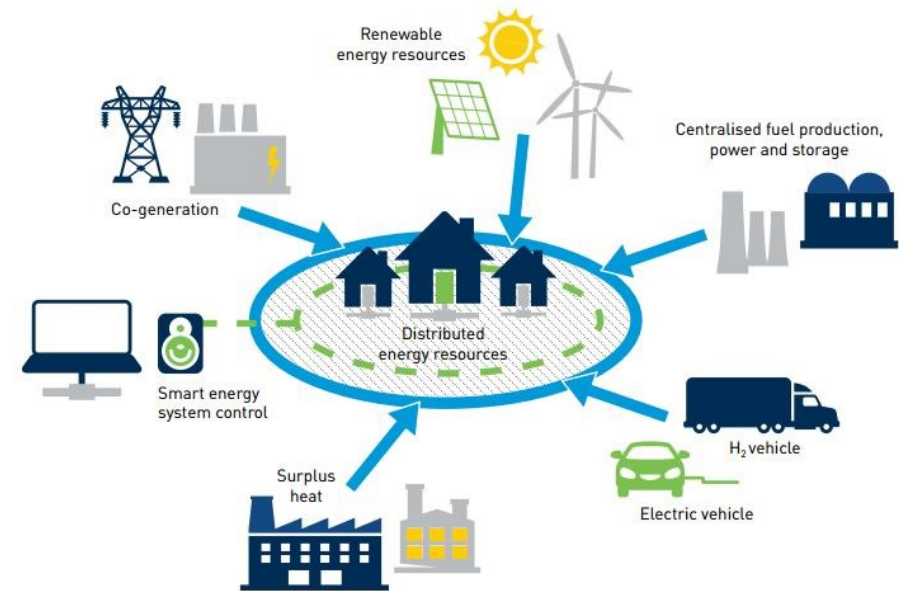


An Empirico-Legal Analytical & Design Model for Local Smart-Grid Systems: Connecting the IAD-Framework to Institutional Legal Theory (‘ILTIAD’)

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Introduction

- Aging energy grid infrastructure →



- Current divide between rules-in-use and rules-in-form
- *regulatory disconnect* between regulation and innovation
- Need rules of the game for design and functioning of SES

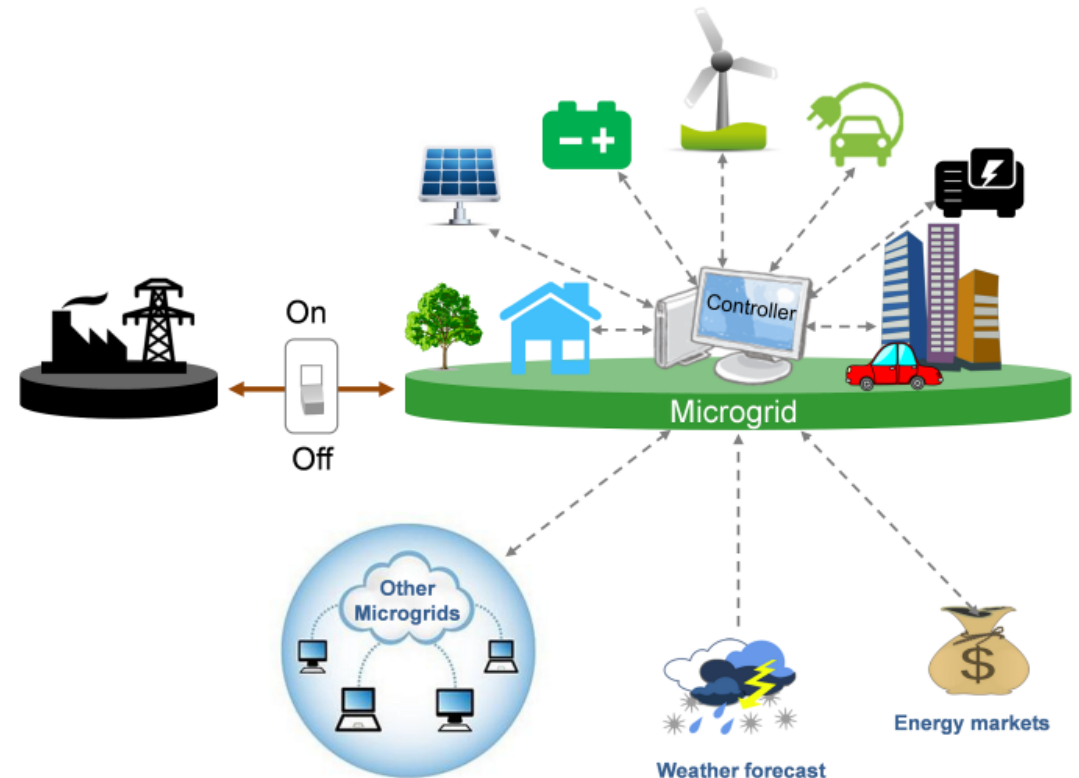
Research Question

'How can institutional settings for smart energy systems be designed, and which consequences does this have in terms of renewable energy expansion and energy democracy?'

