

UNIVERSITY OF OSLO

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Measurable Security & Societal Empowerment

Josef Noll
Professor
Department of Technology Systems

UNIVERSITY
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<https://beststructured.com/intrusion-detection-intrusion-prevention-and-antivirus-the-differences/>

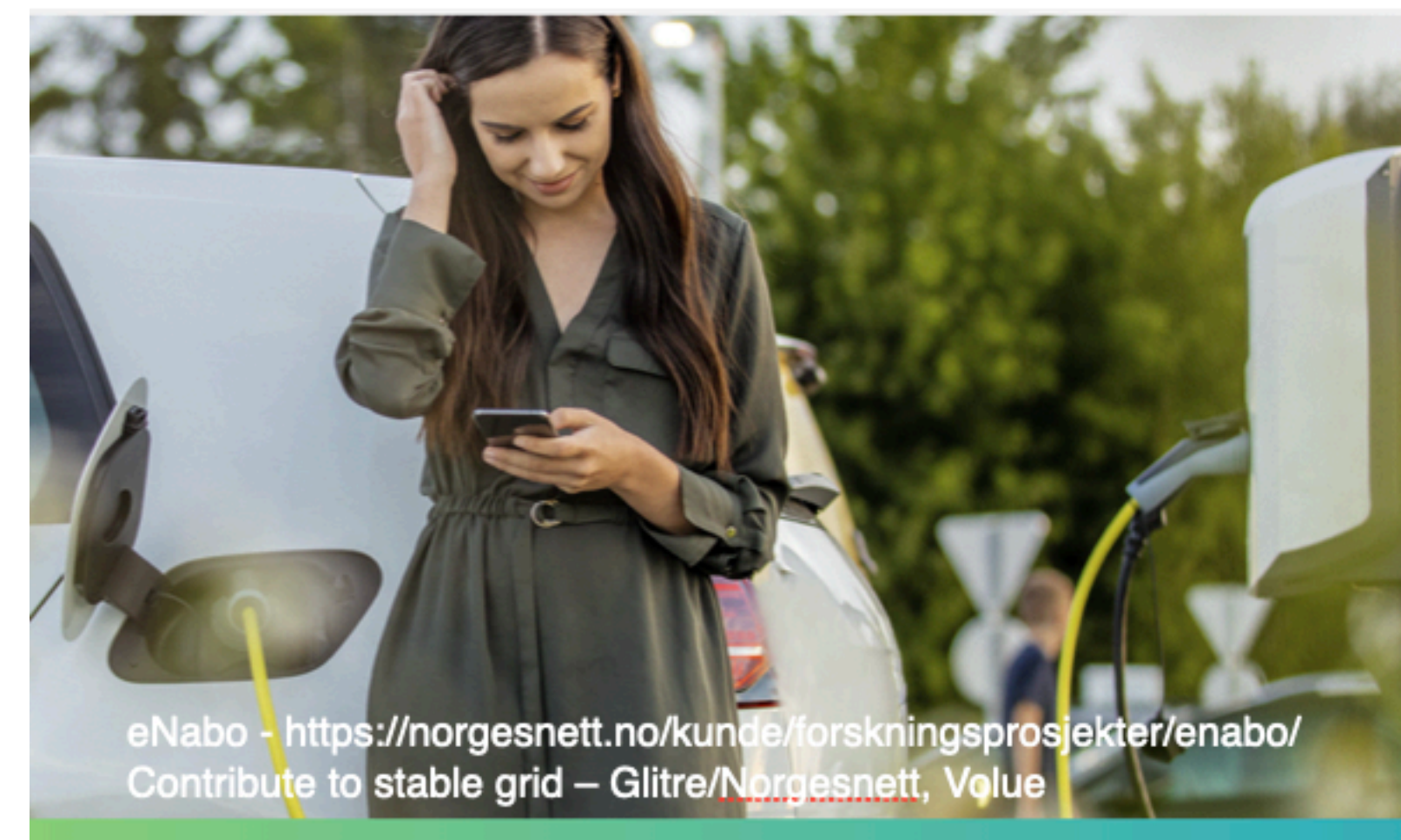
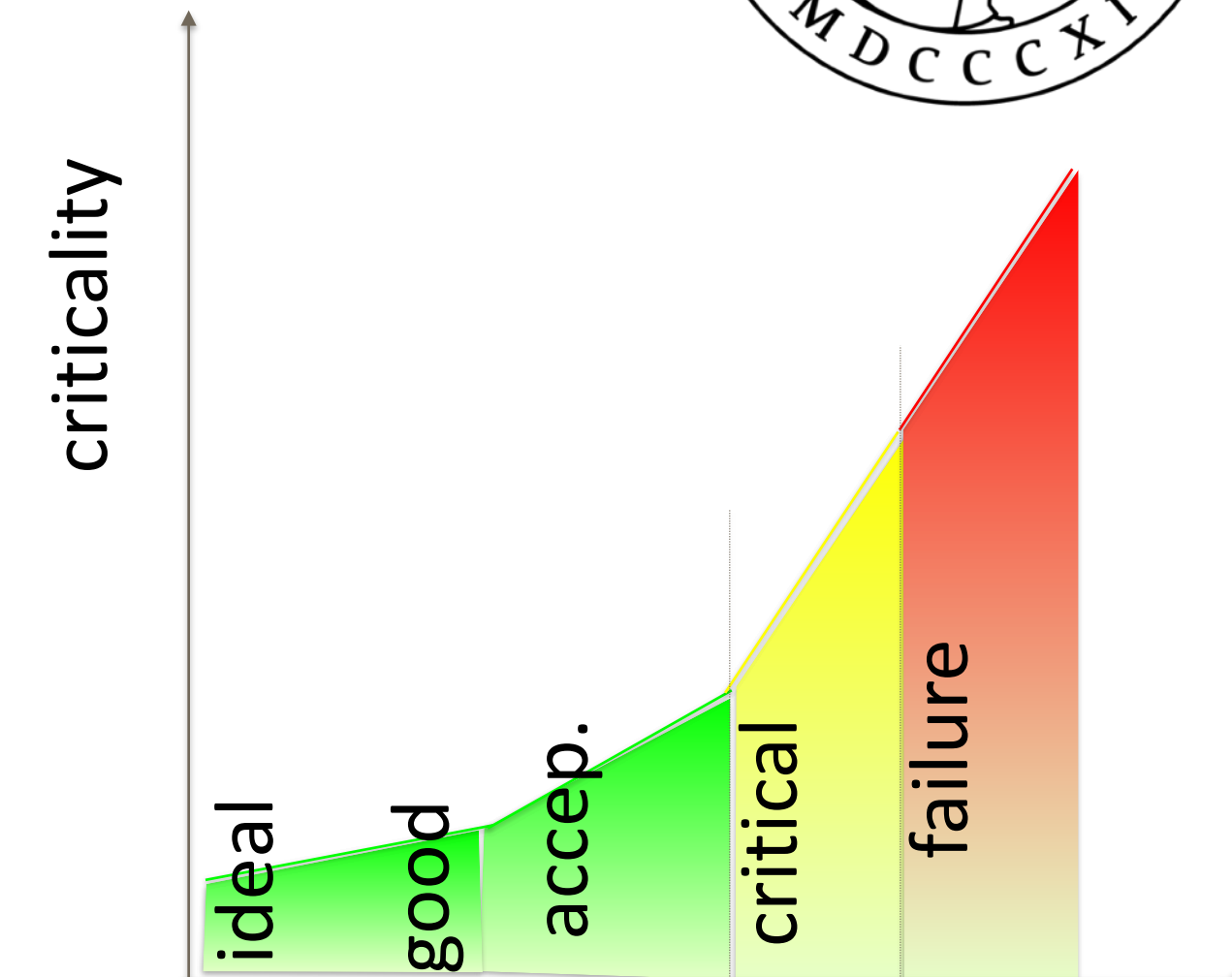
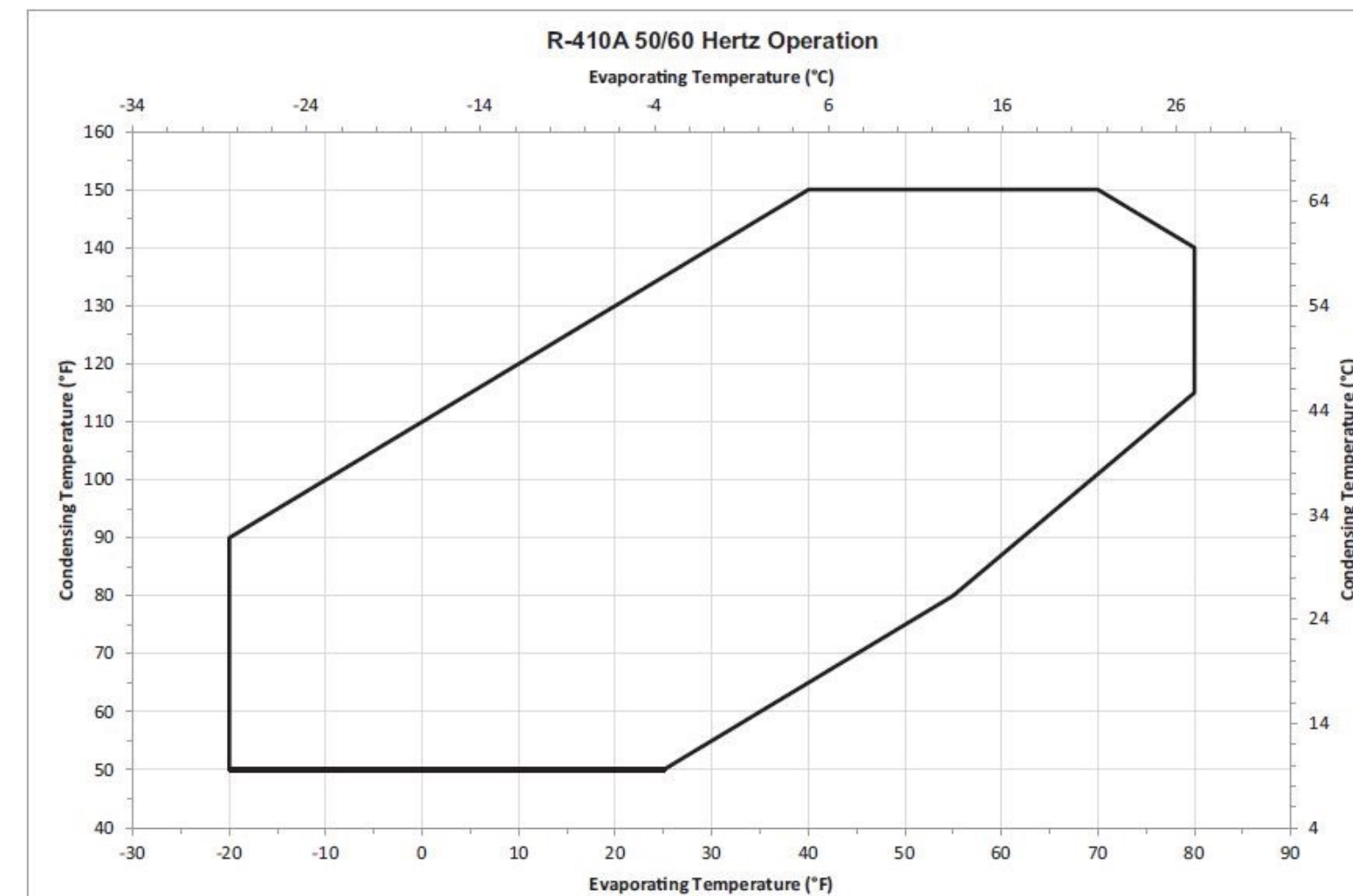


