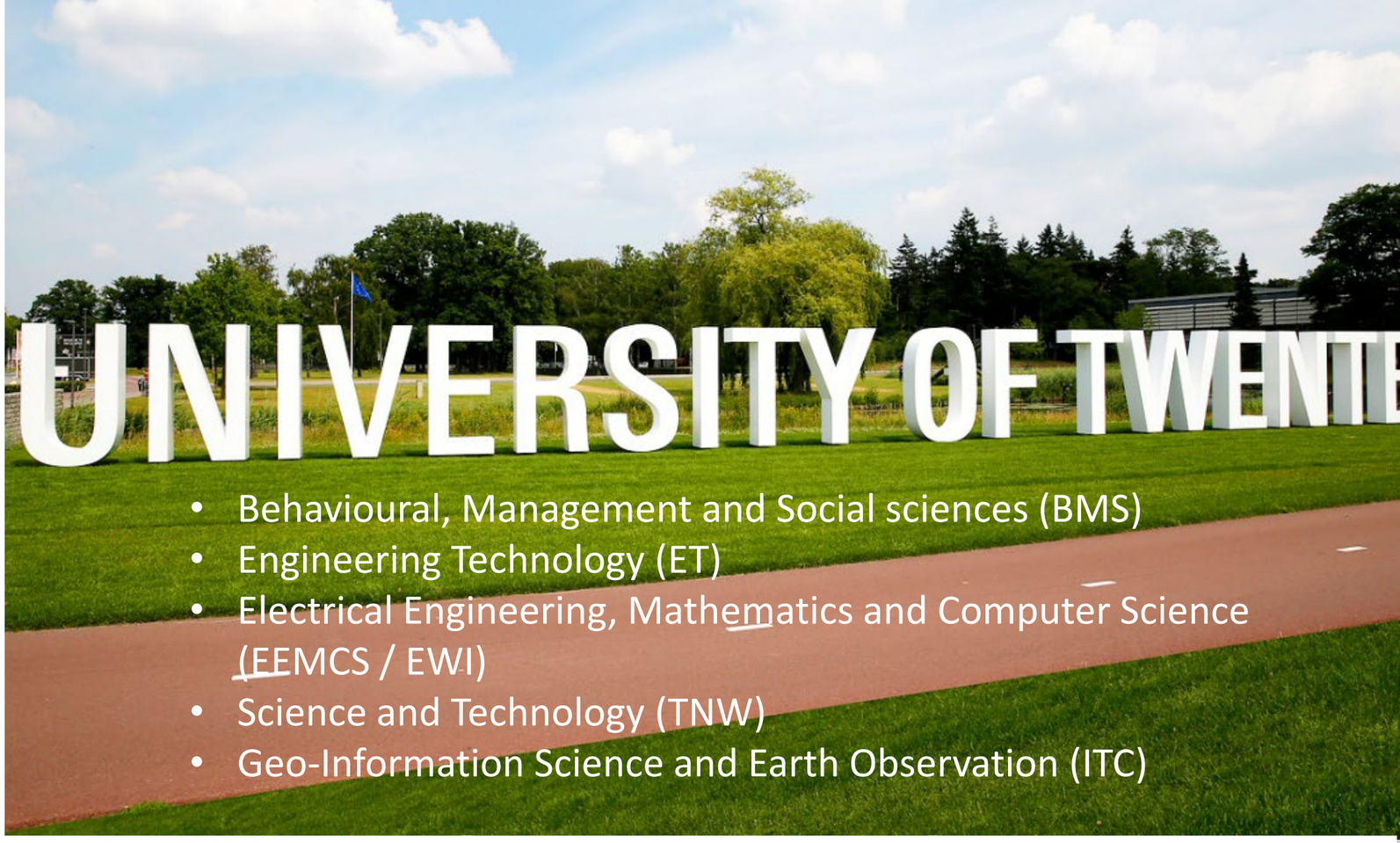
Opportunities and challenges:
Balancing democracy and efficiency in energy transition

