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Time Use and Energy Use in Austria 2010

International contexts of energy use: how much
and what for?

SS6 - Seminar room 251, Natura, 2nd floor
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International contexts of energy use: how much and what for?



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- How much direct and indirect energy is used?
- For which daily activities?
- In Austria 2010?



- Energy footprints of activities
- With a focus on differences between average women and men
- And on differences between rural and urban households

Time Use Research

Time is

- limited and equally divided for all humans
- can be useful in various inter- and transdisciplinary settings

Time-use as indicator for well-being, socio-economic structures and ...?

- Differences in time-use by age, gender, class, ... as indicator for well-being and inequality
- Changing amount of time used for either field ... as indicator for socio-economic changes
- and for changes in environmental footprints?

Time-use research and sustainable development



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Quality of life

- comprises indicators, which encompass different aspects of the social and economic situation of humans.

Energy footprints

- indicator for societal impacts on the environment and especially for climate change.

Time-use research can provide a **bridging concept** and analysis, as ...

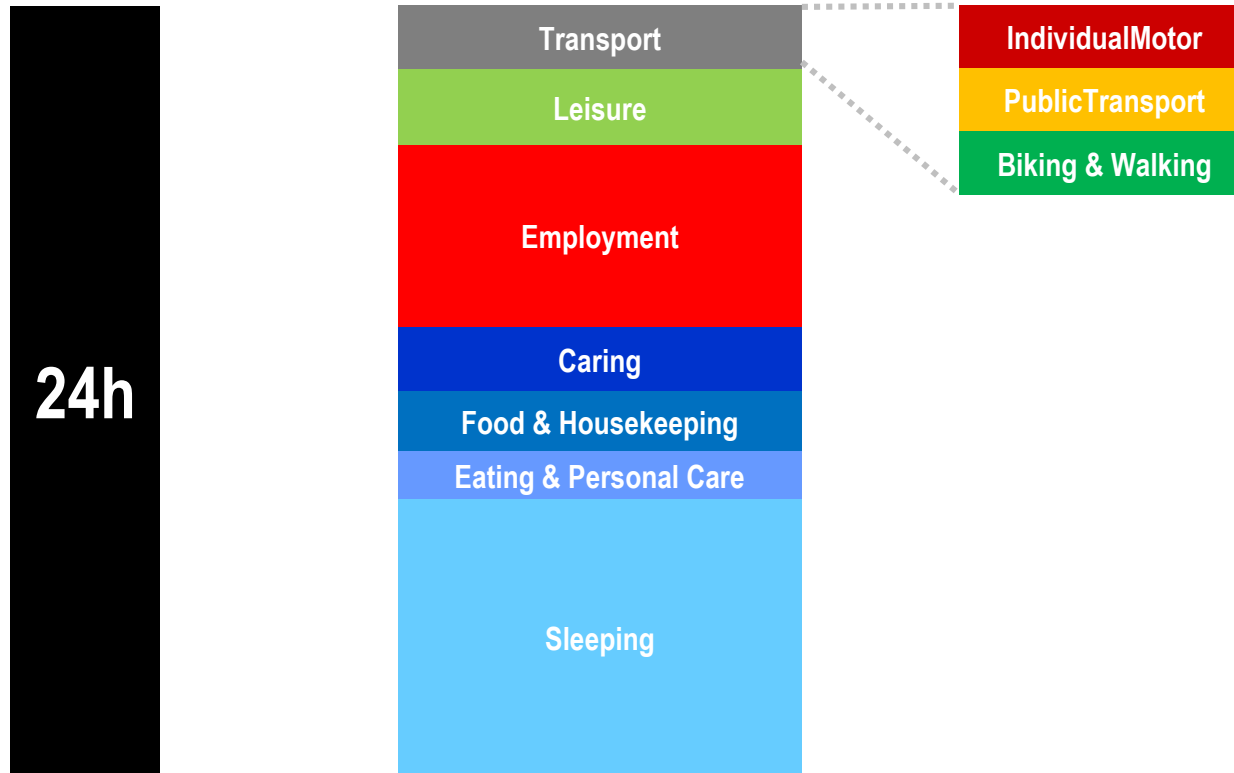
- time use - mostly time scarcity - is a significant factor determining quality of life
- time-use activities – determined through time preferences, needs and practices – can differ widely in their energy intensity.