ITS cyber-society-security areas

- ➔ Measurable Security
 - Security classes
 - Risk-Exposure Model

- ➔ Societal Security, Trust, Digital Transformation
 - “Renewable means Digital”
 - Values: Capabilities of a society

- ➔ eResilience
 - decentralised, eNeighbour, eMunicipality
 - Dec 2025: “Amy” 155.000 households



<https://www.vg.no/nyheter/i/wg7LoA/norge-kan-lammes-av-stroembrudd-advarer-telenor-i-sin-aarlige-sikkerhetsrapport>



Telenor: Uten strøm stopper Norge

Norge kan lammes av strømbrudd, advarer Telenor i sin årlige sikkerhetsrapport. Ekstremværet «Amy» beviste hvor sårbare vi er.



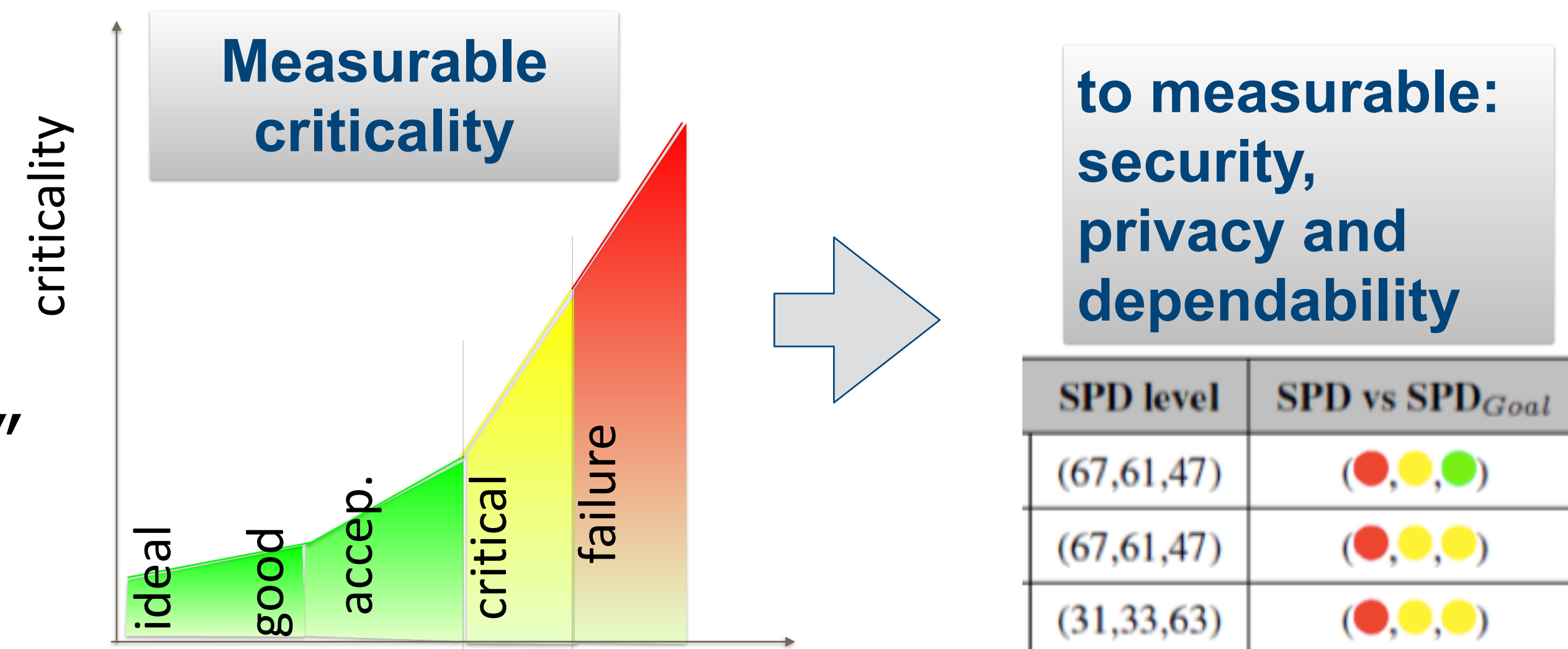
På grunn av strømbruddet under uværet «Amy» måtte familien Valstad-Frydenhaug steke de syv...

