



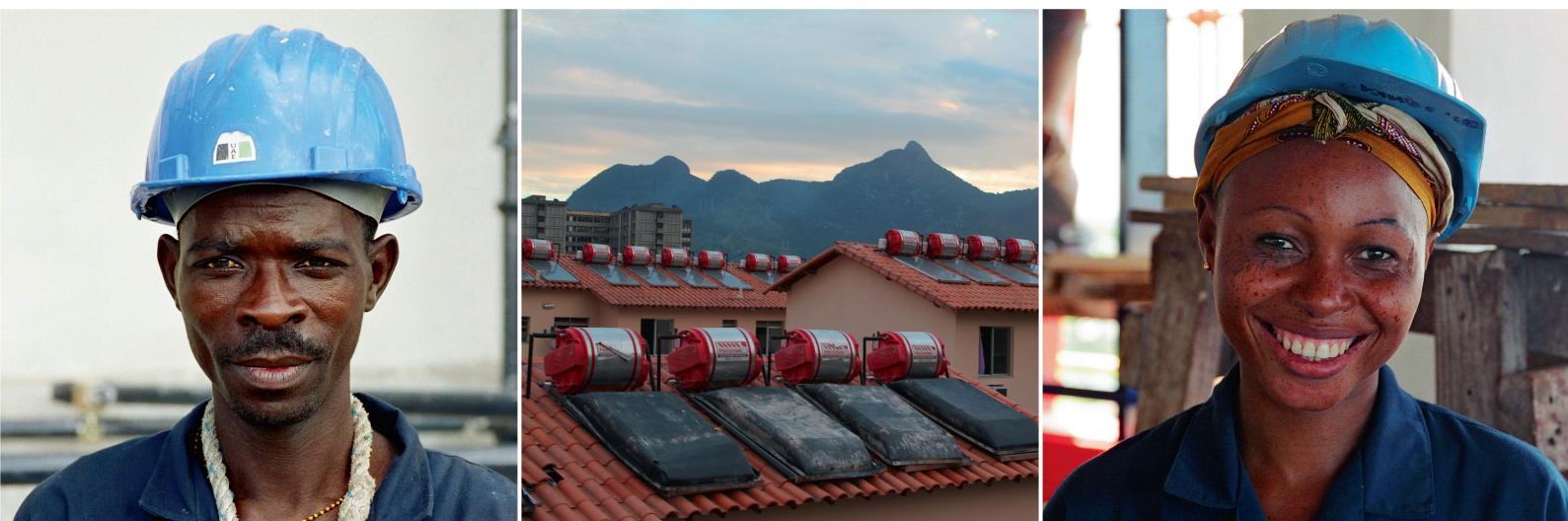
International
Labour
Office

Geneva

BEL (Built Environment & Labour)

Formulating Projects and Studies Concerning
Labour Issues in Greening the Sectors of the
Built Environment

Guidance Manual



Sectoral
Activities
Department

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GUIDANCE MANUAL

Sectoral Activities Department

INTERNATIONAL LABOUR OFFICE • GENEVA

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Preface

This Manual provides guidance to ILO units and field offices which wish to engage in studies and projects related to greening sectors of the built environment. First, it provides relevant background data to inform the preparation of studies and projects. Second, it provides a step-by-step guide to the development of such initiatives.

Green jobs have become an emblem of a more sustainable economy and society that preserves the environment for present and future generations and is more equitable and inclusive of all people and all countries. Green jobs reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials and water consumption through high-efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution. Green jobs in emerging economies and developing countries include opportunities for managers, scientists and technicians, but the bulk can benefit a broad cross-section of the population which needs them most: youth, women, slum dwellers, among other categories of workers.

The sectors of the built environment are the main sources of emissions of carbon dioxide (CO₂) and other greenhouse gases. They are key contributors to climate change and to the depletion of natural resources. These impacts are linked to the production of the built environment (i.e. infrastructure and construction) as well as to its use and maintenance (e.g. buildings, transportation, utilities, waste). Altogether, they generate close to 80 per cent of all carbon dioxide (CO₂) as well as significant amounts of other greenhouse gases. Buildings alone are responsible for 25 to 40 percent of global energy use, and 30 to 40 percent of global greenhouse gas emissions. Emissions from vehicles and transport equipment are rising at a rate of 2.5 percent each year, and contribute not only to CO₂ emissions, but also to local and regional pollution problems through the emission of carbon monoxide, lead, sulphur oxides and nitrogen oxides. The electrical energy for public lighting, transportation and urban consumption is also a source of emissions. In addition, a reduction in the amount of green cover in urban areas reduces a city's ability to reabsorb CO₂, and poor waste management releases CFCs and gases such as methane into the atmosphere.

It is essential, therefore, to make the activities related to the production and use of the built environment an integral part of the solution in the fight against climate change and depletion of natural resources. At the same time, energy efficiency in the built environment encourages the development of new professional skills and can generate employment opportunities. The greening of the built environment requires the development and implementation of new technologies aimed at reducing the negative ecological impact of its sectors, and enhanced performance. This green technology development requires investment into enterprise competency, new skill sets, new training methodologies and materials. It also requires investments to promote decent work conditions. Evidence shows that green jobs do not automatically constitute decent work. Many of these jobs are “dirty, dangerous and difficult”.

Employment in sectors such as waste management and construction tends to be precarious and incomes low. If green jobs are to be a bridge to a truly sustainable future, this needs to change. Green jobs therefore need to be decent jobs. Decent green jobs effectively link Millennium Development Goal 1 (poverty reduction) and Millennium Development Goal 7 (protecting the environment) and make them mutually supportive.

It is anticipated that this Manual will provide sound orientation to ILO units and field offices working on the aforementioned issues, advanced the agenda to green sectors of the built environment.

The Manual was written by Adrian Atkinson from New Synergies for Development. It was technically managed by Edmundo Werna, with the support of Abdul Saboor, from the Sectoral Activities Department of the ILO.

ALETTE VAN LEUR

Director, Sectoral Activities Department

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Introduction to the Manual

The International Labour Organisation has devoted increasing attention to the urgent need of greening economies around the world. In collaboration with UNEP, it produced in 2008 the first major comprehensive report on the employment implications and possibilities resulting from greening the global economy.¹ Negative environmental impacts from development as well as curbing measures have been known for many years. Recently the main focus has been on the potential impacts of climate change from global warming that are predominantly caused by excessive burning of fossil fuels. At the same time, there is a growing awareness that oil, gas and coal supplies will be diminishing as a consequence of increasing exhaustion of the resources, precipitating what could be a disastrous decline in the global economy if urgent mitigation measures are not taken. The urgency of this agenda has been expressed by the World Bank in terms of a serious misallocation of resources in current approaches to urban development. Referring to green urban development, the Bank recently stated that:

“... the problem at stake is not so much one of trade-offs between growth and environment, but is mostly a ‘gross misallocation of capital’. If \$1.3 trillion (less than 10 per cent of annual investments) were redirected into green investments across ten sectors, growth and poverty reduction would be achievable while promoting a greener and sustainable economy.”²

Economically and in terms of the use of resources and impacts on the environment, one of the most important sectors is construction, and more generally the on-going extension and maintenance of the built environment. Altogether, the built environment generates close to 80 per cent of all carbon dioxide (CO₂) as well as significant amounts of other greenhouse gases. Direct sources of greenhouse gas emissions include energy generation, vehicles, industry and the burning of fossil fuels and biomass in households. Buildings alone are responsible for 25 to 40 per cent of global energy use, and 30 to 40 per cent of global greenhouse gas emissions. Emissions from vehicles and transport equipment are rising at a rate of 2.5 per cent each year, and contribute not only to CO₂ emissions, but also to local and regional pollution problems in urban areas through the emission of carbon monoxide, lead, sulphur oxides and nitrogen oxides. The electrical energy for public lighting and transportation, and industrial, commercial and household consumption, is also a source of emissions. In addition, a reduction in the amount of green cover in urban areas reduces a city’s ability to reabsorb CO₂, and poor waste management releases CFCs and gases such as methane into the atmosphere.

¹ ILO (2008). *Green Jobs: Towards decent work in a sustainable, low-carbon world*. International Labour Organization, Geneva.

² World Bank (2011). *Towards a Partnership for Sustainable Cities – Draft Note*. World Bank, Washington DC.

It is therefore clear why much attention in the past few years has been focused on ‘greening the built environment’. In practice, the focus has usually been more narrowly on greening buildings – assembling more environmentally-friendly buildings and refurbishing older ones to bring them in line with good environmental practice.

However, there is a wider issue of the configuration of buildings, of different land uses and infrastructure at the level of neighbourhoods, cities and the peri-urban areas that equally merits attention. Little attention has been focused on looking at the built environment in a holistic and integrated way. Towns and cities and even more scattered developments do not simply consist of buildings but are vitally interconnected in terms of functions and rely on a number of different infrastructure systems including energy and water supply and the removal of waste water and solid waste. All systems have environmental impacts that, where well-managed, can be reduced and minimised to move closer to a situation of urban sustainability. Greening the built environment is thus considerably more than greening the building stock – even though this is an important component – and should be considered as an integrated whole.

The Purpose of the Manual

The purpose of this manual is twofold:

First, to provide relevant background data to inform the preparation of studies and projects related to labour on greening the built environment.

Second, to provide a step-by-step guide to the development of projects.

The Manual is divided into two parts, each one addressing one of the aforementioned objectives. The Manual also includes two appendixes, which supplement the information of part 1. The reading of the manual, especially of part 1 (and appendixes), can be *selective*. I.e., the readers can select what to read and what to skip depending on their prior knowledge of the subjects. It also depends on the specific sector or sectors of the built environment that the project will focus on. Nevertheless, it is suggested that the readers pay attention to the explanation about the linkages between the sectors and to the government policies, as they have implications for labour in each sector.

Throughout the Manual, the words ‘city’ or ‘urban’ are sometimes used as shorthand but the concept of the built environment should be considered also to cover less smaller human settlements as towns, villages, suburban and exurban developments, industrial installations, and so on.

The ILO traditionally (but not exclusively) has engaged in two types of activities related to greening the built environment at country level. First, given the novelty of the topic (and more specifically green jobs), and in order to complement/inform relevant project formulation, it sets out to undertake research studies that are designed to take stock of the context, analyze relevant labour issues and challenges, and come up with clear findings and recommendations. Second, it engages in defining, formulating and implementing operational projects that need direct contact with the constituents and consist of a series of planned and executive activities on the ground. **This Manual strives to provide guidance/tips on how to undertake and combine the two mentioned sets of activities (i.e., undertaking studies and formulating projects on greening the built environment) to maximize efficiency and create a scenario in which the process of undertaking research feeds into project formulation/activities, and vice versa (projects feeding future studies).**

In commissioning studies and projects which entail the relationship between labour and the greening of the built environment, key issues need to be defined; such as what generally makes up the built environment, what needs to be done to reduce the environmental impacts of on-going change and its labour impacts, as well as what the ILO's constituents might do to address environmental and resource challenges in this area. This Manual will assist readers to better understand and define such issues.

The Role of the ILO in Greening the Built Environment

It is not the responsibility of the ILO to assist governments, local authorities and the wider spectrum of interested stakeholders directly to green the built environment. The ILO is concerned with generating decent work and ensuring the availability of skilled workforces to carry out the greening of the built environment. It is also concerned with creation of enterprises that can organise and manage the work involved in greening the built environment. However, if governments and the private sector do not take appropriate initiative to stimulate and promote the greening of the built environment, progress will continue to be slow, as has been the case over the past few decades. As an additional task, the ILO can work with other agencies and organisations to encourage governments and relevant stakeholder groups to take more concerted steps to green the built environment. The Manual will also provide information which could facilitate this process.



This Manual sets out the stages through which ILO projects concerned with labour issues related to greening the built environment should be structured.

Who should use this Manual



This Manual is intended for use by the ILO units and field offices. ILO managers and officials as well as consultants who set out to formulate and implement projects for greening of the built environment (focusing on its labour dimensions) are the direct audience group who will benefit from the guidelines and tips that are provided in the Manual.

How to use this Manual

Part 1:

- 
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- focuses on what is meant by greening the built environment including the many dimensions and sectors involved. This part should be read on a selective basis. The objective is to help readers understand the technical dimensions and what needs to be done in terms of investment and other organisational issues to advance the greening of the built environment.
 - looks at the impacts that increased investment in greening the built environment could have on labour including employment, the skills requirements and potential problems of deficits in decent work in the sectors involved.

This should help the ILO to formulate Terms of Reference for specific country or local (sub-regional or city) projects designed to explore and promote labour issues in new or on-going greening initiatives.



Part 2 sets out the way in which ILO projects related to the greening of the built environment should be structured and carried out. This part is more technical and should be consulted by the reader continuously throughout the inception and implementation phases of the project.

In practice particular countries, sub-regions and sectors need to be studied in ways that engage with the particular configuration of the built environment and the mechanisms through which changes and improvements are, or might be, made. However, there are general approaches that are relevant everywhere and the Manual is designed to help those carrying out studies and projects to structure their work in order to obtain locally relevant results.

It must be stressed that studies need as far as possible to advance beyond the use of existing literature and interviews with key experts. This means that ‘participatory approaches’ to studying and engaging with the local situation should be adopted, appropriate to particular countries or human settlements. More than simply interviewing individuals knowledgeable on greening the built environment, groups of relevant stakeholders should be brought together to discuss the issues at stake and to take these back to their constituencies. The objective is to take action on the conclusions reached regarding effective ways to green the built environment and the role and conditions of labour in this context.

Part 2 is subdivided into two stages:

- **STAGE ONE**, which may be the full extent of ILO involvement in local projects, specifies a step-by-step procedure, indicating approximate time frames for each step. This will inform ILO offices or their consultants studying the labour implications of a series of components for a comprehensive approach to greening the built environment of a particular settlement.
- **STAGE TWO** that concerns the implementation of greening initiatives is outlined in a more general way. It looks at the possibility of ILO local initiatives continuing beyond the first stage to be associated with projects funded by others – typically governments or IFIs – to undertake major programmes in city greening. Here the ILO would continue to assist with information and support for training that could be

expected to improve the commitment of local actors to city greening and the efficiency of their efforts. This second stage leads directly to action.

There are two **appendixes** at the end of the Manual, which provide information on interventions in the built environment and financial initiatives. While the ILO is not expected to promote government action in technical aspects of the built environment (i.e. beyond the “world of labour”), **Appendix 1** illustrates initiatives that lead to the greening of the built environment (as information to the reader) and that may be used as a basis for estimating the labour impacts of greening actions. **Appendix 2** provides information on funding for such initiatives.

PART 1

BACKGROUND INFORMATION ON GREEN DEVELOPMENT AND ITS LABOUR IMPLICATIONS

Part 1 provides relevant background data to inform the preparation of projects related to labour in greening the built environment. It is divided into three sections:

- **I.1. Who is Responsible for Construction and Maintenance of the Built Environment?**
- **I.2. Background Information on the Built Environment with Special Attention to Greening Practices**
- **I.3. Labour Issues in Greening the Built Environment**

I.1. Who is Responsible for Construction and Maintenance of the Built Environment?

Everyone has a stake in the built environment in which they live and work. Furthermore, the ways in which they move about and use it determines the resource and environmental impacts which accrue to the built environment. For example, different modes of using public transport have different impacts on the environment as do water use and waste disposal. Crucial to sustainability is how citizens can reduce energy use with small household investments, being mindful in the control of heating and cooling and the use of household appliances.

Understanding the roles of the actors involved in the construction and maintenance of the built environment is fundamental to the design of studies and projects (and studies) and their implementation.

I.1.1. Citizens

Usually ordinary citizens have options and can reduce resource and environmental impacts significantly simply by altering the way they act, with little effort and no additional cost (usually reducing the cost of everyday life). In this sense every citizen has a responsibility when it comes to greening the built environment, both in trivial acts but more importantly by buying into particular ways of life to reduce negative resource and environmental impacts of their lifestyle.

I.1.2. Politicians, Government functionaries and Professionals

Decisions that are made by politicians and government functionaries, planners and developers, architects and engineers, together with a list of other consultants and advisors concerned with the built environment, can open up or close down options for greener ways of living and working. Studies indicate clearly that, although there has been a great growth in awareness of the need to green the built environment, the aforementioned actors are often in need of training with regard to the technical means to apply their work effectively to greening those dimensions of the built environment that fall under their responsibility.

A specific group of relevant actors includes those responsible for designing regulations, executing controls and ensuring a high quality in the built environment produced. This ranges from politicians and (particularly local) government functionaries responsible for promulgating and administering planning and building regulations, through to those responsible for supervising building activity, including emerging professions of energy and environmental assessors, to quality controllers in industry and on building sites.

I.1.3. Workers

Once decisions have been taken regarding how the built environment should be extended, redeveloped or rehabilitated and designs and specifications have been made, a wide range of skills are required to execute these activities efficiently and effectively. Due to the novelty of much of what constitutes green ways of constructing and maintaining the built environment, there is many times a lack of adequate knowledge and skills (referred to as a 'skills

gap') amongst workers. This needs to be addressed in the immediate future if rapid progress is to be made in greening the built environment. This is not only an issue for contractors responsible for undertaking work designed by architects and engineers. It is an issue for all levels of work, that might for instance involve 'green plumbers' and 'green electricians' for maintaining and upgrading existing buildings contracted by ordinary citizens.

Workers can be champions of greening the built environment. Therefore, it is important to raise their awareness about the environmental impact of their technical work. While there has been progress in such front, particularly through the effort of workers' organizations, future projects can further advance the awareness raising.

The transition to a greener built environment should also ensure decent work, in which workers and their organizations also have an important role.

I.1.4. Enterprises and Employers

Enterprises and employers also have an important role in securing a transition with decent work conditions. While many enterprises/ employers are already committed to greening the built environment, future projects can add to such trend. Different types of enterprises / employers are described below.

Real Estate Developers

Developers play a fundamental role on how the urban areas in general (and the built environment in particular) are shaped, and to the extent to which greening is implemented. Therefore, it is important to raise the awareness of real estate developers about the value of greening the built environment, as well as to inform them about the business opportunities that this entails.

Providers of Utilities

Many companies are public, therefore they follow the rules and regulations set out by government authorities. At the same time, other companies are private, and in this case, it is important to raise their awareness about the significance of greening the provision of water, electricity, gas and management of sanitation; as well as building a 'business case'.

Manufacturers and Retailers

A third group involves manufacturers and retailers of materials and goods used in constructing and maintaining the built environment. In the past, many environmentally-unfriendly and resource-wasting materials and goods used in constructing the built environment have been produced and marketed. In the worst cases, major rebuilding was necessary. For example, to remove asbestos (that for many years was a major building material and is still applied), and to replace ineffective and faulty facades and heating/cooling systems. Manufacturers are constantly improving materials and goods used in the built environment, but not all of these improvements are necessarily 'greener'. Care needs to be taken in assessing these new materials and goods, and in particular how well they are installed, in the framework of principles of greening the built environment.

Construction Enterprises

Construction enterprises follow the directives of real estate developers (and other clients) in regard of what to build. This reiterates the importance of the clients of construction enterprises in promoting green construction. At the same time, construction enterprises need to be technically and managerially prepared to deliver green construction products. In addition, such enterprises can help to make a case for green construction, explaining to their clients the advantages of doing so.

Waste Management and Recycling

The public companies operate under the policies of government authorities. Yet, there is a growing number of private enterprises, which, like their counterparts in other sectors, need to be informed about the importance of green practices and also to be aware of the benefits for business. While many waste management and recycling activities in the private sector are carried out by formal, medium- or large-scale companies, there is also a significant number of small-scale companies (formal or informal) and waste pickers operating alone or in cooperatives. The latter set needs special attention, as inappropriate working conditions including health and safety problems abound.

I.1.5. Unregulated Construction



Unregulated construction exists in both developed and developing countries. To a small degree in industrialised countries, but to a very large degree in most developing countries. In developing countries, one can find substantial parts of human settlements and the buildings to be constructed without the involvement of professionals or any meaningful control on what is being built. On the whole such settlements display a very different set of greening issues from 'regulated' settlements, for one thing they have a relatively low impact on the use of resources. The use of energy and other resources is significantly less. Many people walk rather than take motorised transport, they do not heat or air condition their houses, little water is used and building materials are in many cases largely recycled from the demolition of formal buildings.

However, these informally-built up areas do suffer significant environmental problems. In order to seriously consider greening the built environment as whole, mechanisms need to be found to address issues like sanitation, access and lack of infrastructural resources available to the inhabitants of these areas. Insofar as improvements are made, consideration needs to be given to the means to upgrade the urban environment of the poor without incurring the 'green debts' so evident in the existing regulated urban environment.

Many areas originally built out of government regulations have been upgraded through government assistance, international assistance or/and through self-help. Today they have increasingly onerous environmental impacts due to modern lifestyles in inadequate infrastructural and building conditions. Attention needs to be focused on the labour implications both in terms of numbers and skills needed in order to build 'unregulated areas' and to refurbish these to improve living conditions in a 'green' manner. Some governments build low-income housing with a specific focus on keeping prices low, but in the process omitting green methods and materials. It is also important to address such new housing programmes, as they will have increasingly negative environmental impacts both for the inhabitants and for the urban milieu in general.³

³ Gupta, R., Svenningsen, N. and de Feraudy, T. (2011) *Sustainable Solutions for Social Housing: Guidelines for project developers*. United Nations Environment Programme, Nairobi.