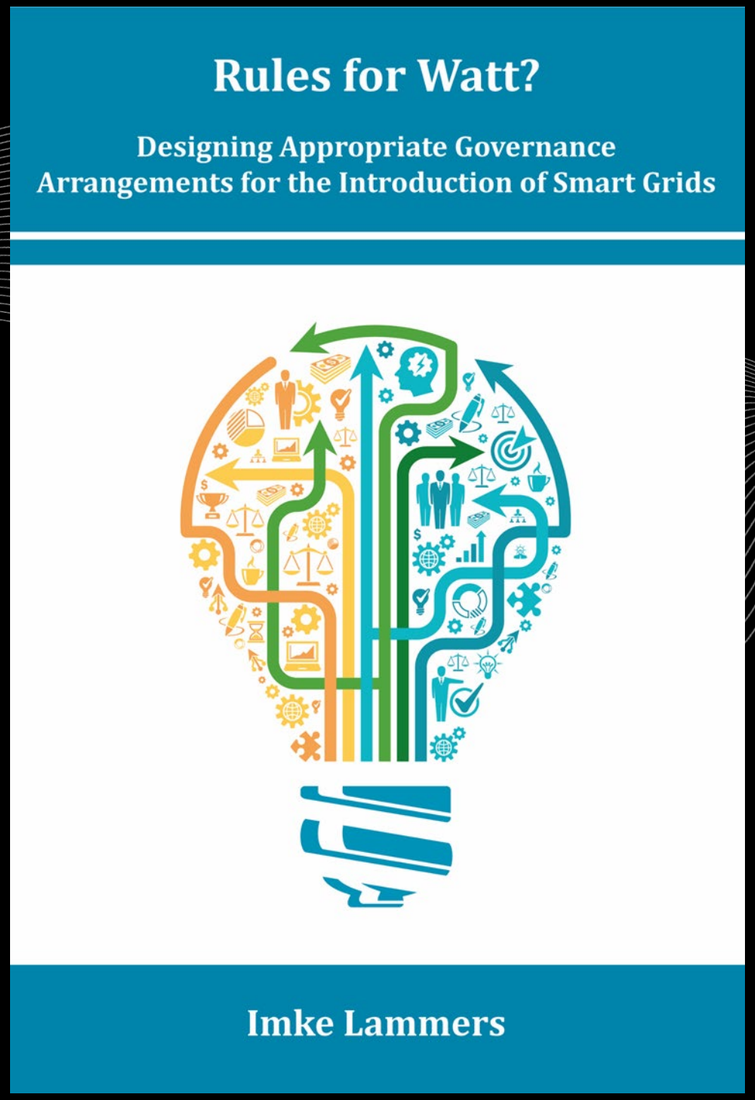
Maarten Arentsen
REFORM Salzburg 2019

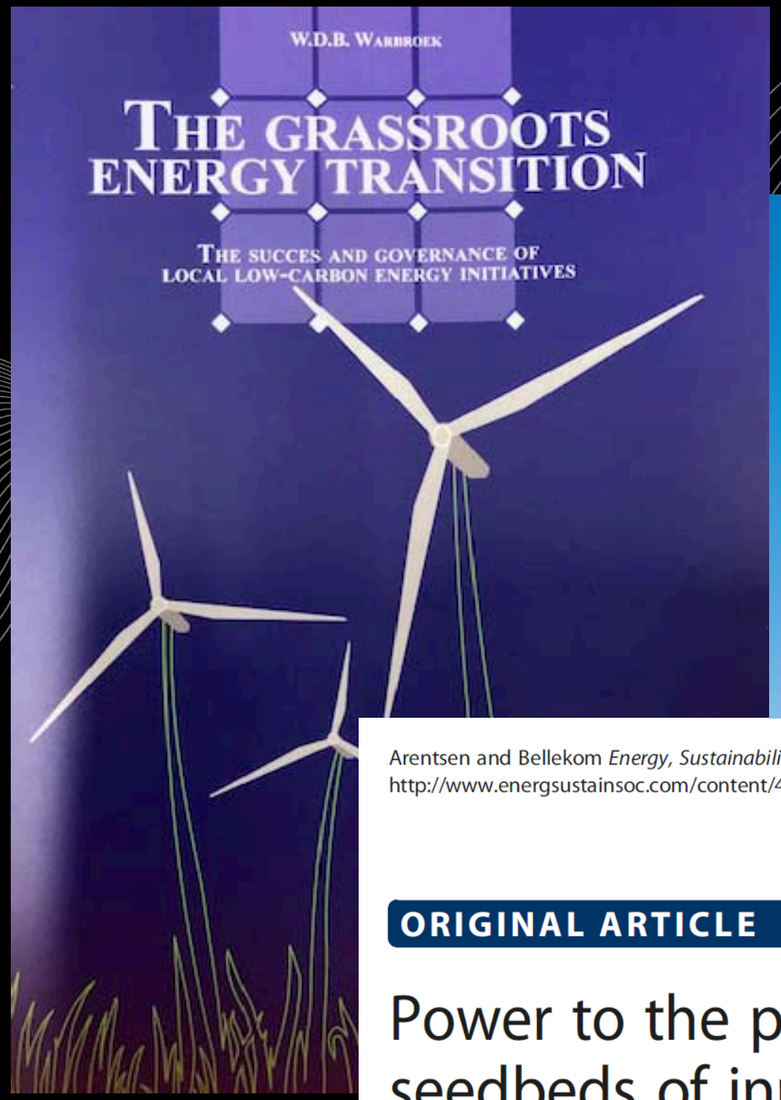
UNIVERSITY OF TWENTE.



- Behavioural, Management and Social sciences (BMS)
- Engineering Technology (ET)
- Electrical Engineering, Mathematics and Computer Science (EEMCS / EWI)
- Science and Technology (TNW)
- Geo-Information Science and Earth Observation (ITC)

ENERGY TRANSITION AND DEMOCRACY





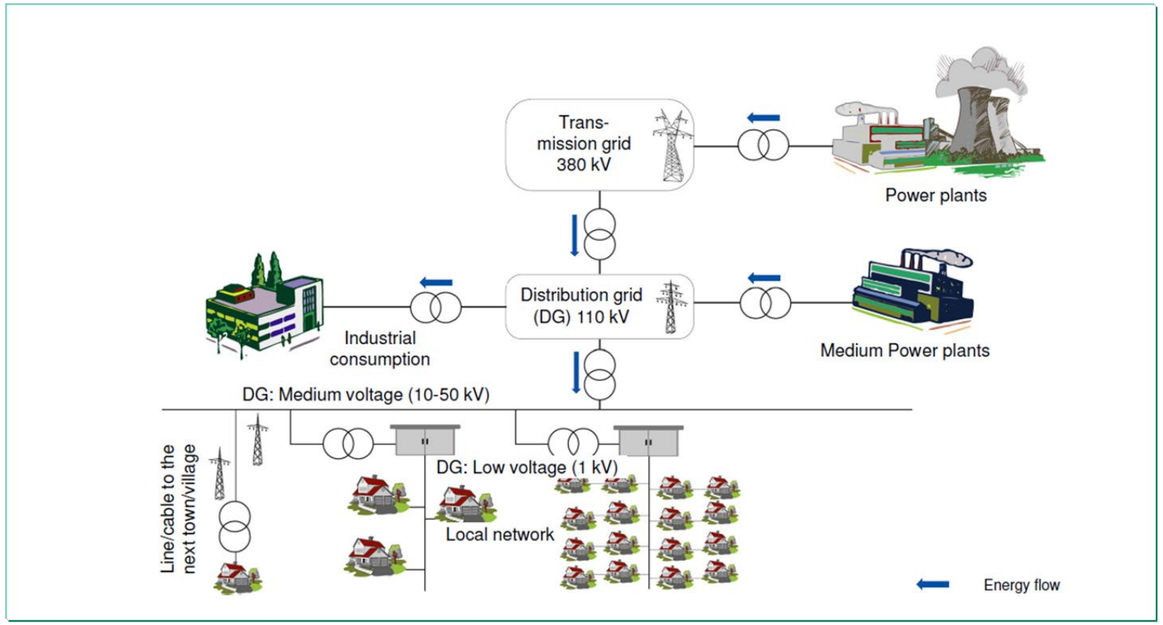
Arentsen and Bellekom *Energy, Sustainability and Society* 2014, **4**:2
http://www.energsustainsoc.com/content/4/1/2

