

# Applying the *Border/Frontera+20* Model

## Paso del Norte



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# *Border/Frontera+20*

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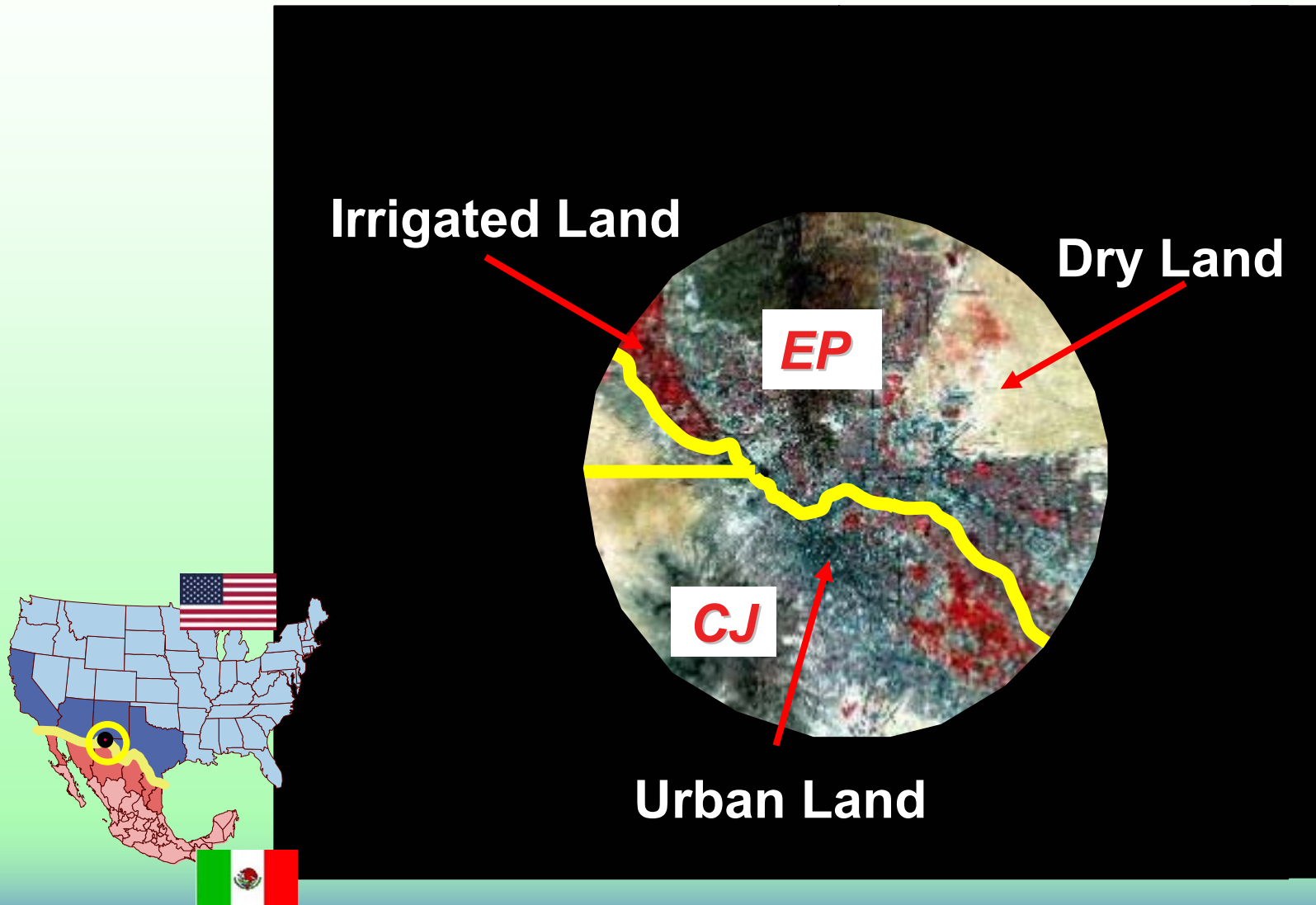
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# Paso del Norte



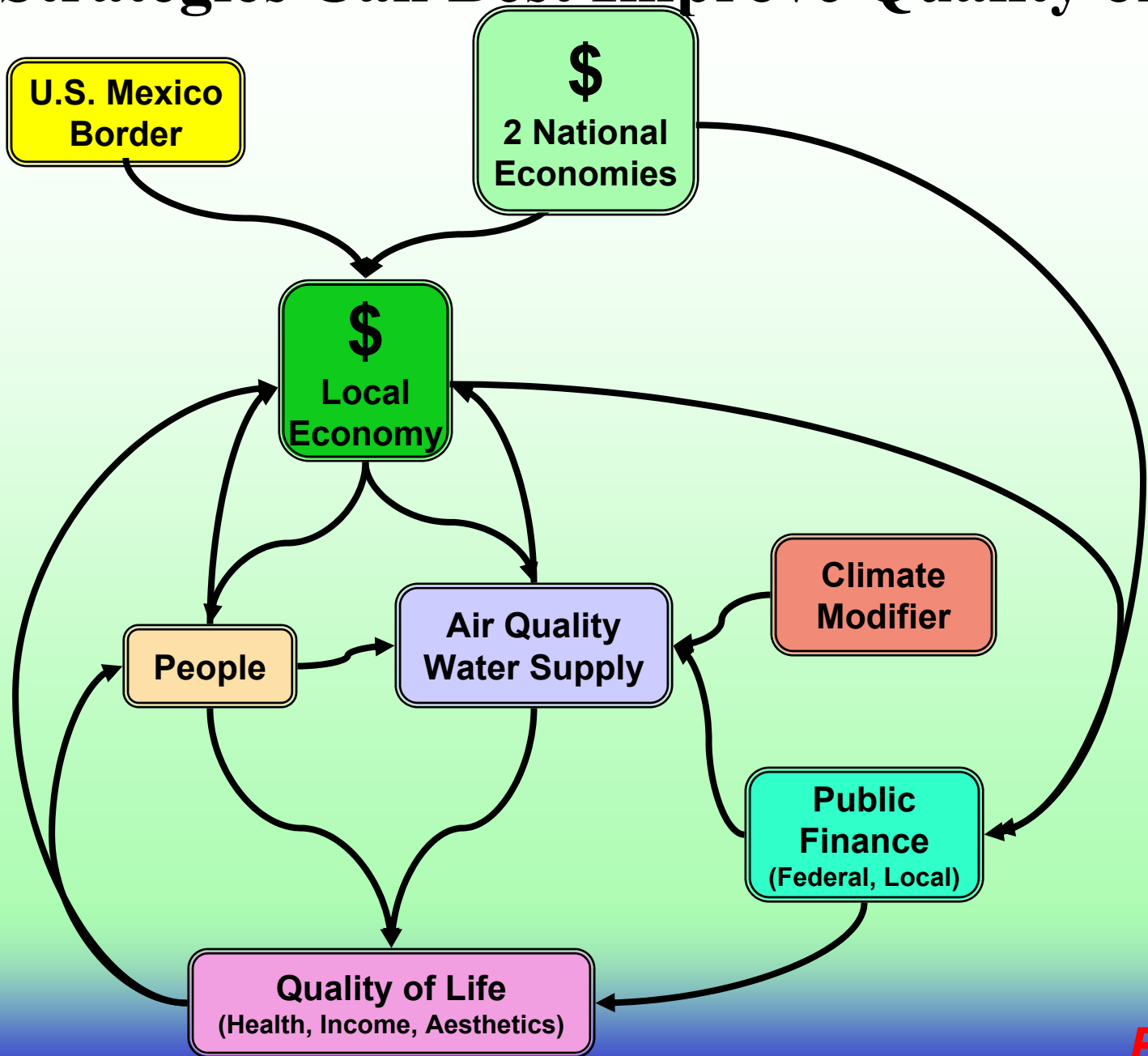
# Population Growth (millions)

