Neoclassical vs. environmental economics

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Introductory remarks

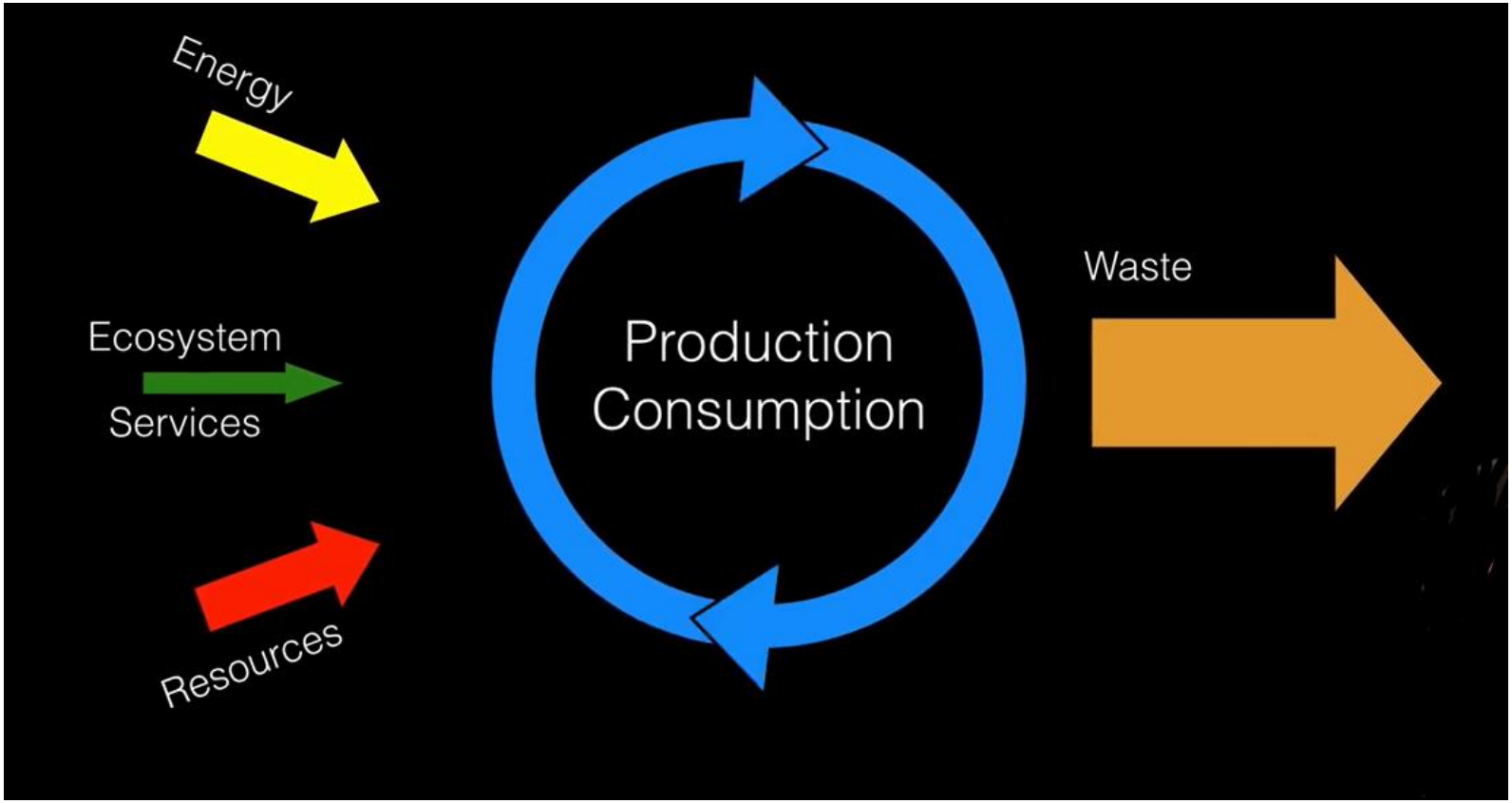
- Environment is providing us with necessary resources and services
- These services are processed in the economy
- Prevailing economic paradigm determines the way these sources are managed
- **Is the dominant paradigm sustainable?**

