

# Energieeffizienz und NutzerInnenverhalten

## IEA DSM Task 24

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**Grazer Energieagentur**



Highlights der Energieforschung 2015  
Kann eine Effizienzrevolution gelingen?  
Wien, 29. April 2015



# Film Brazil



Bildquelle: DV D - 20th Century Fox Home Entertainment LLC

28.04.2015, Folie 2

# Film Brazil



Bildquelle: DV D - 20th Century Fox Home Entertainment LLC

28.04.2015, Folie 3

# Film Brazil



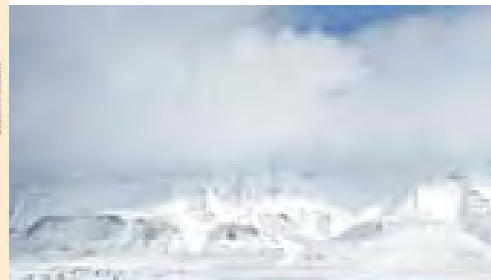
Bildquelle: DV D - 20th Century Fox Home Entertainment LLC

28.04.2015, Folie 4

# Umweltbelastung

*Univ.Prof.Dr. Helga Kromp-Kolb*

*Umweltbelastung = konstant =  
Bevölkerung x Lebensstil x Technologie*



Bildquellen: [www.wissenswerkstatt.de](http://www.wissenswerkstatt.de), [www.diepresse.com](http://www.diepresse.com), [www.focus.de](http://www.focus.de)

# IEA DSM Task 24

## Closing the Loop - Behaviour Change in DSM: From Theory to Practice



16 Countries  
25 Tasks

### Task 24



# Energieverhalten

*Alle menschlichen Aktivitäten, die den Einsatz von Energie zur Erzielung eines gewünschten Nutzen (Wärme, Licht, Kraft) beeinflussen.*



