

LOW CARBON AT WORK

Modeling Agents and Organizations to
achieve Transitions to a Low Carbon Europe





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1 The need for transitions to a low-carbon Europe

Patterns of unsustainable production and consumption have been recognized as main causes of climate change. Despite cross-cutting multidisciplinary research and policy efforts in most European states, significant changes in consumption and production have not been realised. These changes are needed to reverse or slow down the devastating projections outlined by the Intergovernmental Panel on Climatic Change.

While some reductions have been achieved through carbon trading and other flexible mechanisms agreed upon under the Kyoto protocol, it is now recognized that in the long term it is vital to enhance the efforts of individuals, organisations, and societies at large to reduce greenhouse gas emissions through changes in the patterns of production of goods and services as well as regarding their consumption.

2 The role of large-scale organizations

Large organizations are responsible for a significant amount of greenhouse gas emissions. The emissions generated by large organizations result from their production processes and the pressures under which they function within our economic system. Following new EU regulations, national governments have also passed laws concerning emissions and have created policy instruments designed to reduce or compensate the level of emissions of specific organizations in order to reach national and European goals. As a result of these new regulations, organizations have started to implement strategies to reduce their greenhouse gas emissions. However, as stated in the EU Sustainable Development Strategy Review 2009, these strategies have not been sufficient to ensure significant reduction rates. To better articulate efforts undertaken by relevant actors towards sustainability, we argue that it is important to identify barriers to and drivers of *sustainable changes in everyday practices in the workplace*.



3 The workplace as an area of everyday life

As a key practice of everyday life, work is a place and space where the often believed contradictory demands of economic and environmental sustainability meet and are negotiated, which affects work practices, energy consumption and greenhouse gas emissions. As people spend an important part of their lives at work, within a community of values, norms, beliefs and everyday practices, it is also the place where identities are negotiated, where individual values are transformed and where sustainability-related behaviour is either promoted and rewarded or hindered and discouraged.

Large employers hold a high potential for change. As a main area of human life, work is vital in fulfilling basic human needs. This means that changes in work practices can be highly effective and have the potential to be translated to other domains of life.

The Heavy Industry: Transforming Production

Shell is a multinational corporation, the largest energy company in the world, and operates in more than 70 countries with approximately 87,000 employees. Volvo Trucks is the second-largest heavy-duty truck brand in the world. More than 95% of the trucks Volvo build are in the heavy weight class above 16 tonnes. Volvo trucks are sold and serviced in more than 140 countries globally. Multinational, high carbon-emitting companies clearly are critical actors in terms of climate change; they have the potential to have a significant impact in reducing emissions through changes in their production processes. In turn, this may have considerable knock-on effects on the lifestyle choices of consumers, on the practices of their employees away from the workplace, and on production processes across the world.



4 The mission and objectives of the LOCAW project

The LOCAW project has set out to answer the challenge of identifying the barriers to and drivers of low-carbon transitions in Europe and to formulate context-sensitive policy that can contribute to accelerating the transition to a low-carbon Europe.

The project has approached this challenge in two ways:

- i. by identifying how carbon consumption practices in the workplace and the home can be transformed
 - ii. by enhancing our understanding of how these two important areas of our lives can be made to work together to achieve a transition to a sustainable society.
- It also included an analysis of the ways in which people connect everyday practices from one area of life to another and what the obstacles are in generalizing sustainable behaviours across all areas of life

LOCAW first provides a theoretically and empirically grounded analysis of everyday practices in the workplace, of the factors promoting or hindering the transition to more sustainable behaviours and practices and of the ways in which people connect everyday practices among life domains. The results were then taken as a basis for agent-based models which were designed to illuminate the interactions among relevant actors at all levels both within and outside the organization and also to provide a detailed account of barriers to and drivers for cooperation in transitioning to a low-carbon Europe.