I.2. Background Information on the Built Environment with Special Attention to Greening Practices

 This section presents generic material on the built environment and its components. The purpose is to inform readers about the field of activities in which green jobs will play a role. The section concentrates on the technical aspects of the built environment, but without addressing labour issues (which will be tackled in the subsequent section). 

I.2.1. Overarching Global Issues which Affect 'Greening the Built Environment'

Knowledge about the need to 'green the built environment' and how this might be done has been increasing since the beginning of the 1970s. Since then warning have been made about the eventual finite nature of many resources and that increasing pollution and the degradation of ecological systems can damage human health and eventually have serious economic impacts due to the unsustainability of the development process. From the beginning, an important dimension was the differential use of energy resulting from diverse configurations of the built environment and then focusing on energy in the construction and use of the built environment.

Resources are Finite

What has emerged as the most important solution to environmental problems in the short term is the reduction in consumption, and in the long-term in pursuing re-use and recycling of resources. In the case of energy, the focus has been on using it more sparingly and efficiently and eventually replacing non-renewable fossil fuels with energy from renewable sources – the sun, the wind and geothermal sources, among others. In the case of 'water stress' found increasingly in cities around the world and especially in arid areas, the focus has also been on more efficient use and of re-use, which is a question of good planning and management.

Pollution of the Environment is closely related to the Use of Resources

There has been a close relationship between increase in pollution and increased use of resources. The most important connection is between the use of fossil fuel and the production of greenhouse gases – in particular carbon dioxide – that are leading to climate change, a fact that could be disastrous in the coming decades. Once again, reduction in the need for and better management of resources are the long-term solutions to problems of pollution.

Peak Oil and Declining Energy Resources

A further consideration that makes the need to reduce resource use more urgent is the arrival of 'peak oil'. Over the past century to the present days the amount of energy used in human



Combined Heat and Power (CHP) Plant in Sweden © Adrian Atkinson

settlements has been constantly increasing. This has been possible because the resources – predominantly fossil fuels – have been easily available. Now humanity is facing a situation in which the amount of energy available from fossil fuels will be declining. This makes it doubly necessary to find ways of reducing energy whilst maintaining a reasonable lifestyle. And it means making increasing efforts to substitute energy from fossil fuels for energy from renewable sources.

The Role of the Built Environment in Resource Use and Pollution

The on-going construction and management of the built environment confronts all these problems. Considerable research has gone in recent years not only to the problems but more importantly into understanding what might constitute better ways of fulfilling the needs accomplished by the built environment in ways which are less resource consuming, less damaging of the natural environment and less polluting. In the following paragraphs the main issues broken down into major dimensions and components of the built environment are presented. This indicates both the problematic and the general potential that may be achieved through green approaches to address the issues.

I.2.2. 'Spread City' – The Changing Face of the Built Environment

Over the past decades to the present days changes have been happening in the configuration of the built environment. Already early in the 20th century, the populations of inner cities in Europe and North America started to decline, as populations suburbanised and downtowns

specialised in workplaces, with increasing densities particularly of office space and related service facilities. Suburbs, however, continued to reduce in density and many workplaces also suburbanised, while home-to-work journeys, other journeys and the resources spent on infrastructure escalated. From 1960 to 1990 population density diminished by 17 per cent in the Tokyo region, in the United States around 30 per cent (New York 28 per cent, Washington DC 33 per cent, Detroit 35 per cent) and some European cities to an even higher degree (Hamburg 42 per cent, Amsterdam 44 per cent and Frankfurt 47 per cent). In general this has meant continuing increases in per-capita use of a wide range of resources to build and maintain the built environment.

I.2.3. Changing Technologies and Construction Methods

Meanwhile, building technologies and methods have been changing. In particular prefabrication of building parts in factories has been continually replacing site work, which has become increasingly a question of assembly. This has influenced and been influenced by changes in materials used to build, the labour processes and the skills involved. In some cases these changes have been in the direction of improving environmental and resource impacts, but in many other cases this has not happened. Studies concerned with greening the built environment should be aware of the kinds of changes that are under way and how these might be influenced both to reduce negative resource and environmental impacts and be steered in a direction that will be effective. Above all, the interconnections between changes in different sectors of construction and maintenance of the built environment need to be taken into account – and not only the resource and environmental impacts considered but also the labour impacts.

In studying changes in construction, economists have used a method known as Input-Output Analysis (I-O) that presents a picture of all the inputs necessary to produce goods including components and complete buildings. This is still a very useful method.⁴ More recently, two parallel approaches, related to I-O analysis and to one-another, have also been used in calculating the full range of employment and environmental impacts of investments – albeit hitherto tending to be carried out separately, with different data bases. One is Lifecycle Assessment (LCA) and the other is Value-Chain Analysis (VCA). Another tool available in this respect is Local Economic Development (LED), which entails a territorial analysis and is more pro-active than analytical. These approaches are detailed in the Section 1.3, with considerations to their use in assessing the labour of different greening interventions.

I.2.4. Synergies in Greening the Built Environment: Taking Sectoral Functions into Account

The first issue which comes to mind when talking about the built environment is the buildings themselves. However, buildings constitute only one part of the built environment. Buildings house particular functions, but these are interconnected through use to the overall functioning of cities. To perform adequately, buildings need to be serviced by roads and transport systems, energy and water supply systems, waste water and solid waste removal. In addition, other resources including food, other materials and manufactured goods have to be supplied to sustain life in the city. There are many ways in which such sectoral functions can be fulfilled and in the past these have not been necessarily green. In changing to green ways of supplying and managing different components of the built environment, the interconnection between

⁴ The study concerning the retrofitting of the Hungarian housing stock, referred to latter in this Manual, employed I-O analysis to trace all the costs and employment implications of the programme.

functions needs to be considered. Precautions need to be taken to avoid dealing with sectors and functions in isolation, and to look for synergies.

Experts on environmental sustainability and related issues have highlighted the importance of taking into consideration the interactions among sectors. Current thinking on the theme highlights that, if large-scale reductions in carbon are to be made, policy frameworks aimed at reducing the carbon intensity of production (and consumption) systems need to pay more attention to the holistic aspects of this process. I.e. paying attention to all the sectors included in each system and their connections.

Information provided in this section (I.2.) is supplemented in Appendixes 1 and 2, which have a specific focus on government initiatives, behaviours of actors and financing of programmes.

I.3. Labour Issues in Greening the Built Environment

This section builds upon the two previous sections, and concentrates on the labour issues related to greening the built environment. It provides key background information to the step-by-step guide presented in Part II.

Conservation of resources and reduction in pollution require substantially different approaches to on-going construction and maintenance of the built environment than those used in the past. In recent years changes have been made and new directions taken, with clear implications for employment and decent work. This part of the manual analyses the connection between such technological changes and labour.

I.3.1. Synergies in Greening the Built Environment: Taking Labour into Account

Following from sub-section I.2.8, while keeping the specificity of each economic sector is important when defining green jobs policies, their effectiveness and impact would increase if a system-based approach (involving different sectors) is adopted.

In order to understand a system holistically, it is necessary to describe and analyse not only the component parts and actors, but also the interactions, which produce variable outcomes. The relationships between different parts of a given system of production have important implications for the ability of individual actors to reduce their own carbon footprints. It is the nature of the relationship between different players within the system that affect options for decarbonisation. Therefore, a meaningful strategy towards sustainable production (and consumption) requires integrated involvement of all life-cycle stages and players (including workers, employers and labour-related government institutions).

The possible contribution of workers, enterprises and government institutions to decarbonisation and other environmental matters through their activities is central to a green jobs approach. As explained above, such contributions are influenced by the interactions among sectors within a given system of production. In addition, the specific types and range of green jobs to be created within a sector are also influenced by the interactions among sectors within a given system.

Examples of Possible Labour Linkages within the Built Environment

- Policies for environmental protection of the sectors of the built environment tend to be integrated. Therefore, there is a rationale to understand such integrated policies, as they will impact on green jobs in each sector, in order to influence decision-makers.
- Development and/or regulation of the sectors of the built environment tend to be under the local government, which plan in an integrated way. Therefore, there is a need to study such policies to understand the impact on sectoral jobs, to be able to influence them.
- Operations for adaptation to climate change also tend to integrate different aspects of the built environment. Again there is a rationale to understand such integrated policies, as they will impact on green jobs in specific sectors, in order to influence decision-makers.
- There are technical linkages between the sectors of the built environment, and (green) changes in one may affect employment in other(s). Hence again the need to understand the broad picture.

To give one example (among others), the types of utilities available in a given locality influence the choice of real estate investors in regard to the design of buildings – affecting the specific (possible green) jobs in the construction of the buildings.

Conversely, a possible move to green construction in a given locality may affect the provision of utilities – and employment in utilities. E.g. if buildings become more self-sufficient in energy and water.

- Exploring possible linkages and synergies of the sectors of the built environment may expand and strengthen a coalition to advocate for decent work in green employment. This approach is consistent with the plan of action of the Council of Global Unions (October 2010).

1.3.2. An Overview of Labour-related Issues

This sub-section presents key issues that project proposals (and studies) should target, namely:

- Training requirements in face of the prospects for changes in technology towards greening the built environment; how to address such requirements for workers and / or enterprises.
- How to boost employment creation through green technology, and what the different actors could do to improve the situation through the implementation of government and private sector plans. Related to this is the issue of business creation for enterprises.
- Potential opportunities to channel green vocational training and green employment creation to support possible disadvantaged groups of workers – e.g. women, migrants.
- Needs in terms of social protection for enterprises and workers who may be negatively affected by (green) technology change – or how to avoid this by job and business creation in other sectors. This point refers to the situations which lead to decrease in business and employment in some sub-sectors – and therefore the need for measures to reduce unemployment in the sector, to move business and workers to other sub-sectors (e.g. linking to the “Global Jobs Pact”) and/or to provide social protection nets.
- Possible changes in the labour process following a move to greening the built environment, necessary measures (e.g. new OHS elements related to the installation, repair and maintenance of green appliances) and recommendations to implement such measures.
- Possible opportunities to improve existing labour conditions, workers’ rights and social dialogue in the built environment following a move to greener technologies.

The selection of issues to address will depend on the specific circumstances of each project proposal or study.

I.3.3. Employment: Facts and Trends

Employment in the built environment fluctuates significantly with business – and more significantly with building cycles that tend to alternate between booms and busts. In general, since 2008 there has been a severe downturn in construction in the industrialised countries and later in the Manual reference will be made to the implications for greening construction with possible future upturns in the industry. It should be noted, however, that many developing countries have not suffered this decline but – as in cases as disparate as China and Brazil – there continues to be a construction boom.

The lesson is that current and likely future conditions of the industry have to be considered as important background in studies concerned with greening the built environment. Furthermore, national and even local government policies and programmes can significantly influence the size of the workforce involved in constructing and maintaining the built environment, both through stimulus packages and through adoption of labour-intensive construction methods. Significant programmes to address the need to green the built environment can considerably increase the demand for labour.

Employment in Construction and Maintenance of the Built Environment

In general and under normal conditions, employment in construction, as defined in national employment statistics, comprises between six and ten per cent of national employment. That includes buildings and infrastructure such as sewerage, roads and power stations. In analysing employment in all aspects of the built environment discussed below, employment in fields other than construction has to be considered. This entails employment in urban utilities, including a portion of energy production and supply; transportation; water, sanitation and waste management and even, when focusing on urban and peri-urban agriculture, a portion of agricultural employment.

Because in all cases construction comprises only a portion of employment in these sectors, as provided by official employment figures, no accurate statistics for these areas can be estimated *a priori* and it is necessary in the case of country or local studies to analyse the actual situation on the ground. In principle total employment in constructing and maintaining the built environment might be expected to comprise between 12 and 20 per cent of national employment. However, there is considerable potential in greening the built environment for significant employment increases in many of the sectors under discussion here as noted further below.

Even looking strictly at the construction sector, the edges are fuzzy in the sense that construction employment does not cover the complete range of control functions and nor is construction and maintenance of the informal built environment covered. In the United Kingdom – probably in general indicative of other industrialised countries –, professional and managerial occupations comprise some 30 per cent of the construction workforce, skilled workers about half and workers involved in semi- and low-skilled work (such as direct manual activities, driving and site maintenance) a further 20 per cent.

Upstream Employment

The scale of employment upstream in the industries that produce and market the materials and components that go into construction and maintenance of the built environment is difficult to assess given the disparate nature of such industries and on-going globalisation. It is only through detailed value chain analysis that even approximate figures can be obtained. It is therefore important to research this from the point of view of assessing the labour implications of greening the built environment.

I.3.4. Lack of Skills in the Construction Sector

A significant problem from the point of view of developing skills in green construction amongst artisans is that substantial percentages of this workforce have no formal skills training. They acquire skills informally on site or working under skilled workers who themselves may never have been formally trained (especially in developing countries). This can mean that although new technologies for greening the built environment are on offer, they may be slow to penetrate the actual construction activity. Even in Western Europe, few countries have more than a third of their artisanal workforce with formal certified training. In Brazil the proportion of the construction workforce without formal training is around 70 per cent. In India 82 per cent of the construction workforce has no formal education at all beyond primary school.

Upgrading the Workforce involved in Greening the Built Environment

There has been concern that, while there is an increase in demand for labour capable of implementing programmes of green development and refurbishment/retrofitting, there will be a shortfall in skills. There are two phases in the development of skills. The first is motivation and the second is actual acquisitions of skills. Earlier reference was made to the general lack of knowledge among politicians and professionals including architects, surveyors and engineers in the details of greening the built environment.

If politicians are not convinced of the urgency of greening the built environment, they will not support relevant programmes, and reliance falls back on the market to take the necessary actions. If neither the market nor particular investors – from large-scale developers to contractors hired by individual citizens – make demands for green building, little progress will be made. Hence awareness-raising becomes a key component in making progress and should be understood in studies carried out by the ILO as an important, if not central, dimension of the work.

If demand for projects and initiatives to green the built environment does increase, then it will be necessary for a wide range of professionals and managers to obtain effective knowledge. In the case of greening buildings, the training organised and certified by the Green Building Councils is designed to provide this for relevant professionals. A wider range of professionals who would become responsible for other aspects of greening the built environment will also be necessary, including for the design of urban heat networks, the large-scale transition to sustainable sanitation and the organisation of city-wide UPA (urban and peri-urban agriculture) systems. As yet, there is little focus on such aspects.⁵ Studies concerned with promoting the greening of the built environment will need to address this challenge.

There has been considerable concern that a rapid growth in demand for greening buildings might result in ‘skills gaps’ amongst artisans in various building trades. Mention was made above of this concern in the United Kingdom and a number of studies have focused on this issue.⁶ A number of studies have also been carried out in various states of the United States to calculate the amounts of training of different occupations that would be required in

⁵ Engineering colleges may teach civil engineering students the basics of heat networks but there is very little in university or any other curricula today by way of training to design and implement sustainable sanitation and whilst there is a rising interest amongst environmental NGOs in training for UPA, this is very fragmented and on a very small scale.

⁶ CLES Policy Advice (2009) *Developing New Skills to Address the Challenge of Climate Change*. Groundwork, UK. DBIS and DECC (2010) *Meeting the Low Carbon Skills Challenge*. Department of Energy and Climate Change, London. HM Treasury (2006) *Lietch Review of Skills: Prosperity for all in the global economy – world class skills*. The Stationary Office, London. NHBC (2009a) *Home Building Skills – An Action Plan for 2020. Zero Carbon Homes Literature Review*. www.homebuilding-skills.com/ NHBC (2009b) *Home Building Skills – An Action Plan for 2020. Zero Carbon Hub – Foresight Group – 28th September 2009*. www.homebuilding-skills.com/ NHBC (2009c) *Home Building Skills – An Action Plan for 2020. Summary of Literature Review on Housing*. www.homebuilding-skills.com/

this situation⁷. In France, the 'Plan Bâtiment' of the 'Grenelle de l'Environnement' (national construction programme for greening the environment) has proposed a large scale programme to provide training right across the building trades to upgrade skills to be capable of greening buildings. It also assisted in upgrading and networking vocational training in the field⁸.

Some artisanal skills do not require much training to carry out team work on green buildings. For instance, bricklayers and carpenters need little further skills training but should be aware of changes in other skills to which they need to relate their work. Other skills, however, will need to be developed. Small-scale CHP (combined heat and power) and heat exchanger systems, solar water heating and PV system installation require additional skills and this could also generate new employment. In some countries – notably Spain and France and some states in the US – relevant courses have been initiated. Such courses will clearly need to be multiplied insofar as there is significant growth in demand.

'Green plumbers' are being trained and certified in the United States and Australia, but the whole concept of green plumbing, taking into account 'sustainable sanitation', is as yet in its infancy. Once awareness has been raised at the level of policy and professional competence, relevant training will also be necessary for green plumbers.

The mode of calculation of existing studies on skills gaps in building trades has been very different from one country/study to another⁹. As suggested above, if skills requirements for green employment across the whole built environment are to be assessed, the terms of reference for future studies will need to extend beyond the trades involved just in building. A comprehensive list of occupations that are or could be involved in greening the built environment must be generated and an assessment made of what kind and degree of training will be needed to upgrade their skills. Any such further work undertaken by the ILO would need first to generate adequate terms of reference and assess what methodology is relevant for the particular countries and sub-regions in question.

As noted before, in developing countries a large proportion of the construction workforce has no formal training. This is also true for the other fields of the built environment. A different approach will need to be taken to generate skills amongst the workforce that will result in a greener informal building stock.

I.3.5. Functions of the Built Environment and Their Implications for Labour

The following subsections deal respectively with different components of the way the built environment works, what can be done to green each of component and what are the labour implications. The list starts with a look at urban form and function and the role that urban planning could play – including the implications for changes. Whilst the sections that follow focus on individual sectors and functions, the interconnections are stressed. Insofar as ILO projects concerned with greening the built environment narrow down the focus on one or a few sectors, it is crucial that these interconnections are understood and taken adequate account of.

⁷ Examples include: Centers of Excellence (2009) *Energy Efficiency Occupations – Los Angeles Region*. Centers of Excellence, Los Angeles. Bureau of Labor, Market Information and Strategic Initiatives (2009), *Michigan Green Jobs Report. Occupations and Employment in the New Green Economy*. Michigan Department of Energy, Labour and Economic Growth, Detroit. Green Jobs New York (2009) *Green Jobs/Green Homes New York: Expanding home energy efficiency and creating good jobs in a clean energy economy*. Center for American Progress, New York.

⁸ Pelletier, P. (2009) *Rapport du Comité de Filière « Métiers du Bâtiment »*. Plan Bâtiment du Grenelle de l'Environnement. Comité stratégique du Plan Bâtiment du Grenelle de l'Environnement, Paris.

⁹ ILO (2011) *Comparative Analysis of Methods of Identification of Skill Needs on the Labour Market in Transition to the Low Carbon Economy*. International Labour Organization, Geneva.

Urban Form and Function

As already noted, urban areas in recent years have not only grown in size but more so in extent in a process known as 'urban sprawl'. This has been facilitated by the growth in use of petrol-driven, individual means of transport but is very wasteful of resources generally and particularly of petrol.

There has been much criticism by planners and other professionals about this type of development. The first policy document on urban development of the European Commission, the *Green Paper on the Urban Environment*,¹⁰ advocated planning in future to avoid spread out development. The debate about 'sustainable cities' in recent years has highlighted the need for 'compact cities', in general recognition that higher density development is definitely desirable in pursuit of greening the built environment.¹¹ In the United States, this has been led by a movement that comes under the titles of 'smart growth', or 'the New Urbanism', and numbers of new developments have returned from the notion of suburban sprawl to one where houses are built along streets, near to jobs, commerce and social services. Below we refer to other new developments in sanitation and particularly urban agriculture where, in rethinking urban development, this should not necessarily increase densities at the expense of green areas and especially possibilities for urban agriculture.

What might this mean for the creation of employment and decent work? The first consideration is that rethinking urban planning in itself is not so much a matter of creating new jobs as changing curricula and re-training planners. The depth to which this has yet penetrated the actual practice has still far to go and the full implications have hardly been addressed. It is therefore less a specific question of new skills and new employment opportunities than a far broader acceptance of the needs in future years that is required. Smart growth and the New Urbanism have created a certain demand for professionals with knowledge and skills to design and execute relevant projects. But a broader rethinking of forms of urban development relevant to future conditions needs to be extended to policy-makers who achieve an understanding of the full implications of global warming and diminishing availability of energy.

Insofar as such a transformation in awareness and policy takes place, it can be expected that there will be a growth in demand for professionals with skills in new approaches to urban development. The United Kingdom government has been in process of developing policies in this direction under the title of 'sustainable communities' and studies have been carried out concerning future demands on relevant skills.¹² According to this analysis, 'skills' include attitudes and actions of a wide range of actors that are envisaged as moving the development of communities in the direction of greater sustainability. But as yet no explicit recommendations for new development approaches to specific new urban forms has been made.

Whilst these studies do focus not only on changes in skills but also demand for skills that imply increases in employment at the professional level, particular national and sub-regional studies will need to make assessments of skills and employment demand around specific local conditions. This includes assessments of the likelihood of national governments to (a) recognise the need for new approaches to the development of cities, towns and neighbourhoods,

¹⁰ Commission of the European Communities (1990) *Green Paper on the Urban Environment*. COM(90) 218 Final. European Commission, Brussels.

¹¹ For a wide selection of readings, see: Jenks, M., Burton, E. and Williams, K. (Eds)(1996) *The Compact City: A Sustainable Urban Form?* Spon Press, London. Jenks, M. and Dempsey, N. (Eds)(2005) *Future Forms and Design for Sustainable Cities*. Elsevier, Oxford. For the debate as it relates to cities in the South, see: Jenks, M. and Burgess, R. (Eds)(2001) *Compact Cities: Sustainable Urban Forms for Developing Countries*. Spon, London.

