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GRADUATE SCHOOL OF PUBLIC POLICY
UREGINA USASK

"Citizen energy"

Social Innovation, Public Policy, and the German Energy Transformation

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Outline:

Understanding energy transformation & models of innovation

Quick overview of the German case

Concepts of innovation

Social innovation

A combined model of innovation

Key aspects of the German case

Conclusions

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Legislative Framework: The *EEG*

- Liberalization of electrical production 1998
- Law for the Extension of Renewable Energy (*Gesetz für den Ausbau erneuerbarer Energien, "Erneuerbare-Energien-Gesetz", EEG*), 2000*

→ distributors obliged to accept power from renewable-energy facilities

→ fixed, premium prices for 20 years, differentiated by technology and region (declining year by year)

→ consumers pay surcharge: 6.24 ct/kwh in 2014, more than 20% of total electricity bill of private households (Bantle 2014)

→ since introduction of act German renewables have increased every year

→ 2020 target (20%) attained in 2011; 2014 target = 40-45% by 2035

*2004, 2009, 2012, 2014, 2016

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Vision: "Citizen Energy"

IPCC (Intergovernmental Panel on Climate Change) 2014: "complementary actions across levels, from individuals to governments"

WBGU (German Advisory Council on Global Change) *World in Transition: A Social Contract for Sustainability,* 2011: "citizens' inherent right to actively participate in shaping and working towards the vision of a climate-friendly society"

Broad *Bürgerenergie* (Citizen Energy): individual entrepreneurs, SMEs, co-ops

Co-operatives (DGRV surveys)

- New wave of co-ops in 21st century
  - nearly 900 co-ops incorporated from 2006 to 2015 = 64% of all new co-ops, 11% of total co-ops
  - started with ~50 members each; now 165,000 ind'l members total

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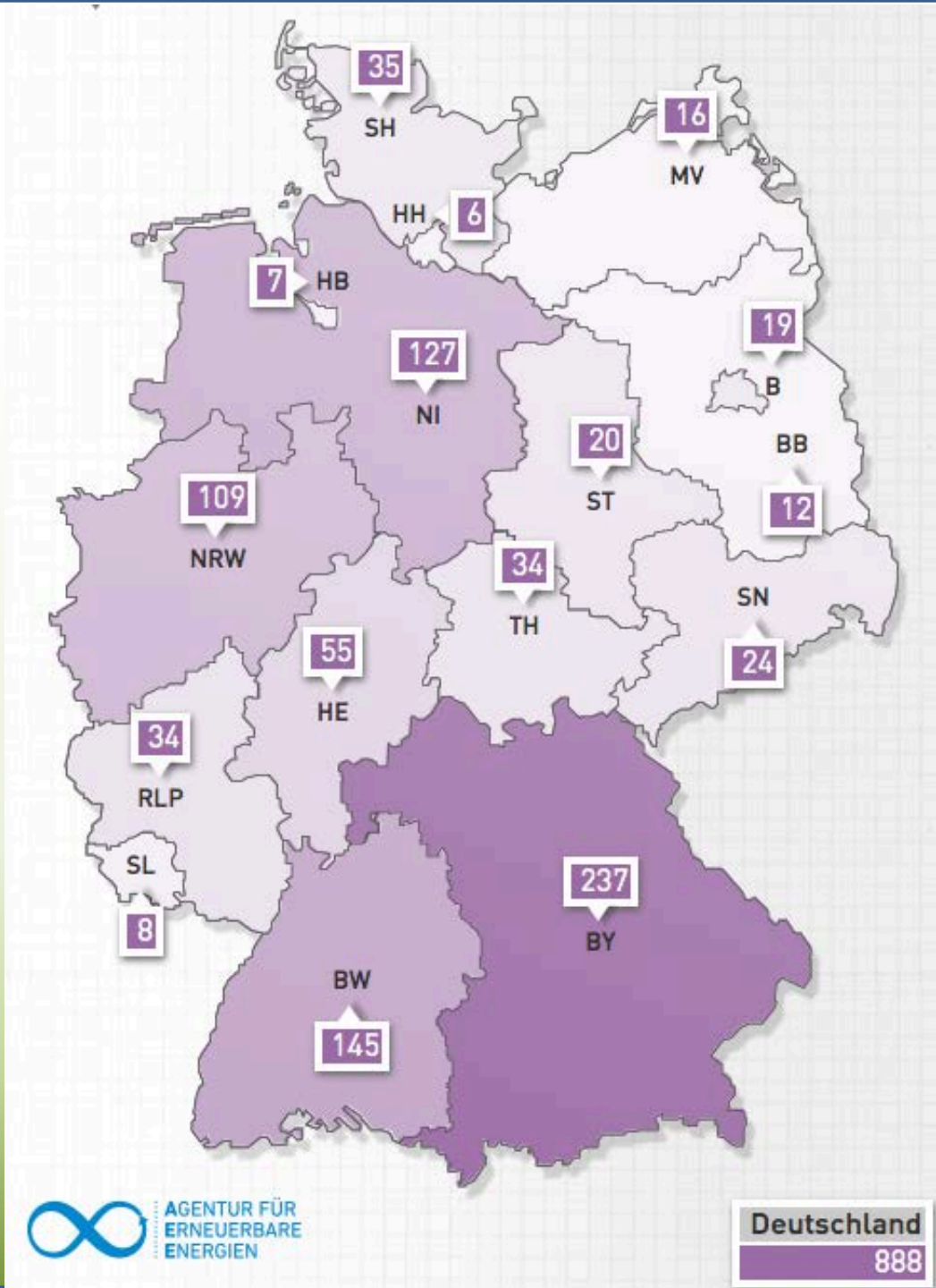
Energy production co-operatives

