

# How Can Research Advance Sustainable Transformation?

Prof. Werner Lang is TUM Vice President for Sustainable Transformation. We previously spoke with him and other colleagues about strategies for spearheading the heat transition. Time and again, we heard that the requisite technologies exist and the issues are with their implementation. So, in this article, we're asking what TUM can do to enable the solutions developed to date to contribute to greater sustainability in actual practice.

*Gesamter Artikel (PDF, DE): [www.tum.de/faszination-forschung](http://www.tum.de/faszination-forschung)*

## Wie kann Forschung die Transformation zur Nachhaltigkeit voranbringen?

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Wir fragen Prof. Werner Lang, TUM Vizepräsident für Sustainable Transformation, was die TUM tun kann, um die Ergebnisse ihrer Forschung zu mehr Nachhaltigkeit in die Anwendung zu bringen. Seine Antwort: Interdisziplinäre Forschung, Einbindung der Gesellschaftswissenschaften, um abzusichern, dass die erarbeiteten Lösungen die Bedürfnisse der Menschen berücksichtigen, und Überführung von Forschung in marktfähige Produkte im Rahmen der UnternehmerTUM und der TUM Venture Labs. □



**More about sustainability at TUM:**

[www.tum.de/en/about-tum/goals-and-values/sustainability](http://www.tum.de/en/about-tum/goals-and-values/sustainability)

**Green and blue infrastructure**  
Forests under climate change



**Use and social practices**  
Affordable electricity for remote rural communities



**Resource flows and energy**  
Producing plastics from CO<sub>2</sub>

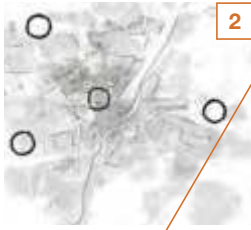


**Prof. Lang, TUM adopted a sustainability strategy in 2022. How is the university's research promoting the transformation to sustainability?**

In 2015, the United Nations adopted Agenda 2030, which contains 17 Sustainable Development Goals and serves as a global beacon, guiding the economic, social and environmental transformation of all member states. The objectives of Agenda 2030 are broadly reflected in our TUM Sustainable Futures Strategy 2030, which features a total of six action areas. Research – including both basic and applied research – has a central role to play in this. Against the backdrop of these 17 SDGs, research at TUM is making great strides in advancing the sustainability transformation in relation to many of these goals. 'Health and well-being', 'clean water', 'clean energy', 'industry, innovation and infrastructure', 'sustainable cities and communities', 'responsible consumption and production' and 'climate action' are just a few examples. For decades, many areas of our research have engaged with the topic of sustainability and it is on this foundation that we are driving our own transformation forward. ▷

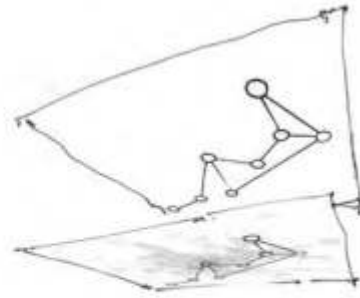


**Mobility**  
A digital real-time twin of traffic



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**Buildings and outdoor spaces**  
How the digital transformation is changing construction sites



