

# Design for Public Values

{ Min I &W  
11-12-2018  
Jeroen van den Hoven

- ❧ Responsible Innovation
- ❧ Ethics by Design

# Contents

# RESPONSIBLE INOVATION

SMART FUSION OF MULTIPLE CONFLICTING VALUES

# Foldable container







Flood Defense (Storm surge barrier)  
Blue energy  
Ecosystem management



Safety  
Recreation  
Environment



# Afsluitdijk

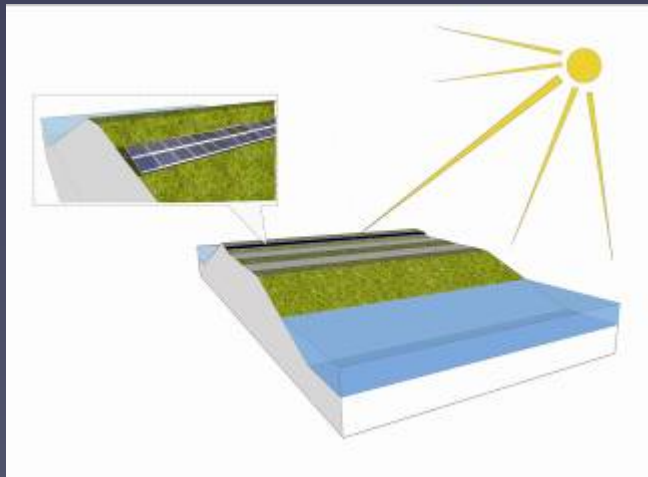
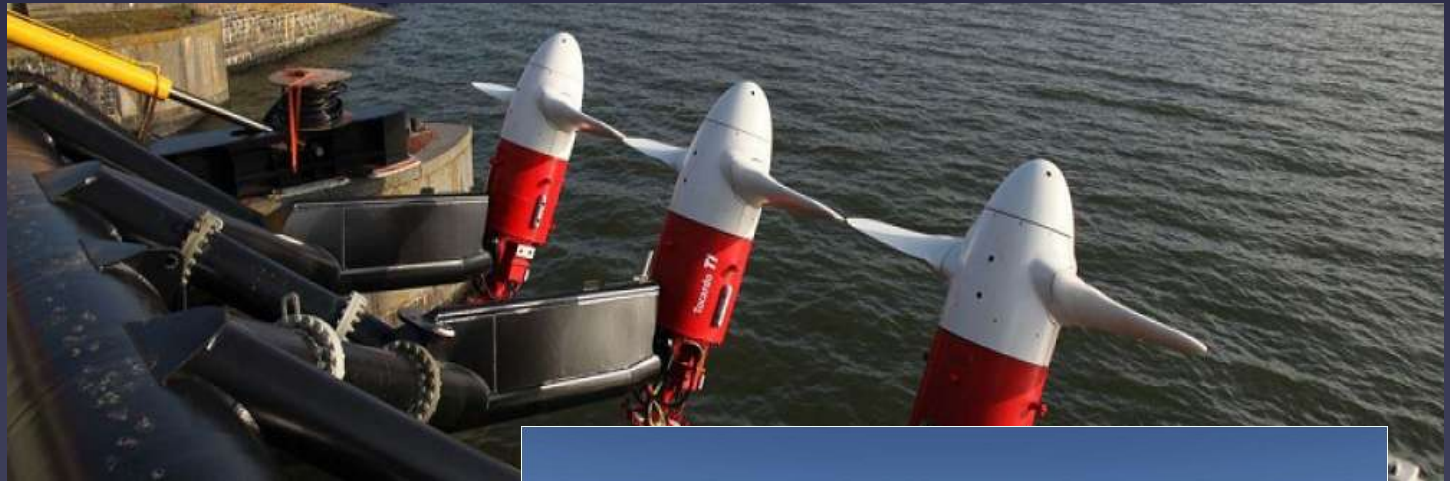