Functional Time Use

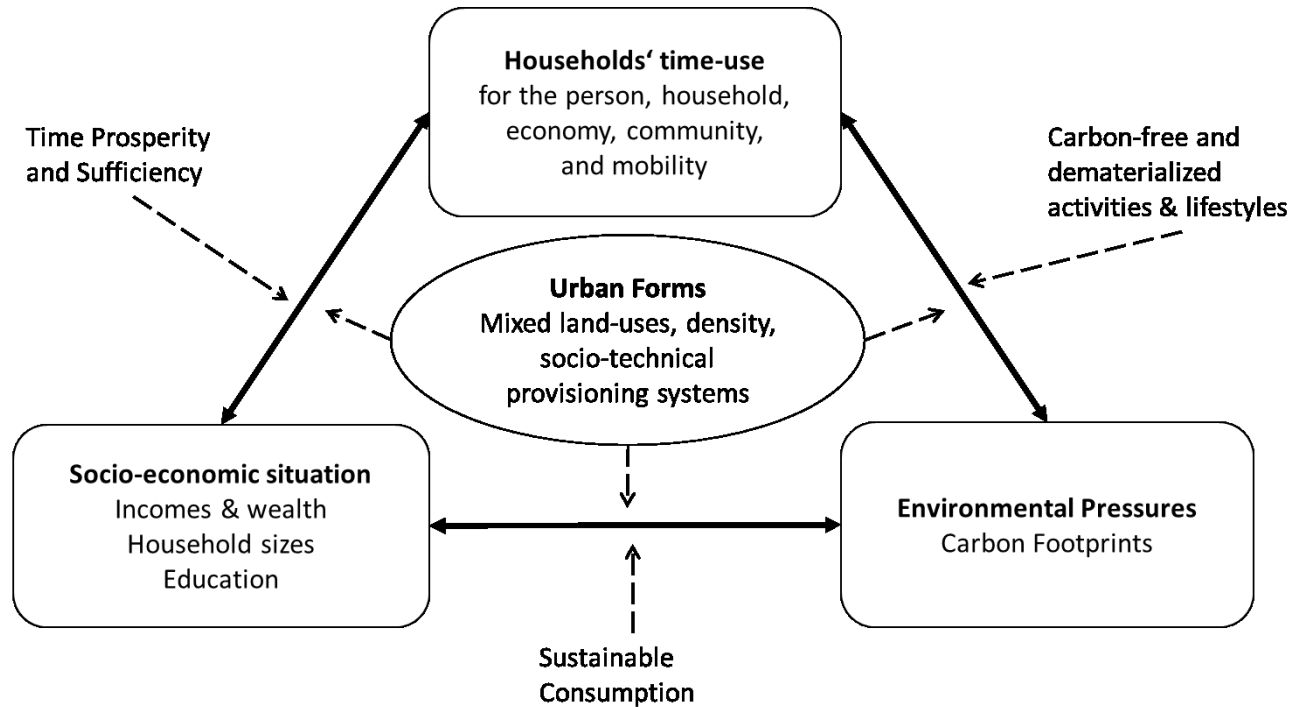
Re/production of system	Functional time-use category	Encompasses activities from time-use survey	And carbon footprints from (examples)
<i>Person</i>	Personal time	Personal Care & Sleep	Food, hot water, personal hygiene products, ...
<i>Household</i>	Committed time	Household; Family, Care & Support	heating and cooling, cooking, supply chain emissions from white goods, appliances, furniture, dwelling maintenance, ...
<i>Economy</i>	Contracted time	Employment & Study	<i>During employment incomes are earned, which enable consumption during all other activities.</i>
<i>Community</i>	Free time	Social activities, politics, culture, leisure	Entertainment activities, sports, socializing, expenditures related to various hobbies, ...
<i>Mobility</i> time “enables” other activities by allowing people to perform spatially distinct activities		Various forms of travel	Direct emissions from fuels, embodied emissions in transport equipment and infrastructures,

Table 1: Functional time use as re/production of systems, time-use categories, encompassing detailed activities and carbon footprints, adapted from (Aas, Ringhofer 2016, Haselsteiner et al., 2015; Wiedenhofer et al., 2018).