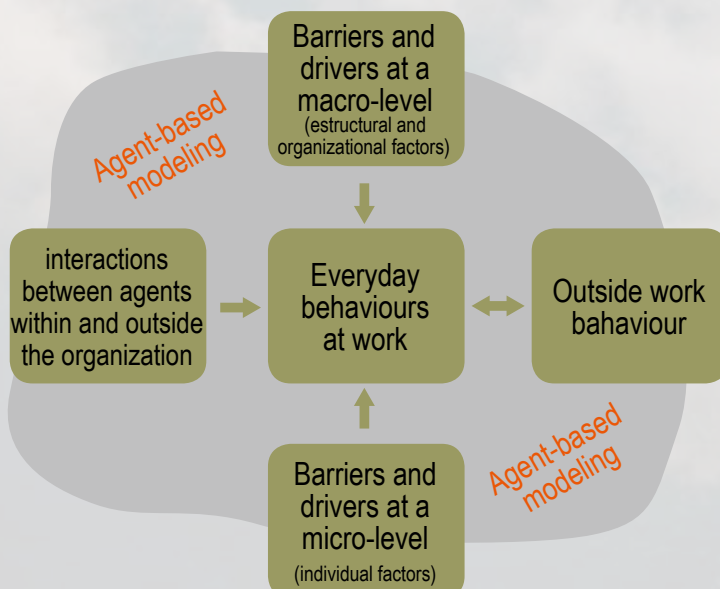
The models constituted simulations of the organizations and of their evolution in time under certain structural and policy conditions. Several approaches were used to model the different case study organizations. Transitions to a low-carbon future were then simulated using the results obtained from our empirical research and the input of workers and management in the organizations under study. The project used participatory future scenario development tools such as back-casting workshops to create visions of the future for the six organizations and to generate pathways to reach them. The agent-based models were then used to simulate these pathways and see how they worked out in relation to the desired vision.



5 The LOCAW way

The integrative investigation of the determinants of everyday practices and behaviours within large scale organizations was undertaken on different levels:

- analysing the patterns of production and consumption in the workplace with their resulting greenhouse gas emissions;
- analysing organizational strategies to reduce emissions and to implement EU regulations regarding the “greening” of their production processes.
- factors affecting everyday practices and behaviours at work of employees on different levels of decision-making within the organization.
- the relationship between behaviours and practices at work and behaviours and practices outside work.
- the patterns of interaction between relevant agents and stakeholders in the organization’s environment and the resulting barriers and drivers for implementing more sustainable practices and behaviours in the workplace.



Renewable Energy: The Green Innovation

Companies in the renewable energy sector are well-situated to be the site where green innovation emerges and an important part of the solution to our carbon-dependent lifestyles. Enel Green Power (EGP) is dedicated to developing and managing energy generation from renewable sources (geothermal, hydroelectric, wind and solar). EGP operates in many countries in Europe and the Americas.



Public Service Companies: Leading Change

Public service companies can be at the forefront of sustainability transitions being the first in implementing measures to significantly reduce emissions, as they are not subjected to the same pressures as private companies. Aquatim ensures the provision of water supply and waste water collection services in Timis County in the Western part of Romania.

AQUATIM



6 Some LOCAW conclusions

There are various important structural factors influencing practices in large-scale organizations. These include the political, social, economic and legislative environment in which the organizations operate, but also organizational factors such as the organizational culture, internal communication processes, the relationships between management and workers and the level of autonomy of decision-making and behavior, or the weight given to environmental issues. EU regulations are very important as they constitute the background against which national and organizational policies are defined, as well as the criteria established by super-ordinate bodies relevant for each organization.

Reputation has a high value for organizations and their success depends on it. Creating an environment in which reputation is dependent on environmental performance should be a relevant policy goal. The crucial step here is moving from mere image to reputation, i.e., bringing sustainability and low carbon practices into a company's identity and in workers everyday behaviors and practices.

At a close analysis, we found that organizations place environmental goals as important in their mission and objectives, but in practice these goals often appear to be either at odds with, or secondary to, other goals such as profit or safety. There is a need to re-prioritize environmental goals in organizations, and to encourage organizations to translate the goals as reflected in their mission and objectives into specific organizational policies and practices. Both formal and informal, and vertical and horizontal communication channels are important for this objective.

Personal and social norms play a key role in transitions to sustainable practices in organizations. These are created within a context of vertical and horizontal relationships within organizations. They develop through the observation of the behavior of others and the inference of what others (colleagues, leaders) think about what is desirable behavior. Organizations can do many things to promote social norms that support pro-environmental options of behavior through the display of sustainable

organizational behavior, for example. This significantly reinforces individual motivations to act in a sustainable way.

There are also important individual factors that influence sustainable practices in organizations, such as motivations, knowledge and abilities. Among motivational factors, the values people endorse influence their behavioral choices. For example, the more strongly people endorse egoistic values, the more energy they use at work. Energy savings can be promoted by decreasing the saliency of egoistic values in choice situations.