	2000	2020
El Paso	0.76	1.1
Ciudad Juárez	1.2	2.4
<b>Total</b>	<b>1.96</b>	<b>3.5</b>

*Peach & Williams (2000)*

**Implications for Quality of Life and Sustainability?**

# What Strategies Can Best Improve Quality of Life?



# Systems Approach

- **Integrate and quantify various mental models....**  
.....used in interdisciplinary decision-making
- **Work with ....**  
.....sparse data, complexity, feedback and delays
- **Explore ....**  
.....tradeoffs and alternative scenarios

# Tradeoffs to Evaluate

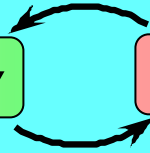
- **Connect all households to water/sewer systems**
  - Reduce waterborne health risks (e.g., # hospital admissions)
- **Pave gravel roads**
  - Reduce airborne health risks (e.g., # of hospital admissions)
- **Reduce brick kiln emissions**
  - Reduce airborne health risks (e.g., # of hospital admissions)

- **What are the benefits?**
  - reduced health risk
  - reduced environmental degradation
- **Which options have lowest net costs?**
- **What are unintended consequences?**

## *National Level*

*Demography*

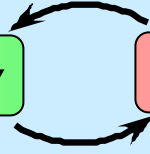
*Economy*



## *Local Level*

*Demography*

*Economy*



**Binational demographic and economic conditions drive local demography and economy**

## *Urban Ecosystem*

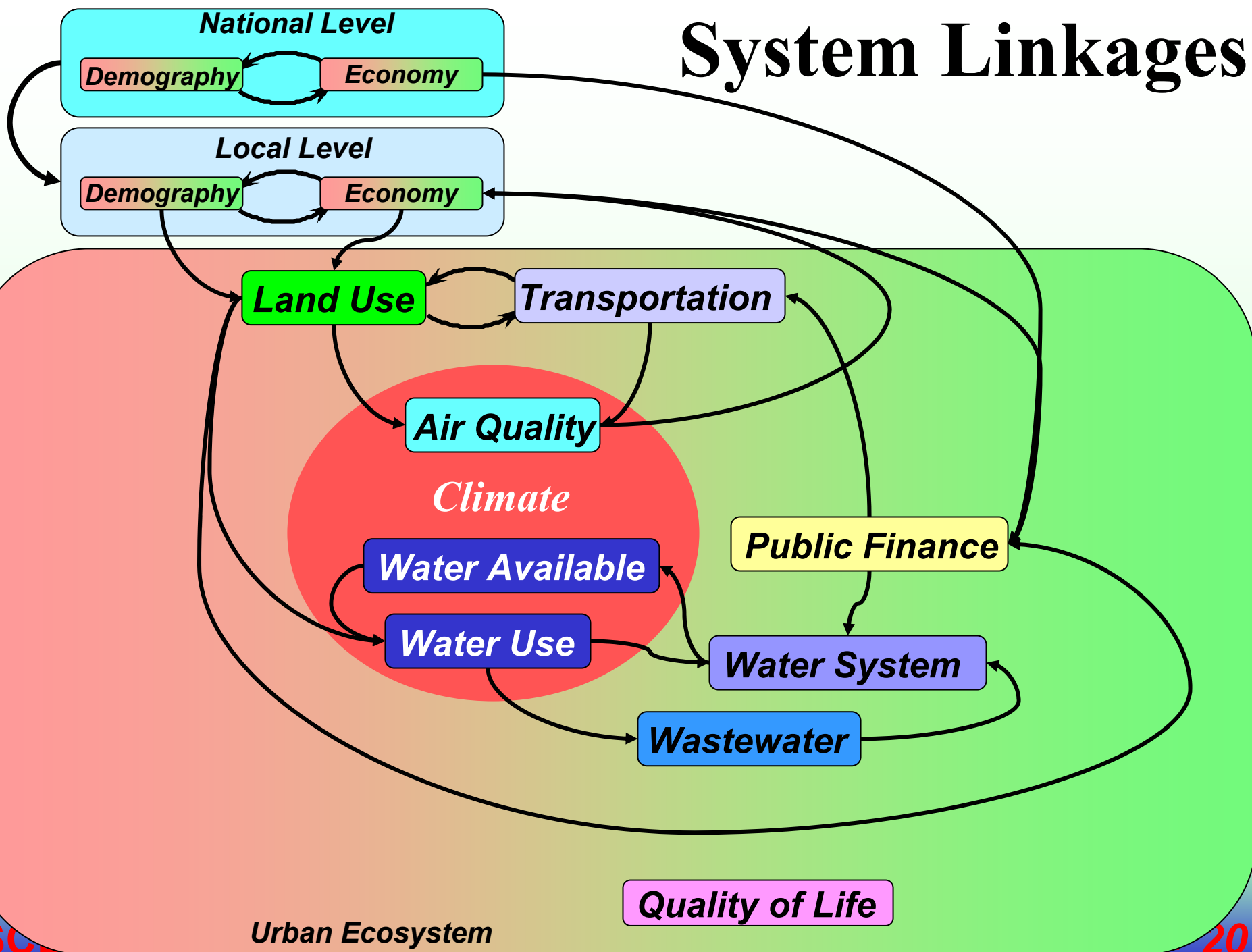
**Local demographic and economic conditions drive changes in sister-city urban ecosystems**

