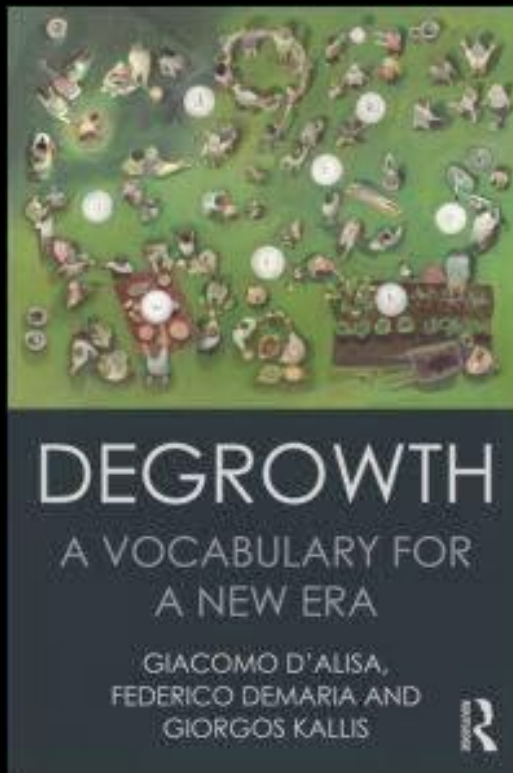


Why our economies cannot be circular

我们的经济为什么无法循环



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The sustainability crisis

可持续性危机

- Climate change;
 - Peak oil and peak everything;
 - Air pollution;
 - Loss of biodiversity;
 - ...
- Limits at both sources and sinks!
- 气候变化;
 - 石油等资源（哈伯特）顶点;
 - 空气污染;
 - 生态多样性的丧失;
 - ...
- 源与汇的双重极限

Economic growth and the environment

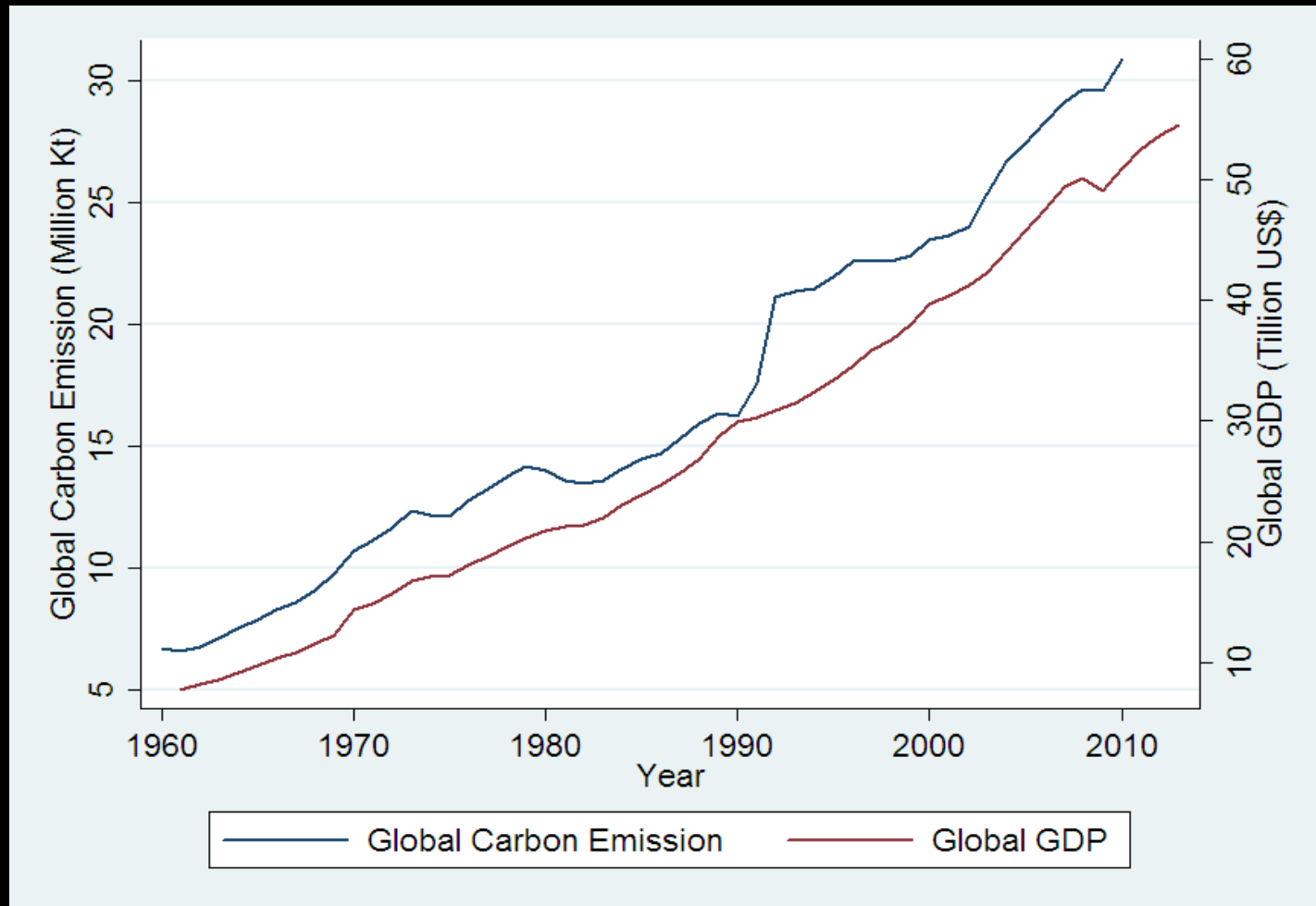
经济增长与环境

Is there a trade-off between economic growth and ecologically sustainability? Or else, can economic growth be compatible with sustainability? 经济增长与生态可持续是否能交换和权衡？或者说，经济增长是否可以与生态可持续兼容？