Photovoltaic

Wind

Local heating networks ("bio-energy villages")

Distribution of energy co-operatives in 2013



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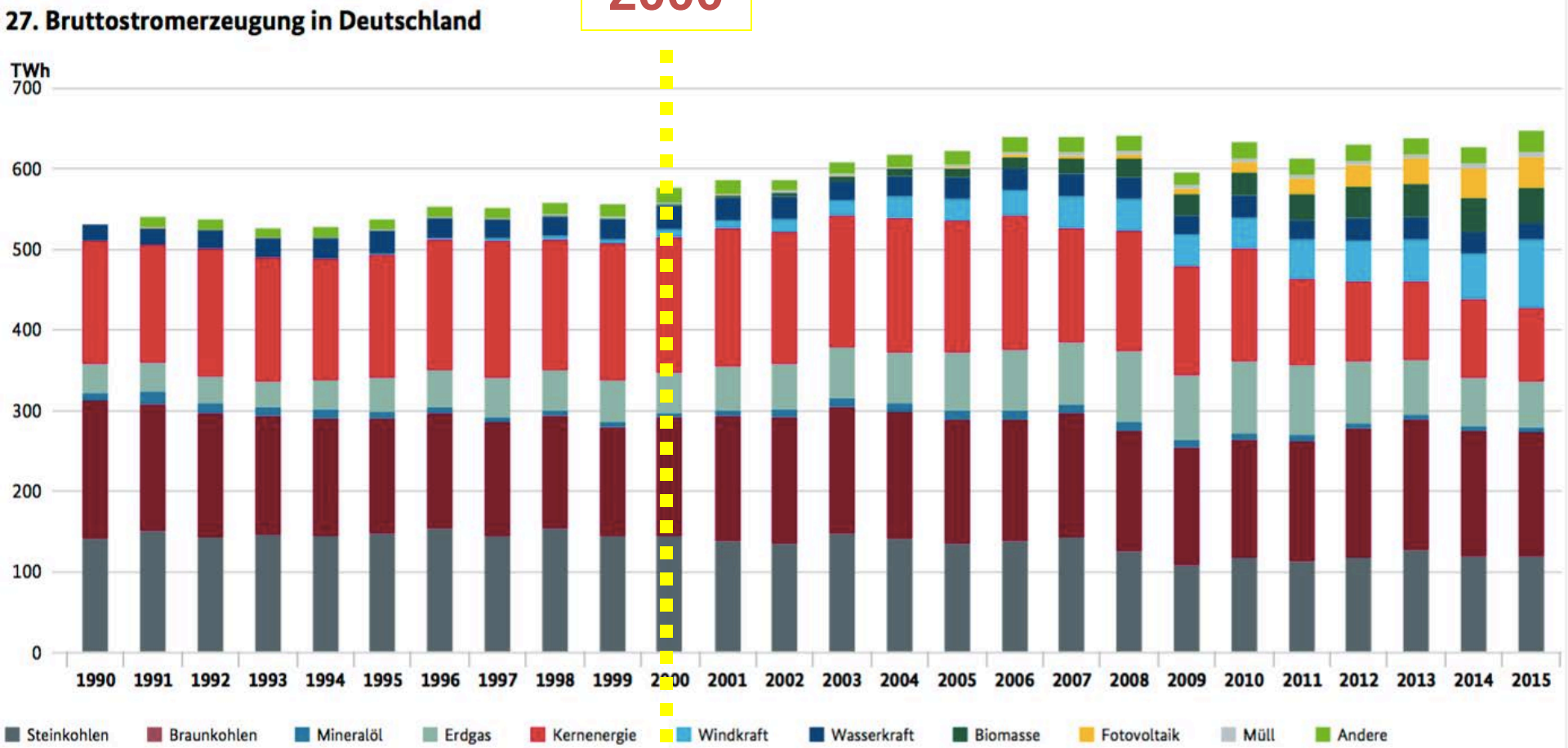
Outcomes