Sustainability

- „Do we care about future?“

- System or process is sustainable if it can be continued indefinitely, without depleting any of the material or energy required to keep it running
- Sustainable society – society in balance with the natural world, neither depleting its resource base nor producing pollutants in excess of nature´s capacity to absorb them
- Sustainable development – progress that meets the needs of the present without compromisisng the ability of future generations to meet their own needs (intragenerational equity)

Environmental system and society



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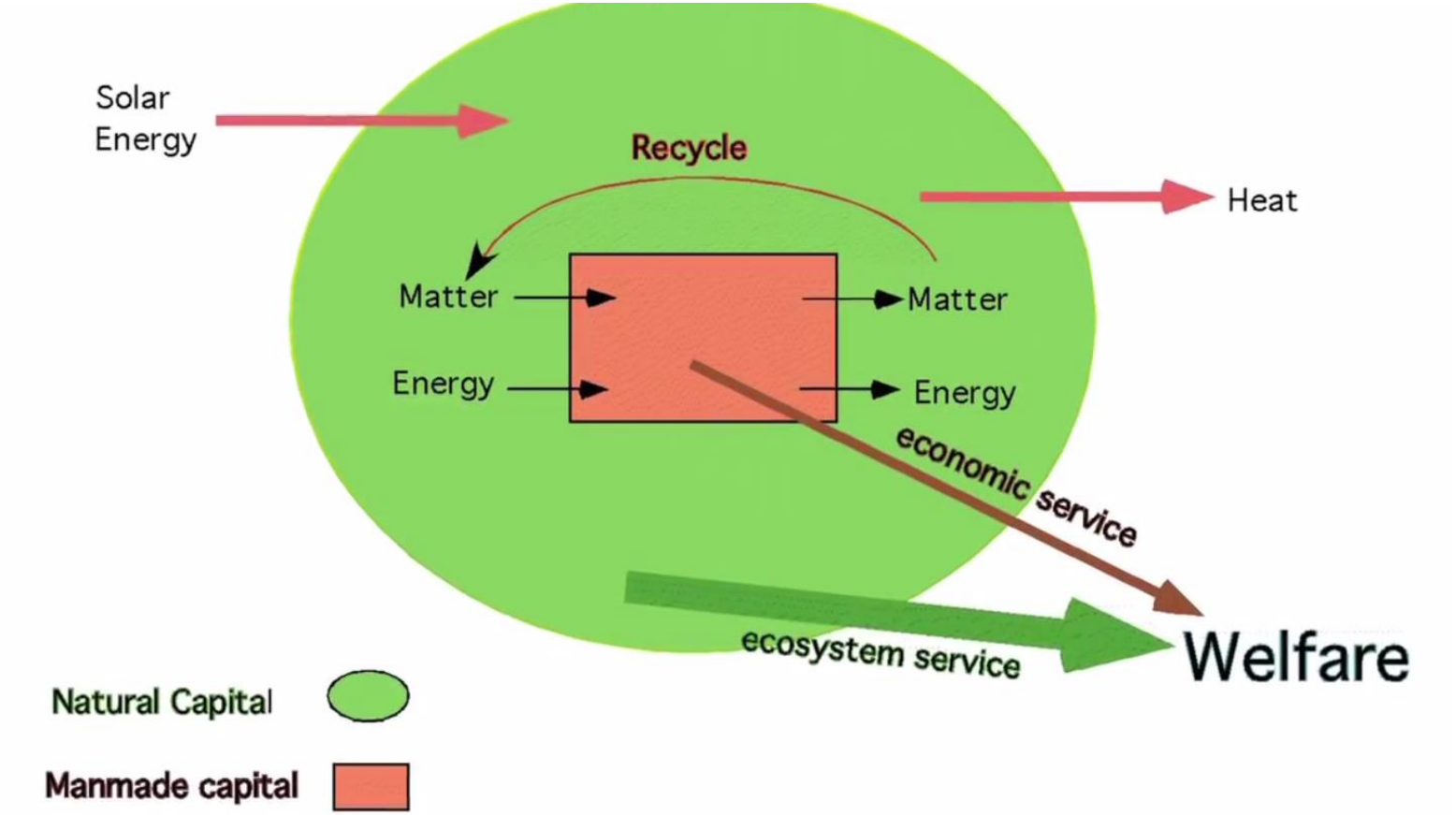
Neoclassical economics

- People (= rational actors) have rational preferences among outcomes, associated with a value
- Individuals maximize utility, firms profits
- People act independently on the basis of full and relevant information
- Emphasis on market

- Created in the limitless world – focus on the distribution, less on sources.
- Resources are „free“ – not valuated.