Time Use – average person/d



Sustainability triangle: linking environmental footprint & time use



Source: Wiedenhofer, D. Smetschka, B. et al. 2018. Current Opinion in Environmental Sustainability.

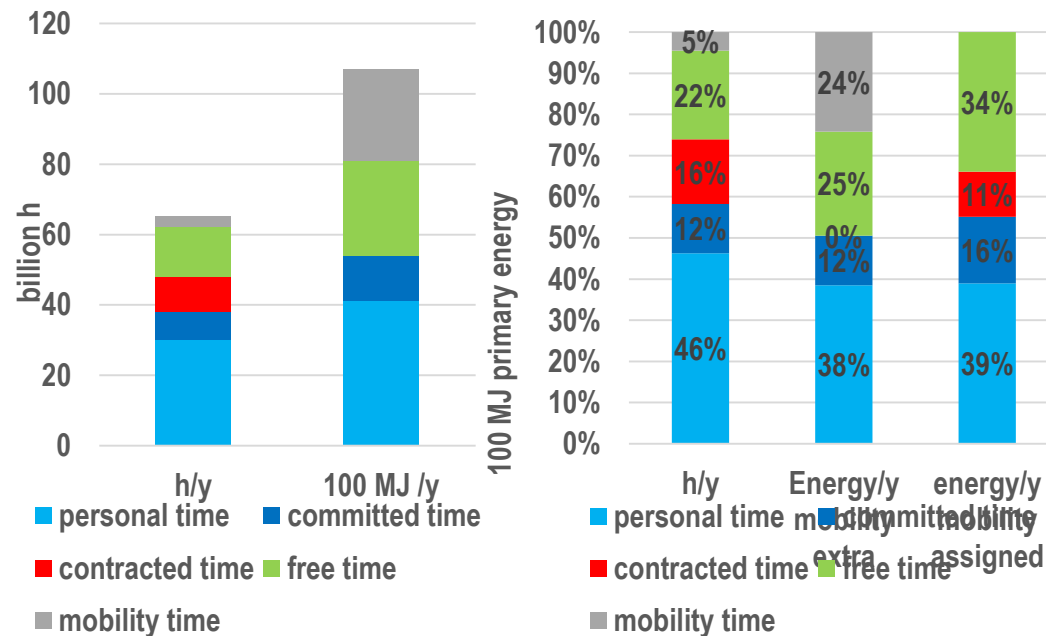
Energy footprints

- Based on the **Austrian time-use survey** (hours) and the **Austrian household budget survey** (money),
- we calculated energy footprints of household consumption using a consumers-price version of the environmentally extended **multi-regional input-output model Eora**
- resulting in the total volume of household related energy footprints (GJ) and the average carbon footprint of each time-use activity (MJ/h).

