

Wind Energy Denmark 2019

Industry University Partnership

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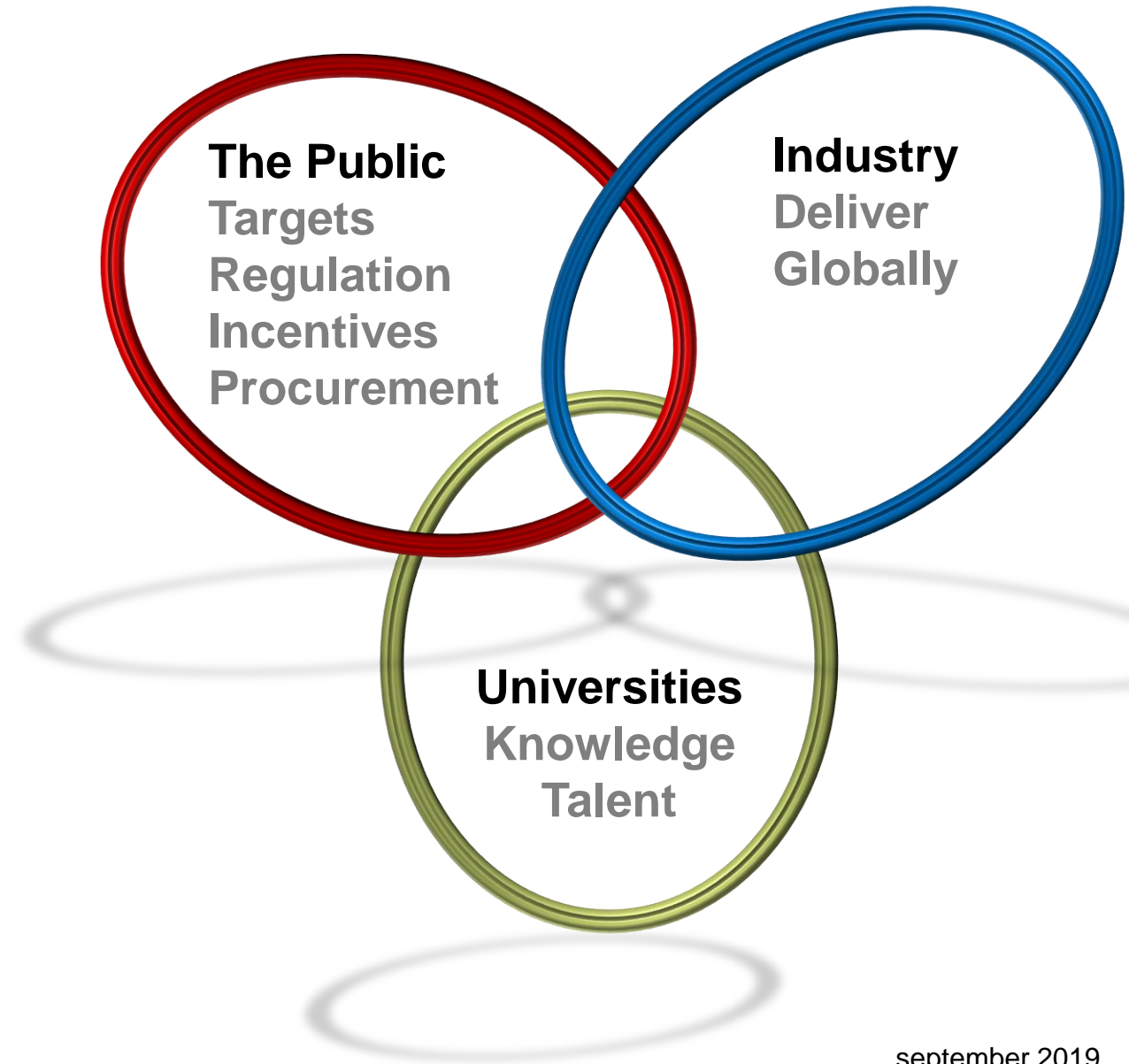
Partnerships

70% by 2030

- Targets create innovation pressure
- Opportunity to innovate and demonstrate

Fossils plentiful and cheap

- Unconventional F-resources
- Regulation and incentives
- Public procurement
- Innovate and demonstrate in DK
- But ambition is global



