Synergy for sustainability

*NTNU’s Strategic Research Area on Sustainability attacks the global challenge from all sides*

The Norwegian University of Science and Technology (NTNU) has established a long-term *Strategic Research Area on Sustainability (2014-2023)* in order to take an international leadership role in environmental and sustainability analysis from a Scandinavian perspective. Research-based knowledge developed across distinguished departments will contribute to environmental frameworks like the UN’s post-2015 development agenda, the EU Horizon 2020 strategy and Norwegian climate policy, and establish a multifaceted approach to international sustainable development.

The research group marries experts in the natural sciences with those in the social sciences – linking, for example, dimensions of land use change, natural resource use and biodiversity with economics, urban planning and political science. Such helps to avoid a fragmented approach to global sustainable development. The group instead recognizes both the environmental and human development aspects inherent for its achievement. Major challenges the research area will address include the preservation and management of natural resources, sustainable transport, production and consumption, climate change and clean energy, public health, social inclusion, demography and migration, and global poverty. Keeping the Norwegian and Scandinavian contexts in mind throughout research and case studies on such challenges provides a unique look into the possibilities of renewable energy and sustainable business in society.

NTNU’s Strategic Research Area is spearheaded by four initiatives. First, the *Goals and Institutional Framework* initiative assesses the conditions necessary for sustainable politics and practices. Next, the focus area on *Sustainable Urban Development* takes a hard look into urbanization and possibilities for reduced emissions and sustainable resource use in order to contribute fundamentally to economic growth and social progress. The increasing pressure on *Biodiversity and Ecosystem Services* represents the third focus area. Research here surrounds new methods and technologies for monitoring and modeling in order to investigate the effects of anthropogenic forces on biodiversity and ecosystem services, and the implications this has for our welfare. The fourth focus area, *Environmental and Sustainability Analysis*, will help to develop an understanding of the scope of human development based on the Earth’s natural limits and available resources, in which researchers investigate new and existing methods and models for
analysis in order to quantify environmental impacts. Improving the multifaceted look into the challenges of sustainable development, the Strategic Area on Sustainability also uses four cross-cutting initiatives to investigate common themes pervasive in each focus area—ICT as an enabling technology, Ethical perspectives, Sustainable design and business models and land use.

Four pilot projects lead the Sustainability Area in linking the focus areas and cross-cutting initiatives. Pilot 1, Sustainability in communities, will set out requirements, based on ISO standards and guidelines, to help communities achieve a framework for sustainability specific to their unique context. Case studies in a Norwegian city, fjord settlement and island settlement, along with a country-side settlement in Tanzania will provide living labs for the testing of quantitative, qualitative and descriptive metrics and indicators for community sustainability. The quest for better sustainability metrics and models continues with Pilot 2, Business models for sustainability. This project seeks to build knowledge around the greening of technology and sustainability with a special focus on sustainable business models and competitive technologies in Norwegian industry. Close partnership with industrial firms allows the development and testing of sustainable business model prototypes directly in operating companies. The project outcome will help companies transition to more environmentally friendly business models across their value chains, helping to preserve the planet and its resources, in addition to increasing the competitiveness of Norwegian production in its basis in sustainability and sustainable energy. Concrete tools and standards will help to align the needs of industry actors with theoretical concepts and to develop criteria for business simulations and roadmaps for corporate governance models. The National Center for Biodiversity and Ecosystem Services (CeBES), Pilot 3, has been established between four partners to tie together biological and social perspectives for the modeling, protection and valuing of biodiversity and resources. Pilot 4, Responsible Research and Innovation (RRI), is based on the explicit and deliberate inclusion of societal values in the design of new technologies, and aims to have engineers act responsibly, by considering sustainability issues, in future design. Established technologies, once accepted in society, are difficult to contest, but must be challenged for their negative contributions to society and the environment. Therefore, addressing important sustainability values in the design and development phase will help to contribute to a green shift in relied upon technologies.

A sample of other projects in the Strategic Area further demonstrates the perspective of recognizing the linked concepts of sustainability. The “In Food We Trust?” project is currently examining industrialized food systems, and applying sociological, technological and economic perspectives to the study of the technologies, mechanisms and labels designed to monitor, control and maintain trust in the food chain. Investigating the technological, architectural, urban and socio-cultural strategies used for the development of carbon-neutral living, the “Towards Carbon-neutral Settlements” project applied new knowledge concepts in architecture, energy use and sociology to the planning and development processes of a case-settlement in Trondheim. Additionally, ongoing projects in sustainability analysis apply the methods of input-output
analysis (IO) and life cycle assessment (LCA) to improve the measurement and tracking of environmental impacts across complete value chains.

NTNU’s Strategic Area on Sustainability has identified the multi-level interactions between the environment, economy and society, and worked hard to establish a synergy between researchers from the ground floor of the project. Case study projects help to link developed theory with real world application, creating new knowledge grounded in society. The evolution of metrics and models that incorporate sustainability challenges into business models, global value chains, biodiversity and species analysis, innovation and future planning engrain sustainability principles directly into the responsible development of technology, infrastructure and business strategies. Applying different perspectives, from biology to urban planning, allows the research group to incorporate both natural and human development contexts into a plan for global sustainable development based on the successes of the Norwegian and Nordic models, and to contribute to a transition in the dynamic study and implementation of sustainability.