Measurable Security

- IoT related
 - home network (critical functionalities)
 - unprotected IoT devices
 - industrial use case
- Risk analysis for IoT-based infrastructure
 - Impact and Exposure (Comm. & Protection)
- Security and Privacy classes
 - operating envelope and “ideal/critical” operation

Catastrophic	A	C	E	F	F
Major	A	B	D	E	F
Moderate	A	B	C	E	E
Minor	A	A	B	D	D
Insignificant	A	A	A	C	C
Impact/ Exposure	E1	E2	E3	E4	E5

[Courtesy: Manish Shrestha, UiO, 2019]



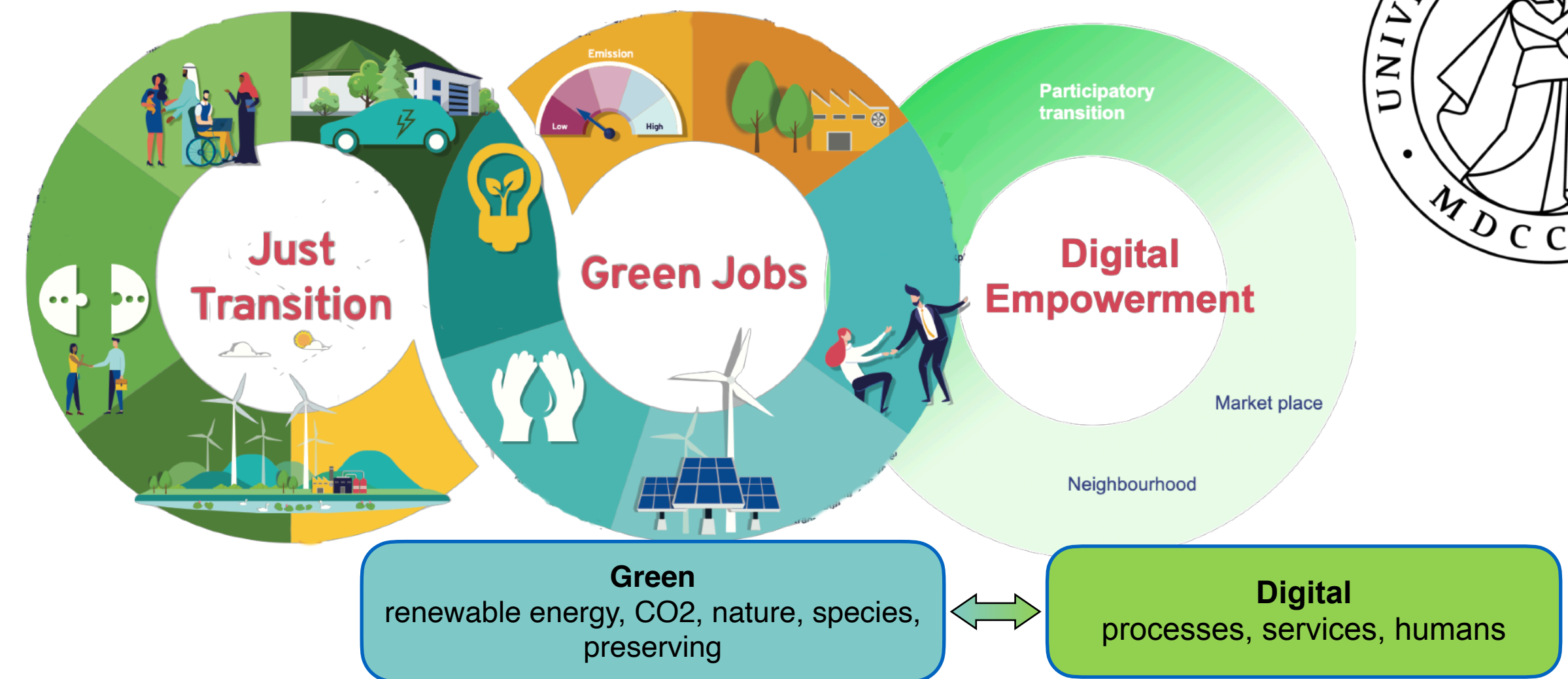
Societal Security

→ Digital (AI), Trust, Societal Security

- Societal Transition

→ Edge-capabilities: Neighbourhood, Society

- “Money is just a transactional entity, not a value”
- “Capability of the society is the value”

