

# FINANCING SUSTAINABLE CITIES SCAN & TOOLKIT



## *A Scan of Financing Mechanisms, Key Metrics, & Potential Funders for Climate Action*

*Executive Summary, pages 1 to 54*  
*Full Report, pages 56 to 251*

*October 2016*

**USDN** | urban sustainability  
directors network

**HIP**™ : INVESTOR  
● Human Impact + Profit



*Financing Sustainable Cities*

Your  
Goals

Financial  
Sources

Key  
Metrics

Potential  
Funders

Five Step  
Process

# This Toolkit for Financing Sustainable Cities is for City Leaders in Sustainability & Finance

- *What:* **Financing Sustainable Cities: A Toolkit**
- *Who:* ***Leaders with sustainability initiatives in cities***
- *Why:* Learn how to craft investable deals that serve city needs for capital and investors' desire to achieve transformational climate action
- *Section Learning Goals:*
  - I) Specify your climate-action **goals**
  - II) Scan the spectrum of financing **mechanisms**
  - III) Understand meaningful **key metrics**, esp. ROI
  - IV) Learn about **investors**, advisors and **funders**
  - V) Follow the **5-Steps** of this Financing **Toolkit**

Your  
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Each page will have this Tracker in the footer below so you know where you are among the 5 sections.

# Acknowledgments: Thank You to a Wide Collaboration of Leaders & Experts



**USDN:** Multi-national network of 155 cities in the Urban Sustainability Directors Network  
Funding and support for this project from **Global Philanthropy Partners (GPP)**

- **GPP:**



**City of Palo Alto CA** (Lead city)

- **Project cities:**  
Ann Arbor MI; Berkeley CA; Ithaca NY;  
Milwaukee WI; Oakland CA; Phoenix AZ;  
Vancouver BC
- **Cities, Investors and Experts at the June 29, 2016 Convening**



**HIP (Human Impact + Profit) Investor Inc.:**  
Author of report; co-producer of Convening;  
Leader in sustainable finance,  
impact ratings & portfolios

## Why Is This Toolkit a Visual PPT Presentation?

- Visual presentations are **easier to read** for new, complex info
  - Each example of financing sustainable cities is typically one page.
  - Each financing mechanism is categorized by type of capital source.
- This toolkit is designed so you can **easily re-use the content and PPT** slides for your climate-action presentations
  - Find examples that match your goals and funding possibilities.
- You can also **more easily educate your city leaders** and colleagues using all or some of these presentation slides.

# Financing Sustainable Cities – A Toolkit

I. Setting Your Climate Action Goals

II. Financial Sources & Mechanisms for Capital

III. Key Metrics & How to Calculate Them

IV. Potential Funders for Municipal Climate Solutions

V. Five Steps to Funding Your Sustainable City Projects

## Cities Have Aggressive Climate Action Goals – Some Of Which Are Financially Attractive



# 80% GHG Reductions by 2050

(or sooner, like 2030 for Palo Alto)

