1. Country and Sector Background

**Economic development of central and western regions in China is a high priority of the central government.** A policy-induced investment boom tilted toward western and central China is a part of the central government’s efforts to spread benefits of economic growth into its less developed regions. Due to its deep integration with the world’s economy, China’s coastal region was hit directly by weakening external demand during the height of the global financing crisis in 2008. The ripple effect of the slowdown in the eastern areas quickly led to deceleration in the Western and Central regions, despite the small relative size of the exporting sectors in these two regions. However, due to the strong efforts by the central and local governments to maintain economic development policies, fixed asset investment growth in these two regions was generally higher than that in the eastern region, leading to higher industrial production and GDP growth there. This in turn is driving greater demand for urban services and improved quality of life.

**Due to the size of its population and nature of its economy, China’s domestic energy efficiency policies significantly bolster global actions in climate change mitigation.** The Chinese government reported it has met its energy intensity reduction target which is equivalent to an estimated annual CO₂ emissions reduction of 1.5 billion tons by 2010, five times the 300-million-ton reduction of the European Union’s Kyoto commitment.¹ On November 26, 2009, China reaffirmed its commitment to addressing climate change mitigation and announced a

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national goal of reducing its CO₂ emissions per unit of GDP by 40% to 45% by 2020 from 2005 levels. Continued energy conservation is an integral part of its plan to meet this climate change mitigation target.

Urumqi is a major economic center in western China but is one of China’s most polluted cities. Urumqi, with a population of 2.3 million, is the capital of Xinjiang Uyghur Autonomous Region.

Urumqi has targeted modernization of the district heating sector as a key air pollution mitigation measure. Due to traditional design approaches and low environmental standards enforcement, space heating is estimated to contribute 16% of annual average concentrations of SO₂, and 8% of PM₁₀ and NOₓ, respectively.

District Heating in China has a large potential for energy efficiency and reducing impacts on the environment. Nationally, China’s urbanization and construction boom are driving growth in demand for heating services in China’s cold climate provinces.

District heating in China represents one of the last vestiges of the old-style welfare system in China. The unreformed heating sector presents no incentives for consumers to respond to market-based energy costs because heat, unlike water or electricity, is billed on a flat floor area basis and still many state-owned enterprises (SOEs) pay for a share of the heating bill. Reform of urban heating system design, pricing, metering and bill payment systems has been gradually emerging on the national agenda since 2003. In July 2003, the central government issued instructions to move ahead with implementing heat system reform in pilot cities of China’s 16 northern provinces and autonomous regions, including Urumqi municipality. The goals of heat reform are to ‘commodify’ heating by addressing key sector issues: (i) discontinuing employer payment of heating bill and making households responsible for payment of the heating bill; (ii) introducing heat metering and billing based on consumption, promoting consumer control of heating and building energy efficiency; (iii) developing safe, clean and demand-responsive heat supply systems; (iv) reforming heat pricing; and (v) accelerating reform of heating enterprises, consolidating many small enterprises in cities, introducing competition, and fostering and standardizing the heat market. Space heating is considered a vital service for cold climate regions. Reforms involve major organizational and institutional challenges at local levels many of which lack the capacity to rapidly overhaul how heating is supplied, consumed and billed. Thus, the pace of reform has been less than hoped for.

Modernization of district heating systems can remove important technical barriers to implementation of district heating sector reform, which has been slower than hoped for.

2. Objectives

The proposed project development objective (PDO) is to connect consumers to district heating services with improved energy efficiency and environmental performance in selected districts of Urumqi City.

3. Rationale for Bank Involvement
The proposed project is consistent with the 2006-2010 Country Partnership Strategy (discussed by the Executive Directors on May 23, 2006) which seeks among other themes to engage China on managing resource scarcity and environmental challenges, through *inter alia* reducing air pollution, and optimizing energy use.

4. Description

The proposed project consists of three components: (A) Shuimogou District Urumqi CHP Power Plant Heating Network (UHN) Component; (B) Shayibake District CHP Heating Network (SHN) Component; and (C) Institutional Development and Project Management Support Component. The total estimated project costs are RMB 2.3 billion (US$343.2 million equivalent). The proposed indicative financing plan includes an IBRD loan of US$100 million, about 30% of total estimated project costs.

5. Financing

<table>
<thead>
<tr>
<th>Source</th>
<th>($m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borrower</td>
<td>243.2</td>
</tr>
<tr>
<td>International Bank for Reconstruction and Development</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>343.2</strong></td>
</tr>
</tbody>
</table>

6. Implementation

A Project Leading Group (PLG), chaired by the Mayor of Urumqi, has been established by the UMG to provide high level guidance to the project and coordinate on policy and institutional issues as needed. The Urumqi International Technical Cooperation Project Office (UPMO) has been established in the Construction Commission and is responsible for overall management and oversight of the proposed Project, including review of disbursement applications submitted by UDHC. The UPMO is also responsible for implementing Urumqi’s subcomponent of the ongoing GEF Heat Reform and Building Energy Efficiency (HRBEE) Project. The Construction Commission is responsible for overall district heating sector management and promoting sector reform. The Urumqi District Heating Company (UDHC), a municipal state owned enterprise, is proposed to be the IBRD sub-borrower and will implement the project under the overall supervision of UMG. UDHC will own and operate the newly integrated district heating networks.