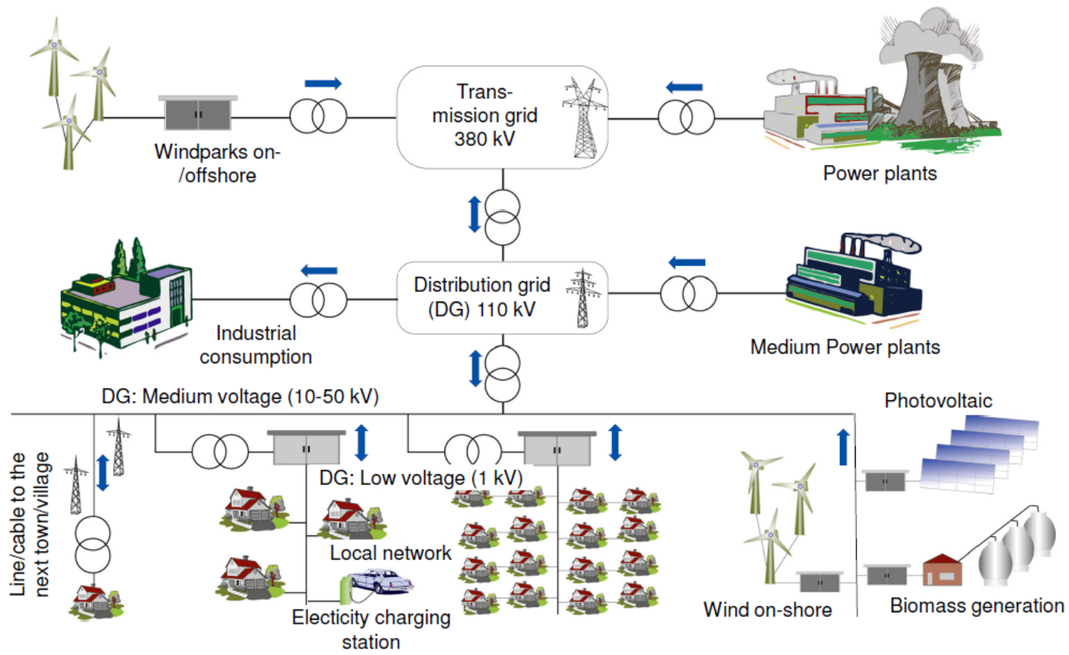
Energy, Sustainability and Society
a SpringerOpen Journal

ORIGINAL ARTICLE **Open Access**

Power to the people: local energy initiatives as seedbeds of innovation?

