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# Corridor Level Transit- Oriented Development Course

## Executive Summary

## Module 1: TOD as a strategy to achieve a sustainable city

### Introduction

The 21st century has become the century of the city: 2009 marked the first year in history that the majority of the world's population lived in urban areas, and cities throughout the world are expected to continue to expand rapidly throughout the course of this century. By 2030, it is projected that 5 billion people will live in the world's cities, with the majority of this urban growth occurring in developing nations in Asia and Africa. With such rapid urbanization, today's cities face great challenges that must be addressed in order to create a sustainable future. Cities can represent innovation and opportunity; however, cities can also house concentrated populations living in extreme poverty, and, with densely-packed populations, can be primary culprits in the creation of greenhouse gas (GHG) emissions.

Faced with such pressing problems, cities are uniquely positioned to be at the forefront of creating solutions to reduce the negative impacts of climate change and be at the epicenter of economic growth. There are many tools that cities can use to advance sustainability goals, address the problems of rapid urbanization and increase their social equity and economic competitiveness. In this course, we will focus on a particular strategy known as transit-oriented development, or TOD and on corridor level scale.

### Scope

Module one focuses on the concept of TOD and the potential benefits it can bring to a city. It delves into the root cause and interconnectedness of three pressing issues plaguing cities today: urban sprawl, rapid motorization, and high energy consumption. Using international examples and data, the module discusses how perverse initiatives such as road subsidies, large housing initiatives relegated to urban peripheries and an emphasis on personal vehicle ownership has led to sprawling suburbs. This problem has been compounded by increases in vehicle ownership, leading to congestion and pollution. A negative correlation between density and energy consumption is also drawn as is the higher economic cost of sprawl. The module also highlights the disproportionately higher cost of poor city development on the most economically vulnerable populations. The poor are often priced out of cities, forced to travel longer distances to get to work, and pay a higher percentage of their income on housing and transportation costs.

TOD is presented in this module as a transformative solution that addresses each of these problems. As a strategy, TOD encourages compact development and prioritizes public transit and active transport over personal vehicle ownership. Simply by building more compact, higher density cities and concentrating jobs, housing, services and amenities near public transit, cities consume less energy. The module provides the history of TOD, discussing both the historical context in which cities form naturally around a walkshed, and the re-emergence of the concept and term coined by Peter Calthorpe.

The module presents an overview of the implementation cycle of a TOD project, illustrating the actors, sectors, institutions and regulations that must be coordinated for a project. The module draws on lessons learned from the field and highlights common barriers to TOD.

### Conclusion

Cities facing the challenges of sprawl, rapid motorization, and wasteful energy consumptions, must avoid the common short-sighted approach of addressing these problems individually. Instead they must think of solutions that are holistic and comprehensive. After viewing module one, viewers will understand the

interlinkages of these problems and how adopting transit-oriented development strategies can work to overcome such challenges. The module provides viewers with a high-level understanding of the concept and complexity of TOD, providing the foundation to delve into the details laid out in later modules. It can be used as stand-alone presentation for audiences not familiar with the TOD concept.

## Module 2: TOD corridors

### Introduction

In areas just starting to build a transit network, choosing the right corridor to construct first can support the momentum for both transit and TOD. Corridor planning that incorporates a strategic, region-wide analysis of the impact of transit can use the identification of where the real estate market is or will likely be most active to shape the corridor, its influence areas, and the entire city. Existing transit lines can also benefit from corridor-level TOD planning, especially if there is a need for community revitalization or the connection of employment hubs and residential areas. Additionally, corridor-level TOD planning is often considered to be the most efficient way in which to carry out TOD planning; this can save stakeholders valuable time during project implementation. Yet planning of TOD is often only considered at the station area.

### Scope

The second module provides an explanation of why it is a good idea for a city to think about implementing TOD strategies at the corridor level. Advantages discussed include better stakeholder engagement; increased efficiency through prioritizing station phasing based on TOD readiness, improving economic development via economies of scale, and offering a wide angle lens to determine complementarity of characteristics such as densities, amenities, affordable housing and land use across the entire corridor. The module also classifies three distinct types of corridors – destination connectors, commuter corridors, and district circulators – and their implications for implementation.

