

Transitioning towards a



Sustainable Circular Plastics Economy (SCPE):

Dual Track Governance (DTG)

Henk Diepenmaat, René Kemp, Laura Nieboer,
Syschemiq policies and tools to enhance plastic waste: Turning waste into opportunity,
Lombardy, Italy, March 12 2025

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This presentation:

- 1. The plastic dilemma**
2. Solution: transitioning towards a SCPE
3. The two tracks of Dual Track Governance
4. Innovating society: the backbone
5. Example packages of DTG measures
6. Open questions

The plastics dilemma:

You cannot continue using current packaging methods, but you cannot abandon them either. After all, the intrinsically sustainable alternatives are not available yet.



(The Packaging Dilemma, KIDV, State of Sustainable Packaging: beyond closing the loops, 2020)

- The societal benefits of plastics are large and difficult to underestimate.
- But plastics also and increasingly cause harm.

(What applies to packaging applies to plastics in general:)

We cannot stop using plastics the way we do, but we cannot continue doing so either.

The plastics dilemma

- The pragmatic benefits of plastics are large and difficult to underestimate.

Plastics are **versatile** and **flexible** building blocks, packaging materials and ingredients in our existing production-consumption chains. They **reduce food spoilage**, which offers enormous sustainability benefits. They are f.e. a **component of renewable** energy technologies (through their use in PV applications and turbine blades, which are light and turn fast), road vehicles incorporate (cheap) lightweight plastic components that **reduce fuel consumption**.

- But plastics also and increasingly cause societal harm.

Harm to eco-systems in which non-collected plastics are released (**littering and plastic soup**), to humans via **toxic components** and **micro- and nano-particles entering the food chain and the human body**, and to the climate system through the release of carbon emissions of fossil origin. **Few** plastics undergo multiple **recycling cycles** because this is not economical. These are big problems which are not easily overcome. There always will be a **need for virgin material** (preferably bio) to make up for the inefficiencies of recycling. This is even more relevant if you consider the advantages and problems of plastics in their full context and interaction.

We cannot stop using plastics the way we do, but we cannot continue doing so either.



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As a society, we are implementing **recycling** of waste (**mechanical, chemical, dissolution, ...**), and testing forms of **circularity** at higher value levels (**reuse, refurbish, repair, ...**).



Recycling

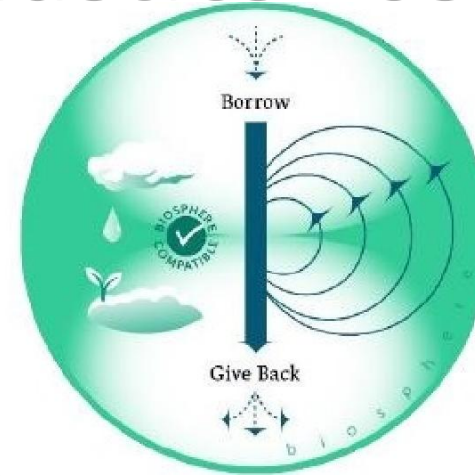


Circularity

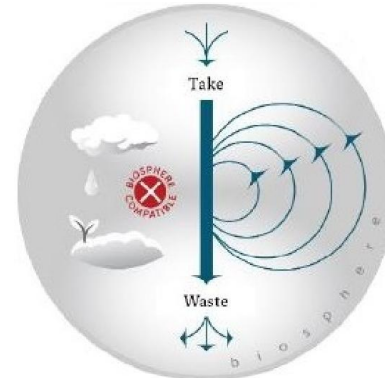
Linearity

This requires the innovation of **production-consumption systems** (*arrangements we will call them*).