*Quality of Life*

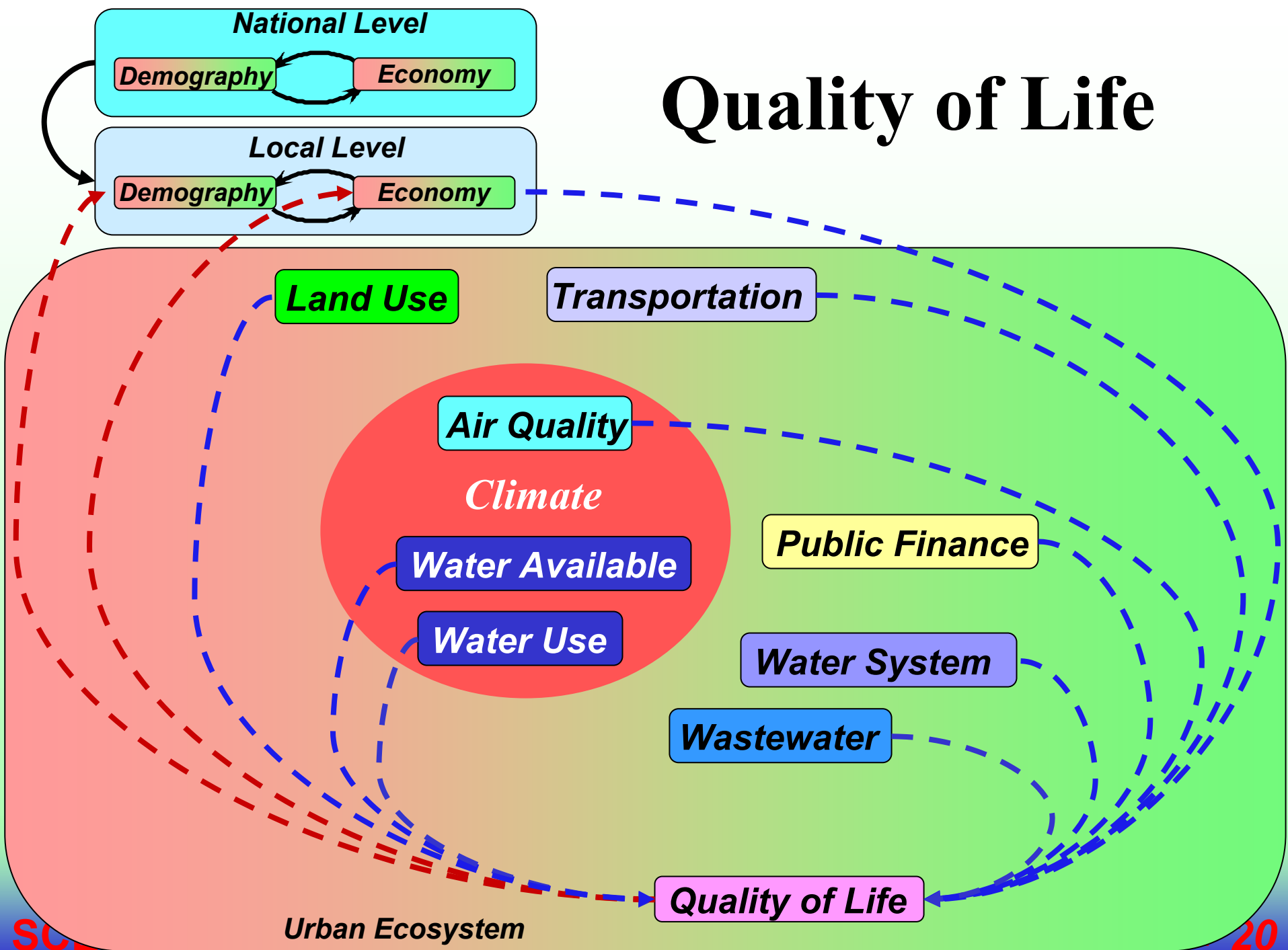
*U.S.A*

*Mexico*

# System Linkages



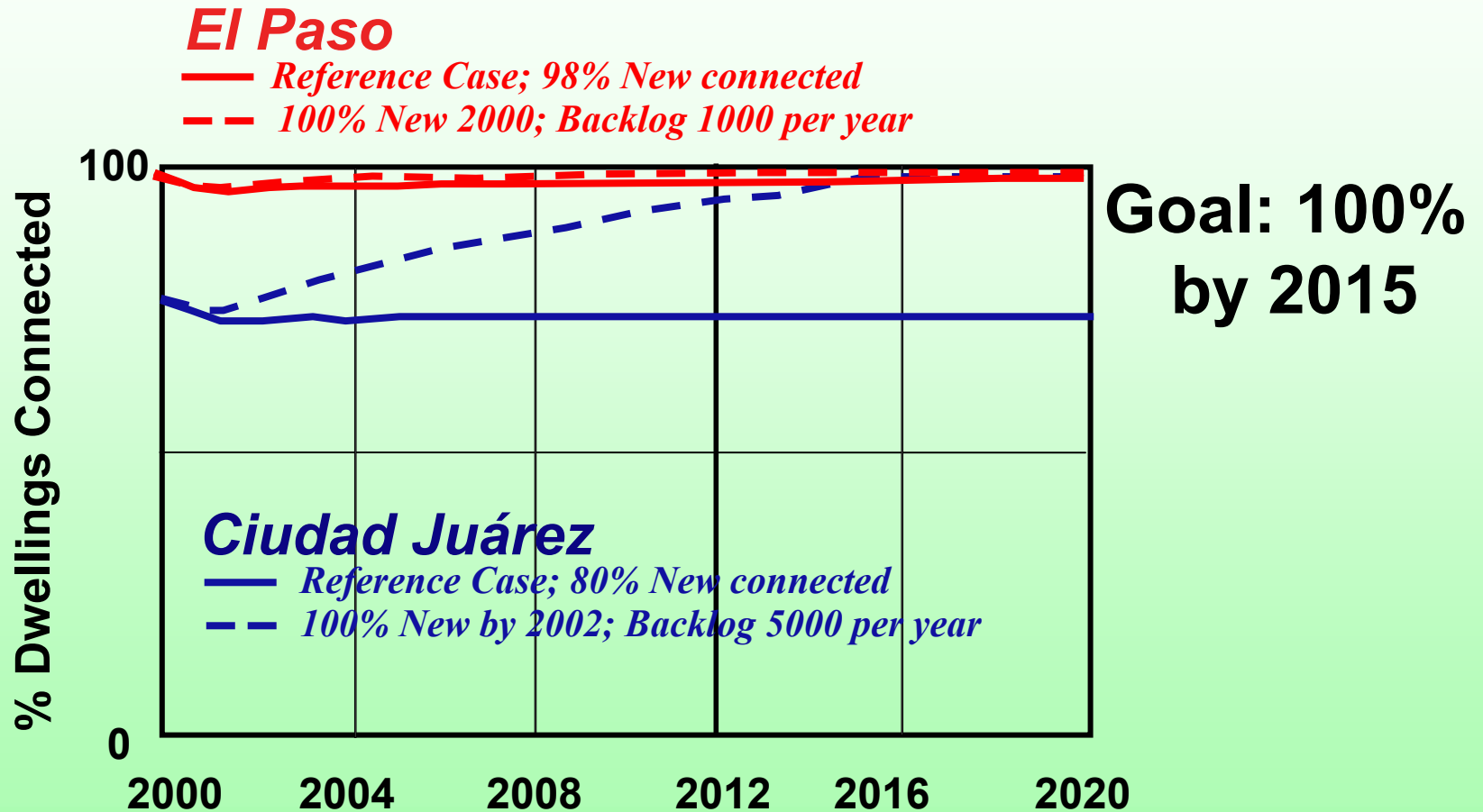
# Quality of Life



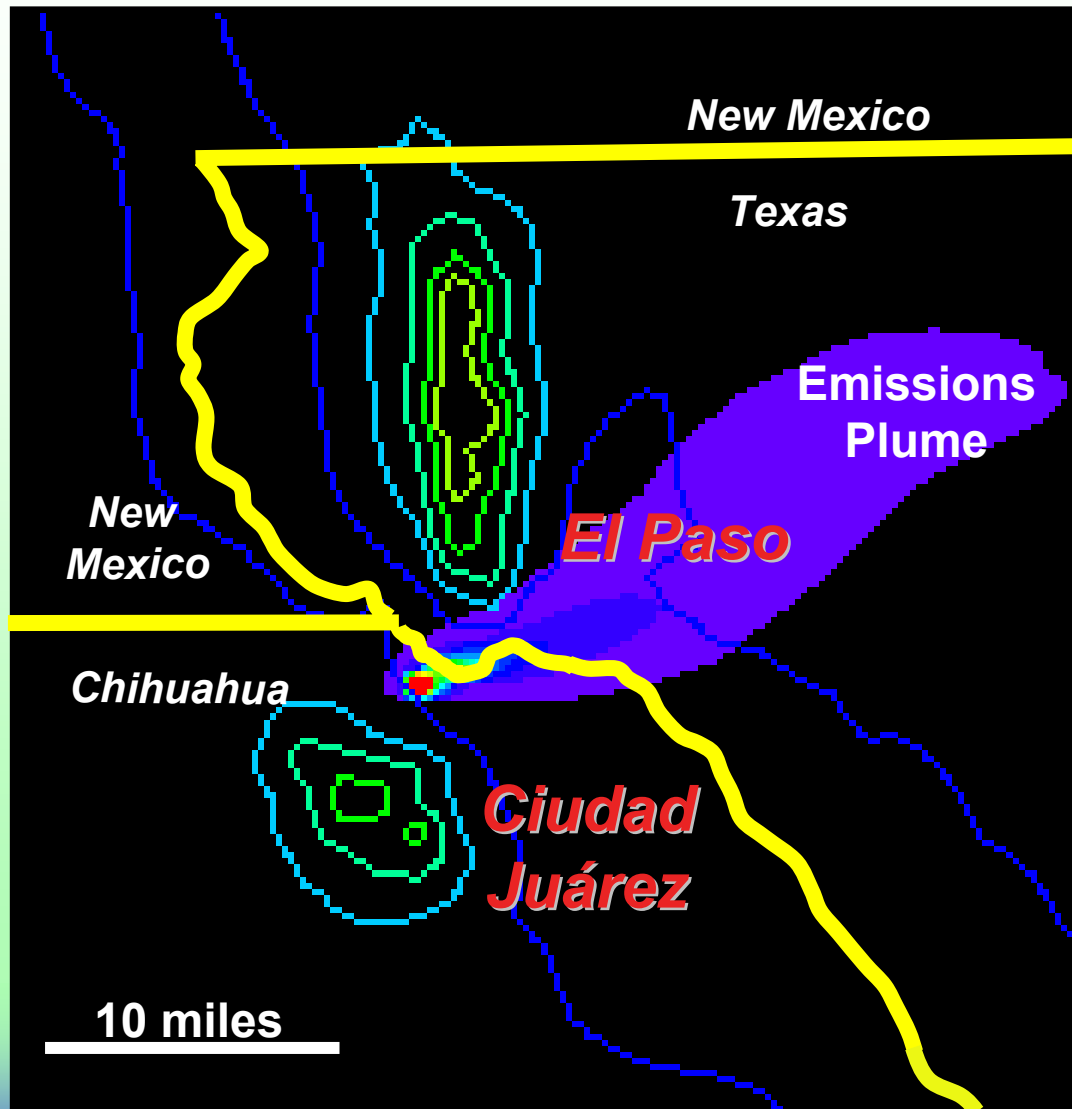
# Quality of Life ‘Indicators’?

- **Per Capita Income**
- **Hospital Admissions**
- **Mortality**
- **Chronic Disease Rates**
- **% Households Connected to Water Systems**
- **Traffic Congestion**
- **Water Availability**
- **.....**