¹² Egan, Sir J. (2004) *The Egan Review: Skills for Sustainable Communities*. Office of the Deputy Prime Minister, London. Arup (2008) *Mind the Skills Gap: The skills we need for sustainable communities*. Academy for Sustainable Communities, London. Arup (2007) *Review of Skills for the Delivery of Sustainable Communities Technical Report 2 – Forecasting*. Academy for Sustainable Communities, London.

and (b) to take steps in terms of policies to promote new forms of redevelopment and new development. Insofar as new developments take place, there will be requirement for new skills and employment in construction.

Urban Transport Systems

The changing structure of cities over the past century and a half has been closely associated with technological developments. Horse buses gave way to trams, busses, metros and individual means of transport. The latter – plus jitneys and mini-buses in the South – came to dominate and encouraged urban sprawl. Urban transport planners have always been aware of the negative resource and environmental impacts of the growth in individual transport and have attempted to control it. Whilst trams were abolished in many cities in the 1950s and 1960s, efforts are being made to reintroduce them as well as ‘bus rapid transport’ (BRT) systems, and to encourage ways of moving around cities that do not need fuel – walking and cycling –, all reducing car-dependence.¹³

In northern cities, on-going reduction of cars and improvement in public transport may expect to increase the amount of work available – and the construction of tramways and rolling stock should replace employment in support of the automobile economy.

In southern cities the problems are different. Whilst overall there tend to be less private cars on the roads (although they are still very numerous and the cause of congestion and pollution), ‘public transport’ usually means fleets of jitneys, minibuses and other small transport vehicles that are also highly polluting. Investments are being made to improve the quality of public transport, which, however, have a tendency to reduce employment. Therefore, studies concerned with greening urban transport need to look closely into the labour issues and find solutions that are beneficial both to the urban environment and to labour in this sector.

Urban Energy Systems

Energy is generally supplied to urban households, enterprises and institutions through gas grids or from trucks. In some countries in the North, heating (and cooling) grids have been encouraged and whole cities – particularly in Scandinavia, Germany and some Eastern European countries – are heated using the waste heat from power stations. This clearly saves energy: it was calculated that if all UK cities were supplied with heating in this way, there could be a 17 per cent reduction in the national use of energy.

A further option, where the earth is warm under cities, is capturing this geothermal energy to heat urban areas. The city of Reykjavik in Iceland is entirely heated in this way and even some Paris suburbs. Finally, it is possible to capture heat (and cold in summer) from the temperature inertia of the earth or particularly large water bodies near cities. Here, water is circulated around the city and pumps in individual buildings are used for heating or cooling. The city of Geneva is implementing such a scheme with the intention of saving half the energy currently used for heating buildings.

Installing and then maintaining such systems creates jobs in construction and maintenance. Studies carried out on such projects proposed in the past indicated how much work could be expected to be created both in manufacture of parts and then construction of the systems.¹⁴

¹³ Newman, PWG. and Kenworthy, JR. (1991) *Cities and Automobile Dependence: A Sourcebook*. Avebury Technical, Aldershot. For a very practical cure to automobile dependence in cities, see: Newman, P. and Kenworthy, J. (1999) *Sustainability and Cities: Overcoming Automobile Dependence*. Island Press, Washington DC.

¹⁴ GLC (1983) *The Development of Combined Heat and Power with District Heating in London. Report 10: The Implications of CHP/DH for Employment in London*. Greater London Council, London. Hohmeyer, O., Jochem, E., Garnreiter, F. and Mannsbart, W. (1985) *Employment Effects of Energy Conservation Investments in EC Countries*. Office for Official Publications of the European Communities, Luxembourg.



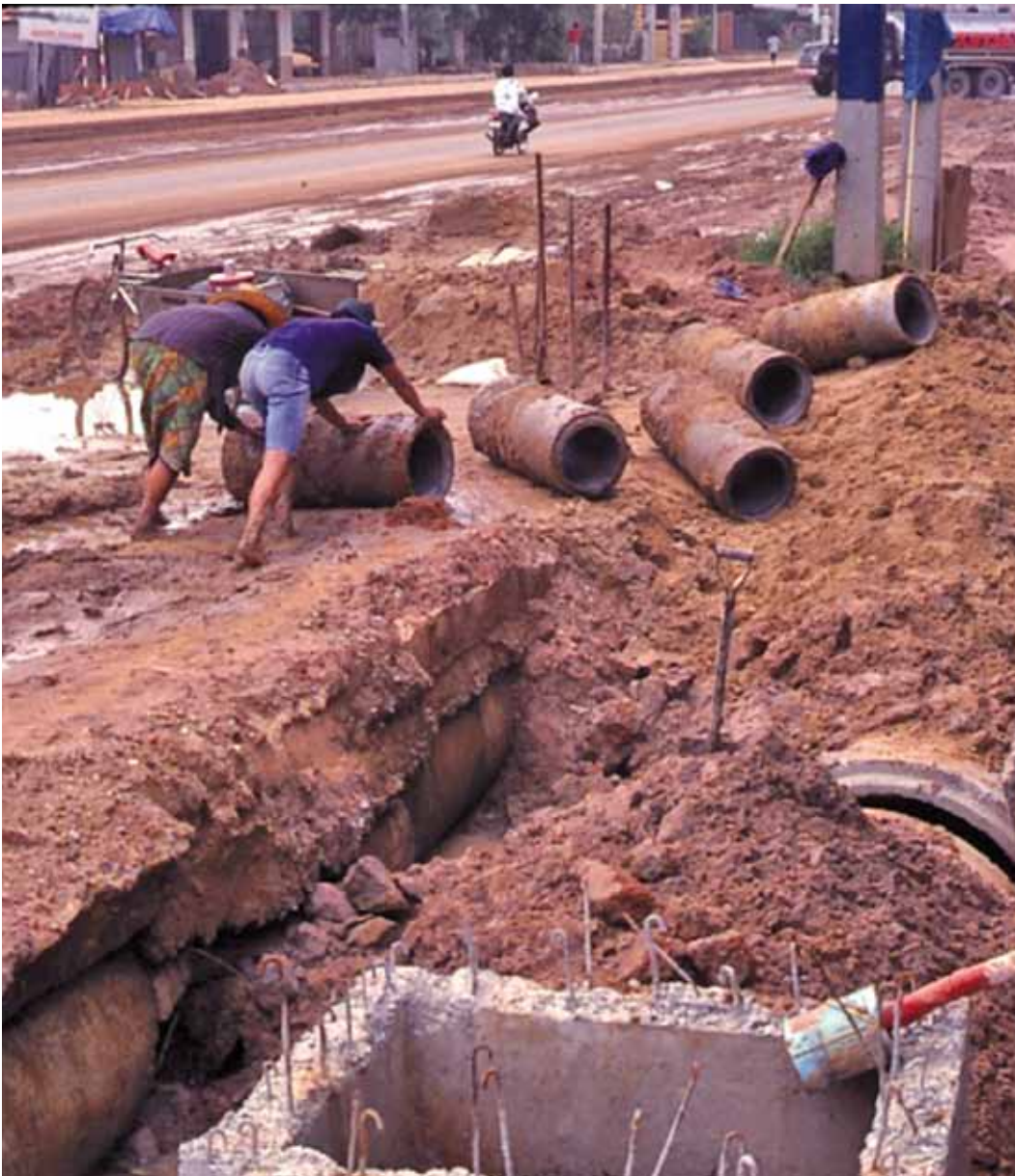
Social housing in South Africa © Llewellyn van Wyk

A further consideration is the upgrading of the electricity supply systems that in the United States has come under the title of ‘smart grids’. This actually involves a cluster of activities and any study of the labour consequence of such upgrading would need to look specifically at what is proposed locally. This might create jobs in the short term but lead eventually, through efficiency measures, to reductions in employment in the sector.

Finally, consideration should be given to the installation in built-up areas of renewable energy systems. This includes solar water heating and photovoltaic systems and in-building small-scale CHP, as well, in suburban areas, the installation of heat pumps using the temperature inertia of neighbouring land. The proliferation of these systems clearly creates jobs in manufacture and installation. Some work has been carried out – mainly as an adjunct to retrofitting of housing – about the job-generation implications and training needs for installers (retraining of electricians and plumbers).

Sustainable Sanitation

Until the end of the 19th century, urban sanitation in Europe, and also in cities in Asia, involved manual clearing of human waste that was taken into the countryside as fertiliser for agriculture, with liquid wastes being carried into rivers or the sea in open drains. As cities grew, these systems broke down due to increased volumes of waste and the increasing cost of carrying wastes to the edge of the city. It was this context that led to the construction of urban sanitary sewer systems. In some cities the water-borne sewage continued to be fed into fields that grew vegetables – the case of Berlin is instructive, where this system survived into the 1970s. However, as domestic sewage – and with it some industrial waste water – became more complex, contaminated with chemicals and heavy metals, the vegetables fertilized by sewage became an increasing threat to health and the system was abandoned.



Drainage construction in Payao, Thailand © Adrian Atkinson

A recent movement under the title of ‘sustainable sanitation’ or ‘ecosan’ is reconsidering the possibilities for using human waste as fertiliser, in conjunction with urban and peri-urban agriculture (see below). This considers the whole water cycle in the built environment including rainwater harvesting in the first instance for washing and for irrigation. In addition, increasingly the possibilities for the use of rainwater for drinking are under exploration with some companies and urban authorities introducing experimental systems¹⁵.

Numbers of systems are already in operation. In India considerable attention has been given to including biogas digestion, providing energy for household cooking, as one of the stages in processing human waste before it is used for agriculture. The first complete urban quarter where a sustainable sanitation system was implemented was in Dongsheng district

¹⁵ The Sustainable Sanitation Alliance (SuSanA) has since 2009 brought together a range of interests including universities and international and bilateral development organisations that carry out research, disseminate information and finance demonstration projects in sustainable sanitation. See: www.susana.org

in Inner Mongolia and the headquarters of the GIZ (German International Cooperation Agency) is also fully equipped.

However, as yet there is little awareness in the North of the need to change from conventional urban sanitation to ecosan systems. Awareness-raising of policy-makers and the public is necessary, together with introducing relevant technologies and practices into engineering curricula and more broadly retraining of sanitary engineers. In southern cities, where in any case sanitation is usually poor, the reorientation should bring benefits insofar as the 'waste' becomes a saleable commodity.

The employment potential of changing to sustainable sanitation in the north and pursuing programmes of sustainable sanitation in the south is substantial both at the level of engineering and supervision and at the level of the low-skilled and semi-skilled workforce. As yet this has not been taken up as an issue anywhere and no studies have been undertaken of the employment impacts of major transformations of cities to sustainable sanitation systems. However, *prima facie this merits study at the country and local level north and south. In all cases this will need to be linked closely to developments in urban and peri-urban agriculture.*

Reuse and Recycling of Materials and Goods

In recent years, recycling of discarded materials and goods has been increasingly recognised as a necessary dimension of urban solid waste management systems. Cities and towns throughout the developed countries now have municipal systems for collecting waste separated at source to facilitate recovery and reuse. There are still substantial improvements that can be made – particularly in the area of food waste and other organic materials that can be reused to feed livestock for meat production and, through composting, to provide fertiliser and soil conditioner over and above the use of sewage in UPA.

In cities of the South, recycling is predominantly undertaken in the informal economy with waste pickers removing materials along the waste stream¹⁶. This includes small enterprises buying materials direct from households, personnel of the formal waste management department or enterprise removing some materials for sale informally and with significant numbers of people – often including many women and children – working through the waste at the disposal site to remove materials for sale. Although providing an income for many, this system is inefficient in terms of the proportion of materials recovered and is also dangerous and unsanitary – in brief far short of decent work.

In addition to recovery of waste materials, there is much today that is discarded and enters the waste stream long before its potential useful life is over. The concepts of refurbishment and remanufacturing are important as focusing on the recovery of goods and reinsertion into the economy. In developing countries there is a much greater propensity to continue the life of goods (with recycling) than in developed countries are discarded as 'waste'. This is both good for the conservation of resources and generates jobs. The one proviso here is that this be decent work. Where many modern products are made of materials that are a danger to human health if released into the environment, issues of occupational health and safety and indeed the health of the ecological environment must be serious considerations in the context of advocacy for refurbishment and remanufacturing.

Waste-pickers are becoming more organised and in a few instances have a positive relationship with local authorities that opens the door to increasing efficiency in resource recovery and in general waste management. Re-use of discarded objects and materials is less wasteful in the south but employment could also be generated by rationalising the means of recovery

¹⁶ For an overview of this situation, see: Medina, M. (2007) *The World's Scavengers: Salvaging for Sustainable Consumption and Production*. AltaMira Press, Lanham, Maryland.



Local Authority-supported recycling in Surabaya, Indonesia © Adrian Atkinson

and improving the skills in renovation and remanufacturing. As noted above, more attention needs to be paid to health and safety of those working in the resource recovery sector. This is a rewarding area within which to carry out labour studies in greening the urban environment. Here, too, studies should enquire into the links with UPA.

In northern countries, increasingly sophisticated mechanical means of sorting waste have tended to reduce employment in the sector. Furthermore, second hand markets, although well served through informal 'car boot sales', 'yard sales', flea markets and then through the internet (particularly e-bay), remain relatively weak, with valuable goods being prematurely junked and materials poorly collected. More focused initiatives, particularly at the local authority level, could be expected to generate employment that would be financed through the resale of refurbished and remanufactured goods.

Urban Greening

The provision of parks, gardens and planting of trees, green verges and flower beds have been a consideration of urban authorities going back into the 19th century but has been pursued at very different intensities in different cities. Pressure to develop urban land, together with the widening of roads to cater for cars, has often reduced the attention needed to maintain liveable cities. The consequence of such problems have been the rise of heat islands and dust levels, reducing both the pleasantness of urban living and the health of urban inhabitants.

Many European cities have managed to maintain the balance but elsewhere, and particularly in cities of the South, where informal developments have often occupied what were intended to be public open spaces, urban greening has been neglected. There are, however, movements such as the Indonesian Adipura programme that are intent on ensuring adequate

attention – and with it employment – in this area. Clearly, the move towards compact cities must be weighed against the need to have adequate greening within the built environment.

Local authorities in northern towns and cities generally possess departments of parks and gardens and have considerable expertise in greening the built environment in the literal sense of planting. Significant employment is created by maintenance of green areas. In southern cities generally professional and financial resources are restricted and even control to prevent green areas from being squatted is limited. Studies and initiatives by the ILO and other development organisations concerned with greening the built environment should pay some attention to this issue to understand the possibilities of improving performance and employment.

Urban and Peri-Urban Agriculture (UPA)

Until quite recently, the assumption of urban planners was that agriculture belongs outside the city limits. In practice, however, in the early years of modern urbanisation, rural-urban migrants often brought their livestock with them and looked for land on which they could at least supplement their diet with home-grown vegetables. In recent years urban agriculture has been growing in cities of the South and also in the cities of the developed world¹⁷. This movement has not only been amongst the poor but also middle class families that are engaging in UPA for own consumption and as small businesses that eliminate the ever-increasing distance between food growers and urban markets. This is predominantly focused on growing fruit and vegetables on otherwise vacant land, on rooftops and even (mushrooms, chicory) in basements. It can involve intensive methods including greenhouses, hydroponics and combinations of small livestock producing waste that feeds fish and/or fertilises vegetable growth.

Meanwhile, however, malnutrition in southern cities has grown to crisis proportions (according to the World Food Programme over one billion people currently suffer from perennial hunger). In this context international and bilateral development organisations are starting to provide assistance to urban agriculture initiatives. Most prominent are the Food and Agriculture Organisation programme¹⁸ and Canadian IDRC's Cities Feeding People programme.

Local authorities around the world are becoming increasingly conscious of this movement and starting to provide assistance. At the same time, NGOs and cooperative associations are assisting with local demonstration projects on open plots, training local actors in the use of appropriate techniques. Such assistance includes devising means of bringing householders together to buy agricultural produce direct from urban and peri-urban farmers. This started in Japan in the 1960s and is currently spreading rapidly in North America and Europe under the general title of Community-Supported Agriculture (CSA).¹⁹

Although UPA is growing in cities and their sub-regions all around the world, the methods vary considerably. With very few exceptions has the issue of employment generation been a significant motivation at a strategic level for support given by government and non-government organisations. One exception is the city of Caracas where the government has promoted UPA *inter alia* specifically to provide employment for unemployed youth in unregulated settlements. It has also been a sentiment in UPA promotion elsewhere without formal analysis of the employment potential or promotion of UPA as a means of generating local employment.

¹⁷ For an excellent introduction to the whole issue of UPA, see: ETC (2003) *Annotated Bibliography on Urban Agriculture*. Swedish International Development Agency, Stockholm.

¹⁸ Executed in conjunction with the NGOs RAF-ETC.

¹⁹ Recently an international association promoting such 'community-supported agriculture' (CSA) projects has been formed under the title of URGENCI (Urban-Rural network Generation new forms of Exchange between Citizens).



Urban farming in the financial heart of Jakarta, Indonesia © Adrian Atkinson

Country and local programmes supported by the ILO should analyse specifically the labour implications of UPA to ensure that approaches taken also promote local employment especially amongst the urban poor. This should identify groups in need of work and initiate mechanisms for identifying methods and training communities and individuals to engage in effective UPA programmes. The synergies with sustainable urban sanitation should also be kept firmly in mind. It should be emphasised that the employment potential of UPA is considerable.

I.3.6. Greening the Building Stock: Past, Present and Future

The sector or area which is most in need of greening within the built environment – and the most complex to deal with – is the building stock itself. It has been estimated by the World Business Council for Sustainable Development (WBCSD)²⁰ that as much as 40 per cent of energy is used in buildings including manufacturing of materials and components, the process of construction, energy used by building occupants and in the demolition and disposal of building waste. The construction of buildings also absorbs the greatest share of

²⁰ WBCSD (2009). *Energy Efficiency in Buildings: Transforming the Market*. World Business Council for Sustainable Development, Geneva.

many materials including not only concrete, bricks and other specific ‘construction materials’ but also timber, metals and other materials. Finally, poorly designed buildings result in environmental problems ranging from ‘sick building syndrome’ that can result from the wrong materials used in construction, poor lighting and so on, to impacts on the environment surrounding buildings.

The complexity of analysing the labour impacts of buildings stems from the need to look at all phases building implied from the above assessment of energy use. There are labour consequences derived from: (a) the generation and processing of materials such as timber, bricks and concrete; (b) designing buildings and controlling construction from the planning stage through to the completion of the buildings; (c) the actual process of construction; (d) using the buildings, including supplying them with energy and water and waste removal; (e) retrofitting, major refurbishment and demolition. All of these can be carried out in green ways, altering the labour inputs and the conditions of work.

Not all building types are the same regarding their need to be greened and the steps that need to be taken to do so. Here are seven categories by way of illustration:

- 1. Unregulated existing and new-build housing:** About half the housing in towns and cities around the world has been constructed without any regulation, most of which of very poor quality. Insofar as this is in most places incrementally improved, methods need to be found to influence how this is done by way of an ‘informal culture of greening’ that we might refer to as a ‘neo-vernacular’. Studies regarding employment and greening the urban environment might do well to focus on this sector, as it is so important from the point of view of housing large populations.
- 2. New-build housing in accordance with building code standards:** Over recent years, building codes in most countries have improved with regard to the level of green standards required. However, there remains a significant gap in many countries between minimum requirements and current ‘best practice’. We can expect standards to become increasingly stringent, requiring architects and builders to employ a more skilled workforce.
- 3. New-build housing to higher standards:** several countries have agencies or institutions that have developed house plans to very high standards of greening, demonstrating that this can be done at little extra cost.²¹ However, it does require a workforce capable of undertaking this quality of work. These standards may be introduced into the building codes in the coming years, necessitating significant training programmes for relevant professionals and artisans.
- 4. Dwelling retrofitting:** the greatest challenge in northern countries is to bring the existing housing stock up to high green standards through ‘retrofitting’. In the past relatively little energy was used in buildings but over time this has increased as have lighting and other internal environmental standards. Today, dwellings right across the developed world are extremely wasteful of resources in their use, requiring insulation and ‘weatherising’ as well as measures to reduce electricity use. Small programmes have been implemented – the most extensive in Germany – to assist in identifying what needs to be done and in financing improvements. The employment implications of any more concerted retrofitting programmes is considerable, as discussed further below.
- 5. Non-domestic new build:** This comprises about one third of buildings currently under construction. It is currently increasingly the subject of a more assertive focus on green building, particularly as promoted by the national and international Green Building Councils. On the whole, however, the green standards of new non-domestic buildings

²¹ Including the German ‘Passivhaus’, the Swiss ‘Minergie’ and the UK Zero Carbon standard described further below.

tend only to conform to building code standards and in the future it can be expected that, as in the domestic sector, there will be an increasing demand for skilled professionals and artisans to construct such buildings.

- 6. Non-domestic buildings designed to higher standards:** as with dwellings, considerably higher green building standards can be achieved at little extra cost if clients show interest and if architects, engineers and the building workforce are aware and trained to design and build to these standards. It is of some note that best practice buildings (such as the EAWAG building of Zurich University) were constructed almost entirely using conventional materials and methods that required little additional training of the building workforce.
- 7. Non-domestic green refurbishment:** almost no attention has so far been paid to this sector except where serious internal environmental problems (e.g. the need to replace asbestos) have become evident. The buildings involved are of varying design and quality and so a special focus will be necessary on this sector to find appropriate methods of retrofitting that can be easily adapted to the wide range of building types. Training programmes for professionals and artisans should take this into consideration. This might become a special focus for investigating the labour dimensions of greening the built environment.