Maarten Arentsen* and Sandra Bellekom

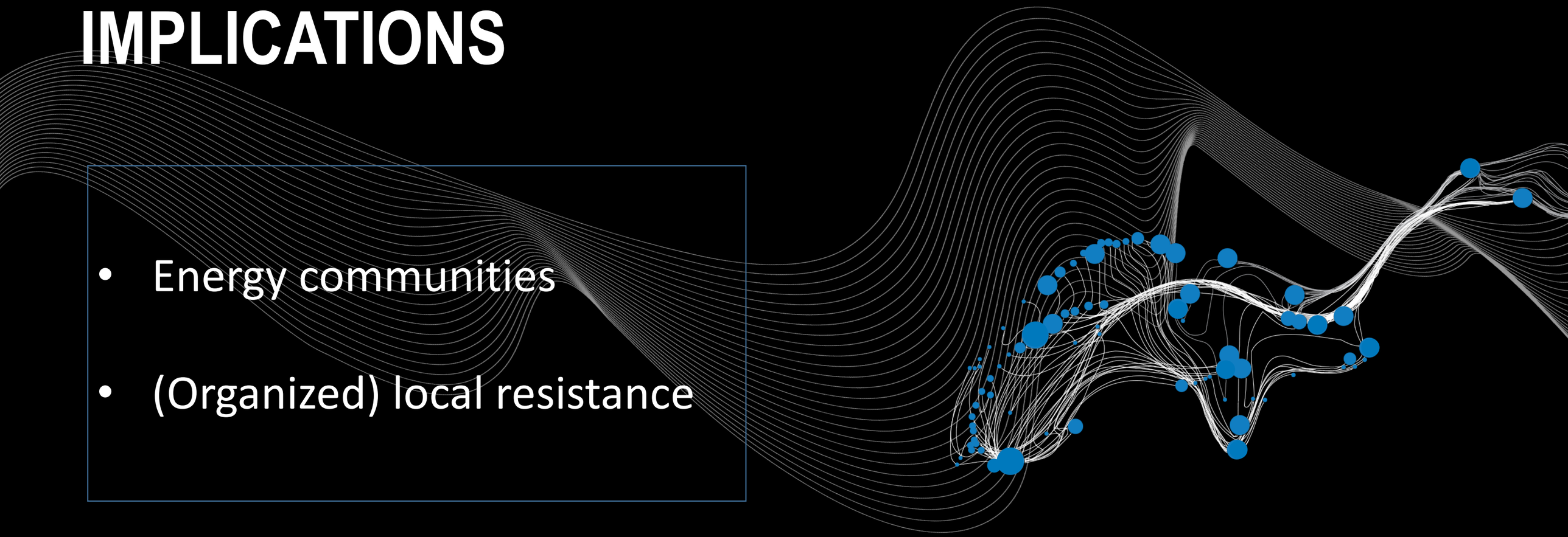




Transition in the electricity system

TWO LOCAL IMPLICATIONS

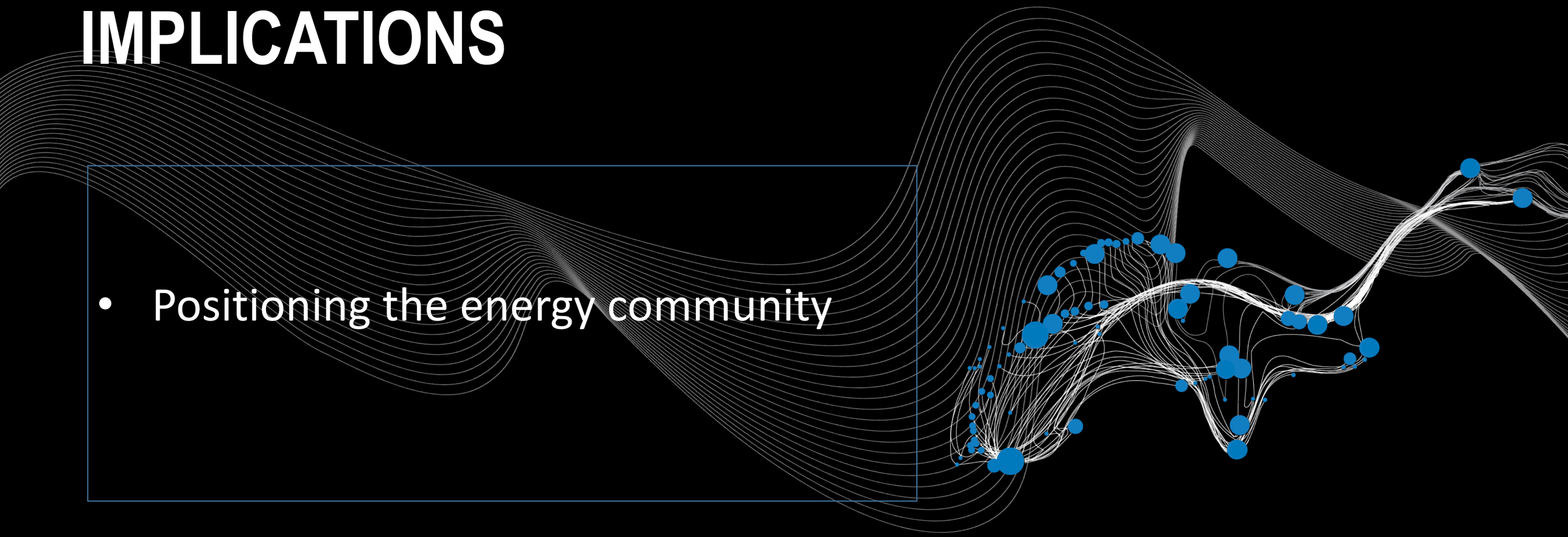
- Energy communities
- (Organized) local resistance



UNIVERSITY OF TWENTE.

TWO IMPLICATIONS

- Positioning the energy community



UNIVERSITY OF TWENTE.

- Revival of grass-root movement
  - Combination of moralism, autonomy and self-organisation
    - Past: anarchism, leftism, ecologists, anti-nuclear
    - Present: Small scale energy systems
      - Autonomysation of problem perception and solution
      - Morally guided design of own environment

- Neglectance incumbent technology and institutions:

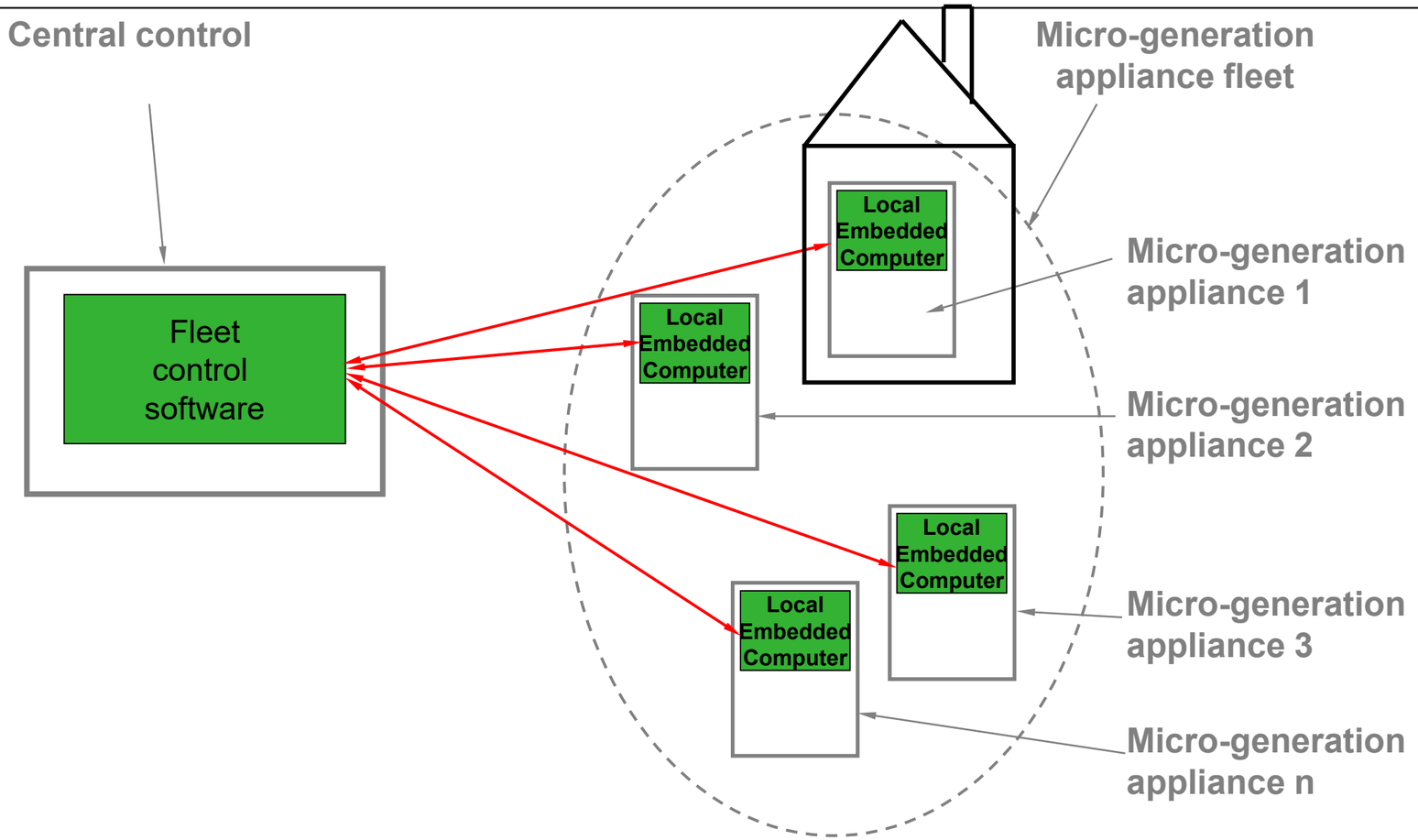
  - **Localised technology**
  - **Self organisation**