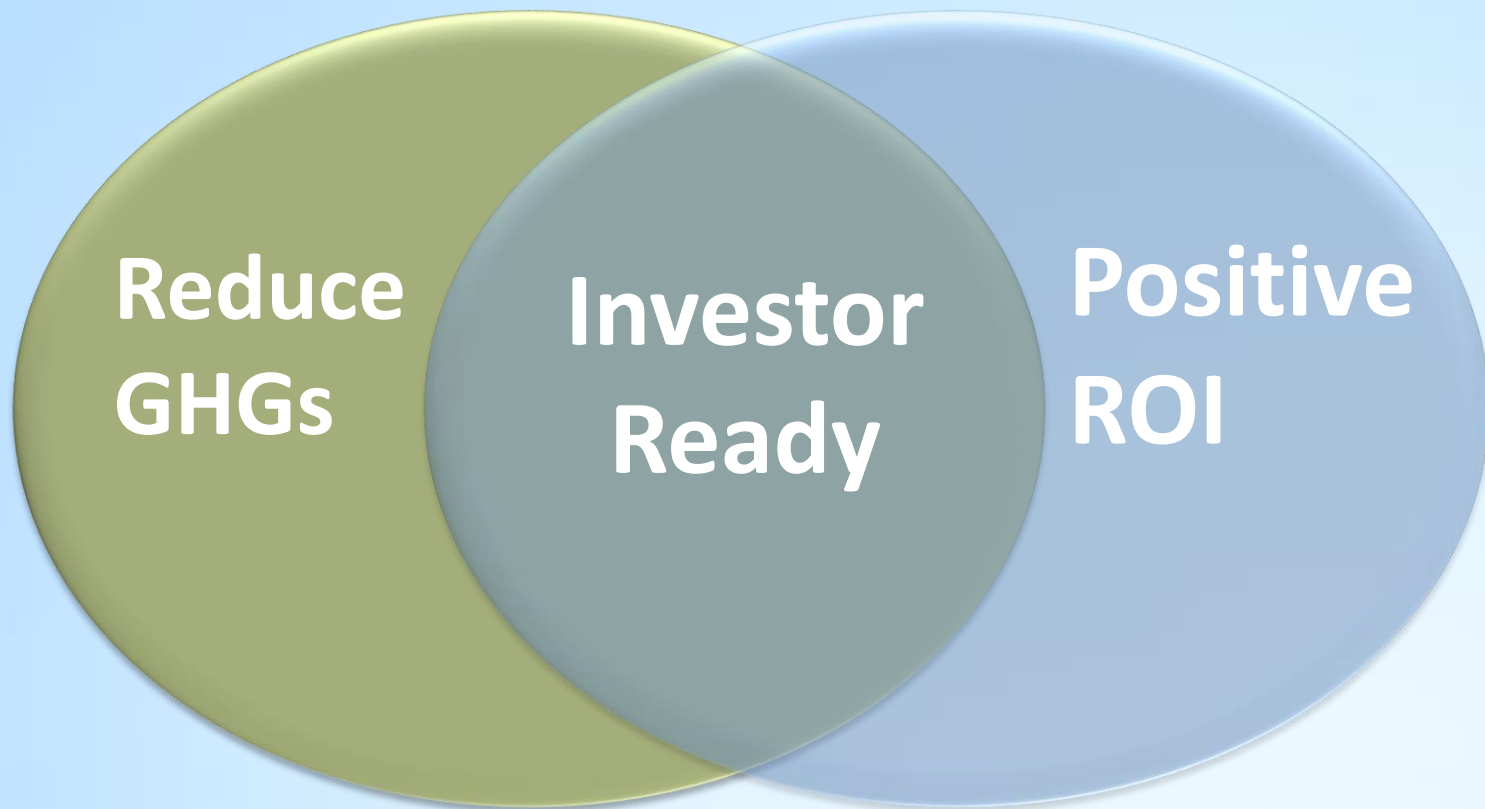
## ...with Positive ROI

\* ROI = Return on Investment (see how to calc in [section III, p. 181](#))

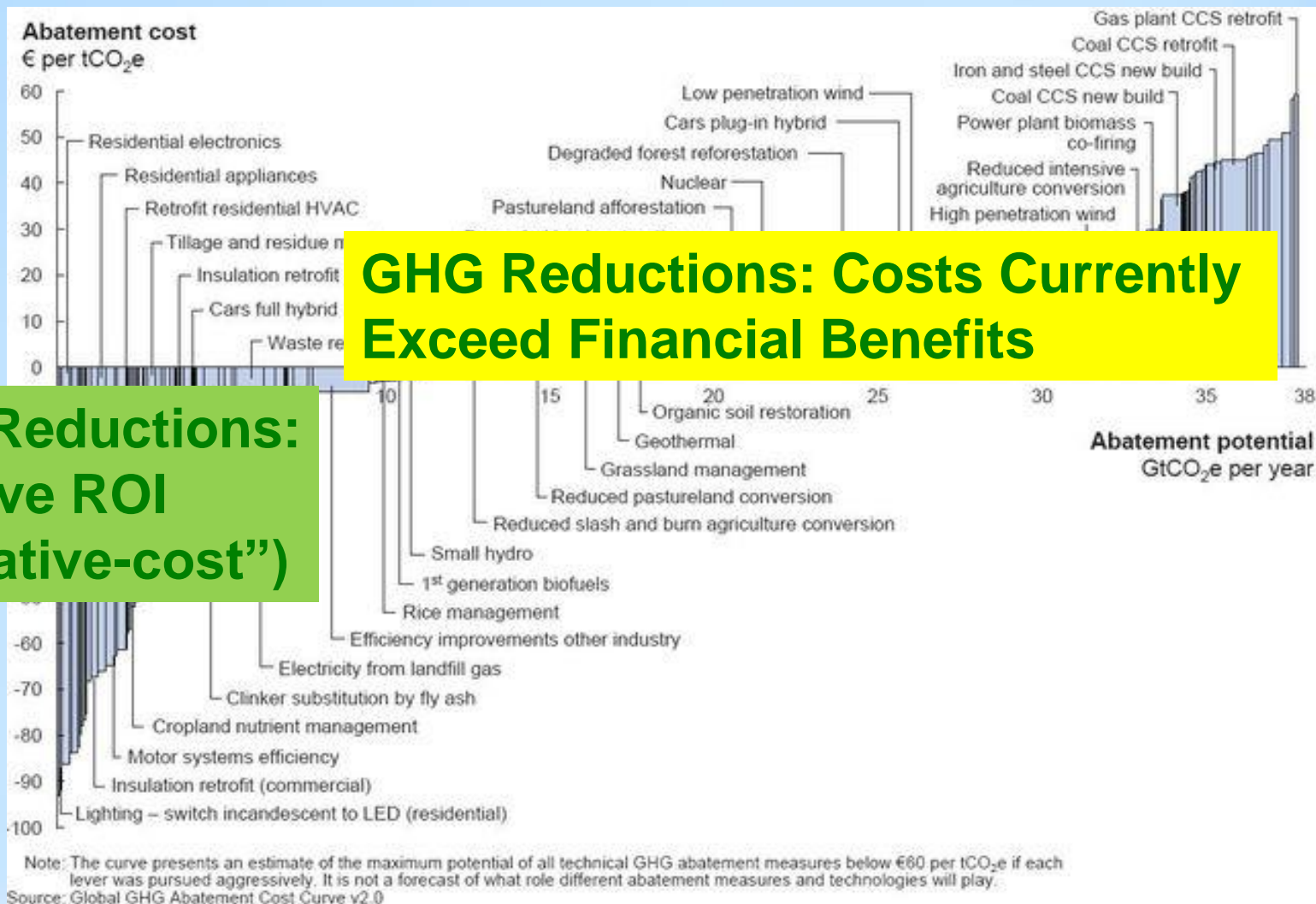
***As a sustainability leader, with your finance team, you can :***