The foregoing sub-section has set out in outline the main dimensions of greening the building stock, existing and future, and the potential labour demands and consequences. Three points from this sketch need some emphasis as set out in the following sections.

Greening the Existing Building Stock

Today a huge building stock that was constructed in years prior to the rise of resource and environmental concern will need to be brought up to the appropriate green standards. Buildings from the more distant past used materials that had proven to be effective over long periods and as such were proven to be relatively environmentally benign. Heating requirements were modest and cooling systems were available only for a rich minority. Hence energy and environmental impacts were modest.

Over the past 50 years two changes leave us with a substantial problematic legacy in cities around the world. First, in the cities of industrialized countries, incomes and expectations in terms of living standards have risen. Increasing amounts of energy have come to be used in heating and cooling buildings. This is also the case for families of modest incomes in cities in developing countries. Typically in northern climates this now amounts to half of household energy consumption and is substantial also in non-residential buildings. Second, building materials and methods have been changing at an accelerating pace often with inadequate testing of their efficacy and safety. In some cases, this has involved the use of materials subsequently found to be a health hazard and also structures that were grossly inappropriate to the point of needing major refurbishment and even premature demolition.

Building standards have improved through experience, in particular in northern countries, recognising the need to reduce energy through insulation and weatherising (double glazing and weather-stripping) and even better, 'passive solar' design. However, there has nowhere been any comprehensive programme to upgrade older buildings, but rather piecemeal ameliorations that have not covered more than a modest proportion of the building stock and were usually well below adequate 'green' standards.

Therefore, it is now recognised that, whilst it is important to ensure that all future building be carried out to consistently high green standards, at the same time it is necessary to

initiate major programmes aimed at bringing the existing building stock up to such high green building standards, generally referred to as 'retrofitting'. In particular, this means introducing measures that will substantially lower the demand for energy whilst maintaining current or improved comfort standards. Studies concerned with greening the built environment must focus major attention on this issue and devise effective approaches to meeting the challenge.

It has been calculated for the United Kingdom that houses built between now and 2050 will by then only add some 20 per cent to the existing housing stock. It is unlikely that this situation is much different in other industrialised countries (China is a major exception where the housing stock is expected to double already by 2030). That is to say that 80 per cent of the 2050 housing stock has already been built, requiring substantial upgrading to bring it up to adequate green standards. Effective greening of the housing stock is therefore predominantly a question of retrofitting the existing stock. The same is true also for the non-domestic building stock. Here, the type and quality of construction is far more varied than in the case of housing. Non-domestic building does not lend itself to any standard approach to upgrading and as such presents a more intractable problem than greening the housing stock.

Many industrialised country governments have introduced programmes to encourage householders, landlords and in general building owners to invest in greening measures, especially focusing on reduction in energy demand. The most concerted efforts have been undertaken in Germany where it was estimated that the programme, bringing two per cent of the national housing stock up to high green standards resulted in creation or saving of 140,000 jobs. However, left to householders and small landlords to take individual decisions, even in the context of generous tax breaks, interest-free loans and small subsidies, the evidence is that slow progress is likely to be made, indicating that more structured government intervention is necessary to precipitate major retrofitting programmes. An assessment of future government commitment to greening the building stock should be used in ILO projects concerned with the labour implications.

In the case of cities in the developing world where much of the housing has been built through informal methods, studies analysing the potential for greening the building stock will have to make some assessment of the durability of such housing into the future. If this housing stock, through upgrading by householders, is already consuming significant amounts of energy, then retrofitting programmes may be worthwhile. Here also, government intervention will be necessary to stimulate retrofitting activity. This is not entirely unknown where both in Brazil and South Africa the governments have undertaken programmes to install solar water heaters in the houses of low-income residents. There can be no doubt that such programmes can generate employment. However, greater efficiency in terms of a wider spread of benefits may be achieved through a combination of government intervention and organised resident activity discussed in the second half of this Manual.

Concerning the question of the availability of skills for retrofitting, a type of company entitled Energy Service Companies (ESCOs) has been spreading, with the expertise and the offer of comprehensive energy auditing and retrofitting of buildings. As yet demand has remained modest with only small financial incentives offered by government agencies. An important proposal made by the World Business Council for Sustainable Development (WBCSD) in their comprehensive study of energy use in the building sector²² is that a new profession of 'systems integrators' be created. This professional would be able to assess what needs to be done to retrofit existing buildings up to effective green standards with the competence to write complete specifications and to supervise and approve work done.

²² (WBCSD). 2009. *Energy Efficiency in Buildings: Transforming the Market*. World Business Council for Sustainable Development, Geneva.

Box 1. Retrofitting the Entire Hungarian Housing Stock

This study was based on five scenarios that focused on three different types of retrofitting approach (business as usual, suboptimal and deep) and a range of different rates at which retrofitting progresses (from 60,000 to 250,000 dwellings per annum). The study focused on residential and public buildings but excluded commercial buildings. It classified residential buildings into six types, namely: historical and protected buildings, pre-1960 traditional multi-family homes, multifamily homes pre- and post-1992 and single family homes pre- and post-1992. The study used two main methodologies to estimate employment impacts:

- Case studies were undertaken to identify actual employment associated with retrofitting projects, disaggregated between different levels of skill. The quantitative findings of these case studies were scaled up based on the levels of activity assumed under each scenario, to estimate the direct employment impact of retrofitting activity.
- Input-output (I-O) modelling was undertaken to analyse wider employment impacts, including indirect and induced impacts. Assumptions about the labour intensity of retrofitting construction output were based on the best current available data. Costs were assumed to be constant for baseline and suboptimal retrofits, but it was assumed that they would fall for deep retrofits as the technology matured. Peak employment under the different scenarios varied from approximately 120,000 full time equivalent (FTE) workers under the fastest deep retrofit scenario to being maintained at less than 10,000 under the business as usual baseline scenario. Employment projections under each scenario were disaggregated between three skill levels – low-skilled, skilled and professional.

Whilst this study is academic, it is useful in indicating a research methodology and for being realistic about employment impacts if coherent retrofitting programmes were to be organised and financed.

In Germany, a major environmental NGO, the Deutsche Bundesstiftung Umwelt (DBU) has established a network of associates to undertake a programme entitled 'Haus-sanierung – Profitieren', that has built up a roster of artisans trained to carry out building audits and organise the installation of improvements in energy use in buildings. The website includes maps of all German localities pinpointing where some 4,500 trained professionals and artisans can be found who will carry out free energy audits and advise on work to be carried out to upgrade building energy performance.²³ This is the closest any country has yet come to establishing the profession suggested by the WBCSD. But it is unlikely, failing a consistent national accreditation system, that all artisans in the list are capable of advising on the full range of expertise needed to review all aspects of greening existing buildings.

Insofar as national city-wide retrofit programmes come into existence, such a profession would greatly facilitate the process. In cities in the developing world, local governments would be greatly assisted if a professional is brought into the picture to assess refurbishment possibilities, impacts, costs and to work with residents, supported by municipalities to organise extensive upgrading programmes with a focus on resource and environmental concerns. There has been a significant number of studies to calculate the labour consequences of major urban or national programmes to retrofit the existing housing stock. Here we present in outline a 2010 study concerned with retrofitting the entire Hungarian housing stock.

'Vernacular' Buildings

The history of construction entails an era where certain 'traditional' means of construction were used that inherently made more modest impacts on the environment. Before the modern era, inhabitants built with local materials and devised often sophisticated ways to protect against harsh climatic conditions, without the availability of energy used nowadays to achieve

²³ www.sanieren-profitieren.de

interior comfort standards. This included, for instance, building to withstand winter cold in the north and to ameliorate the harsh heat of desert conditions in the Middle East and North Africa. Examples of such vernacular architecture can still be found all around the world. With the increasing attention and need for energy conservation and resource efficiency, there is a lot to learn from the vernacular past. A recent project in the old city of Damascus studied the way in which the availability of mechanical heating and air conditioning had been encouraging inhabitants to abandon traditional ways of building and of living in traditional houses, a trend that can be found all over the world.

Refurbishment has thus often meant reorganising spaces in ways that require substantial energy inputs without yet applying insulation or other modern methods of greening. In fact, maintaining traditional means to ameliorate harsh climatic conditions (e.g. in the Damascus case traditional building materials, courtyards and means to encourage ventilation) would be preferable from the point of view of a future of expensive energy, to re-learn traditional means to adapt to climate with only modest energy needs. In greening the existing building stock – particularly buildings more than half a century old – it may be useful to consider not only modern approaches to greening but also how vernacular means of living with modest resource inputs might be recovered. This is relevant also for new buildings. It is important to note that, in general, construction which entails vernacular methods is labour-intensive.

Green Building Certification

Over the past ten years interest has risen rapidly in regard to achieving green building standards. Demonstration buildings have been constructed in many countries and certification systems put in place. For individual houses, the German Passivhaus and Swiss Minergie are currently seen as state of the art systems for achieving a high standard of green building. For larger buildings the World Green Building Council (WGBC)²⁴ was established in 2007 as an umbrella for proliferating national green building councils. There are, as of 2010, 20 established national green building councils, nine in process of emerging, 26 prospective councils and 27 associated groups that have developed or are developing similar initiatives to encourage and certify green building design.

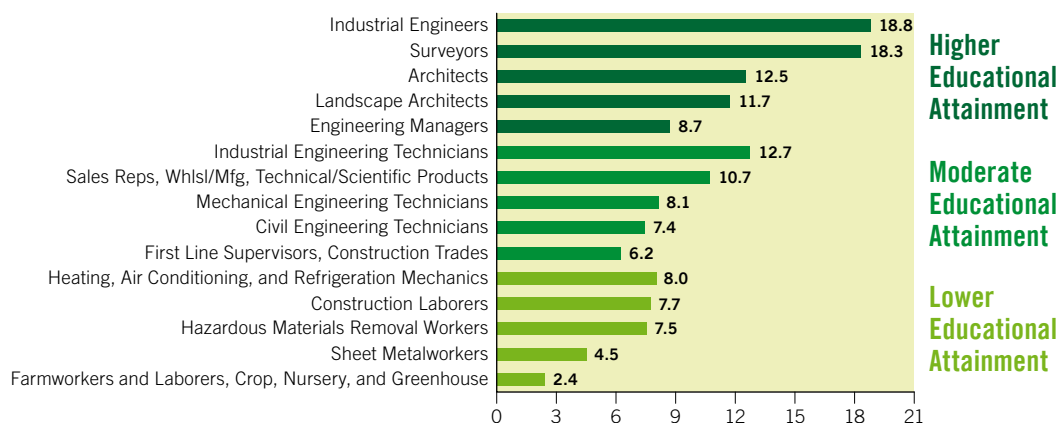
In fact green building certification started already in 1990 with the British BREEM certification system and this has been adopted by a number of national green building councils as their criteria for certification. The United States Green Building Council (USGBC) introduced the Leadership in Energy and Environmental Design (LEED) certification system in the year 2000, which has been adopted by a further selection of national green building councils. Yet other countries have developed their own systems, for instance Green Star in Australia – adopted also by South Africa – and Japan's Comprehensive Assessment System for Building Environmental Efficiency – CASBEE).

As the oldest system, BREEAM certification has already been achieved by over 200,000 buildings with over a million buildings registered for assessment over the past 20 years. As of June 2007, 1,377 billion square feet of commercial space had been certified by the USGBC that has introduced a scheme for 'volume certification' where commercial companies are keen to green sometimes hundreds of outlets countrywide. Whilst in the United States the USGBC focuses mainly on non-residential buildings,²⁵ systems are in place to certify 'green contractors', 'green plumbers' and 'green electricians' who respond to demand for greening the domestic sectors in terms of family homes. It is not evident that the proliferation

²⁴ Ürge-Vorsatz et al (2010). *Employment Impacts of a Large-Scale Deep Building Energy Retrofit Programme in Hungary*, Centre for Climate Change and Sustainable Energy Policy, Central European University, Budapest.

²⁵ The same is true of the Australian Green Building Council that focuses on: Retail, Offices, Education, Prisons, Courts, Healthcare, Industrial, Specialised buildings assessed under the BREEAM Bespoke method.

Figure 1. Green-related Occupations in the building industry expected to see high growth through 2016 in the State of Michigan, USA



Source: Michigan Bureau of Labour, Market Information and Strategic Initiatives (2009).

of such green certification systems is leading to a universally consistently high 'green quality' with possibilities that the use of 'green labels' is little more than a sales pitch.

Whilst as yet relatively few buildings worldwide – and just a small fraction of current construction – is aimed at achieving green council or equivalent certification through one or other of these systems, these nevertheless provide a basis for an eventual expansion to a point where national and local building regulations require the standards set by green building councils which at present are only voluntary. For instance, the British Government is setting a target for the achievement of 'zero carbon' in all house construction by 2016 and the Australian Government is considering means to upgrade building regulations to standards set by the Australian Green Building Council.

A major function of Green Building Councils is to train 'Accredited Professionals' (APs) in greening building design, that can lead to them becoming Green Council Associates (or in the case of BREEAM, BREEAM Assessors). Courses have been established in many countries to provide those who are certifying green buildings with the knowledge to carry out this function. There are also courses to professionals with some responsibility with regard to the building design and construction process.²⁶

The courses are short and in principle one could expect over a relatively short time for large numbers of professionals to be certified. However, insofar as certification is voluntary, it remains a question of client awareness and insistence on certification for these systems to be put into practice. Whether this could eventually lead to increased employment in the field remains speculation but could be estimated in the context of specific country or sub-regional studies. What is clear is that the downturn in construction as a component of the current global depression has resulted in a lowering of demand for building professional service. As the recession bottoms out, demand in general for building service professionals may be expected to have shifted in a greenward direction requiring more trained professionals.

So long as green building certification remains voluntary – and where certification of green contractors may be little more than a labelling exercise with little change in the content of work undertaken – indications are that demand for professionals and managers involved in design, certification and other 'software' aspects of green building is unlikely to increase over what would be expected without green buildings being built. However, with building

²⁶ These are listed by the Australian Green Building Council as: academics, architects, contractors/builders, cost planners, engineers, facilities managers, general managers, interior designers, landscape architects, marketing managers, policy advisers, product manufacturers, project managers, quantity surveyors and lawyers.

regulations being raised to green certification standards, the additional complexity of achieving these standards might be expected to increase the numbers of professional hours in demand (or full-time equivalents). Specific country studies should make in-depth investigations about realistic estimates of future greening of building regulations. One of a few examples of such studies was undertaken by the State of Michigan Bureau of Labour²⁷ based on expectations of a steady increase in interest in certifying buildings as green. Figure 1 shows the results.

1.3.7. Drivers and Blockages

Although concerns to increase efforts to green the built environment are evident, movement has been slow. The major driver in increased concern is that continued emission of greenhouse gases could lead to catastrophic climate change and hence reduction in the use of fossil fuel is urgent. Although less has been discussed about the issue, the pending diminution in the availability of fossil fuels due to depletion is a closely related problem.

Insofar as such concerns have included a focus on labour aspects of greening the built environment, this stems from the severe economic downturn of 2008 where unemployment grew rapidly in most countries. The result was the launching of 'economic stimulus packages' in many countries, aimed at combating unemployment and generating businesses. Many of these had specific components concerned with greening the economy, with a significant focus on greening construction, particularly buildings.

It is important that the users of this Manual be aware both of the reasons for greening the built environment as well as the ways in which this can be best achieved. Whilst studies and projects which this Manual helps to structure should focus particularly on how greening the built environment can stimulate employment, there should also be an awareness of the accompanying challenges.

Focusing on the activities involved in greening the building stock, together with the agencies and institutions responsible for its promotion, the British Zero Carbon Hub (ZCH) listed the following drivers²⁸:

- Legislation
- Consumer Attitudes
- Design Approaches
- Building Approaches
- New Product/Materials

As for the blockages the following can be highlighted:

- Inadequate vision on the part of government and utility companies regarding such initiatives as heat networks and ecological sanitation;
- Lack of effective legislation and inadequate implementation;
- Lack of finance either in consumer's and client's pockets or from the governments;
- Inadequate interest on the part of consumers and clients;
- Inertia of particularly small building firms inhibiting change in design and methods;
- Inadequate interest amongst building designers to incorporate green principles;

²⁷ Bureau of Labor, Market Information and Strategic Initiatives (2009), *Michigan Green Jobs Report. Occupations and Employment in the New Green Economy*. Michigan Department of Energy, Labour and Economic Growth, Detroit.

²⁸ NHBC (2009b) *Home Building Skills – An Action Plan for 2020*. Zero Carbon Hub – Foresight Group – 28th September 2009. www.homebuilding-skills.com/

- Inadequate knowledge amongst politicians and professionals concerning green infrastructure systems and technologies, and their advantages;
- Lack of knowledge and skills to design green buildings or to organise coherent and effective programmes to refurbish existing buildings to green standards;
- Lack of workplace skills (factory and building site);
- Lack of appropriate new products and materials in volume and at reasonable cost.

This Manual is not an attempt to address all these blockages. However, projects which consult the Manual should be aware of what actors and institutions need to be recruited as allies and active participants in order to promote employment and secure other gains by greening the built environment. At a strategic level this should include an awareness of the need generally to reorient the allocation of capital to overcome the ‘gross allocation of capital’ asserted by the World Bank, noted at the outset of the Manual.

I.3.8. Methods of analysis

The previous section mentioned approaches to analyse changes in the built environment. Three of these are detailed below.

Life Cycle Assessment²⁹

Lifecycle Assessment (LCA) looks at systems from the point of view of the environmental and resource impacts of development ‘from cradle to grave’, generally focusing on reducing energy demand. Taking the example of urban wastewater systems, LCA examines the origins, processes and application of the resources that go into building and maintaining household appliances, sewerage and treatment plants and treatment methods. The purpose of LCA here is to be able to look critically at areas where non-renewable resources and methods can be replaced with renewable resources and in general how fewer resources can be used, reused or recycled to fulfil the same purpose – with the labour implications.

Value Chain Analysis

Value chain analysis looks backwards at the way in which value in the final product has been constructed through the different materials, components and labour. Looking again at urban wastewater disposal systems, comprised of household fittings, street sewers and pumping stations to sewage treatment plants, value chain analysis can calculate the costs of each component and from this relatively easily the labour implications of building and maintaining the system. Such analyses carried out by ILO personnel or consultants should not, in undertaking value chain analyses, forget the quality of work produced both in current practices in construction and maintenance of the built environment. Decent work can at least be maintained or improved in implementing programmes to green the built environment.

²⁹ Reference was made earlier to Input-Output Analysis as a further method of estimating the full range of labour requirements to produce a particular good, including buildings and the components that go into producing these. LCA is essentially a variant of I-O.

Local Economic Development

Although not a direct component or central activity in greening the built environment, the methodologies for developing local economic plans can be environmentally-friendly. Recent developments in approaches to local economic development (LED) have emphasised participatory planning methods similar to those discussed in the second part of this Manual as being appropriate for greening the built environment. Indeed, the process discussed in the second part might be developed in tandem with LED procedures. This should articulate both to generate employment and re-localise economies in the face of escalating problems of diminishing energy supplies, and at the same time ensure that initiatives taken will move the local economy in a green direction. The ILO has developed training materials on LED relevant to greening initiatives,³⁰ as has UN-Habitat.³¹

³⁰ www.ilo.org/led

³¹ Ecoplan International (2005) *Promoting Local Economic Development through Strategic Planning*. UN-Habitat, Nairobi.

PART 2

DESIGNING AND IMPLEMENTING INTERVENTIONS

This Part of the Manual provides a step-by-step guidance to the development of relevant projects and related studies.

It proposes a participatory process which involves the actors from the beginning, and integrates studies with the development of the project itself. The aimed result is a product which analyses the challenges, proposes solutions with the participation of the actors, and concludes with practical actions to be followed by each actor involved in the process.

- **Stage 1 is about the design of projects (and related studies).**
- **Stage 2 is about the implementation of projects.**

Contents

- **Town, City and Sub-Regional Initiatives**
- **Stage 1: Background, Information Collection and Assessment of Labour Implications of Greening Initiatives**
- **Stage 2: Intervention Planning and Implementation**

Stage 1

- Project Formulation
- Selection of the City or Region
- Project Initiation
- Profile of the Built Environment
- Assessing the Labour Implications of Greening the Built Environment
- Completion of the first stage of the Project

Stage 2

- Stage 2 Preliminaries
- Reconstituting the Advisory Group or Steering Committee
- Revised Terms of Reference
- Reconstituted Secretariat
- Benchmarking
- Orientation, Education, and Training
- Monitoring and Evaluation
- Replication

Introduction

This Manual follows on from the considerable attention which the ILO has already focused on: issues of labour relating to the greening of economies and particular economic sectors. Hitherto, most of this work has taken either a strategic and/or sectoral view, looking at particular national situations and economic sectors. Studies have looked at the potential generation of jobs and the focus appropriate for the specific countries where the studies have been carried out. With respect to the built environment, *de facto these have addressed national constituencies – governments, trade unions and the various professions and industries involved particularly in the building sector. Labour issues surrounding the greening of building construction has been the predominant interest*³². This Manual calls for a greater attention to a focus on a more holistic view of greening the built environment.