# Connecting to Water Systems

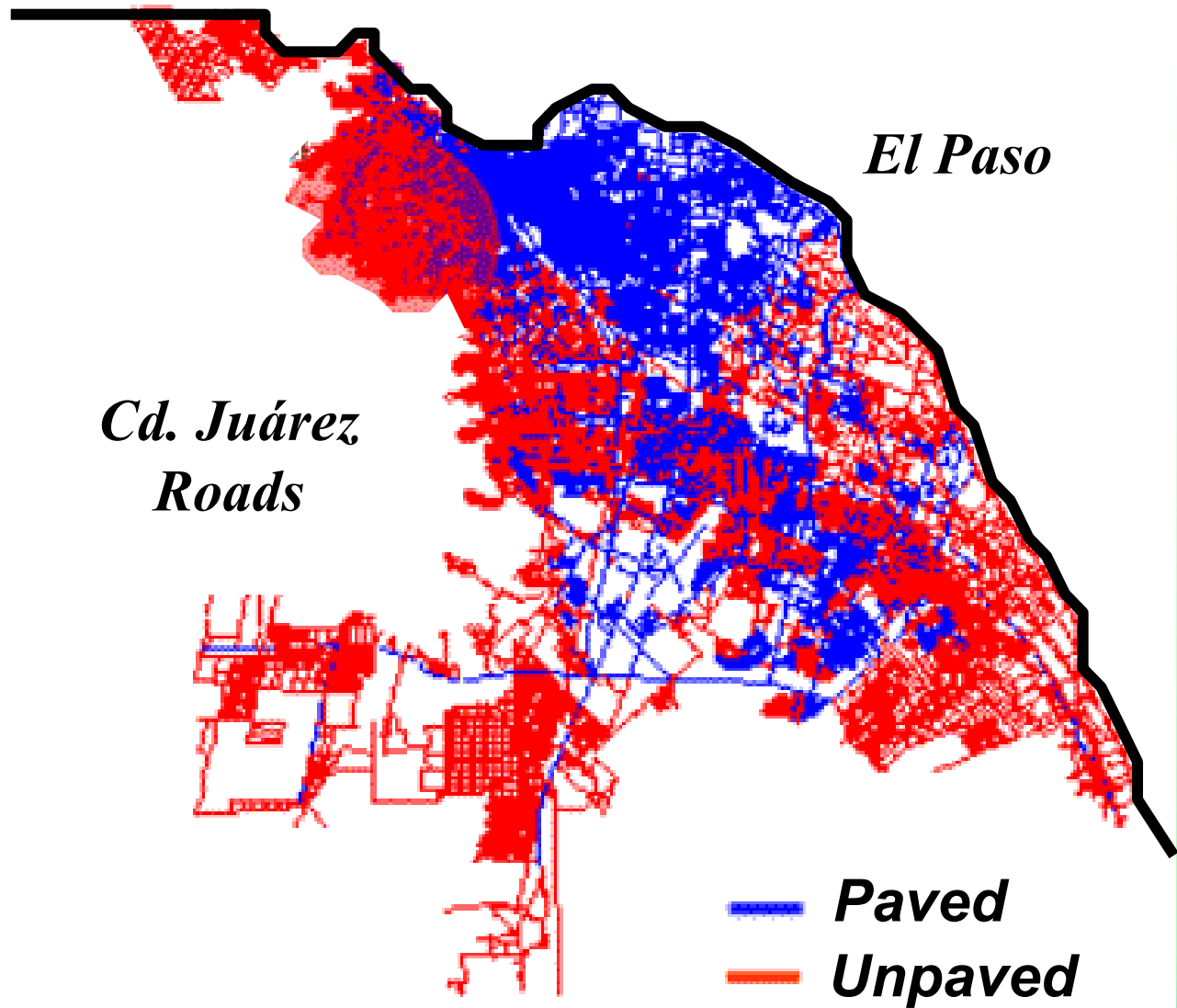


# Air Quality Explorations



*From Los Alamos National Laboratory*

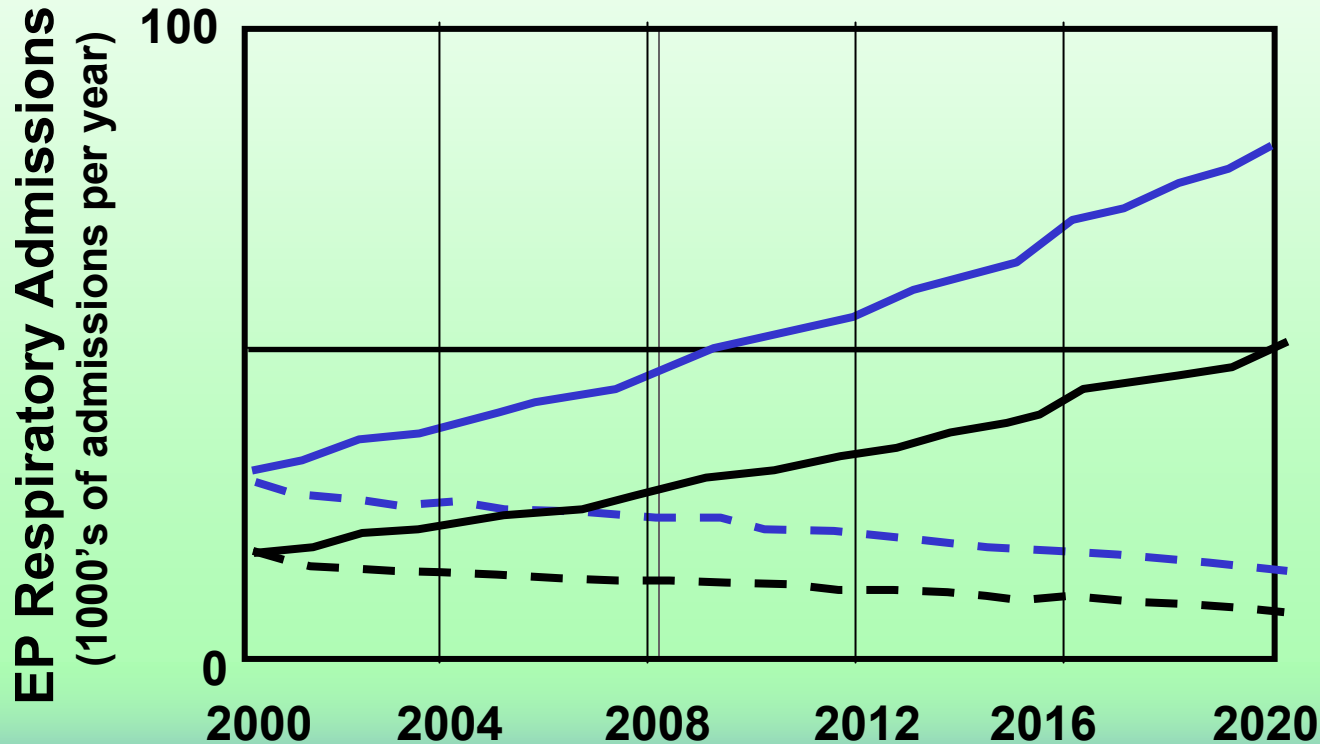
# Cd. Juárez Unpaved Roads



# Pave Cd. Juárez Roads

## Ciudad Juárez Respiratory Health Admissions?

- 10% CJ Emissions to EP; 50% New Roads Are Paved*
- - Paving Cd. Juárez Roads: 80% New Roads Are Paved; 100 km/year backlog*
- 30% CJ Emissions to EP; 50% New Roads Are Paved*
- - Paving Cd. Juárez Roads: 80% New Roads Are Paved; 100 km/year backlog*



