Future Energy Networks and the Role of Interactive Gaming as Simulation

Image from http://www.ulster.ac.uk

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Games can operate as critical spaces
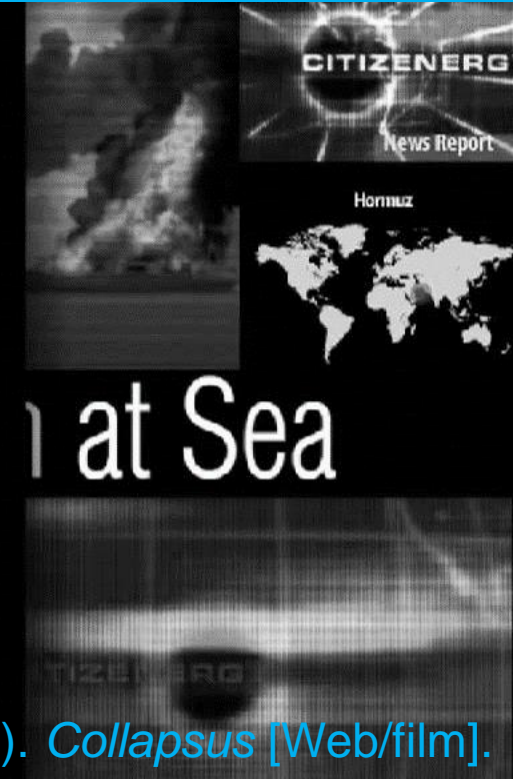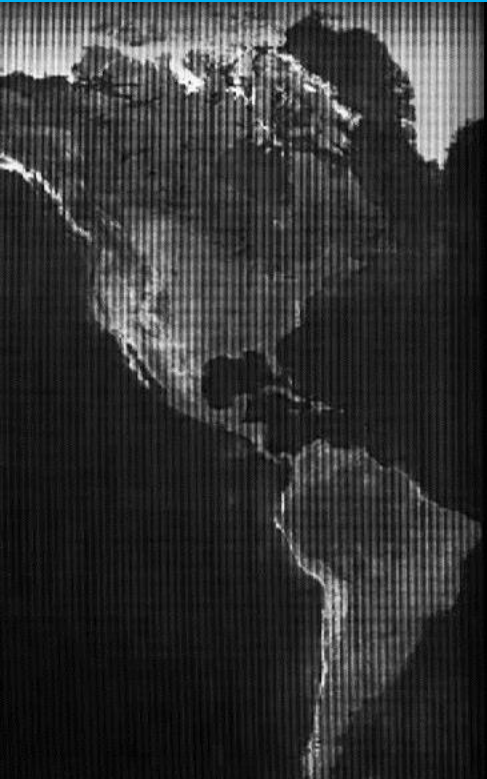
Pollotta, T. (2010). *Collapsus* [Web/film].

[1] Games are a means of increasing literacy of complex system dynamics through simulation (Procedural Rhetoric).
[2] Games can be a constructive mode of critical exploration (Speculative Design).

Further Questions
[3] How might the interaction of simulated experience and critical thought produce changes in cognitive realities concerning energy use?
[4] How are games being used for this problem already? How can they be used in the future? What challenges do we face as designers?