Rather than focusing in a general way on various interests in the country as a whole, and making assessments on potential employment generated by greening the economy that might be used to influence policy-making at the national level, there is a need to engage directly with constituents in participatory processes. This would entail assessing needs and possibilities for generating decent jobs and influencing decision-makers to implement more concerted programmes in greening the built environment. It is not the responsibility of the ILO to directly promote programmes and other initiatives in greening the built environment. But if more rapid progress is not made in the coming years, besides increasing economic problems resulting from inefficiencies in the built environment, positive impact on employment may not take place.

The ILO offices should therefore consider participating with other agencies and interests to convince national and local governments of the need to intervene more actively to promote greening of the built environment through related projects. In this collaboration, the ILO's responsibility is to analyse the labour dimensions of greening the built environment, seen as explicit components of such promotion. Appendix 1 of this manual indicates four areas where national policies and programmes could be launched to increase activity in greening the built environment, where ILO regional and country offices might want to focus some effort.

This part of the Manual presents a **step-by-step** process through which future ILO projects concerned with the labour aspects of greening the built environment should structure their efforts. The focus here is not on national projects but on projects that will be undertaken in specific cities or urban sub-regions. The aim is to provide a basis upon which Terms of Reference for particular projects may be written. What is presented here is not itself a set of Terms of Reference but aims to describe a typical project. Circumstances are very different from one country to another and from one city to the next. In most cases, past or on-going projects in greening the urban environment will already have produced a foundation from which an ILO project can be launched.

This will mean adapting the 'typical' project to these circumstances, 'mixing and matching'. In this sense, the following step-by-step process will look somewhat different from one project to another. The main components of the procedure set out below should, however, appear. This means in particular undertaking the participatory planning process – if appropriate merging it or cooperating with existing related initiatives (such as Local Agenda 21, LED processes or a City Development Strategy described further below).

³² Kievani, R., Tah, JHM., Kurul, E. and Abanda, FH. (2008) *Green Jobs Creation Through Sustainable Refurbishment in the Developing Countries*. International Labour Organization, Geneva. ILO (2011) *Study of Occupational & Skill Needs in Green Building*. International Labour Organization, Geneva.

Although in the foregoing analysis of what greening the built environment involves there were descriptions and analyses of particular sectors, the **emphasis in projects concerned with the labour dimensions of urban greening should in principle be holistic/multi-sectoral**. Even where particular sectors (such as transport, sanitation or building) are selected as the main focus of ILO projects in this area, connections with other components of the built environment should continue to be considered. As far as possible, the **interconnection between sectors should be understood to generate synergies** that will improve the greening of the cities and the generation of jobs.

The vision here, from the outset and including initial background research, involves bringing together a wide range of stakeholders in particular settlements – towns, cities and sub-regions – to undertake a face-to-face development of integrated greening policy, planning, programmes and projects to achieve a level of greening well-above that which isolated, sectoral initiatives have achieved in the past, with the generation of decent work as a key dimension. **The focus here is thus on the labour implications of metropolitan greening programmes to ensure that increased employment in the area conforms to the principles of decent work.**

Town, City and Sub-Regional Initiatives

The main thrust of ILO projects concerned with the labour dimensions of greening the built environment should be at the level of particular towns, cities or urban sub-regions, taking in suburbs and other peri-urban areas. They may be simply entitled “Labour Dimensions of the Greening of (City Name)”. **Chronologically such initiatives will fall into two parts:**

- an initial information-gathering and background analysis, followed by
- a participatory planning process.

From the start of the project, a group of stakeholders, constituted as an Advisory Group or Steering Committee, should be brought together to advise on aspects of the background analysis. The group should be flexible over the period of the project, broadening out in stages. This obviously entails a significant amount of advocacy and political work to get stakeholders on board.

The group will oversee the process of analysing the labour dimensions of greening the particular city or region. The group will be expected to continue to function after the studies – i.e. to follow the implementation of the proposed initiatives. If a process to green the built environment is already under way, then the ILO project will add resources to the group, particularly including workers, employers and government authorities with a stake on labour (if not already on board), to ensure that the employment generation and decent work aspects of the initiative are well incorporated.

Greening initiatives at the city or sub-regional level of the kind that the ILO is concerned with should, from the outset, seek to coordinate and even combine with other relevant initiatives in the area. During the 1990s, **‘Local Agenda 21’ processes were initiated in thousands of cities around the world, comprising participatory planning processes intended to green the cities.**³³

³³ See: Lafferty, WM. And Eckerberg, K. (Eds)(1998) *From Earth Summit to Local Agenda 21: Working towards Sustainable Development*. Earthscan, London. Barton, H. (2000) *Sustainable Communities: The Potential for Eco-Neighbourhoods*. Earthscan, London.

Numbers of manuals aimed at guiding LA21 processes that appeared at the time are relevant and applicable also today,³⁴ despite of problems in implementation. Most of the LA21 processes faltered within ten years mainly as a consequence of inadequate commitment in terms of finance or incorporation of outputs into the regular activities the local authorities.

These were generally also small in scale, failing to address such wider issues as transformation of sub-regional transport or sanitation systems based on green principles³⁵. But where these have survived, steps should be taken to link the ILO project, highlighting the labour dimensions.

In recent years, the Cities Alliance has financed short participatory planning processes in well over a hundred cities throughout the developing world and the transition states. Whilst this process has introduced participatory planning procedures under the title of '**City Development Strategies**' (CDS),³⁶ the focus has not been particularly on city greening. However, although labour issues have not generally featured as one of the dimensions of CDSs, these have often started processes of accelerated urban development to which ILO initiatives can usefully build on, adding in a greater emphasis on city greening and its labour dimensions.

Furthermore, a significant number of cities have initiated structured approach to local economic development and in some cases formed **Local Economic Development Agencies (LEDAs)**.³⁷ These are constituted as multi-participant institutions at arm's-length from local authorities, but associated in some structured way with them. The planning processes are similar to those described below and a comprehensive set of guidelines supporting this process is available from UN-HABITAT.³⁸

The ILO has strongly supported LED processes.³⁹ Where such initiatives are already under way, efforts should be made to determine whether the greening initiative should be merged with LED or whether some other structured relationship can be found. Under all circumstances it is important that, although LED is not taken here as a major theme, greening the built environment should be seen as enhancing local economic activity and, where seen to be relevant, be undertaken with a coherent LED dimension.

³⁴ The International Council on Local Environmental Initiatives, founded in 1989, initiated LA21 and supported initiatives, publishing a set of guidelines that circulated widely. See: ICLEI (1996) *The Local Agenda 21 Planning Guide: An Introduction to Sustainable Development Planning*. International Council for Local Environmental Initiatives, Toronto.

³⁵ However, a few of these initiatives were more extensive. See: <http://www.iclei.org/index.php?id=1202>; Furthermore, some cities carried out similar exercises under other names. See the initiatives carried out in the City of Portland, Oregon (USA) at <http://www.portlandonline.com/bps/index.cfm?>. It is worthwhile to research and study these and other models for benchmarking new initiatives in other cities.

³⁶ Cities Alliance (2006) *Guide to City Development Strategies: Improving Urban Performance*. Cities Alliance, Washington DC.

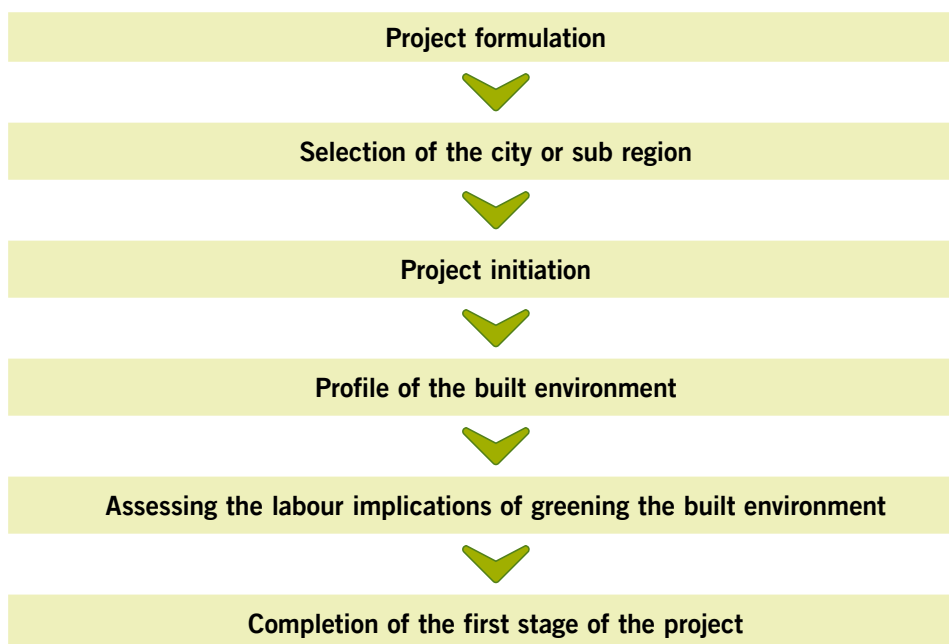
³⁷ See ILO and UNOPS (2002) *Local Economic Development Agencies: International co-operation for human development, democratic economies and poverty reduction*. International Labour Organization, Geneva. Also the ILO LED web site: www.ilo.org/led

³⁸ Ecoplan International (2005) *Promoting Local Economic Development through Strategic Planning*. UN-Habitat, Nairobi.

³⁹ See the ILO LED web site: www.ilo.org/led

STAGE ONE: Background, information collection and assessment of labour implications of greening initiatives

THE DESIGN PROCESS



II.1.1. Step 1: Project Formulation

Already as an important ingredient of the **Terms of Reference** of any ILO project concerned with the greening of the built environment, those designing the project should produce a **logical framework**, as is usual for development initiatives. This sets out the purpose of the project, the specific outputs it aims to achieve, the activities that will be undertaken and flags the difficulties the project may have to face.

The ‘logframe’ should not constrain the actual content and the way in which the project unfolds in practice. It should aid those composing the programme as well as those with overall responsibility for administering it and keeping it on track over time.

The **Terms of Reference should be clear concerning the content respectively of stage one and stage two**. The **first stage** will be concerned with developing local commitment to city greening, outlining one or more projects and then assessing the labour issues raised, emphasising employment creation and decent work.

Stage two will be concerned with implementation of projects developed and analysed in the first stage. If stage two involves major new investments in city greening, it may be that the ILO cannot play the main role. It should thus formulate stage two as a parallel project, working alongside and in collaboration with other constituencies responsible for project implementation, advising on the labour implications of different approaches to project implementation with a view to generate decent jobs.

The Terms of Reference will describe stage one in considerable detail, as set out below. It will probably only be possible to set out stage two in outline insofar as partners will not have been identified yet. This will subsequently be structured on the basis of agreements that have been negotiated in stage one.

II.1.2. Step 2: Selection of the City or Sub-Region

Projects must start by **selecting a city or metropolitan sub-region**. A project might be undertaken in more than one city – for instance two cities might compete with one-another to show their capability. However, care must clearly be taken in ensuring that resources are not spread too thinly.

Progress is unlikely to be made and results followed-up unless there is commitment in the city chosen, in terms of time by staff from local institutions and organisations. This clearly requires from the outset a demonstrated **municipal commitment** by local politicians in terms of staff, time, and political willingness. It is also important to ensure before the choice is made that the ILO constituents, workers and employers, in the city are also committed to active participation. Eventually proven active interest on the part of yet other constituents, especially ones already working on aspects of city greening, will also be a great advantage.

II.1.3. Step 3: Project Initiation

The project may be carried out by ILO staff directly or may be tendered. The timing of the following different stages may vary from one city to another. It may be expected that staff or consultants responsible for project execution have particular expertise and experience that is likely to focus predominantly on the built environment (urban planners, engineers) and on labour issues (economists, labour experts). It is important that both types of expertise are represented within the project staff with good communication between the two that will ensure understanding of the technical details of city greening and of the labour implications.

Project Staff Presence

It is important that one or more **staff or consultants of the project be permanently present** in the sub-region or city, responsible for animating the process. For more extensive initiatives the project should make resources available to hire **short-term experts** to assist in particular technical or organisational fields.

Collaboration with Related Initiatives

In cities where greening initiatives are already under way (Local Agenda 21, CDS, LEDA or other), the ILO project should work closely with this, deferring to it with regard to the direct focus on greening activities and offering expertise to study the labour implications of any activity being proposed or undertaken.

Getting Started

The following preliminary activities may already have taken place, but if not, then the ILO project should take some responsibility for organising them, as far as possible with resources from various sources that must include the municipality (demonstrating commitment) and the ILO but possibly also other agencies and stakeholders.

Stakeholder Analysis

The first substantive activity of the project will be to carry out a preliminary stakeholder analysis to ensure that key actors with an interest or on-going involvement in greening the urban environment be involved in the project from the outset. The information on actors mentioned in Part I, Section 1.1. is important as a background to the stakeholders analysis.

Box 2. What is a Stakeholder Analysis?

Stakeholder analysis is the process of identifying the individuals or groups that are likely to affect or be affected by a proposed action, sorting them according to their impact on the action and the impact the action will have on them. This information is used to assess how the interests of those stakeholders should be addressed in a policy, programme, project or other action. It is considered in many development initiatives to be an essential step in programme or project implementation.

Stakeholder analysis is a term that refers to the action of analyzing the role and attitudes of stakeholders – individuals or institutions – towards a programme or project and its components. It is frequently used during the preparation phase of a project to assess the attitudes of the actors regarding the potential changes. Stakeholder analysis can be done once or on a regular basis to track changes in stakeholder attitudes over time.

A stakeholder is any person or organization, who can be positively or negatively impacted by, or cause an impact on the actions emanating from a programme or project. Types of stakeholders are:

- Primary stakeholders are those ultimately affected, either positively or negatively by programme or project actions.
- Secondary stakeholders are the ‘intermediaries’, that is, persons or organizations who are indirectly affected by programme or project actions.
- Key stakeholders (who can also belong to the first two groups) have significant influence on the outcome of a programme or project.

Therefore, stakeholder analysis has the goal of developing cooperation between stakeholders and the programme or project team and, ultimately, assuring successful outcomes. Stakeholder analysis is performed when there is a need to clarify the consequences of envisaged changes, or at the start of new projects and in connection with organizational changes generally. It is important to identify all stakeholders for the purpose of finding their success criteria and turning these into quality goals.

Project Title and Location

The organisation as a whole may have a title – such as “City (*name*) Greening Agency” to give it the needed profile to promote the greening of the built environment. If the ILO is the prime organiser, then the initiative should include “Labour Issues...” in the title of the organisation. The organisation may not be directly under the local government but should nevertheless have a close relationship with it, reflected on the Steering Committee.

As the ILO will be concerned specifically with labour issues, in the case of a broader collaborative project, a separate sub-group on labour should be established in the Steering Committee, to ensure adequate representation of workers’ and employers’ organizations. The ILO project or sub-project should be represented on the Agency Steering Committee ex-officio.

Communication

Once the project is established with a project office and staff, substantive work can start. The components are listed below. Meanwhile, it is vital that contact is maintained with local – and possibly national – media and that a constant flow of information on and throughout the project, is broadcast.

- Regular contact should be maintained with local media to ensure interest is maintained in project progress and key information is transmitted orally and visually to the population at large;
- A web site should be established and regularly updated with news on progress including interesting facts from the profile of the built environment focusing particularly on:
- What can be achieved to green the built environment by particular interventions and with the efforts of particular stakeholder groups; and
- Employment generation that can be expected from the various interventions.
- Printed material such as brochures should be produced on important issues and distributed to targeted audiences;
- Meetings and focus group discussions should be organised for different components of the project. These may be one-off to exchange information or constituted as 'soft' steering groups for particular components.

II.1.4. Profile of the Built Environment

Many urban projects start by compiling a city profile which is clearly necessary background for any focused planning initiative. Such profiles are generally based on information already published or otherwise immediately available – and it is necessary to make a thorough search for information already available. However, sometimes there is a wealth of information that comes with a temptation to present matters that are not relevant to the particular purpose and which diverts attention from key issues. This can discourage the involvement of wider audiences from participating because of the excessive material of questionable relevance resulting in confusion and lacking a sense of practical direction. Therefore, a consistent profile of the built environment needs to be prepared.

Challenges in information collection

The temptation to use irrelevant information – sometimes confounded by inaccuracy – is particularly strong in southern cities, where existing data bases are often very meagre and of poor quality. Those responsible for constructing the profile can become apprehensive that nothing definite can be said, leading to attempts to fill gaps with irrelevant 'facts' that only exacerbate confusion and lead to stakeholders disengaging. So in carrying out background analyses for greening initiatives, the eye of those organising the process must remain firmly on key issues and the information necessary.

Where the ILO is responsible for the initiative, the issue of employment and labour conditions will always remain salient with respect to all information collected for each component of the analysis. This will presuppose an analysis of the institutions – formal and informal – that are active with respect to each of the components.

Selection of Emphases, Topics, Sectors in City Greening

From the outset it will be evident that some sectors or components of the built environment in the particular city in which the project is located are more in need of and/or amenable to greening than others. Furthermore, some sectors may already be in active process of being greened. Even the Terms of Reference may already make a selection of theme(s) or sector(s). Following the initial event, there may be further clarification of where the emphasis might be placed and a narrower set of themes selected for further consideration.

Important Information to be collected

Here is a preliminary list of issues for consideration in the project and, in each case, what kind of information will need to be collected (if the theme is to become part of the project):

- The sub-region which is the object of the initiative should be subdivided into **morpho-logically consistent areas**. These may not necessarily be existing districts but should be assessed as far as possible to be consistent in terms of building types and uses – requiring considerable judgement. Important characteristics of each area include:
 - Population density and key relevant characteristics of the population;
 - Land and building use map and summary land and floor space statistics;
 - **Summary profile of employment by industry and occupation**, which will be used as baseline for evaluating the effectiveness of urban greening programmes to create jobs;
 - Commuting patterns that can be discerned, focusing on modal split.
- A profile of the transport system should be drawn up. This will include data from ‘public’ transport undertakings and from travel and transport studies carried out in the (recent) past. In southern cities it is vital to document informal, semi-formal and formal transport systems. The data should include technical issues concerning vehicle types, routes and passenger volumes together with information on measures taken so far to restrict car use (road closure and pedestrianisation, one-way systems, parking and/or license plate restrictions, road pricing, etc.).

Operational data including ownership of both formal and informal public transport vehicles and system should be collected. It will be of great importance to **collect employment data on both formal metro, tram and bus systems and on informal systems such as minibuses, jitneys and motorcycle taxis** as a basis for monitoring changes with the implementation of greening policies and system changes. Where **decent work conditions** are in question, information should be sought.
- An overall energy balance for the city is necessary as a basis for evaluating progress in greening the built environment. Where this does not exist, the project should stimulate the urban authorities to produce one and to institutionalise it, with annual updating. This should be broken into sub-uses (household energy uses, significant industries, commerce and especially hotels and restaurants, institutional energy use, transport system components and whatever else is significant in terms of energy use) and detailed information obtained on the current sources of energy for each sub-use.

The methods of energy distribution should also be analysed, with particular attention to group provision and any existing heating/cooling networks. Although this sector is not generally a major source of employment, statistics should nevertheless be collected both on **employment in operating ‘conventional’ energy systems** (electricity, gas, petrol) and **employment in installation of energy conservation (e.g. small-scale CHP) and renewable energy systems (e.g. solar)**.
- Details of the water supply and sanitation system should be collected, including formal and informal aspects. Key problems should be identified, for example the level of water stress and the inadequacies of the sanitation system and how/if wastewater is treated or re-used. As with energy supply systems, currently there is generally little employment in this area but **employment could increase dramatically** with a change to sustainable sanitation systems. Current employment levels would thus provide a benchmark against which future changes can be measured. However, decent work conditions will need to be

monitored in any significant system changes so information on existing work conditions (and generally local sanitation problems) should be collected.

- Information on other resource flows should be collected with a particular focus on solid waste recovery, recycling, refurbishment, etc. **paid and un-paid employment** in the waste cycle. **Decent work deficits** especially amongst scavengers and formal recycling enterprises should be analysed. If financial resources are available, this part of the data collection exercise could be undertaken as a full Material Flow Analysis (MFA) described further below.
- Information on existing urban and peri-urban agricultural components should be collected including areas farmed, volumes of produce, techniques applied and **paid and unpaid employment** generated in both farm and non-farm activities. Any existing utilisation in UPA of urban organic waste should be documented. A special focus should be placed on institutional and market arrangements.
- Information on green planting activity and results in terms of parks and gardens, trees, green borders, roofs, etc. should be mapped and documented statistically, with the **amount of employment involved**. This should be linked to the information on UPA.
- If building or more broadly construction, including infrastructure, are to be a component of the eventual project, then general information will need to be collected on the local construction industry. This will include aspects of employment such as **numbers employed workers by profession and trade** and if available fluctuations in recent years. Information on available skills training will also be vital. Any existing information on green construction as a separate sub-sector should also be sought.
- Formal building activity over the past few years should be documented (planning permissions and building permits by building use type) and the proportion of this which has been green certified should be enumerated. If there are special construction programmes – for instance in the public housing sector – then an assessment of its level of ‘greenness’ should be collected.
- Current building regulations should be analysed with regard to their ‘greenness’ and available estimates of the degree of conformity of the building stock and recent building activity to the regulations. The project should be aware of current debates on possible upgrading of the building regulations to require higher green standards.
- It is particularly important to attempt, even where little formal information is available, an assessment of the existing formal building stock in terms of shortfall on green criteria, estimating the amount and cost of work needed to retrofit it to acceptable green standards.
- A similar assessment should be made, where this is significant, of the state of the informal housing stock including everyday resource use and sanitation arrangements.

