This project is co-financed by the
European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından
finanse edilmektedir

TURKEY in HORIZON 2020
COOPERATION. INNOVATION. COMPETITIVENESS

Technical Assistance for Turkey in Horizon 2020 Phase-II
EuropeAid/139098/IH/SER/TR

General & Introductory Training (Webinar) Cluster 5: Climate, Energy and Mobility

General & Introductory Training (Webinar) (GIT-6)

Çağatay Yılmaz (LANDE)

Online, 7/4/2021

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

TURKEY in HORIZON 2020
COOPERATION. INNOVATION. COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

ecoqube

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 956059"

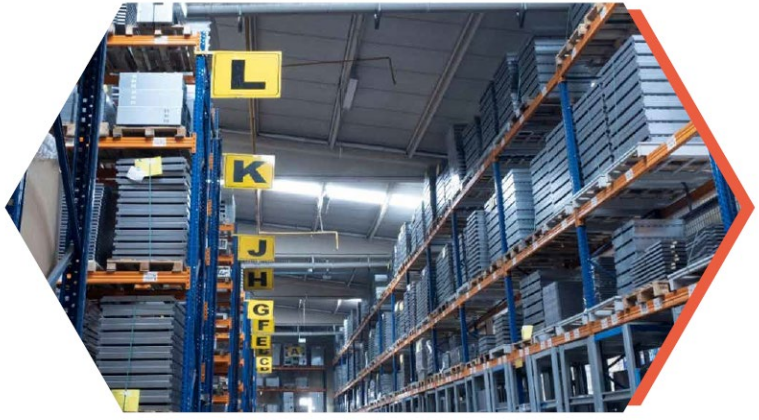
REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