The relationship between practices at home and practices in the workplace is a complex one. The transfer of sustainable practices between work and home does not happen 'naturally'. If the interchange of work/home sustainability practices is to occur, then this will not only require the workforce and management to develop their knowledge about sustainability in both the home and work environments, but decision-making and communication barriers within companies will have to be changed in order to encourage bottom-up initiatives drawing on workers knowledge and skills for improving low-carbon production and green workplaces. At Volvo, for example, workers made suggestions to improve sustainability but these were not realised. While laws, regulations, and financial incentives are important drivers for company environmental performance, they often become boundaries of permissiveness rather than drivers for change. The

7 Building visions of the future for sustainable organizations

We used back-casting scenario development to build normative visions of a sustainable future for 2050 for the organizations, and to define the pathways to reach them. These are a few examples:

The green office of EGP.

"The EGP offices will be small multi-functional offices, located outside of the city, within green areas near to the homes of the workers, with infrastructures that enable workers to travel in sustainable ways. Delocalized offices will be therefore characterized by hyper-technological systems, and energy saving, with a total elimination of greenhouse gas emissions. Mobility for work purposes will be strongly reduced, to the strictly necessary. Transportation will be reduced to minimum. Short travels, and only with electric vehicles, will be incentivized."

The "de-localized" University of A Coruña

"The University has been moved to the city and the different communities around it with small and multi-functional rooms in each neighborhood, as support for virtual teaching. These rooms possess efficient energy systems which are adapted so as to ensure the minimum consumption possible. Return recycling is also promoted and dangerous materials are adequately processed. Green contracting is implemented at all university levels and the cost of products is generally calculated by including ecological parameters. Paper does not exist in the University anymore. Water provision is self-sufficient. The majority of both staff and students use public transportation and bicycles to reach the university. Many walk to and from the university. Car use is only common for a minority and is not well seen at the University."

The "reaching for close-to-0 emissions" Aquatim

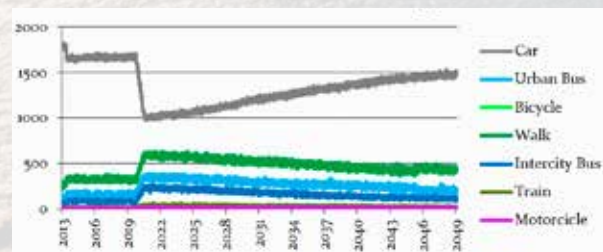
"Aquatim is an organization which uses only sources of renewable energy (solar, vortex, etc.). Energy management inside Aquatim is eco-efficient with zero losses. Aquatim owns a fleet of environment friendly electricity powered vehicles for certain professional travels and, in the same time, it owns both a bus and a bicycle travel system for the employees. Some of the employees work from home, and the working schedule is adjusted to the different periods of the year in order to maximize the use of natural light. All industrial equipments have non-polluting engines. 80% of waste is recyclable. In the necessary interventions and in running repairs, Aquatim uses remote controlled intelligent robots, thus, reducing risks to employees. These robots run on renewable energy sources. Employees are assigned tasks to optimize their potential and working tasks are drawn in a way to ensure an efficient consumption of power, water and materials resources. Also, employees benefit from recreational green places which ensure higher productivity and less working hours."

8 Simulations for sustainability

The task of integrating findings from multiple case studies and multiple methodologies has been facilitated through the use of agent-based models. These agent-based models have also been used to test some of the policy tracks suggested by the backcasting workshops undertaken as part of the project - examining potential low carbon scenarios for workplaces into the future.

These empirically grounded models provide useful simulations of policy tracks, and demonstrate the importance of combining interventions and ensuring that the maintenance requirements of policies are given sufficient weight, and that the frequency of policy maintenance is adequate. The graph on the left shows the effect of an isolated structural policy which results in a large reduction of car use, but the graph on the right shows the effect of combining this policy with one that encourages the uptake of cycling and includes regular policy maintenance. In terms of non-structural policies, we found that the isolated effect of these (e.g. hiring people with biospheric values) was marginal, but can sometimes be useful when combined with structural interventions.

Use of means of transport



Isolated one off car-reduction policy with no policy maintenance



Combined car-reduction and cycling policy with regular policy maintenance

9 PROJECT IDENTITY

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