UNIVERSITY OF TWENTE.

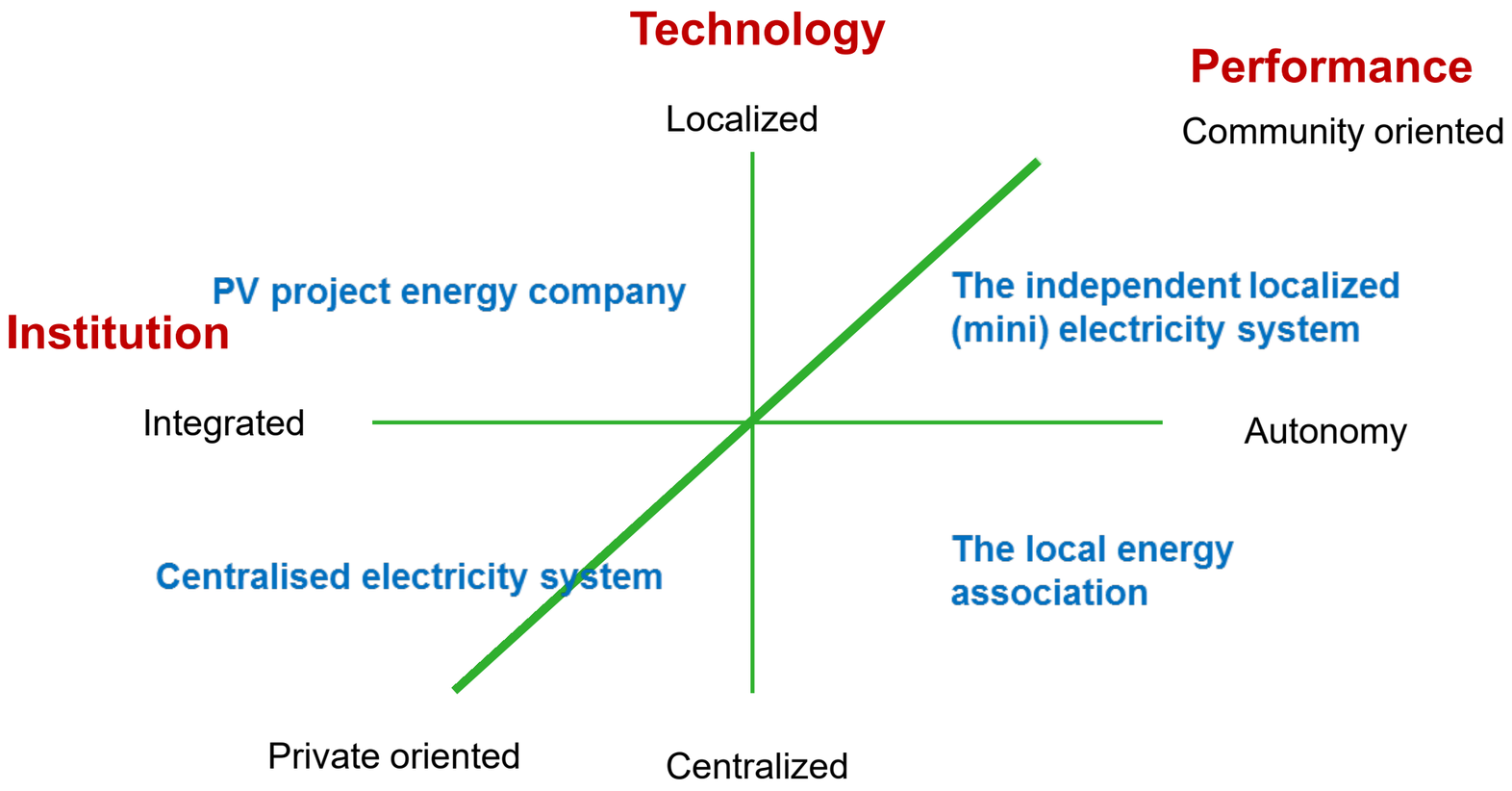
LOCALIZED TECHNOLOGY

UNIVERSITY
OF TWENTE.