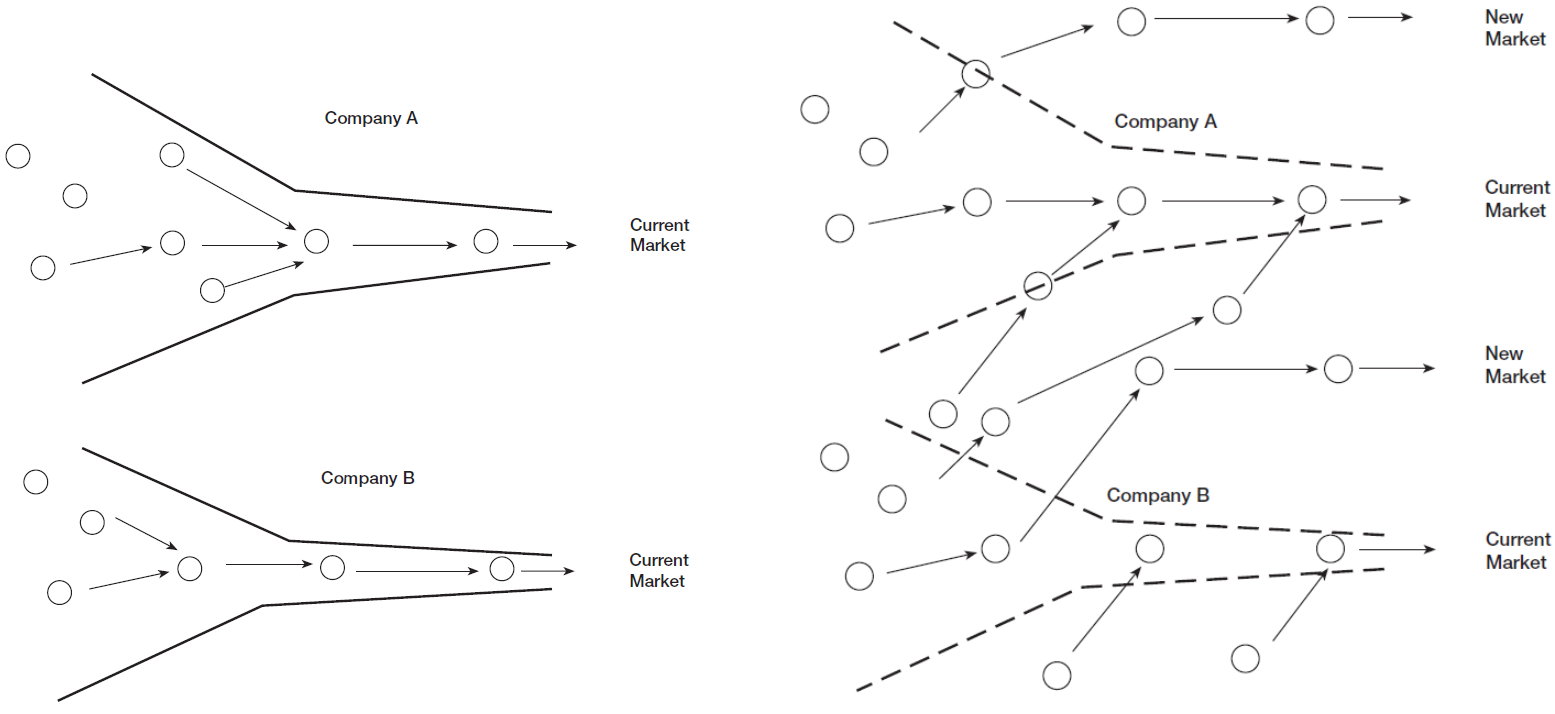
TÜBİTAK

NE MUTLU

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir



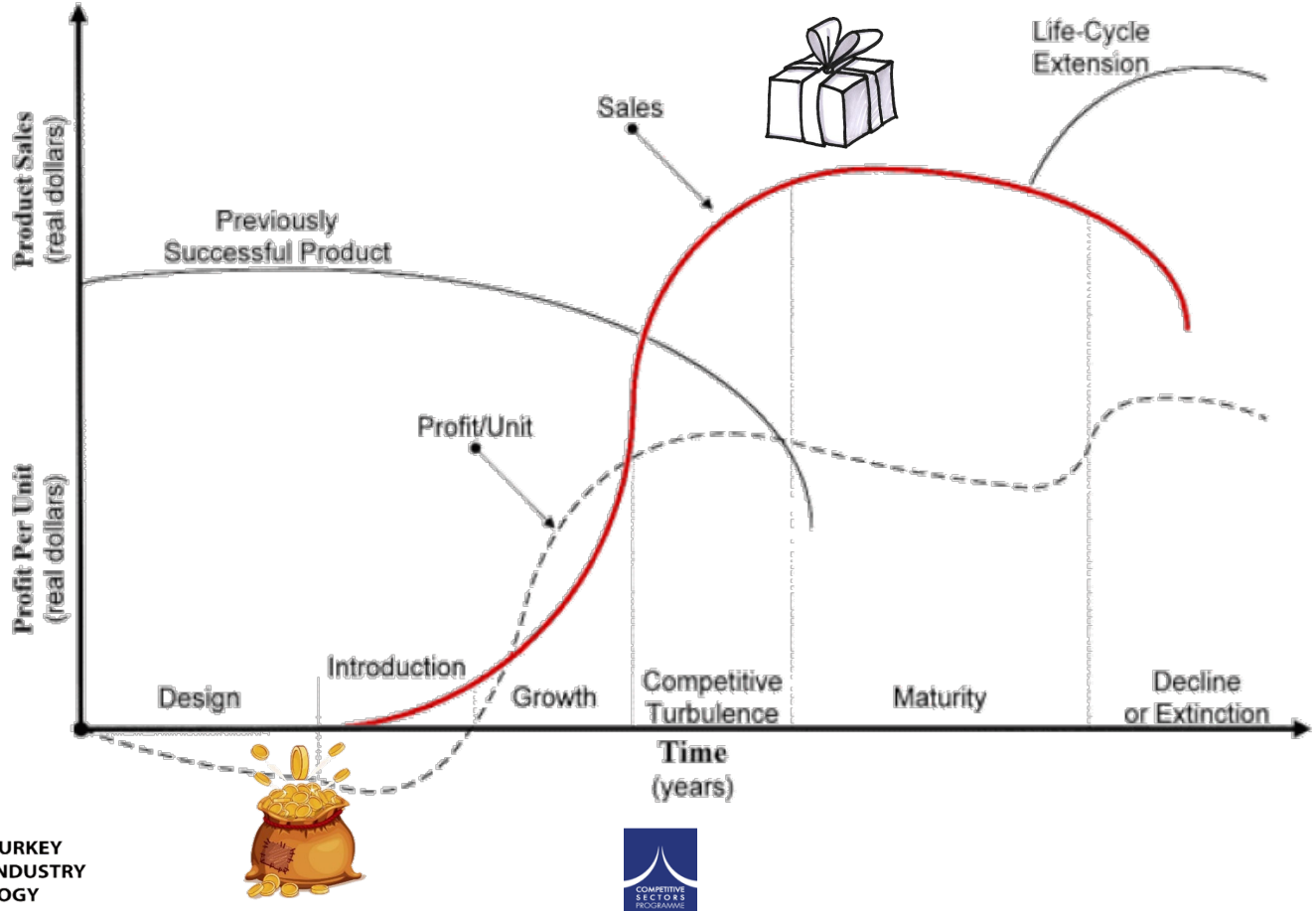
This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir



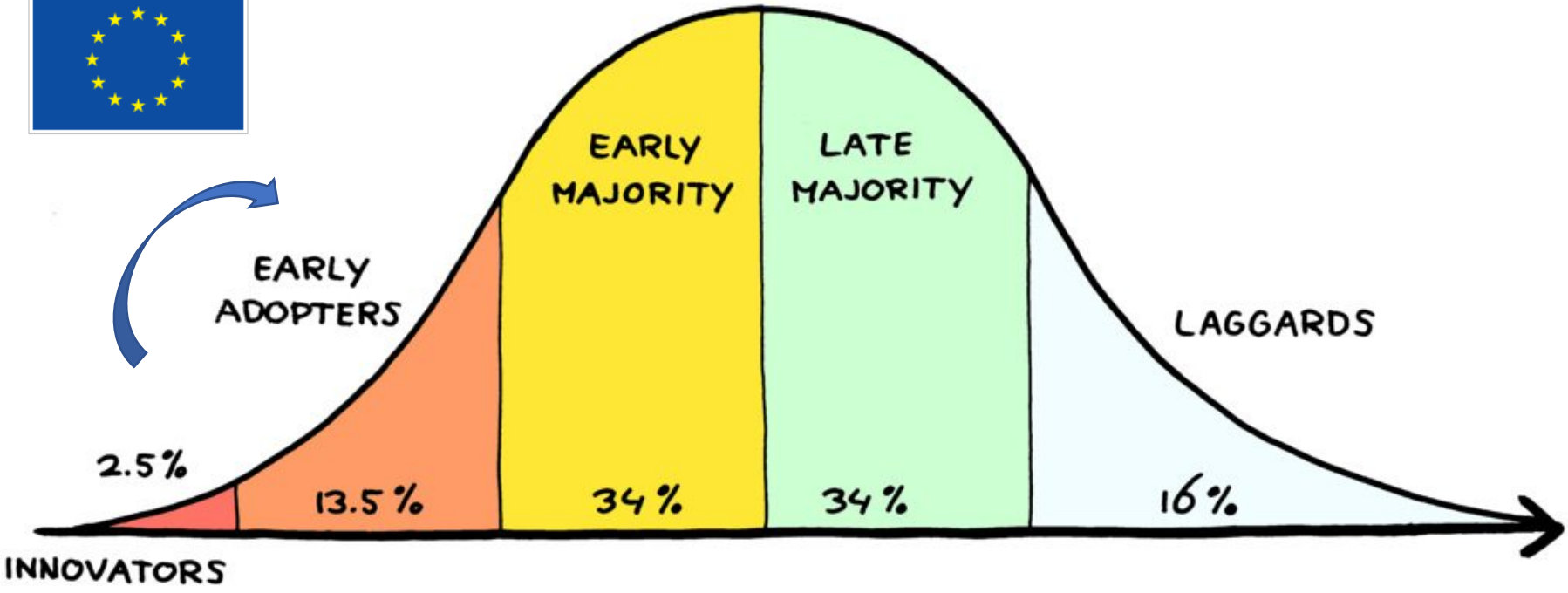
*Source: Open Innovation the New Imperative For Creating and Profiting from Technology – Henry CHESBROUGH