2000



Quellen: Arbeitsgemeinschaft Energiebilanzen (AGEB), Arbeitsgruppe Erneuerbare Energien-Statistik (AGEE-Stat)

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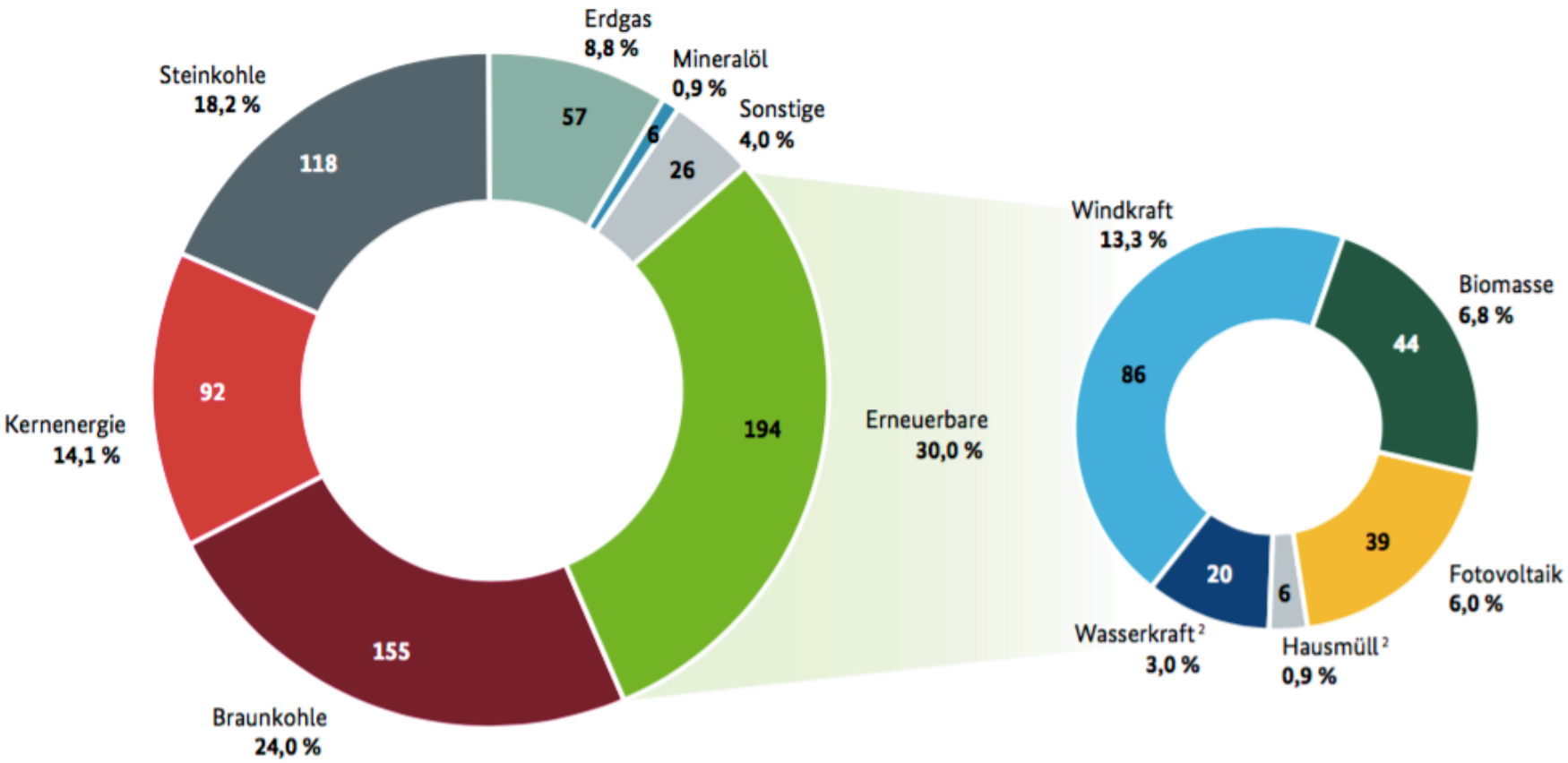
28. Bruttostromerzeugung in Deutschland 2015[1]: insgesamt: 647 TWh



1 Vorläufig
2 Regenerativer Anteil
Geothermie aufgrund der geringen Menge nicht dargestellt

Quelle: AG Energiebilanzen, Stand Dezember 2015

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CONCEPTUALIZING INNOVATION

The story of German renewable-energy co-operatives is a story of innovation.

What kind of innovation? What kind of processes? What does this example teach about innovation?

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20TH CENTURY INNOVATION THEORY

Impulse | Actor | Invention | Cost | Diffusion | Innovation

Factor Price Relations

Entrepreneur

Technology

Investment

Production

etc.