- If yes, how? 如果能，那么怎样平衡或兼容？
- If not, what alternatives do we have? If you had to choose between economic growth and sustainability, what would you choose? 如果不能，我们还有哪些替代选择？如果必须在经济增长与生态可持续间进行选择，你会选择什么？

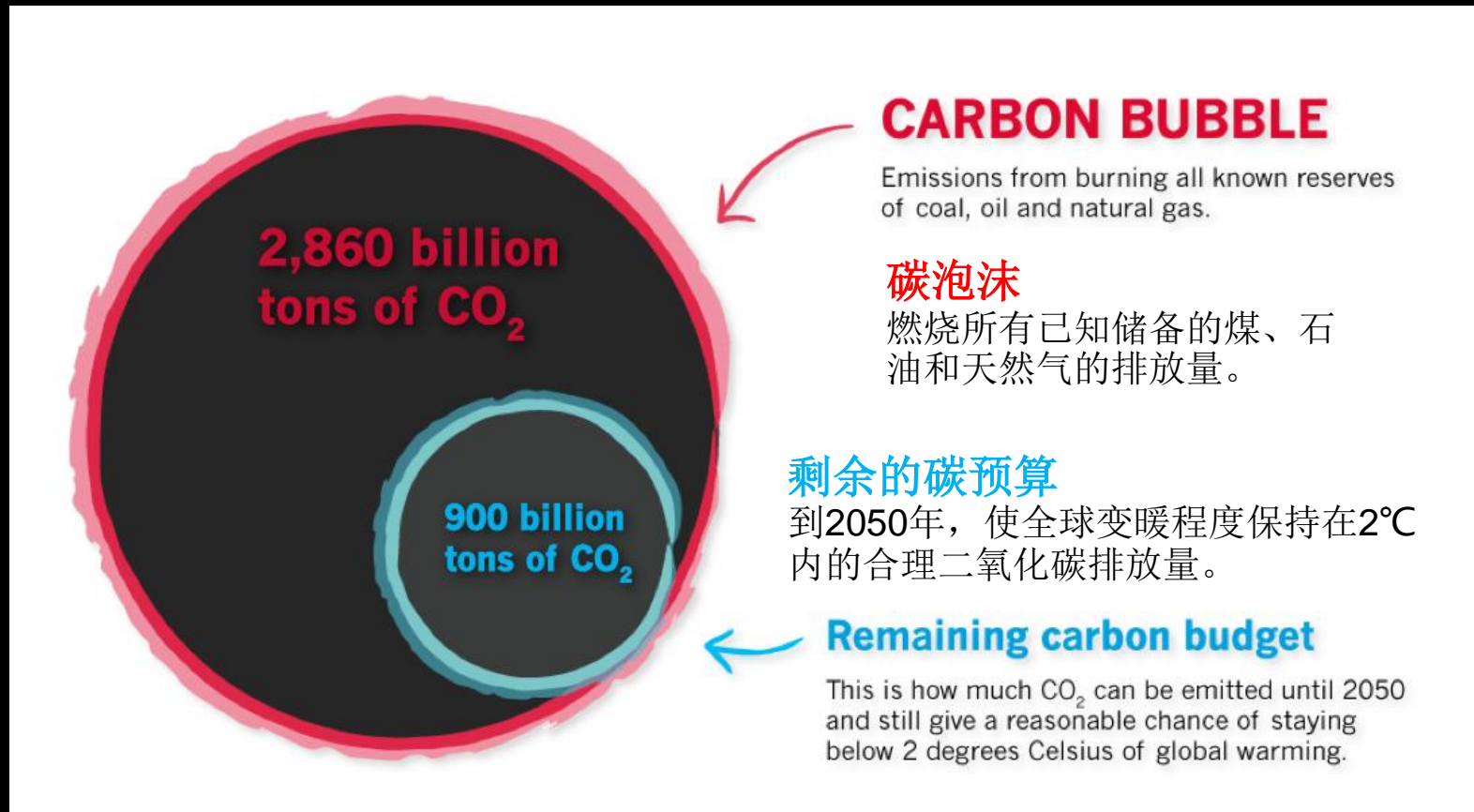
More economic growth, more CO2 emissions.