# Pave Cd. Juárez Roads

## El Paso Respiratory Health Admissions?

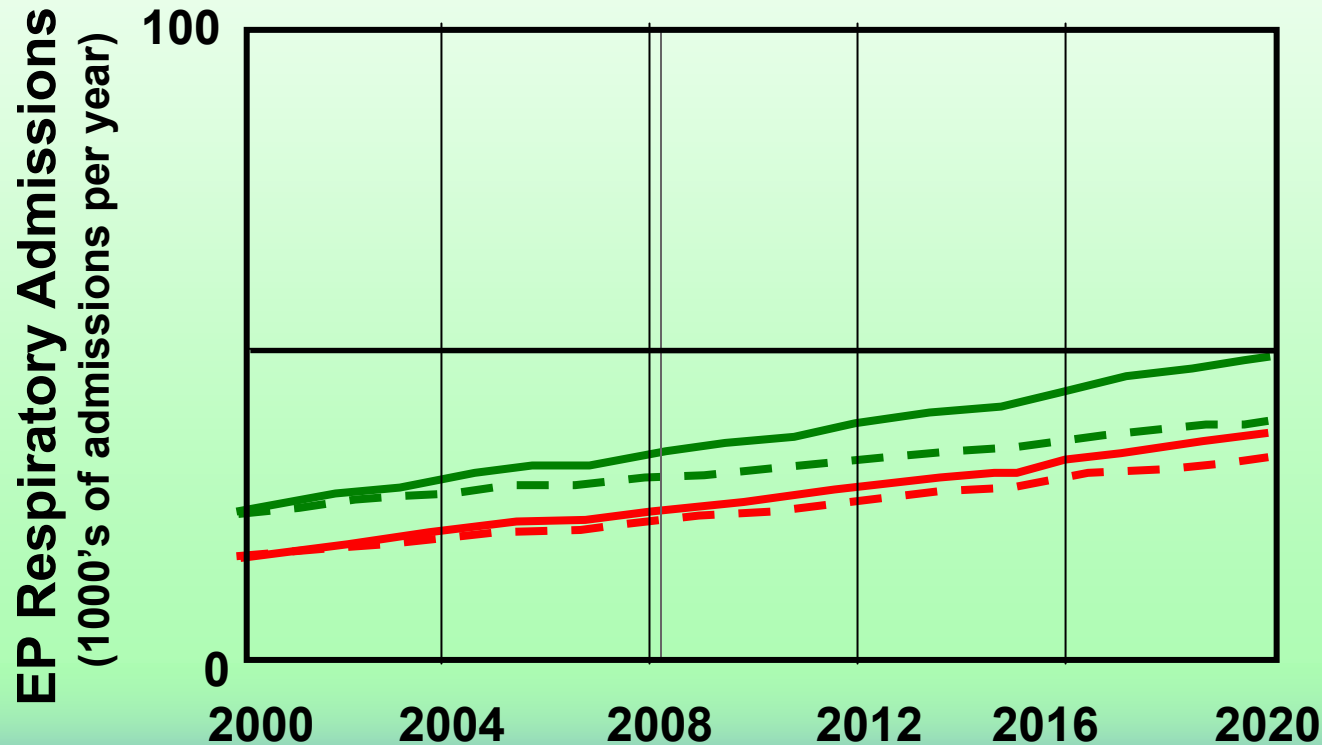
(El Paso 80% New Are Paved)

*— 10% CJ Emissions to EP; 50% New Are Paved*

*- - Paving Cd. Juárez Roads: 80% New Are Paved; 100 km/year backlog*

*— 30% CJ Emissions to EP; 50% New Are Paved*

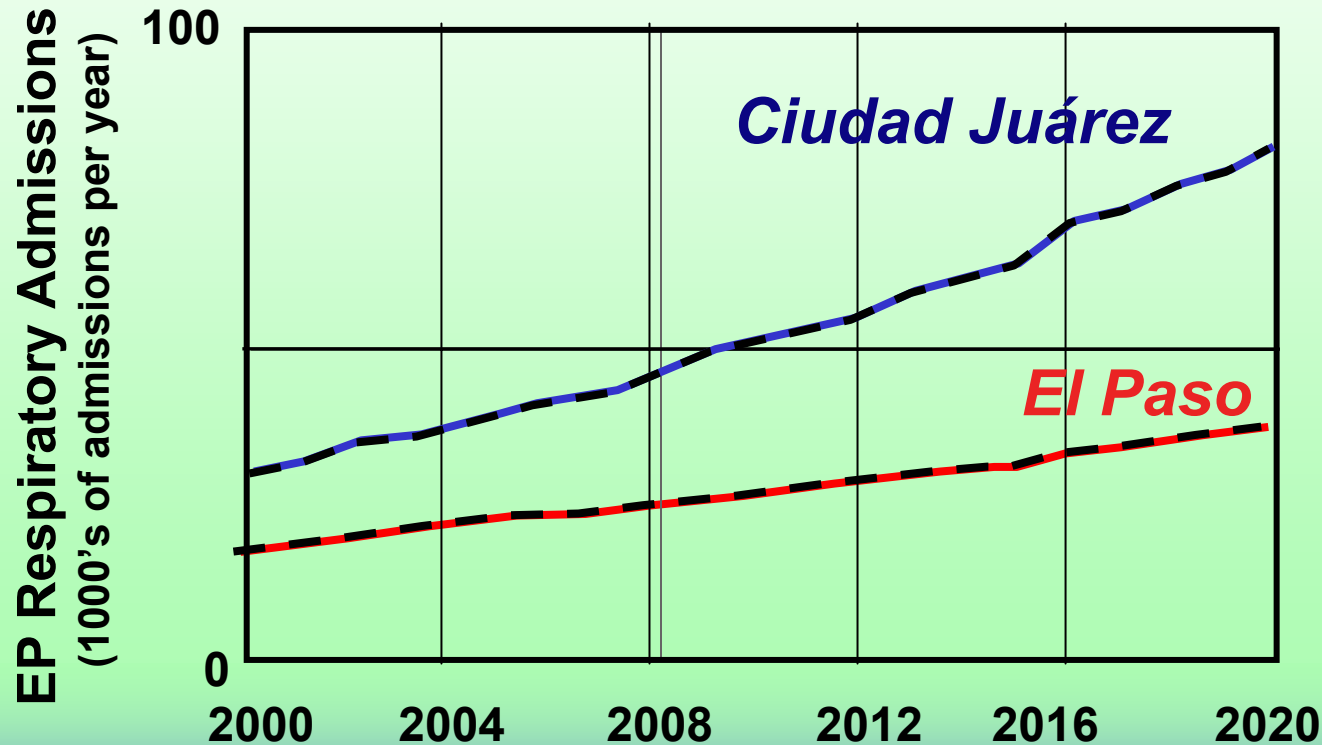
*- - Paving Cd. Juárez Roads: 80% New Are Paved; 100 km/year backlog*



