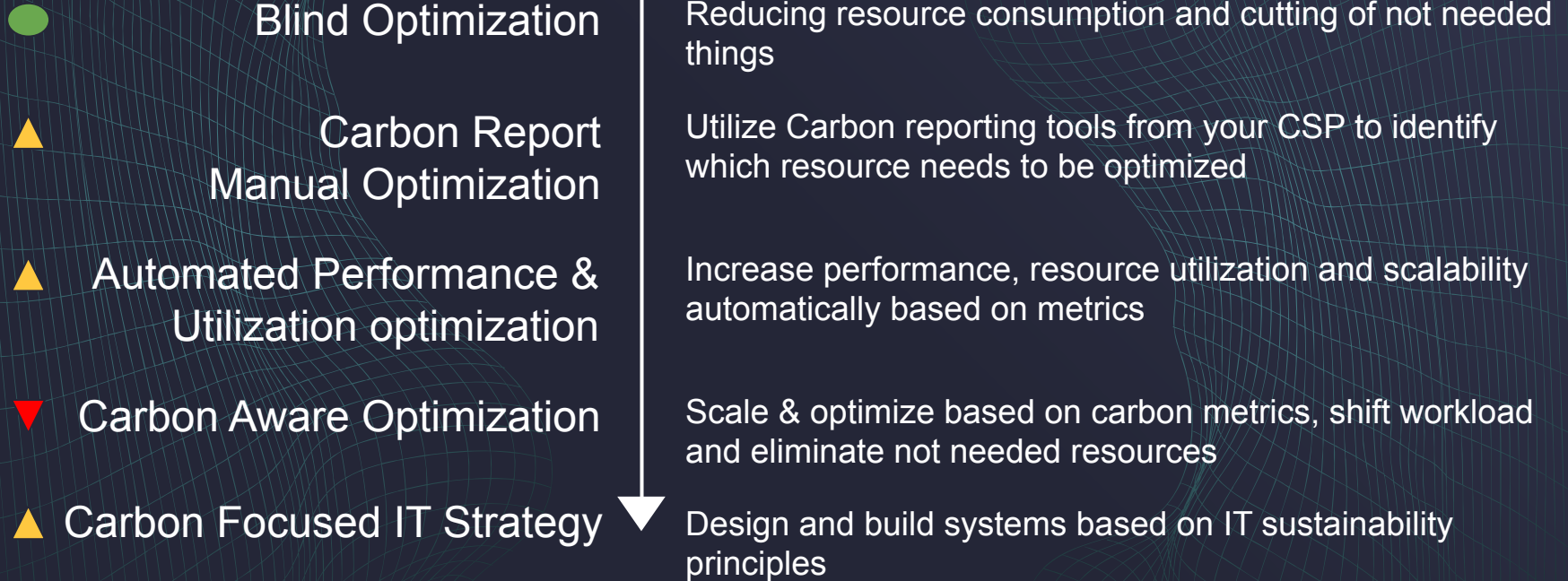


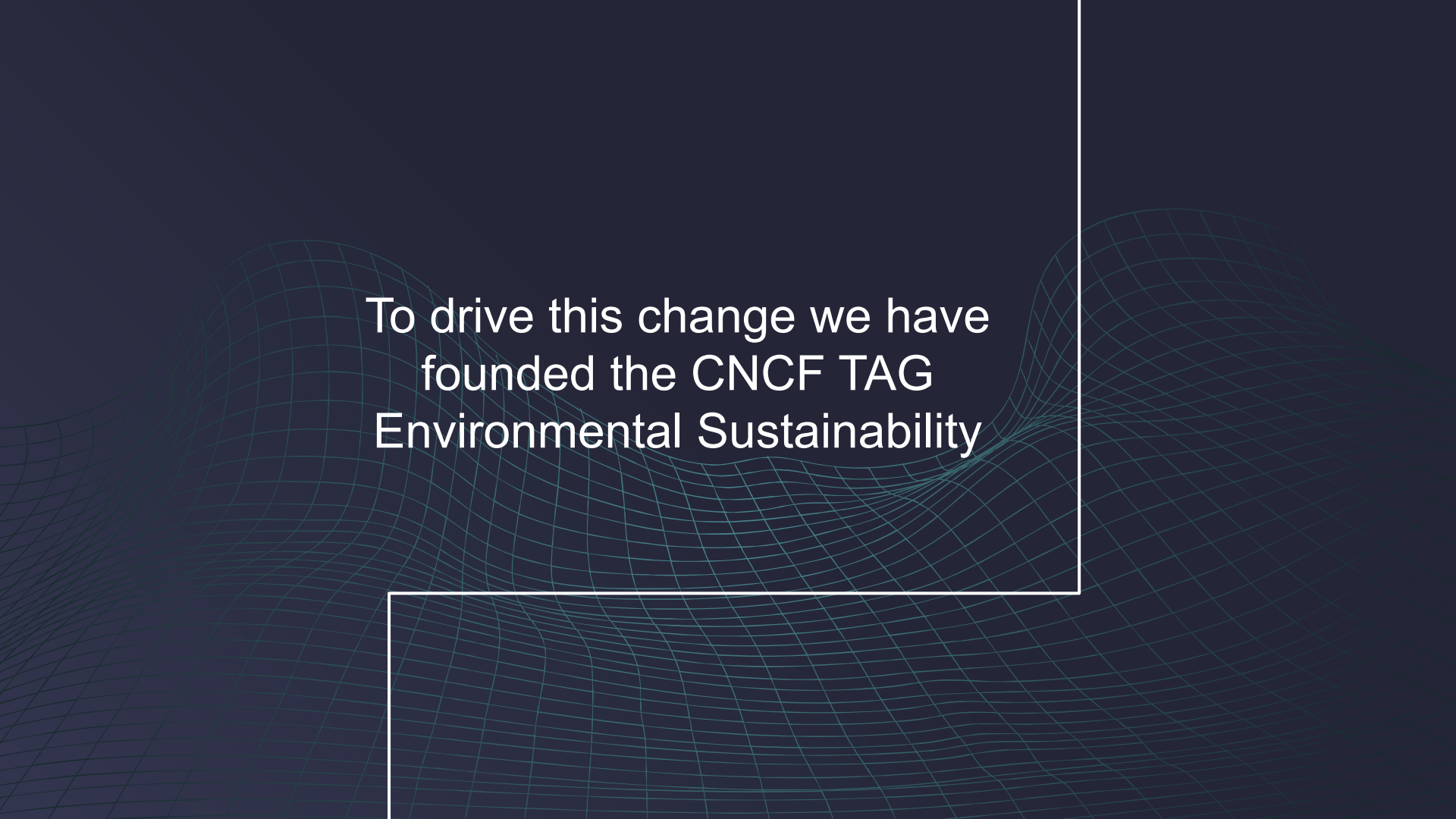
Kubernetes provides a unified approach to integrate various solutions and to make them act on each other.\*