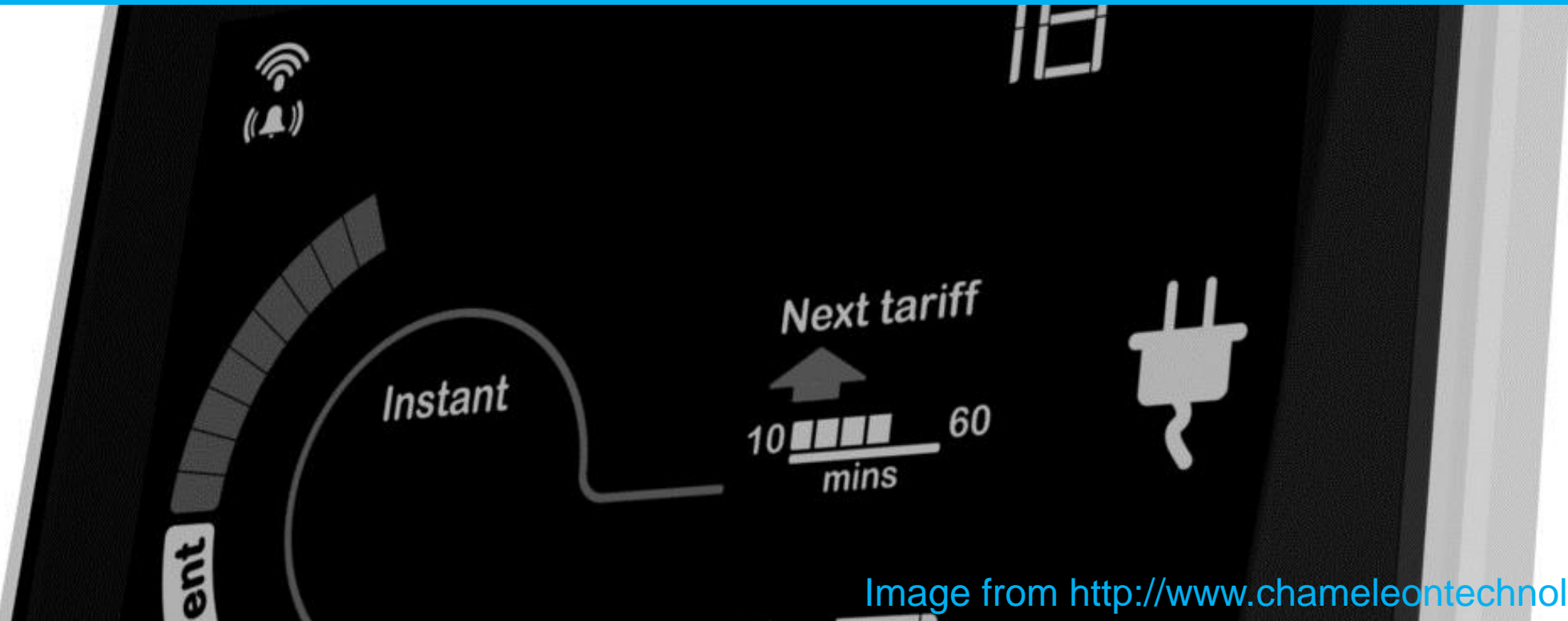# Major challenges of faced by the current approaches.

Image from http://www.chameleontechnology.co.uk/

[1] Data alone isn't enough to change behavior.
Provision of information is not, in itself, enough to convince consumers to make changes (Owen, 2004).
The greatest impact is found with consumers who are already taking steps to reduce energy use and have a stated interest in environmental sustainability issues (Strengers, 2011).

[2] The energy network is inaccessible as a concept.
Consumers are more likely to perceive energy networks as "cables and wires" than human beings and organizations (Devine-Wright et al., 2010).

Energy is a Social Resource

"[S]ustainable development is a transformative goal and traditional tools will never lead to social transformation. It is only in shaping the quality and quantity of daily interactions amongst people that we have a chance to shape more sustainable systems"

(Willard, 2009, p. 29)

Image from http://www.theguardian.com/

Attempts to change individual behaviours regarding sustainable consumption often struggle to take into account the dynamics of social change, including technological change (Pierce & Paulos, 2012).

The research around energy engagement and intervention indicates that the social processes around energy use are likely to be best influenced through dynamic, user-centric social interactions (Tsoukalas & Gao, 2008; Honebein et al., 2009).

These types of interactions will become integral to future energy delivery systems (Pierce & Paulos, 2012; Simmhan et al., 2012).

Proceduralism and Video Games

Digital games, although experienced by the player as a sprawling narrative or sophisticated puzzle, provide a landscape to explore a set of challenges to overcome. The game system can be fundamentally considered a dynamic system of inter-related objects, agents and relationships.

Simultaneously the game is composed of rendered data sets, algorithmic conditions and computational logics.

"A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome." (Salen and Zimmerman 2004 p 96).

Video Games as Algorithmic Media

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McKinney, (2011) *Spent* [Web]

Games are algorithmic media. To play a game is to interact with, play through and learn the logics of the algorithm (Manovich 2001 pp 222-223).

The algorithms of the game produce the procedures which control the representation, responses, rules and randomness of the game world (Arenault and Perron 2009 p110).

These algorithms govern the relationship between objects, the objects conditions and the players affordances inside the game space as they effect the values, variables and integers of the games objects (Pinchbeck 2009)

Playing with data

Australian Bureau of Statistics (2013). *Run This Town* [Game]

Australian Bureau of Statistics (ABS), used census data to create a dynamic, playful experience of resource management on a town-planning level with a good deal of relevance to the typical Australian town (ABS 2013).