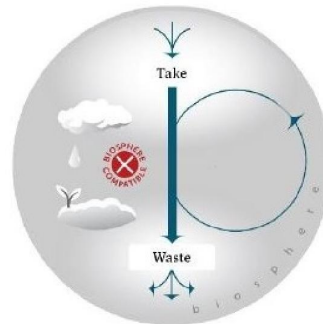
Sustainable Circular Plastics Economy (SCPE):



Largely **biosphere-compatible** production-consumption systems causing no harm to man and environment (future)
“Beyond closing the loops”



Production-consumption systems using **several cyclic principles** like recycle, refurbish, repair (medium future)



Production-consumption systems **recycling waste** (now and future)



Linear production-consumption systems (not so long ago and now)

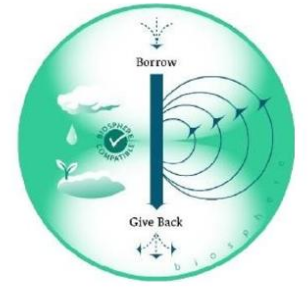


Autarkic production-consumption systems (long ago)



“Beyond closing the loops”

Is this crucial **recycling** transition step going well?



Focus of Syschemiq: **recycling**



Two illustrations ...

Packaging and Packaging Waste Regulation (PPWR) timeline

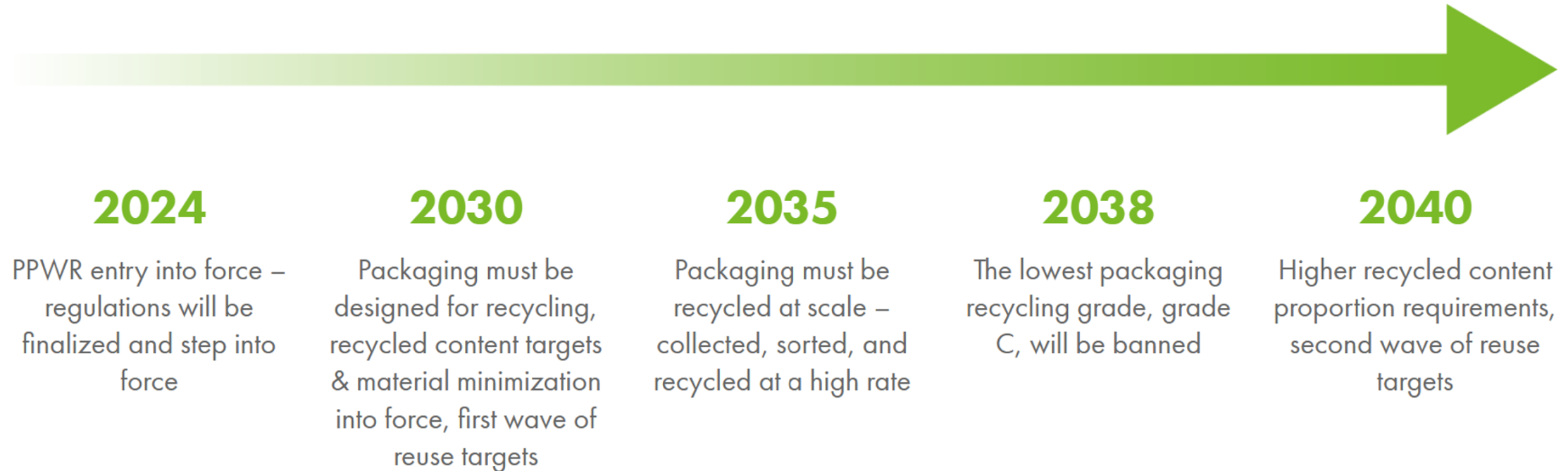


Figure 28: The Packaging and Packaging Waste Regulation timeline. Source:

<https://www.upmraflatac.com/sustainable-packaging/ppwr/>.

Technology provider Innovative SME	Chemical Corporate partner	CR (*)	Location CR-Plant (**)	Timing	Scale (Kt waste)
Plastic Energy (UK)	SABIC	P	Geleen	Q1 2023	20
Blue Alp	Shell	P	Moerdijk	2024	35
Pryme	Shell	P	Rotterdam	2023	40
Mura (UK)	Dow NL	H-P	Teesside	2023	20
Mura	Dow NL	H-P	Böhlen (D)	2024 (FID)	120
Fuenix Ecogy	Dow NL	P	Weert	2023	15
Clariter	Teijin	P	Delfzijl	2024	60
Alterra	Neste	P	Vlissingen	2025	55
Ioniqa	Indorama	S	Geleen	2020	10
Ioniqa	Koch TS	S	Several	>2024	Roll out
Cure Tech	Niaga Covestro	S	Emmen	2023	25
BioBTX/Agilyx	Teijin	C	Delfzijl	2027	50
Synova	SABIC	C	tbd	2025 (FID)	50
Synova	Trinseo	D	Tessenderlo (B)	2024	15
Gidara	BP	G	Amsterdam	2024	175
Gidara	PoR	G	Rotterdam	2025/2026	180
Enerkem	Shell	G	Rotterdam	2023/2024	360