Competition

Selection by institutional environment

Economic Efficiency

Innovators

Early Adopters

Schumpeter (1942)

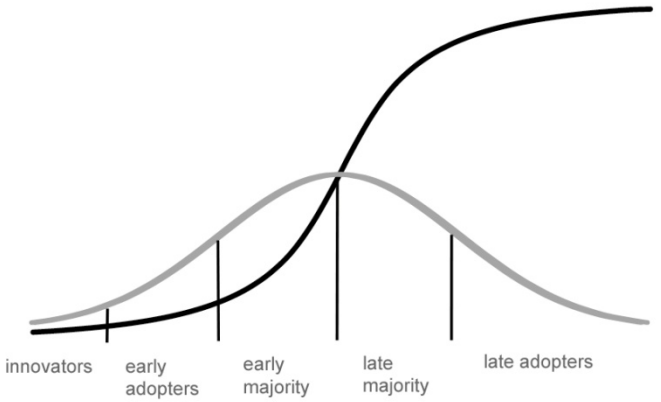
Ruttan & Hayami (1984)

economically driven technology

Frankelius (2009)

Veblen (1898)

Nelson & Winter (1977)



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An incomplete model

- existing frameworks "at best a rudimentary characterization of process and relevant institutional structure, a considerably more fine grained theoretical structure is needed" (Nelson and Winter 1977)
- concepts of entrepreneurial/technological/economic-competitive innovation do not fully explain our case
  - the actors – the inventions – the drivers – the adoption
- "a synthesis of technological and social change" (Yildiz *et al.* 2015)
- promising candidates:
  - social innovation
  - cognitive models
  - user innovation

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Social Innovation

- "a novel solution to a social problem that is more effective, efficient, sustainable, or just than present solutions and for which the value created accrues primarily to society as a whole" (Stanford 2015)
- "new ideas (products, services and models) that simultaneously meet social needs and trigger new social relationships or collaborations (Murray et al. 2010) (cf European Commission 2015)
- "a process of collective creation in which the members of a certain collective unit learn, invent and lay out new rules for the social game of collaboration and of conflict" (Howaldt and Schwarz 2010)
- "new social practices created from collective, intentional, and goal-oriented actions aimed at prompting social change" (Caijaba-Santana 2014)
- institutionalism – "Montréal School": CRISES (Lévesque, Bouchard, Harrisson)

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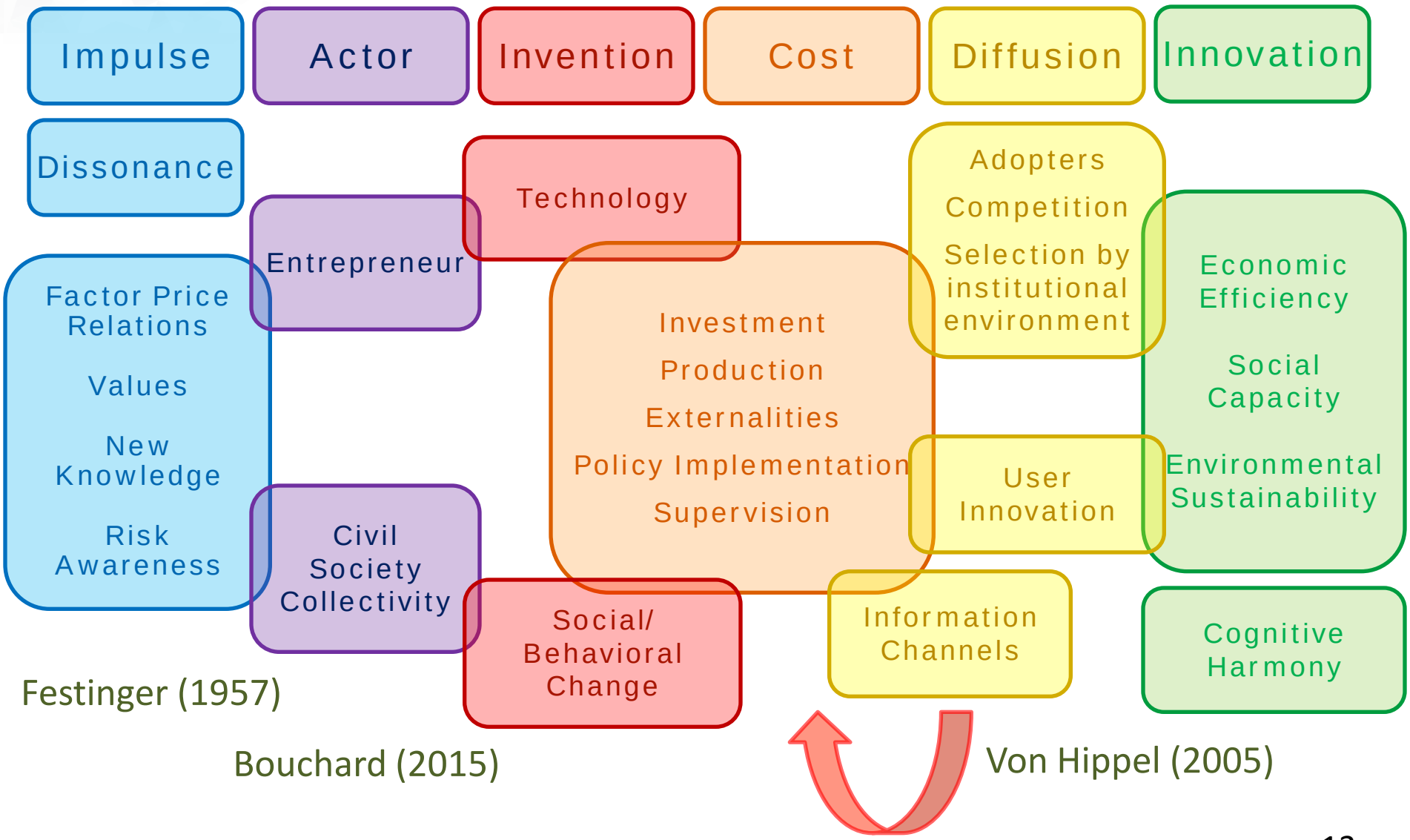