- Focus: legally facilitated experimentation for SES (Netherlands)
- Approach: add normative dimension to IAD Framework
IAD Framework + Institutional Legal Theory (ILT)
→ ILTIAD Framework

Case: microgrids as CPR systems

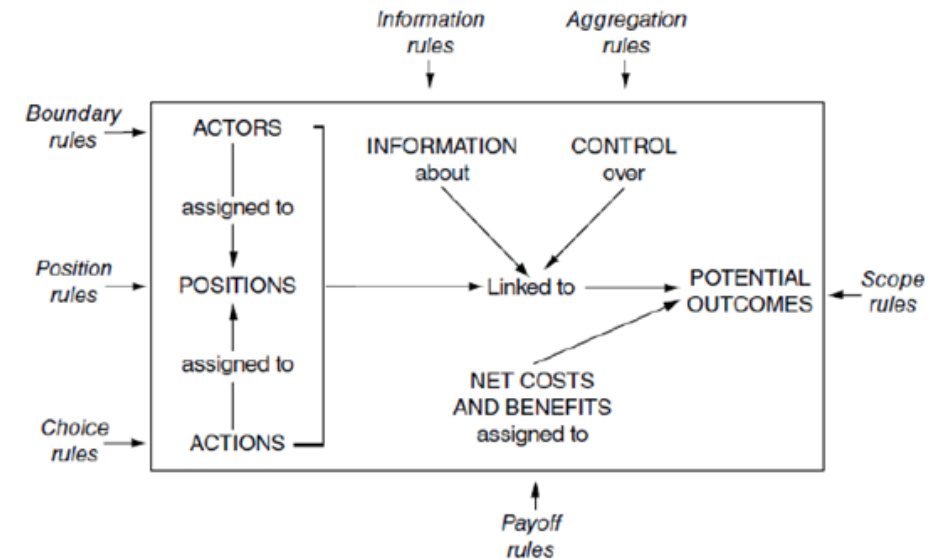
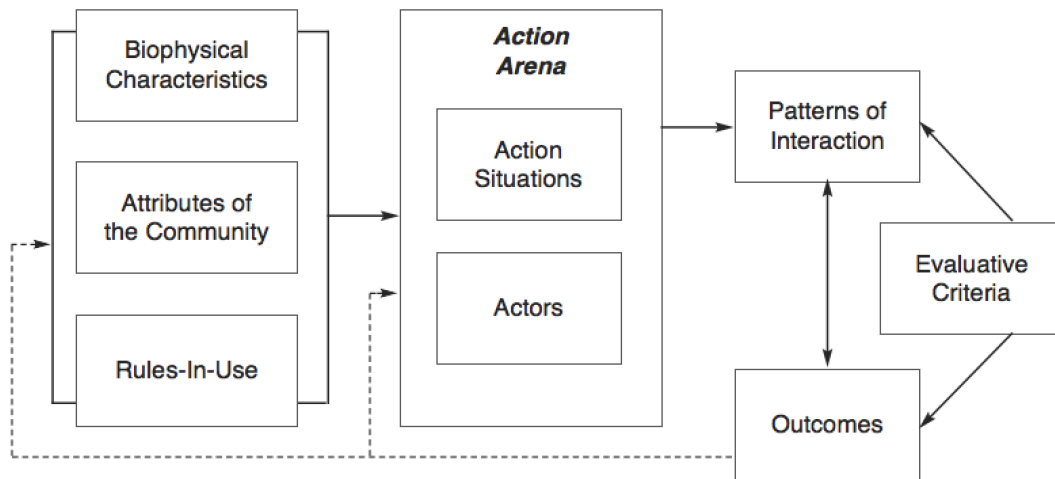
- variety of distributed energy sources
- can run independently from the main power grid
- University of Princeton – no blackout via Hurricane Sandy



		Subtractability	
		<i>Low</i>	<i>High</i>
Excludability	<i>Difficult</i>	Public goods	Common-pool resources
	<i>Easy</i>	Toll goods	Private goods

Source: Ostrom et al. (1994, 7).

Theory 1: Rules-in-use for microgrids



Disconnect

When existing rules-in-form block desired rules-in-use

Assumption: actors want to act lawfully

How to adjust (which) legal rules-in-form?

Theory 2: Rules & Rules (What to adjust?)