Kauf / Entsorgung



Benutzung



geistiger Prozess

# Verhaltensspektrum

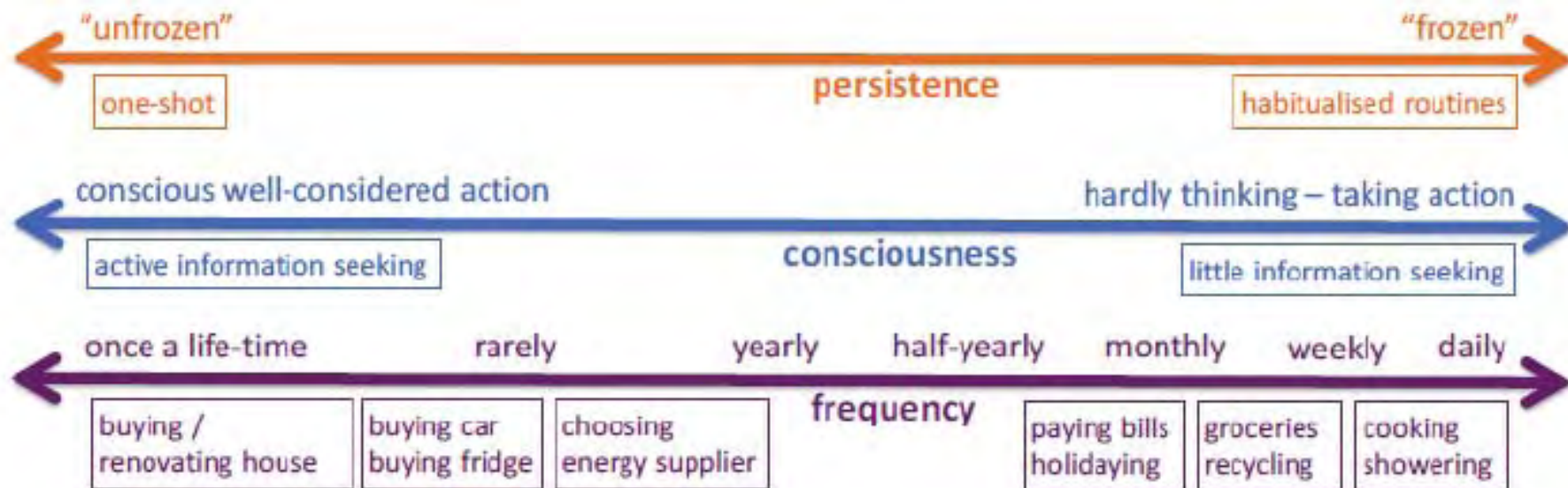


Figure 1: behaviour spectrum, retrieved from Breukers & Mourik 2013

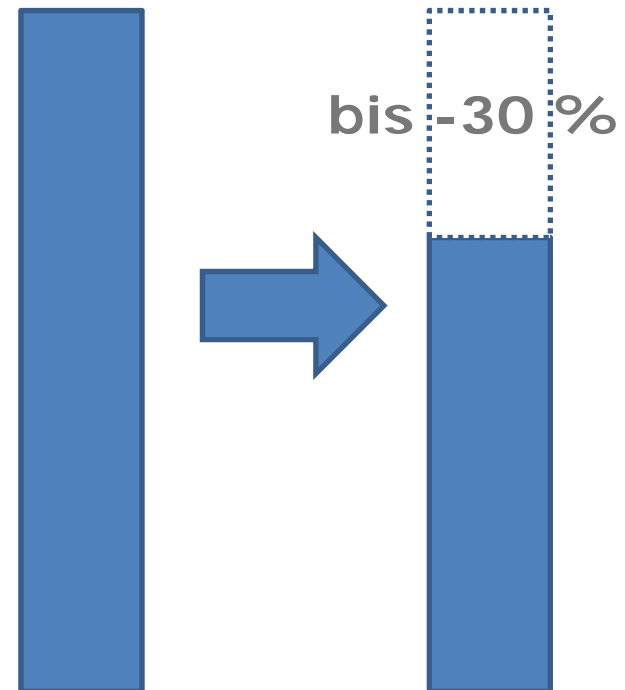


# Verhaltensänderung

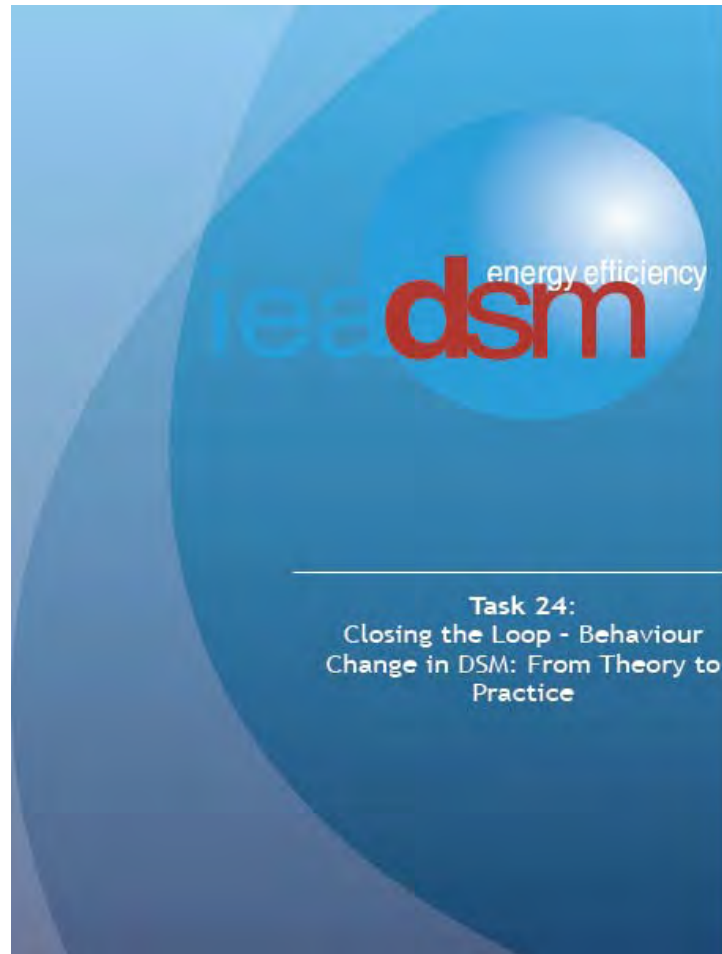
*Alle Änderungen des Energieverhaltens, die direkt oder indirekt durch Interventionen beeinflusst wurden.*

## Mögliche Interventionen:

- Gesetzgebung
- Regelungen
- Anreize
- Förderungen
- Aktionen
- Informationskampagnen
- Feedback
- ...



