

# Brownfields in China: How cities recycle industrial land

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# What is Brownfield?

- **Definition of brownfields** (USEPA): Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.
- Types of brownfields:
  - abandoned industrial and railroad facilities, or traditional manufacturing plants
  - small commercial lots (e.g., gas stations or laundry businesses)

# Brownfield Redevelopment Process in the U.S.

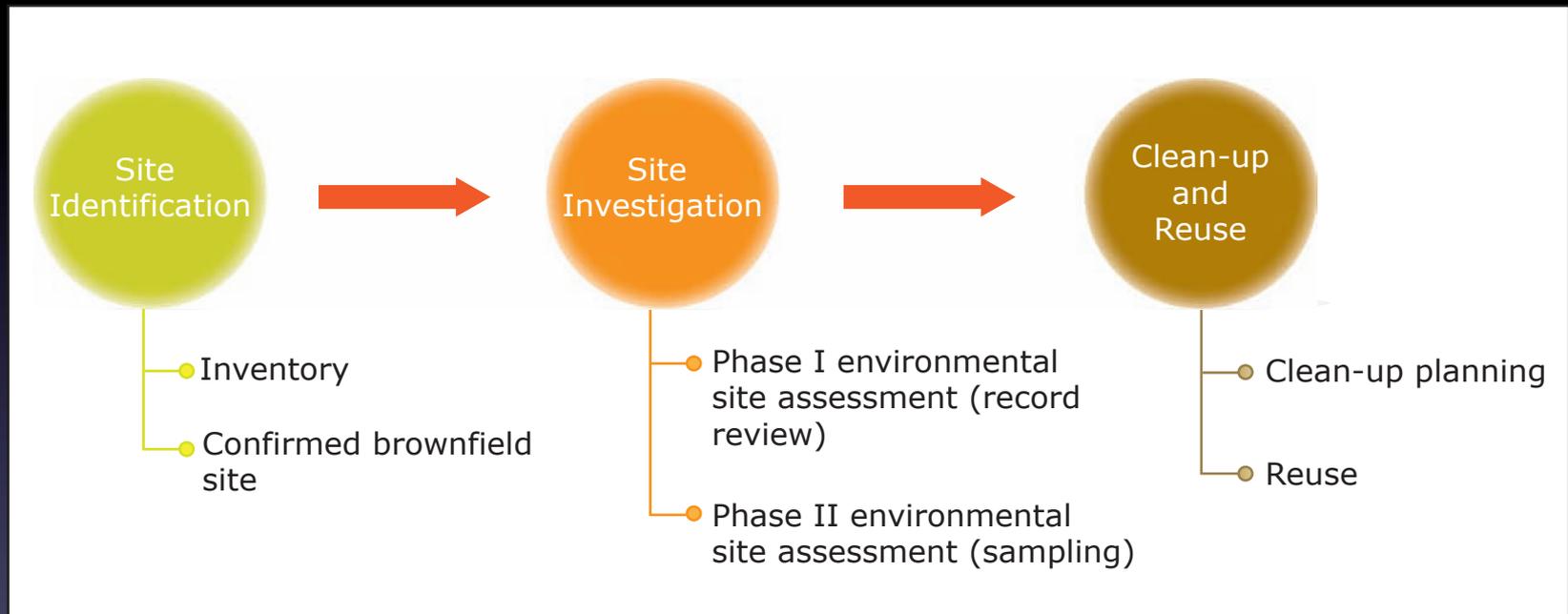


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# Urban Expansion of Beijing