- Legal rules-in-form are *ex ante prescriptive*! (Table 1 of paper)
 - Actors' (lawful) response has causal effect of *ex post descriptive* rules-in-use



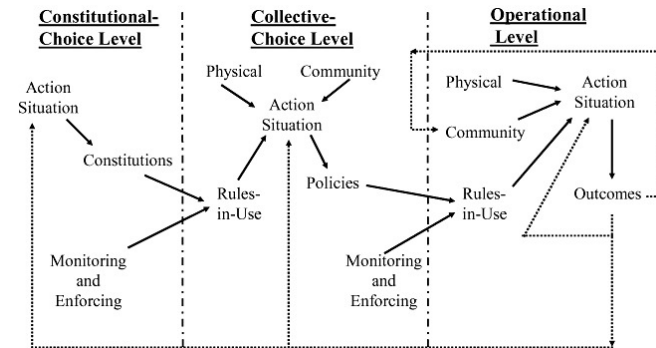
- Regulative rules in IAD v. In ILT



- ADICO: no IAD distinction between rules-of-conduct and rules-of-power
- In ILT rules-of-power key to **valid** rules-of-conduct..... 'legal can'

Theory 3: Rules & Levels (How to adjust?)

- Rules of power are key to introducing etc. rules-of conduct
- Legal **system** applied to IAD-levels:



1. Operational level	Factual lawful acts within rules-of-conduct (towards service)
2. Collective choice level	Establish valid rules-of-conduct (towards operational practice) (Legal acts upon powers from 3.)
3. Constitutional choice level	Establish valid rules-of-power (towards making rules-of-conduct) (Legal acts upon systemic validity from 4.)
4. Meta-constitutional level	Establish a rules of recognition (to underpin the legal system) (Constitution building from 'informality')

Theory 4: Rules & Levels (How to experiment?)

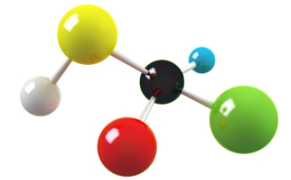


- Change through experimentation
 - by **derogation** from standard (by exception)
 - lawfully starting at **Constitutional level**, information gathering upon outcomes, to evaluate and conclude at **Constitutional level**

Operational level	Standard AS Utility practice	Experimental AS → Microgrid practice	→ diff. outcomes ↓
Collective choice level	Standard AS ↑ Set Utility conduct	Experimental AS ↑ Set Microgrid conduct	Information from experiment ↓
Constitutional choice level	Standard AS ↑ Enable Utility rules	Experimental AS ↑ Enable derogation	Evaluate and change(?) to new Standard AS rules

Theory 5: Rules & Legal Institutions (What to..?)

Rules come in **clusters** prescribing patterns of behaviour
 - upon institutive, consequential & terminative rules



1st order	Attributes persons/objects			Relations		
	Legal quality adulthood	Legal status nat.cons.area		P2P contract, permit	P2O ownership	O2O easement
2nd order	Legal persons				Legal objects	
	Assoc	Found.	Corpor.	Priv ownership		Trad. allowances
3rd order	Institutional Environments					
	Public hierarchies State, municipality			Civil networks Energy communities		Competitive markets Energy market

Theory 6: Institutional Environments (What..?)

- 3rd order Institutional Environments – 3 pure types / many hybrids

Public hierarchy (Ph)	Competitive markets (Cm)	Civil networks (Cn)
Command	Exchange	Co-operate
Public interest	Private interest	Community interest
Voice/distributive	Exit/commutative	Loyalty/community
Constitutional / administrative law	Competition / consumer law	Law of association and societal enterprise
Possibilities of hybrids: e.g. regulated market (between Ph and Cn)		

- typology of key relations & interests work across levels and influence scope for 1st and 2nd order legal institutions

Theory 7: Institutional Environments (What..?)

- Relevance to microgrids: relevant to renewable energy objectives: expansion (energy market) or democratization (energy networks)

Expansion	Hybrid/Both	Democratization
Participation and sharing only in as much as efficient towards expansion*	Only input or only output legitimacy (as value in itself)	Input & output legitimacy (as value in itself): procedural and substantive justice is key
(regulated) energy market?	Overarching hybrid or Market with niches?	(regulated) civil energy network?
* involve communities only to reduce NIMBY-ism		

Experimentation in Practice



- **Dutch Experimentation Decree (constit. level)**
 - exemptions Art. 16 Dutch Electricity Act: ‘only DSOs for grid operation’
 - associations can experiment with local generation, distribution and sale of renewable energy (coll. choice & operational level)
- **9 projects granted (2015 & 2016)**
 - divide between rules-in-form and rules-in-use

Experimentation Decree (constitutional level RiF)	Rules-in-use in experiments (collective choice level)
Associations responsible for generation, supply and grid operation.	Projects led by project developer/ solar PV panel company/ research centre/ real estate company
DSOs cannot exercise control in projects	DSOs and energy suppliers exercise control
Associations must be entirely controlled by members	DSOs and energy suppliers still exercise control
Projects shall increase consumer involvement	Limited consumer involvement in decision-making
No rules	Energy management with batteries as storage units
No rules	Interest of aggregators to play a role, e.g. in energy balancing

→ De jure: civil networks VS. de facto: regulated energy market

→ ILTIAD supports choice of institutional environment and resilient legal design of experiments and beyond

FIN!

Questions?