Next, an overview of the common economic, social, and environmental objectives that cities hope to achieve through the creation of TOD corridors are discussed. Finally, specific examples of successful TOD corridor implementation from cities around the world are examined.

### Conclusion

The ultimate goal of module two is to make the case for why and how to apply TOD at the corridor scale, to unlock several benefits. When a corridor is implemented successfully, the transit system will serve to unite adjacent communities. Successful TOD corridors adapt to the context of each community, and are accessible to drivers and non-drivers alike. When local planners consider TOD at the corridor scale, they can enhance their understanding of how transit will influence the TOD, ridership, and market potential at each station. When planners only consider the station area, they can miss this important broader context.

## Module 3: The Building Blocks of TOD

### Introduction

Implementing a corridor-level TOD project is a long-term investment in time, capacity and money. It requires ongoing coordination of many, often disparate, groups of people from the public and private sector and civil society; creative financing and investment models; land assembly; analysis and adjustment

of existing institutional structures and regulations; evaluation of an array of supporting infrastructure; and implementation of strategies to protect vulnerable populations. Officers in charge of TOD projects must acknowledge the importance of each of these blocks and understand how they impact one another and fit together. This can be a daunting process which is often met with obstacles at every turn, especially when a project is first of its kind. However, challenges can be lessened when obstacles are identified early on.

## Scope

Module three provides a menu of options and tools which can help decision makers to begin thinking about all the ingredients necessary for corridor-level TOD project implementation. The tools are illustrated with examples based on case studies, with a focus on developing country cities. The following 6 building blocks are explored in module 3. Although design, finance, and affordable housing are also building blocks of TOD they are discussed in greater detail in later modules.

**Political leadership** is a key factor throughout TOD project implementation. Because TOD implementation is a long-term, transformative process, which generates disruptions and is inherently risky, political leadership is essential to managing the change process so that all stakeholders feel engaged, understand its importance to the future of the city, and have genuine outlets to participate.

**Institutional Structure:** TOD is, by definition, an interdisciplinary task. It requires the coordination, at the very least of the transportation and land use planning efforts. The nature of TOD projects also requires vertical coordination between different levels of government, from national agencies in charge of transportation and urban development programs and funding, to metropolitan agencies in some cities, and the local and neighborhood levels. It also requires the coordinated work of the public sector, private developers and funders and the community.

**Regulatory Environment:** Zoning and building codes can have an enormous impact on the shape of a city. TOD corridors are only possible when codes allow for mix-use, and higher densities near mass transit corridors. Many zoning codes are outdated, or have not been created in conjunction with transportation plans. For example, instead of requiring a minimum number of parking spots per apartment unit, codes may require a maximum number, and in this way, provide the right incentives to build less parking and switch from car to use public transportation use. However, designing and enforcing zoning and building codes, long-term and local plans cannot be left to only one sector. Instead, they must be crafted and implemented through an integrated planning effort to avoid undermining efforts.

**Stakeholder Engagement:** Inclusive TOD has, as a core value, the improvement of the quality of life of current and future residents—however, much of TOD planning and implementation relies on public and private institutions with little public participation, beyond the election of public officials. There is a need for public participation and stakeholder engagement to increase the inclusiveness of TOD and ensure that the beneficiaries' thoughts and inputs are being considered.

**Infrastructure:** TOD corridors need supporting infrastructure, starting with mass transit. TOD can be structured around BRTs or Metro systems. They also require non-motorized transportation infrastructure to encourage the use of active transportation: biking and walking. TOD encourages densification, which (unless the project area has excess capacity) in turn requires expanding/creating supporting horizontal infrastructure such as water, drainage and sanitation, and social infrastructure to accommodate the additional population living in the area.

**Land:** Land is often the most valuable asset a city possess to leverage TOD. It can be used strategically, and as a tool to place the different players on the same table. Many funding and financing tools covered

in this course can be used to harness land assets. Finally, given the variety of land-ownership regimes, diverse tools and cooperation between different entities is key to assemble land for TOD corridor projects.