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

Generalized Product Life Cycle

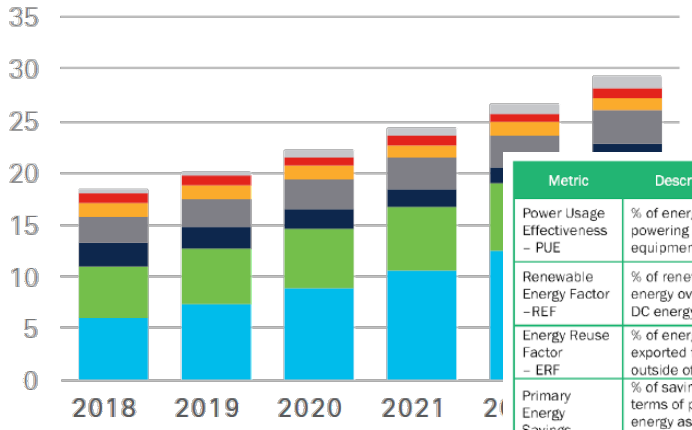


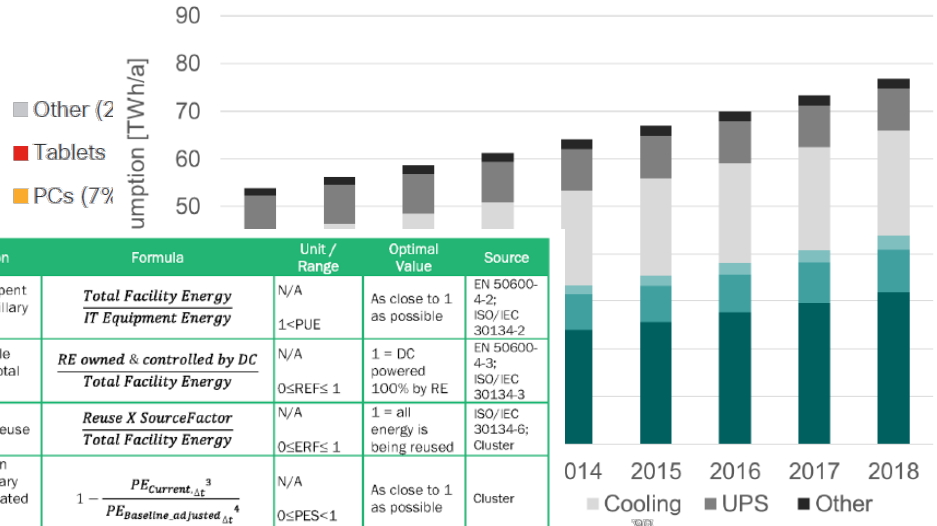
This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir



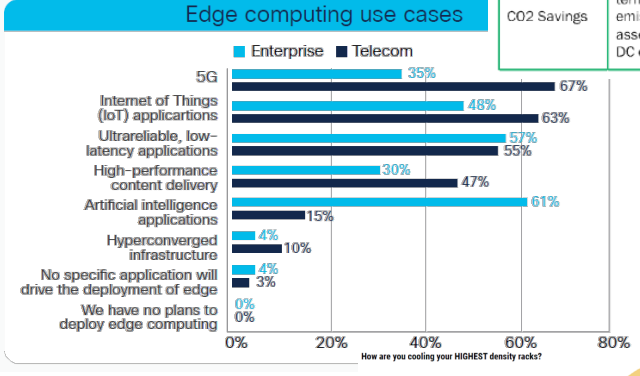
TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

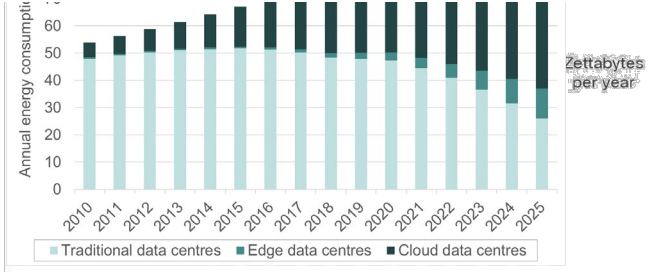
This project is co-financed by the European Union and the Republic of Turkey
proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

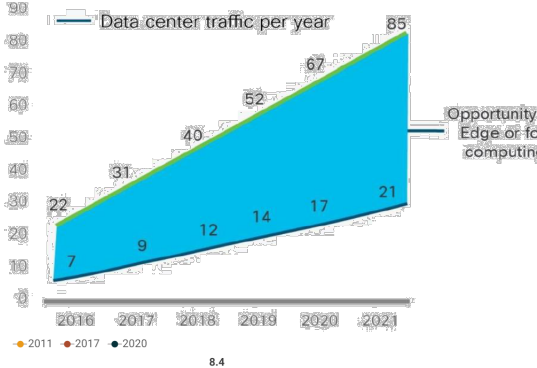


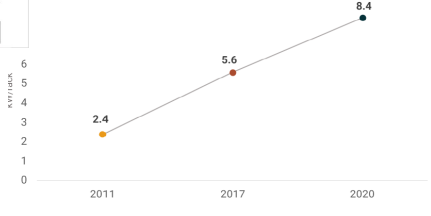


Metric	Description	Formula	Unit / Range	Optimal Value	Source
Power Usage Effectiveness – PUE	% of energy spent powering ancillary equipment	$\frac{Total\ Facility\ Energy}{IT\ Equipment\ Energy}$	N/A 1<PUE	As close to 1 as possible	EN 50600-4-2; ISO/IEC 30134-2
Renewable Energy Factor –REF	% of renewable energy over total DC energy	$\frac{RE\ owned\ \&\ controlled\ by\ DC}{Total\ Facility\ Energy}$	N/A 0≤REF≤ 1	1 = DC powered 100% by RE	EN 50600-4-3; ISO/IEC 30134-3
Energy Reuse Factor – ERF	% of energy exported for reuse outside of DC	$\frac{Reuse\ X\ SourceFactor}{Total\ Facility\ Energy}$	N/A 0≤ERF≤ 1	1 = all energy is being reused	ISO/IEC 30134-6; Cluster
Primary Energy Savings – PES	% of savings in terms of primary energy associated with DC operations	$1-\frac{PE_{Current\_\Delta t}{}^{3}}{PE_{Baseline\_adjusted\_\Delta t}{}^{4}}$	N/A 0≤PES<1	As close to 1 as possible	Cluster
CO2 Savings	% of savings in terms of CO2 emissions associated with DC operations	$1-\frac{CO2_{current\_\Delta t}{}^{5}}{CO2_{baseline\_adjusted\_\Delta t}{}^{6}}$	N/A 0≤CO2 Savings<1	As close to 1 as possible	Cluster