Source: Analysis by expert team Circular Biobased Delta

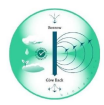
Figure 32: Chemical Recycling plants in the Dutch ecosystem. Source: <https://circulareconomy.europa.eu/platform/sites/default/files/2023-08/Chemical%20Recycling%20in%20Circular%20Perspective.pdf>. P stands for Pyrolysis, G for Gasification, D for Dissolution.



Chemical recycling plants in the Dutch ecosystem. Harsh times!!

???





Is this recycling transition step going well?

We've surely made progress. But there are also many obstacles and questions:

- Wat arrangements to choose? Mechanical, chemical, dissolution, mixtures, ...?
- How about the potentials of ecodesign?
- How to deal with the **disastrous** linear competition (virgin plastics from the east)? Is that fair?
- **How about the cooperation between recyclers, producers, packagers, municipalities, consumers?**
- **How about the roles of and cooperation between business and governments?**
- **Who is responsible? (etc.)**

Focus of
Syschemiq:
recycling



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- 2. Solution: transitioning towards a SCPE**

Transitioning towards a SCPE is very likely to solve the plastics dilemma, but is far from easy.

It requires some serious societal innovations. This is where the need for DTG emerges.



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Dual Track Governance

Governance: "the organization of alignment" (Hans Boutellier).

Observation 1: Circularity is not at all new or difficult.

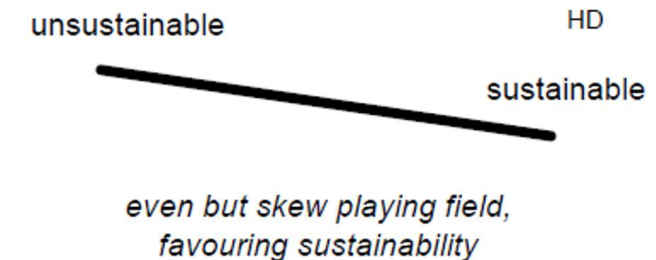
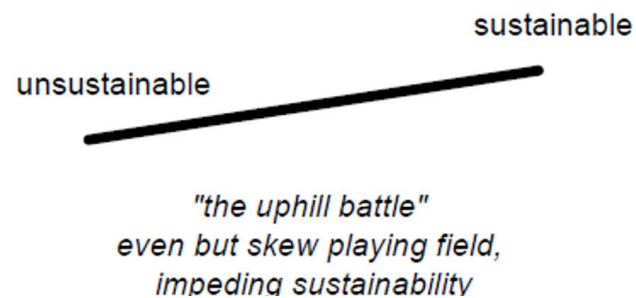
Gold has been recycled since time immemorial. Fist axes and amphora were repaired and reused intensively.



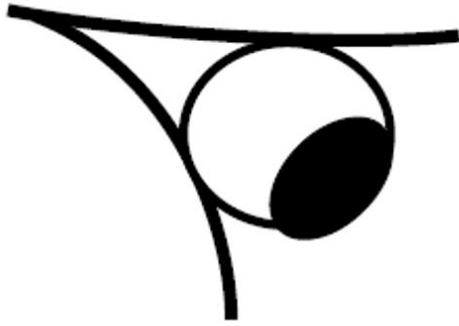
Observation 2: Circularity tends to emerge naturally, to arise spontaneously.

That is, when **value** is generated for the actors involved (a crucial precondition).

When the going is tough, this value is lacking, so *organize an alignment* that creates value!
= governance!



Tilt the playing field by professional governance! How?



The reflective and participatory Dual Track Governance stance

Governance on the societal and institutional level

system barriers, cultures, rooted experiences,
sector regulations, legislations, Institutions, ...

