



Energy Behaviour Change driven by plug-and-play-and-forget ICT and Business Models focusing on complementary currency for Energy Efficiency for the Wider Population



The problem of free riding and the rebound effect
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Dr. Anna Malamou

Research consultant

European Dynamics SA

anna.malamou@eurodyn.com

What is a Free Rider?

- A free rider is a person who:
 - benefits from something without expending effort or paying for it.
 - utilize goods without contributing their fair share.



The Free Rider Problem



- An economic concept of a **market failure** that occurs when people are benefiting from resources, goods, or services that they do not pay for.
- If there are too many free riders, the resources, goods, or services may be **underprovided**.
- The problem is commonly seen with **public goods**.

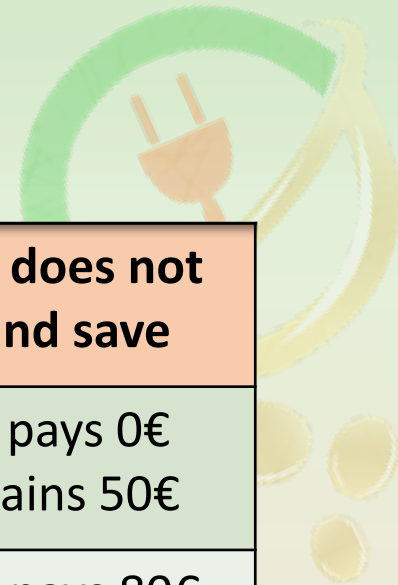


Public Goods and the Free Rider Problem



- Examples of public goods include:
 - Fresh air
 - Lighthouses
 - Wikipedia
 - **Energy** (energy efficient behaviour)
- **Public goods** commonly face a free rider problem due to:
 - **Non-rival:** Consumption of the good or service by one individual does not reduce the availability of the good to others.
 - **Non-excludable:** It is impossible to prevent other consumers from consuming the good or service.

Example of the Free Rider Problem



- It is good to reduce our CO₂ related energy consumption.
- However, if one person in a city of five million saves energy, it makes little difference.
- People tend to free-ride on efforts of other people to save energy and make less effort.

	Anna buys and saves	Anna does not buy and save
Peter buys and saves	Anna pays 80€ and gains 100€	Anna pays 0€ and gains 50€
	Peter pays 80€ and gains 100€	Peter pays 80€ and gains 50€
Peter does not buy and save	Anna pays 80€ and gains 50€	Anna pays 0€ and gains 0€
	Peter pays 0€ and gains 50€	Peter pays 0€ and gains 0€

- ❖ Buy an energy efficient device to replace an old one: **Cost = 80€**
- ❖ Individual gain from saving energy if a certain goal is reached: **Gain = 100€**

Problem of free riding in energy efficiency

- We all benefit from reasonable energy consumption, but rarely pay for this as for all public goods.
- Those who benefit from energy efficient behaviour of others do not take the full cost and consume excessively.
- Excessive energy consumption leads to exhaustion or destruction of this public good.