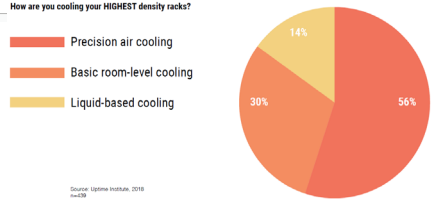








*What is the overall average server rack density (kW/rack) deployed in your organization's data center(s)? Choose one.**



Source: Uptime Institute, 2018
n=639

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

JRC TECHNICAL REPORT

2021 Best Practice Guidelines for the EU Code of Conduct on Data Centre Energy Efficiency

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

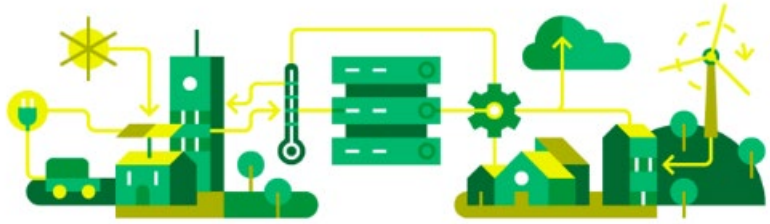
COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

Catalyst



BODEN TYPE DC ONE

GreenDC
greening datacenters

dolfin | The Green Data Center: *solutions for* Energy-Efficient DCs

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

European Commission

EUROPEAN COMMISSION
JOINT RESEARCH CENTRE

Institute for Energy, Transport and Climate
Energy Efficiency and Renewables Unit

CODE OF CONDUCT DATA CENTRES Endorser

Ispra, 25 March 2019

LANDE Endüstriyel Metal Ürünler San. ve Tic. A.Ş.
Reyhan EKŞİ
Merve Mah. Gazi Cad.n.17
Sancaktepe – İstanbul/Turkey

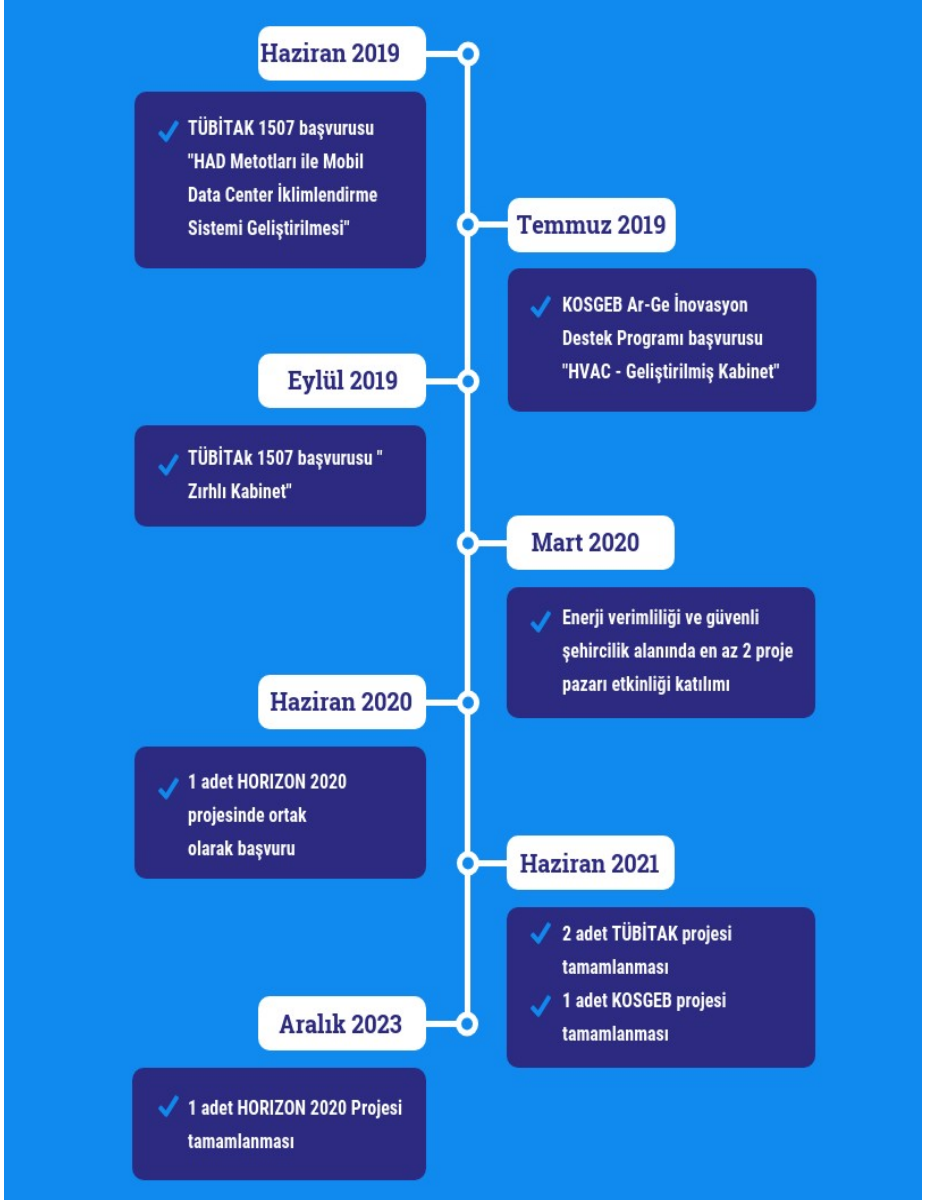
Dear Mrs. Reyhan EKŞİ,

Thank you for having sent the registration form and the action plan to join European Code of Conduct on Data Centres as **Endorser**. Your organisation is hereby granted the title of Endorser. I am proud to welcome you to our network.