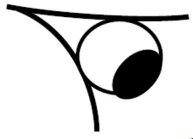
Governance on the operational and technical level

technical and financial/economic features of
circular production-consumption processes

*Such a governance must include,
differentiate and integrate at
least two different viewpoints,
hence:*

Dual Track Governance

*Such a governance requires
Concerted actions of at least
Business and Governments,
which largely correspond with
the tracks.*



*The reflective and participatory
Dual Track Governance stance*

Governance on the societal and institutional level

system barriers, cultures, rooted experiences,
sector regulations, legislations, Institutions, ...

Governance on the operational and technical level

technical and financial/economic features of
circular production-consumption processes



Syschemiq

A strong government and an innovative and energetic business community who put their heads together could get far.

However, we all know that this is not that simple to achieve. Societal systems encompass and should serve many quite different and not seldomly opposite interests and needs. Let's put DTG in a societal embedding.



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Backbone (intuitive)



Politics



Policy
measures



Production-consumption
arrangements



Daily practices /
Daily transactions

Backbone (intuitive)



Politics

Policy measures



Governance on the societal and institutional level

system barriers, cultures, rooted experiences,
sector regulations, legislations, Institutions, ...

Production-consumption arrangements



Governance on the operational and technical level

technical and financial/economic features of
circular production-consumption processes

Daily practices / Daily transactions





Dual Track Governance:

coherent policy sets, operational measures and packages on at least two tracks encourage new transactions (vertebra 1) that help realise newly emerged or neglected societal goals (vertebra 4) and thus re-align the four vertebrae resulting in a rebalanced backbone.