- (1) select from this catalog of financial mechanisms to fund climate action for your GHG goals; and***
- (2) follow a 5-step process for matching investable opportunities with potential funders and investors.***

# When Climate Action Reduces GHGs with Positive ROI, those City Initiatives Are Investor-Ready



# Climate Actions that Reduce GHGs Offer Some Projects with Positive ROI



**GHG Reductions: Costs Currently Exceed Financial Benefits**

**GHG Reductions: Positive ROI (“negative-cost”)**



# Climate Actions Can Seek Capital from 3 Sources: Your City Budget, Outside Funders, and Partners



*The next Section will describe  
Financial Sources & Mechanisms from all 3 Groups*

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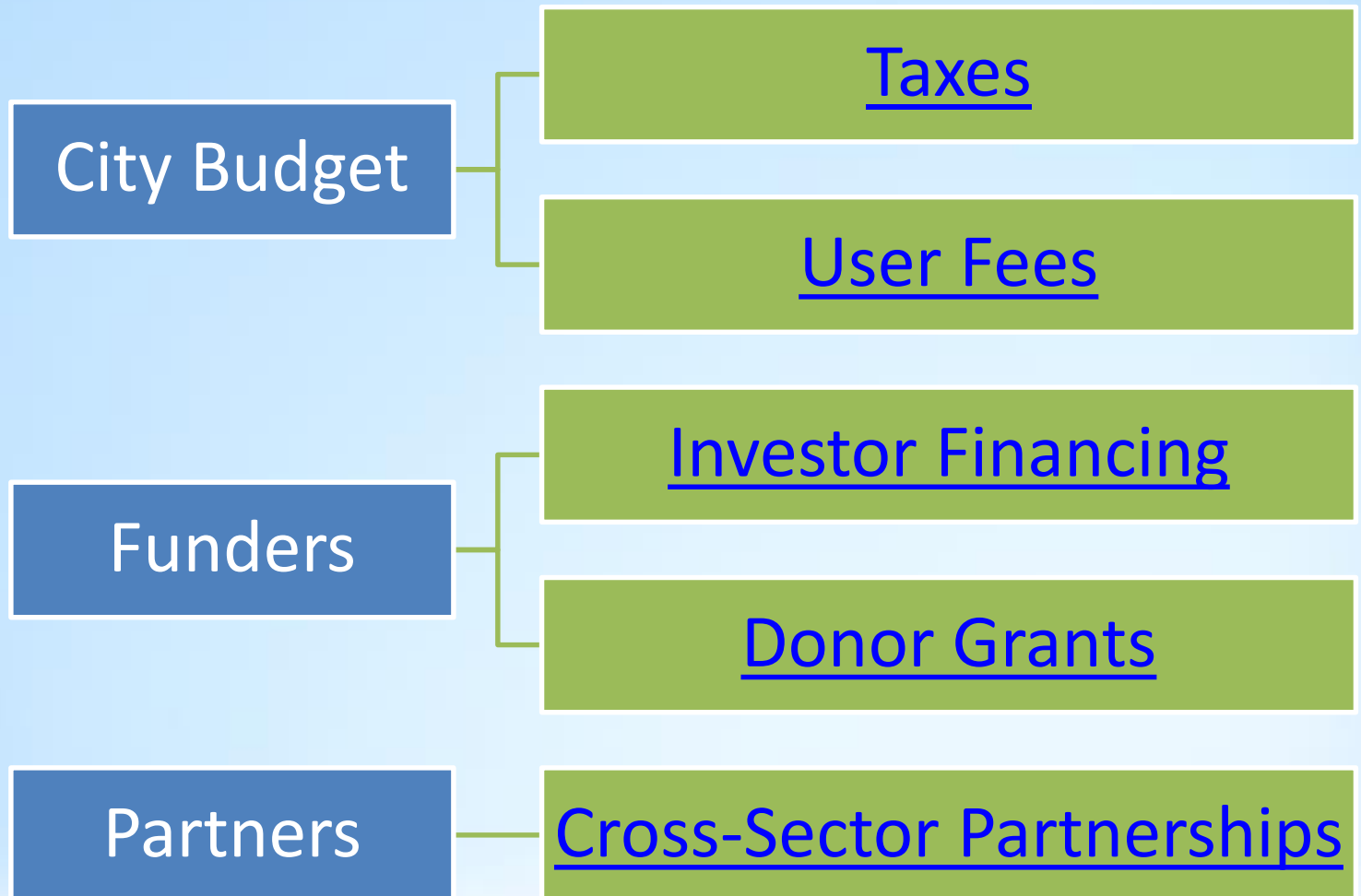
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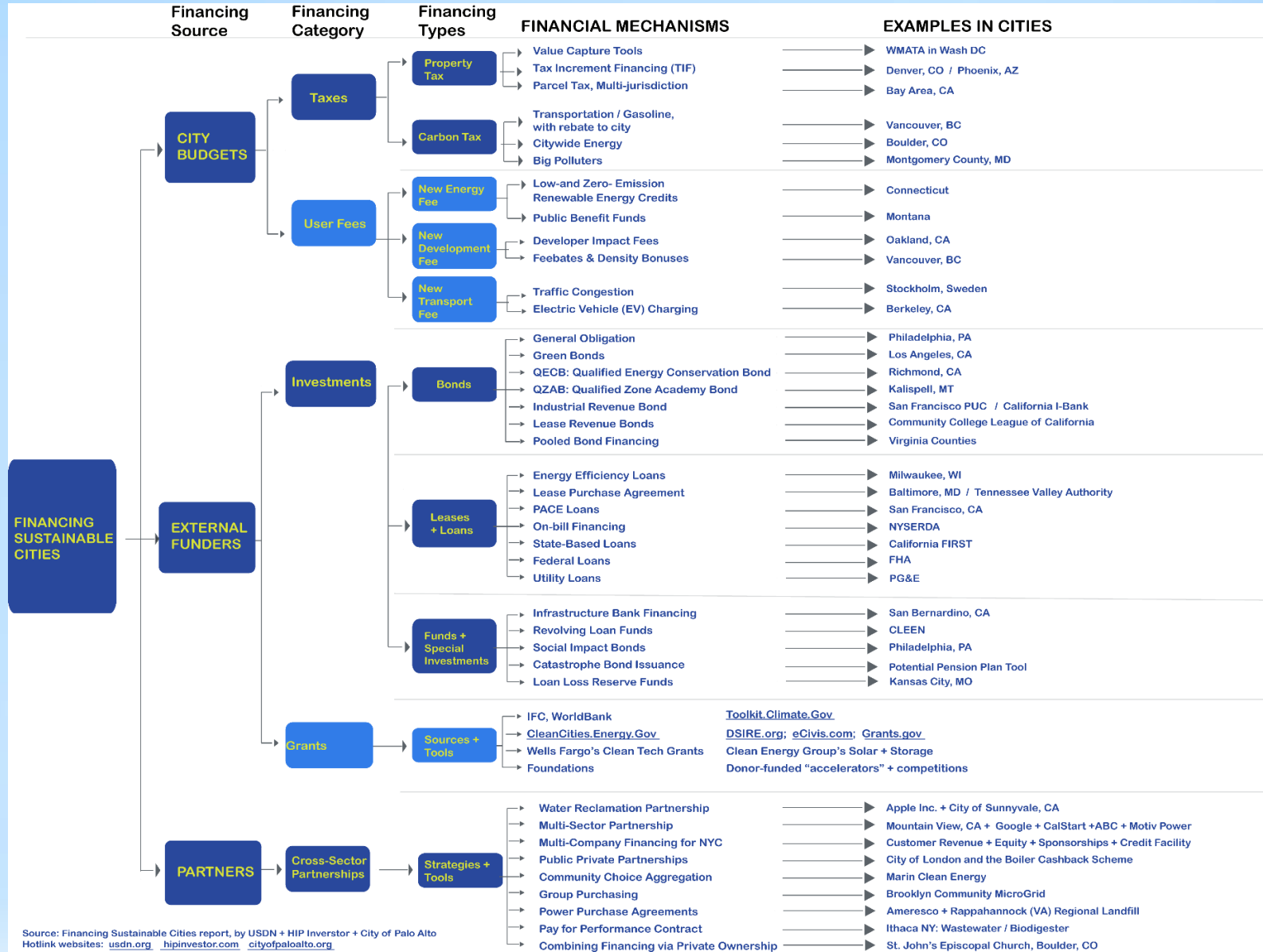
# Climate Action Can Seek 5 Types of Capital: Taxes, Fees, Financing, Grants, & Partnerships