Mindset of traditional economics



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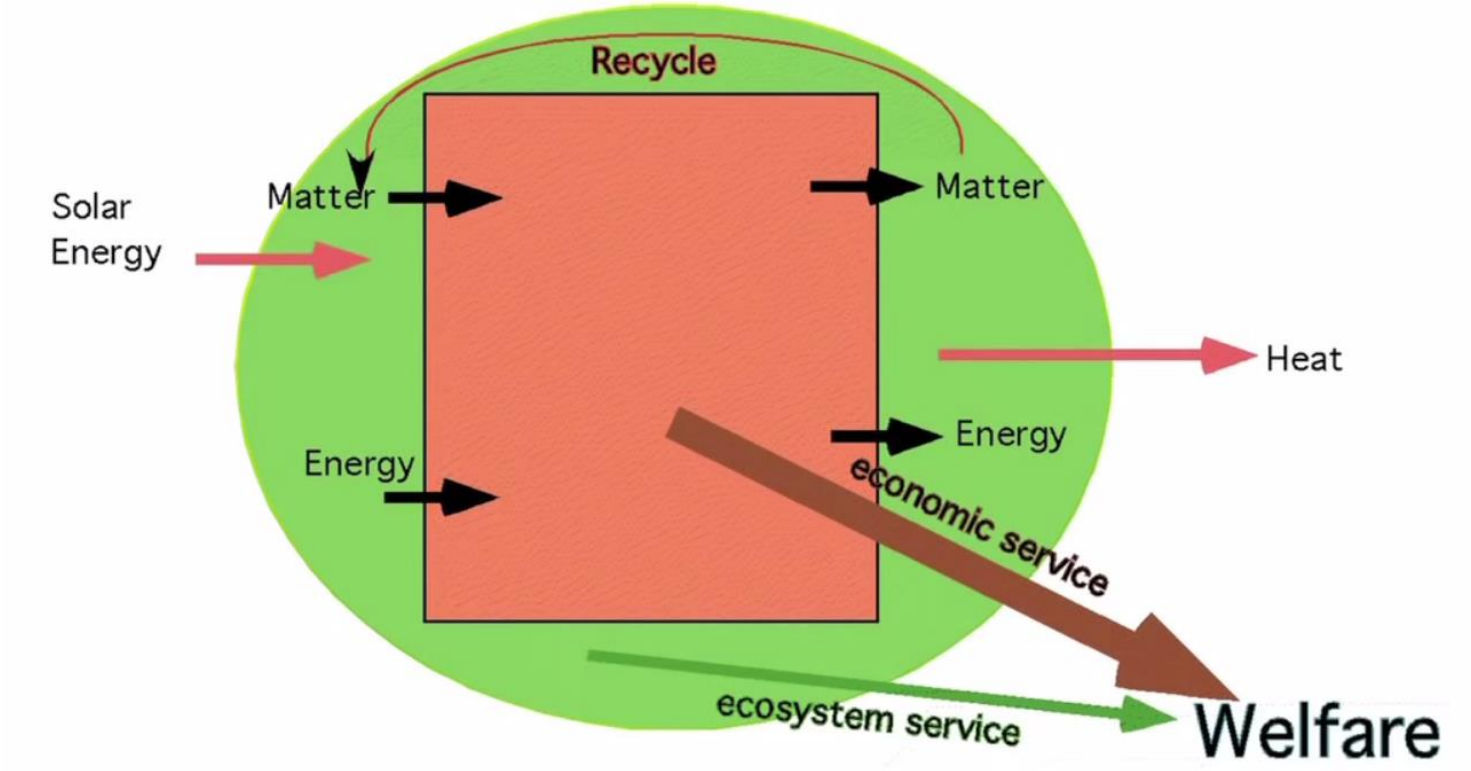
Modern 7bn people world