经济越增长，二氧化碳排放量越多



Carbon budget (IPCC, 2013)

碳预算 (政府间气候变化专门委员会 , 2013)

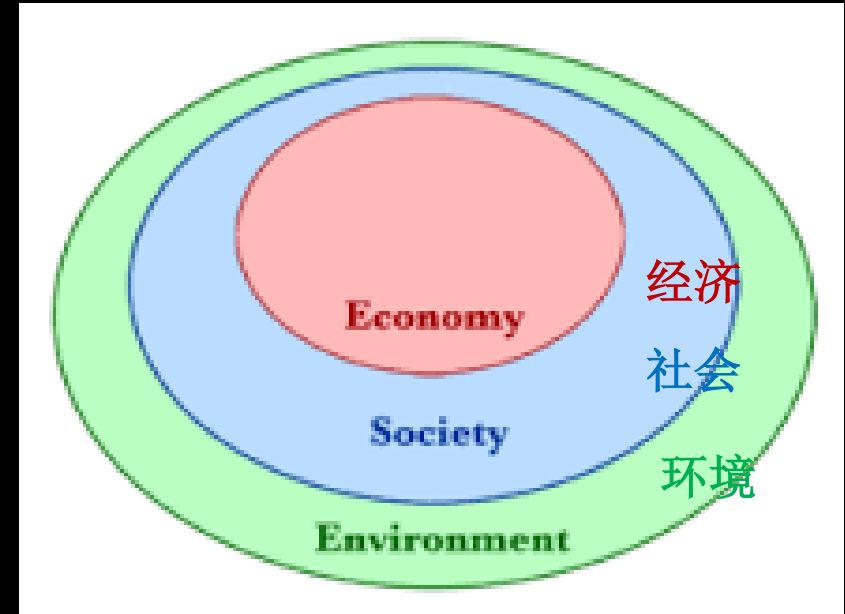


Source: Carbon Tracker and Grantham Institute (Imperial College – LSE; 2013; carbonbubble.info)
See also: Meinshausen et al, 2009; IPCC, 2013; Le Quere et al, 2013.

My theoretical perspective

理论视角

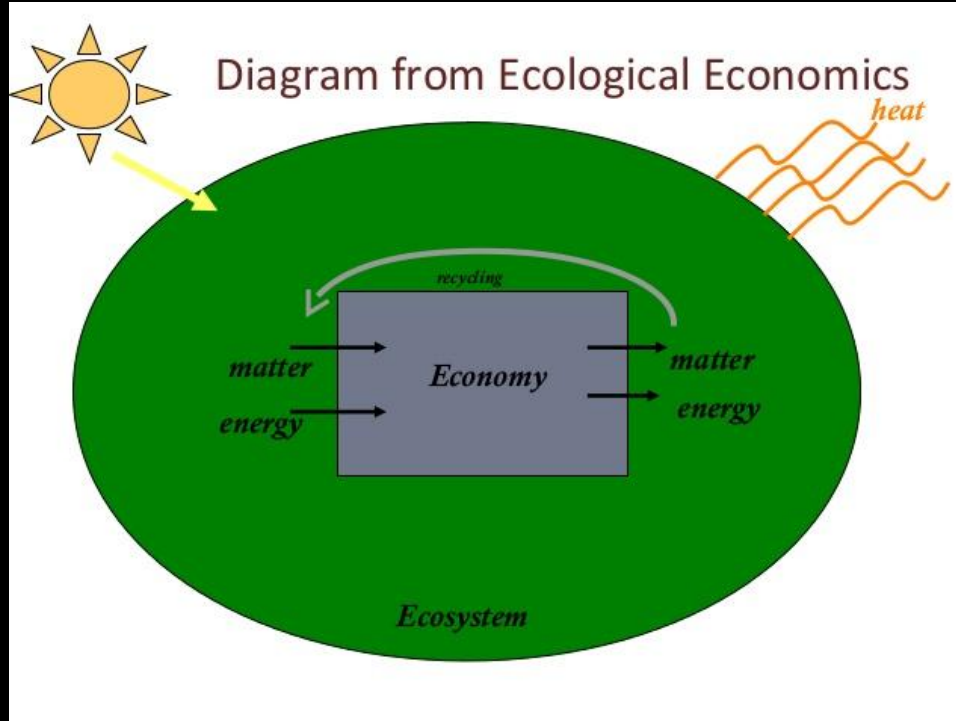
- Ecological economics
- 生态经济学
- Political ecology
- 政治生态学



Ecological economics (EE)

生态经济学（简称EE）

- EE studies the material and energy flow within the economy. **生态经济学研究环境中物质与能量的流动。**
- It is different from environmental economics, that only studies money flow. **它与环境经济学不同，环境经济学仅仅关注资金流动。**



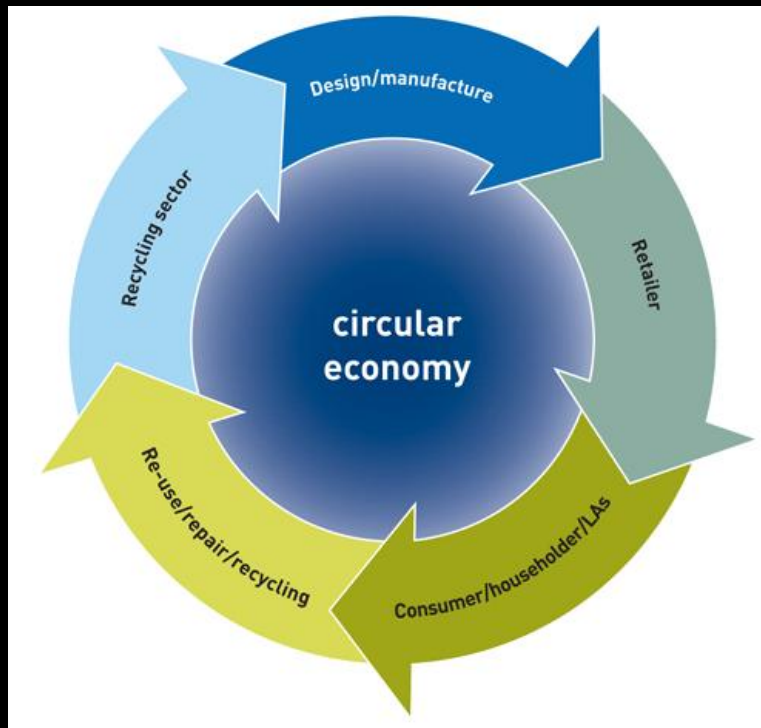
生态经济学图示

- Economy 经济
- matter 物质
- energy 能量
- recycling 循环
- heat 热量
- Ecosystem 生态系统

What is the Circular Economy?