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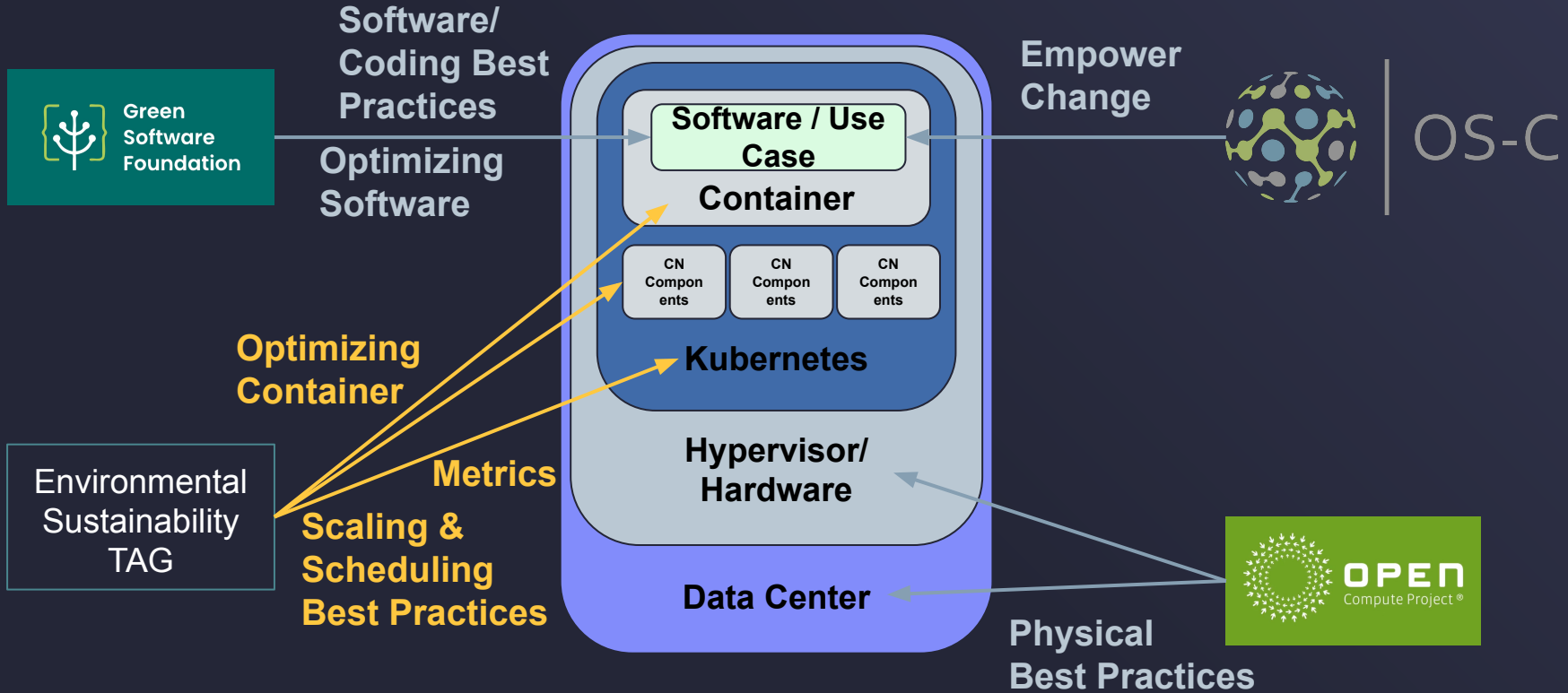
\*yes, we still need better data at the node level, beyond this, only the creativity is a limit