*Click the link to jump to that section*



# All Financing Mechanisms Summarized In this Scan

*This summary is also published as a one-page handout*



Source: Financing Sustainable Cities report, by USDN + HIP Investor + City of Palo Alto  
Hotlink websites: [usdn.org](#) [hipinvestor.com](#) [cityofpaloalto.org](#)

# All Financing Mechanisms Summarized In this Scan with Linked Examples (1 of 2)

*Click the link to jump to that example*

## New Property Tax EXAMPLES

- Value Capture Tools:
  - [WMATA in Wash DC](#)
- Tax Increment Financing (TIF)
  - [Denver CO](#)
  - [Phoenix AZ](#)
- Parcel Tax, Multi-jurisdiction
  - [Bay Area CA](#)

## LIVE Carbon Tax EXAMPLES

- Transportation / gasoline, with rebate to city
  - [Vancouver BC](#)
- Citywide energy
  - [Boulder CO](#)
- Big polluters
  - [Montgomery County MD](#)

## New Energy Fee EXAMPLES

- Low- and Zero-Emission Renewable Energy Credits
  - [Connecticut](#)
- Public benefit funds
  - [Montana](#)

## New Development Fee EXAMPLES

- Developer Impact Fees
  - [Oakland CA](#)
- Feebates & Density Bonuses
  - [Vancouver BC](#)

## New Transport Fee EXAMPLES

- Traffic Congestion
  - [Stockholm](#)
- Electric Vehicle (EV) Charging
  - [Berkeley CA](#)