# Building with and for nature





# Renewable energy

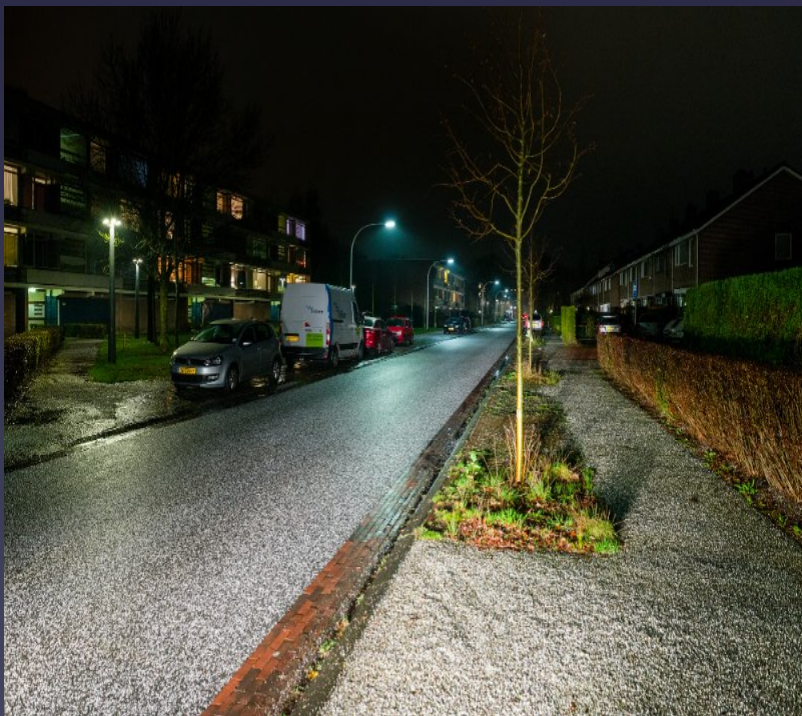


# Mobility, recreation, wild life





# Safer and silent roads



Safety, sustainability, silence

**DAGBLAD VAN HET NOORDEN** Proefabbonnemen

## Proef met stil en reflecterend asfalt bij Aduard

🕒 26 april • [Groningen](#)



[f](#) [t](#) [✉](#)

Op de provinciale weg N980 tussen Oldekerk en Sebaldeburen voert de

# Street lighting on demand



Safety, Security, & Sustainability

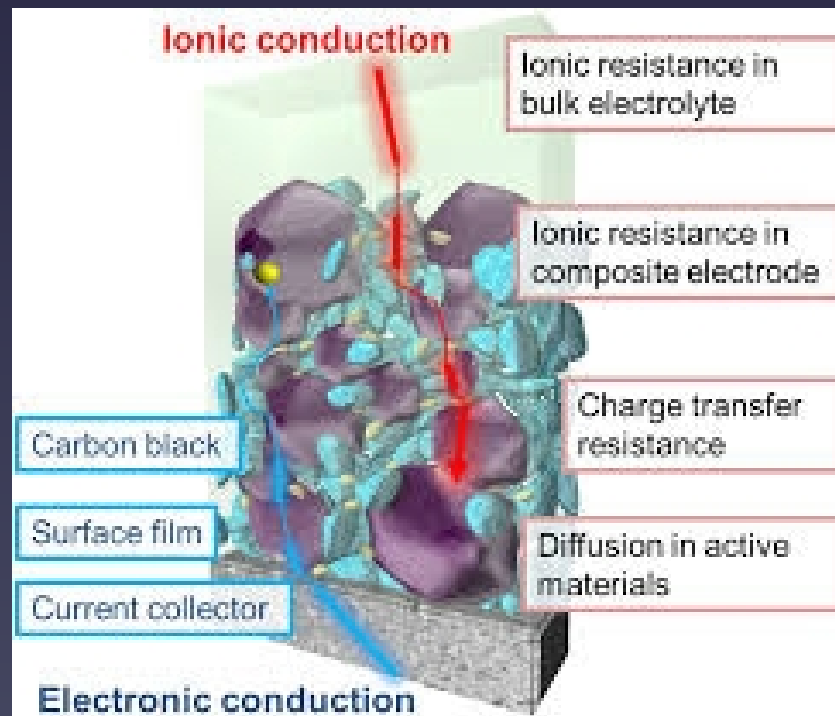


# Sand Motor



# Battery of the future

- Environmentally Benign
- Accommodate Element Abundance (Cobalt, Sodium, Lithium)
- Reduce geo-political dependence
- Reduce Cost
- Increase affordability
- Improve Access, Equity
- Increase energy density
- Increase Cycle Life
- Increase Circular Economy
- Increase safety

