THE SANDWICH

SYSTEMS THINKING
- SCIENTIFIC WORLDVIEW
- COMPLEX ADAPTIVE SYSTEMS
- HOW WE TEACH AND LEARN
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PRODUCTION & CONSUMPTION
- CRADLE TO CRADLE
- PRODUCT SERVICE SYSTEMS ETC
THE SANDWICH

SYSTEMS THINKING
- SCIENTIFIC WORLDVIEW
- COMPLEX ADAPTIVE SYSTEMS
- HOW WE TEACH AND LEARN

PRODUCTION & CONSUMPTION
- CRADLE TO CRADLE
- PRODUCT, SERVICE, SYSTEMS ETC

ENABLING CONDITIONS
- GOVERNMENT ‘RULES OF THE GAME’
- ICT REVOLUTION ETC
CONSUMER CREDIT

NOVELTY (NEW VERSIONS)

ENVIRONMENTAL IMPACT

STABLE CONDITIONS

CUT LABOUR

TRANSFER RESPONSIBILITY TO PURCHASER

BUILT-IN OBSOLESCENCE

MARKETING

CONSUMER CREDIT

NOVELTY (NEW VERSIONS)

TRANSFER RESPONSIBILITY TO PURCHASER

ENVIRONMENTAL IMPACT

STABLE CONDITIONS

CUT LABOUR
- Internalised cost/ responsibility
- Smaller scale/ adaptable to change
- Incentive to lower cost of service/ performance
- User experience paramount
- Product/ component/ material supply risk reduced
- Extended product life
- ICT provides feedback - use/ maintenance/ access
- Components also a product of service
A CAKE

PRIVATE SECTOR

PUBLIC SECTOR

INFORMAL & UNPAID, CARING, SHARING ETC.

NATURAL CAPITAL, CLEAN AIR, CLEAN WATER, RESOURCE BASE INC. SOILS, FISHERIES, BIODIVERSITY

MONETISED

NON-Monetised
A Doughnut for Later?

7 WAYS TO THINK:

1. CHANGE THE GOAL
   - GDP
   - Circular economy as a transition; fixes materials/resources, harnesses digital feedback?

2. SEE THE BIG PICTURE
   - SELF-CONTAINED MARKET
   - Circular economy as one part of a transformation: using dynamic systems insights with materials/resources as Step 1?

3. NURTURE HUMAN NATURE
   - RATIONAL ECONOMIC MAN
   - EMBEDDED ECONOMY

4. GET SAVVY WITH SYSTEMS
   - MECHANICAL EQUILIBRIUM
   - SOCIAL ADAPTABLE HUMANS

5. DESIGN TO DISTRIBUTE
   - GROWTH WILL EVEN IT UP AGAIN
   - DYNAMIC COMPLEXITY

6. CREATE TO REGENERATE
   - GROWTH WILL CLEAN IT UP AGAIN
   - DISTRIBUTIVE BY DESIGN

7. BE AGNOSTIC ABOUT GROWTH
   - GROWTH ADDICTED
   - REGENERATIVE BY DESIGN

Close loop/closed source dominates?

Source: Kate Raworth, adapted by Ellen MacArthur Foundation
Are we headed for a new economic paradigm?
Effective Systems as a Dynamic between Efficiency and Resilience

Sustainability

Window of Viability

Real life ecosystems

Towards brittleness

Towards stagnation

Optimal balance

Greater Efficiency

Greater Resilience

Efficiency

Diversity & Interconnectivity

Authors claim this structure applies to all flow networks - data, energy, money, molecules, in these kind of systems.

Source: Goerner, Lietaer and Ulanowicz, 2009
We managed to develop all technologies required to separate, purify and recycle PV waste. End-of-life modules,

Luc Federzoni, French research institute CEA

Second use batteries as part of storage as a service. Effective not just efficient.