Center for Design, Innovation and Sustainable Transitions (DIST)

Foundational notes – May 2013

A new research center

Decades after it was introduced sustainable development is still something yet to be achieved. With the globalization of production and finance, population growth, prospects of climate change, resource scarcity, increased environmental degradation and resource depletion, the growing gulf between the rich and the poor as well as the complex interplay between all of these developments, serious tasks lies ahead to ensure sustainable development happens.

> *How, then, might it be possible to transform some of these persistent problems and move towards developments that are more sustainable – more socially, environmentally and economically equitable?*

The Center for Design, Innovation and Sustainable Transitions – DIST – brings together researchers from the humanities as well as the technical and social sciences with a common interest in sustainable development.

Through its research, teaching and outreach activities, the Center's ambition is both to enhance our understanding of what sustainable transitions entail and to develop methods and modes of intervention building on design and innovation that can support transformations of the status quo.

The Center seeks to support the creation of new development paths by advancing research that can challenge and qualify existing debates and practices, propose alternative development paths, while encouraging and engaging other actors in making transitions to a more sustainable society.

The Center's empirical research includes topics like smart energy systems, urban transportation, urban development and livability, clean-tech innovation and market development, design for sustainability, actors' mapping and navigating transitions, social practices, valuation processes and market reforms as well as institutional reconfigurations of society.

While administratively located in Copenhagen, the Center is a core part of Aalborg University's strategy for building a strong, research-based, and inter-disciplinary cooperation across its campuses and faculties that is nationally and internationally recognized within the fields of environmental planning, design and sustainable transitions.

The researchers have a common interest in the field of science and technology studies (STS). Among the perspectives significantly contributing to the Center's research are: science and technology studies, actor network theory, practice theory, new economic sociology on markets and valuations, socio-material transition theory, ecological economics and organizational theory. More information about the Center's activities, research projects and staff can be found on its homepage: www.cdist.dk.

Contemporary challenges and Center vision

The DIST research center addresses the opportunities and challenges associated with making sustainable pathways that transform existing energy, waste, water, and transport systems linked to contemporary ways of living based on urbanization, and resource intensive consumption patterns and globally distributed production.

Needless to say, such transitions are not easy. They do not only involve technological changes and innovations but also question and challenge existing practices for citizens, companies and nations which are supported by assumptions, ideologies and regulatory institutions that constitute societal development and growth.

It may involve what in the field of innovation theory has been labeled 'creative destruction' (Schumpeter), which means that the creation of new combinations entails the political and scientifically controversial processes of destruction. This social science based understanding is also itself an important element in the study and support for new courses of action.

For example, the existing fossil fuel based techno-economic arrangements have historically become 'locked-in' to specific technologies and consumptions practices. This is *because* of the interaction of such factors as 1) actor identities, expectations and competences, 2) technical design and standards, 3) revenue streams and distribution of economic resources, 4) product qualities valued in the existing market arrangements, and 6) enabling and protecting regulations, and 7) political discourses about societal development.

Lock-in makes existing techno-economic arrangements self-reinforcing because the factors both enable and protect existing technologies and practices in terms of regulatory frameworks, accepted externalities in markets, competencies, calculation

methods, and socialization processes. New sustainable pathways face the challenge of making new technologies 'work' and are often confronted with active and silent resistance from existing vested interests, taken for granted assumptions, calculation methods and market arrangements. As the development of Danish wind power shows, challenging the status quo, calls for new coalitions of actors that can develop and institutionalize new combinations of technology, politics, science and markets in our society.

Framing transition challenges in terms of 'lock-in' thinking has the advantage that actors will expect that both scientific and political controversies among stakeholders are integral parts of challenging the status quo and creating new pathways for change.

Throughout society many concerned actors have started new lines of action, they have become engaged 'rebels' and are proposing new solutions and creating pathways leading eventually to transitions. Many scientists study and propose new approaches; innovative companies invest in the design of clean-tech products and low-carbon solutions; many citizens re-design their shopping list; and many innovative cities design new agendas to become more sustainable.

The DIST center addresses such critical questions. The center vision aims at improving the development of transitional solutions and pathways in society by studying, designing and advancing research, solutions, tools and methods that:

1. *can participate in and mediate debates as well as evaluate proposed and conflicting courses of action with a transitional perspective, and*

2. *enable actors to participate in and navigate transitions towards a more sustainable society.*

A core challenge for the Center is to establish this combined research and outreach agenda and to make it work.

Focal areas and insights from technology studies

In the center's approach to studying and supporting pathways building sustainable transitions four fields of engagement are seen as crucial – as are also reflected in the center's name.