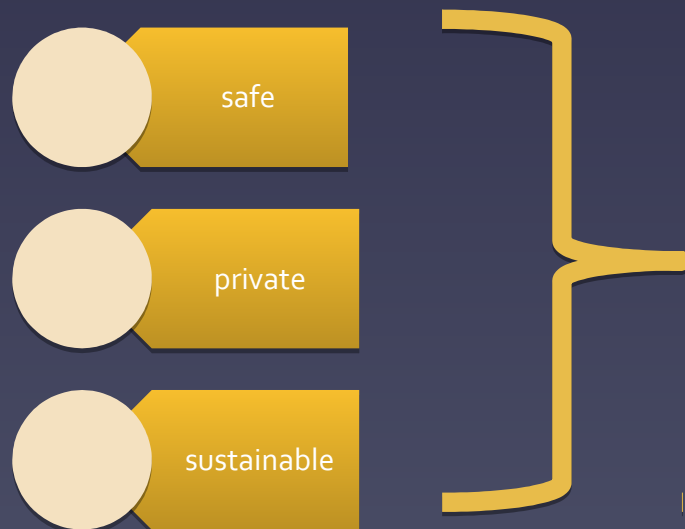


# Bronchoscope



Flexibility  
Reliability  
Accuracy  
Precision  
Speed  
Useability  
Minimally invasive  
Low cost  
Easy to sterilize

# Public Values





# Responsible Innovation

**“If you can change the world by innovation today so that you can satisfy more of your obligations tomorrow, you have a moral obligation to innovate today”**

# Dutch 17<sup>th</sup> century “flute ship”



# Value Requirements

- Minimize tax payment
- Increase cargo volume
- Increase speed
- Increase stability
- Shorten production time, time to market