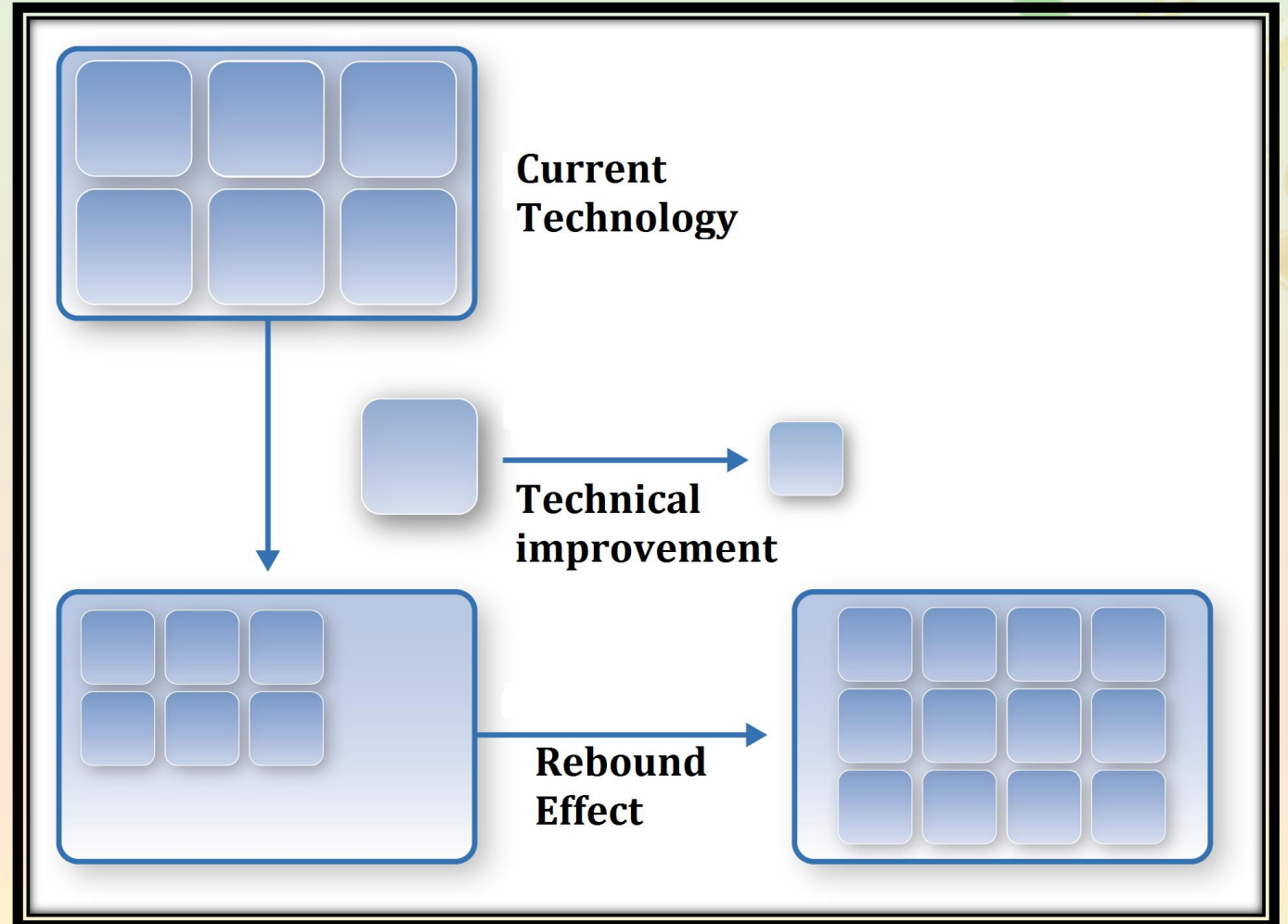
The rebound effect



The rebound effect



- A rebound effect describes an increase in an energy service demand that has been caused or at least enabled by a (technical) improvement in energy efficiency



Basic logic of the Rebound effect

- Increased efficiency lowers the price of energy services
- People then consume more energy services
- Rebound Effect = Potential savings – Actual savings