什么是循环经济？

- **Definition:** “A circular economy is restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times.”
- **定义：** “循环经济可通过设计实现的可恢复、可再生的经济形态，其目标是使产品、组件与原材料在所有过程中能够实现最高的利用率。”



circular economy 循环经济
Design/manufacture 设计、加工
Retailer 零售商
Consumer/householder/LAs
消费者、家户、地方行动者
Re-use/repair/recycling
重复使用、维修、回收
Recycling sector 回收部门

But in reality it is more like this:

但是，所谓循环经济在现实中更像：

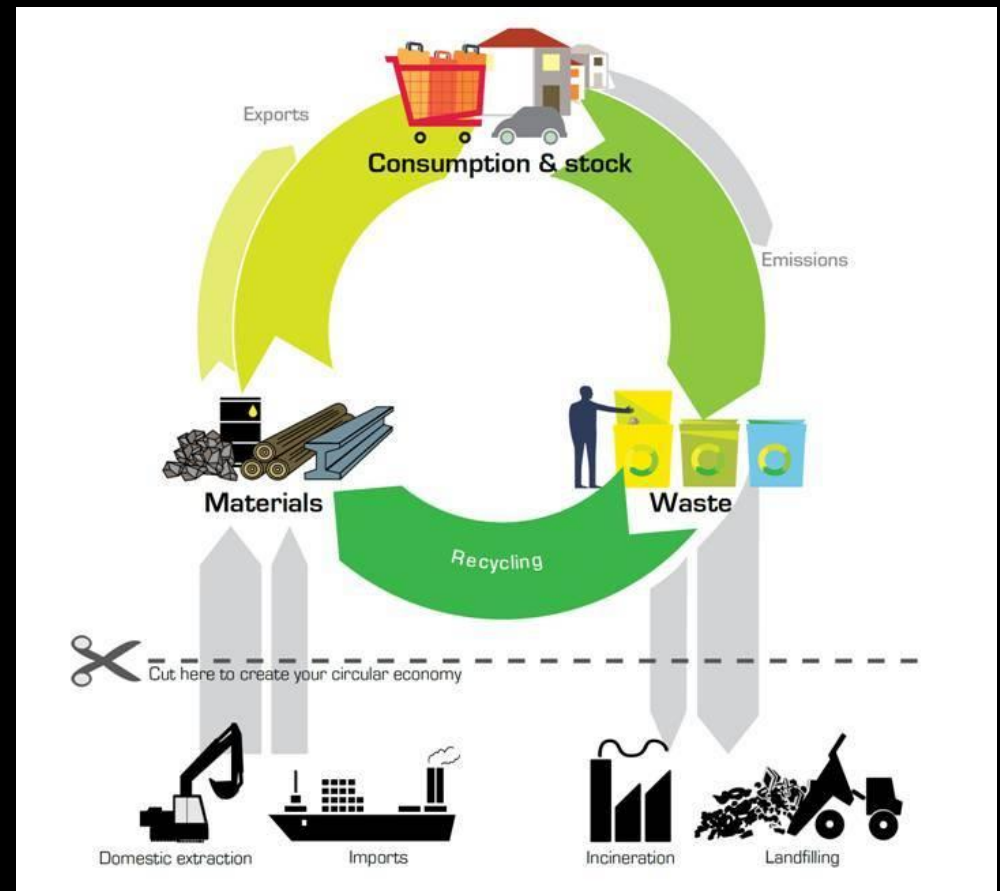


- There are still inputs (resources) and outputs (waste)!
- 其中仍然有（资源）输入和（废弃物）输出！

What is the Circular Economy?

循环经济是什么？

- Transition: From linear to circular.
- 转变：从线性到循环。



The Circular Economy in China

中国的循环经济

- The Law for the Promotion of the Circular Economy, Circular Economy Development Strategies and Action Plan, and the 12th and 13th Five-Year plans.
- 《循环经济促进法》（2008），《循环经济发展战略和行动计划》（2013），以及“十二五”和“十三五”计划。
- Measurement indicators: Material Flow Analysis (MFA), but also life cycle analysis (LCA), CO2 emissions and Energy.
- 测量指标：物质流分析（MFA），还有生命周期分析（LCA），二氧化碳排放量和能值。