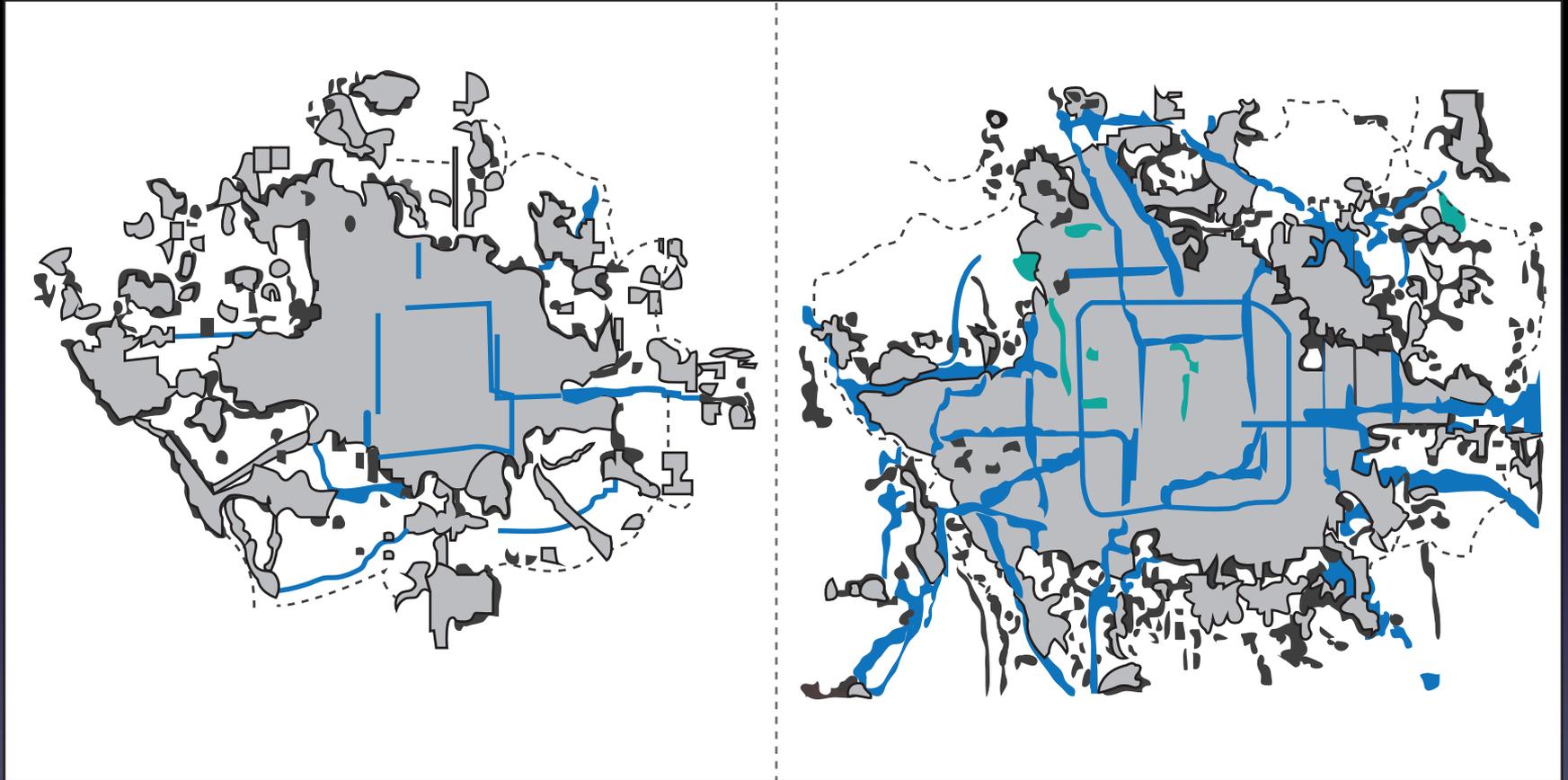


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1983

2000

**2010**

**6,421 sq km**

**population: 11,741,000**

Aerial map of Beijing removed due to copyright restrictions.

Source: [Beijing, 2010](#) from Berkeley's Global Metropolitan Observatory.

# Statistics of Industrial Relocation in Beijing

	1996-2000	2001-2005
Enterprises relocated within the five years (unit)	59	142
Vacated land (acre)	420	2,175

Source: compiled by author from various years of Beijing Five-Year Plans.

# Existing Industrial Land Location in Beijing (2003)

City plans removed due to copyright restrictions.

# Proposed Industrial Land Location in Beijing (2020)

City plans removed due to copyright restrictions.

# The Big Question

- During a brownfield law deficient period, in what ways has land contamination been taken into account during the redevelopment process?

# Land Banks in the U.S.

- 1960s
- Public authorities
- Vacant, abandoned or foreclosed properties
- Revitalize blighted neighborhoods

# Land Banks in China

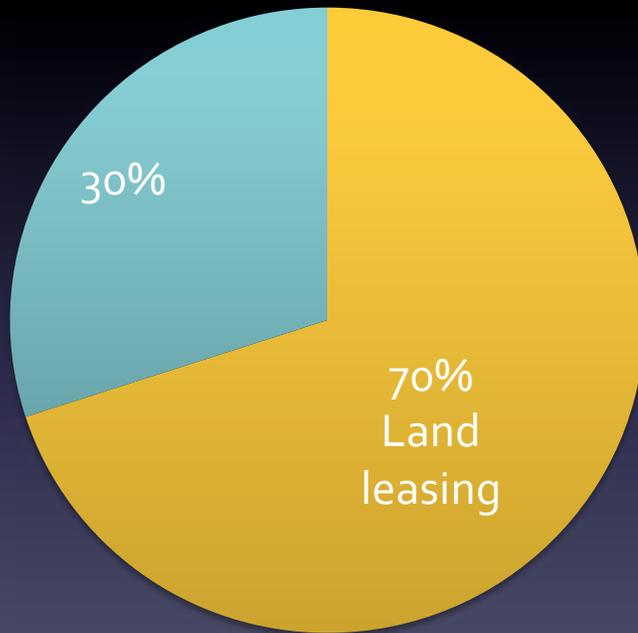
- 1996      Shanghai
- 1997      Hangzhou
- 2001      Beijing
- Over 2000 cities and counties

# Purposes are to...

- Enhance government intervention
- Circumscribe land speculation
- Increase local revenue

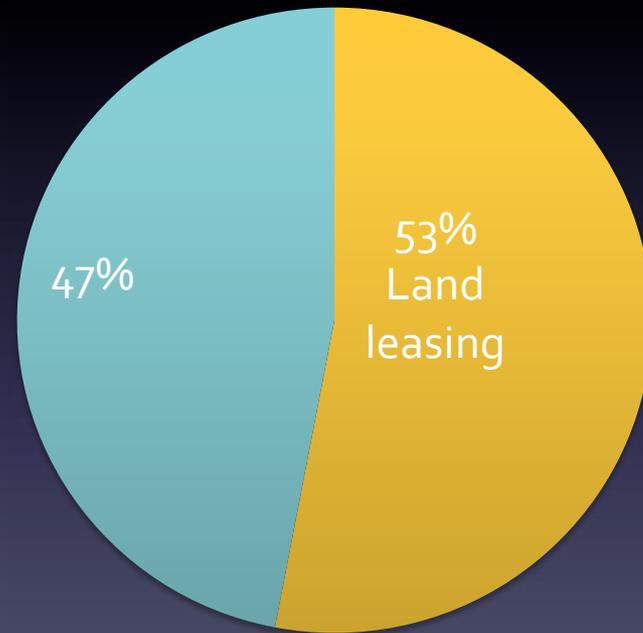
# Local Revenues from Land Sale, 2010

Total revenue:  
235 billion (\$37 b)