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GIVEN ALL THAT…

… WHAT ABOUT THE GERMAN ENERGY CO-OPS?

Values Motivations

WBGU (German Advisory Council on Global Change) *World in Transition: A Social Contract for Sustainability,* 2011: a **"worldwide remodelling of economy and society towards sustainability … a 'Great Transformation'"** (referencing Polanyi 1944), based on **"a global transformation of values"**

Cite a **"gap between attitudes and behavior"**

← → Phase-out of nuclear energy (Fukushima 2011)

Motivations of leaders of energy co-operatives (DGRV and Holstenkamp 2015):

- #1 = **to promote renewable energy; to promote regional value creation**
- followed weakly by dividends, local energy security; distantly by independence, low cost

Members and Leaders

Average membership: at time of founding 54; overall in 2015: 221

92% private citizens, 3% businesses/banks, 3% farmers,
2% public entities (incl. local gov'ts, churches)

←→ Significant roles played by co-op banks, local governments etc.

Individual leaders (Holstenkamp 2015):

- men, 45-64, well-educated, high incomes
- leaders less motivated by financial returns than members are
- **80% members of other organizations** – very different patterns by regions
- participation very important in rural regions – seems to be connected to "processes of identity formation"

Social-Technological Invention

- New technologies of large-scale energy production *(PV, wind, biomass)*
  New structure of industry *(decentralized)*
  New owners and governance *(citizens-consumers)*
  New goals of enterprises *(values, financial return, regional development)*
  New forms of incorporation *(registered co-operatives)*
- only the first of these was mandated by legislation:
  users/adopters co-constructed the innovation (more on that in a moment)

Focus on Costs and Conflicts

Economics:

- Investment: average €3,652 per member – €2.2m per co-op
  €438m total member capital, €1.67b total investment in co-ops
- Average dividends 3.9%

Politics:

- Growing push-back on cost distribution and land use
- private households bore 35% of costs for *EEG*, € 8.3 billion out of € 23.6 billion (Bantle 2014)
- Revised law (2014, 2016): reduced premiums and certainty;
  new tendering process