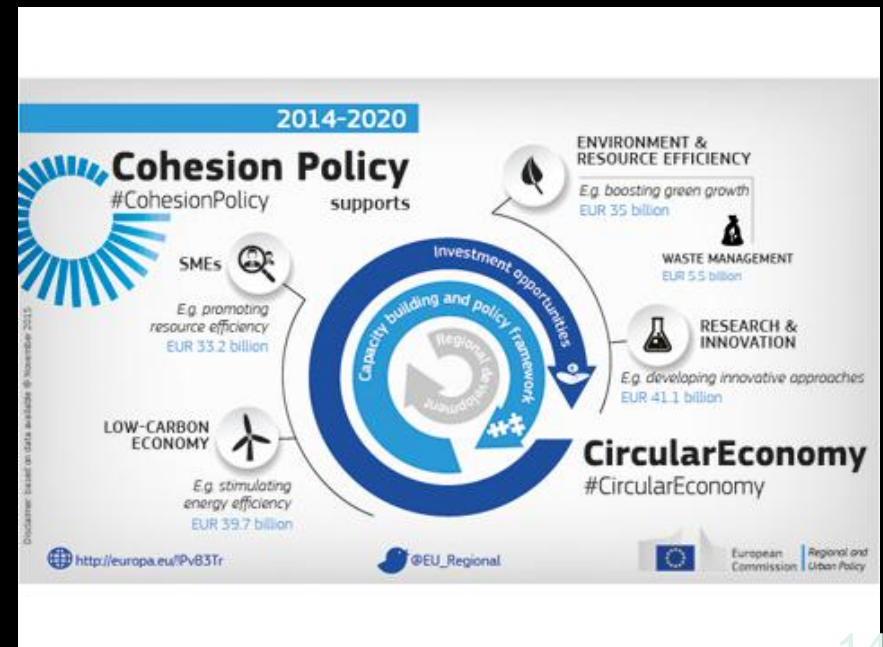


The Circular Economy in Europe

欧洲的循环经济

- “The CE transition will boost the EU’s competitiveness by creating new business opportunities and protecting businesses against scarcity of resources and volatile prices, offering opportunities for innovation, new business models and more efficient ways of production and consumption.” (Council of the European Union, 2016)
- “循环经济转型通过创造新的商机、保护企业免受资源稀缺和价格波动的影响，提供创新机会、新的业务模式和更高效的生产方式和消费方式，从而提高欧盟竞争力。”（欧盟理事会，2016）

- Aims: “to maintain EU competitiveness and protect the environment”.
- 目的：“保持欧盟竞争力，保护环境”



A critique of the Circular Economy

对循环经济的一个批判

1. Energy cannot be recycled; 能源不能回收 ;
2. Renewable energy is not like fossil fuels; 可再生能源不同于化石燃料 ;
3. The limits of efficiency; 效率限度 ;
4. Materials can be recycled only up to a certain extent; 材料只能在一定程度上回收 ;
5. What about the social and political dimensions of the circular economy? 循环经济的社会和政治维度如何 ?
6. Global assessment of how circular is the global economy. 对全球经济循环程度的全球性评估



1. Energy cannot be recycled

能源不能回收

- Energy: It is constantly degraded or lost from the system (Laws of thermodynamics). 能源：它不断地从系统中退化或丢失（热力学定律）。

Fossil fuels cannot be recycled; 化石燃料不能回收；

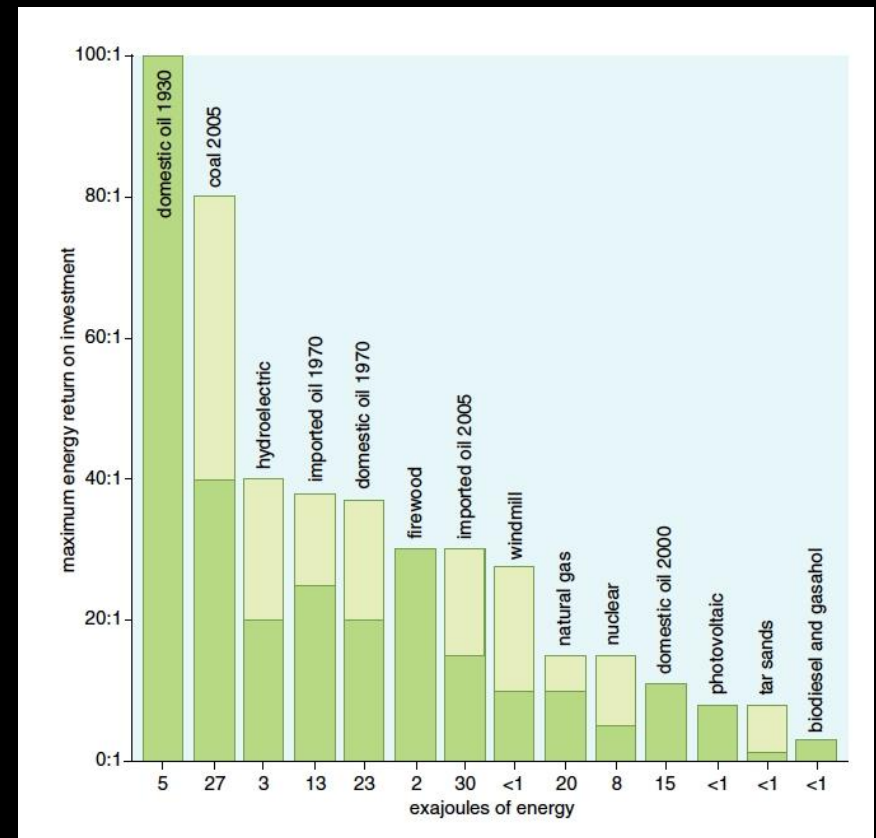
Ecosystems are circular, but they depend only upon solar energy. 生态系统是循环的，但它们只依赖于太阳能。

- Materials: Only partial recycling is possible. 材料：只能部分回收。

2. Renewable energy is not like fossil fuels

可再生能源不同于化石燃料

- Renewable energies depend on the sun, but they are different from fossil fuels. **可再生能源依赖于太阳，但它们不同于化石燃料。**
- Today's economies cannot be easily transformed into solar economies. **今天的经济不能轻易转化为太阳能经济。**
- E.g. Energy Return on Energy Invested (EROI) **例如能源投资回报率 (EROI)**