Beijing

Total revenue:  
287 billion (\$46 b)



Shanghai

# Structure of Revenue from Land Sales, Beijing

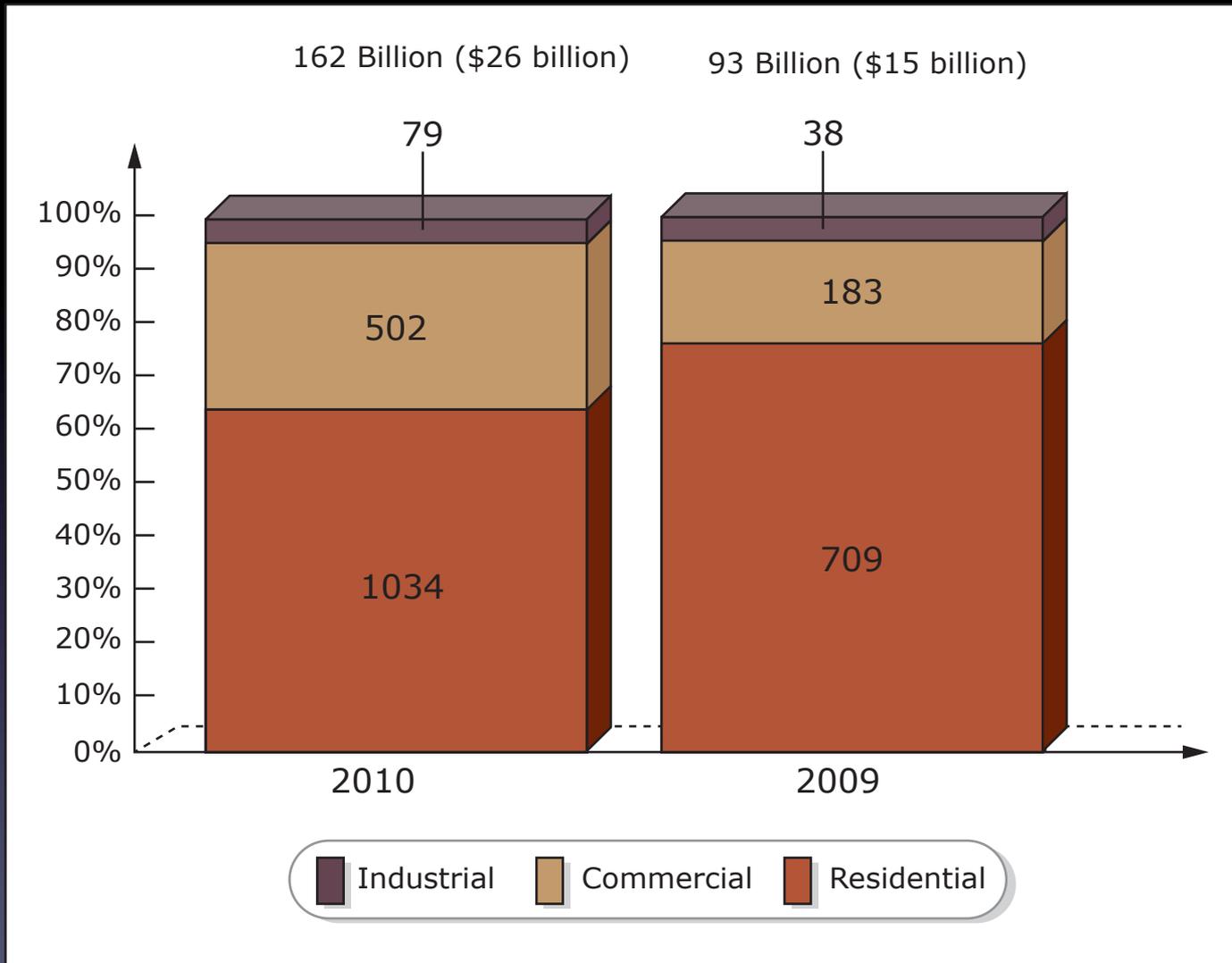


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# Unintended benefit

- Solve land contamination problem

# Land Banking System Contributes to Two Institutional Changes

- Land market reform



- Environmental governance