# **CHANGING THE BEHAVIOUR OF THE BEHAVIOUR CHANGERS**



## The Monster

Subtask 1 analysis of IEA DSM Task 24:  
*Closing the Loop: Behaviour Change in DSM - From  
Theory to Practice*

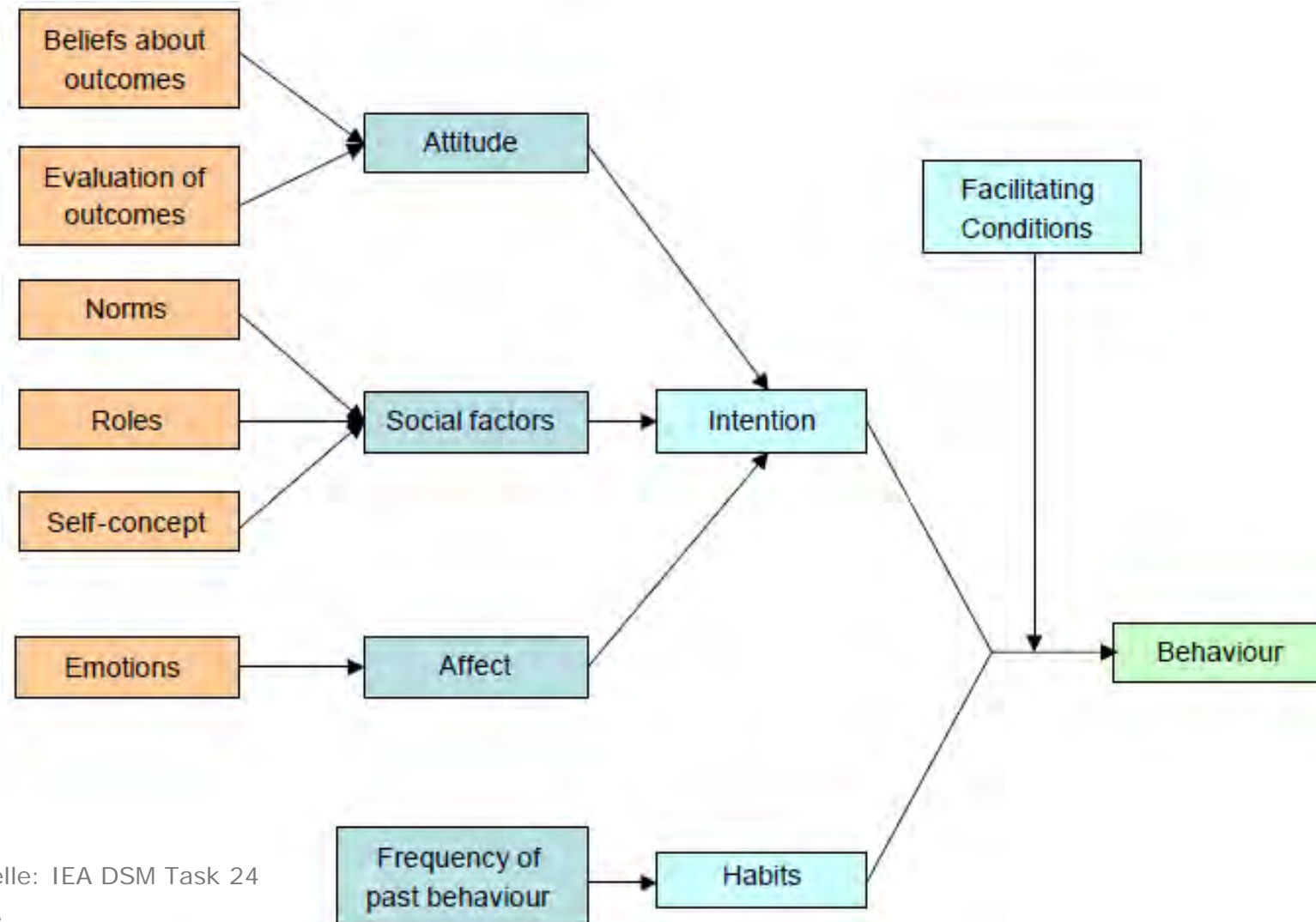


Dr Ruth Mourik  
Dr Sea Rotmann

Read the full monster here: <http://bit.ly/task24monster>

# Zahlreiche Theorien

Beispiel: Triandis' Theory of Interpersonal Behaviour (1977)