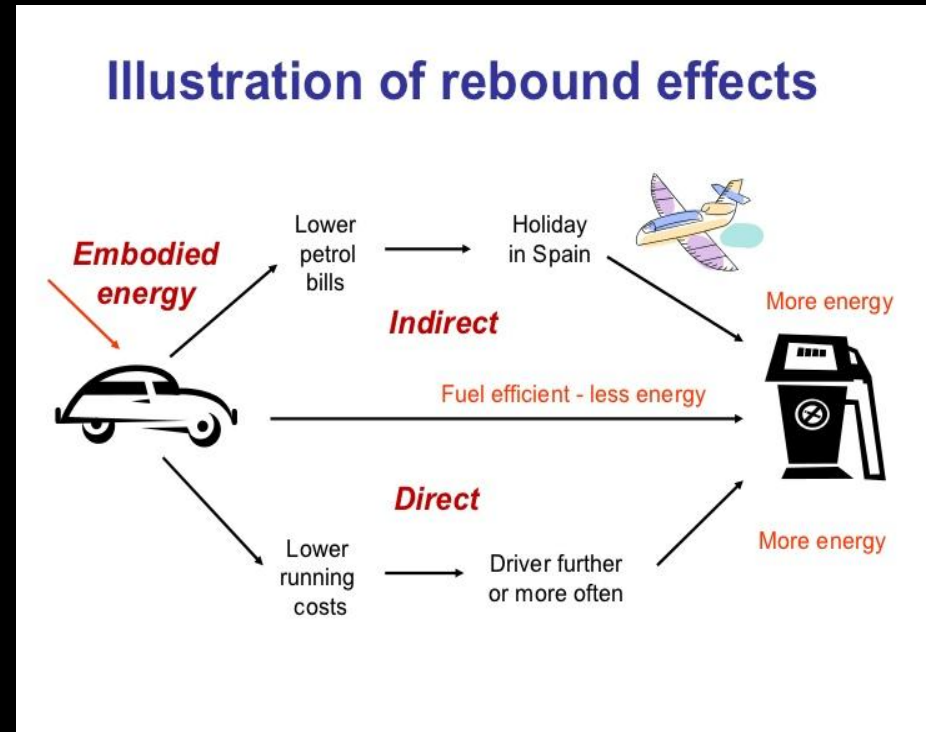


3. The limits of efficiency 效率限度

- **Rebound effect** is the reduction in expected gains from new technologies that increase the efficiency of resource use, because of behavioral or other systemic responses.
- **回弹效应**是指由于行为性或其他系统性反应，从提高资源利用效率的新技术中获得的预期收益减少。

- In simple terms, efficiency improvements can lead to and increase in consumption, rather than a decrease.

- **简单来说，效率的提高会诱致和增加消费，而不是减少。**



4. Materials can be recycled only up to a certain extent **材料只能在一定程度上回收**

100% recycling of materials is theoretically possible, but practically impossible.

100%回收材料在理论上是可能的，但实际上不可能。

Many materials can be recycled only a finite number of times (e.g. Plastic or paper, about 6 times)

许多材料可以回收的次数有限（如塑料或纸，约6次）

Other can be recycled infinitely, assuming they are collected separately (e.g. glass, steel or aluminium)

假设能够被分别收集起来的情况下（如玻璃，钢或铝），可以无限次回收利用。

5. What about the social and political dimensions of the circular economy?

循环经济的社会和政治维度如何？

Recycling often involves labour exploitation and pollution.

回收往往涉及劳动力剥削和污染。

e.g. Shipbreaking or informal wastepickers in our cities

例如，拆船工人或拾荒者



6. Global assessment of how circular is the global economy (Haas et al, 2015).

对全球经济循环程度的全球性评估

“4 gigatonnes per year (Gt/yr) of waste materials are recycled, this flow is of moderate size compared to 62 Gt/yr of processed materials and outputs of 41 Gt/yr”. → Only 6% of materials are currently recycled!

“每年40亿吨的废旧物资得到回收，相对于620亿吨/年的加工材料使用和410亿吨/年的产能，这一规模是相当小的”。 →目前只有6%的材料被回收利用！

Why is it so low?

为什么回收率这么低？

e.g. 44% of processed materials are used to provide energy and are thus not available for recycling. **例如：44%的加工材料用于提供能量，因此无法回收。**

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RESEARCH AND ANALYSIS

How Circular is the Global Economy?: An Assessment of Material Flows, Waste Production, and Recycling in the European Union and the World in 2005

Willi Haas, Fridolin Krausmann, Dominik Wiedenhofer, Markus Heinz

First published: 13 March 2015 Full publication history

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Metabolism Research

Volume 19, Issue 5
October 2015
Pages 765-777

Summary

It is increasingly recognized that the growing metabolism of society is approaching limitations both with respect to sources for resource inputs and sinks for waste and emission outflows. The circular economy (CE) is a simple, but convincing, strategy, which aims at reducing both input of virgin materials and output of wastes by closing economic and ecological loops of resource flows. This article applies a sociometabolic approach to assess the circularity of global material flows. All societal material flows globally and in the European Union (EU-27) are traced from extraction to disposal and presented for main material groups for 2005. Our estimate shows that while globally roughly 4 gigatonnes per year (Gt/yr) of waste materials are recycled, this flow is of moderate size compared to 62 Gt/yr of processed materials and outputs of 41 Gt/yr. The low degree of circularity has two main reasons: First, 44% of processed materials are used to provide energy and are thus not available for

So, is a circular economy 100% achievable?