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK



TURKEY in HORIZON 2020
COOPERATION. INNOVATION. COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

Haziran 2019

- TÜBİTAK 1507 başvurusu "HAD Metotları ile Mobil Data Center İklimlendirme Sistemi Geliştirilmesi"

Temmuz 2019

- KOSGEB Ar-Ge İnovasyon Destek Programı başvurusu "HVAC - Geliştirilmiş Kabinet"

Eylül 2019

- TÜBİTAk 1507 başvurusu " Zırhlı Kabinet"

Mart 2020

- Enerji verimliliği ve güvenli şehircilik alanında en az 2 proje pazarı etkinliği katılımı

Haziran 2020

- 1 adet HORIZON 2020 projesinde ortak olarak başvuru

Haziran 2021

- 2 adet TÜBİTAK projesi tamamlanması
- 1 adet KOSGEB projesi tamamlanması

Aralık 2023

- 1 adet HORIZON 2020 Projesi tamamlanması

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

TURKEY in HORIZON 2020
COOPERATION. INNOVATION. COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

Brussels Project Brokarage Event &Tur&Bo Visit
Energy Efficiency in Endustrial Processes
11-12/04/2019

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TRAVEL SUPPORT

TÜBİTAK

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

LC-SC3-B4E-5-2020: Integrated design concepts for energy-efficient ICT in buildings

Specific Challenge: The demand for data processing is expected to grow in the coming years. Consolidation is quickly replacing a multitude of small, remote and inefficient data centres with big and more resource and energy efficient data centres. This tendency however does not address specific delay- and security-sensitive small data centres. Moreover the emergence of edge computing, Internet of Things and Software Defined Networks (Network Function Virtualisation) will increase the amount of small data centres at the edge of the network. This is also the situation for server rooms in buildings.

These server rooms, **small data centres** or other ICT equipment in building (e.g. Telephone cabinets) **should become more energy efficient, better integrated with the buildings in which they operate, and should maximise where possible the integration of intermittent renewable energy sources, district cooling systems, and synergies with buildings' energy management systems (e.g. space heating and cooling).**

Scope: Proposals should **investigate innovative design concepts and advanced ICT solutions for integrated design of server rooms and small data centres in buildings** (based on state-ofPart 10 - Page 65 of 325 the-art sustainable data centre designs such as the Open Compute Project or similar), covering as many as possible of the following areas:

- **Optimal energy performance** of the proposed design concepts,
- **Innovative and energy efficient cooling technologies and/or solutions,**
- **Integration with buildings' energy management system and energy-consuming systems** (using European and global communication standards such as SAREF), taking into account building usage,
- **Integration with intermittent renewable energy sources,**
- **Waste heat valorisation** (e.g. recovery, conversion, usage in local low-temperature heat networks to serve urban areas), while minimising the total waste heat production,
- **Geographical and temporal workload balance,**
- **Elimination of unnecessary repeated power conversions (AC/DC),**
- **Operation of ICT equipment in a wider range of temperatures** (to mitigate cooling and airflow needs in data centres but also heating needs in telecommunication cabinets/booths in the field).

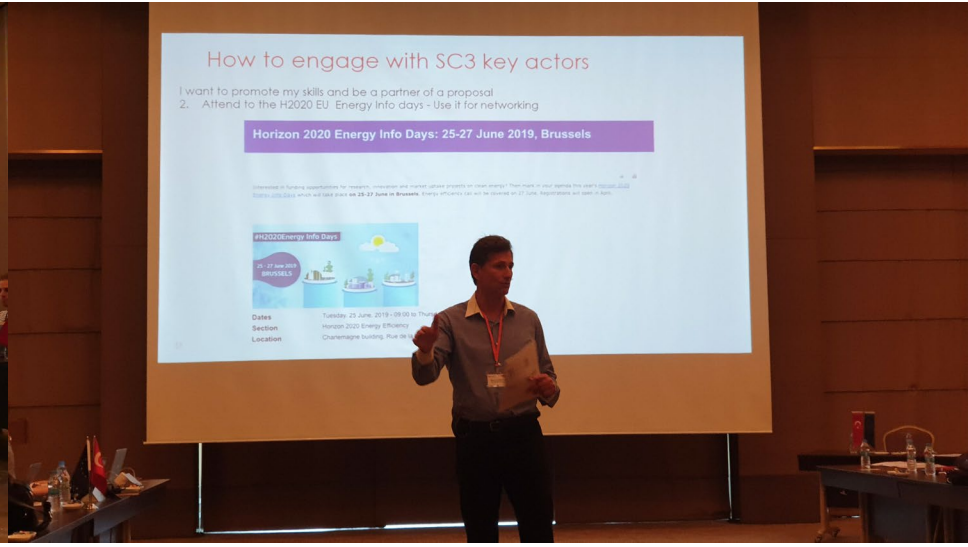
TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