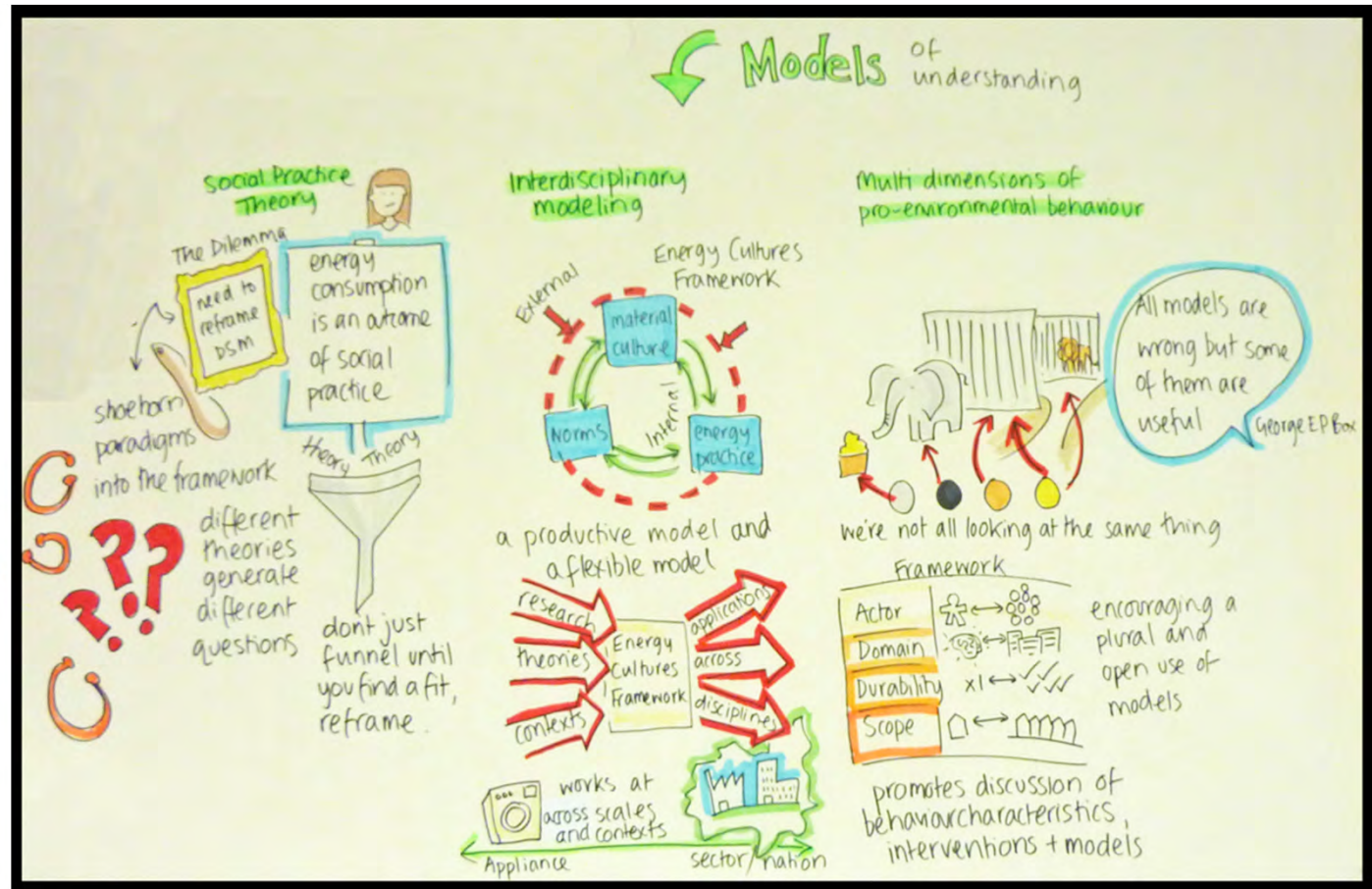


Quelle: IEA DSM Task 24

28.04



**“All models are wrong, but some of them are useful”**  
 George E.P. Box  
 (1979)



# Case Studies



smart metering



building retrofits



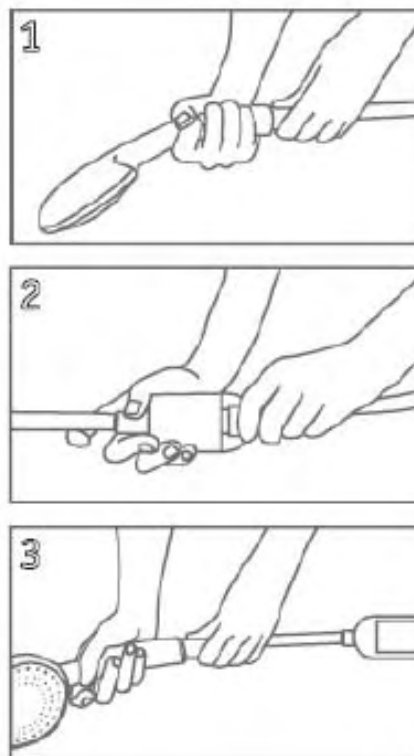
transport

15



SMEs

# Duschen mit Feedback (Schweiz)



- **Households with the display decreased their water and energy consumption by 23% relative to the control group**
  - Time: -22%
  - Breaks: +12%
  - Temperature: -0.25°C
  - Flow rate: no significant change
  
- **Per-shower reduction**
  - 10.6 liters
  - 360 Wh ( $\eta=100\%$ ) → 550 Wh ( $\eta=65\%$ )
  
- **Effects stable throughout the study (long-term study still ongoing)**



# Vergleich mit Smart meter

Reduction	Electricity smart meters <sup>1</sup>	Smart shower meters
Energy – relative consumption change	3.2% of household electricity	23% of shower energy
Energy – absolute change	86 kWh	443 kWh
Water (liters/yr)	/	8500
Cost savings (CHF/yr)	15	96

<sup>1</sup>source: ewz-Studie Smart Metering,  
[www.stadt-zuerich.ch/content/dam/stzh/ewz/Deutsch/Netz/Publicationen und Broschueren/Praesentation\\_ewz\\_sm.pdf](http://www.stadt-zuerich.ch/content/dam/stzh/ewz/Deutsch/Netz/Publicationen%20und%20Broschueren/Praesentation_ewz_sm.pdf)