## Bond EXAMPLES

- General Obligation
  - [Philadelphia PA](#)
- Green Bonds
  - [Los Angeles CA](#)
- QECCB: Qualified Energy Conservation Bond
  - [Richmond CA](#)
- QZAB: Qualified Zone Academy Bond
  - [Kalispell MT](#)

## More Bond EXAMPLES

- Industrial Revenue Bonds
  - [San Francisco PUC](#)
  - [California I-Bank](#)
- Lease Revenue Bonds
  - [Community College League of California](#)
- Pooled Bond Financing
  - [Virginia Counties](#)

## Lease & Loan EXAMPLES (1 of 2)

- Energy efficiency loans
  - [Milwaukee WI](#)
- Lease Purchase Agreement
  - [Baltimore MD](#)
  - [Tennessee Valley Authority](#)
- PACE Loans
  - [San Francisco CA](#)

# All Financing Mechanisms Summarized In this Scan with Linked Examples (2 of 2) *Click the link to jump to that example*

## Lease & Loan EXAMPLES (2 of 2)

- On-bill Financing
  - [NYSERDA](#)
- State-Based Loans
  - [California FIRST](#)
- National Loans
  - [FHA](#)
- Utility loans
  - [PG&E](#)

## More EXAMPLES

- Infrastructure Bank Financing
  - [San Bernardino CA](#)
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- Catastrophe Bond Issuance
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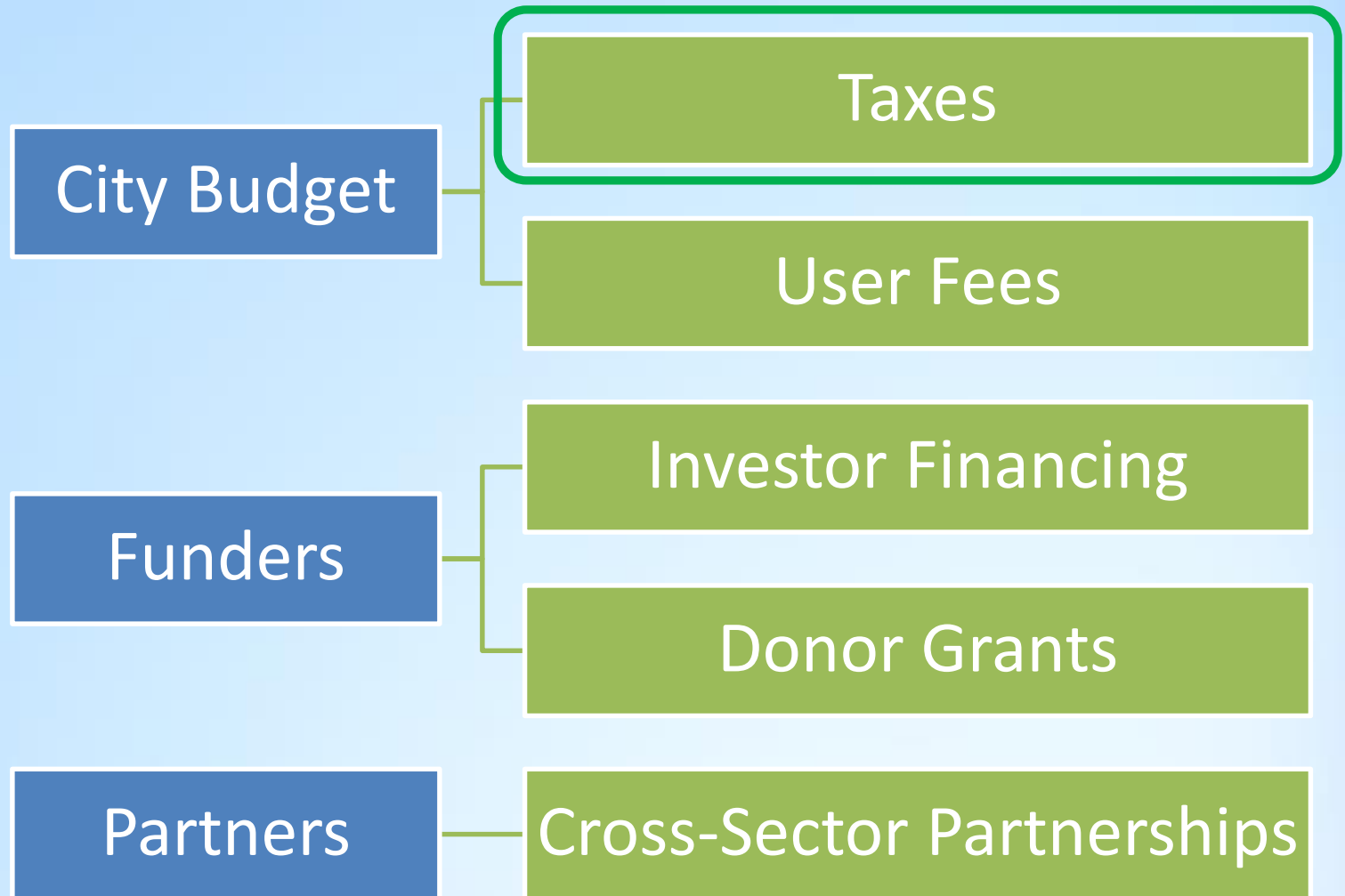
## Grant EXAMPLES