Partnerships, U&I

Industry need or challenge

- I reach out to U seeking help to solve

System, foresight, road-mapping

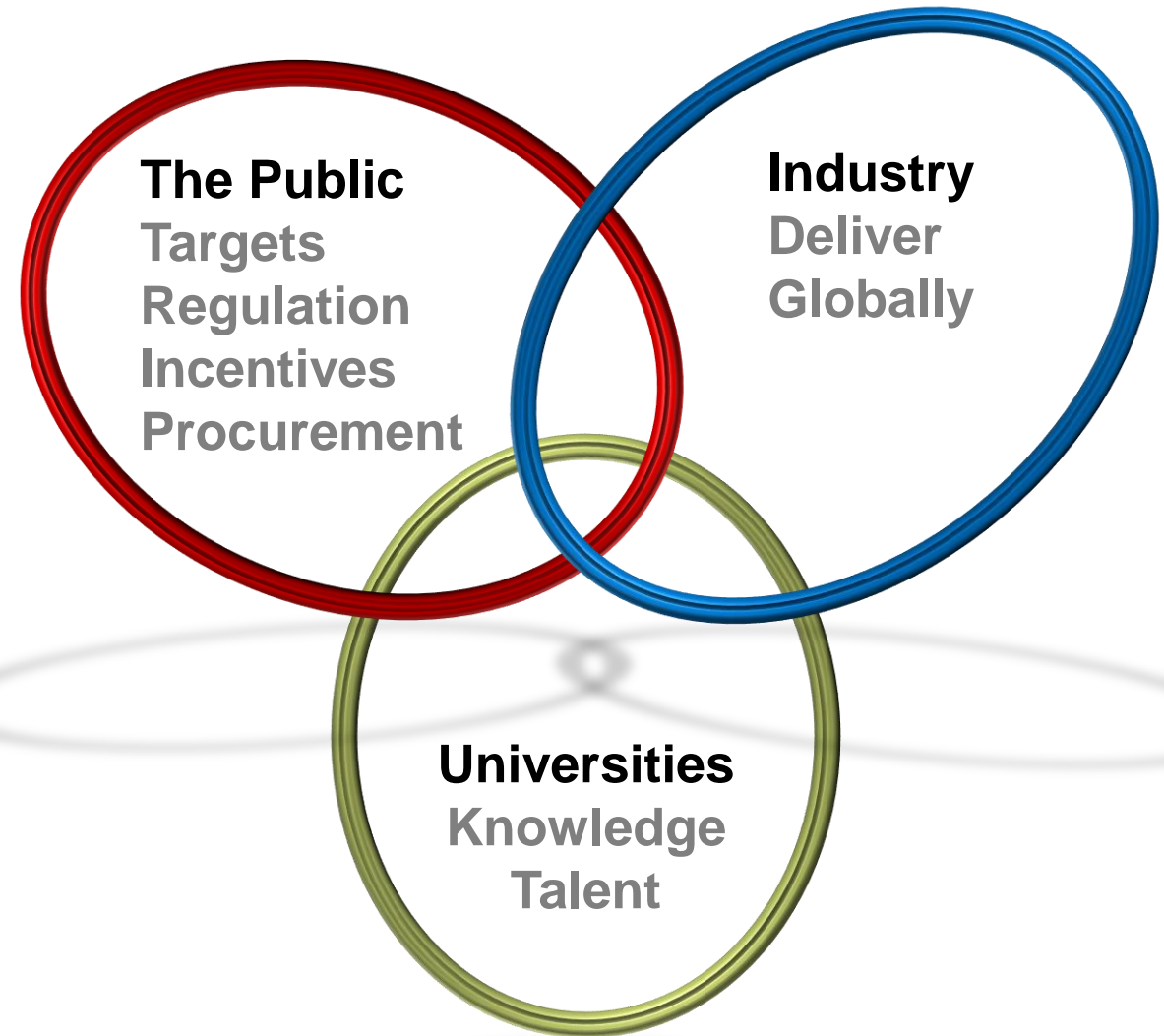
- Optimisation and gap-analysis

Pushing the new

- U reach out to I seeking help to mature and scale

Competent graduates

- Dialogue



Partnerships, U&I

Industry need or challenge

U excited by hard relevant challenge

- Open innovation with broad participation
 - Shared challenges, e.g. leading-edge erosion
- Closed innovation with sharing in confidence
 - Specific mission critical problem