General Examples of the Rebound effect



Increase efficiency of the use of coal, an output like iron becomes cheaper



People can be expected to demand more iron

Buy a fuel efficient car, so it's cheaper to drive a mile



People can be expected to drive more or faster

Three Categories of Rebound Effect

1. Direct Rebound Effect

Lower price of energy services

Use more energy services

Likely to be dominant

2. Indirect Rebound Effect

Spend less on energy

Buy more other energy-using goods

Not likely to be dominant

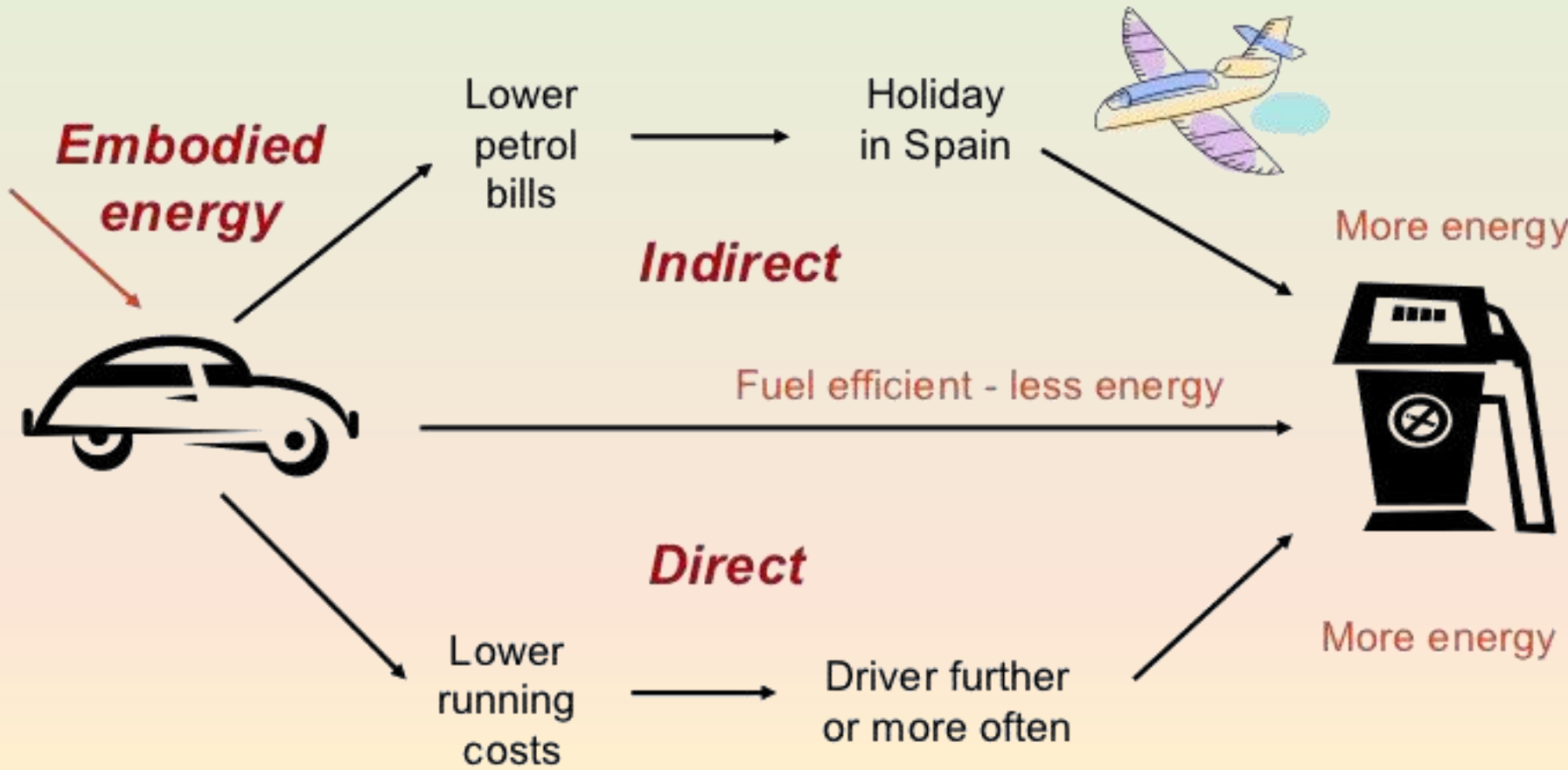
3. General Equilibrium Rebound Effect

A large group spends less on energy

Price of Energy drops but people in other groups use more energy

Not likely to be dominant

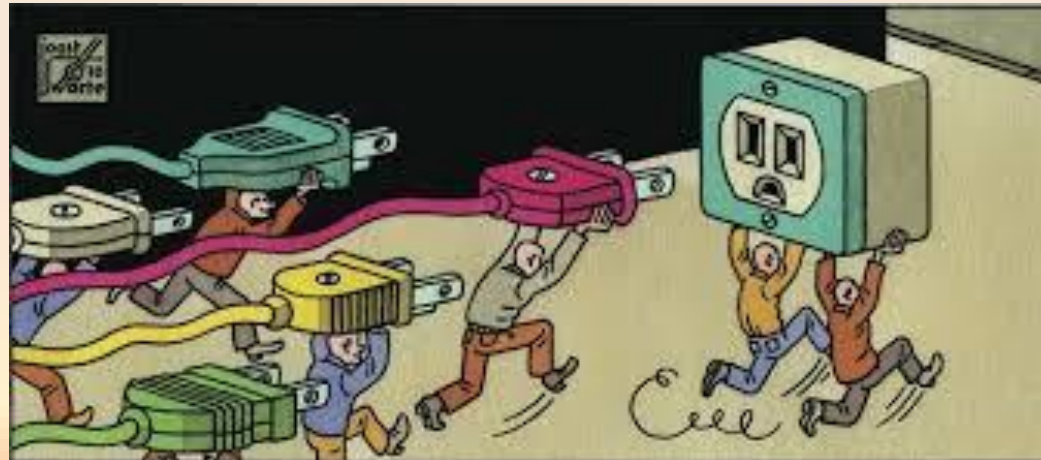
Examples of direct and indirect Rebound Effects



Problem of the rebound effect in energy efficiency

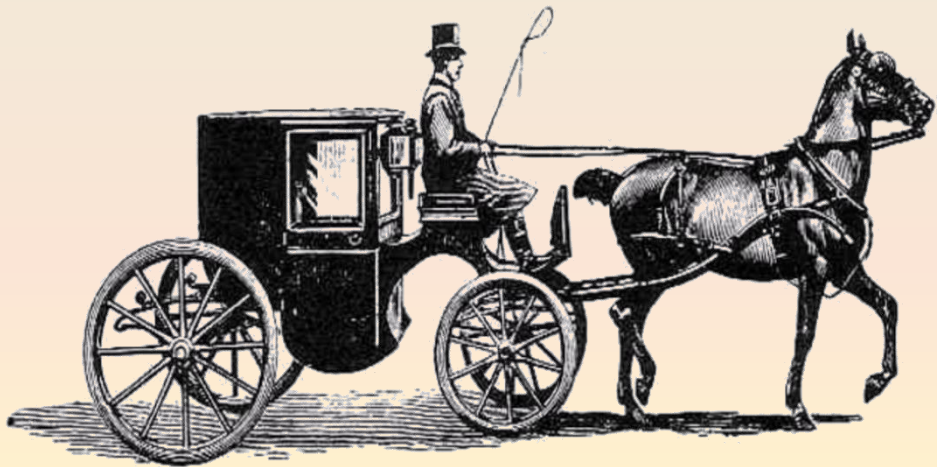


- Negative relationship between technology and consumption
- Technological improvements in energy efficiency induce increase in demand and production, and **consequently energy consumption.**



Rebound effect misunderstanding

- Many are asking the wrong question:
How does energy consumption change after efficiency improves,
relative to before improvement?



VS



Solution??

- Free riding and rebound effect critically **undermine the Paris Climate Conference Agreement** and **EC policies** that aim at reducing energy consumption.
- A solution is to **change consumers' behaviour**.
- Despite all economic approaches and business models implemented so far the objective of energy consumption **reduction is not achieved**.



Solution??

- Free riding and rebound effect critically **undermine the Paris Climate Conference Agreement and EC policies** that aim at reducing energy consumption.
- A solution is to **change consumers' behaviour**.
- Despite all economic approaches and business models implemented so far the objective of energy reduction is not achieved.
- **Can we really incentivize voluntary actions to change energy behaviour addressing the barriers that restrict long-term adoption?**



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