R2M RESEARCH TO MARKET SOLUTION

Focus Group Training on Energy
29-30/05/2019

Endoks



REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TRAVEL SUPPORT

TÜBİTAK

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

OCP Regional Summit 2019 Participation
26-27/09/2019

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TRAVEL SUPPORT

TÜBİTAK

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

TÜBİTAK

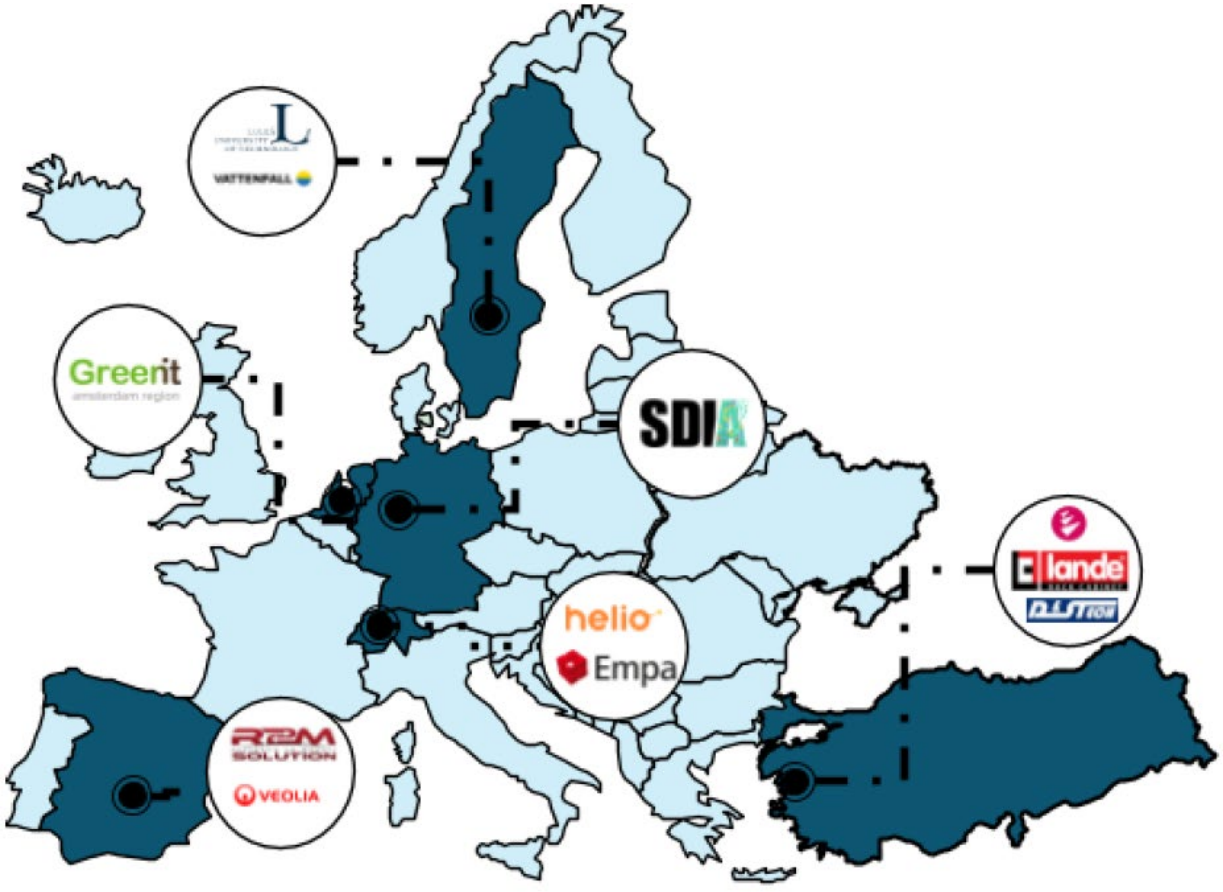
Application Guide for TUBITAK Coordinators Support Programme

Incentive Program for 'EU FP Coordinators', has been established by TUBITAK for encouraging Turkish Institutions to lead consortia in projects submitted under EU FP Calls and increasing the success rate of them in European Union Framework Programme (EU FP).

The coordinators, who wish to apply for the supports, first have to go through "General Application" process.

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

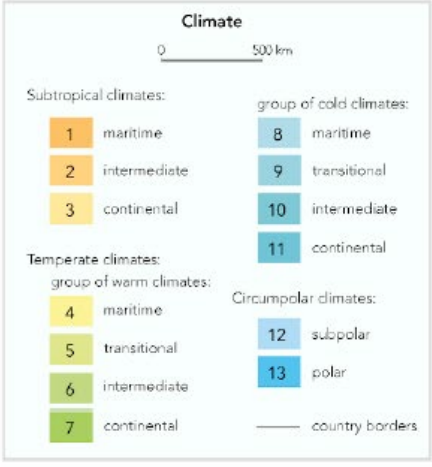


REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

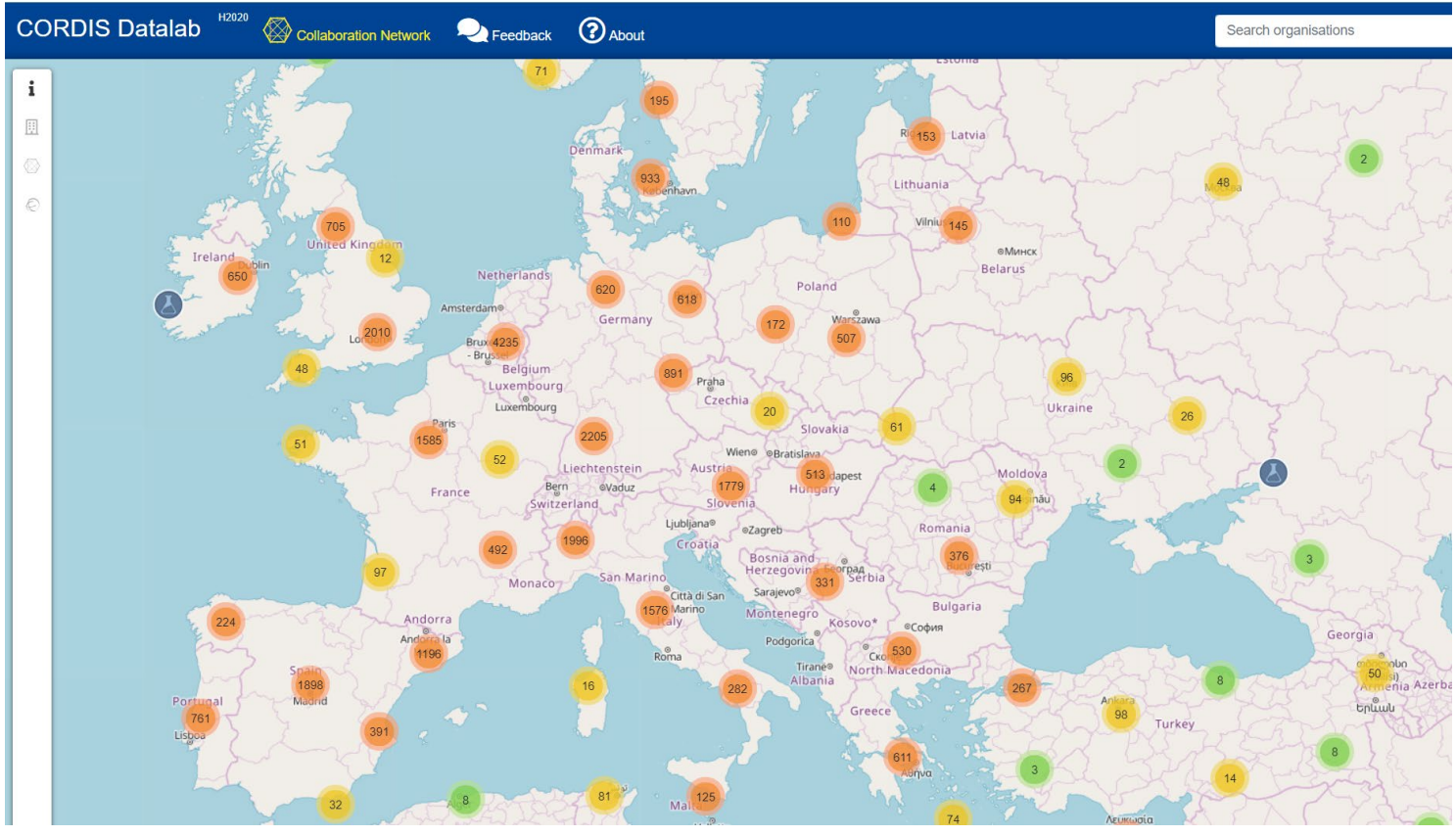
TÜBİTAK

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir



This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

European Commission | CORDIS Bringing you the results of EU research and innovation framework programmes since 1990: Horizon 2020, FP7 and earlier.