Estimation where Formal Information is Lacking

Where little information is available and where what is available is of questionable accuracy or value, consideration should be given to carrying out surveys to improve the quantity and quality of the data. Clearly what can be achieved depends on the available budget.

The Importance of Participatory Information Collection

However, it is crucial that the information collection exercise not be seen and carried out simply as a technical exercise but should incorporate a dimension of **action-based research**.

This is the first opportunity to engage with the stakeholders in a process of education and commitment-building. Therefore information gathering, whilst in part relying on off-the-shelf data, should at the same time be in part guided through a process of dialogue with the eventual beneficiaries of the intervention.

Starting from the participants in the opening and broadening out through contact with the municipality, key civil society organisations and local groups, numbers of **focus groups** should be organised over a number of months, each **around a specific issue**. Early on, sessions will assist in creating a map of morphologically consistent areas. Then groups will be convened on themes that might include transport, energy, sanitation, recycling, UPA, greening dwellings and/or greening other building types and possibly other themes (it is probable that only a selection of these will be deemed to be appropriate to particular city projects).

The fact is that most people attending these groups will lack knowledge of green approaches. Very few people anywhere have any knowledge of heat networks or of sustainable sanitation; indeed on almost all the themes dealt with here. Therefore, in all cases, those organising the groups must prepare well in being able to provide good information on technologies, modes of implementation and the relative importance of adopting the particular dimension of greening under discussion.

Some group discussions will be more in the nature of ‘teach-ins’. But these events must be two-way: dispensing information and receiving information on what is already on the ground – that is likely to change priorities with respect to what data are important and what initiatives will be included in the future greening programme. Participants should be encouraged to understand the issues but not feel pushed to accept actions before they are prepared to accept them as necessary.

II.1.5. Assessing the Labour Implications of Greening the Built Environment

In the course of collecting the above information, an impression will have been made as to the impacts on employment and labour standards that are likely to be made by different interventions in different sectors. At the same time, the likelihood of increases in activity in the coming months and years within the various sectors should also have become relatively clear. Work should therefore now be undertaken to clarify the emphases that should be placed on different activities with regard to the interests of labour and the need to green the built environment. The project should now **employ professional expertise and judgement** to undertake the following activities:

→ **Clarify the focus of the project – final choice of sectors:** The focus of the project should be clarified and a final choice of themes/sectors be made. This might result in only one sector being selected – such as the local transport system, housing, energy conservation and supply, etc. The project staff may, however, decide on a combination of themes/sectors where there are clear connections and synergies such as in implementing sustainable sanitation, together with UPA and the arrangement of planting of parks, gardens, trees and so on throughout the city. It might be decided at this stage, however, to study several themes/sectors further before making a definitive choice.

→ **Assessment of current shortfall in greening the selected sectors:** assessment will have to be made of the shortfall in greening each selected sector. In most cases this will require the construction of scenarios or projects indicating the final state of what might be expected in the sectors.

For instance: what will be required technically and in terms of investment to extend or implement a city-wide heating/cooling network? What are the technical and investment implications of implementing a comprehensive sustainable sanitation system? What are the technical and financial requirements to retrofit the entire existing building stock (such as the case of Hungary described before)? These will have to have sufficient methodological content to be able to make meaningful assessments of the labour implications.

→ **Assessment and Calculation of the Labour Issues in the selected sectors:** Detailed studies of the labour implications of greening the selected sector(s) should then be undertaken, based upon these technical and financial proposals or scenarios. I.e. how many temporary and permanent jobs (or full-time equivalents) will be generated (and/or lost)? What need will there be for skills training? What decent work deficits might be expected that will need rectifying?

It was noted in the first part of the Manual that different methodologies have been developed and applied to analyse the labour – and other social and environmental/resource – impacts of greening different sectors. It is thus necessary to choose relevant analytical tools for the sectors selected. In all cases, in-depth information will need to be collected with regard to the labour impacts of the sector as it currently operates and with respect to up-stream and down-stream impacts. Two important tools, mentioned before, are Value Chain Analysis (VCA) and Life-Cycle Assessment (LCA).

→ **Value chain analysis:** applied to particular sectors, documents the stages and individual processes through which end-products on the market are produced, starting from raw materials, through processing to final production and looking sideways at the services that go into the design, transport and marketing of the products. When first introduced, value chain analysis acted as a heuristic device to understand how decisions are made, based on economic criteria but taking also into consideration such influences as trade and other legal barriers, subsidies and ‘business climates’ in different countries. Empirical work was

Box 3. What is Value Chain Analysis?

The value chain approach takes as its unit of analysis the full range of activities that are required to bring a good or service from its conception to its end use. Detailed value chain analysis can provide us with a range of tools to understand the actors, processes and relationships within a given value chain, and provide a basis upon which to make evidence-based recommendations for interventions.

As an example: how did a shirt sold in a shop in Europe get to be there? It was designed in one place and the design governed the materials used and its shape. The cloth, buttons, etc. were produced in factories, from cotton, acrylic or other material, and transported to other factories or put out to seamstresses where they were cut and stitched and delivered to companies responsible for shipping. Parts may have been produced and shipped in different places and there may be intermediate steps including packaging before the shirt arrived in the shop. Value chain analysis generally looks at the value added of each stage but can also inquire into the labour time and even the labour conditions involved throughout the chain.

The Green Jobs value chain development methodology seeks to integrate the conventional market-focused approach to value-chain development with an assessment of the environmental and social outcomes generated by a given sector, with the aim of creating employment that is environmentally, socially and economically sustainable.

carried out to understand how the global economy was evolving. It was also able to clarify who was benefiting and not benefiting from this evolution and why.

Confidence has been increasing to use this understanding in an analytical mode upon which decisions can be taken to influence the way in which particular value chains are operating.⁴⁰ The two most important issues here are to reduce de facto tendencies towards inequality in benefits, particularly focusing on poor countries but also within countries, and the reduction of negative resource and environmental problems along the value chains. The ILO has been a major player in developing methodology with a particular view to increase employment and improve labour benefits that can accrue through value chain development. In collaboration with the United Nations Environment Programme (UNEP), the concern to also use this method towards greening local, national and ultimately the global economy has been added.⁴¹

In the foregoing sections of this Manual, reference was made to analysing the labour implications of particular interventions. In practice this means analysing the amounts of labour in terms of person-days or years – full-time equivalents – and permanent jobs created. In some cases – such as the development of UPA – the labour impacts are expected to be predominantly local and hence amenable to immediate empirical analysis. In other areas, the generation of work will not be only, or in some cases even significantly, local. Rather, it will be in other parts of the country or the world. This is particularly the case with the increase in factory production of building components, the manufacture of renewable energy appliances and more sophisticated public transport equipment.

Value chain analysis becomes relevant here as a tool to clarify where the employment benefits are likely to accrue from increased investment in greening the built environment. Consideration can be given to measures that might be taken to increase the employment components of the value chain that are local or to make choices that alter what is being produced – such as increasing the use of local materials and skills.

⁴⁰ To understand how value chain analysis works and how it can be applied, see: Kaplinsky, R. and Morris, M. (2001) *A Handbook for Value Chain Research*. Prepared for the IDRC. http://www.fao.org/fileadmin/user_upload/fisheries/docs/Value_Chain_Handbook.pdf For a summary insight, see: Schmitz, H. (2005) *Value Chain Analysis for Policy Makers and Practitioners*. International Labour Organization, Geneva.

⁴¹ ODI op cit.

→ **Life Cycle Assessment**⁴² is a methodology, related closely to value chain analysis, which analyses the greening of sectors, rather than the labour implications. However, in selecting approaches to greening sectors of the built environment, it is necessary to be aware not only of the immediate resource and environmental impacts but also of the impacts down and up stream. Life cycle analysis should be carried out in parallel with value chain analysis.

Box 4. What are Life Cycle Assessment and Material Flow Analysis?

LCA is a technique to assess environmental impacts associated with all the stages of a product's life 'from cradle-to-grave', meaning from raw material extraction through materials processing, manufacture, distribution, use, repair, maintenance and eventual disposal or recycling. It is used to evaluate the impacts of product designs and allow designs to be modified prior to mass-production. It is also extensively used in building design and in addition applicable to infrastructure programmes. LCA procedures are similar to those of value chain analysis and can be merged with these to include the dimension of resource and environmental impact. The main analytical stages are:

- (a) Compiling an inventory of relevant energy and material inputs and environmental releases;
- (b) Evaluating the potential impacts associated with identified inputs and releases;
- (c) Interpreting the results to make more informed decisions.

Material Flow Analysis (referred to above with respect to resource management) is essentially LCA carried out for whole urban districts, cities or sub-regions. It is usually more general and strategic, looking at key resources (energy and water flows, key pollutants) but can also be applied in more detail to focus on other resources and goods deemed important in the analysis.

LCA takes individual products – that might be as simple as a light bulb or as complex as a whole building or even a neighbourhood – and traces back to the origins of the materials used, through processing and manufacturing, and assessing the resource and environmental impacts. It goes on to look at the impacts over the life of the product and then impacts of disposal or demolition. This is therefore referred to as 'cradle to grave analysis' – or if recycling is considered, 'cradle to cradle'.

As a parallel process to value chain analysis, LCA analyses resource and environmental dimensions where value chain analysis looks at economic and employment dimensions. They can therefore be used in tandem to analyse the same sequence of events along the way to the marketing of products and thence in resource and environmental terms their use and decommissioning. Having been in use now for some twenty years, many institutions have assembled data bases that can produce information on impacts of a wide range of products. Indeed, although relatively rarely applied, LCA is an excellent tool for architects and their associates to design green buildings through interactions of different options in terms of building components and plan configurations until negative impacts are minimised for a given activity⁴³.

There are by now many computerised systems of LCA that allow product specifications including complete buildings to be analysed with regard to their environmental and resources impacts back to source and during building use. Clearly these can be used as a tool for achieving green certification and have the potential in future to continually refine assessment of resources and environmental impacts as a progressive route to greening the built environment.⁴⁴ Developing methods of value chain analysis specifically as an adjunct

⁴² See: ODI op cit Section 3.3

⁴³ Crawford, R. (2011) *Life Cycle Assessment in the Built Environment*. Spon Press, Abingdon, Oxfordshire.

⁴⁴ The European Commission has been assisting in the promotion and dissemination of the various LCA systems developed in different EC countries with the potential of greatly improving their application in practice. See: <http://lca.jrc.ec.europa.eu/lcaifohub/service.vm?sid=21>

to LCA should assist at the same time to refine the examination of the labour implications of different approaches to the various dimensions of greening the built environment.

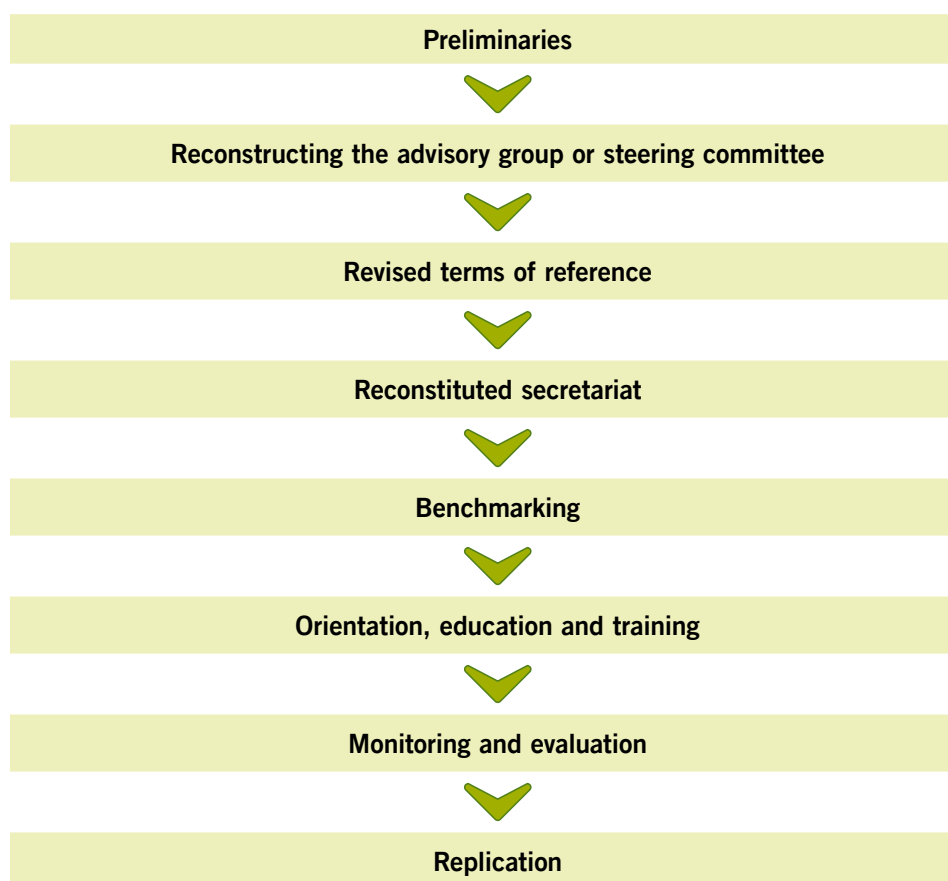
→ **Appropriate choice of analytical tools:** The aforementioned techniques take time and resources to apply. Judgement will be needed in each case of country or local studies financed and/or undertaken by the ILO as to whether to use these tools. It is likely that they will be useful looking at particular sectors (e.g. infrastructure, building, services) and may even be transferred in the course of the study to a government or a research organisation to be applied on a continuous basis following the end of the particular initiative. Developed in collaboration with the national green building council of the countries in which initiatives are carried out, the ILO could have an important role in adding labour issues on the on-going development and application of green certification systems where labour impacts could accrue points towards the level of certification of buildings applying for accreditation.

II.1.6. Completion of the First Stage of the Project

By the end of the first stage of the project, background information will have been collected and consolidated, a sub-set of themes and/or sectors in greening the built environment will have been selected and outline programmes designed for them. These will have been used as the basis for assessing labour impacts of the selected programmes. The results of the assessments should be written up in one or more reports (one per theme/sector). Further material, including brochures and electronic communications, should have been produced and the population of the city or sub-region in which the project is being carried out become aware of the importance of city greening and especially the links with labour issues.

STAGE TWO: Intervention planning and implementation

THE IMPLEMENTATION PROCESS



For the ILO to be involved in the operational implementation of projects and programmes of greening the built environment – based upon the kinds of initiatives set in stage one – the following is suggested:

- Continue to work with the local authority and other local stakeholders to secure wider commitment and investment in greening initiatives including awareness-raising, research, training and assistance in supporting expert advisors, and providing knowledge about labour issues;
- Work together with other agencies, including bilateral agencies, UN agencies and/or IFIs to implement specific initiatives where the ILO plays the role of assisting in advising, building the capacity and/or organizing workers, enterprises and/or government authorities which relate to labour; whilst other agencies develop and finance main projects.

This section of the Manual thus outlines the steps through which a holistic programme to green the built environment of a city should pass and the role the ILO can play in supporting its labour aspects. As with stage one, stage two may also only focus on one or a few key sectors of intervention. However, the steps outlined here are relevant for multi-sectoral as well

as single-sector programmes. The institutional arrangements may be put in place to initiate action on one or a few areas but should have an orientation towards extending activity over time to cover the greening of the built environment holistically, in all relevant sectors.

II.2.1. Stage Two Preliminaries

As in the preliminary steps of stage one, it will be necessary to review the full range of interested stakeholders. Also, to make whatever revisions are needed to bring new stakeholders into the process, adjusting the advisory and steering functions to move beyond research and into implementation. It may be that for individual project components, different sources of funding will be brought to bear and Project Management Units (PMUs) established to manage the development of the sectors to be financed, such as major investments in energy saving technologies or city-wide systems of sustainable sanitation.

II.2.2. Reconstituting the Advisory Group or Steering Committee

The Project Advisory Group should continue as a Steering Committee to oversee all project components and maintain the holistic view of the longer term greening of the built components. The Steering Committee should continue to explore possibilities for funding further sectors and initiate project identification and design exercises to encourage interest in implementation of further components.

In principle, the Steering Committee should initiate a strategic planning process for the greening of the city that explores all potential sectors. Whilst the ILO could not take responsibility for this, the ILO contingent in the overall programme would be expected to be involved in plan formulation,⁴⁵ due to the labour implications. The Steering Committee may take on new members to incorporate voices from new project components as the overall programme evolves.

II.2.3. Revised Terms of Reference

In the light of the new spectrum of participants, the ILO will need to take the section of the initial Terms of Reference, as set out at the start of stage one, that outlines what might be expected of the ILO in stage two. It should now draw up specific Terms indicating the actual role which the ILO will play, the expected length of its involvement and the resources required.

II.2.4. Reconstituted Secretariat

The secretariat established during stage one should continue to work with the support of the municipality, the ILO and the other organisations which have committed themselves to implement the greening programme(s). The Secretariat will inherit the output of the background studies undertaken in stage one and should possess the professional staff capacity necessary to assess the studies and develop programmes. The ILO should seek to continue to have representation on the Steering Committee. From this point on there should be clarity as to how long ILO involvement in the initiative will continue in the context of the broader remit of the Committee. The secretariat will be encouraged to **revise assessments of labour impacts of salient programmes and promote employment as these are developed.**

In this context, the ILO presence in the programme should include the labour-related issues identified in stage one. An example is **promotion of labour-based construction**

⁴⁵ Appendix 1 briefly outlines salient points with regard to such a strategic greening planning process.

Box 5. What are Labour-based Construction Methods?

The analysis of construction processes from a labour-based perspective starts from an assumption that there are various procedures for constructing infrastructure and buildings that can make a difference with regard to the total hours of work involved. The method was developed in order to address employment problems where increasingly machines are used to carry out tasks, eliminating labour that can carry out such tasks just as well. The machines also produced employment in being manufactured but this may have benefited others than those in need of work in the place where it is most needed and where it will raise local income and benefit the local economy.

Related to this, attention can be paid to examining, through value chain analysis, the source of materials and parts going into infrastructure construction and where this has good chances of surviving. Local enterprises can be supported to substitute imported projects, bring more jobs to the area and reduce the outflow of funds that, if kept local, can be used as capital for local investments.

Finally, 'community contracting' is an approach that also keeps money circulating locally. Rather than bringing construction companies from outside to build infrastructure, these can be built by the communities themselves that will benefit from the results. This means training local workers to be able to undertake the work and may (as promoted by the South African government) involve larger companies sub-contracting, including carrying out the necessary training.

methods in those sectors where they can be relevant. It is unlikely that those responsible for individual sector programmes will have much awareness about ways that infrastructure and buildings can generate different quantities of work.⁴⁶ Different approaches can be taken to organise construction on a machine-intensive or labour-intensive way. The decision can be taken in specification-writing to call for a labour-intensive method for green construction.

For instance, if the decision is taken to install a network of heating/cooling pipes throughout a city, value chain analysis should have been used in stage one to discover where different elements of the work will be carried out to make the parts. There may be no contention with regard to creating jobs elsewhere. But if the generation of local jobs (and indeed the enrichment of the local economy) is one of the goals of the project, then efforts may be made to start local enterprises to fabricate parts. With respect to the installation of the networks, labour-based methods may be selected as a means to increase local employment in the process of construction.

The use of labour-based methods is just one example of labour-related issues that should be defined in Stage one (design) and now implemented.

II.2.5. Benchmarking

At this stage, there should be widespread public knowledge of the existence of the initiative and commitment of the involved actors to green the built environment (or the specific sectors selected) and the labour-related implications. Information should now be available on potential programmes or projects to green the built environment with respect to the selected themes.

For instance there is clarity on what initiatives might be taken to green the transport system or to implement a programme of introducing sustainable sanitation or systematically retrofitting the existing housing stock. And by now **the labour implications, including numbers of jobs that will be generated should have been estimated. This should provide a good basis for moving into implementation of the planned actions. However, before substantive work starts, it is recommended to establish some benchmarks.**

⁴⁶ Tajman, D. and de Veen, J. (1998) *Employment-Intensive Infrastructure Programmes : Labour Policies and Practices*. International Labour Organization, Geneva

Box 6. What is Benchmarking?

Benchmarking is a technique for comparing the performance of an organisation or a project with what may be considered as 'good practice' and to set targets to achieve a similar performance over time. In industry this is generally oriented towards increased efficiency. In the public sector, this is more oriented towards improving service delivery and environmental performance. Targets may be set with respect to a set of selected indicators, starting from present practice and making incremental improvements. In the energy field this means improving energy performance. In the transport field this may involve reducing congestion and air pollution in specific places. With regard to UPA, indicators could cover increase in land and other inputs and increase in outputs. In the case of ILO projects, benchmarking should have a focus on labour-related issues.

Thus action should now be taken to explore the issue of benchmarking and to adopt a small number of indicators for each project component. The ILO will be concerned to ensure that indicators relating to job generation and decent work are included in the list. However, it will be necessary to adopt different approaches for different dimensions of greening the city. In many cases, it will be more a matter of assembling case studies and lessons. Here are two examples.

Heating/Cooling Networks: While such networks are common in northern cities, few southern cities have such experience. Whilst assessments should be made as to whether significant energy savings can be made in a particular city by their installation, these should be accompanied by assessments of the likelihood of obtaining competent utilities and the possibilities of finance. If these assessments are positive, then relevant case studies – and possibly city twinning – should be sought, be they for CHP, geothermal heat/cooling networks or use of inertial temperature of a major water body adjacent to the city. The construction or extension of such networks and possible construction of power plants will generate jobs and this should be one of the indicators used in assessing progress.