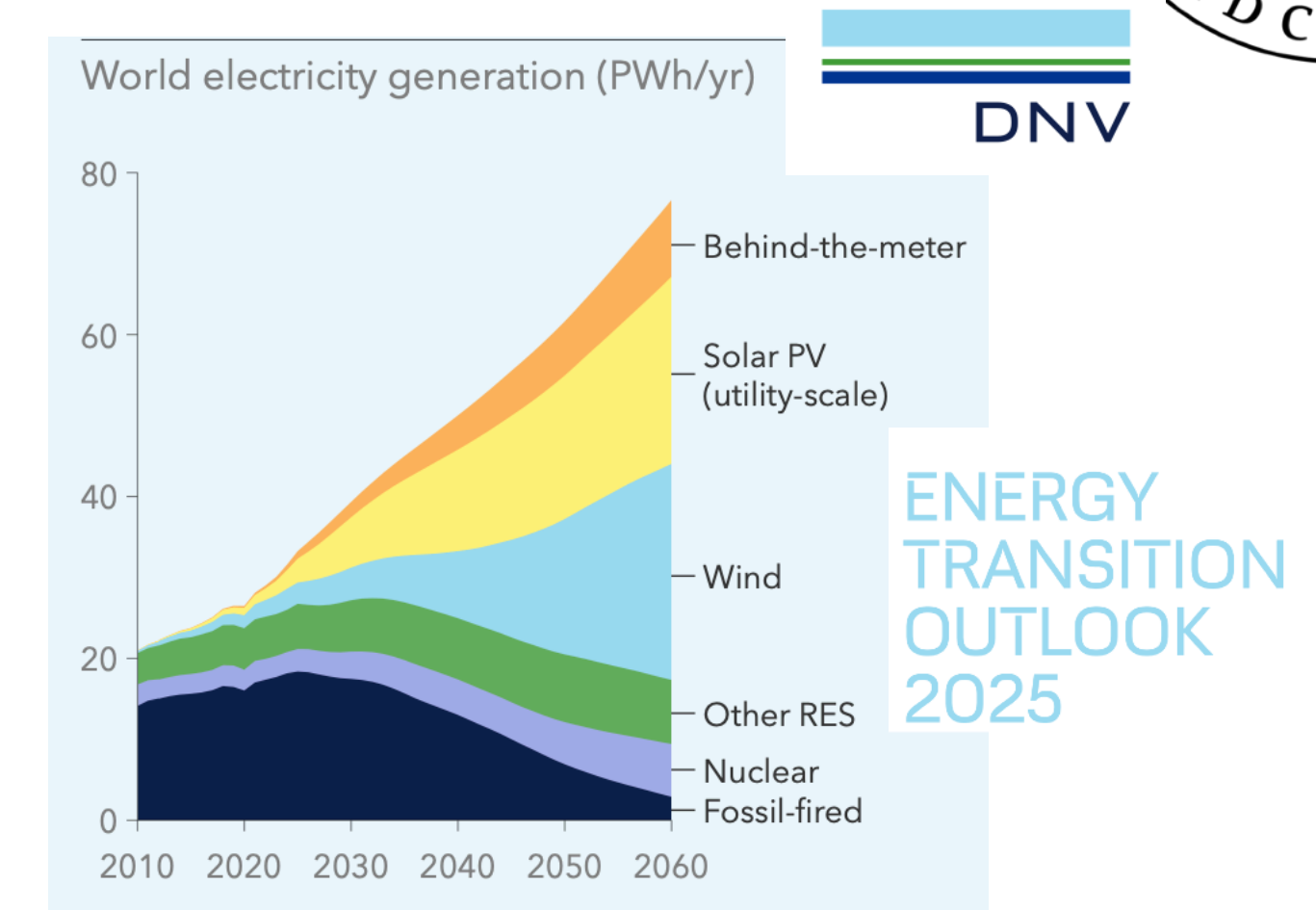


“OSI” layer model for energy



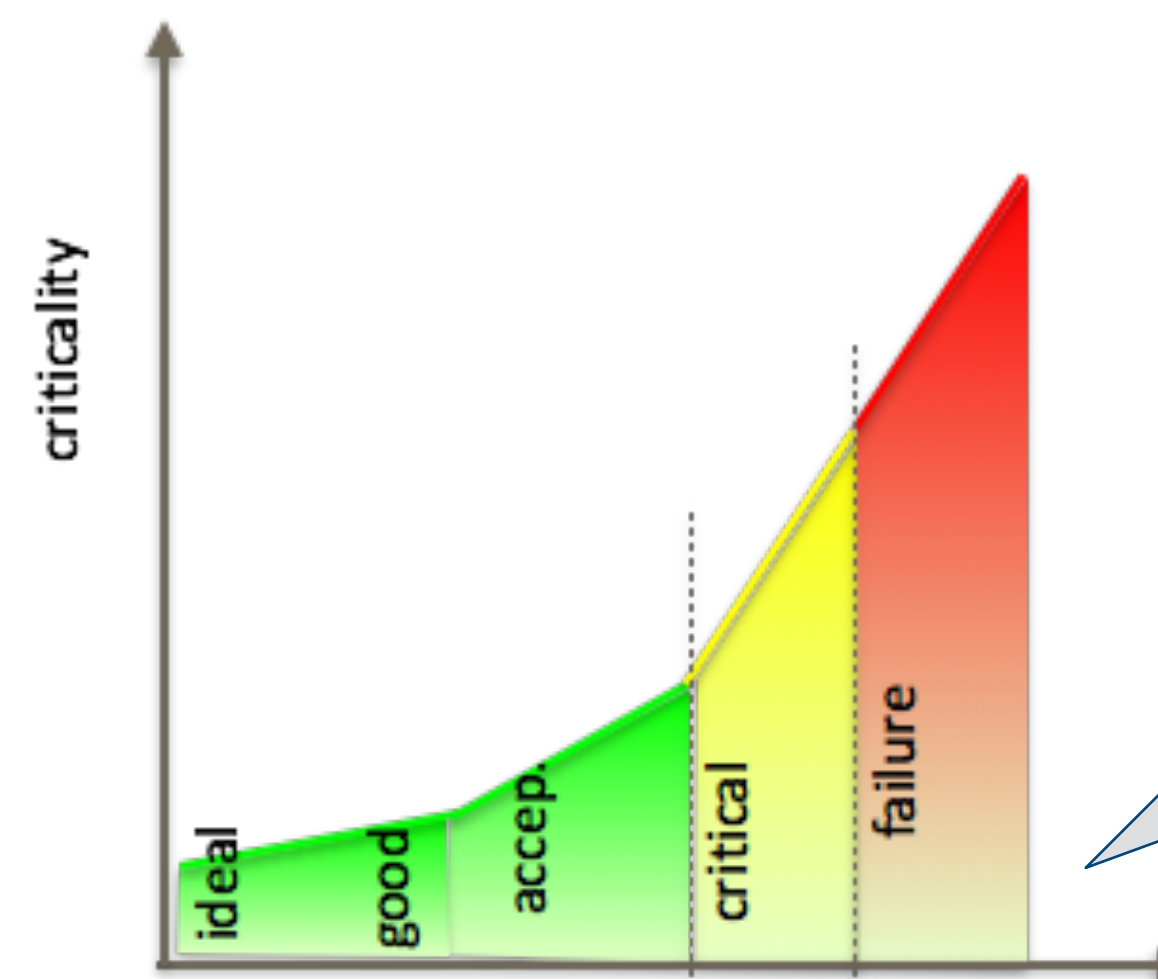
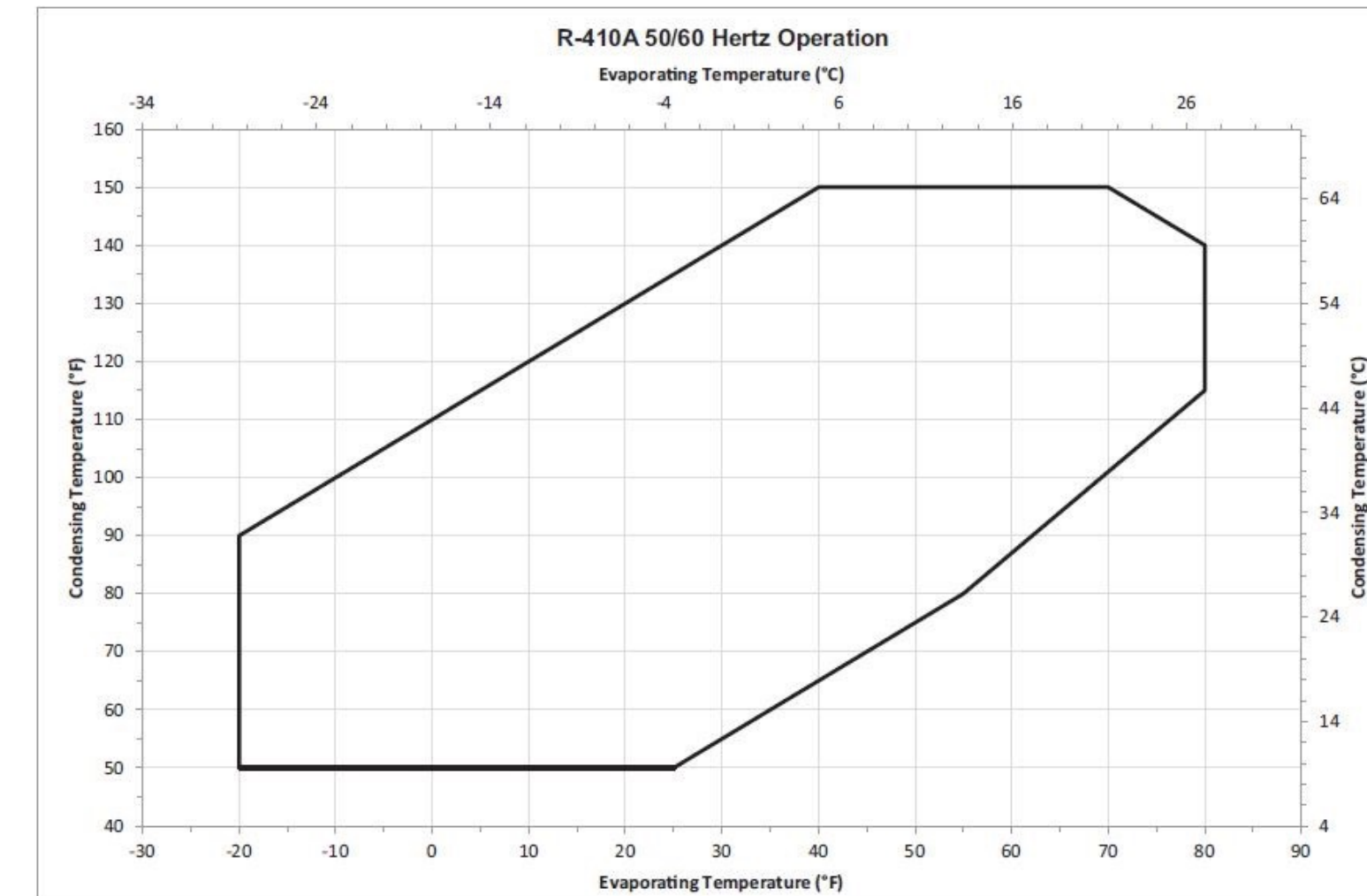
Resilience of the electrical grid