# Energiejagd vs. ECO<sub>2</sub>-Management



Bildquelle: Grazer Energieagentur, Kleine Zeitung

28.04.2015, Folie 18

**KLEINE  
ZEITUNG**

Zuletzt aktualisiert: 20.11.2009 um 18:56 Uhr [\(1 Kommentar\)](#)

## Klagenfurter testen Energieprojekt

Die Energie Klagenfurt startet mit 300 Testhaushalten für ein Jahr ein Energie- und Kunde kann dabei bis 400 Euro sparen.



Foto © Montage: Weichselbraun/Privat Der Kunde kann seinen aktuellen Energie- und CO<sub>2</sub>-Verbrauch über das Internet abrufen

# Opower Home Energy Reporting (US)



Last Month Neighbor Comparison | You used 34% less than your efficient neighbors.



How You're Doing:

► **GREAT** 😊 😊  
Good  
More Than Average

WHO ARE YOUR "NEIGHBORS"?

■ ALL NEIGHBORS

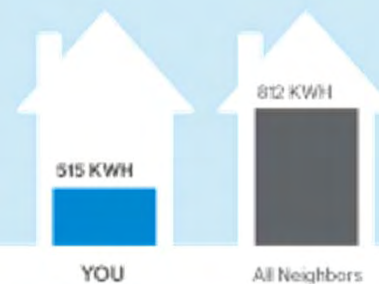
Approximately 60-occupied, nearby homes that are similar in size to yours (avg 5,379 sq ft)

■ EFFICIENT NEIGHBORS

The most efficient 20 percent from the "All Neighbors" group

Spotlight on Cooling

Your cooling usage compared to your neighbors:



You used **36% LESS** energy on cooling than your neighbors.



**Summer Reminder**

Adjust your thermostat every time you leave the house. Even one degree can make a difference in savings.