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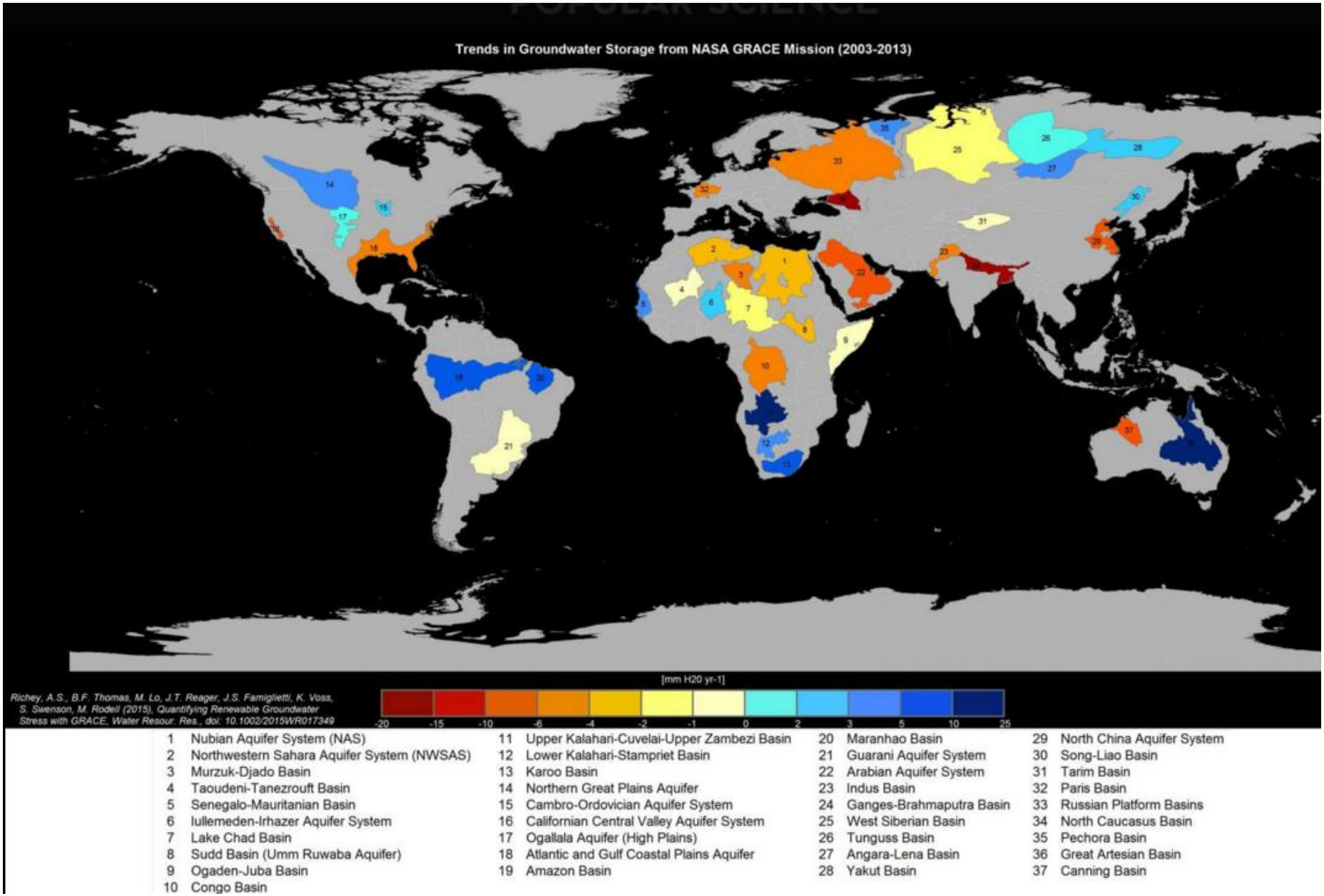
Environmental economics

- Recognizes necessity to consume natural resources and services and pollute
- Calls for balancing the economic activity and environmental impacts by taking into account all costs and benefits
- Market failure = inability of markets to refects the full costs or benefits, resulting in inefficient allocation of resources
- To fix the market failures by correcting prices so they take into account external costs
- Scarcity of resources