- edge empowerment, distributed grid
- elNeighbourhoods, minimum energy, smart usage,
- AMS2.0 pathway to resilience
 - New AMS in Hvaler (2028?)
- industrial transformation (2x energy)
 - Dec2025: 59% more request (Elvia)



Security Semantics - decentralised

- ➔ IoT System components, Security functionality & Security attributes
- ➔ IoT Lifetime security functionality
 - Operations
 - Development, Audit, Maintenance
 - Decommissioning
 - Mechanisms, Humans, Physical, Privacy protection
- ➔ Internet, Things, Semantics
 - Semantics vs Syntax
- ➔ Operating envelope
 - Meaning, examples
 - communication



- 1) How does the Operating Envelope look like applying criticality?
- 2) How can the criticality be applied for SPD?

Risk-Exposure Model

- Why not Impact & Frequency/Likelihood risk analysis?
- Risk-Exposure model components
 - Exposure: Connectivity & Protection level
 - Connectivity: C1 (isolated) ... C5 (full Internet)
 - Protection level: P1 (lowest) ... P5 (highest)
- Protection: data encryption, communication protection, SW security, HW security controls, Monitoring, Access control, Cryptography, Physical security
- Home control, explain
 - external supervision vs in-house solution

Catastrophic	A	C	E	F	F
Major	A	B	D	E	F
Moderate	A	B	C	E	E
Minor	A	A	B	D	D
Insignificant	A	A	A	C	C
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[Courtesy: Manish Shrestha, UiO, 201

Multi-Metrics (MM) Method

→ Accountable security - MM

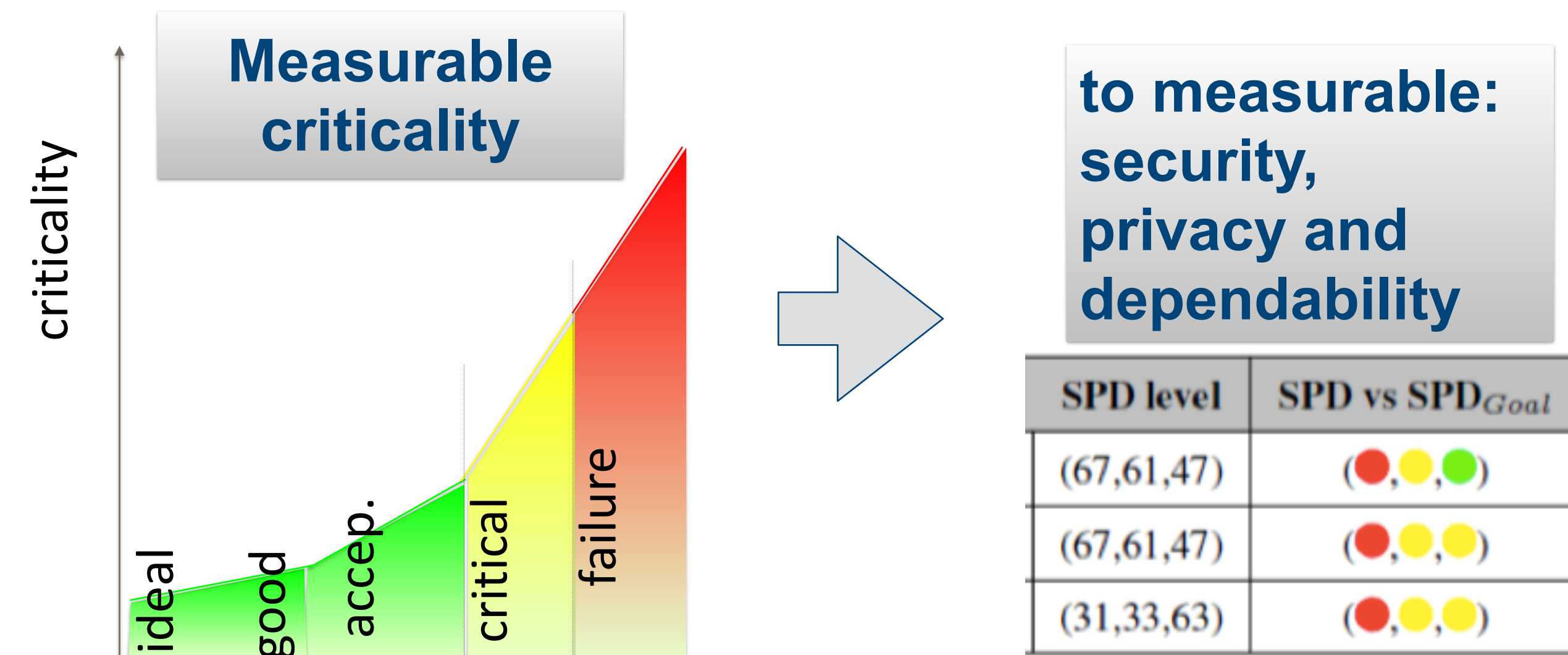
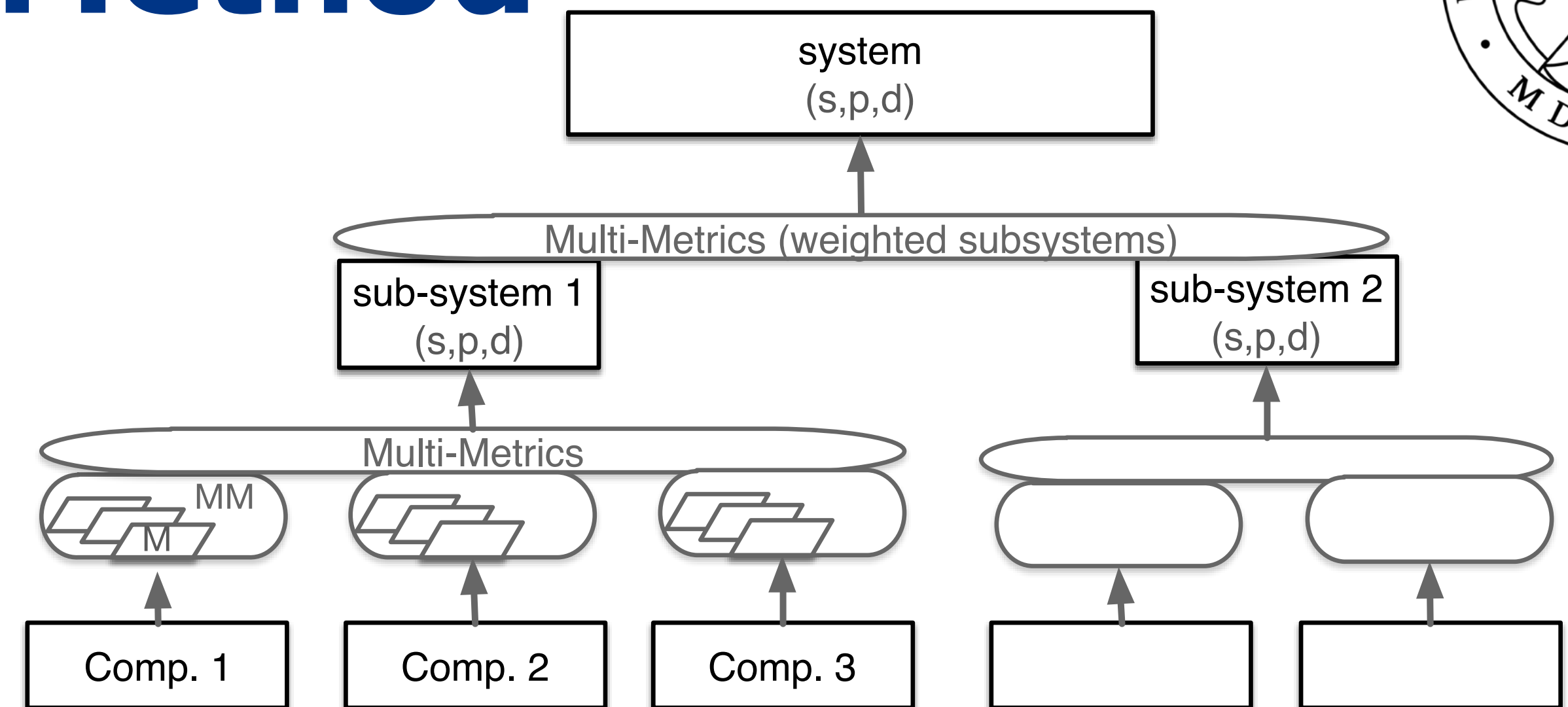
- principle operation