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- [Toolkit.Climate.Gov](#)
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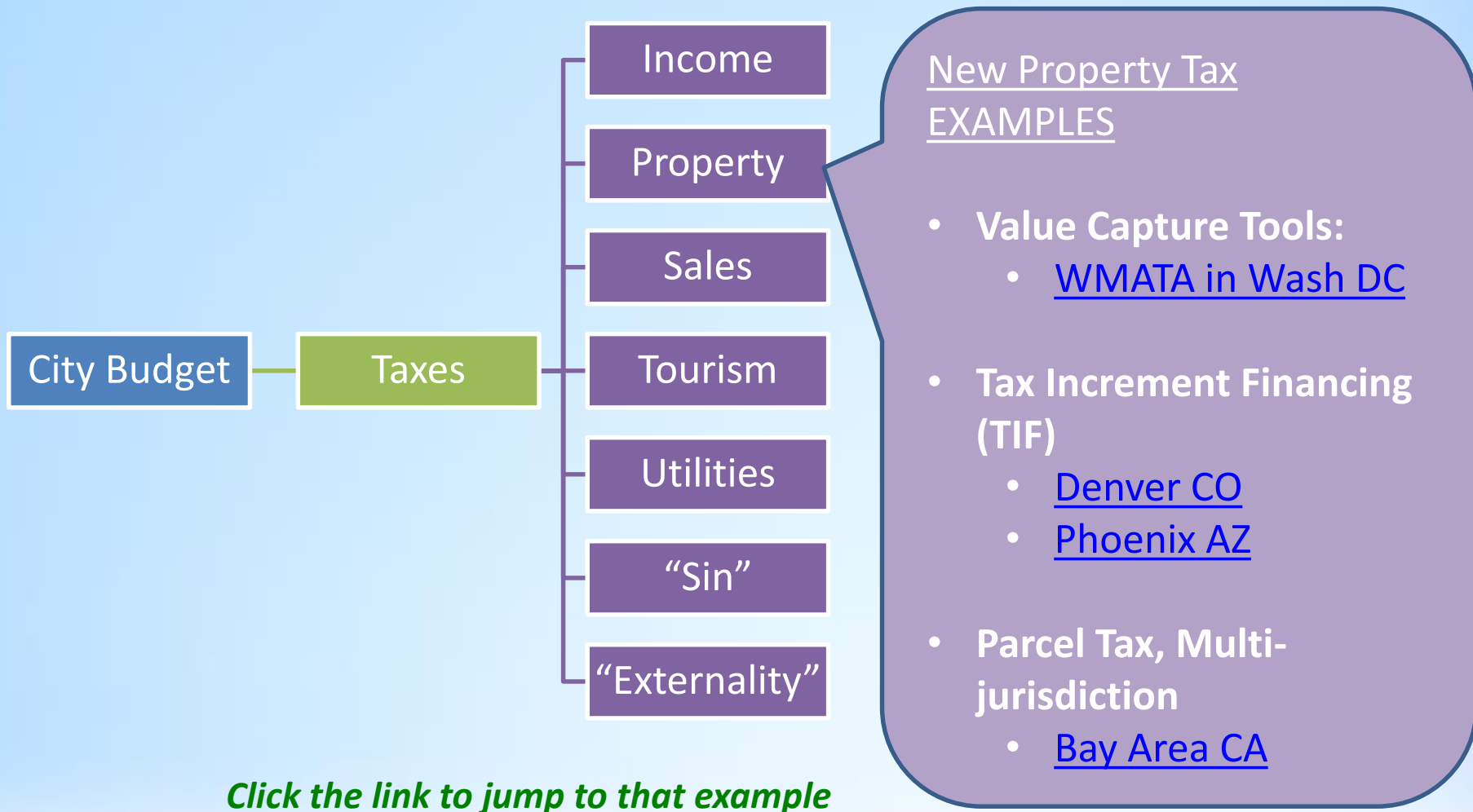
## PARTNERSHIP EXAMPLES

- Water Reclamation Partnership
- [Apple Inc. + City of Sunnyvale CA](#)
- Multi-Sector Partnership
- [Mountain View CA + Google + CalStart + ABC + Motiv Power](#)
- Multi-Company Financing for New York City
- [Customer Revenue + Equity + Sponsorships + Credit Facility](#)
- Public Private Partnerships
- [City of London and the Boiler Cashback Scheme](#)
- Community Choice Aggregation
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- Pay for Performance Contract
- [Ithaca NY: Wastewater/Biodigester](#)
- Combining Financing via Private Ownership
- [St. John's Episcopal Church, Boulder, CO](#)