Energy footprint in Austria

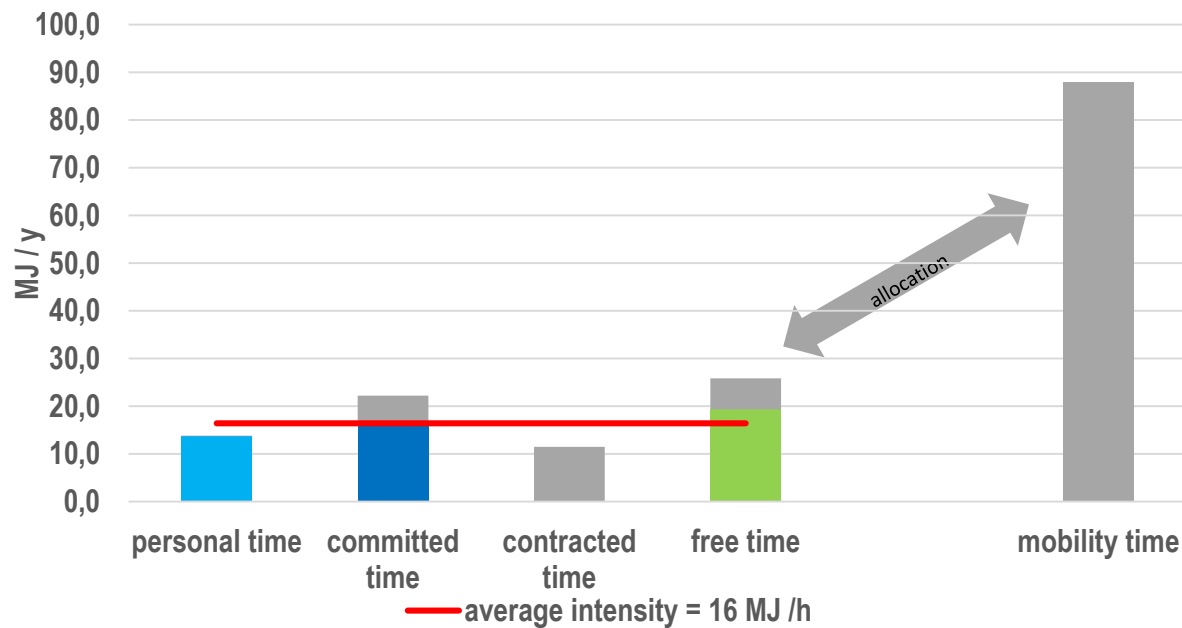
Austria	GJ primary energy	GJ/d	GJ/cap y	MJ/cap d	MJ/cap h
urban	258.949.311	29.560	176	483	20,1
rural	811.956.156	92.689	137	374	15,6
all	1.070.905.467	122.249	144	396	16,5

Time use in h and energy footprint: Austria 2010



Total time use by activity in billion h/y and total energy footprint of households by activity in 100 MJ/y in absolute values (1a) and as shares of the total (1b) for Austria in 2010