This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

Metric	Description	Formula	Unit / Range	Optimal Value	Source
Power Usage Effectiveness – PUE	% of energy spent powering ancillary equipment	$\frac{Total\ Facility\ Energy}{IT\ Equipment\ Energy}$	N/A 1<PUE	As close to 1 as possible	EN 50600-4-2; ISO/IEC 30134-2
Renewable Energy Factor –REF	% of renewable energy over total DC energy	$\frac{RE\ owned\ \&\ controlled\ by\ DC}{Total\ Facility\ Energy}$	N/A 0≤REF≤ 1	1 = DC powered 100% by RE	EN 50600-4-3; ISO/IEC 30134-3
Energy Reuse Factor – ERF	% of energy exported for reuse outside of DC	$\frac{Reuse\ X\ SourceFactor}{Total\ Facility\ Energy}$	N/A 0≤ERF≤ 1	1 = all energy is being reused	ISO/IEC 30134-6; Cluster
Primary Energy Savings – PES	% of savings in terms of primary energy associated with DC operations	$1-\frac{PE_{Current_{\Delta t}}{}^{3}}{PE_{Baseline\_adjusted_{\Delta t}}{}^{4}}$	N/A 0≤PES<1	As close to 1 as possible	Cluster
CO2 Savings	% of savings in terms of CO2 emissions associated with DC operations	$1-\frac{CO2_{current_{\Delta t}}{}^{5}}{CO2_{baseline\_adjusted_{\Delta t}}{}^{6}}$	N/A 0≤CO2 Savings<1	As close to 1 as possible	Cluster

CODE OF CONDUCT DATA CENTRES Endorser

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

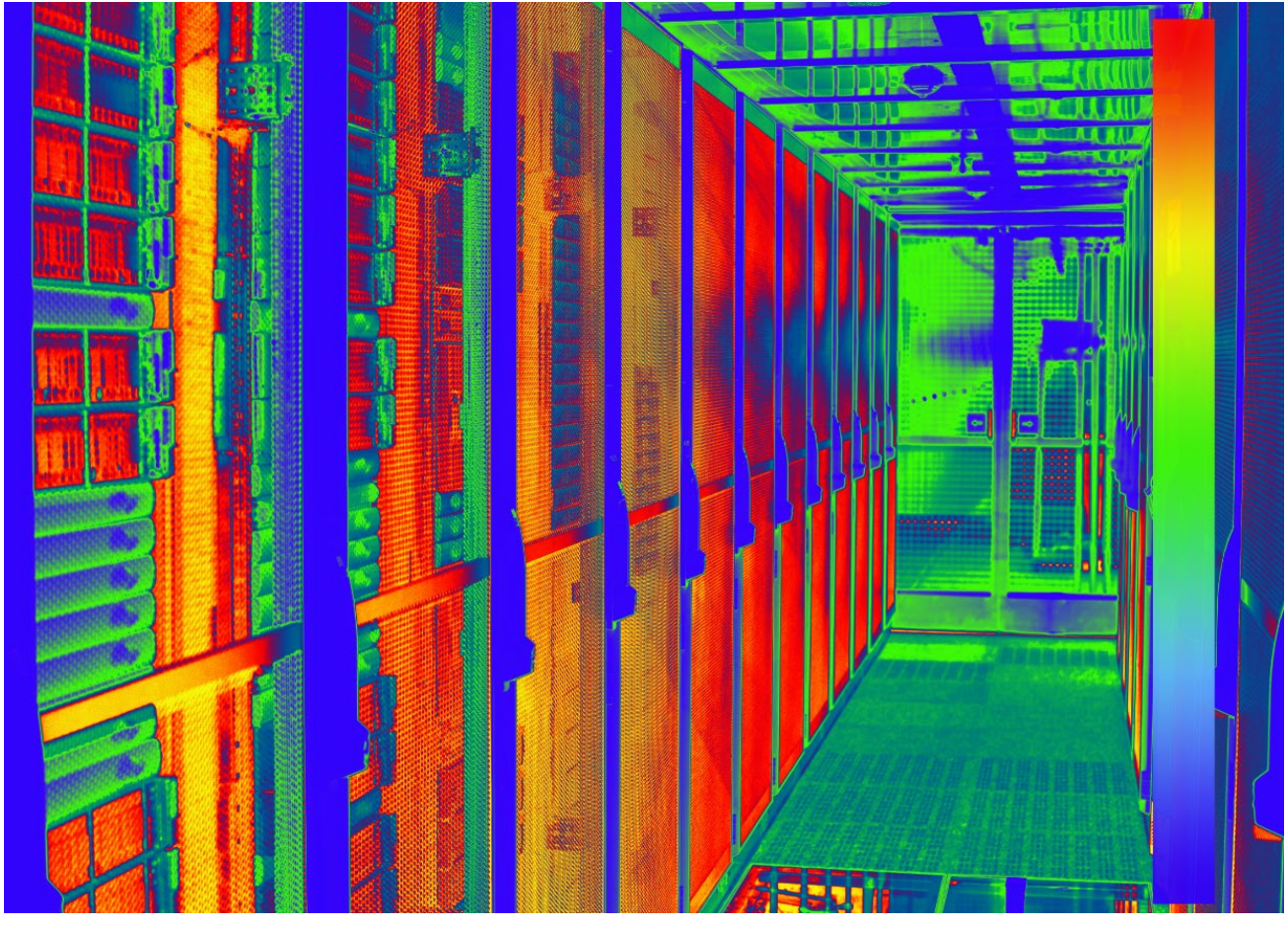
This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