Community technology

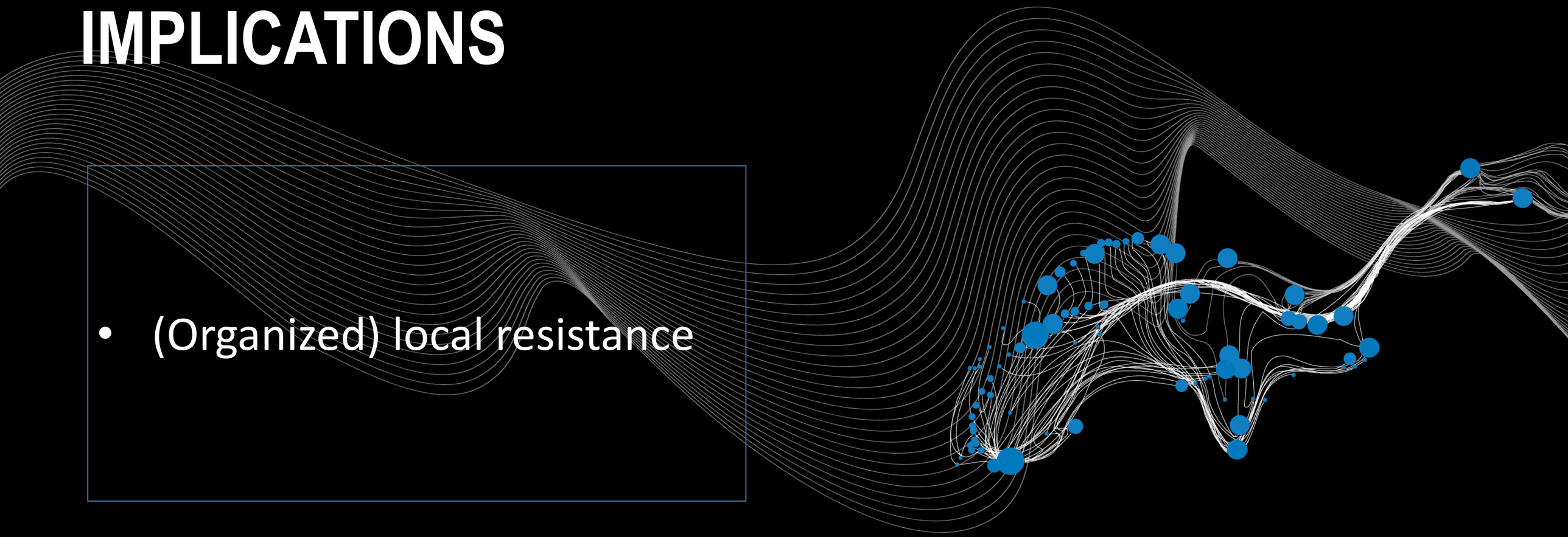


Positioning the Energy Community in the Electricity System



TWO IMPLICATIONS

- (Organized) local resistance



UNIVERSITY OF TWENTE.

New sustainable project development by company (consortia)

Societal acceptance

Legal state

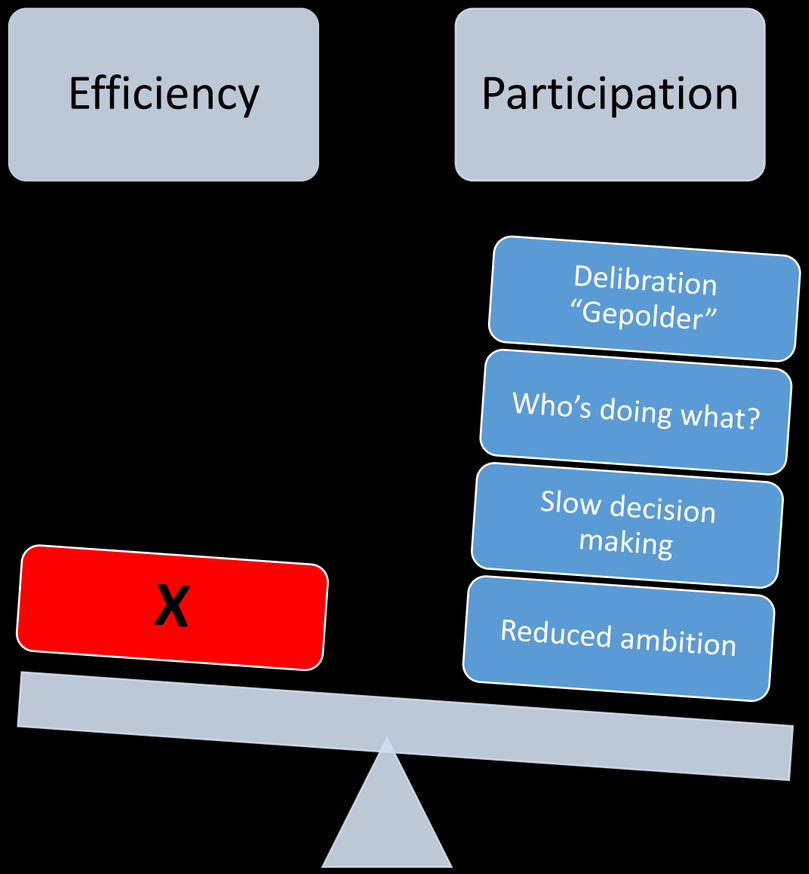
Democracy

Societal costs

Too long procedures

Time

Implication



UNIVERSITY OF TWENTE.