那么，我们是否能够100%实现循环经济？

Zero waste is impossible!

零废弃是不可能的！

How close to circular can an economy be?

经济如何接近循环？

We could get closer to a circular economy if our consumption of energy and materials would be much lower than today. **如果我们的能源和材料消耗能在当前基础上降低很多，我们可以更接近一个循环的经济。**

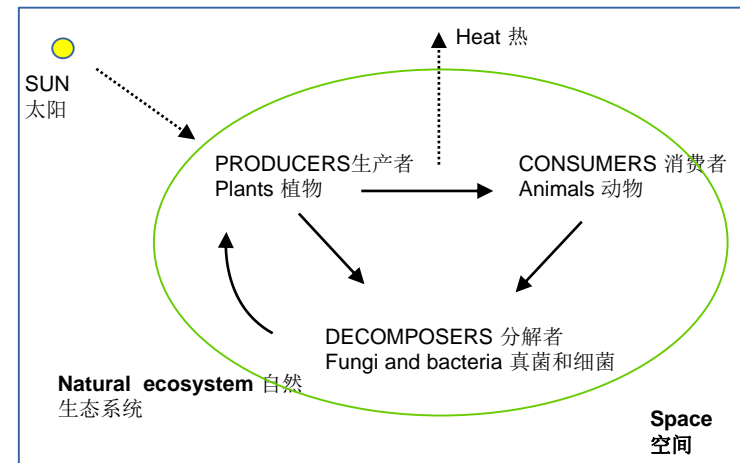
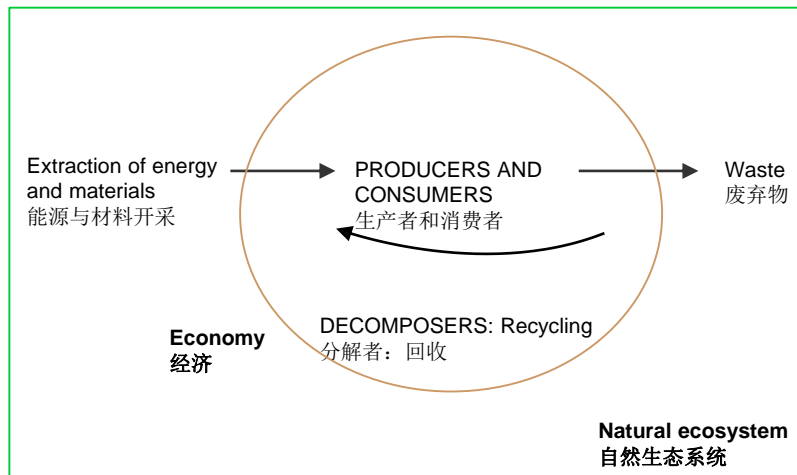
In fact, we would need a solar based economy to emulate the circularity of ecosystems. **事实上，我们需要一个以太阳能为基础的经济系统来模仿生态系统的循环性。**

Human economies are linear

人类经济是线性的

Ecosystems are circular

生态系统是循环的



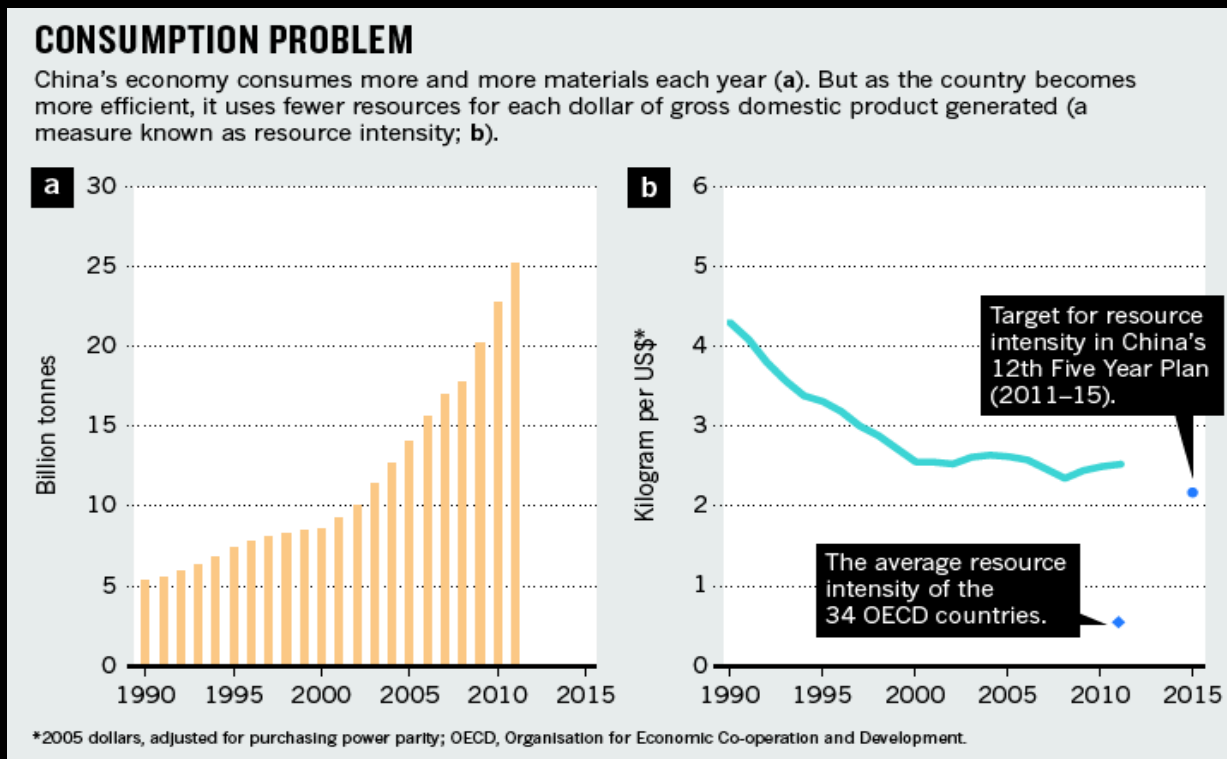
There is a trade-off between economic growth and sustainability **经济增长与生态可持续之间存在平衡**