Sustainable Sanitation: Whilst in the longer term, as sustainable sanitation becomes more widespread and recovers a significant proportion of urban wastewater and human waste as resource inputs to agriculture, benchmarking should come into its own as a basis for measuring progress. However, as sustainable sanitation is yet in its infancy, it is crucial that case study material be introduced from towns and cities where this has been successfully introduced, in order to demonstrate the possibilities and initiate local research and pilot projects in close association with the development of UPA. Here also job generation can be assured and this should be one of the indicators of progress.

Other aspects of greening the urban sub-region can be approached through a combination of case study and benchmarking:

Improving Urban Transport: Case studies from Europe should be used with caution as good examples for southern cities, as the different level of available resources to carry out improvements is substantial. Thus selection of case studies should focus on the kinds of actions desired, such as success in restricting car use, comparisons of main systems (trams versus metro or BRT) or success stories in organising informal min-bus and jitney systems, etc. Benchmarking may become relevant once the city's policies have been firmed up, regarding the direction of improvements. This would include both upward and downward indicators: reduction in cars on streets, accidents and air pollution, increases in cycling and ridership on improved public transport modes, etc. It is less sure that urban transport reform will have

positive or negative impacts on employment but this should certainly be included as one of the indicators in benchmarking.

Resource Recovery: Benchmarking can be applied to set targets for the recovery of specific materials – organics for animal feed or composting, paper, plastics, metals and other significant waste materials. Levels currently achieved in the sub-region should be compared with best levels achieved in other cities in the country. Targets should be suggested for future years to be negotiated through the participatory planning process. A case study approach should be used regarding the means of recycling materials and especially the recovery of goods to be refurbished and sold as second hand goods. Here examples should be included: of organisation involving options for the local government or the waste management utility; options for waste-pickers to improve their organisation and the role of local authorities; and options for private enterprises, ranging from door-to-door purchase, to materials processing enterprises (re-making paper, production of plastic and glass goods, etc.). Indicators should include issues in the quality of the work as well as the quantity of employment generated.

Urban and Peri-Urban Agriculture: Appropriate general benchmarks should include amounts of different produce in absolute terms and in terms of per centage of local consumption satisfied by local production. This may be linked to benchmarks related to agricultural inputs – rate of reduction in the use of non-renewable inputs and increase in renewable inputs (organic farming). However, UPA may initially be relatively modest in scale and if greening initiatives are to increase activity, then there is good reason to introduce case studies from around the world. This would include material on techniques and mix of products (especially the Cuban case), utilisation of land – balanced with the need to provide green recreation space – marketing arrangements for peri-urban produce such as community-supported agriculture (CSA – Japanese Teikei), examples where employment generation is an active ingredient of the UPA initiative and other experiences deemed to be relevant to the sub-region in question. Employment indicators must distinguish between unpaid household work in this sector and paid employment.

Green Building: From the outset, benchmarking will be an important tool to measure the numbers of buildings conforming to a set of green indicators that can be derived already in many countries from the criteria of the Green Building Councils. This should provide a hierarchy of benchmarks in which numbers of buildings by type (residential, commercial, institutional, industrial, etc.) achieving each level of green certification is documented, and for each building type the numbers achieving specific targets, for instance energy use per square metre per year, rates of water use, and other key targets to be determined. In each level of benchmarking, labour considerations should feature.

Where possible, once policies are adopted, benchmarking should be raised to a general level where indicators can be applied and targets can be set for improvements to be assessed on an annual basis. In addition to striving to reach targets within the city, competition between cities can be an additional incentive to achievement. When several cities in the country undertake the kind of greening processes as the city or region of this initiative, benchmarks may be compared.

II.2.6. Orientation, Education and Training

An important component of any country, sub-regional or city project that are carried out using this Manual as a guide, is to ensure that adequate resources are put into the 'software' necessary to influence change. There are three broad streams to this:

- **Awareness-raising** through media interventions including advertising, short films and use of the internet; organised events ranging from large-scale public gatherings and conferences through to workshops, seminars, focus-group meetings, technical discussion with community leaders and professionals;
- **Education** over longer time-periods in regular schools, 'adult education' and ad hoc education in the context of other social and community programmes;
- **Vocational training** for those who aspire to be involved in substantive work relevant to greening, including professionals, government employees, workers looking for regular employment, householders and others who will carry skills into the community and home to accomplish greening tasks in the context of everyday life.

These are not altogether separate activities but overlap and, above all, can be made to synergise in the context of **campaigns** and a general atmosphere created to engender commitment to the changes in general that move consumption away from uninformed and deleterious dimensions of current lifestyles and related productive processes. Greening the built environment presupposes a range of knowledge and expertise necessary to undertake the work.

However, preceding this, as has been analysed in various places in this Manual, there is an important task of raising general awareness and commitment in a wide range of stakeholders from ordinary citizens, through decision-makers to professionals and thence workers in many fields. Although the ILO is unlikely to take the lead on all aspects of awareness-raising, the organisation nevertheless has considerable experience, including the on-going activities of the Turin Training Centre. This experience, expertise and resource should be brought to bear in city greening projects and programmes in which the ILO is involved.

The Terms of Reference of ILO involvement in stage two of city greening initiatives should thus include a component that defines its role in awareness-raising, education and training. Possible involvement could be:

- **Raising awareness amongst other project participants** about the importance of employment in city greening projects and components;
- **Continuation of work with the focus groups** formed during stage one that remain relevant in stage two to motivate them to play a substantive role in project execution;
- **Production of information and education materials** in cooperation with other project proponents to orient understanding amongst the broader population of the importance of city greening initiatives, contributing with the labour dimension;
- **Analysis of the training needs of workers** – from the professions to the particular trades – that will need to be satisfied as a basis for ensuring rapid and efficient progress in the initiatives for which finance has been secured and which other project proponents will be responsible for implementing.

The ILO will have an important task in the implementation of training programmes. Terms of Reference for stage two should thus identify local training institutions and other potential training agents, such as professional associations, that will contribute to the necessary training. Studies during stage one should have already identified areas where training will be necessary.

In stage two, ILO resources should be made available to advise the training institution about needs and provide training of trainers. The result will be courses and programmes that will produce the necessary aware, motivated and skilled workforce. Depending on the particular components selected to initiate stage two, the approach and structure of the training could be significantly different. To take **three examples**:

1. A comprehensive programme to change from 'conventional' to sustainable sanitation presupposes:

- Awareness-raising and information programmes for policy-makers;
- Awareness-raising and technical training for mid-career and graduating sanitary engineers;
- Technical information for would-be entrepreneurs who will produce and supply components;
- Skills training for workers, who will build, install and maintain the systems.

2. Programmes of resource recovery presuppose:

- Stimulation of householders to engage in more effective approaches to resource recovery;
- Stimulation of the local authority to improve the collection and marketing of resource recovery;
- Stimulation of the private and voluntary sectors to enter into new market arrangements;
- Education and training amongst workers involved in resource recovery.

3. A programme to retrofit the existing housing stock presupposes:

- Stimulating the local authority to produce a coherent programme or, where this is already in place, to ensure that municipal staff have the skills necessary to play their part;
- Ensuring that the skills required by the programme are available at the time they are required.

Stage one of the project should have identified the role of the ILO. Collaboration with other project proponents should produce an efficient division of labour and the Terms of Reference for stage two provide details of the resources and time table for the execution of ILO responsibilities.

II.2.7. Monitoring and Evaluation

Many programme and project Terms of Reference include a stipulation that monitoring should be undertaken during the activities and evaluation take place at suitable times – often mid-term, at the close of the programme and an ex-post evaluation sometime after the end of the programme. In practice this is often inadequately followed and here it should be stressed that the ILO include these in the Terms of Reference of any initiatives in greening the built environment that grow out of this Manual.

At a minimum, **regular self-monitoring** of the initiative with reports to the ILO office must be prepared. However, it is extremely valuable to carry out monitoring with the involvement of selected stakeholders actively involved in the project or programme. This may be

organised ad hoc or formally involving the Steering Committee, the Secretariat and particular beneficiaries of the project components down to the community level. The Evaluation Unit of the ILO should be approached for further guidance.

Whilst it is not deemed to be appropriate to define in any detail the content of monitoring or evaluation reports, the ILO should be mindful of key questions that need to be answered and the indicators around which these revolve, adapted to the particular initiative and ensuring that the participatory approach is consistently followed. **Monitoring and evaluation can usefully be linked to benchmarking**, using some of the same indicators.

II.2.8. Replication

Whilst the recommendation above is that the ILO carry out an initiative only in one city (unless there are adequate resources for more than one), there will be scope for many more such initiatives both by the ILO and by other organizations in later years. Depending on the success of a given initiative, the ILO could undertake to promote the approach in other cities. It should then carry out national workshops to discuss the approach and/or contact national agencies (either government or municipal associations) to adopt the procedure, publish local guidelines and promote the approach amongst other local governments. Where ILO country offices have undertaken the initiative, the experience might also be transmitted to other regional and country offices through informal discussions or more formally through the production of documentation based on the experience and evaluation.

APPENDIXES

- **Appendix 1: Government Support for Greening the Built Environment**
- **Appendix 2: Financing Initiatives**

APPENDIX 1:

Government Support for Greening the Built Environment



The Appendixes supplement information provided in Section 1.2.



The creation of jobs in greening the built environment will not happen unless there are changes in policies and programmes of governments as well as in the behaviour of consumers, builders, architects and other private persons and interests. There are many initiatives that can be taken by governments, some requiring no more than legislation and others involving incentives, fiscal and/or financial measures. It is not the remit of the ILO to advise governments directly in this respect. although the ILO can act with others – indeed via many of the initiatives set out in this Manual – to influence governments towards greater support of greening policies and programmes.

It should be evident from the discussion in the main text that there are many different kinds of initiatives that need to be undertaken in order to green the built environment and whilst these need to be coordinated, different approaches with respect to planning and execution will be necessary for each sector of intervention. Discrete institutional frameworks – in many cases already existing but requiring reorientation – will be necessary to plan these in detail and to organise implementation. The establishment on a ‘**Greening Agency**’ is proposed. The main function of the Greening Agency will be to provide overall guidance, to motivate the actors responsible for each of the components and, above all, to ensure coordination and synergy between the parts under the overall vision and strategy of the Agency, regularly revised and updated.

In general, the Agency will not be in a position to direct other agencies and nor will it undertake major actions itself, leaving these, rather, to existing municipal departments or other agencies, sometimes reformed, reorganised or where necessary newly created. It should nevertheless have sufficient resources to undertake planning activities and organise workshops, fora, teach-ins, seminars, various means of information dissemination through close contact with the media and even short training courses and other means to motivate all manner of stakeholders, institutions and ordinary citizens to become involved and take appropriate actions.

How this – and the major activities of the executing institutions – might be financed is discussed in Appendix 2. Here we do not again go through the complete list of possible components – departments authorities, agencies and so on that will play an executing role. While there are many areas in which governments in general and Greening Agencies in particular could focus and operate, examples of sectors are given in the present Appendix. Before doing so, the Appendix will present a general analysis of planning, which has implications to all sectors.

Green Land Use Planning

In the middle decades of the 20th Century, land use planning had in many countries a sense of purpose and an overall concept of how development should be organised across the territory. However, over time this visionary and strategic thinking declined, especially following the move after 1980 into a more liberal political regime. As discussed earlier in this Manual, certain debates continued into the configurations, at least from the point of view of reducing energy use, into which urban form might be steered and small projects – in ‘smart growth’ and some municipal initiatives – were undertaken. However, overwhelmingly, the trend everywhere has been towards a random dispersal of development and in general suburbanisation to the point in many sub-regions of the world where ‘urban’ describes almost the whole landscape over very wide territories with pockets of ‘rural’ between.

Box 7. Greening Land Use Planning

Greening urban regions over the coming years will potentially require radical new approaches to the organisation of urban functions over the territory. The following considerations might be expected to enter the arena:

Sub-regional energy balances (city of Toronto) and material-flow analysis (the city of Vienna has long worked with this tool) are needed as basic background to formulating measures to reduce the need for energy and materials and to explore how these might be more locally sourced.

With the changes in the structure of sub-regional economies and land-use configurations that can be expected, as noted below, which should be pro-actively planned, explicit analysis of the labour circumstances that will inevitably accompany these changes should be undertaken with a view to smoothing the passage to the new economies and providing decent work in the construction and industrial sectors.

More concerted analysis is needed to systematically reduce work journeys by introducing short-term measures (as in Holland: enterprise work-journey reduction plans) and in the longer-term reorganisation of land-uses.

Dormitory suburban developments (and indeed large inner city social housing developments) need to be examined for possibilities of consolidation into multifunctional entities (towns and urban quarters). Long-term plans should then be formulated to encourage these to happen.

Where sub-regional transport authorities exist, they usually cooperate closely with land-use planning agencies. Where this is not the case, this will become more important in the future as land-use decisions such as the above take on a greater importance, resulting in major changes in spatial distribution of activities.

The return of food production to peri-urban areas to supply sub-regional needs, and the development of urban agriculture, should be steered as an important component of sub-regional planning.

In the longer-term we might expect increasing global energy depletion and/or policies to mitigate global warming to have increasingly powerful impacts on all aspects of urban life with multifarious implications for land-use planning.

Many sub-regions in Europe have initiated the process of seeking to develop renewable energy sources: this should become an important pillar of all sub-regional planning initiatives and take on more urgency than in the past.

The decline of economic globalisation that might be expected with energy depletion suggests changes in the structure of local economies where once again more is locally produced rather than imported. Although it is currently unclear the direction this will take in the coming decades, sub-regional land-use planning should cooperate closely with LED initiatives to assist in distributing work-places so that these are closer to the homes of workers.

In southern cities and regions, although there are notable exceptions (the city of Curitiba in Brazil, planning via the Research and Urban Planning Institute of Curitiba – IPPUC, has been used as a benchmark for other cities across that continent with respect to far-sighted and effective land use planning), on the whole land use planning has been singularly ineffective in guiding the morphology and spread of cities. Major new efforts are necessary in order to improve past experience in the light of the urgent need to green urban sub-regions through land use management, related to the other issues discussed below. City twinning between European and southern cities aimed at making these improvements should be strongly promoted.

The spread of cities into the surrounding countryside has also been a feature in the South, often as rural populations no longer urbanise but informally construct new peri-urban settlements and ribbon developments along highways that are connected and increasingly dependent on motorised transport to link them into regional economies. Appropriate solutions should be sought for combating dependence on motorised transport systems and increasing local self-reliance of these new communities.

If meaningful efforts are to go into greening the built environment, then land use planning at the city and sub-regional scale will have to revive more visionary and comprehensive thinking and convert this into long-term strategies for reducing negative environmental impacts and especially automobile dependency. Where in some countries land use planning was at one stage an important function of local governments, almost everywhere this has become reduced to control of developments at a very local level with minimal attention to wider strategic issues. The Greening Agency should, in this respect, motivate local governments to return to more strategic thinking with regard to their land-use planning responsibilities.

In numbers of cities and city-regions around the world there already exist planning organs – institutes, agencies, etc. – that involve more than one local government and undertake some kind of participatory (albeit usually little more than consultative) processes. In many European countries this is organised through ‘inter-municipal cooperation’ where municipalities join together to form a planning (and sometimes transport and/or water supply and sanitation) agency or authority⁴⁷ These will need to adopt a new orientation that needs to be conceptually more ambitious – or we might say more urgent – in its green thinking and planning. And where such institutions do not already exist, the Greening Agency should press for their creation. It is particularly important that the boundaries of the planning entity include not just the contiguous built-up area of a city but also substantial hinterlands that can be included in consideration of energy and transport planning and especially sanitation and UPA and where the looming problems of unviable automobile dependent suburbs can be effectively addressed.

Sectors

Urban Transport Systems

In most countries, urban transport policies and investments are overwhelmingly determined by local authorities – although when significant investment is called for as with urban rail systems, the central government will have a strong say in what is to be built. There is, therefore, scope for central governments to influence choices both through the adoption of definite policies and legislation but particularly by making funds available. Hitherto, almost everywhere, there has been a bias in transport funding towards the construction of roads which have become a significant budget item in southern countries.

In the spirit of the World Bank quotation at the outset of this Manual concerning a ‘gross misallocation of capital’, greening national economies should include significantly a redirection of transport funding from roads to urban public transport systems. This would open the space and encourage local governments to formulate plans for city-wide public transport systems that would have a major positive impact on lowering pollution and raising (energy) efficiency standards. As noted above, the employment implications can only be realistically studied in the context of particular city plans and projects.

Greening the Transport System

Cities generally possess a transport department and public transport is run either directly or by a separate company. The local authority is always responsible for transport planning and regulation of traffic and, in the South, regulation of less formal public transport systems (albeit often poorly regulated). Throughout Europe and in many other larger cities around the world, the formal public transport system is now run by a sub-regional transport authority or undertaking

⁴⁷ This is particularly true in France and Germany where cities have long overflowed their historic municipal boundaries but there has been no consolidation of municipalities. See: Hulst, R, and van Montfort, A. (Eds)(2007) *Inter-Municipal Cooperation in Europe*. Springer, Dordrecht.

Box 8. Greening the Sub-Regional Transport System

In Europe, urban transport planning has become increasingly green in the sense of restricting car access to and use in the cities, encouraging walking and cycling, extending and improving the efficiency, convenience and image of public transport. These policies should continue and be increasingly tightened. Where these policies are not in place or only weakly developed – particularly in southern cities – steps should be taken to introduce them. City twinning (eg Zürich with Kunming) should be proactive.

Urban transport undertakings, and with them transport planning, should be organised on a sub-regional basis and where this is not yet the case, the Greening Agency should actively seek to promote the institutionalisation of sub-regional transport undertakings and authorities. Currently such undertakings are usually only responsible for operating the public transport systems. However, urban policies concerned to reduce car use should be extended across whole sub-regions, closely allied to public transport improvements and land use planning in suburban areas described above.

There will be considerable refocusing of transport infrastructure in implementing the above policies, with substantial employment implications of redeployment and in construction that need to be considered from the outset as an integral dimension of planning.

In the case of southern cities throughout Latin America, Asia and Africa, whilst private car use is lower than in the OECD countries, the transport systems have serious problems of congestion (inefficiency) and pollution, particularly caused by large informal and semi-formal 'public' transport sectors. In Latin America some improvements have been made particularly with the introduction of bus rapid transit (BRT) systems. Already this has impacted employment through reduction in micro-bus and related forms of transport, but in many cities informal transport is an important source of employment and income. Whilst restrictions on private cars (and eventually also motorcycles/mopeds) will encourage more use of public modes that in principle have positive employment implications, the net result of these changes in terms of employment may be negative or positive. Hence policies and planning to restrict private and improve public transport modes in green directions should be monitored and closely linked to measures to protect and increase employment.

Many southern cities, in spite of high levels of walking as the means for the poorer sections of the community to move around, suffer from a lack of even the most basic consideration of convenience for pedestrians. With a very few notable exceptions, nothing is done to encourage cycling. This needs urgently to be rectified in a strong focus on encouraging non-motorised means of movement and the provision of related infrastructure. This should also have positive employment implications.

that has responsibility not only within the city boundaries but also into the surrounding territories. Sometimes it also takes a number of other towns and even more than one city under its responsibility with traffic regulation remaining within the participating local governments.

The responsibility of the Greening Agency here will be to study means across the whole transport system to reduce car use, improve the coordination, routing and quality of public transport s and to coordinate with the promotion of non-motorised transport (e.g. walking and cycling). The movement of goods in the city will also need to come under scrutiny with a view to changes that will improve environmental efficiency. In many cities, particularly in the South, this will call for institutional changes to bring all forms of transport into a single planning and decision-making framework. This should include increasing participatory methods in the planning and decision-making of the resulting institution.

Urban Energy Systems

The national potential for urban CHP, geothermal and inertial supplied heat networks needs to be developed. This will include evaluation of the electricity supply system to (re)build urban power stations with a potential to use renewable fuels. It will need a national survey of geothermal heat potential (where heat near the surface is accessible and of a quality that can be utilised over at least the medium-term). And settlements near large water bodies should be evaluated for the possibility to use the temperature inertia of the water to supply heat-pumps in buildings throughout the settlement to halve the amount of energy used for heating and cooling across the year.

Besides the nation-wide study component, a selection of settlements will need to be taken to indicate practical dimensions of how such systems could be developed. Such studies should clarify the national potential for energy-saving. They should also calculate the employment implications of the national and local dimensions of typical urban projects and point to needs for investment and training. The national governments need to have an interest and parliaments must be prepared to pass legislation to promote the systems as recommended by the analysis.

Energy Provision and Energy Management

In the first part of this Manual, much has been made of the need, where these do not yet exist to install urban district and urban-wide heating and/or cooling networks. The source of energy may be from CHP stations – eventually, as common in Sweden, heating plants supplied by biofuels – or geothermal energy sources. A further alternative is the construction of distribution systems for cold water from local lakes that can be used in conjunction with heat pumps to halve the demand on energy for heating and cooling in urban areas. There is also the possibility of tapping renewable sources in peri-urban areas that might include wind and sea energy (tidal and wave sources and even OTEC) as well as biofuels.

Until the exploitation of fossil fuels came to dominate global energy consumption, biofuels were the main source of energy for all purposes and even today supply 11 per cent of global energy. In southern towns and even cities in some countries – especially in Africa and South Asia – it is still the dominant source of energy supply. It was mentioned under the heading of land-use planning that an essential background tool for planning is the construction and continual updating of an energy balance for urban sub-regions. This, however, needs to be related to some institutional framework that can make effective use of the information.