→ Privacy: Loan of vehicle

- difference of scenarios 1-3 (privacy, speeding, crash)

→ Privacy labels

- which data, sharing
- integrity, storage
- ownership, further distribution



Multi-Metrics (MM) Method

- ➔ Applications: Smart Meters
- ➔ Communication: Smart Meter System
- ➔ SPD
 - from components and functionalities
 - to SPD functionalities
- ➔ Operation envelop
- ➔ Weighting in MM
- ➔ Combining sub-systems through MM

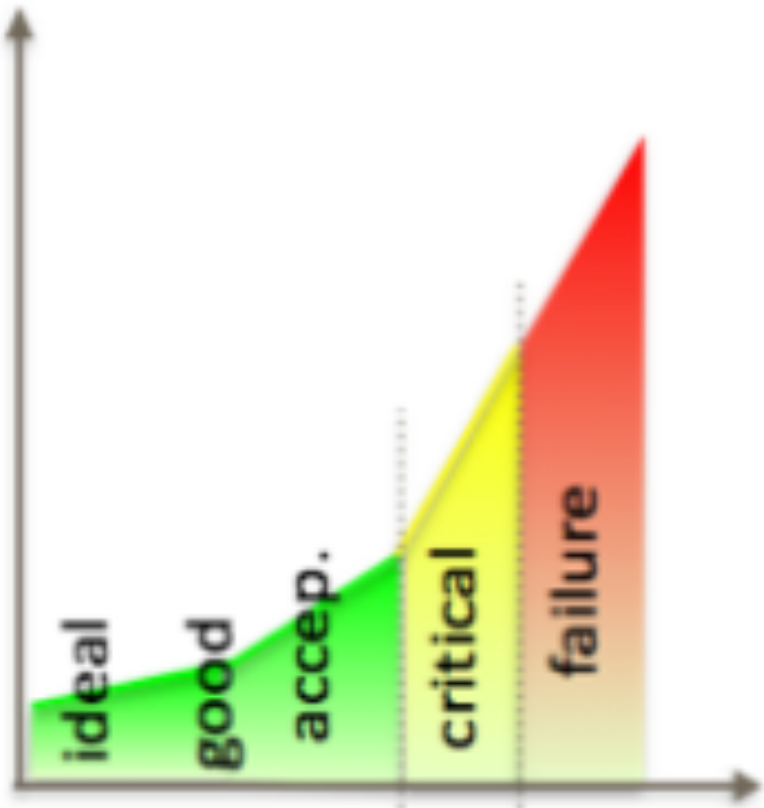
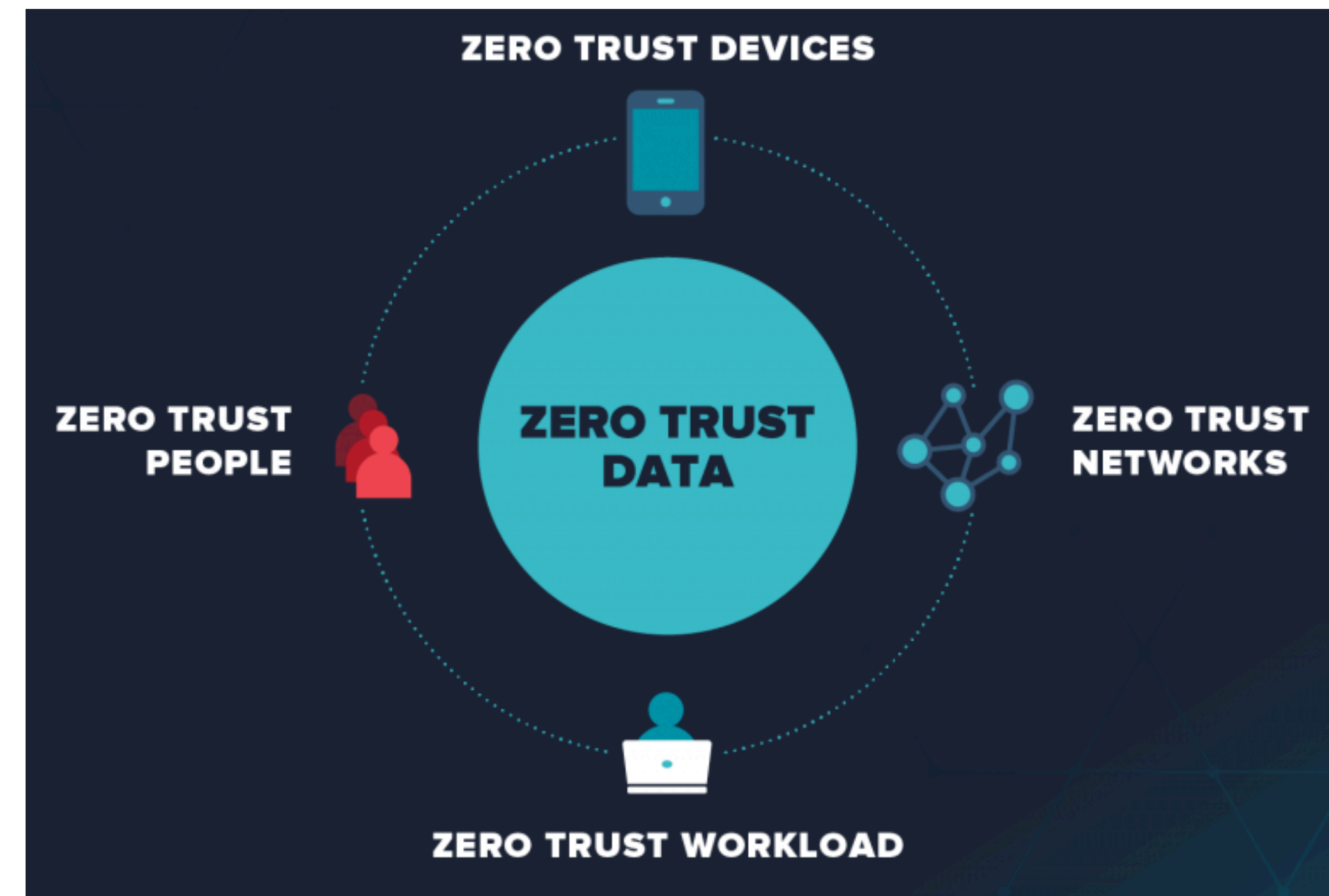