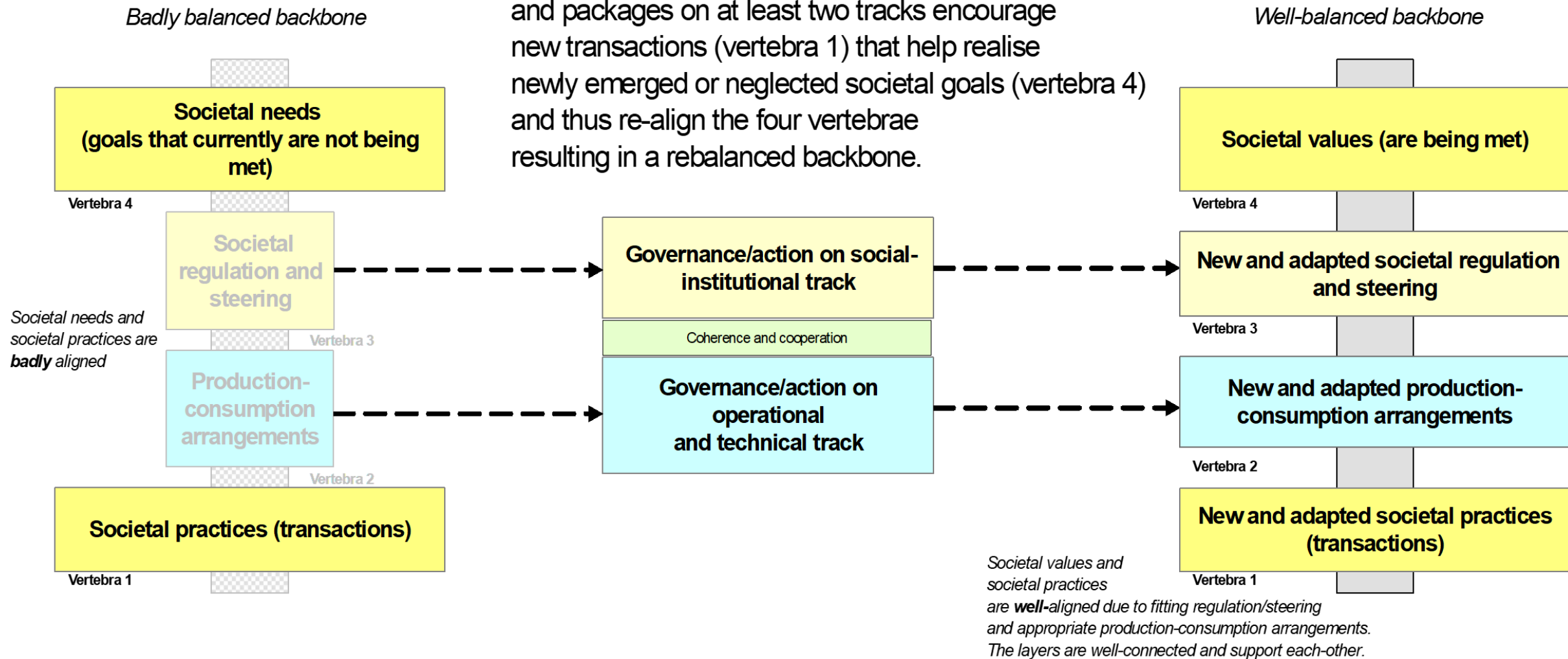


Figure 29: Dual track governance as a shift in the societal backbone of transactions-arrangements-societal needs and values.



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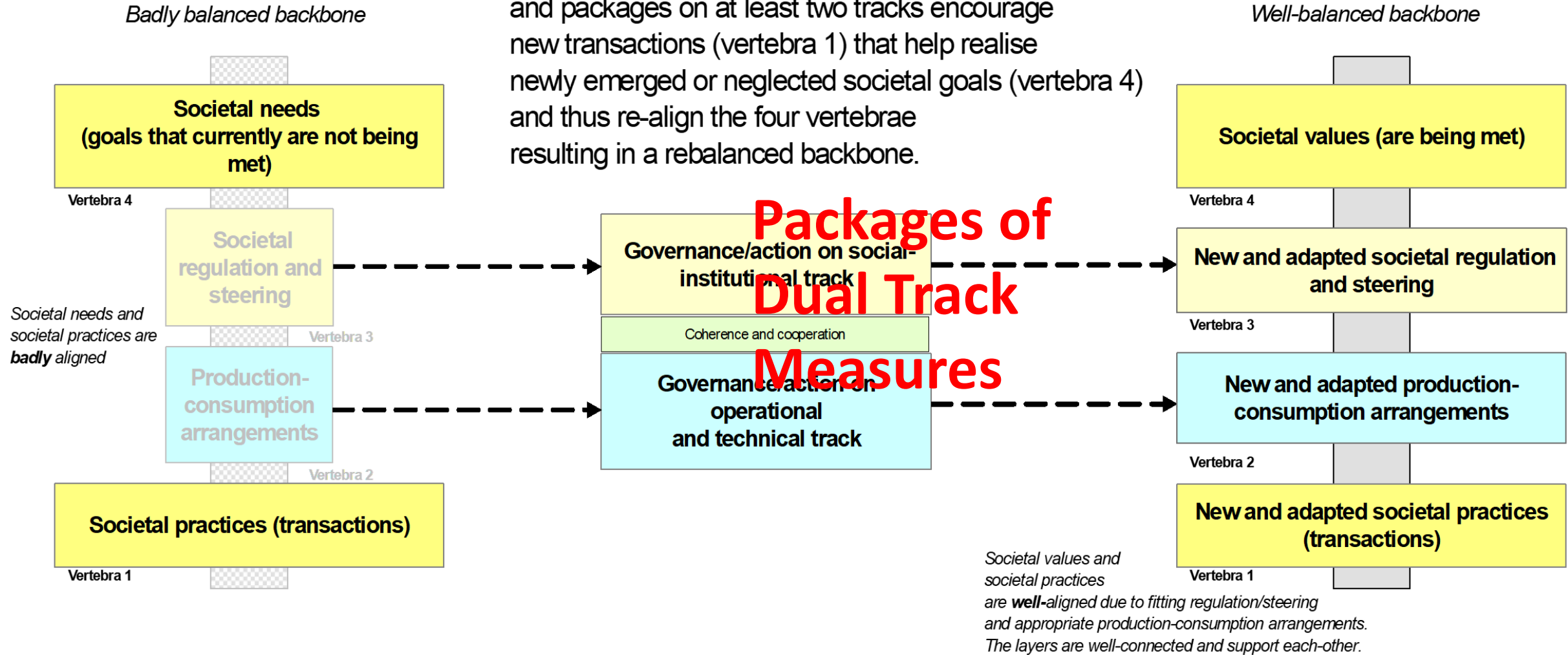


Figure 29: Dual track governance as a shift in the societal backbone of transactions-arrangements-societal needs and values.