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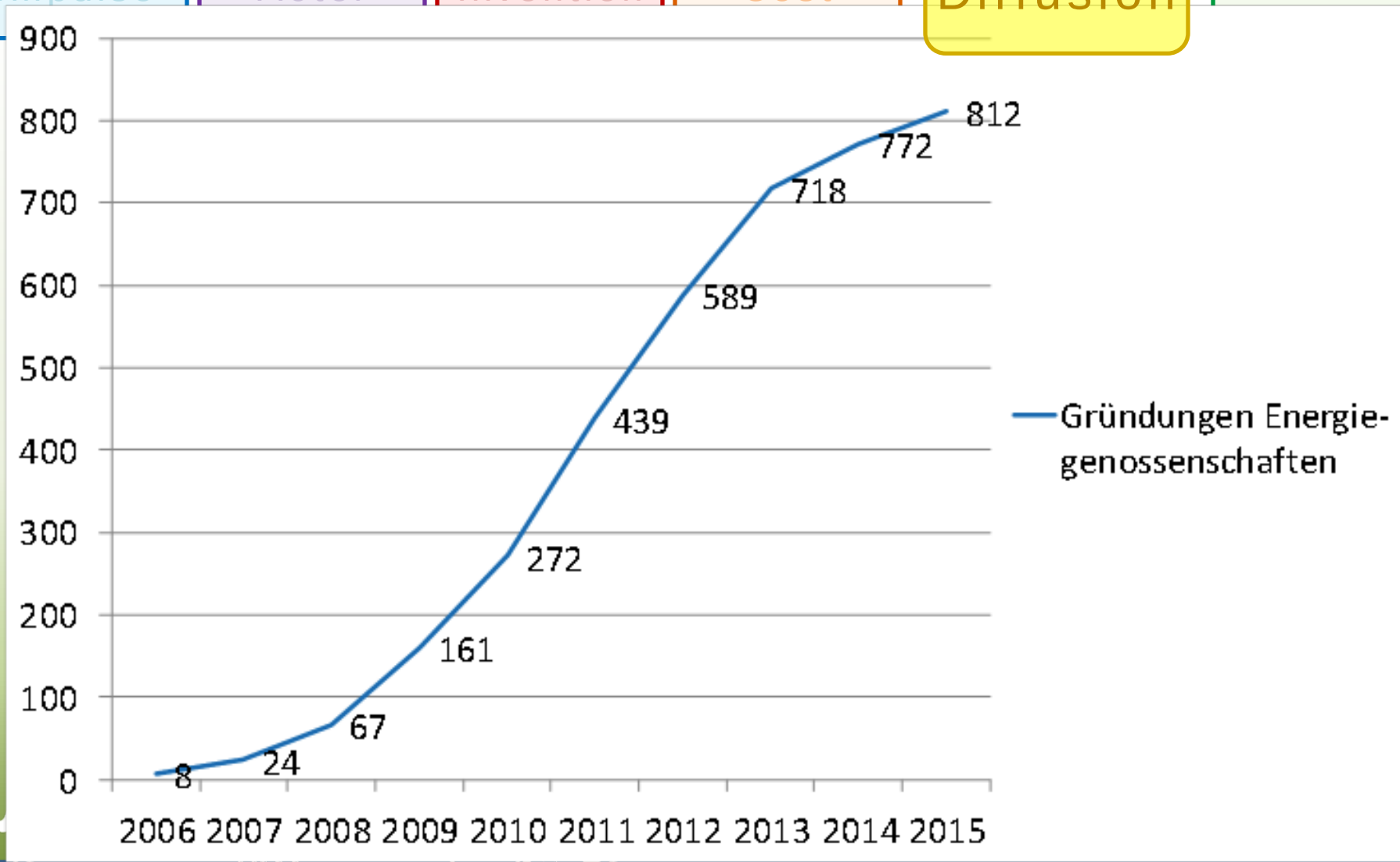
Impulse | Actor | Invention | Cost | **Diffusion** | Innovation



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Why Co-ops? Conflict and Innovation

Conflicts, suspicion, and uncertainty: costs, land use

Hypothesis: locally owned co-operatives help manage potential conflicts

- ownership, participation, contracts, profits kept within small region
- local people have a stake in the projects in their back yards
- co-op values of equality, equity, and solidarity
  → open membership, egalitarian voting rights

Evidence

- Musall & Kuik 2011: residents of Zschadraß (co-op) 3 times more accepting of wind energy than residents of Nossen (private developer)
- Becker *et al.* 2015: local conflicts determine organizational forms
- Sagebiel & Rommel 2014: German consumers will pay premium for municipal and co-op energy

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Co-ops as user innovations

Co-operatives are a recognised legal form of incorporation in Germany (*eingetragene Genossenschaft* or eG)

- principles of self-help, self-responsibility, self-administration
- understood to promote the economic strength of the members

Unique new use of the co-op legal structure
not intended by law or policy-makers

- A co-op that does not do business with its members
  → a blend of values-based returns and dividends
- Multistakeholder membership
  → businesses, banks, farmers as members alongside consumers

Co-ops were user-innovated by societal actors as solutions to resolve conflicts and/or reduce suspicions and uncertainty about costs and benefits.

Value-Based, Community-Embedded Enterprises

Examples show that the most successful co-operatives do not produce only energy. Rather, the outcomes from the co-operative enterprises are multiple:

- more renewable energy produced
  (→ satisfaction/cognitive harmony)
- profits, dividends, and capital retained locally
- contracts awarded locally
- role of co-operative as a community hub for services, events
- initiatives to improve regional quality of life

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Profile: Energiegenossenschaft Odenwald eG (Erbach)

Founded 2009

3,000 individual members

€50m invested – 80 PV parks – 6.5mW

Energie Genossenschaft Odenwald eG

Energie für die Region!