# Values in Technologie

Ethics by Design



# L. Winner: Do artefacts have politics?



# Homeless people



# Hostile architecture



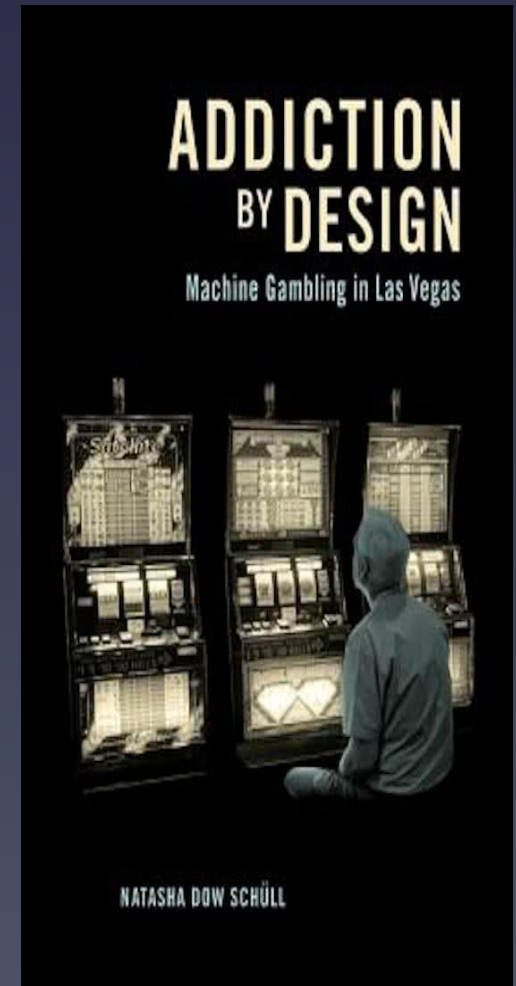








# Design for Addiction



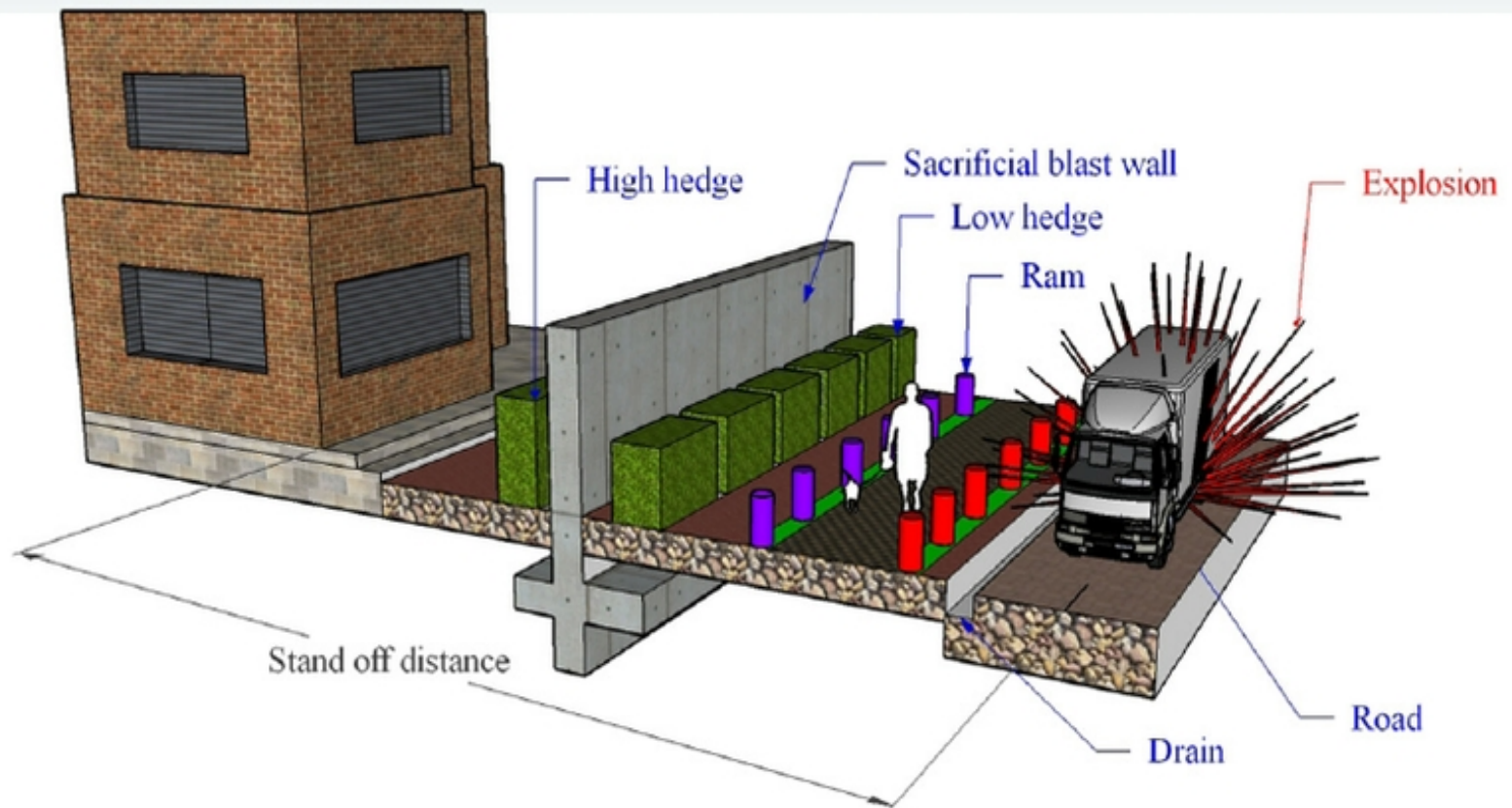


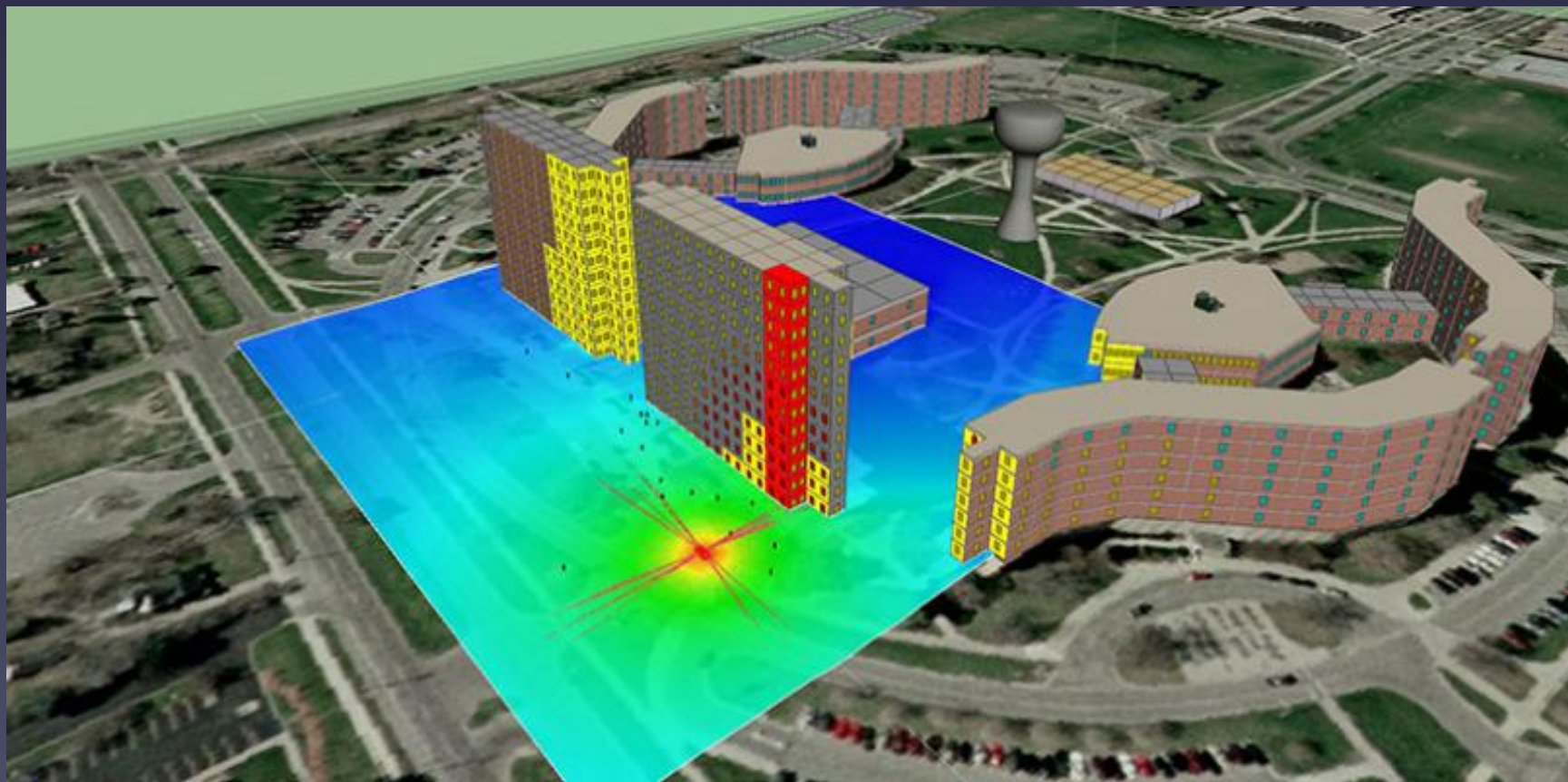
# Design against Obesity

## Urban Sprawl and obesogenic environments



# Counter Terrorism Urbanism







# Design against flooding: “room for the river”





# Nijmegen



# Design against crime



Large windows promote casual supervision of sidewalk.

Porches and sidewalk encourage interaction between neighbors.

Paving and architectural treatments define public and private zones.

Good pedestrian-scaled lighting on street.

Low landscaping and fences define property lines without creating hiding places.



# Light pollution

Taylor Stone



# Design for Darkness





# Smart cities: values



Equity  
Sustainability  
Safety  
Security  
Quality of Life  
Privacy  
Resilience  
Social Cohesion  
Solidarity

# Churchill

**“WE SHAPE OUR BUILDINGS; THEREAFTER THEY  
SHAPE US.”**

**WINSTON CHURCHILL**

© Lifehack Quotes





# Built environment Designed to support Human Flourishing

## ■ Rights and Needs



## ■ Happiness; wellbeing



## ■ Safe, secure and



## ■ Justice and ethics



# Sustainable Development Goals

## How Baltimore is using the Sustainable Development Goals to make a more just city

MARCH 21, 2017



# Values Built into (information) Systems

- Interfaces
- Infrastructures
- Algorithms
- Ontologies
- Code
- Protocols
- Integrity constraints
- Architectures
- Governance arrangements
- Identity Management Systems
- Authorization Matrix
- Procedures
- Regulations
- Incentive structures
- Auction mechanisms
- Voting mechanism
- Monitoring and inspection

# How to use this idea?

Ethics by Design

Responsibility  
Privacy  
Accountability  
Agency  
Autonomy  
Sustainability  
Safety  
Security

Values  
Norms  
Laws  
Ideals  
Ethics  
Principles

Express  
Implement

Artefacts  
Architectures  
Materials  
Standards  
Security  
Systems  
Infrastructure

Computers  
Oiltankers  
Airports  
Reactors  
Roads  
Internet  
Electricity  
Grids  
Hospitals

Justify  
Audit

Key Problem  
21st Century: Value Sensitive Design



# Design for X

- Design for privacy
- Design for security
- Design for inclusion
- Design for sustainability
- Design for democracy
- Design for safety
- Design for transparency
- Design for accountability
- Design for responsibility

Jeroen van den Hoven  
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Ibo van de Poel  
*Editors*