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Policy package one: a circular plastics norm for *brand owners* with a trading system in plastic recycle credits and information requirements for brand owners on recycle use in packaging of fast moving consumer goods.

In this policy package, brand owners have to report to the EPR organisation the share of recycle use in all of their packaging, if they do not meet a certain percentage for the packaging as a whole they have to buy credits from the producer responsibility organisation or converters. This system will give a positive incentive to both mechanical and chemical plastic recycling (and dissolution and gasification).

The system is effective and efficient and does not disadvantage Dutch converters.

Brand owners are not unduly shamed or accused of greenwashing. The system is transparent as to recycle use.

Lessons can be used in an EU scheme. Systems of credit trading have been successfully used for carbon emissions from facilities and for carbon emissions from vehicles in the EU.

Bioplastics use can be stimulated in the same way (through bioplastic use requirements and bioplastic credit trading).

(Policy) Package two: Business action for a SCPE with the help of innovation policy and voluntary standards.

In this package, front runners engage in coordinated action for innovation and market development.

In a joint effort to become more green, a group of supermarkets and brand owners decide not to compete on prices for packaging but adhere to certain sustainability standards. The problem of supermarkets competing on low costs is thus circumvented.

In those efforts they are helped by innovation policy and special funds.

+ ???

Policy package three: a protectionist policy by the EU for the plastic industry and chemical recycling.

To keep plastic production in Europe the EU engages in a protectionist policy for green plastics (low-carbon and high percentage of circularity). The greenness is used as the reason for keeping out foreign competitors.

Within the EU, greenness is actively encouraged through policies proposed by the Dutch acceleration table for chemical recycling (described in 2.2) and a green deal for plastics, to remain more green than companies in other trading blocks.



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Transitioning to a SCPE is no easy matter. But key questions can be identified and become answered.

1. Are we in a stalemate?
2. Can waste collectors and plastic recyclers survive the next 5 years? (In 2030 EU recycle requirements take on effect) What to do about it?
3. What are the future societal needs and wishes concerning packaging and materials?
4. What does the future of plastics look like? What do we see in 30 years (desired functionalities, other raw materials, design)?
5. What are the future routes for waste and plastics (recycling technologies: mechanical, chemical, dissolution, ...)?
6. What are good coherent Dual Track packages of measures for stepping towards a SCPE (on the basis of DTG policies and DTG transition strategies)?
7. How can business and government truly cooperate, while respecting their different roles? Who is/are in charge?
8. ..., ... See also slide 11 and the different reports on DTG so far (at the end).

**Transitioning towards a
Sustainable Circular Plastics Economy (SCPE):**

Dual Track Governance (DTG)

**We are not there yet
but we are on track!**



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Literature on Dual Track Governance

Diepenmaat, H. (2018), *The path of humanity: societal innovation for the world of tomorrow*, Parthenon Publishing House, Almere, The Netherlands.

Diepenmaat, H., Kemp, R., Velter, M. (2020), *Why sustainable development requires societal innovation and cannot be achieved without this*, *Sustainability* (special issue "Sustainable Innovation and Transformation"). 12(3), 1270 <https://doi.org/10.3390/su12031270>