1

**Use and social practices**

2

**Buildings and outdoor spaces**

3

**Mobility**

4

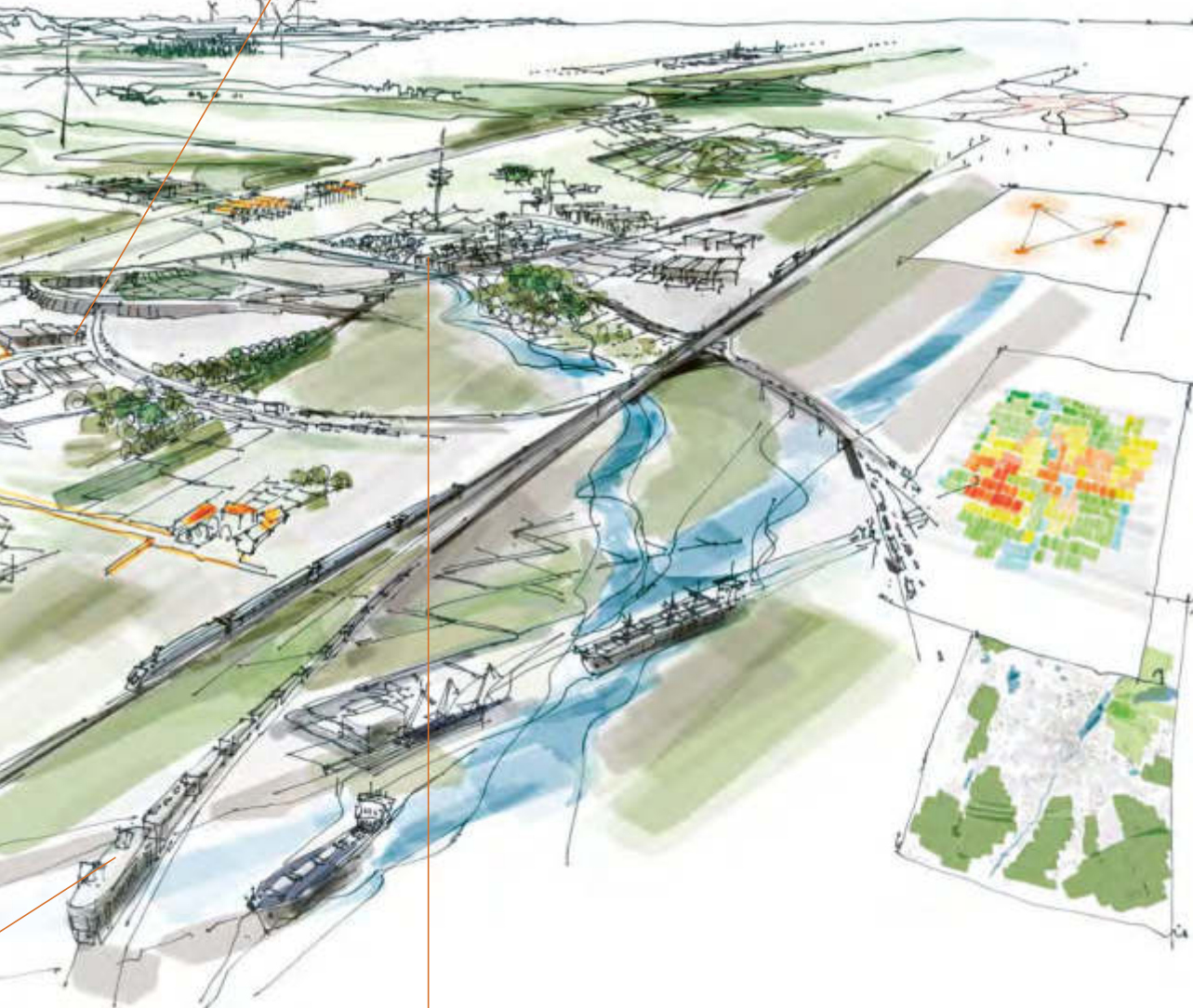
**Resource flows and energy**

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**Climate and microclimate**

6

**Green and blue infrastructure**



5

**Climate and microclimate**  
Making satellite data available for visualizing changes in land use and climate change impact

**Our built environment** can be depicted in a condensed form as an interlinked system of these interrelated topics: use and social practices, buildings and outdoor spaces, mobility, resource flows and energy, climate and microclimate, and green and blue infrastructure.

The transformation to sustainability must take an analytical approach to these fields so that they function as a system. TUM conducts research across all of these areas, shown with an example project each.

**Spin-offs transfer knowledge** generated at TUM to the economy. At the crossroads between research topics and social requirements, start-ups discover new, meaningful fields of application – especially for the transformation towards sustainability.

**Energy & Utilities**

**Built Environment**

**Mobility & Aerospace**

**Agriculture, Food, Forestry & Other Land Use**

**Industry & Circular Economy**

**Climate Action**

**Resilience**

**Responsible Resource Management**

**Plan4better**

Planning for 15-minute cities

**HopfON**

Building with Hops

**air up**

Bringing flavor to water without actually adding anything

#### TUM Venture Labs

As a joint initiative by TUM and UnternehmerTUM, the TUM Venture Labs support talents and start-ups in successfully establishing their deep tech or life science ideas. Domain-specific expertise and continuous support enable scalable, sustainable and global impact.

**On the one hand, we can identify a strong fixation on progress and technology in society, such as demand for the latest gadgets. By contrast, the implementation of technologies required to effect the change we need continues to lag behind. How are we, as TUM, dealing with this?**

Above all, we have to recognize that the transition to sustainability can only succeed if it transcends disciplinary boundaries and integrates society in the process. With this in mind, TUM has made tremendous structural changes in recent years. Its faculties, which previously had a narrow disciplinary focus, have been restructured into seven schools that encompass major scientific domains and gear their research towards sustainable innovation for people, the environment and society. This means we are in an ideal position to address key contemporary issues with our interdisciplinary approach. Our Agenda 2030 explicitly puts people at the center of our work. After all, the preservation of our biosphere is a fundamental human need. If we develop solutions that people don't like, our efforts will come to nothing. But if our solutions exceed the limitations of our planet, they'll be equally worthless.

Let's take an example from our field of work: Green City of the Future is a joint project striving to develop concepts for climate-resilient neighborhoods in growing cities that can be applied in Munich. It integrated sociology right from the outset. The results of surveys and civil participation were also incorporated into competitive calls for tender. The first projects are now being implemented in Moosach, which is one of the six living labs. Here, the focus lies on creating additional housing in a way that doesn't exacerbate heat levels in the neighborhood, such as opting for green façades, for example.

#### UnternehmerTUM

UnternehmerTUM GmbH is an associated institute of TUM. Supporting more than 50 high-growth technology start-ups each year, it is the leading center for innovation and business creation in Europe. UnternehmerTUM offers support and services to start-ups at every stage in their development, from the initial idea through to IPO. UnternehmerTUM also offers established companies access to its ecosystem.

**Let's turn to research outcomes that are not yet being implemented within living labs. How can TUM promote their adoption in future?**

Our business creation center, UnternehmerTUM, and our entrepreneurial innovation centers, the TUM Venture Labs, have important roles to play in this. They transfer knowledge generated at TUM to the world of business. UnternehmerTUM is tasked with nurturing ideas through to their market launch as product-ready solutions. The European Commission's Green Deal opens up growing prospects for topics such as combating climate change, climate change adaptation and circular concepts with a view to conserving resources. This also helps to guide UnternehmerTUM and its activities, turning research at TUM into entrepreneurial activity in areas such as construction, energy, mobility, agriculture, food and the circular economy. HopFON – a start-up that develops construction materials from the waste produced in hop harvesting – is a relatively recent example of a spin-off supported by UnternehmerTUM. ■ *Christine Rüth*