Energy intensity of time-use categories

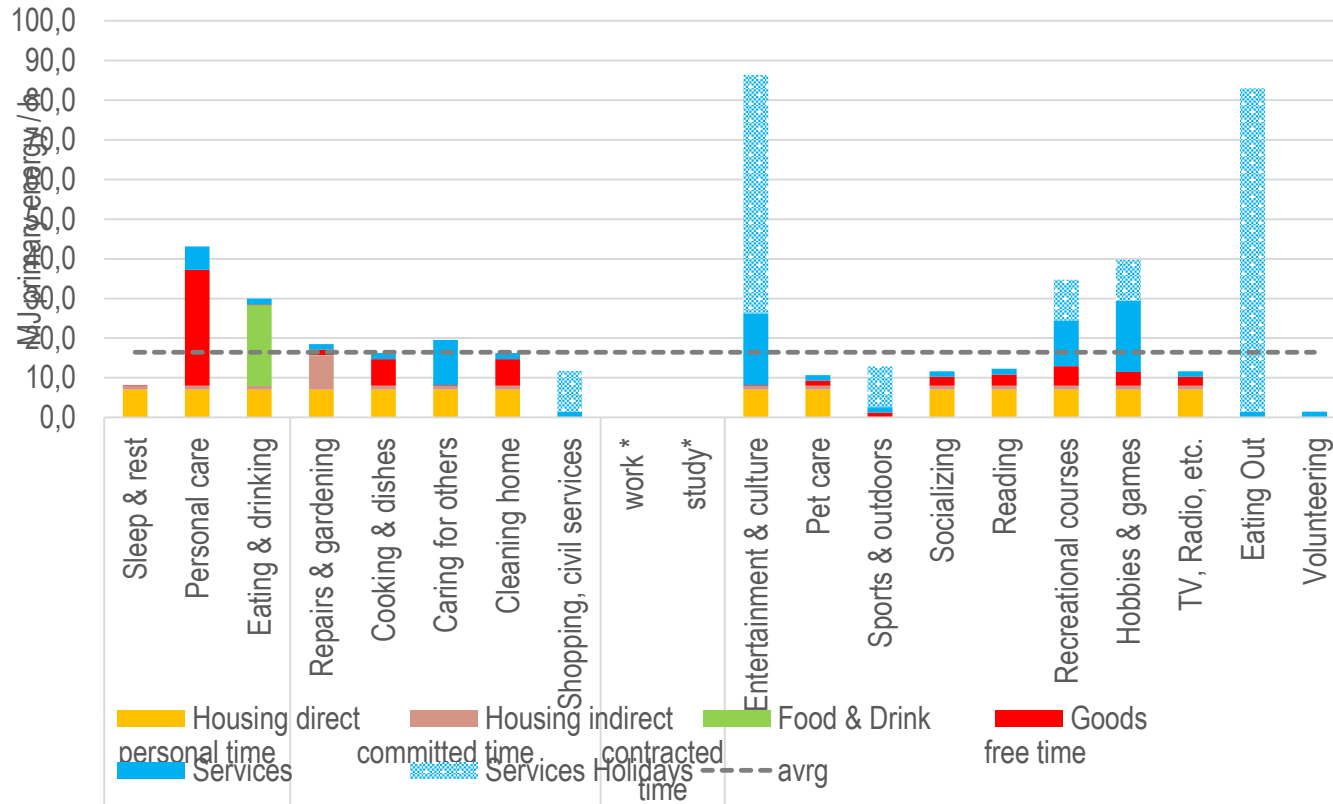


Average energy footprint intensity of functional time-use category, with mobility allocated (bars on the left, incl. grey component) versus all mobility time and footprint extra (right hand side, grey bar).