# Modernize Brick Kilns

## Cd. Juárez & El Paso Respiratory Health Admissions?

*Brick Kiln Emissions Reduced to 20% of Previous*



# Another Tradeoff to Evaluate

- **Limit CJ in-migration due to high water infrastructure cost**
  - Reduce water demand and infrastructure costs
  - Reduce airborne health risks (e.g., # of hospital admissions)
  - Reduce population growth rate
  - Reduce economic health

**What are the benefits?**

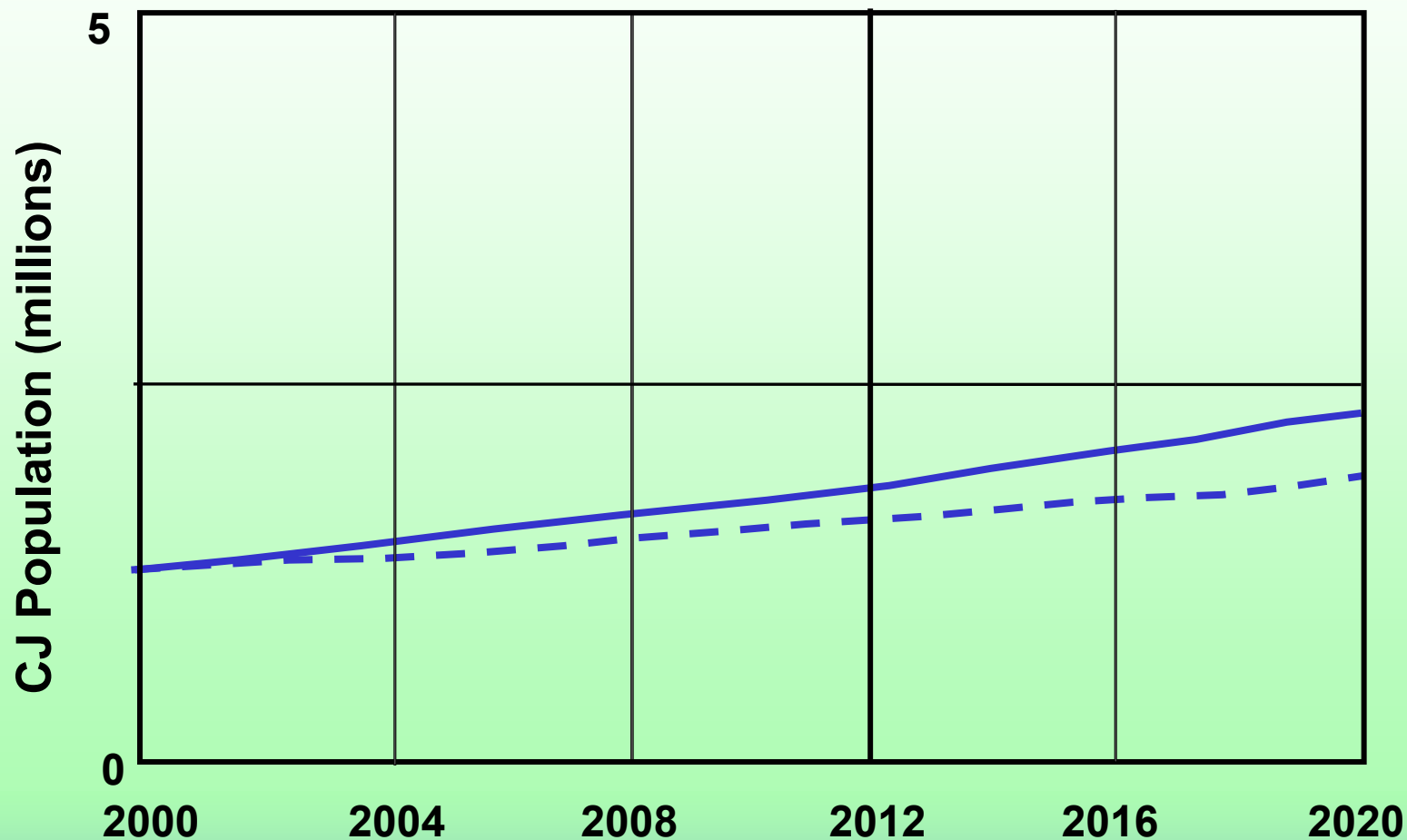
- **reduced health risk**
- **reduced environmental degradation**