The game simulates responses to proposed planning scenarios using census data to inform the systems response to player decisions.

The game could be developed towards a possible testing ground for planning decisions, and crowdsourced configurations of the city.

Procedural Rhetoric

"Procedural rhetoric is the practice of using processes persuasively, just as verbal rhetoric is the practice of using oratory persuasively and visual rhetoric is the practice of using images persuasively."

(Bogost 2007 p28)

Tiltfactor (2009) *Layoff* [Game]

According to Bogost, games can deliver meaningful experiences of concepts and perspectives via step-by-step processes of interaction or procedure, which can be used to enact arguments (Bogost, 2010).

The interrelationship between objects, controlled by the games procedures, simulates or represents relationships between subjects and objects in the world outside of the game.

"Procedural Rhetoric is a subdomain of procedural authorship; its arguments are made not through the construction of words or images, but through the authorship of rules of behaviour, the construction of dynamic models." (Bogost, I., 2007)

Design Rhetoric

A TAXONOMY OF FUTURES

Possible
Plausible
Probable
Preferable

Present — Futures
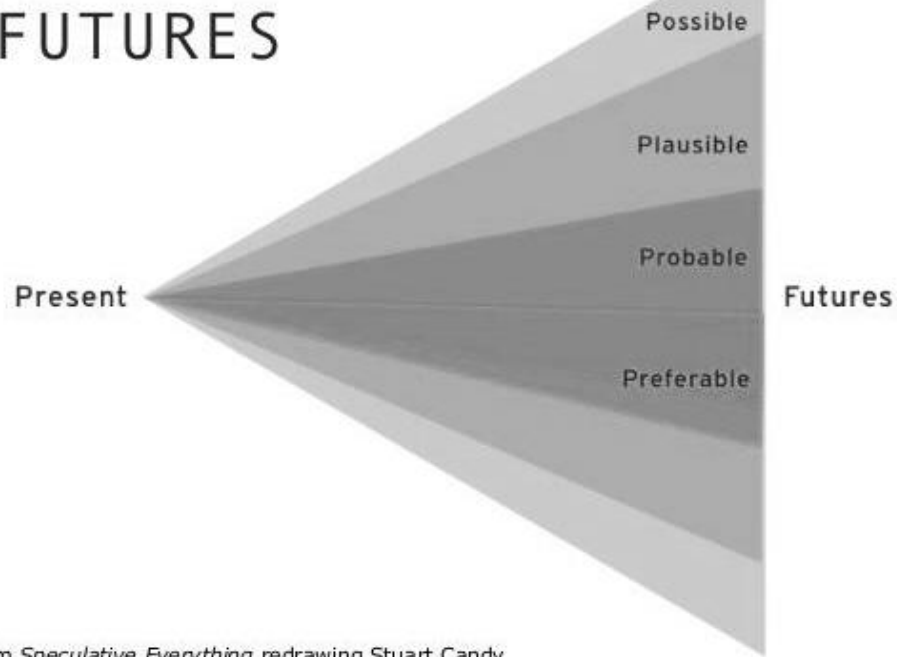
Redrawn from *Speculative Everything* redrawing Stuart Candy

Image from Dunne, A. and Raby F. (2014) *Speculative Everything*

"[Design Objects] persuasion comes through arguments presented in things rather than words; they present ideas in a manipulation of the materials and processes of nature, not language. In addition, because there is seldom a single solution to a problem in human affairs dictated by the laws of nature, they do not provide necessary solutions." (Buchannan 1985 p4)

Before Bogost's assertion that processes present rhetoric, designers such as Buchanan argued that all objects are inscribed with a rhetoric by the designers, but fro Buchanan this was a largely unconscious process.

Games as Speculative Design

Games can create projections of "possible" or "plausible" future scenarios for players to investigate and play within.

Usually Speculative Design is used to create or consider design objects as a process of "engendering debates and changing perspectives about important social issues" (Bradzell, Bradzell and Stolterman 2014 p1952)

Speculative and critical design (and connected practices of Design Fictions and Design Probes) refocus design away from function and problem solving, and toward a discursive mode of critical practice which looks to propose values, make arguments, and communicate ideas about the world through objects.

Speculative Game Design

ISLES OF WIND

TIDAL STATES

GEOTHERMALIA

C.C.S.R.