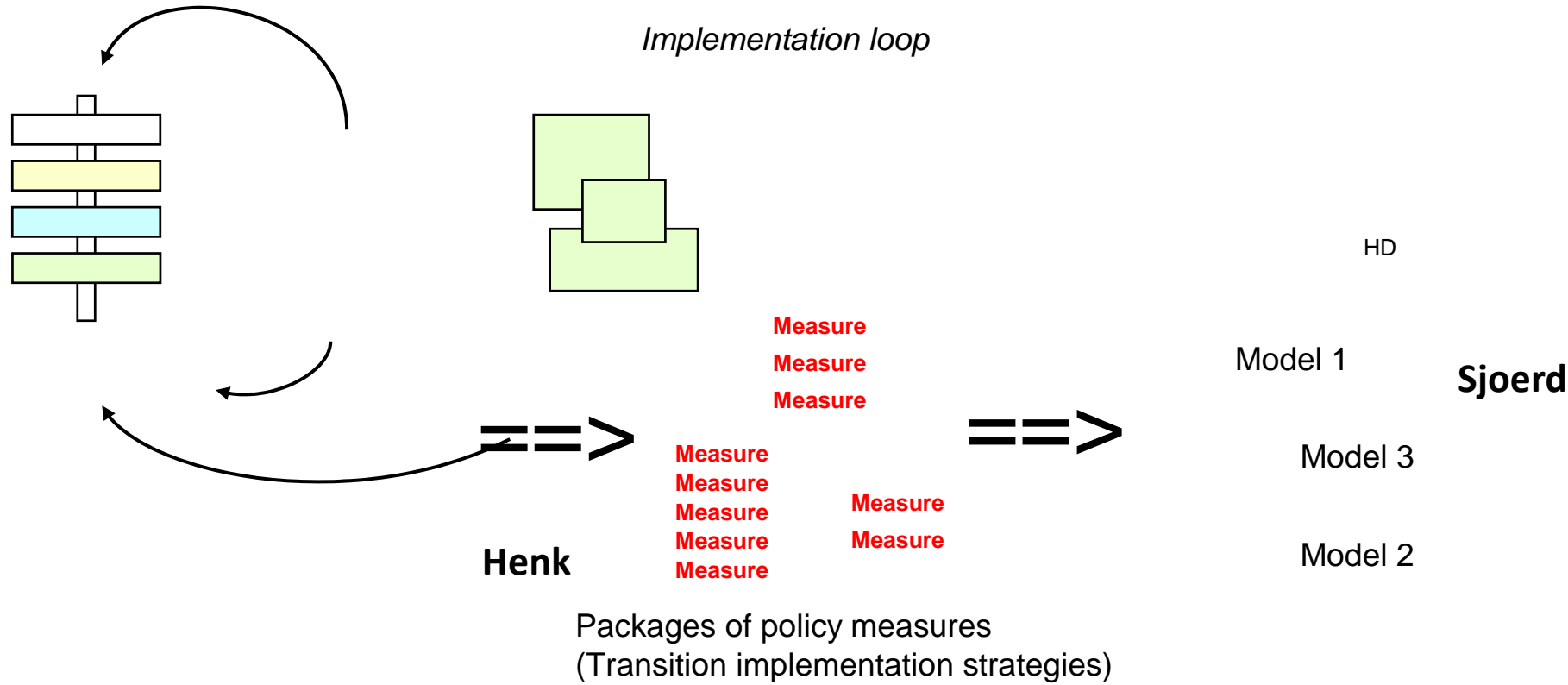
Diepenmaat, H., Kemp, R. (2023). *Dual Track Governance for a Circular Plastics Economy. Methods for analyzing and furthering plastic packaging circularity in the Meuse-Rhine region, D1.1 Methodology report Governance Support Systems: Design*, Report for SYCHEMIQ project.

Diepenmaat, H., Kemp, R., Nieboer, L. (2024). *D1.2 Case Report Multi-Actor Governance Model: Application 1.0 - Dual Track Governance: Aligning Individual with Collective Rationality for a Circular Plastic Economy*. Report for SYCHEMIQ project.

Diepenmaat, H., Kemp, R., Nieboer, L. (2025). *D1.3 Case Report Multi-Actor Governance Model: Application 2.0 - Dual Track Governance: Understanding and steering the societal playing field towards a sustainable circular plastics economy*, Report for SYCHEMIQ project.

The Dual Track Governance research has many sources and relies heavily on these. For further literature references and sources, see the references at the end of the above references.

Relationship talk Sjoerd to talk Henk



The thinking through, communication and design of Dual Track Governance Transition Strategies on the basis of intentional logics.

Exploring the effects of implementing packages of policy measures by means of mathematical models (they change settings)

Exploration loops