**Which options have lowest net costs?**

**What are unintended consequences?**

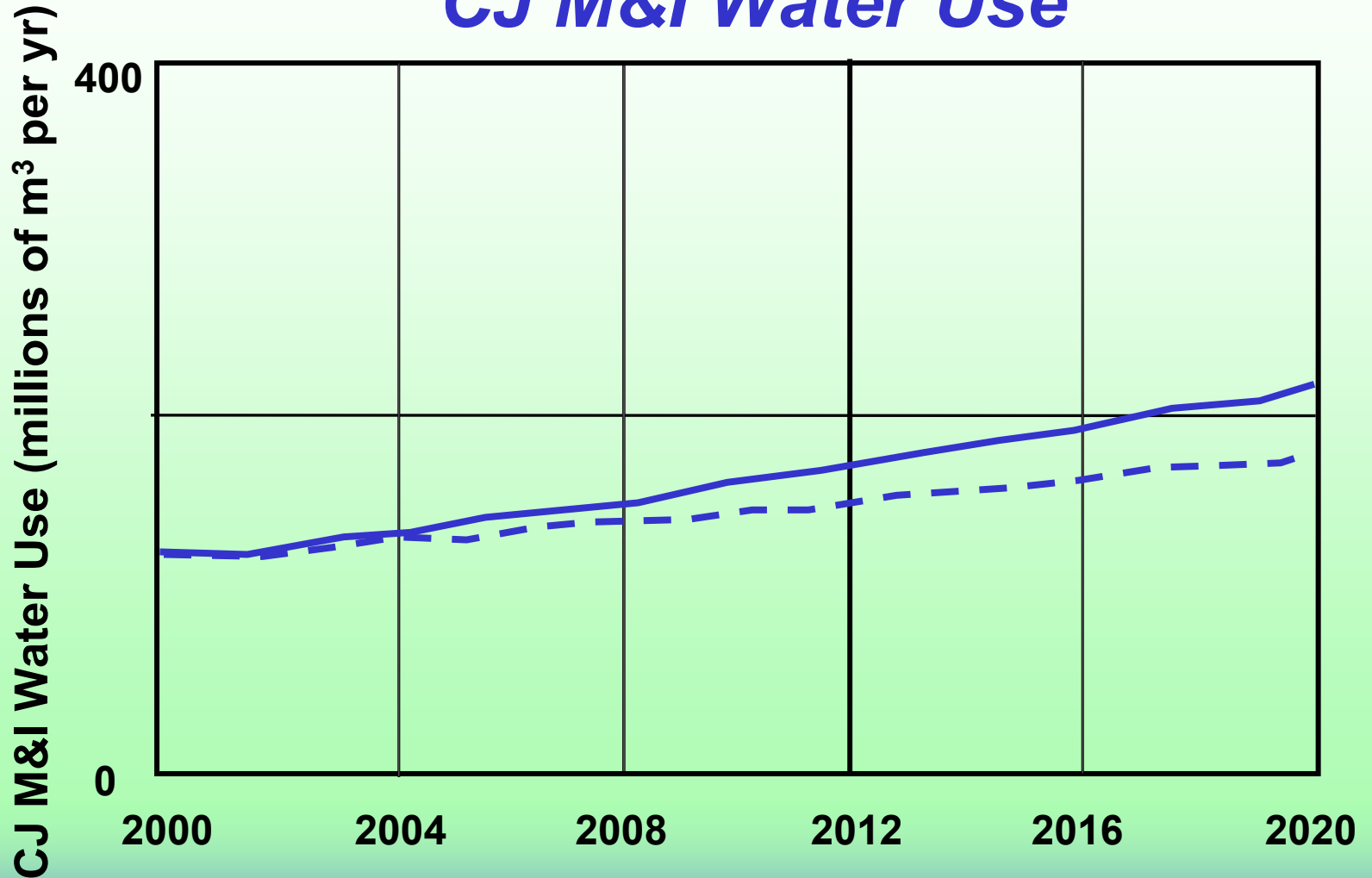
# Limit In-Migration to Cd. Juárez

## *CJ Population*



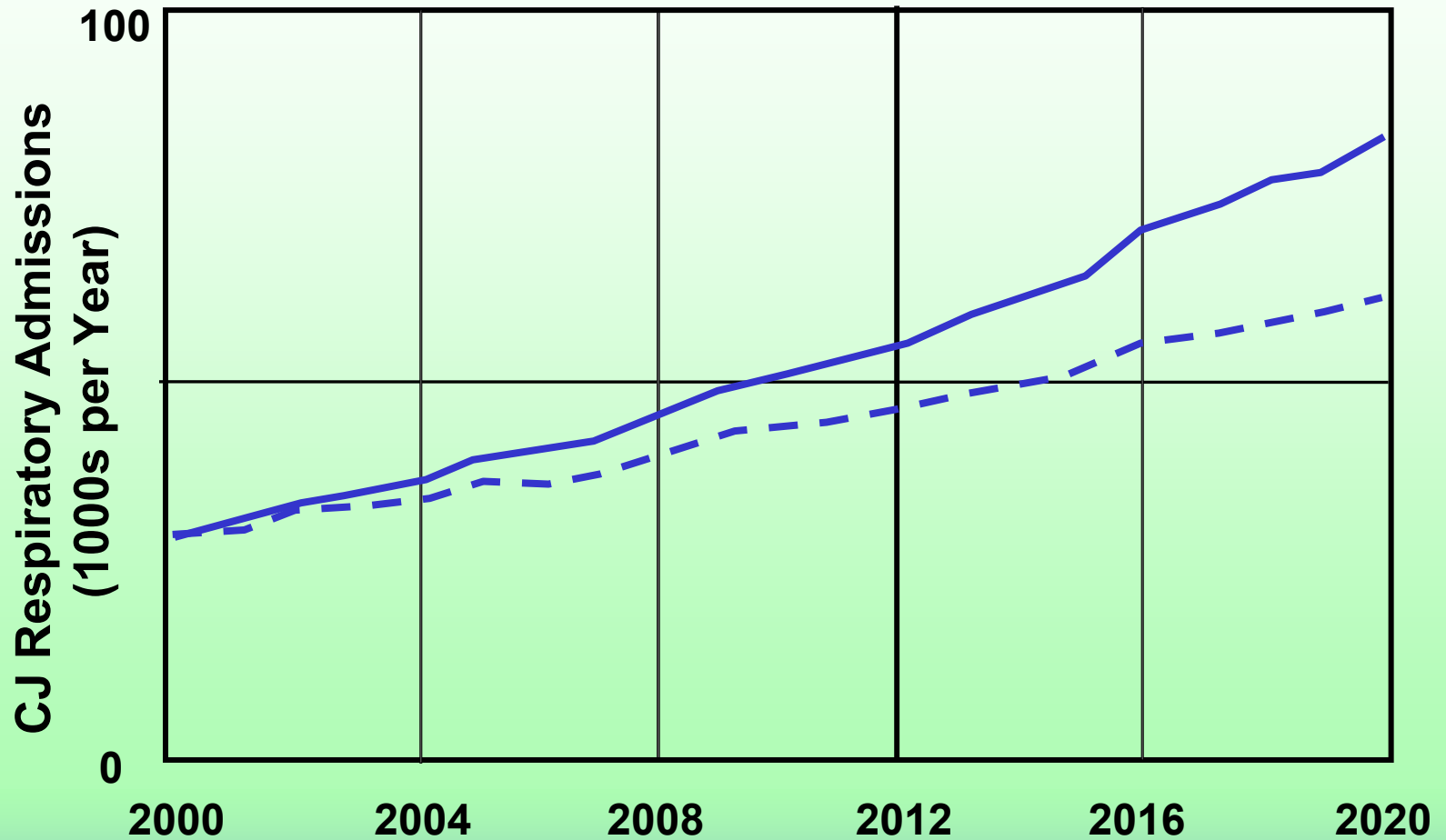
# Limit In-Migration to Cd. Juárez

## *CJ M&I Water Use*



# Limit In-Migration to Cd. Juárez

## *CJ Respiratory Hospital Admissions*



# Limit In-Migration to Cd. Juárez

## *CJ Economy*



# Model Applications

- **Interdisciplinary communication about the system**
- **Evaluate & prioritize indicators**
- **Explore alternate futures and indicator trends**
- **Support education & decision-making**

# B/F+20 Project Status

- **Model testing and refinement is underway**
- **The Public Finance sector is being developed**
- **Dialog with borderland urban ecosystem managers, residents and other stakeholders are required for:**
  - **additional model refinement**
  - **exploring alternative futures**
- **Mexicali/Imperial Valley/Salton Sea model in progress**