# Cloud Native Sustainability Maturity Model (a draft)

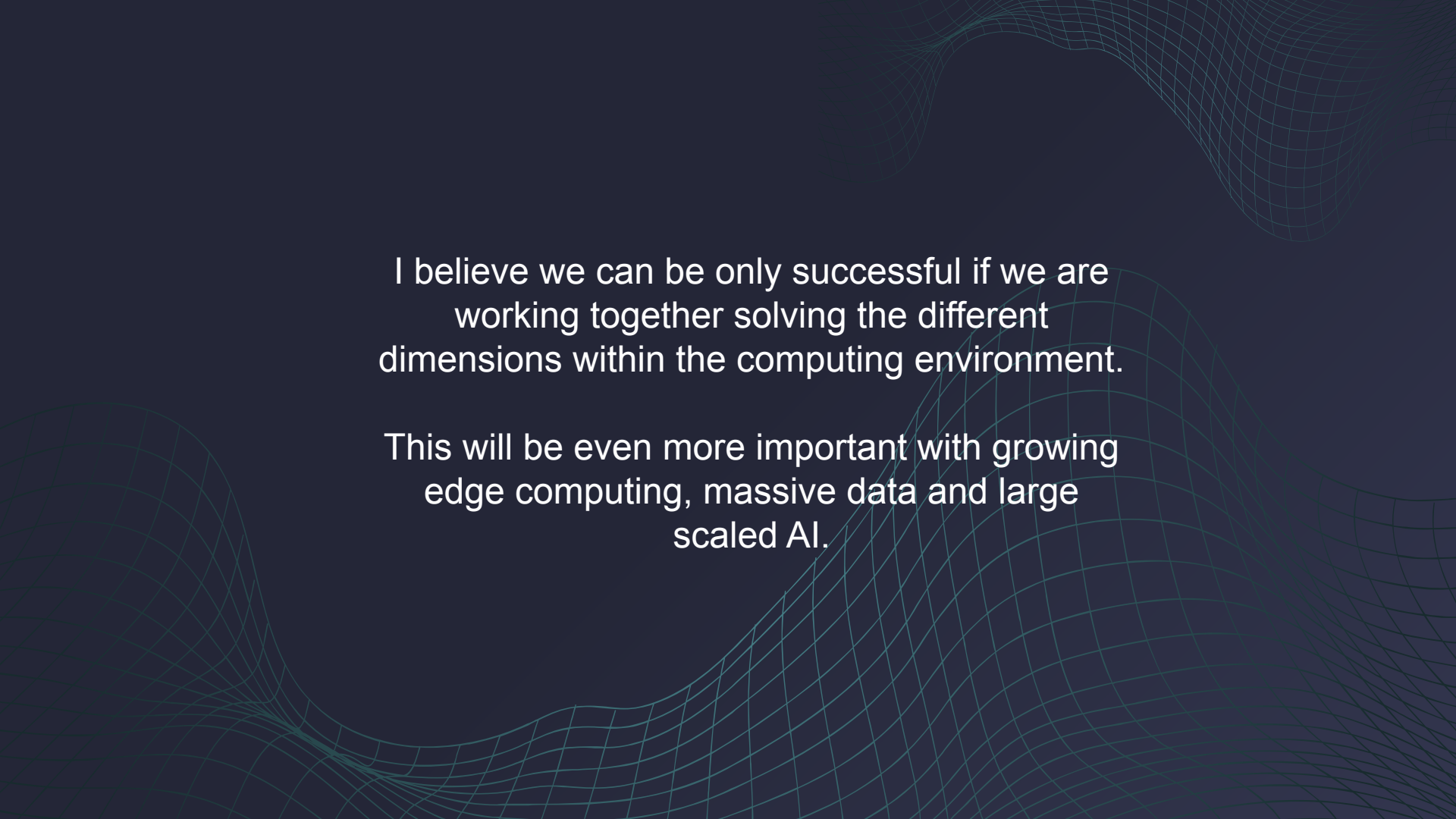




To drive this change we have  
founded the CNCF TAG  
Environmental Sustainability



the here given examples should show how the different initiatives play together



I believe we can be only successful if we are working together solving the different dimensions within the computing environment.

This will be even more important with growing edge computing, massive data and large scaled AI.

We need  
your help!





Talk with us on the  
CNCF Slack, find a team  
to work with or show us  
your ideas!

[#tag-environmental-sustainability](#)



Find us on the CNCF  
GitHub, discuss current  
working artifacts and  
review our deliverables.

<https://github.com/cncf/tag-env-sustainability>



Join our mailing list  
and most importantly  
virtual meetings!

# THANKS!

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Does anyone have any questions?

**Max Körbächer**



**maxkoerbaecher**



**mkoerbi**