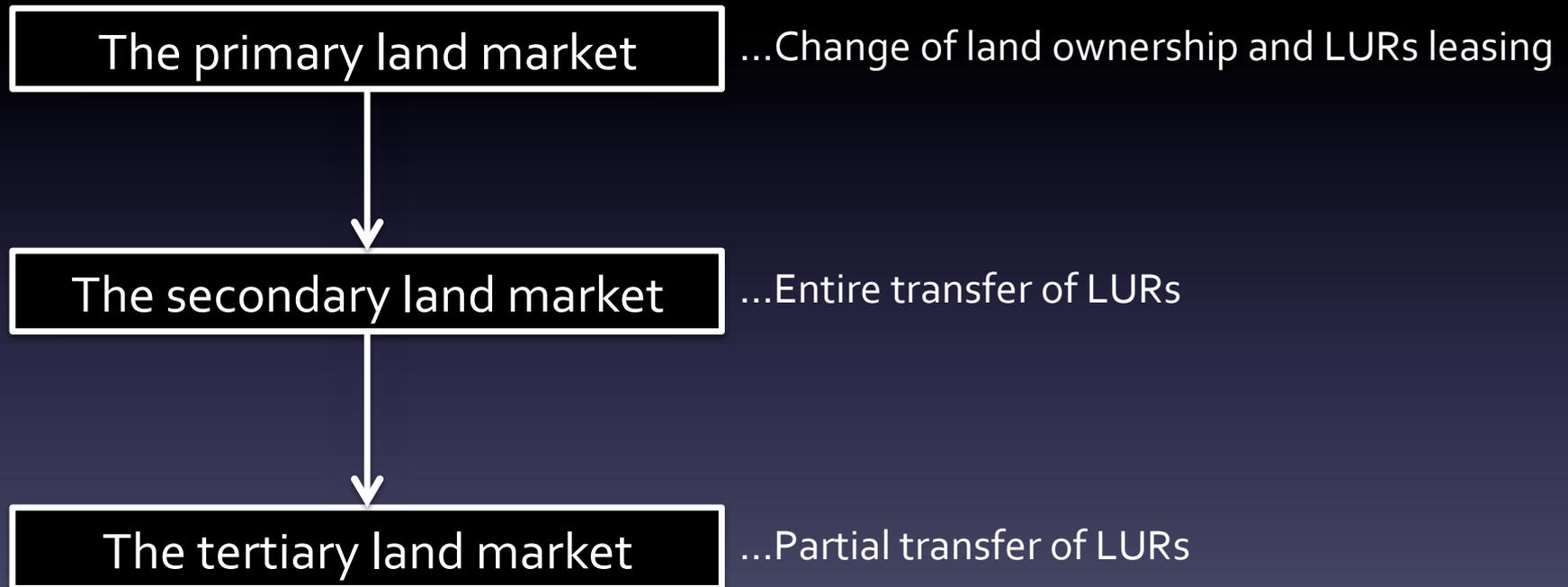
# Property Rights

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# Land Market Reform

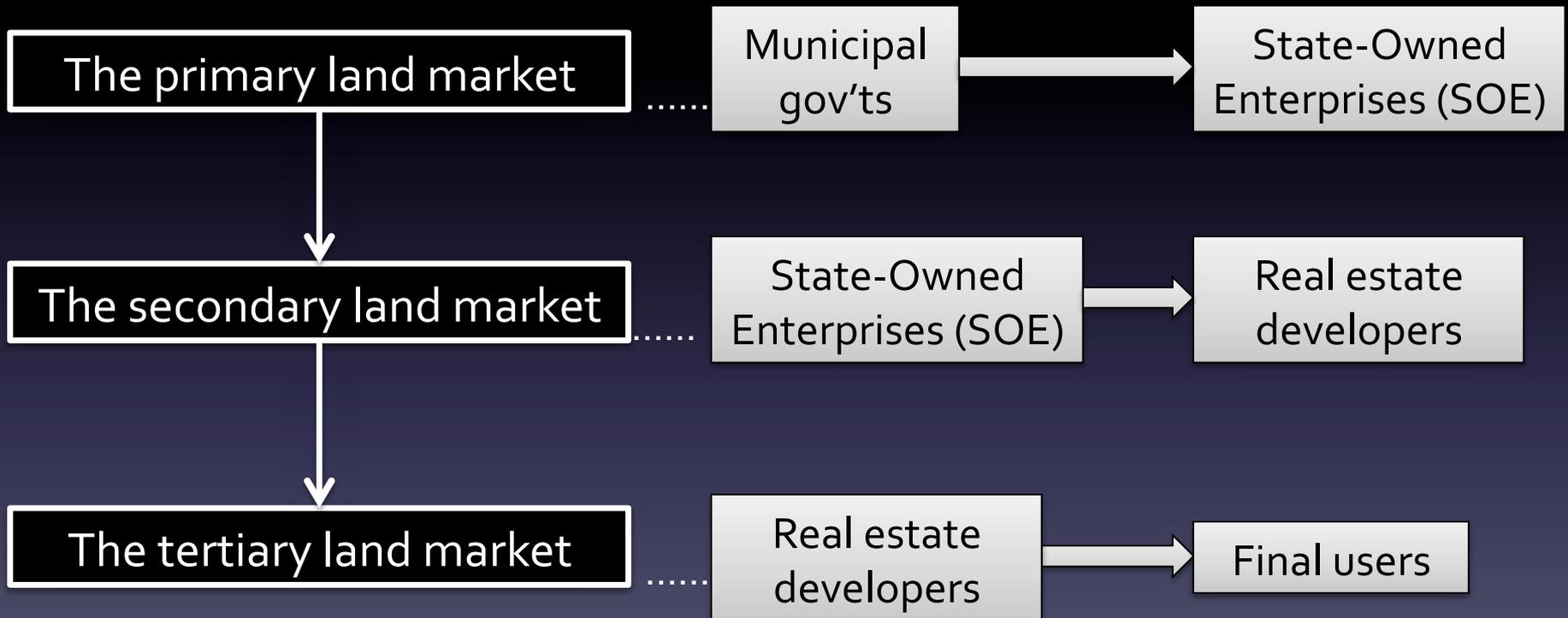
- Before 1988, administrative allocation
- Since 1988, paid transfer of land use rights (LURs)
- 2004, land banking system

# Land Use Rights (LURs) Transfer, 1988-1995



Source: Tian and Ma (2009)