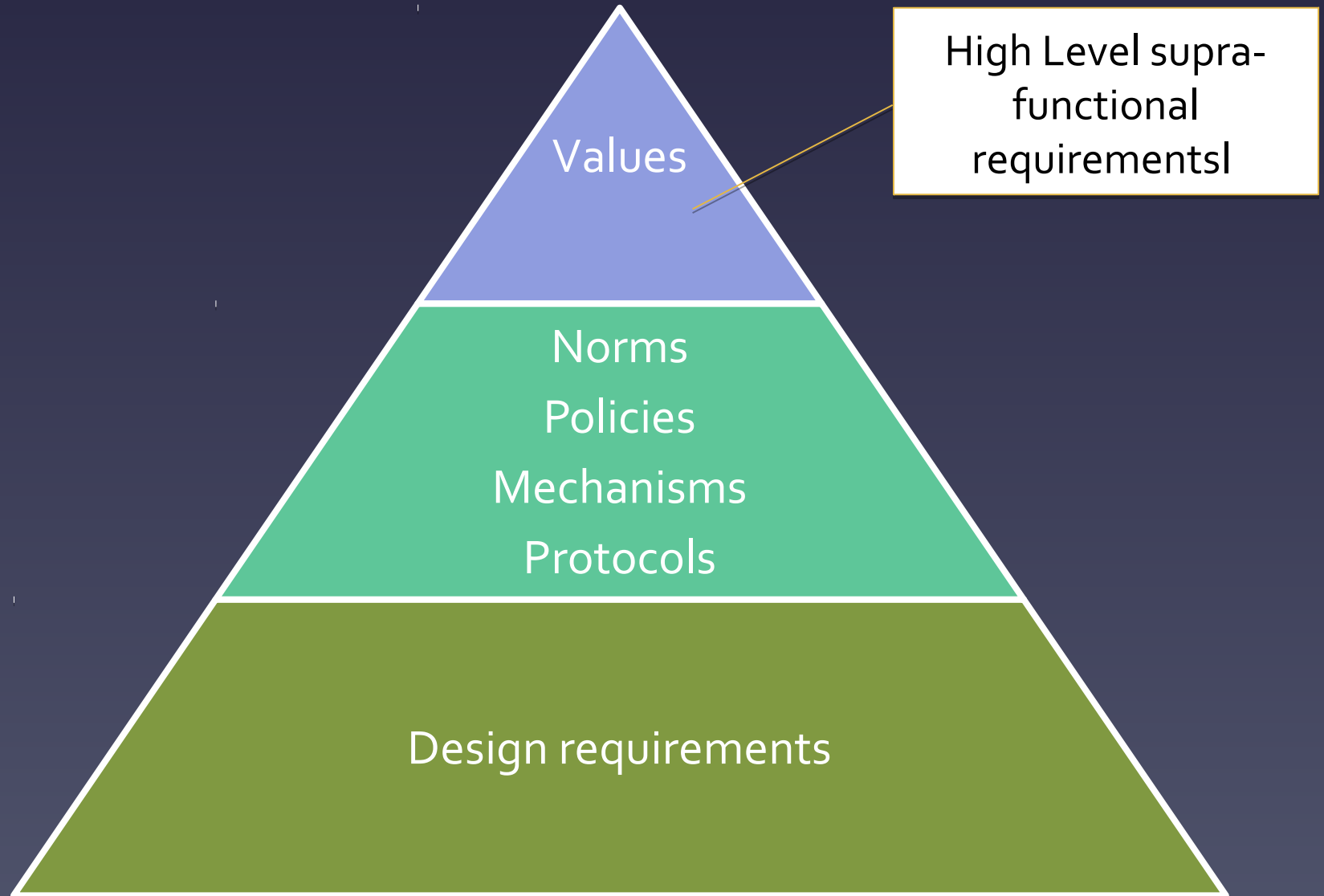
## Handbook of Ethics, Values, and Technological Design