Design is seen as the deliberate proposition to make socio-material interventions based on cooperation with involved actors and the outline of concepts and solutions at the levels of systems (institutional configurations and procedures), services and products. However, design is also unfinished and incomplete and such a perspective places the

design process at the center of configuring social, economic, cultural, technical and material relations and thereby as the key for how societal order is constituted.

Innovation is considered to comprise of both the narrow perspective of socio-technical innovations bringing into play technology in an economic and use context and more broadly as new and applied social and political configurations. Innovation is to be studied in its basic dependency upon specific formations of society's material production, institutional/economic structure and use/dependency of resource consumption.

Sustainability is viewed in its broad meaning, integrating the environmental, social and economic dependencies and balances to achieve societal reproduction. Sustainability is a contested and actor centered perspective more than a finite set of goals or measures. As such it represents a continued discourse emphasizing the legitimacy of specific socio-material arrangements in society and how they are to be developed and changed. It is an important object of study and engagement as a continuously unfolding and negotiated political metric that can support the choice of transition pathways.

Transitions are the socio-material transformations that are needed to radically change the resource and fossil fuel dependency of contemporary societies. Transitions can be seen as the reconfiguration and deep changes in social values, institutions, relations, material structures and resource use that characterizes societies systems of production and reproduction. Historic transitions related to the creation of industries, modernization of society, the hygienic revolution, urbanization, etc. can contribute toward the reflection upon and understanding of contemporary transitions in the making. At the core is our recognition of the unfinished and controversial character of transitions that create a need to understand and support actors' navigations and actions in the shaping of transition pathways.

Topics and fields of research

The DIST center will embark on studies within different arenas of transitions. Our initial research agenda will cover integrated energy systems development, climate adaptation, infrastructure planning and city development, use and everyday life practices, design actions and performance, staging translation processes, creating markets and governance as well as design for development.

Energy systems in their integrated forms as production, distribution and consumption are one core area to investigate further. Energy is such a basic part of a modern society that it touches upon many other aspects and therefore must be analyzed in terms of many different kinds and purposes of socio-material practices. Social practices in

everyday life, in transportation and in production and leisure are key objects of study to reach an understanding of how sustainable patterns of consumption and production may or may not result from different transition pathways.

Cities are also at the core of efforts to achieve sustainable development as they are where the life and practices of many people unfold. They present cohesive spatial entities with their own governance structure and dynamics that may play an intermediary role in transition processes. Especially when it comes to infrastructures, transport systems and the organization of everyday life practices.

Inclusive and sustainable design methods and practices outlined and studied within a framework of co-design may provide an avenue for new ways of engaging with actors in the search for new use practices and their embedding in larger socio-material configurations in society. New theorization in the field of design adds to the way scientific research approach the objects of study by extending the field of interaction and demonstrating how socio-material practices can be said to be "performing society" as a manifestation of a contradictory social order.

The navigation of actors and their shaping of programs and alliances are important objects of study as they highlight the very basic uncertainties involved with acting and strategizing actions with the attempt of building sustainable pathways. The configurations of actors involved in transition processes seem to be crucial for their direction and impact and in these processes conflicts are an unavoidable part. A broader understanding of network building and alliances as well as practices of inclusion and exclusion is important for the understanding of the involved processes of translation. Here a classic search for consensus is a much too narrow way to understand the involved alignments while differentiated concepts of conflict as well as of agnosticism may be part of theorizing this field.

Theoretical perspectives: STS and process understandings

The DIST center's research profile draws broadly upon insights and approaches from Science and Technology Studies (STS). This new interdisciplinary field offers a way of understanding how science and technology are deeply connected with and embedded in society, history and culture. STS has developed its own methodologies, frameworks and strategies for intervention.

A common thread for the research at DIST is a process focused view that builds upon the sort of relational socio-material ontology postulated within STS, which states that all entities such as artifacts, facts, institutions and actor-practices have existence only through their existing relations to other entities. Within such a process view we examine the making and breaking of relations among heterogeneous things, rather than seeing

the world as composed of pre-given substances. Such a process perspective puts more emphasis on performance and activity rather than outcome or product, and involves studying both continuity and transformation rather than accepting the persistence of the status quo as a given. In such a perspective of becoming, processes of design, creativity, and disruption are critical even if uncertainty in multiple actor processes means indeterminism of outcomes.

Within the overall Centre research vision the following topics define current interrelated research activities:

- **Sustainable Transitions** with emphasis on how actors can navigate them based on visions and mapping of arenas of change but at the same time having to act with uncertainties as a condition.

- **Design thinking and practices** as an important contribution to perform interventionist actions that are part of shaping and reshaping socio-material orders and changing how society and technology operate.