Approach 1:
learning from engineer to structure decision making process

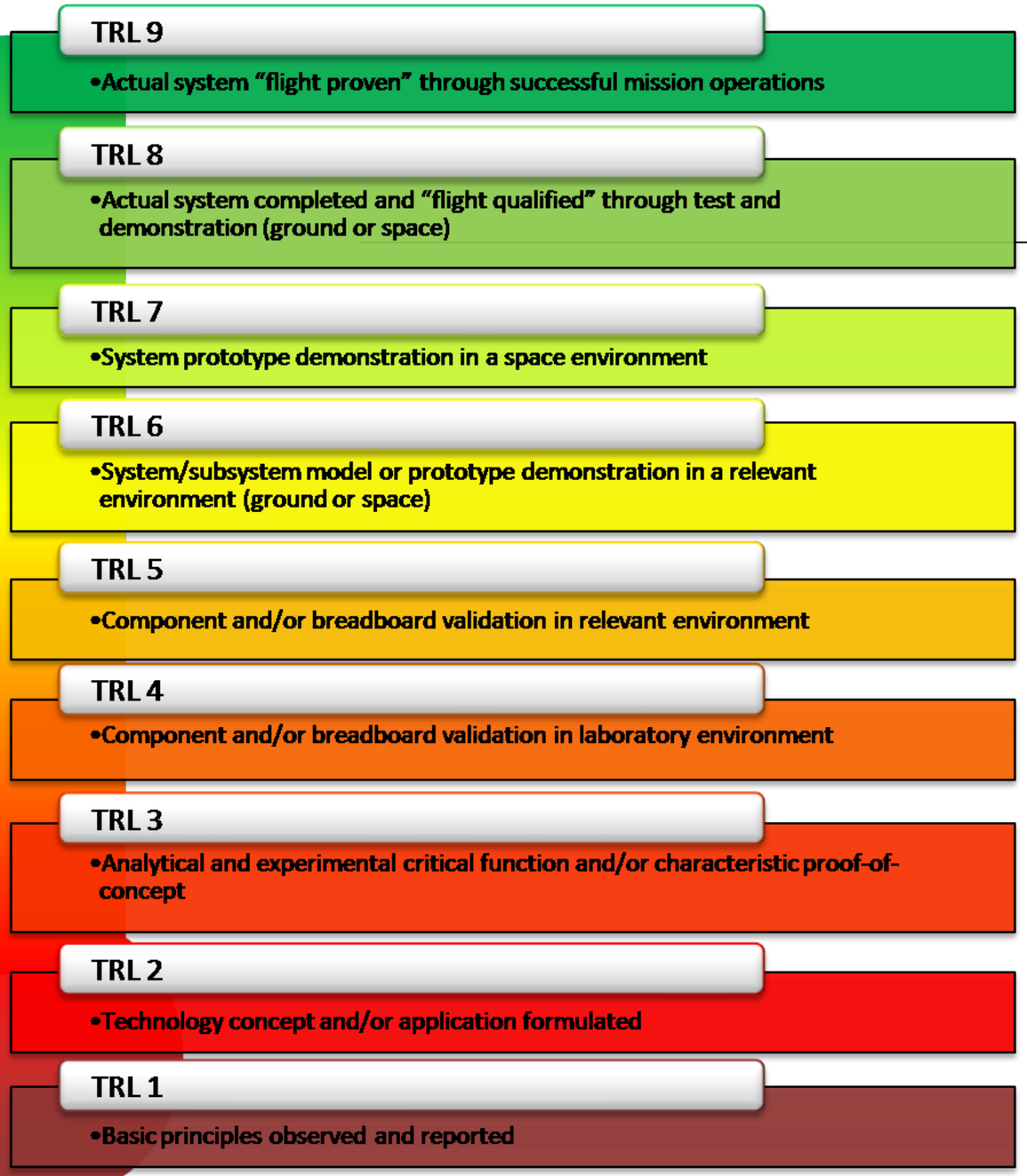
Engineering design thinking

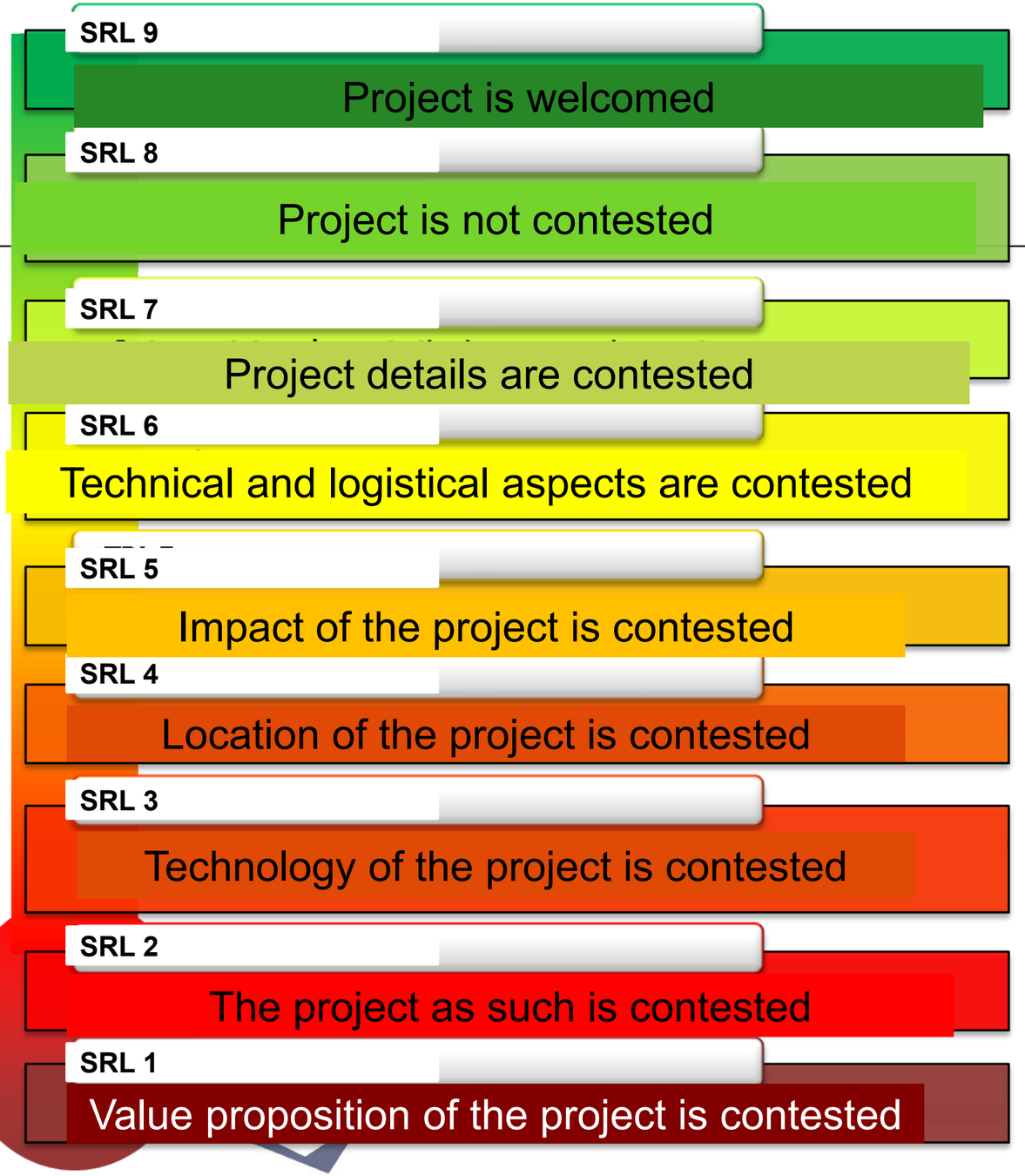
	Design	Implementation
1	Task definition	
2	Task clarification	
3	Requirements	
4	Conceptual Design	
5	Detailed design	
6		Implementation

UNIVERSITY OF TWENTE.