VRANIA

ENHANCED GEOTHERMALIA

EAST HYDRO

Boundaries:

Biomassburg
C.C.S.R. (Carbon Capture & Storage Republic)
Enhanced Geothermalia
Geothermalia
Hydropia
Isles of Wind
Solaria

Image of Eneropa from http://infranetlab.org/

Coulton presents a manifesto for Speculative Game Design in which games can help to model futures for players and help them reflect on their behaviors and foster behavioral change (Coulton, 2015).

Coulton argues that Design Fictions can be used to open spaces for consideration and analysis of Wicked Problems.

Eneropa works as a Design Fiction as it remaps state lines based on renewable and sustainable energy production, posing that the whole of the North West of Europe could work as one grid.

Data Simulated Futures

Games could be used as a space to not just visualise, but simulate play spaces constructed from live data. This could be used to project or simulate future energy scenarios, or predict climate change interactions.

Coulton's game *Cold Sun's* (2014) landscape is procedurally generated from weather data. The game helps to link together climate change and weather but in a complex and meaningful way. The game produces a dynamic system which will become increasingly difficult to master as the difficulty curve is manipulated by climate data.

The Chinese Room

The Chinese Room to explain how systems can "think". Searle's metaphor was that of a man assembling "Chinese" in a closed room.

This is the Internet of Things: flows of data from objects and devices forms an information-rich, "smart" environment, indeed a system of interpenetrating environments, in which the feedback we currently associate mainly with "screen" devices increasingly arrives via many other avenues.

One result is a certain fluidity in how we interact with information and objects.

# Procedural rhetoric and complexity.
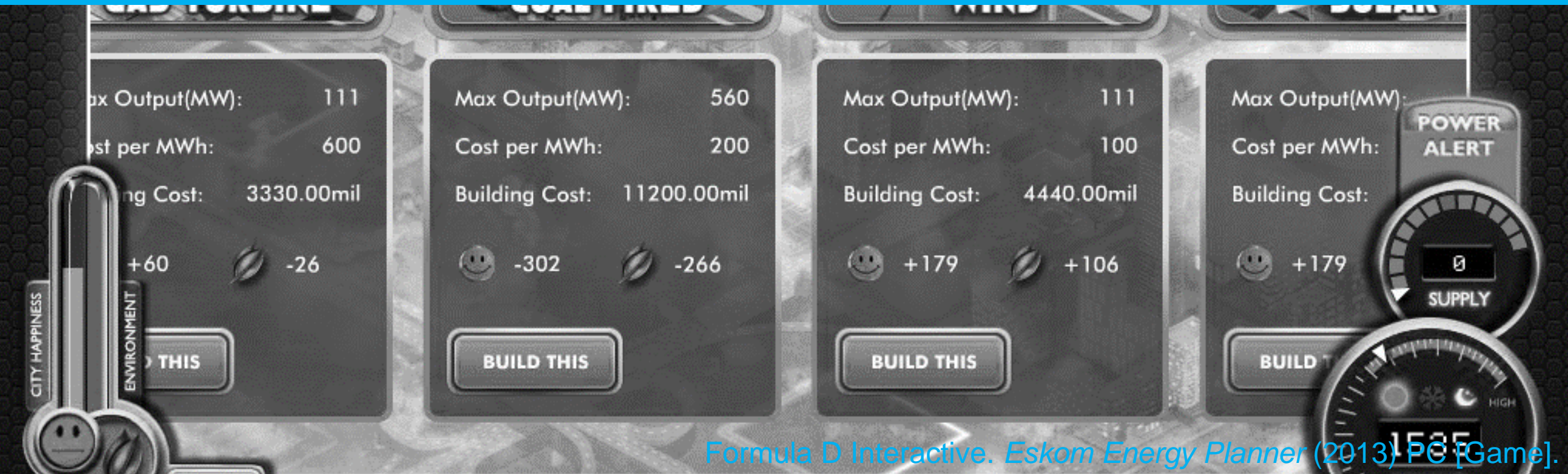
Formula D Interactive. *Eskom Energy Planner* (2013) PC [Game].

The game is an environment for testing out limits and possibilities.

This helps players grasp the dynamics of the network/systems, and their own agency within the network/systems.

Games such as *Eskom Energy Planner* (2013) help to map tangible links between the micro energy transactions we make in private and macro energy decisions which shape the energy grid.

Speculative design and complexity.