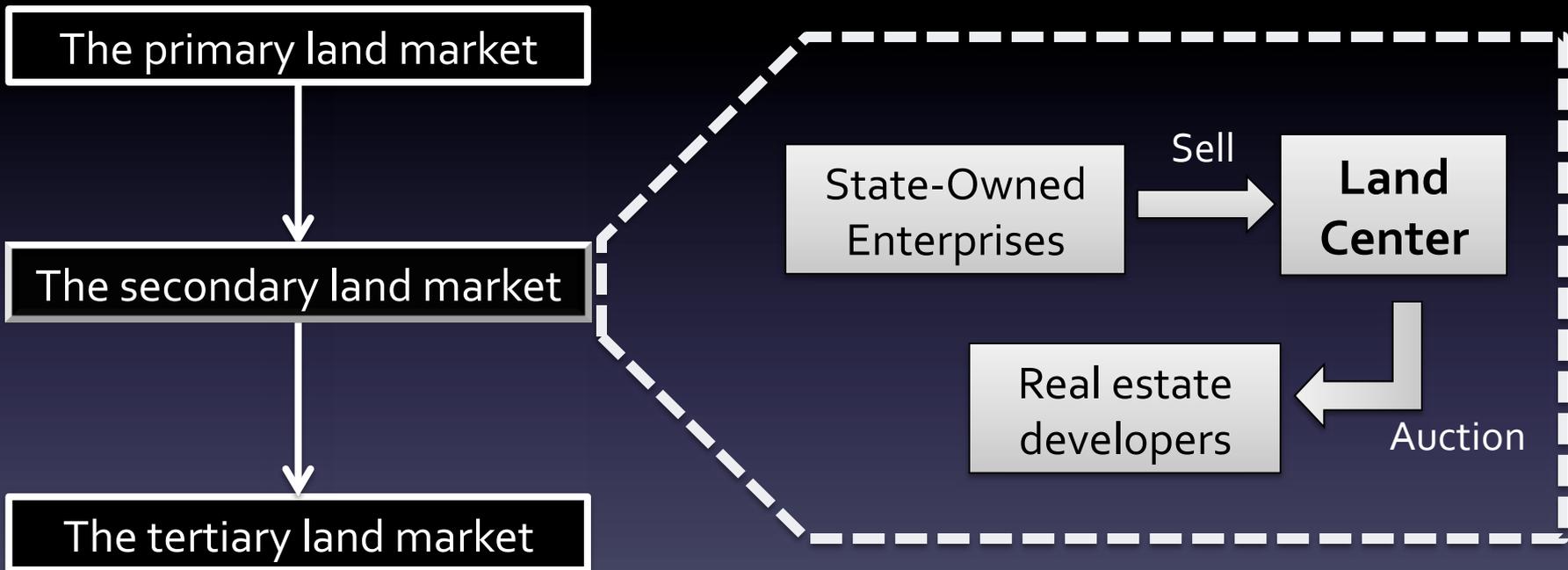
# Land Use Rights (LURs) Transfer



# Land Sale through Negotiation

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# Tender-Auction-Listing strictly enforced for all land sales since 2004