Circular economy is based on the hypothesis that absolute **dematerialization** is possible. In fact, it assumes that 100% absolute dematerialization is possible. **循环经济是基于绝对去物质化是可能的假设。事实上，它假定100%去物质化是可能的。** For the moment, human economies have proved that only relative dematerialization is possible. This means that the resource intensity of the economy decreases, which means the resources used per unit of GDP decreases. **目前已经证明，人类经济只能相对去物质化。这意味着经济的资源消耗强度降低，单位GDP资源耗用减少。**

China has not decoupled economic growth from resource consumption

中国的经济增长离不开资源消耗

China has improved in relative (to GDP) dematerialization, not in absolute dematerialization. It has increased resource consumption by 5 times from 1990 to 2011. **中国已经在相对 (GDP) 去物质化方面有所进步，但在绝对意义上并未实现去物质化。从1990年到2011年，其资源消耗增加了5倍。**



资源消耗问题：

- 中国经济每年所消耗的原材料量越来越多（图a）。
- 但随着这个国家变得更高效，单位美元GDP增长所消耗的资源越来越少（图b）

Source: Mathews and Tan (2016) Circular economy: Lessons from China. *Nature*

How do we achieve sustainability?

我们如何实现可持续发展？

If there is a trade-off between economic growth and sustainability, what shall be done?

如果经济增长与可持续发展之间存在权衡关系，我们应该做什么？

I only see two options:

两种选择：

1) Shall we sacrifice sustainability in the name of economic growth?

我们应该以经济增长的名义牺牲可持续性吗？

2) Shall we sacrifice economic growth in the name of sustainability?

我们应该以可持续的名义牺牲经济增长吗？

A proposal: Sustainable degrowth

倡议：可持续的缓增（去增长化）

In Europe there are debates about how to achieve prosperity without economic growth.

当前欧洲存在关于如何实现无经济增长的繁荣之争论。

These debates are called post-growth or degrowth.

这些辩论被称为后增长或者缓增（去增长化）。

What is degrowth?

什么是缓增（去增长化）？

Degrowth is the hypothesis that we can live well with less.

去增长化假设在较少的能源和材料消耗基础上我们也可以拥有美好的生活。

A DEFINITION:

一种定义：

“degrowth calls for a democratically led redistributive downscaling of production and consumption in industrialised countries as a means to achieve environmental sustainability, social justice and well-being”

(Demaria et al, 2013; D’Alisa et al, 2015).

“作为实现环境可持续、社会正义和人类福祉的方式，缓增（去增长化）提倡在民主领导的再分配制度下工业化国家生产和消费规模的精简”

（ Demaria et al, 2013; D’Alisa et al, 2015 ）。

What about China?

那么中国呢？

If in Europe we debate about degrowth, what shall China do about the trade-off between economic growth and sustainability?

如果在欧洲我们的争论是关于缓增（去增长化），那么，中国应该如何
如何在经济增长和可持续发展之间进行平衡呢？

What about China? **那么中国呢？**

What China should do is up to you, but I'm happy if we could have a dialogue how about how to ensure prosperity, social justice and ecological sustainability to **current and present** generations, in China, Europe and worldwide.

中国应该怎么做取决于你们，但我们非常乐意探讨有关我们这一代人如何在中国、欧洲和全球范围内确保繁荣、社会公正和生态可持续的话题。

The most vital and urgent task for society is imagining a world without growth.

对我们的社会而言，当前最重要和紧迫的任务是——想象一个没有增长的世界。

The most vital and urgent task for society is imagining
a world without growth.

**对我们的社会而言，当前最重要和紧迫的任务
是——
想象一个没有增长的世界。**

Thanks!

感谢倾听!

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10 'Degrowth' policy proposals

10个“缓增”政策建议

1. Citizen debt audit **公民债务审计**
2. Work-sharing **工作分享**
3. Basic and maximum income **设置基本收入和最高收入**
4. Green tax reform **绿色税收改革**
5. Stop subsidizing and investing in polluting activities **停止补贴和投资污染活动**
6. Support the alternative, solidarity society **支持替代发展模式和团结型社会**
7. Optimise the use of buildings **优化建筑物的使用**
8. Reduce advertising **减少广告**
9. Establish environmental limits **设立环境限度**
10. Abolish the use of GDP as indicator of economic progress **摒弃GDP作为经济发展指标的方式**

→ A coherent package of mutually supportive measures

→ **一整套互相支撑的举措**