1 Nubian Aquifer System (NAS)
2 Northwestern Sahara Aquifer System (NWSAS)
3 Murzuk-Djado Basin
4 Taoudeni-Tanezrouft Basin
5 Senegalo-Mauritanian Basin
6 Iullemeden-Irhazer Aquifer System
7 Lake Chad Basin
8 Sudd Basin (Umm Ruwaba Aquifer)
9 Ogaden-Juba Basin
10 Congo Basin
11 Upper Kalahari-Cuvelai-Upper Zambezi Basin
12 Lower Kalahari-Stampriet Basin
13 Karoo Basin
14 Northern Great Plains Aquifer
15 Cambro-Ordovician Aquifer System
16 Californian Central Valley Aquifer System
17 Ogallala Aquifer (High Plains)
18 Atlantic and Gulf Coastal Plains Aquifer
19 Amazon Basin
20 Maranhao Basin
21 Guarani Aquifer System
22 Arabian Aquifer System
23 Indus Basin
24 Ganges-Brahmaputra Basin
25 West Siberian Basin
26 Tunguss Basin
27 Angara-Lena Basin
28 Yakut Basin
29 North China Aquifer System
30 Song-Liao Basin
31 Tarim Basin
32 Paris Basin
33 Russian Platform Basins
34 North Caucasus Basin
35 Pechora Basin
36 Great Artesian Basin
37 Canning Basin

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Tools of environmental economics

- Putting the price on the nature (externalities and ´tragedy of commons´)
- Regulation
- Change of mindset – GDP to be replaced by „index of happines“?

Approaches to energy resources

- Technology-based substitution

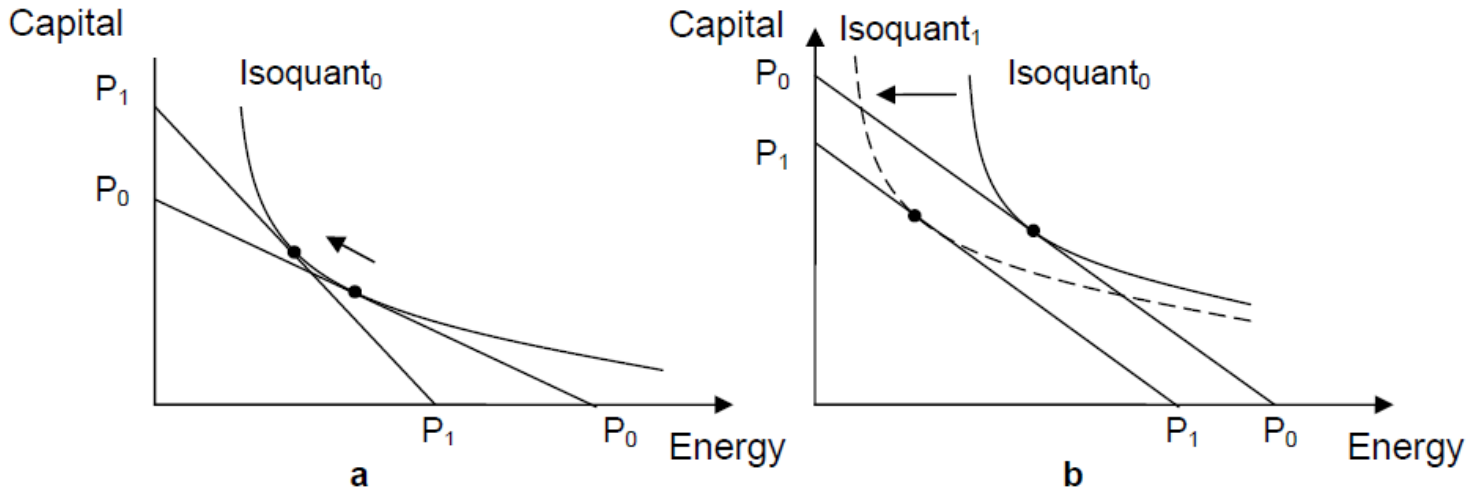

Figure 1 (*a*) Energy efficiency–improving substitution versus (*b*) energy-saving technological change.

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Approaches to energy resources

- Thermodynamics argumentation:
  - Energy can neither be created nor destroyed
  - Energy transformation always losses at least a little energy in the form of diffuese heat (entropy)
  - In any process some energy is always needed – full substitution of energy with technology is not possible (steam engine – from 0,5% to 60% at best).