Functional design and democracy

	Activity	Design performer	Participants	Outcome
1	**Task definition**	Problem owner		Problem definition
2	**Task clarification**	Problem owner/ expert		Task definition
	Moment 1			Joint task definition
3	**Requirements**	Problem owner/ expert		Design conditions
4	**Concept**	Expert		Technical options for smart energy system
	Moment 2			Selection of preferred smart energy system design
5	**Detailed design**	Expert		Detailed smart energy system design
	Moment 3			Joint detailed smart energy system design
6	**Implementation**	Project manager		Realised infrastructure
	Moment 4			Operational infrastructure


TRL 9
•Actual system "flight proven" through successful mission operations
TRL 8
•Actual system completed and "flight qualified" through test and demonstration (ground or space)
TRL 7
•System prototype demonstration in a space environment
TRL 6
•System/subsystem model or prototype demonstration in a relevant environment (ground or space)
TRL 5
•Component and/or breadboard validation in relevant environment
TRL 4
•Component and/or breadboard validation in laboratory environment
TRL 3
•Analytical and experimental critical function and/or characteristic proof-of-concept
TRL 2
•Technology concept and/or application formulated
TRL 1
•Basic principles observed and reported


SRL 9
Project is welcomed
SRL 8
Project is not contested
SRL 7
Project details are contested
SRL 6
Technical and logistical aspects are contested
SRL 5
Impact of the project is contested
SRL 4
Location of the project is contested
SRL 3
Technology of the project is contested
SRL 2
The project as such is contested
SRL 1
Value proposition of the project is contested

Types of resistance

- Value based
- Emotion based
- Interest based
- Cognitive based

Project developer’s strategy

- Depends on
  - Type of resistance
  - Willingness contester to collaborate in finding solution

- Value based resistance is unsolvable
- Emotion based: tailor made approach possible

- Cognitive based resistance offers opening to find jointed solution

Options

- 1 Communicate what you do and why
- 2 Negotiate options and solutions
- 3 Make “opponent” partner in business
  - New society oriented business models

Cognitive collaboration

1. Process Architecture

   Agree on how to collaborate

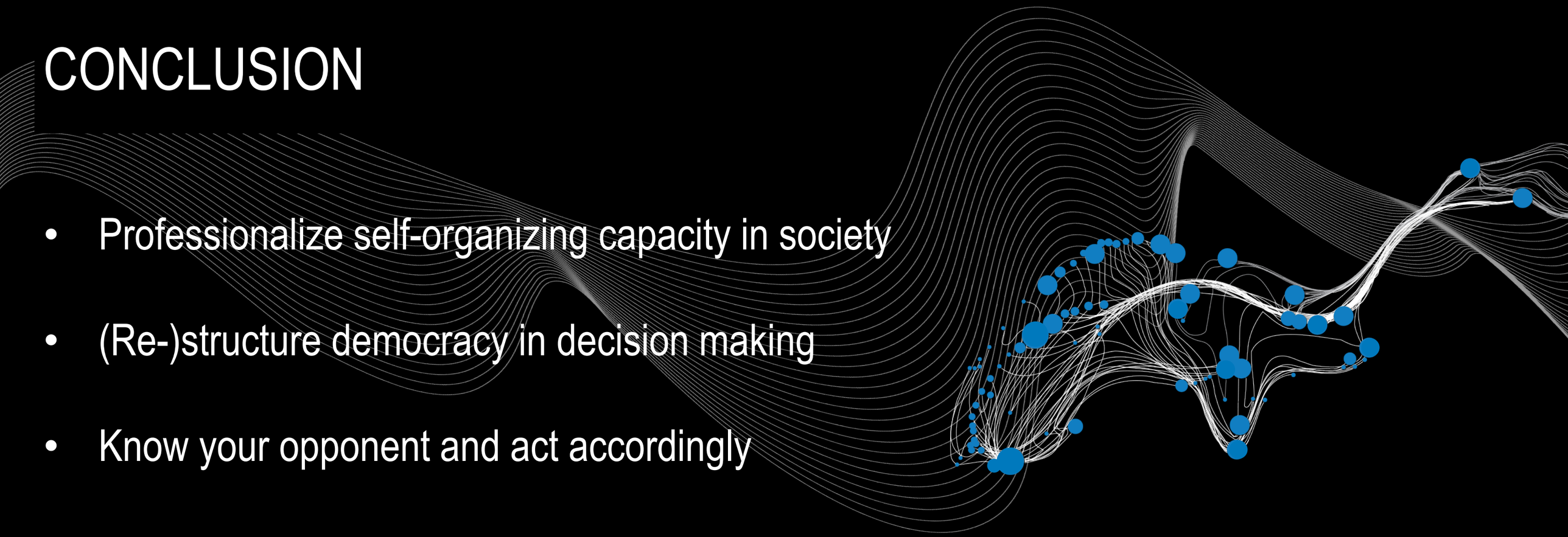
2. Contract Architecture

   Agree on the focus of collaboration: what do we want to achieve

3. Project design

CONCLUSION

- Professionalize self-organizing capacity in society
- (Re-)structure democracy in decision making
- Know your opponent and act accordingly



UNIVERSITY OF TWENTE.