Energy supply to the built environment, whilst vital to its functioning, is generally highly fragmented in terms of suppliers, being marketed by different utilities or companies that sell petrol, heating fuels, electricity and in southern cities, charcoal and other biofuels. In the 1970s and early 80s, in the context of the then ‘energy crisis’, many European cities and sub-regions, and a few in other countries, established energy planning departments and began to provide advice and some support for energy initiatives, particularly to assist households to bring down their energy bills through house insulation and related measures. In the United States, sub-regional energy regulatory agencies introduced mechanisms to encourage utilities to finance house insulation rather than building new supply facilities.

This interest diminished when energy prices fell again in the late 1980s and we are left with few municipalities having retained their energy departments. In cities that still have significant energy supply functions – particularly in Germany and Scandinavia – municipalities continue to possess public energy utilities that supply electricity, heat and occasionally other fuels to households and building owners (in some cases these have been privatised). From this starting point, the following box outlines steps towards greening the energy economies for the built environment.

Sustainable Sanitation

Enough is known about the potential benefits of changing urban sanitation systems into sustainable sanitation systems and yet this has made very little headway in ‘conventional’ sanitation circles. That is to say that the sanitation engineering profession, national government agencies and sanitation utilities need a basic reorientation that will start the process of up-scaling. Two prongs are needed here: (a) research programmes about the reintroduction of sewage farming, together with the local processing of wastewater and separate collection

Box 9. Components of a Green Energy Future for the Built Environment

Where municipal energy departments were abandoned in the latter years of the 20th Century, the Greening Agencies should promote their revival and elsewhere their establishment. As with land-use planning and transport, energy departments might be extended to sub-regions and constituted as arms-length agencies or authorities with a participatory mode of representation and planning (in Helsinki, the municipal energy company performs wide-ranging local energy functions and maintains strong links in its decision-making with civil society).

It is clear from many studies undertaken over past years with the aim of pursuing improved energy management and the various dimensions of action that there are clear employment gains to be made. As a central part of their promotion of energy management, Greening Agencies should commission research into the employment implications of the various dimensions, including both general demand for workers and skills requirements.

A key policy to be pursued by sub-regional energy utilities should be to increase the proportion of energy supplied from renewable sources, especially from within the sub-region but also contracting from other regions that possess better potential for the development of renewable energy resources but with less internal energy demand.

As utilities have a tendency to promote sales, it is advisable to de-link supply from regulation, promotion of energy conservation and reduction in demand, establishing a separate institution. This institution would possibly remain a local government function as distinct from energy supply – with a remit to influence or direct energy utilities to seek efficient solutions to supply and also to advise users on how to reduce energy, including the retrofitting of buildings. Regulators should ensure transparency of utility activities and encourage public awareness and participation in policy formulation and on-going activity.

The foregoing sections of this Manual have focused much attention on the reduction in energy use in buildings and this task should be taken on by the energy regulatory body of the municipalities. These could promote the establishment of local Green Building Councils and furthermore raise building standards and controls to the levels of certification set by the national Green Building Councils. However, they should focus their main resources on retrofitting, carrying out studies analysing the current level of building energy use and state of energy conservation and devising programmes for retrofitting the entire building stock over a limited time span.

A few studies have been carried out in southern cities – especially financed by the European Commission and with the long-standing World Bank ESMAP programme – that set out ways in which energy management and conservation and the introduction of renewables might be managed there. This work should be disseminated more widely and built upon in the establishment of southern urban sub-regional energy agencies.

The possibilities for establishing energy supply utilities as sub-regional agencies will need to be investigated, promoted by sub-regional Greening Agencies. The financing and generally the organisation of heating and cooling networks will be unrealistic in most southern cities but should nevertheless be seriously studied and where applicable, developed.

Energy conservation in buildings in the South should be promoted in the formal building sector also through the establishment of local chapters of the national Green Building Councils. But effective retrofitting initiatives should also be undertaken.

In southern cities, special programmes will need to focus on informal housing to investigate realistic possibilities for improved energy management and conservation, connected directly with existing urban community upgrading programmes (see below).

and processing of human waste in conjunction with UPA; and (b) the adoption by national governments and institutions of policy, institutional and programme changes related to sustainable sanitation. At the same time, awareness of the general public needs to be raised to understand what is at stake and what their role will be in realising sustainable sanitation at the level of the household and in the development of UPA in the urban interstices. A reorientation of national investments and financing mechanisms will be necessary to realise sustainable sanitation systems.

Sustainable Sanitation Programmes

In the past, urban sanitation was green but unhygienic. Today's sewage management systems are sanitary but very un-green. Earlier in this Manual the story was told of how the transformation came to be. In future what must be sought is arrangements that are, indeed, sanitary

Box 10. Implementing Urban Sustainable Sanitation Systems

The initial work of Greening Agencies related to sustainable sanitation will be to motivate and perhaps finance the initiation of research both into the general question of local treatments of separated human waste and wastewater and into the logistics in the particular city where they are active, of handling and delivering the treated product to local urban and peri-urban agriculture.

In northern countries we can expect existing wastewater management utilities (usually one with, or closely associated with, water supply undertakings) to play an important role in the transition to sustainable sanitation. The first issue along the road to conversion will be for the Greening Agencies – or particular members – to convince the utilities of the need to change their fundamental philosophy of disposal to one of re-use of sewage. In some cities wastewater utilities already have links with academic institutions that can assist with research and thus links must be strengthened, or newly forged, and action-research projects initiated.

Once the utility has agreed to manage the transition, it will need to produce a plan including short-term actions, long-term objectives and the stages through which these are to be reached.

The utility may agree to undertake initiatives to implement sewage farming in the vicinity of existing sewage treatment plants. This would review past histories and start with pilot projects based on research into the possibility of using wastewater with amended treatment to remove the possibilities of contamination of crops grown using the waste.

Campaigns in local media and via relevant events will need to be organised to prepare the general public. Detailed collaboration with UPA initiatives will be needed to prepare the ground for the transition.

With little doubt, implementation of local UPA-connected wastewater management projects in northern cities and urban sub-regions, based on initial research, will begin with pilot projects. These can be expected to select existing urban or peri-urban agricultural initiatives and to organise neighbouring households to collect and deliver source-separated human waste and grey water for treatment. This will require investments to be made at the household level to facilitate source separation and storage and at the UPA site for treatment facilities. The potential sources of this finance are discussed further below.

In southern cities where human waste treatment is rudimentary or non-existent (almost universally the case in informal settlements) the Greening Agency will itself need to commission local research or to do this with the municipality where there is already an effective institution responsible for sanitation (which may be a health department).

This research will need to be undertaken to study both formal areas of the city and informal settlements and identify mechanisms that might be effective in organising the collection of human waste (separated urine and faeces) and grey water, appropriate means of treatment and application to areas where urban farming is already taking place or can be adopted for this purpose. This might at the same time consider collection of food and other organic wastes that can be used as animal feed and for composting in the context of UPA.

The Greening Agency will need to explore the issue of institution-building in close collaboration with the local authority (or over a sub-region several local authorities) and relevant members organisations of the Greening Agency itself. Effective institutional arrangements should be brought into being in parallel with pilot projects that demonstrate the possibilities.

In both North and South, the implementation of sustainable sanitation may be expected to generate substantial employment. To some extent this will be 'conventional' kinds of work at both design and implementation levels. However, the new approach generally will require a reorientation of attitudes and in some cases skills with knowledge of the health implications of what is being done. Relevant awareness-raising and training programmes will be necessary as described further below. The Greening Agency should commission relevant studies to be undertaken.

but also green and hence sustainable, recycling nutrients into agricultural production. Sustainable Sanitation pilot projects have been carried out, mainly in rural areas (as described earlier, in India much has been achieved) but few 'modern' projects that demonstrate what can be done in denser urban settings have been undertaken. The issue in the future will be to transform technologies and with them institutional arrangements to scale up sustainable sanitation arrangements to complete urban nutrient-recovery systems, closely linked to the development of urban and peri-urban agriculture.

Currently in the North, urban sanitation systems are based on sewer networks that take human waste and grey water by gravity and with pumping stations from individual houses and other buildings, to sewage treatment facilities on the edges of cities. Town and village networks may be linked to rural areas, all ending in sewage treatment plants that improve

water quality before returning it to rivers or the sea, disposing of the sludge through incineration or landfilling. If the sewage is to be retained in towns and cities for use in fertilising urban agriculture then eventually the extensive existing sewer networks will continue to be used only in limited areas.

How will the sewage be collected and treated within the cities to avoid the possibility of health risks? That urine, faeces and grey water should be collected separately is a basic tenet of sustainable sanitation. Attempts to keep these separate and treat them locally for use in urban agriculture is an area yet requiring extensive research that has a general dimension (techniques) but will also have an essential local dimension concerned with the availability of land to accommodate treatment and adjacent agriculture.

In cities of the South usually only rudimentary sewer systems exist and even where there are sewage treatment plants, few of these function on more than a sporadic basis. Human waste is poorly treated and enters the environment as pollution which presents a constant health hazard to the citizenry. Here it may well be that sustainable sanitation as a new approach will present the solution to wastewater management that hitherto has eluded urban authorities. However, what is clear, is that the citizenry as a whole will need to be educated in the new system, as it is unfamiliar already at the household level, and it is expected in the future to be linked in with the growth of UPA. The links have yet to be made in terms of citizen knowledge and technical and institutional arrangements. The following box outlines the main stages through which efforts need to be made to realise the ambition of widespread adoption and implementation of sustainable sanitation.

Urban and Peri-Urban Agriculture

Here also national governments including (and particularly) agricultural ministries in collaboration with other relevant ministries and agencies at the national level need to be appraised of the possibilities and then to disseminate information on the wide variety of techniques of urban agriculture that have been developed around the world. From here, a legislative framework and finance for research is needed to promote and facilitate local initiative. Whilst different approaches in different countries that build on local practice will be required, experiences from elsewhere can also add value and should be an integral part of studies undertaken to prime the actors at national level to focus on what is possible and promote the widest range of initiatives. Insofar as the ILO participates in this effort, the employment implications and the need to ensure decent work approaches must be added to the concerns for good ecological and environmental practice. There is no essential difference that is not a matter of adaptation to local culture between promotion of UPA in northern and southern cities.

Progressing Urban and Peri-Urban Agriculture

Earlier in this Manual it was pointed out that UPA is developing rapidly in both North and South. Most of this activity is spontaneous as individual initiative or, increasingly through groups of citizens organised through non-government and community-based organisations. The Japanese case was discussed earlier, where the cooperative movement has played an important role in helping local groups to organise themselves. Gradually local authorities are realising the importance of UPA as a food security strategy and for a variety of other reasons. Here the case of China is instructive where already in the 1960s the boundaries of the larger cities were extended explicitly to give the municipalities powers to manage food supply to the urban populations in situations of severe food shortages. The policy has persisted and extended, in the case of Beijing to include UPA as an education and recreational initiative, with a broadening out of the range of produce supplied. This is an extreme in terms of

Box 11. Extending Initiatives in Urban and Peri-Urban Agriculture

The Greening Agency should receive, at its founding, information on UPA initiatives across the city. It should seek to contact those responsible for the initiatives insofar as they are organised into some kind of institution, and also be aware of those that are simple lone enterprises and individual private initiatives (allotments).

If the municipality already has a department responsible for UPA, the Greening Agency should enter into discussions to coordinate their activities with other greening initiatives, particularly regarding sustainable sanitation. The goal is to promote, where appropriate, accelerated activity in the area of UPA.

In the case of peri-urban agriculture, it is likely that the Ministry of Agriculture has initiatives such as extension services, facilitating loans for machinery and materials and possibly other initiatives it is implementing in the urban sub-region. And besides individual peri-urban farmers, private enterprises may be involved in agriculture to serve local or external markets.

As there is no one model for the organisation of UPA, once the Greening Agency has information on what already exists, where this is as yet weakly organised, it should assist all current actors and prospective new entrants to build their organisational capacity. It should also tie the UPA activities into the revised land-use planning system to ensure that UPA is promoted.

Technical aspects of UPA should be left to the actors themselves to organise; including development of techniques and extension services as well as marketing mechanisms from markets through existing shops to CSA 'box' systems.

centralised management; elsewhere we can expect more complex modes of promotion and coordination.

Promoting UPA should be an important dimension of the Greening Agencies. This must start from what has so far been achieved. Research should be carried out into the different ways in which UPA has been organised and seek to build a robust institutional framework for the further development of initiatives. Where relevant, also bringing information on initiatives in other cities that might be propagated in the sub-region in question. The following box outlines some directions that could help to promote UPA further in urban sub-regions around the world.

Retrofitting the Existing Building Stock within a Short Timeframe

Reference has already been made above in the context of local energy planning and management of the need to focus urgent attention on retrofitting the existing building stock. The main text above dwelt at some length on this issue, as efforts since the oil shocks of the 1970s have fallen far short of achieving the level of greening that can be deemed satisfactory, particularly in terms of reducing the energy demand of buildings – or seen another way, ensuring reasonable comfort standards in a situation of rising energy prices and reducing availability in the coming decades.

It was also noted that traditionally, going back eighty years ago and for centuries prior to this, buildings were constructed in ways that did not stress resource use and required little energy to achieve reasonably comfortable living standards, simply because little energy was available. Re-learning the wisdom embodied in vernacular building should be seen as a priority for new buildings and a model for retrofitting the older building stock. The following box outlines how the Greening Agency might go about assisting in the structuring of an effective and rapid retrofitting programme for the entire building stock.

Box 12. Retrofitting the Building Stock and Learning from the Vernacular

The main focus of the energy initiatives promoted by the Greening Agencies will be to secure green energy supply and to regulate municipal supply undertakings, ensuring transparency and adequate access of civil society to the decision-making processes. Nevertheless, a distinct programme should be established to effect the retrofitting of the existing building stock to achieve high standards of energy efficiency and other environmental standards.

The Greening Agency should investigate and document the achievements of any earlier or possibly on-going programmes aimed at retrofitting existing buildings, including national or international programmes subsidising householders to contract relevant work, local authority promotion programmes, etc.

Studies should be commissioned by the Greening Agency to propose different approaches to greening the entire sub-regional building stock. These will need to analyse various measures that can be taken, their cost and payback. The employment generation dynamic and possible skills development needs should be analysed.

Either incorporated into the above studies or as a separate initiative by the Greening Agency (or the energy regulatory institution), information should be gathered and disseminated through published documents and the local media concerning vernacular approaches to living. The intention will be to assist in raising thinking about appropriate lifestyles under conditions where fossil fuels are expensive and in short supply.

On the other hand, conventional retrofitting programmes involving building insulation, weather-proofing and improving the performance of appliances should be the main thrust of work to be done. Added to this, consideration should be given to the possibilities for investments made across the entire building stock in green technologies including ventilation heat exchangers, solar water heating and photovoltaic electricity production together with heat pumps to lower energy use in heating – possibly associated with urban inertial temperature water circulation networks.

Approaches to implement sub-region-wide retrofitting programmes should be disseminated by the Greening Agency and events held in particular neighbourhoods (the 'morphologically consistent areas' that might have been determined at the information-collection stage of the initiative) with the aim of obtaining community agreement on the approach to be taken. Local committees should be established to oversee the retrofitting of all buildings in each neighbourhood and community contracting considered as a possible approach to carrying out the work.

The programme will need to be externally financed, conceived of, as with urban infrastructure investments generally, as a necessary component of the maintenance and operation of the city.

The sub-regional energy regulatory body should monitor progress and the quality of the work done and ensure that the costs do not become inflated as a consequence of accelerated activities and temporary market bottlenecks for materials.

Contextual Initiatives at the National Level

The ILO already has some experience on the job-creation potential of greening particular sectors in particular countries⁴⁸. Future studies need to add to the research dimension, participatory methods that engage – possibly over a longer period of time – with stakeholders relevant to the sectors. This would be for instance in the case of sustainable sanitation: the relevant ministries, engineering associations, research institutions and a selection of local governments. The participatory methodology is discussed further below in the context of integrated city initiatives.

In the national case, this would include: (a) background materials for individual stakeholder groups; (b) seminars/training workshops to transmit knowledge and messages about the sectors in question; and (c) a focus on why given sectors should be given substantially more support including legislation and finance. Hence, whilst an important focus must be on labour issues, these initiatives should seek to promote acceptance and adoption of the sector policies and programmes and aim to influence the realignment of capital suggested as being necessary by the World Bank to green the built environment.

⁴⁸ See: MOHRSS (2010) *Research Summaries and Pilot Project Introductions*. Green Jobs in China Project, ILO Office for China and Mongolia, Beijing. There are also other ILO studies, noted in previous footnotes in this Manual.

It should again be stressed that sectoral studies should be seen as promoting sectors which broad, strategic studies are not able adequately to influence. Where 'greening the built environment' is concerned, ILO offices should focus on initiatives that integrate the different sectors into holistic approaches to the problematic of greening human settlements. As noted, individual city initiatives will be important. But a national level initiative is crucial to give impetus to rethinking the territorial arrangement of settlements together with their internal morphology, aiming at national programmes that will provide a framework for individual city long-term strategies and programmes.

APPENDIX 2: Financing Initiatives

Reference has been made in various places in the Manual to the issue of financing programmes to green the built environment actions. In some cases, such as the construction of city-wide BRT systems or heating networks and associated plant, it is clear that large-scale finance will be necessary. In other cases such as UPA or retrofitting buildings including installation of solar equipment, the assumption has been that this is a matter for householders or enterprises but not one where large scale finance will be applied. It should be emphasised that this is a question of inertia in thinking about these issues rather than in some way a 'natural' division.

In the frame of reference implied by the World Bank notion of a 'gross misallocation of capital', it is necessary to reconsider how far major capital injections might be spread in undertaking coherent, city and sub-regional greening programmes. In the first instance the apparent lack of finance inhibits even starting to plan more concerted programmes. Confidence needs to be raised throughout cities (both in the North and South) that finance is potentially available for all manner of greening projects and programmes that are well-formulated.

It may be said that, of course, a rich city such as Geneva can undertake the rebuilding of its tram system, powered by electricity generated from a hydro power station located inside the city and then go on to install a city-wide inertial heating system with heat pumps (because it is a rich city). However, this is given the lie by such initiatives as the building of major BRT systems in very short time spans in cities as diverse as Bogota and Jakarta that are by no means rich cities. A wide range of greening programmes have been undertaken in southern cities. For example, the installation of solar water heating equipment in houses of the poor in South Africa and Brazil and the many installations of sustainable sanitation in Indian towns, indicate the possibilities where there is will.

There is no fundamental reason either technical or financial, that such programmes cannot be incorporated into comprehensive programmes of building retrofitting and then progressively scaled up, financed as any other major infrastructure project. The fact is that governments everywhere have been all too happy to finance roads to accommodate more cars and trucks (and fail to invest in environmentally more sound means of transport) because this benefits powerful industries and satisfies the public desire to drive. A reorientation of capital flows means changing the direction of investment and preparing financial institutions to be to fund green programmes.

To some extent, the ground has already been prepared in the massive growth taken place over the past few years in investment, for instance, in renewable energy technologies⁴⁹. The initiative taken by the Clinton Climate Initiative in drawing a number of international banks into arrangements to finance building retrofitting in 16 cities around the world also indicates the potential willingness of financial institutions to participate in greening programmes. In short, in principle, finance is available to move on many kinds of greening initiative.

The real issue is, as noted already, the political will. But it should also be added the institutional capacity at the national and particularly the local government and community level to organise what in most cases are complex programmes that can be very easily subject to mis-design and poor management.⁵⁰ It is for this reason that the emphasis throughout this

⁴⁹ ILO/UNEP op cit, Part 2, Chapter 1

⁵⁰ A recent case of mis-planning of what should have been an initiative to greatly improve urban transport was in Santiago, Chile where a massive change in the whole transport system was brought about on one day in February 2007, without adequate involvement of the public or testing of the components. This has been considered to have been negative and is still in process of sorting out.

Manual is on involvement of all major stakeholder groups including expertise to advise on programmes and the general public who will eventually be the recipients of the programmes.

Indeed, even whilst in principle large-scale finance may be available for most components to green the built environment, this should not be the exclusive approach to fund activities. Just as the broad citizenry should be informed of the initiative, educated in what is involved and how it affects them personally and then encouraged to participate in decisions with regard to what should be done and how, so also they should be required to participate financially in implementation. The World Bank has many decades of experience in approaches, for instance, to urban sanitation, where citizens have been the subject of 'social marketing' of connection to sewer systems that were unsuccessful. Many citizens were not convinced of the benefits and where the up-front costs were beyond their immediate means.

All initiatives have to be thought through and designed in terms of how much outside capital should be introduced, how much (central and local) government subsidies should be introduced and how householder commitment can be secured in terms both of immediate and overtime contributions. Overtime commitments are essential in the context of building a culture of ownership for new ways of action. Hence the public is prepared to spend time, effort and money to ensure that things work from day one and well into the future.

Insofar as citizens are directly involved in financing components or sub-components of the greening programme, then there is a wide range of formats according to which this can be done. Much has been made in recent years of micro-finance and this might have relevance, for instance, in financing urban farming or the household component of sustainable sanitation or solar energy systems. But there is also a wide range of community-organised forms of finance from credit unions to community funds, cooperative banking and local authority companies utilising local savings. In many European countries the latter can be found in the form of local or sub-regional banks. In the United States a wide range of local financing tools has developed over time and these examples can also be examined for their replicability.⁵¹

⁵¹ See: Schuman, M. (2000). *Going Local: Creating Self-Reliant Communities in a Global Age*. Routledge, New York.