Sources, Theory, Values and  
Application Domains

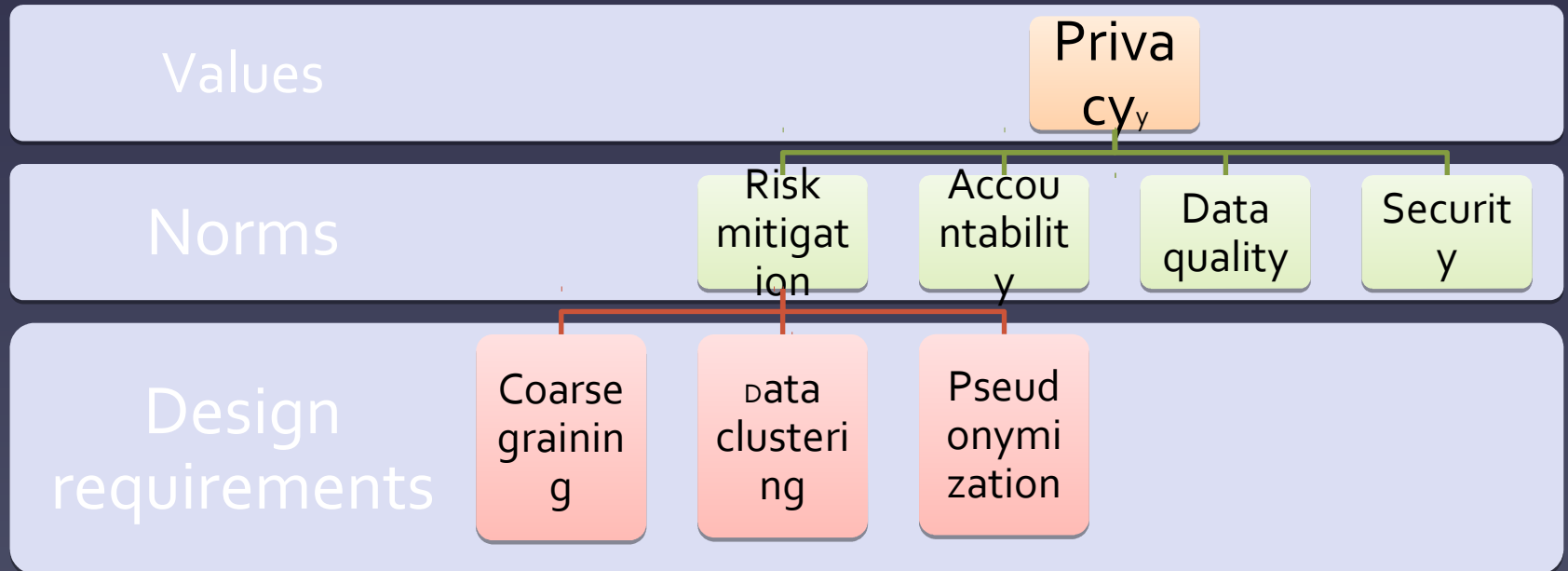


SpringerReference

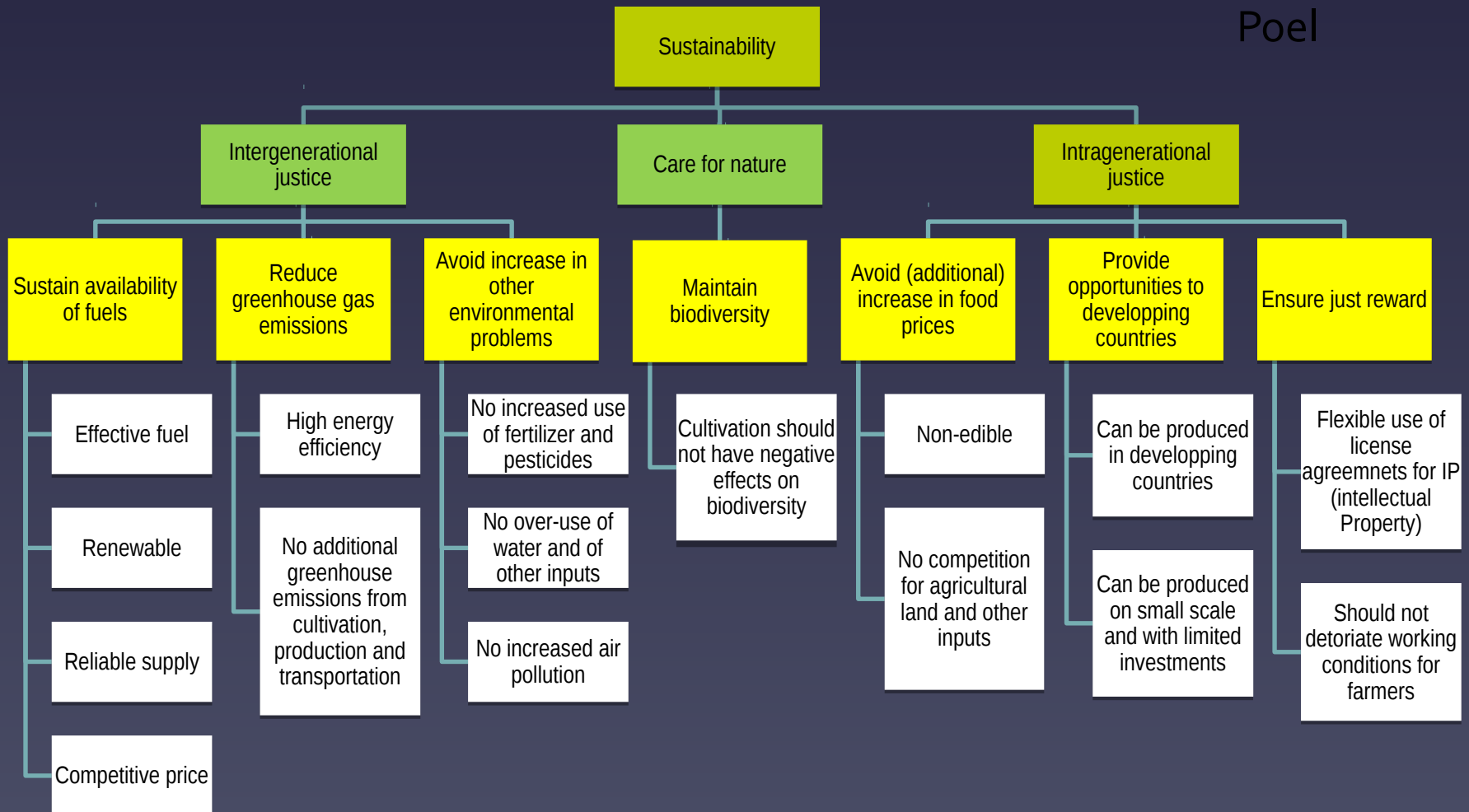
# Values hierarchy



# Example of values hierarchy



# Diagram Ibo vd Poel





# Moral Overload

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68748464	498					654	86421315
78126178	156					744	65434587
23156732	874					149	49886845
13321672	789					564	63432535
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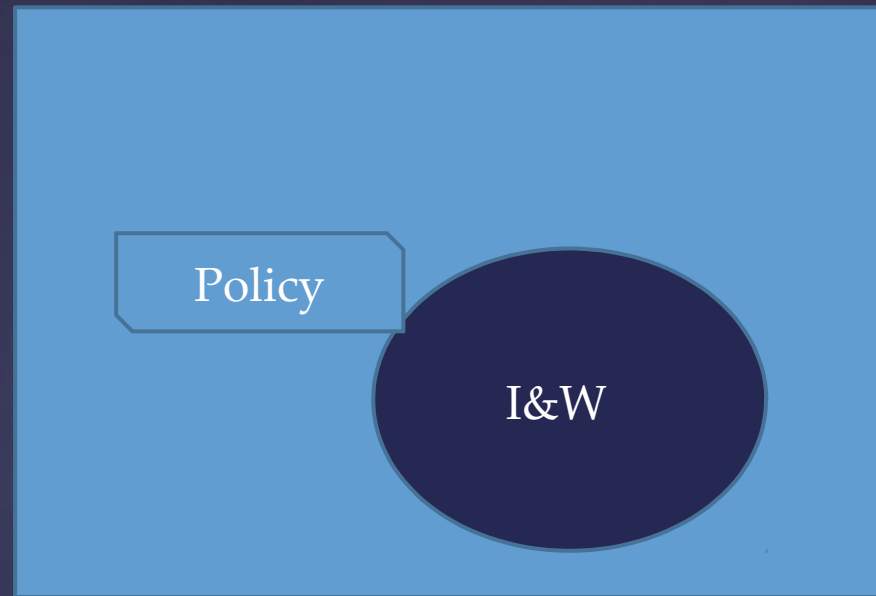
OVERLOAD



**RESPONSIBLE INOVATION FOR I&W**  
**SMART FUSION OF MULTIPLE CONFLICTING VALUES**

Applied Science &  
Engineering

Transitions/Goals/  
Problems



Digital  
Technology

Public Values

I&W

🐼 Safety

🐼 Security

🐼 Sustainability

🐼 Efficiency

🐼 Dependability

🐼 Access

🐼 Accountability

🐼 Equity

🐼 Justice

🐼 Privacy

🐼 Democracy

🐼 Autonomy

🐼 Freedom

# Public Values



- Civil Engineering
- Material Science
- Mechanical Engineering
- Urban Planning
- Computer Science
- Transport and Logistics

# Science and Engineering

☞ Data Science

☞ IoT

☞ AI

☞ Blockchain

☞ Sensors

☞ Inter (Net) works

☞ Reconfigurable Sensor  
Networks

☞ Digital Twins

☞ DAO

# Digital Technology

- ☞ Stakeholders (direct and indirect)
- ☞ Scale
- ☞ System
- ☞ Values
- ☞ Value conflicts
- ☞ Design solutions

# Analysis



- ☯ Climate Change:  
Adaptation/Mitigation
- ☯ Smart Transportation
- ☯ Circular Economy
- ☯ Cybersecurity
- ☯ Resilience

# Transitions/Problems/Goals



# Responsible Innovations

- Aiming at serious problems (UNSDG's)
- Taking Values into account
- Anticipatory and Design approach
- Interdisciplinary approach
- Proceeding Responsibly (in creasing opportunities for taking, holding, feeling, making responsible)