Bringing in relevant competences

- Know what is relevant and where to find it
- Not always with those already in wind
- Partner incumbents and visitors
- AI honed in medical applied to predictive maintenance
- Quantum mathematicians in Wind OEM
- AI for robotic control now in nuclear fusion control



Partnerships, U&I

System analysis, foresight, road-mapping

Across sectors, global and long term

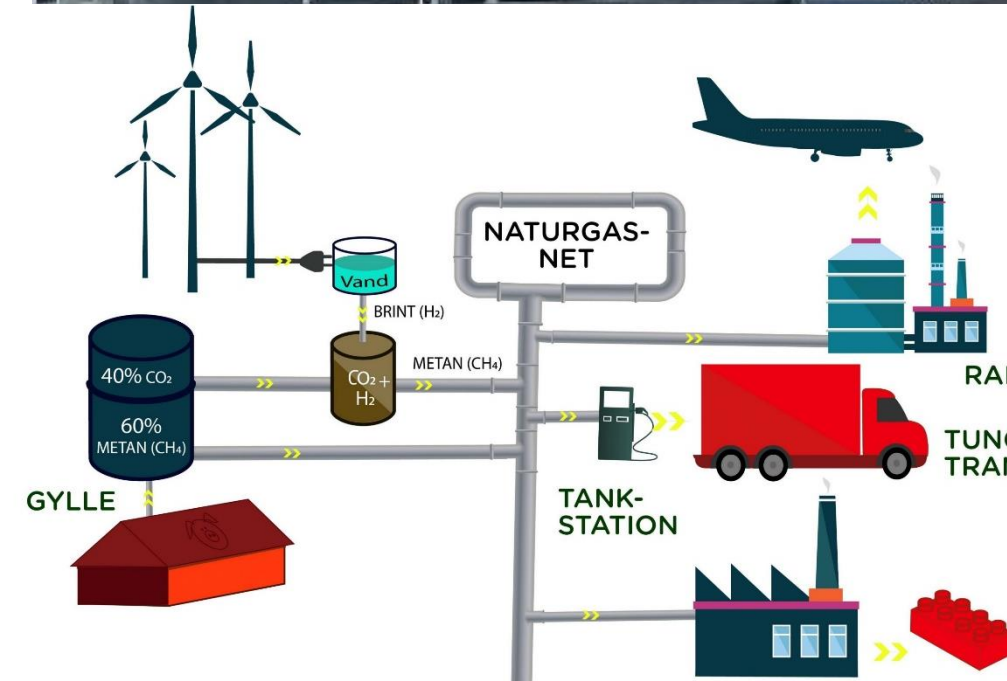
- System optimisation, sector coupling
- E-mobility, balancing and chemicals need electro-bio fuels
- Electrolysis is cost driver
- Energy islands vs. service trading

Life Cycle Analysis

- Resources and recycling when scaling
- Biomass, blades, batteries, magnets, catalysts, ...

(Non-) Disruptive technologies

- CEO of wind OEM: “Why did U not warn about fracking?”
- Will batteries become as good as we hope and bank on?



Partnerships, U&I

Pushing and facilitating the new

Domain knowledge and agile thinking

- Need the incumbent industries
- Open to the imperfect new
 - Let's avoid: "Not invented here, so not interesting and not relevant"

Shared risk taking

- Mindful of demand for early business plan
- Expect to tumble before flying

Automation an opportunity

- Production, Construction, Inspections, Repairs
- Less Dirty, Dull and Dangerous
- Cost reductions



Partnerships, U&I

Pushing and facilitating the new

Automation an opportunity

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DK no little player in robotics

- Growth around 50 % per year
- 130 companies, 4000 staff just in Odense
- Outpaced Munich in start-ups
- SDU won World Robotics Challenge in industrial robotics in Tokyo October 2018



Partnerships, U&I

Sufficient competent graduates

Dialogue on need and opportunities

- Curricula evolve
- Industrial student projects
- Shared facilities and challenges
- Consider broad range of graduates

More women

- Girl STEM-camps, role models
- Purpose is key
- Who puts women off STEM?
- Sharpen up boys



Thanks!
See you

SDU 