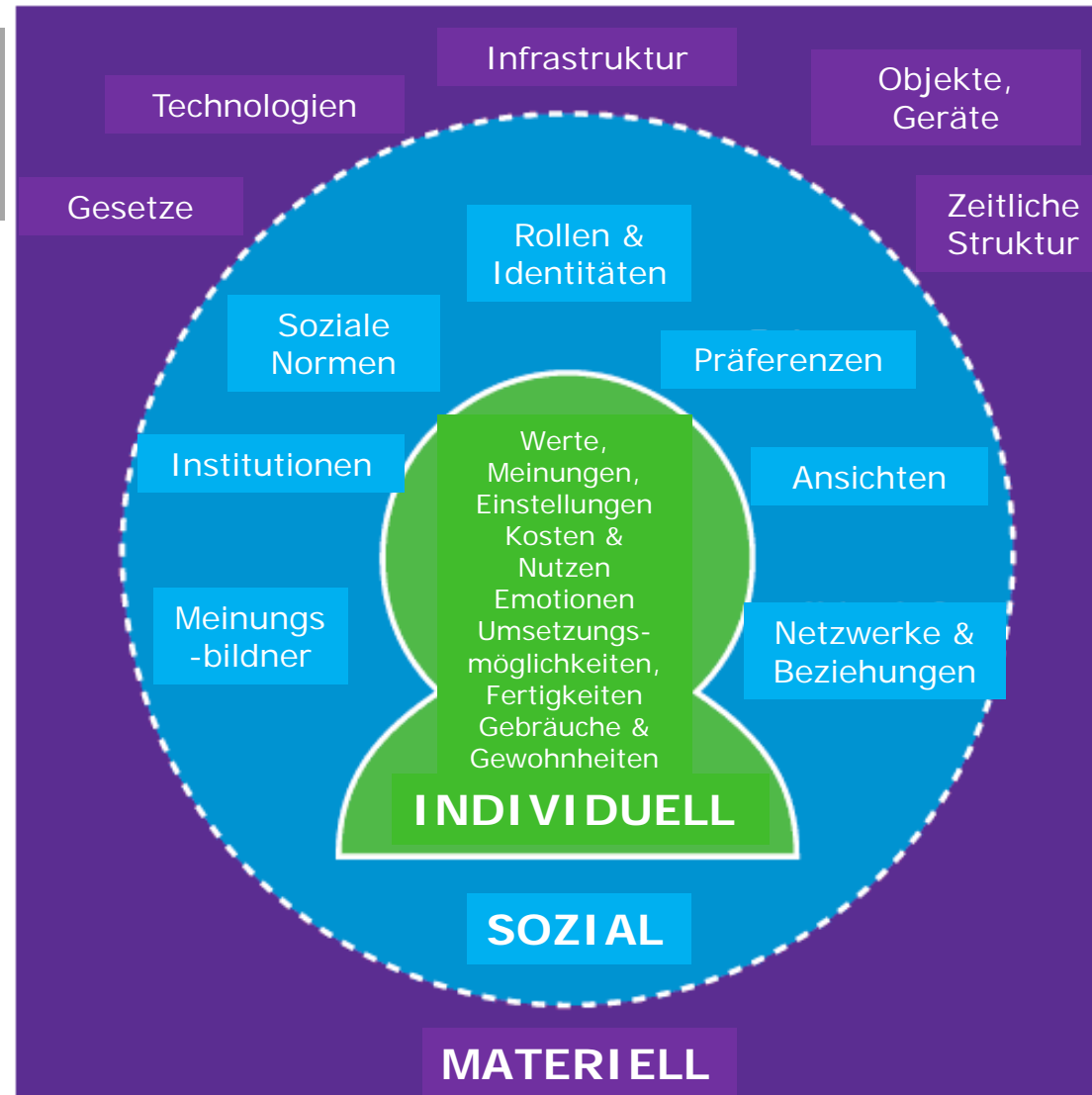
Your estimated cooling usage is based on last summer's energy use and temperature.

Quelle: Opower

28.04.2015, Folie 19

# Grundlegende Strategie

## ISM-Modell



Quelle: [www.gov.scot](http://www.gov.scot)

28.04.2015, Folie 20

I cannot do it ...



## DI Gerhard Lang



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Direkt zur Homepage!