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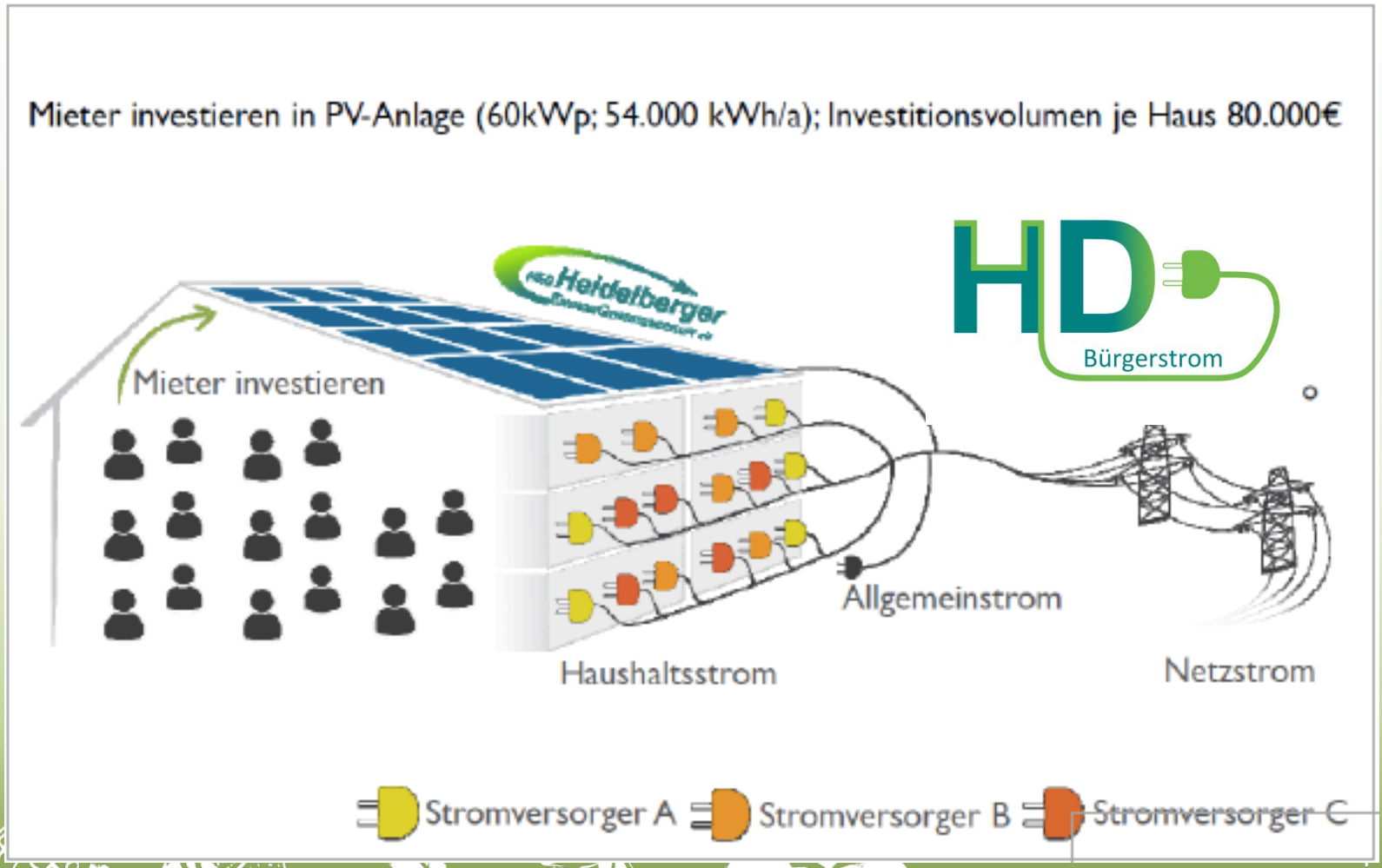
Profile: HEG Heidelberger EnergieGenossenschaft eG