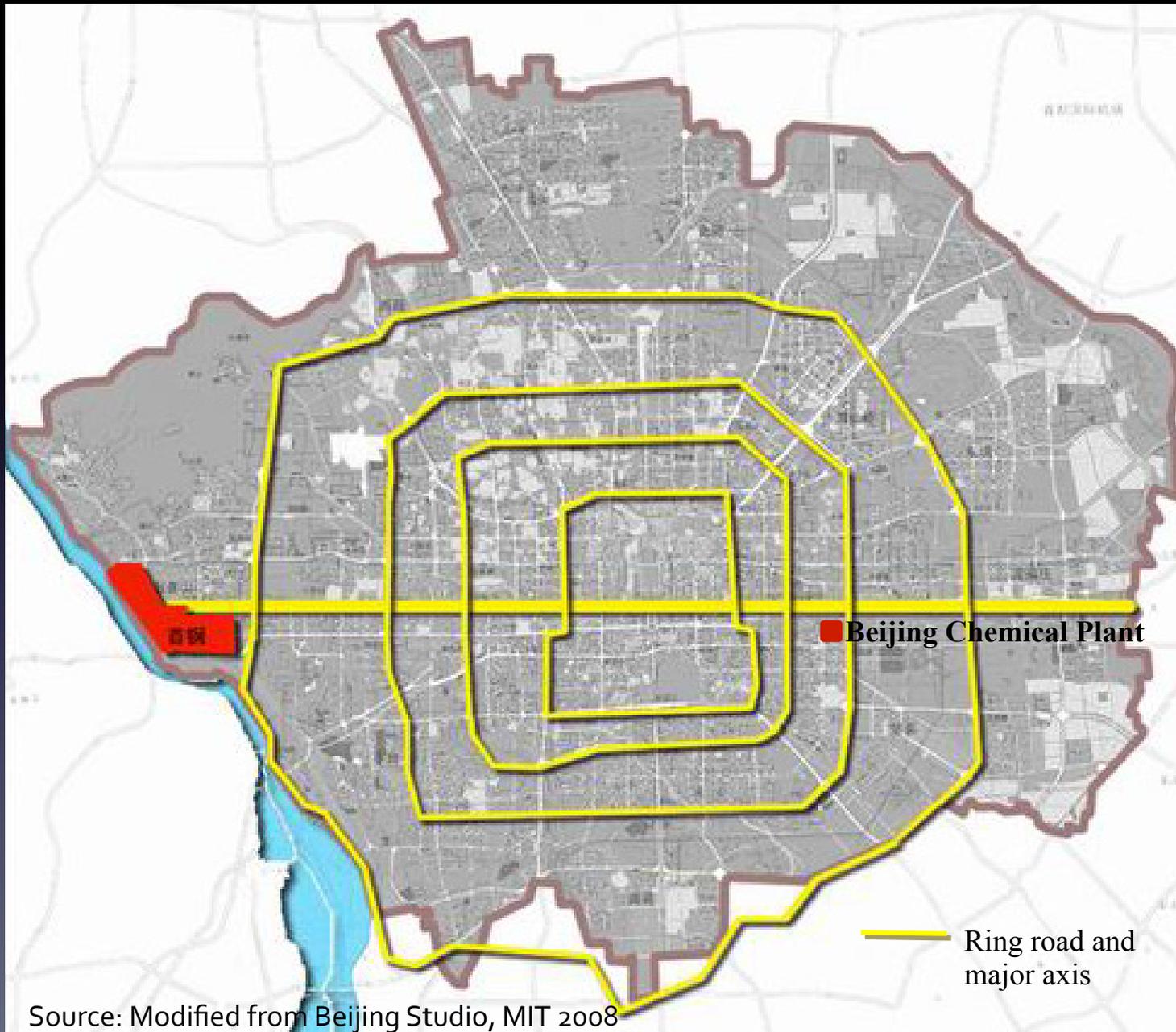




# Question

How is the land banking system conducive to solving contamination problems in the redevelopment process?

# Location of the Chemical Plant



Source: Modified from Beijing Studio, MIT 2008

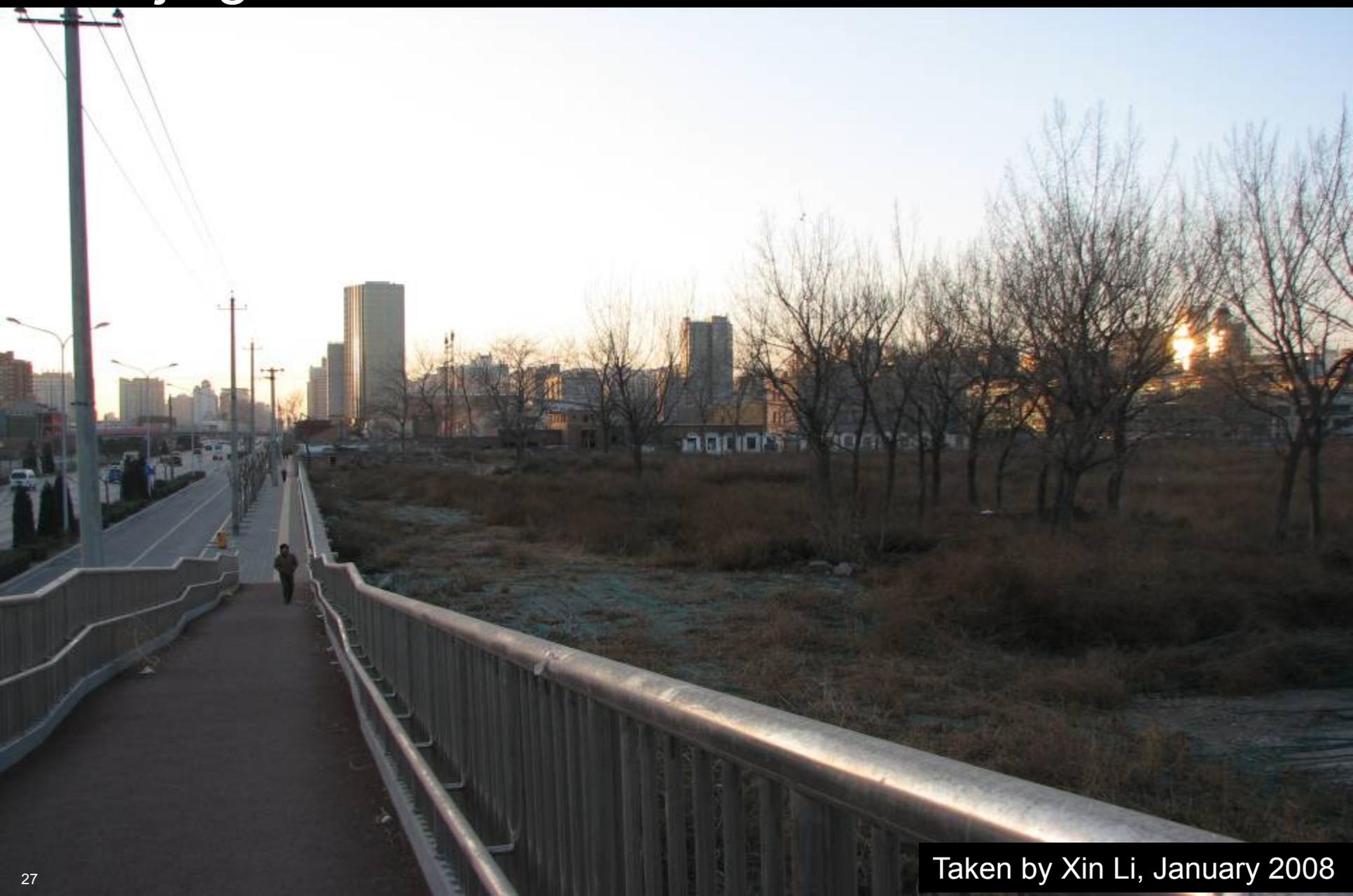
# Capital Iron- and Steel-Making Plant, Beijing

- The 2<sup>nd</sup> largest steel producer
- Large scale--District wide
- Land area: 7 square kilometers



Taken in January 2008 by Xin Li

# Beijing Chemical Plant



Taken by Xin Li, January 2008



Taken by Xin Li, January 2008

# 2009 Auction of the Chemical Plant Site

Photograph from auction removed due to copyright restrictions.