Eklund, K., (2007). *World Without Oil* [Game].
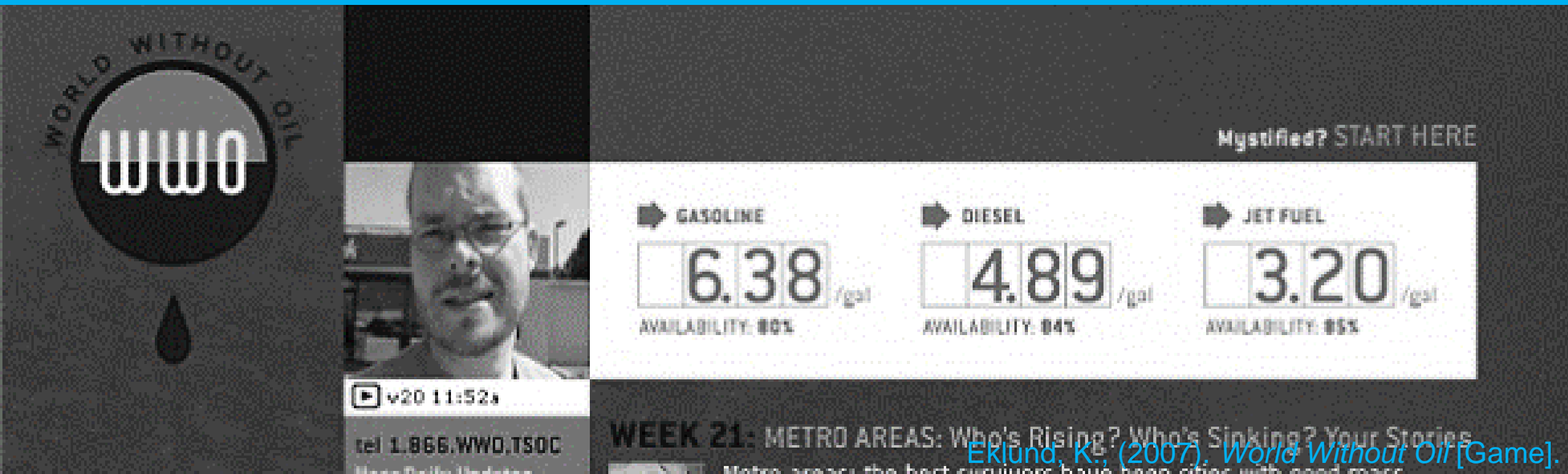
The design process is a space for testing out limits and possibilities.

This helps designers grasp:
- the dynamics of new arrangements of relationships, ie. new network structures
- the potentials of human agency within those arrangements, where players can also be designers.

Proceduralism helps to demonstrate the nature of the networked world as it is; speculative or critical design/play help to enable models of the world as it could be.

Using Games for Energy Transitions
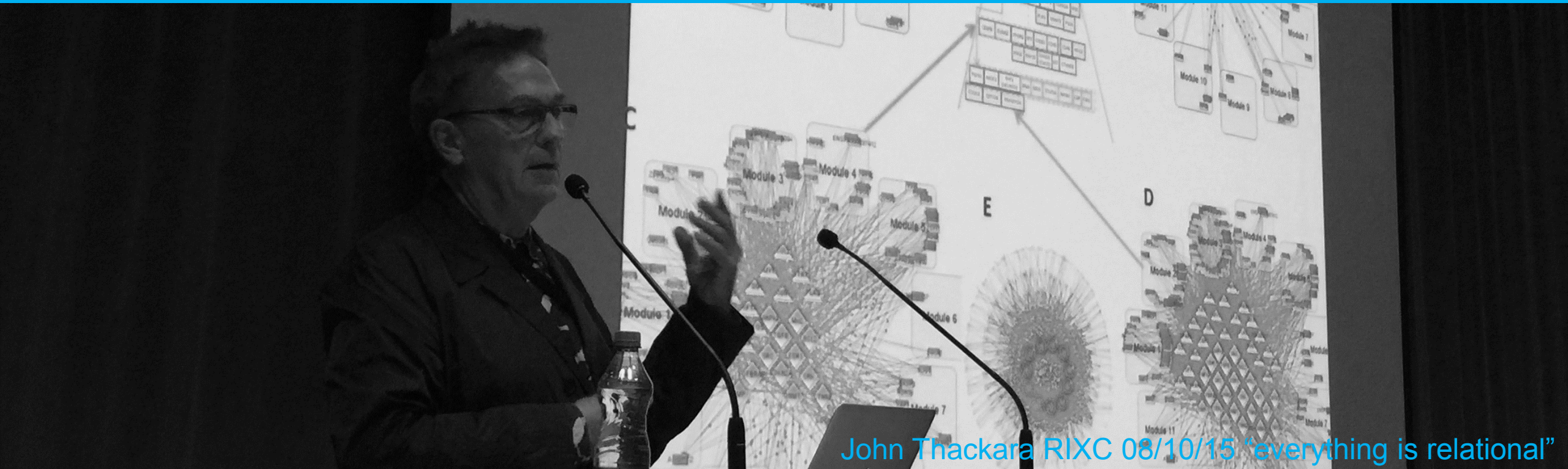
John Thackara RIXC 08/10/15 "everything is relational"