- **Market creation and valuation processes are re-conceptualized** with markets not seen as pre-existing arenas for setting and combining prices and qualities. By contrast markets and valuations are organized, even designed and are outcomes of specific historical projects and key elements in societal re-building activities.

- **Clean-tech innovation and business development** address the challenges for funding and market development for clean-tech innovations with a need for going beyond single technologies.

- **Design with people** is a new perspective in the approach to acting on a global scale with the needs and competences that must be part of shaping sustainable development strategies.

- **Cities as transition arenas** are the core to the understanding of contemporary change processes implying not only new technical and social practices but also new institutional configurations that can act as a space and mediation for transitions.

- **Staging of design and transition processes** is the core to the idea of change as the performed intervention of a variety of stakeholders and not least their visions and deliberate ideas and often professionally framed understanding of the arena of change.

- **Consumption, ecology and use practices** are complement the ideas of cross-cutting transitions of socio-material practices, institutions and values in society as

their grounding is core both to the established patterns of normalized consumption patterns and for the tensions and options found within emerging new practices.

- **Historic transitions** are important fields of study to learn about the complexities, conflicts and activities that have been involved in earlier transitions and how different actors have navigated these periods of unpredictable transformation and change.

- **Public controversies and negotiation spaces** are the core to our understanding of new perspectives on democracy and knowledge in the contemporary era of societal change as change and transitions are controversial and we need new ways of understanding conflict from an agonistic perspective.

The research themes will evolve and change alongside unfolding research, but are envisaged as a tool for the Center to keep track of the ongoing changes and refinements in building a coherent research agenda.

Knowledge for action – education and engagement with societal stakeholders

The research activities described above will be prioritized and made useful through the center staff's engagement in a varied set of educational interventions at the bachelors and masters level comprising of design-engineering, transition governance, energy planning, city planning, production systems and globalization as well as in techno-anthropology and other fields of relevance.

As important for the Center is its engagement with societal stakeholders in a broad set of outreach activities that will be organized by the center. Here the focus will be on activities that support active engagement and collaborative learning with different groups of actors in society ranging from companies, consultancies, citizen groups, organizations, local authorities and government. Given the complexity and unpredictability of transition processes, the center will emphasize developing an experimental and learning-based approach towards studying sustainable transitions. Our outreach entails the active engagement with navigational approaches and experimental interventions with new technologies and socio-material assemblages. The Center will offer analytical support, design concepts, strategic visions and negotiation space for new actor constellations that emphasize engagement with sustainable transitions.

This engagement might comprise of collaboration agreements with e.g. the Copenhagen Municipality including research and innovation as well as student projects and the organization of training courses and co-design processes involving staff and citizens in sustainable change. It will also include thematic workshop series organized

with groups of industries and stakeholders around core contemporary topics. The Center's home page www.cdist.dk will serve as place, where ideas, discussions and results will be published. As part of this, blogs will serve at means of instant communication on hot and emergent topics. Last but not least it will include open meetings and design laboratories where local citizens can become involved with students and researchers in working for and with sustainable change.

The Center will be involved in a number of collaborative efforts involving external partners as well as scientific peers. The external partners include companies, public organizations as well as non-governmental organizations and community groups. The Center's collaborative approach is one of engaging with its external partners in an interactive way as opposed to a one-way dissemination of research results. The aim is to also incorporate practical knowledge or insights "from the field" into Center activities. Internationally, the Center collaborates with other research groups including KSI (TUE, Eindhoven, NL), DRIFT (EUR, Rotterdam, NL), STEPS (SPRU at Sussex, UK), Policy Studies Institute (UoW, London, UK), Sustainable Consumption Institute (SCI, Manchester, UK), Energy Matters (Lancaster, UK), Institute of Technology Assessment (ÖAW, Wien, AU), Institute of Environmental Social Sciences and Geography (Uni Freiburg, G), Rachel Carson Centre (TUM, Munich, G), Centre for Technology and Society (NTNU in Trondheim, N) and Tema T (LIU, Linköping, S). This collaboration entails engagements in common European research projects as well as knowledge and innovation collaborations funded by the EC.

Educational activities

The Center is involved in a number of different educational programs – at the undergraduate, Mater's, post-graduate levels as well as within executive education encompassing the fields of sustainable design, sustainable cities, sustainable transitions and anthropology of technology. Our pedagogy is deliberately cross-disciplinary combining competences from engineering, design, sociology and humanities. The center is engaged in PhD training at national and international level within its core research fields.

The primary engagement of the Center will be within a new design-engineering program with focus on 'Sustainable Design' at both the bachelor and master level, a master's program on 'Sustainable Cities' and a program in 'Techno-anthropology' at both levels. In the future the engagement may be extended to also include teaching within a master program covering topics within economy, politics and business/market creation in support of sustainable transitions.