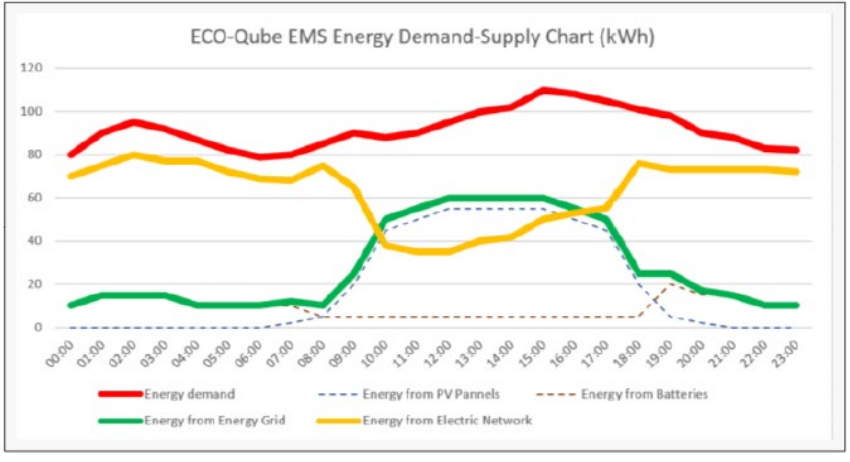
COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

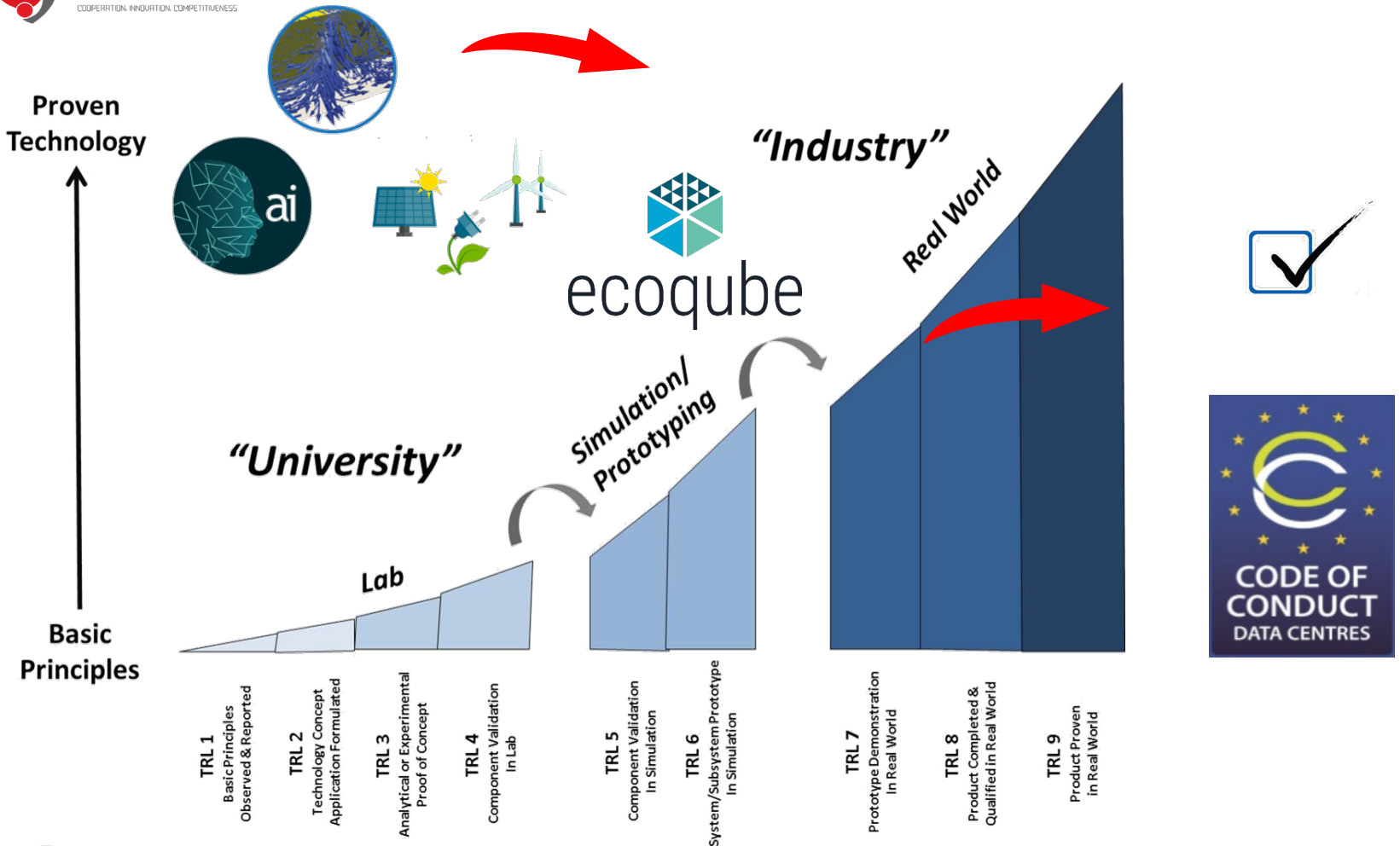


This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir



TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir



CODE OF CONDUCT DATA CENTRES

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

Proposal Evaluation Form

European Commission	**EUROPEAN COMMISSION** Horizon 2020 - Research and Innovation Framework Programme	**Evaluation Summary Report - Innovation actions**

Evaluation Summary Report

Evaluation Result

Total score: 14.00 (Threshold: 12)

The proposal describes the current state of the art very well *and convincingly demonstrates how it goes beyond it. TRL levels for each subsystem are described and the proposal systematically shows how the project brings them to TRL7/8 in a convincing manner.*

The data-driven approach to energy performance improvement is novel and has the potential to be widely applicable and scalable to other DCs.

The zonal heat management system *(with real time measurement and Artificial Intelligence (AI) analytics) will support improved workload orchestration and extend heat management in DCs* ***beyond the current state of the art****. This approach is novel in terms of further cost optimisation.*

The proposal can be expected to provide useful open source data that can serve as evidence for future European policies.

TURKEY in HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS

This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir

Q&A

Time to ask your questions!

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY

COMPETITIVE SECTORS PROGRAMME

TÜBİTAK

TURKEY in
HORIZON 2020
COOPERATION, INNOVATION, COMPETITIVENESS
This project is co-financed by the European Union and the Republic of Turkey
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir
Teşekkür ederim!
Thank you!
REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY
COMPETITIVE SECTORS PROGRAMME
TÜBİTAK