Approaches to energy resources

- New (unconventional) sources of energy

- EROEI = usable energy output/energy consumed
- Net energy = energy output – energy consumed
- Global EROEI is declining (= you need to produce more gross energy to satisfy the same consumption)

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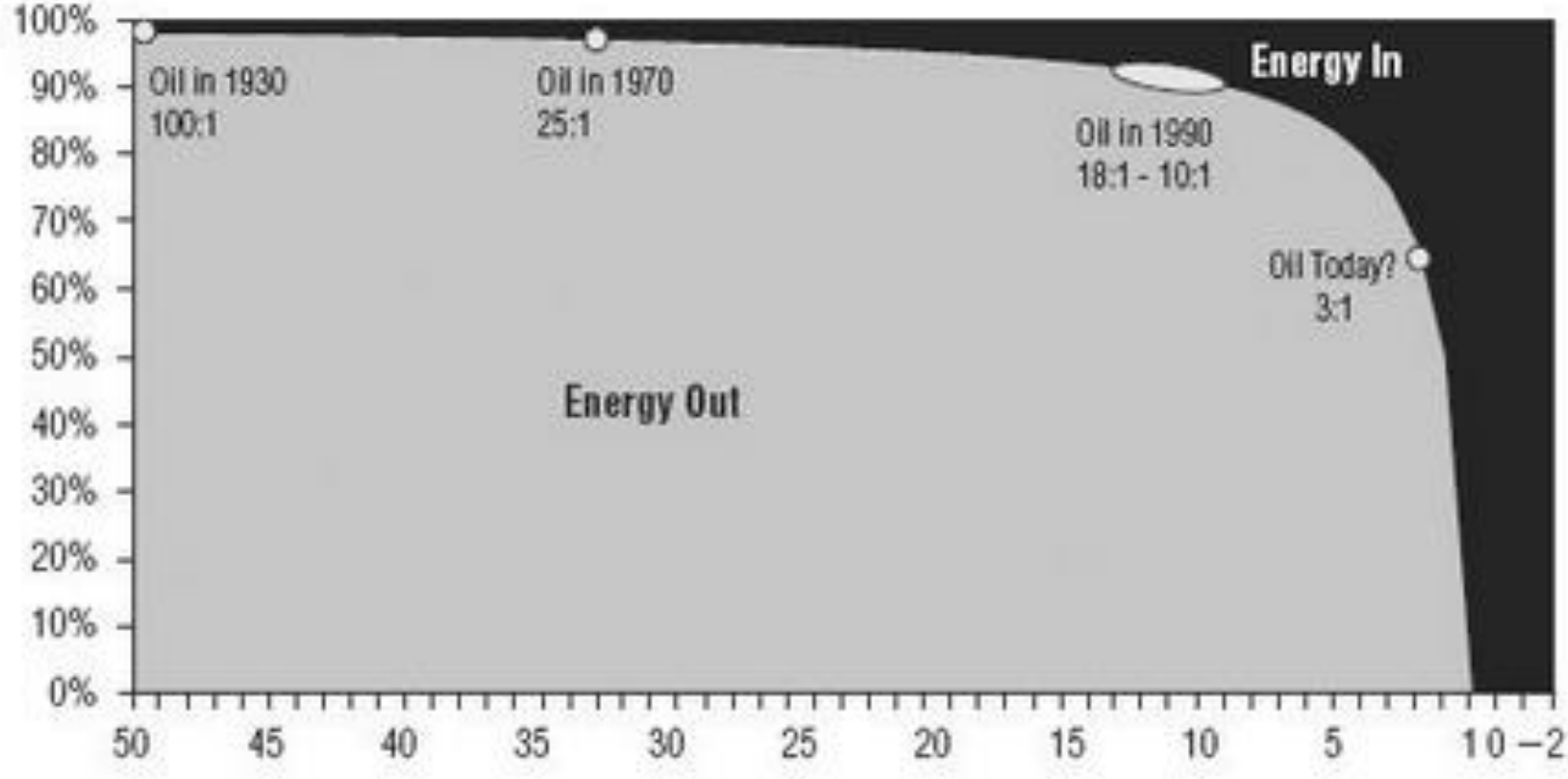

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Approaches to energy resources

- New energy source

- „Are there any?“
- Path dependence

Sources

- Andersen, P.: Environmental Science, Bozeman Science.
- Erickson, J.: Ecological Economics, GundIndistute.
- NASA: Third of Big Goundwater Basins in Distress.

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