- 2002      Plant closed

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- 2010      New construction started

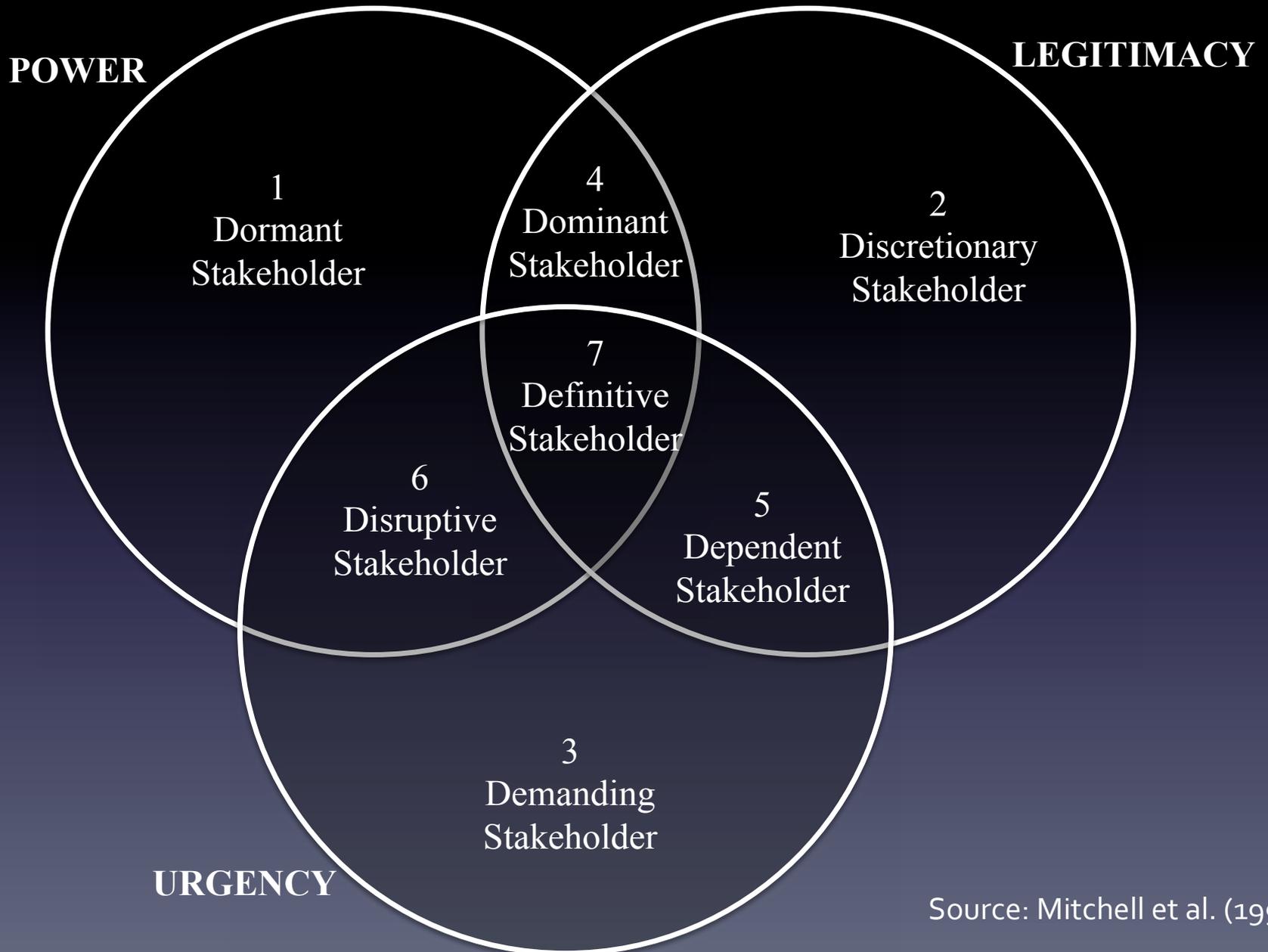
# Stakeholder Analysis

- Who are the stakeholders in the redevelopment process?
  - Who affects the redevelopment?
  - Who is affected by the redevelopment?
- In what way can these stakeholders influence the environmental outcome?

# Data

- Interviews
- Government documents
- Newspapers

# Stakeholder Typology



Source: Mitchell et al. (1997).

# List of Stakeholders

	Stakeholder Type	Attributes			Stakeholder Representation
		Power	Legitimacy	Urgency	
1	Dormant	X			Citizens
2	Discretionary		X		Design companies
3	Demanding			X	Resistant individuals/communities
4	Dominant	X	X		Municipal governments
					State-owned enterprises
					Land developers
					Construction developers
					Land bureaus
					Land reserve centers
					Planning commissions
The media					
5	Dependent		X	X	Financial institutions
					Local residents
					International organizations
					Environmentalists
6	Disruptive	X		X	Environmental NGOs
					Individuals/groups using violent means
7	Definitive	X	X	X	Environmental bureaus

# Delayed Redevelopment Process

- 2002 Plant closed

Land  
Center  
owned  
LURs

- 2003 LURs transfer to the land center
- 2004 Site sold through public listing, unsuccessful
- 2006 Site cleared, but not cleaned
- 2008 A citizen reported buried chemicals
  - Environmental agency involved
  - Cleanup procedure set up
- 2009 Site auctioned
  - Disclosure of contamination information
  - Cleanup responsibility
  - Public commenting on rezoning request

- 2010 Construction started

# Findings

- The land center is more responsive to public concerns
- Increased awareness of contamination risks
- Improved public participation in brownfield redevelopment

# Timeline: United States versus China

1960s-1970s

1980s

1990s

2000s

## United States

### Deindustrialization

- plants closed
- job loss
- reuse of industrial land
- weak regulation
- environment incidence

### Regulation modification

- economic revitalization
- liability release
- gov' t supports (financial and technical)