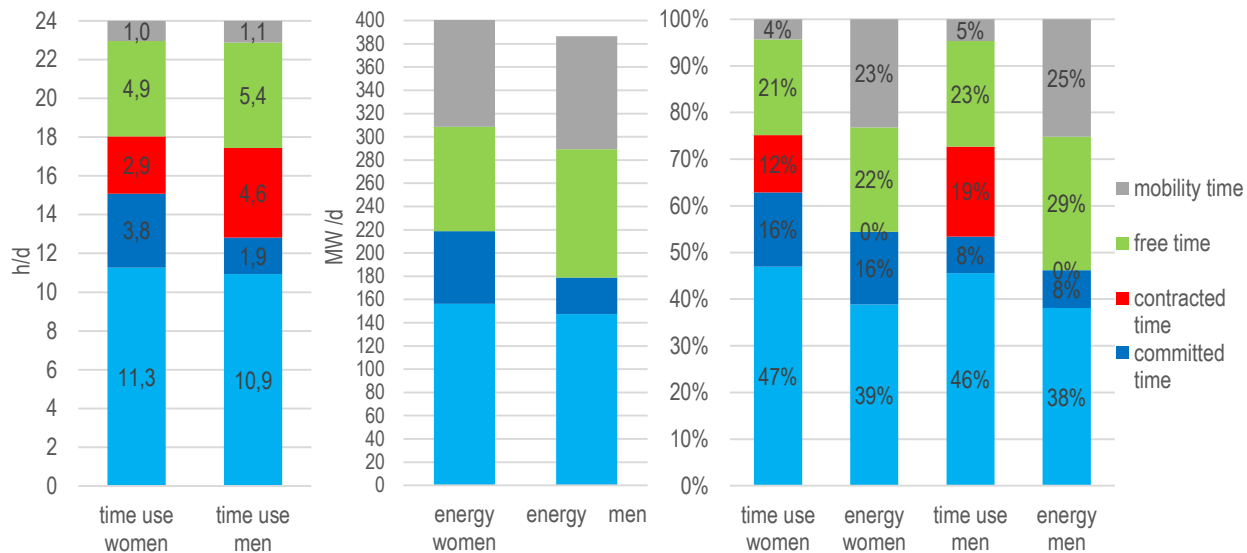
Energy intensity of activities



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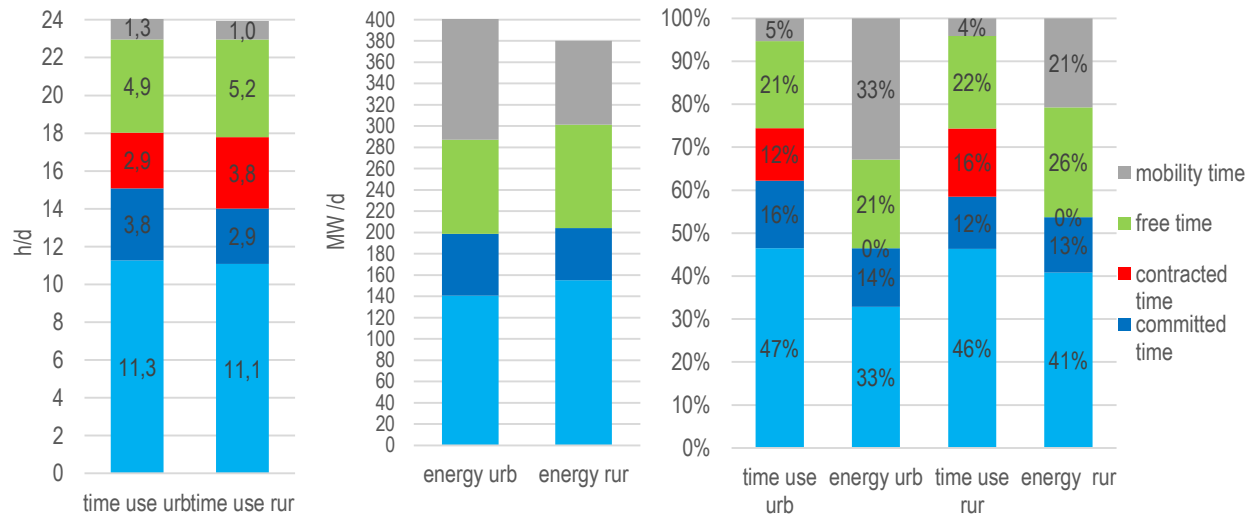


Energy footprints of average day of an avrg woman or man



The energy implications of the average day of women and men in Austria, in hours per day (a), the respective average energy footprint in MW per day (b) their compositions (c).

Energy footprints of average day urban / rural Austria



The energy implications of the average urban / rural person in Austria, in hours per day (a), the respective average energy footprint in MW per day (b) their compositions (c).

Learnings from analysing environmental footprints of activities



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- Energy footprint of time use of Austrian households in 2010 estimated. We find an average direct and indirect energy intensity of time use of 16 MJ primary energy/hour
- Functional time-use research provides a systems perspective on household consumption and environmental footprints allowing to analyse
 - gendered division of labour and urban / rural differences
 - time- and infrastructure-related constraints are important
- A good quality of life requires goods and services which are available (distance), affordable (economy) and enough time to use them (time prosperity and sovereignty)
- Sustainable development needs changes in everyday life:
 - more time spent with low energy activities
 - low energy alternatives for necessary activities

Open questions and future plans for discussion



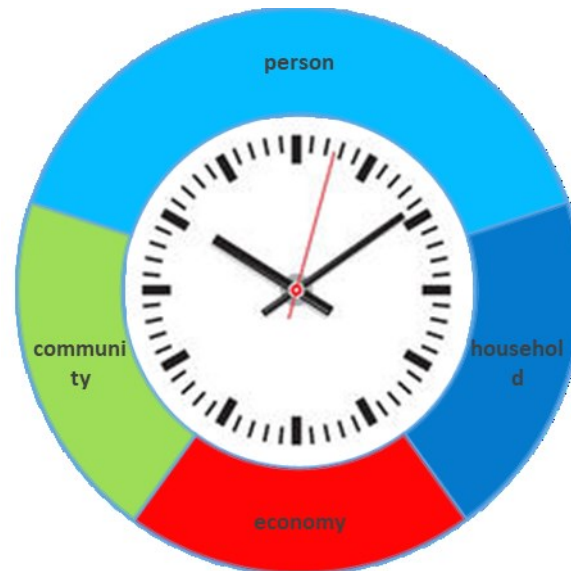
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- Energy use and environmental footprints are related to available income, but we do not know time use per income
- A huge part of energy footprints relates to holiday making (hotels, gastronomy, air travel), but we do not have time-use data on holiday making
- Analysing changes over time would be valuable, but Austria just cancelled the next time-use survey
- With MRIO databases available cross-national comparisons would be interesting – cooperation in projects?

Literature

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Thank you!



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