Table 8 Sub-systems and components weights

Sub-system	Sub-sys. Weight	Component	Comp. Weight
AMS	80	Remote Access	70
		Authentication	80
		Encryption	80
Radio link	50	Mesh	60
		Message Rate	80
		Encryption	40
Mobile link	20	Mobile link	70
		Encryption	40

ZeroTrust Architecture - and applicability for the society

- ➔ Why zero trust
 - "your system is hacked already"
 - "no user or device is trusted until they have proved otherwise"
 - what do you do in case of hacking/ ransomware?
- ➔ Domain examples
 - Hospital architecture
 - IT-deployment, docker-based
 - Cloud access
- ➔ Role in the organisation (HMSS/EHSS)



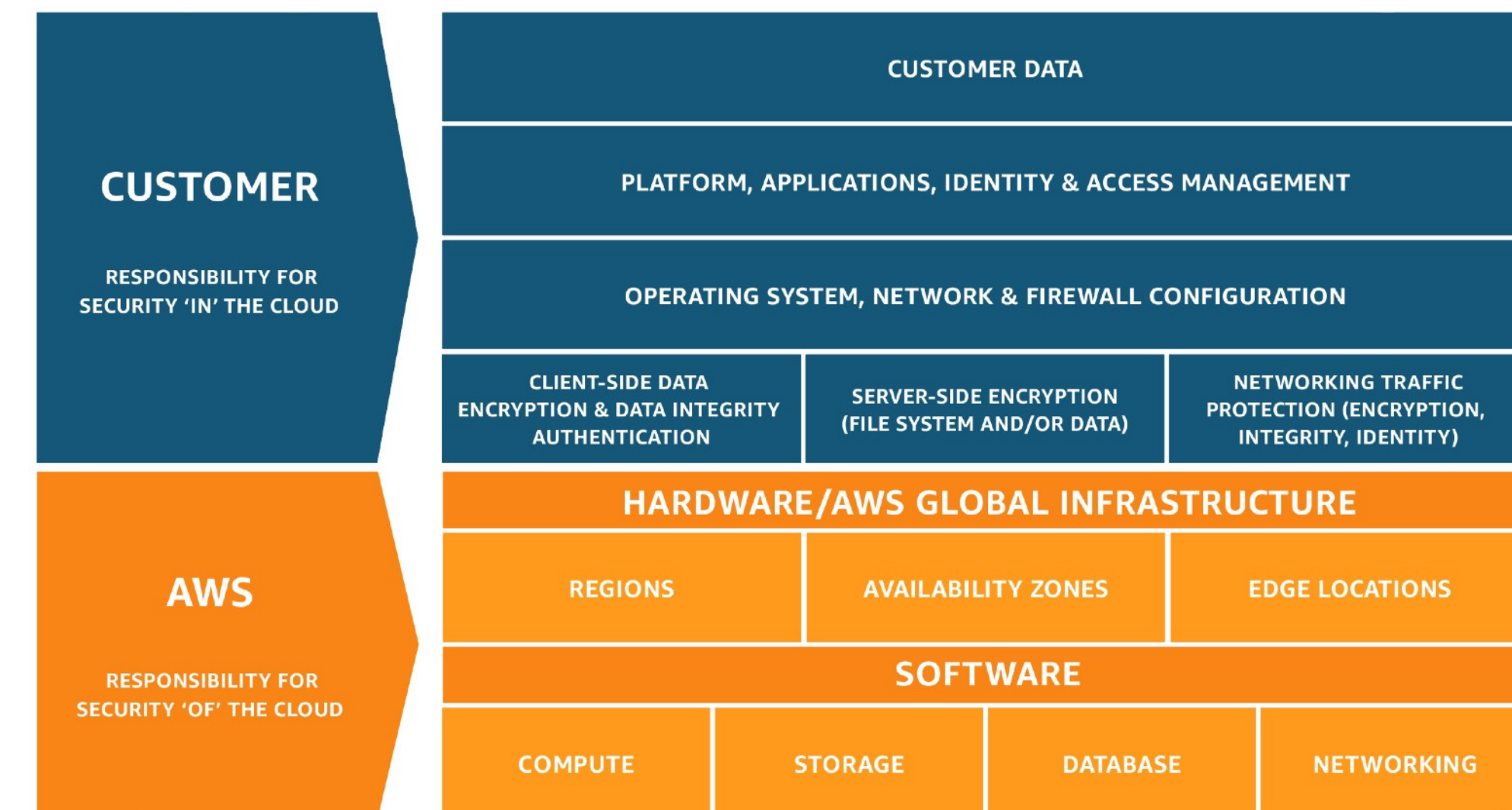
<https://dtt1.com/how-to-set-up-a-zero-trust-network/>

Cloud Security - latency,

- Delivery models
 - Infrastructure (IaaS), Platform (PaaS), Software (SaaS) as a Service

- Responsibility of Cloud provider, and of Customer

- Cyber vs Cloud Security
 - Threats, reasons, main defence



Energy transformation is Societal transformation

- Starting from Municipalities
 - Lokal energy demand
 - Operational flexibility/reserve
- towards a supportive transition
 - psychology, involvement, organisation



Klimanøytral kommune: Slik skal vi få det til

Vi står overfor en viktig omstilling: Innen 2027 skal Lillestrøm kommune oppnå klimanøytral drift. Dette betyr at vi skal kutte utslippene våre så mye som mulig og kompensere for dem vi ikke kan fjerne.