## Conclusion

The objective of this Module is to present the elements, concepts and vocabulary that are required to look at TOD corridor projects as interdisciplinary strategies. Professionals coming from different sectoral spheres will better understand the perspectives and language of colleagues from other sectors and improve communication and coordination. The final goal is to open up the opportunity for multi-actor dialogue and cross-fertilization of ideas and more effective project implementation.

## Module 4: Design and urban planning components of TOD

### Introduction

As was discussed in module three, a TOD project is made up of several building blocks. However, it is not enough to simply assemble those building blocks together as they do not ensure social or economic vibrancy, characteristics which are at the core of successful TOD. Creating TOD corridors that are in high demand requires careful attention to design and urban planning. Unique local heritage, safe and inviting complete streets, mixed-use building design that engages the street, and networks of welcoming public and green spaces are just some of the design and urban planning components that must be factored in to TOD planning at a corridor level. Module four discusses nine design and urban planning components of TOD adapted from the World Resources Institute publication "TOD Guide for Urban Communities," with some new components added.

### Scope

The objective of this module is to introduce participants, particularly people without an urban design or architecture background, to a variety of design concepts that are central for successful TOD project implementation. After completing this module participants will be familiar with design and planning vocabulary commonly used in TOD projects, and will be able to utilize these concepts when designing and implementing TOD corridor projects.

Module four defines the following design and urban planning components and describes strategies for how they can be applied to a TOD project at the corridor and nodal level.

**Density:** Dense populations create the ridership numbers needed to sustain public transit financially, while mixed-use neighborhoods create demand that generates trips across a region. Higher concentrations of people establish the customer base needed for businesses and services to survive, and, with proper design, can encourage walking and biking, which can bring vibrancy to roads and public spaces.

**Quality public transit,** a cornerstone of TOD, is the provision of reliable, safe, affordable, and connected public transportation. Public transit can operate using many different forms, including rail, bus, BRT, LRT, or metro. A connected public transit network will ideally include an integrated mix of several transit technologies, with increasing multi-modal stations clustered in the urban core of city.

**Non-motorized transportation (NMT),** a fundamental concept of TOD, is a term that encompasses the modes of walking and bicycling. Most trips begin and end with walking or cycling, modes that conveniently bring people to mass transit. In order to encourage NMT, safe, connected, and inviting infrastructure must be provided.

**Vehicle demand management (VDM)**, is the application of strategies and policies to reduce or redistribute travel demand for private vehicles. Utilization of some of these concepts is also termed Transportation Demand Management, or TDM. Discouraging the use of private automobiles in the planning and design of a community gives priority to users of more sustainable means of transportation.

**Mixed-use development:** Well-designed mixed-use spaces can provide a diverse range of urban services for city residents that establish 24-hour districts. This can decrease the number of trips residents take by car outside of their neighborhood. The diversity of uses within sustainable urban communities makes them appealing and vibrant destinations, encourages the use of public spaces, promotes the use of non-motorized transit, and generates economic value. Specific design strategies, including the strategic location of regional facilities and neighborhood facilities, can be used to create more efficient TOD neighborhoods.

**Neighborhood centers and active ground floors:** Creating central public spaces and buildings that engage pedestrians is a necessary component of TOD; including such features in the design of a TOD neighborhood can prevent the creation of an isolating built environment. In addition, creation of vibrant neighborhood centers can drive demand along an entire TOD corridor, bringing prosperity to residents throughout the area.

**Public spaces and natural resources** are important components of successful TOD, as well-planned public spaces have countless social, environmental, and economic benefits for a community's residents. Public spaces, including green space, provide places of meeting and cultural exchange for all segments of the population, regardless of social or economic status.

**Community identity and heritage:** Preservation of local identity is key in defining unique places and creating a sense of belonging among residents, which are central for TOD projects. Effort should be made to recognize local assets when planning a TOD project. TOD design can serve to compliment, enhance, and reflect local cultural, heritage/historical, and environmental features.

**Resilience:** For a TOD project to be successful, its design must also be resilient; TOD design must take into account and plan for uncertainty and hazards. Understanding and planning for risks, while seemingly more costly and time-consuming in the short-term, can help protect communities from disasters and lessen economic and social costs during times of crisis.