# With the Power to Create New Taxes, or Shift Existing Taxes, Cities Can Fund Climate Action

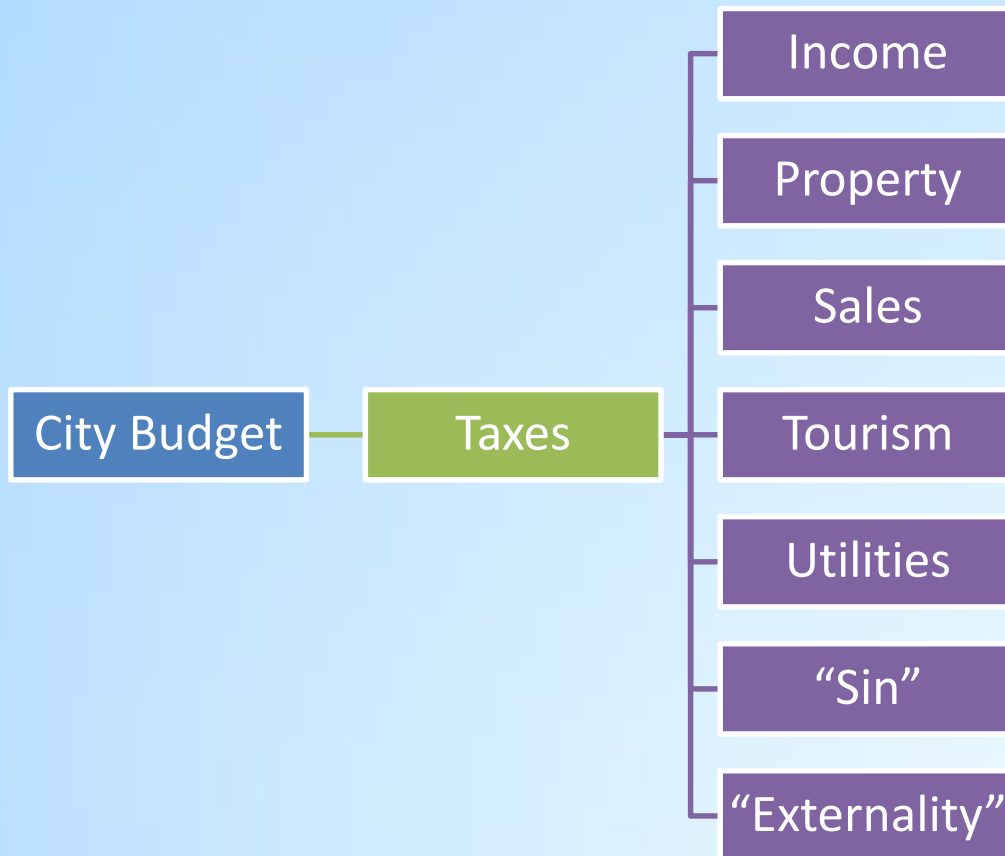


# As Climate Actions Improve Livability and Mobility, New Property Taxes Can Be Applied





# Several Version of a Tax on GHGs, or “Carbon Taxes,” Have Been Implemented

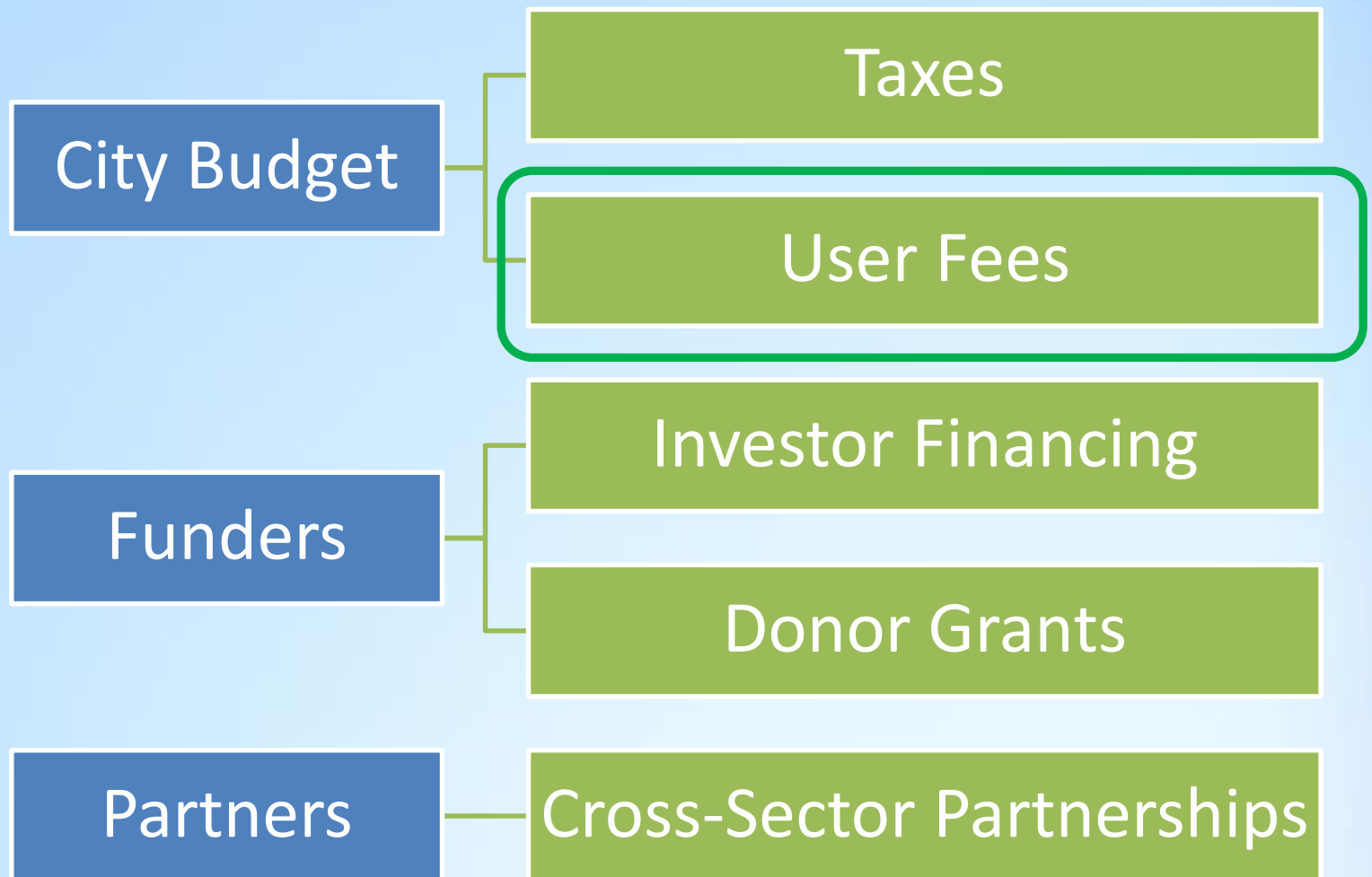