The public is likely to have an increasingly proactive role in managing energy, and smart energy systems will rely increasingly on the proactivity of consumers (Faiers and Neame, 2007; Krätzig and Warren-Kretzschmar, 2014).

[1] Energy organizations adopt game strategies for public engagement.
[2] Governments and NGOs provide guidance/funding.
[3] The "digital divide": pair innovative engagement methods with more traditional methods.
[4] A focus on active consumers in "smart" energy systems research and development.
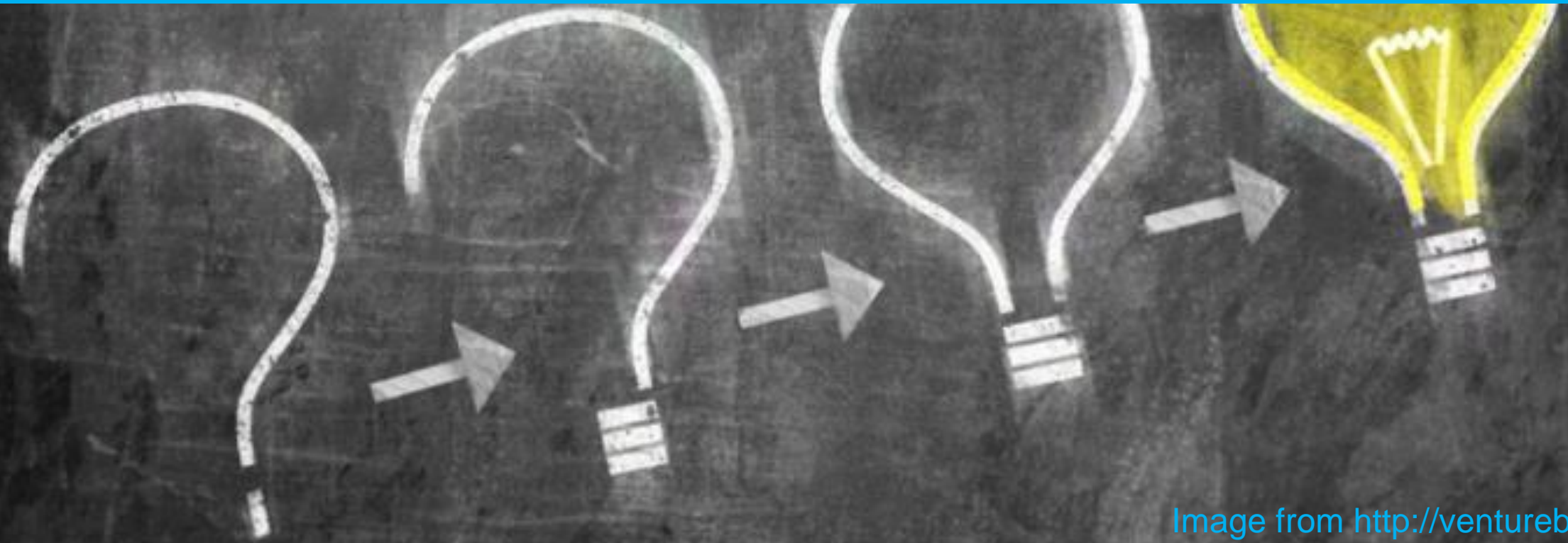
Further Research

Image from http://venturebeat.com/

Determining the most effective design methods will require empirical studies aimed at understanding how energy network information, delivered in online, social environments, is likely to interact with sociodemographics, levels of awareness and existing attitudes.

As the control of data from the IoT becomes proprietary and fragmented into pots monitored and controlled by different companies, how can we work with live energy consumption data in a meaningful and useful way?

Thanks

Image from http://grist.org/

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