- “Integrated approach across disciplines”

Energy transformation

→ Future of work

- need more electricity (Elvia: need 51% more power **today**)
- innovation, new businesses, transformation

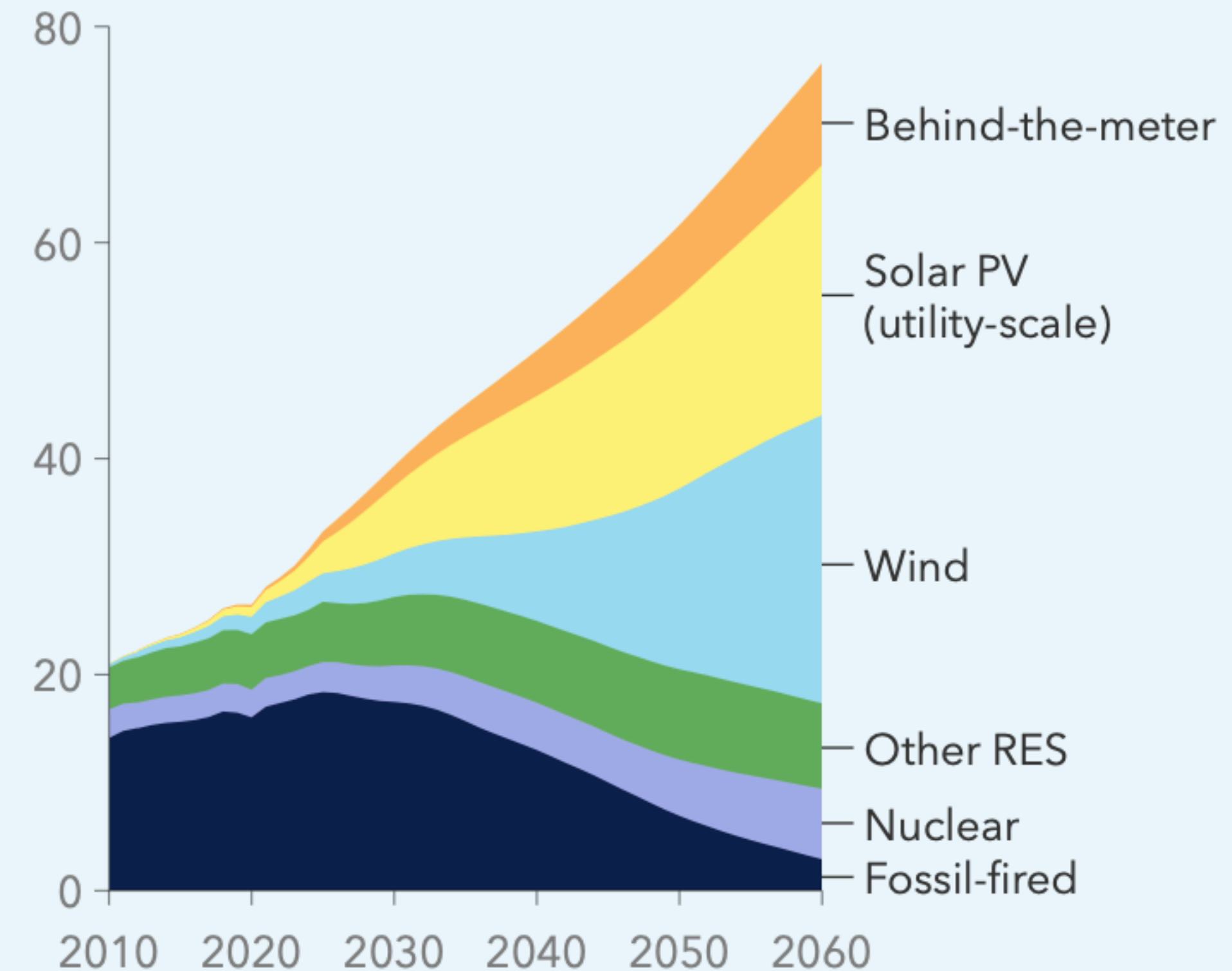
→ Growth potential

- comes from “behind the meter”, solar and wind
- price drop in Europe: 80-85 €/MWh (2024) down to 50 €/MWh (2050) due to renewables and **flexibility**. (Statnett, 2025)

→ Flexibility challenges for Statnett

- society that stops the transition (infrastructure)
- de-industrialisation of Norway (too little energy)
- political insecurity

World electricity generation (PWh/yr)



ENERGY
TRANSITION
OUTLOOK
2025



(Statnett 2025) Julie Larsen Gunnerød et al., Langsiktig Markedsanalyse 2024-2050, Statnett, 2025



Societal aspects of energy transition

- ➔ Shift people's self-conception from passive consumer to active participants (Dütschke, et al. 2021, Frontiers in Psychology)
- ➔ "domestic pathways" from small-scale renewable (Juntunen 2014)
 - attitude, economic incentives, age
- ➔ Escalator effect - lowers threshold for further engagement
- ➔ real decision-making power of renters and apartment dwellers (Lennon et al. 2019)
- ➔ intakt "engagement chain" (Lowitzsch et al. 2016)



Government drives to make 'plug-in' solar available in shops as part of clean power mission

- 'Plug-in' solar panels to be in shops within months, offering households chance to significantly cut energy bills

<https://www.gov.uk/government/news/government-to-make-plug-in-solar-available-within-months>

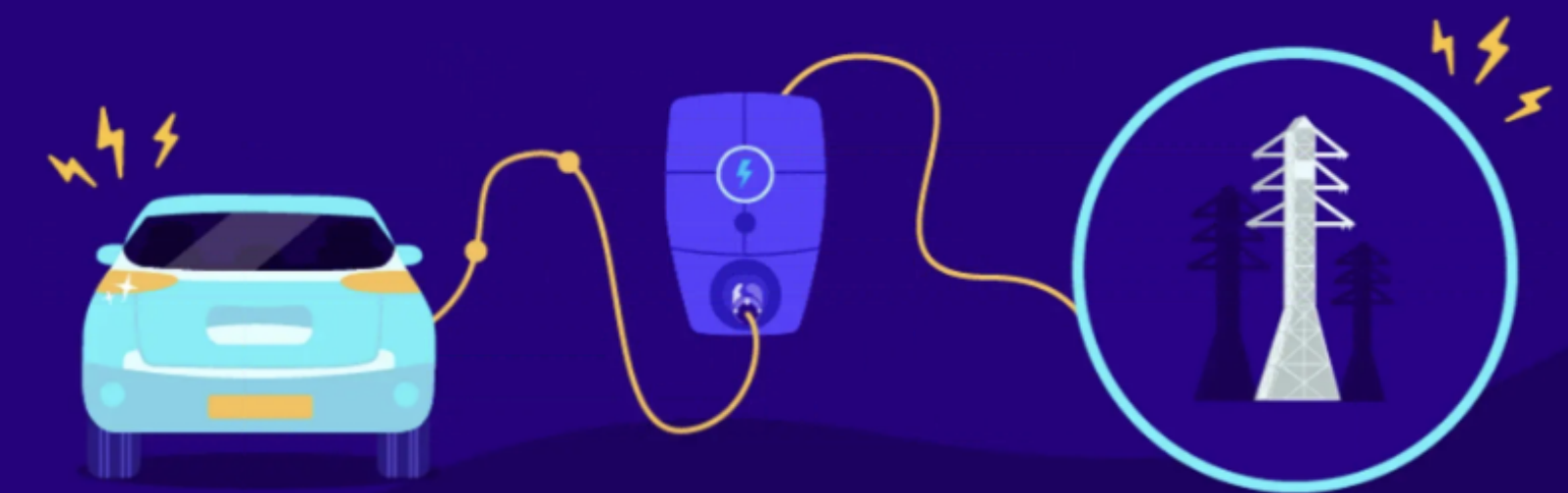
Energy transformation

eResilience, flexibility and regulations

- Hvaler: Preparedness including EV charging and Municipality infrastructure
- Lillestrøm: Top-system for 240 buildings, 19 swimming pools++
- Grenland: industrial transition, massive energy need
- Kristiansund: “energy emergency on the island”
- real-world island operations (shortcoming or outage)

Power Pack Bundle

Free home charging for your entire lease with Octopus Energy. (Mileage limits apply.)



And put energy back into the grid

<https://octopusev.com/power-pack-bundle>

UK – Octopus, Zaptec Pro, BYD – free home charging
plug in your EV for around 12 hours a day, 20 days a month