## Conclusion

Urban planning and design concepts are not only useful for planners and architects. TOD projects require the interaction of stakeholder from multiple public sector departments, private sector and civil society, all of whom must understand and embrace a shared vision of TOD. Users who complete module four will have a deeper understanding of the need to create vibrancy along a TOD corridor.

## Module 5: Investing in TOD

### Introduction

Transit-oriented development has great potential to address many urban problems that cities are facing. But investing in TOD requires careful coordination between different kinds of stakeholders and over long time periods, especially at the level of corridor.

There is a wide variety of funding and financial instruments that can be used to develop TOD projects. In most cases, teams in charge of developing TOD projects need to be creative and put together a package

that includes multiple sources of financing, and both public and private resources. The package will take into account the available funding and financing tools that cities have (for example, if they have the capacity to take on debt or not, or if they have access to federal lines of financing or grants for TOD), the economic situation of the city (the market for a city that is growing will be different from one that is shrinking), the availability of public land in the TOD corridor area, and interest and expertise in the private sector to develop TOD projects.

### **Scope**

Module five explores the key elements involved in TOD investments; the elements must come together for successful TOD investment. The key to operationalizing TOD is to find a business model that works for everyone – so that the public and private sector actors can find win-win solutions.

The TOD “business model” presented has been developed within the framework of the Financing Sustainable Cities Initiative, an initiative of the WRI Ross Center for Sustainable Cities and C40 Cities, funded by the Citi Foundation, focused on helping cities develop business models that can accelerate the implementation of sustainable urban solutions, such as TOD. It is here applied to TOD investments, but it can also apply to other kinds of urban investments.

The module begins by addressing lessons learned from case studies on financing TOD at a corridor level. Findings include difficulty in structuring manageable transaction sizes; necessity of utilizing institutional and contractual frameworks to establish productive commercial relationships and guide decision-making; importance of unlocking and capturing funding sources to pay back investments beyond public budgets to cover infrastructure and services; and the need of financing by third parties due to capital-intensive and upfront investments needed.

The module defines a business model framework comprised of investment components, funding sources, delivery mechanism and financial products with each piece and its application discussed in detail.

### **Conclusion**

The financing required for a TOD investment is, ultimately, context-specific. Stakeholders involved in a TOD investment must collaborate to determine what elements might work best for a specific project based on the instruments available in their specific context.

Though the structure of individual TOD investments varies widely, the business model framework provides a clear way in which to understand all of the elements that stakeholders must consider. This is particularly applicable for stakeholders in emerging cities, where a concrete framework for TOD finance can help to improve TOD implementation.

At the end of this module, the user will understand the elements of a business model for sustainable investments in TOD projects, including: investment components, delivery mechanisms; financial products and funding sources.

## **Module 6: Sequencing for implementation of TOD corridors**

### **Introduction**

TOD corridors are multifaceted and long-term endeavors that require facilitation and coordination of numerous stakeholders, plans and processes, investment and financial flows, and construction phases. Adding to the complexity is the reality that the nature of any TOD project depends greatly on local

circumstances. Promoters of a TOD corridor project must utilize whatever planning process exists in their particular city. The content and order of the planning process is usually determined by code and law, and transportation and land-use master plans should serve as the base for TOD corridor planning. While planning documents are sometimes powerful guidelines to follow, in other cases they are just a compilation of projects executed by different agencies. Ideally, plans are the combination of an analysis of goals, options and constraints; and advocacy for a particular set of solutions and interventions formed from extensive stakeholder engagement. Navigating the financing of a TOD corridor can also be quite challenging – some cities and financial institutions may require full-fledged “cost-benefit analyses” before public funds can be expended; others may have ad-hoc financing mechanisms. Alignment of stakeholders, goals, processes, and financing is further complicated by time and the need to sequence and synchronize different steps in order to avoid significant delay, loss of funding or public support. City-level practitioners

### **Scope**

Module six of this course focuses on practical recommendations for TOD corridor implementation, introducing sequencing steps to get the project on the ground. Having reviewed the building blocks for implementation such as institutions, financing and design, participants will now learn to take the concepts reviewed to a more practical level. The module is structured around six logical and chronological steps: preparation, operational design, physical design, corridor integration, business model and implementation. Each step is further broken down by a series of broad sub-steps that emphasize the variety of activities that can take place in each phase.