### Stringent regulations

- plants abandoned
- local economic depression
- high crime rate

### Flexible liability regulation and financial incentives

- institutional setting to ensure healthy brownfield redevelopment

## China

### Deindustrialization

happened in China

# Evolution of U.S. Brownfield-Related Legislation

<b>Stage One</b>	Outburst of environmental problem	1970	Clean air act passed
		1972	Federal water pollution control act passed
		1974	Safe drinking water act passed
		1976	Resource conservation and recovery act (RCRA) passed Toxic substances control act passed
		1978	Love canal showcases toxic waste threat
<b>Stage Two</b>	Stringent regulation	1980	Comprehensive environmental responses, compensation and liability act (CERCLA) passed
		1986	Superfund amendments and reauthorization act passed
<b>Stage Three</b>	Flexible liability regulation and financial incentives	1993	EPA creates Brownfields Economic Redevelopment Initiative
		1995	EPA develops Brownfield Action Program
		2002	Small Business Liability Relief and Brownfields Revitalization Act passed

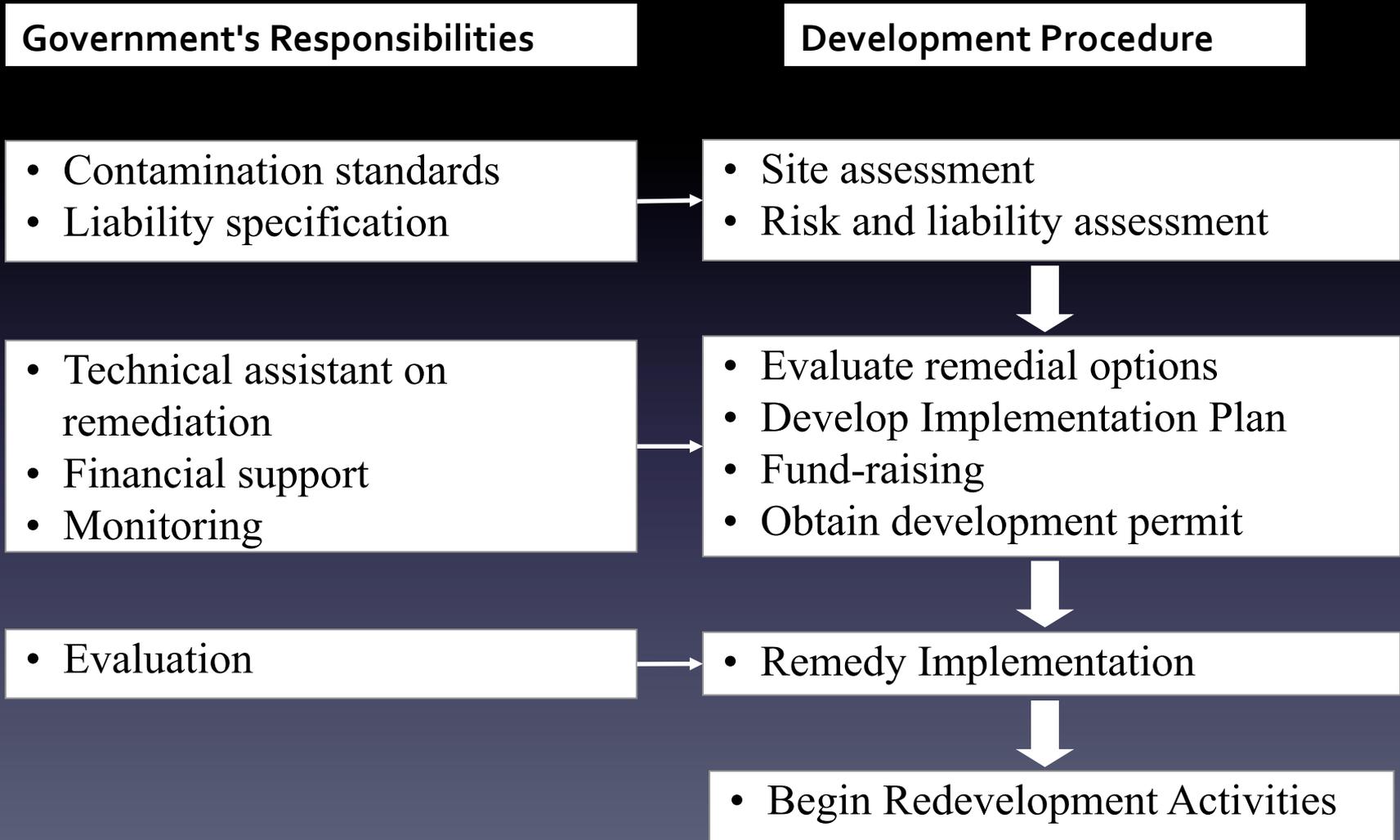
Source: 1970-1995 from Day and Johnson (2004: 243); 2002 author's addition.

# China's Brownfield-Related Legislation

<b>Stage One</b>	Outburst of environmental problem	1986	Land Management Act, revised in 2004
		1989	Environmental Protection Act
		1994	Real Estate Management Act
		1995	Solid Waste Polluting Environment Protection and Remediation Act, revised in 2004
		1995	Environmental Quality Standard for Soils
		1998	Construction Project Environmental Protection Management Regulation
		1999	Environmental Quality Risk Assessment Criteria for Soil at Manufacturing Facilities
<b>Stage Two</b>	Stringent regulation		
<b>Stage Three</b>	Flexible liability regulation and financial incentives		

Source: modified from Kang and Hua (2007)

# Key Components of Brownfield Redevelopment



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