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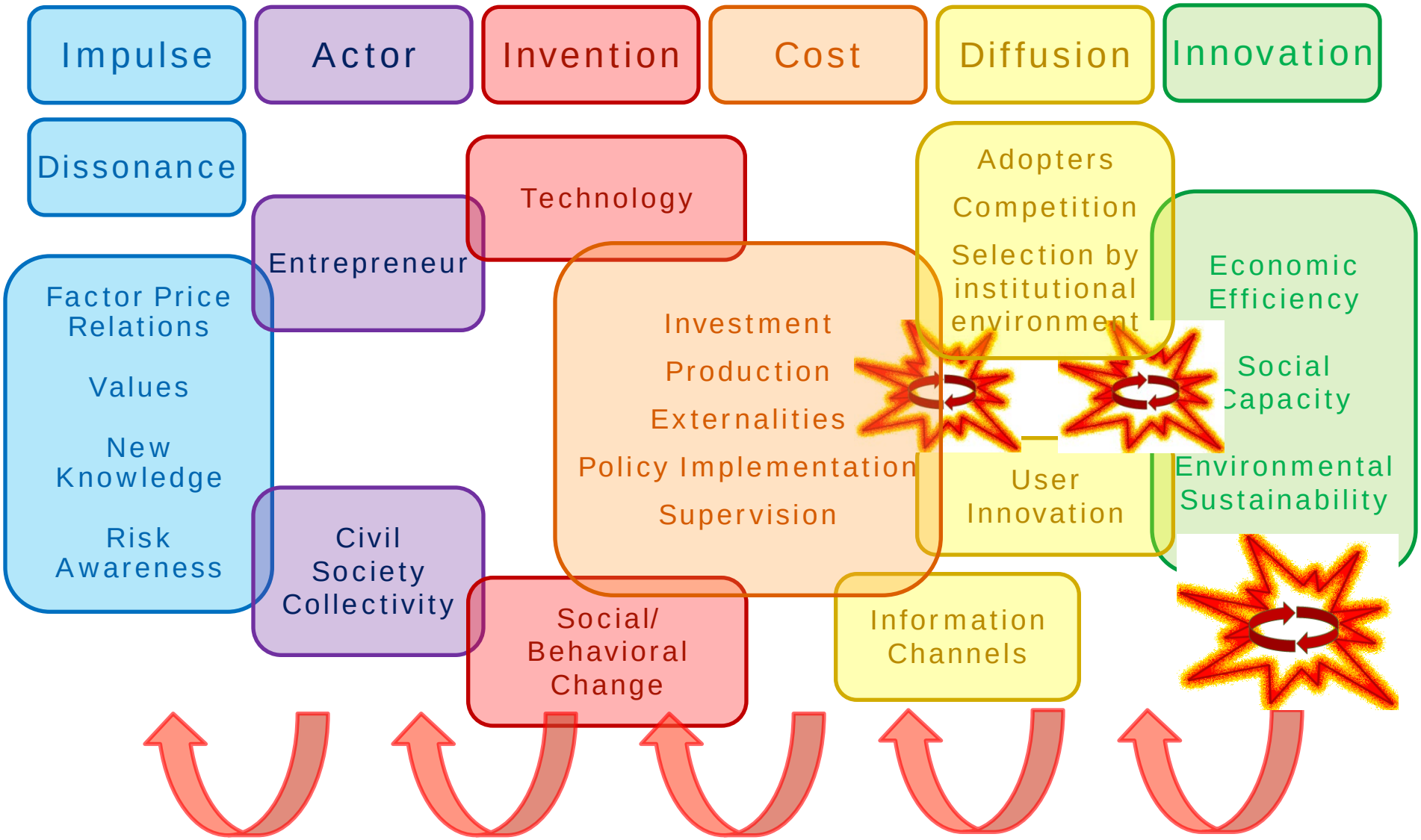
CONCLUSION

The spread of German energy co-operatives illustrates a conceptual model of innovation inclusive of:

- **values** motivations by innovators and adopters (cognitive dissonance)
- networked, plural, and hybrid (multistakeholder) **civil society actors** — business, professionals, community leaders, local institutions
- **conflicts** over distribution of costs (financial, symbolic, aesthetic) as a central feature of innovation
- **user innovation** — e.g. adaptation of the co-op model to manage locally controlled energy transformation
- an outcome that is a **synthesis of social, technological, economic, and governance innovation**


Impulse
Actor
Invention
Cost
Diffusion
Innovation
Dissonance
Technology
Adopters
Competition
Selection by institutional environment
Economic Efficiency
Entrepreneur
Factor Price Relations
Values
New Knowledge
Risk Awareness
Investment
Production
Externalities
Policy Implementation
Supervision
Social Capacity
Environmental Sustainability
User Innovation
Civil Society Collectivity
Social/ Behavioral Change
Information Channels

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What could Canada learn?

- Values-driven transformation
- Institutional environment matters

  (Values + institutions→ unlikely to be able to copy exactly)
- Not business alone, legislation alone, or civil society alone
- Synthesis of technological and social innovation
- Allow for user information and local dynamics
- Expect conflict and plan for how to manage it

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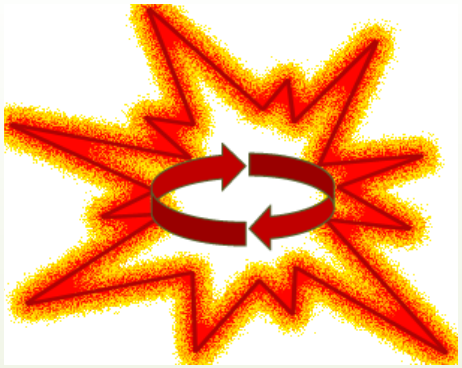
THANK YOU!



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a note on sources

- statistics, graph, and photos related to German energy co-operatives are drawn from publications of the DGRV – German federation of co-operatives and available on their web site
- map is from the Agentur für Erneuerbare Energien e.V.
- graphs related to energy production are from the Statistisches Bundesamt and the Bundesministerium für Wirtschaft und Energie
- photos and logos of the Energiegenossenschaft Odenwald eG and the HEG Heidelberger EnergieGenossenschaft eG are from their web pages
- full citations of published literature available in conference papers

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