The sequencing presented in the module is not intended to be thought of strictly as a linear process. Instead, many of the steps/sub-steps must be revisited at different stages. For example, although we touch on monitoring and evaluation (M&E) at the end of the sequencing process, M&E should be planned for early on in the process to ensure clear targets and indicators are established, and funding for M&E is identified and secured to cover the costs associated with properly assessing performance and making necessary adjustments during and after implementation. The same is true for other steps of the process, especially stakeholder engagement, which in many cases are iterative and adjusted after successive renegotiations /consultations.

### **Conclusion**

Participants who complete module six will have a clear sense of the general steps, and subsequent sub-steps involved in TOD corridor level planning and implementation. The sequencing order defined in the module is presented as one option, but participants will learn that locality will dictate order. Participants will be better prepared to steward the sequencing process, understanding how to balance the steps within the boundaries of their city’s planning processes, financing structures, and public engagement initiatives. They will also be able to identify areas for improvement and make recommendations or take appropriate action to revise and streamline the process for TOD corridor projects.

## **Module 7: Housing strategies & local economic development tools for inclusive TOD**

### **Introduction**

One of the major social ramifications of ill-conceived spatial development is the burden placed on residents who cannot afford to purchase a private vehicle or are unable to live close to work and schools. Many of the poor must consequently endure long-distance commutes to make ends meet. Transit investments help increase mobility and accessibility. But investment in public transit also increases

property values near transit corridors and stations, raising housing costs and rental prices. Higher property values and gentrification continually force low-income residents farther and farther out toward the periphery of the city. Local governments must consider mitigation measures for the resultant shortage of affordable housing while promoting TOD investment.

Besides having access to affordable housing, the local population residing in the TOD area must have opportunities to participate in the local economy in order to reap the benefits of increased economic activity in the area. Gentrification is not only related to pushing original population out as a consequence of higher land values and rents; in addition, new economic opportunities in the area might not match the labor force qualifications of previous residents.

TOD should strive to be inclusive.

### **Scope**

Module seven explores two broad areas of concern: affordable housing and business dynamics. The module is divided into three sections: the first section describes strategies to address the challenges of inclusive TOD; the second presents tools to provide inclusive and affordable housing options in a TOD corridor; and the third presents strategies for local economic development that work with existing and low-income communities within TOD corridors. Through the presentation of real-life applications of strategies from cities in countries around the world, users gain a clearer understanding of how to contextualize these approaches on-the-ground.

### **Conclusion**

Inclusion and equity are among the most challenging issues in adopting TOD in any city in the world. These challenges are particularly compounded in cities located in developing countries, where sizeable populations can not find affordable shelter. Though a complete solution to this problem has not yet been found, this module presents approaches for inclusion and equity that have been successful in different contexts, equipping those who complete the module with ideas on how to apply such strategies to their local contexts.

## **Module 8: Monitoring and evaluating TOD Projects**

### **Introduction**

The role monitoring and evaluation (M&E) systems can play in ensuring the success of TOD projects is often overlooked, due to such factors as monetary and capacity constraints. M&E systems play a vital role in all development projects, including TOD projects: they ensure that the goals of a project are achieved, and that improvements to people's lives are realized. M&E helps ensure the successful implementation and the materialization of the intended outcome of the project. Linking outputs – activities or efforts – with outcomes, the actual end results, are an important piece of this process.

### **Scope**

Module eight, establishes a definition of monitoring and evaluation, and provides an overview of the strategies used to apply M&E to TOD projects. The module incorporates elements of M&E systems, describing the difference between project and impact evaluation. Designing and implementing M&E systems is covered. The module also highlights the different ideas of success shared by the diverse group of stakeholders who are included in a corridor-level TOD project. Performance indicators are addressed

by the qualities and benefits they measure (mobility, social, and environmental). Finally, specific measurement models for TOD implementation, such as WRI's Safe Access Manual, are discussed.

### **Conclusion**

By end of this module, participants will understand the important role M&E systems play in TOD implementation, and the application of M&E systems to TOD corridor planning and implementation. The underlying goal is that participants will be motivated to include M&E systems in their projects, incorporating strategies and allocating resources early on in the project cycle.