7. Sustainability

Long term sustainability will depend on effective development of DH/CHP as the main municipal heating energy system with effective and efficient operation and maintenance (O&M). The Project will move the municipal heating system toward sustainability by addressing major energy efficiency and environmental penalties associated with the use of distributed boilers in the city and increasing heat demand by taking advantage of economies of scale through increased coverage of the DH/CHP systems. At the customer-end, a fundamental issue remains to be resolved: the use of normative heat load estimates from older system design standards. These norms drive investments and O&M cost estimates because metered data is unavailable. The project will introduce meters and monitoring and control (SCADA) systems which will collect
data that, if properly used, could start to build more robust heat load estimates, optimize heating supply operation, help prioritize O&M budgets, and provide referential heat load data for future DH system planning and design. In addition, the project includes technical assistance to improve the capacity of UDHC to operate the new integrated network and optimize network management so as to improve energy efficiency and cost effectiveness.

The project will also move part of the heat chain into billing based on real energy consumption data because bills from the CHPs, peak load boilers and heat distribution companies will be based on metered supply. The heat distribution companies are the former boiler plant operators, which will purchase heat from the new integrated DH systems. This is an important institutional change that will introduce incentives for further cost containment and energy efficiency.

Experience with this stepwise introduction of meter based billing is expected to build confidence and pave the way to switch from existing building floor-based tariffs to heat meter-based tariffs, the final step in providing incentives for efficient energy use for heating in the built environment. The project’s technical assistance will support UDHC to accommodate meter based billing in its billing and accounting system. This should contribute to creating an enabling environment for heating price and billing reform to be more quickly adopted in the city.

8. Lessons Learned from Past Operations in the Country/Sector

The proposed Project incorporates lessons and innovations from industry practices in China and Europe: (i) promotion of use of waste heat from CHP plants for district heating is considered good practice in Europe and is promoted by the central government in China; (ii) demand-driven enabled operation in the primary and the secondary networks allows the system to respond more efficiently to individual customer requirements, saving on pumping and energy costs, than compared to traditional supply-driven operating modes; (iii) metering across the heating supply chain enables best practice control and optimization and provides necessary data for calculating two part heat tariffs. Meters will be installed in heat sources, project substations, in new buildings, and in existing buildings on a pilot basis at the building level as a key technical step toward consumption based billing; (iv) building level substations are to be piloted – to demonstrate the energy efficiency and heating quality benefits associated with linking substations to fewer buildings compared to conventional designs and preferences for larger substations due to less up front investments.

Project’s Approach to Innovation. The experience gained during preparation and implementation of this project will support the Bank’s efforts for promoting more energy efficient and less polluting forms of space heating in China. District heating in transition economies has a legacy of being operated by conservative technicians and in China this is also the case. It is a local service where international exchanges are less well developed than in other sectors. Therefore, new ideas are approached cautiously and heavy premia are placed by clients on experience and results. The proposed stepwise approach to innovations and modern technologies through pilots, with policy development support from the GEF HRBEE project for related sector issues such as building energy efficiency and heat pricing, is an established method for introducing new ideas and incubating innovations in China. If successful, the project will contribute to an overall strategy for scaling up modern district heating approaches in Urumqi and other cities. Through a series of projects², a critical mass of well implemented examples should

² About 17 cities are engaged through Bank / GEF supported DH operations.
further accelerate acceptance of new ideas in district heating. This type of project could be replicated in other large cities.

9. Safeguard Policies (including public consultation)

The heating pipelines supported by the Bank will be built on existing urban roads whose land is owned by the municipality. No acquisition of collective land or structures will be required. The main direct impacts will be caused by traffic disturbance in the areas where the pipelines will be installed in densely populated areas. A Resettlement Policy Framework (RPF) was prepared in case of any need for land acquisition and/or resettlement by the modification of the pipeline alignment after Bank appraisal.

The proposed project is a Category A project as per the Bank OP/BP 4.01. By eliminating the use of locally polluting heat boilers and connecting to an integrated heating system supplied by CHP plants and peak load boilers with strengthened emissions controls, the project is expected to contribute to a net reduction of coal consumption and associated emissions.

**Environmental Assessment (OP 4.01).** Following the requirements of the Bank’s OP 4.01 and relevant domestic regulations, the project includes two EAs one for each of the two project networks. Both EAs were prepared by the EA Center of the Xinjiang Uyghur Autonomous Region, a top-level certified EA institute in the region. Each EA presents: the baseline environmental and socio-economic conditions, impact assessment, alternative analysis, public consultation process, and the EMP. An executive summary of the EA was prepared following Bank’s requirements for Category A projects.

10. List of Factual Technical Documents

Feasibility Studies, Environmental Assessment for both investment components.

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