## LIVE Carbon Tax EXAMPLES

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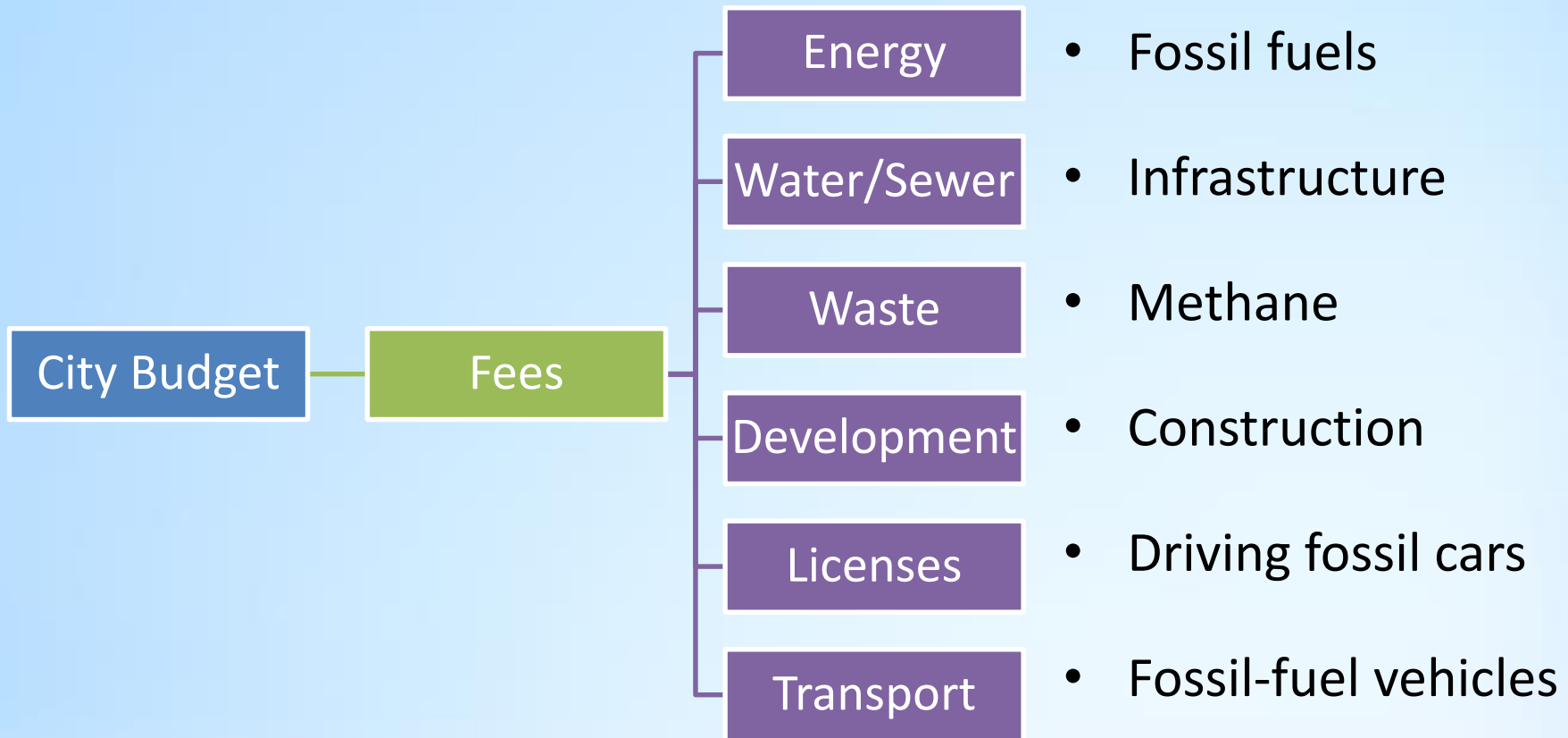
*The next pages explain the concept, and show an example;  
you can click the links to jump to the examples*

# Cities Can Charge Fees to Users to Fund Climate Action

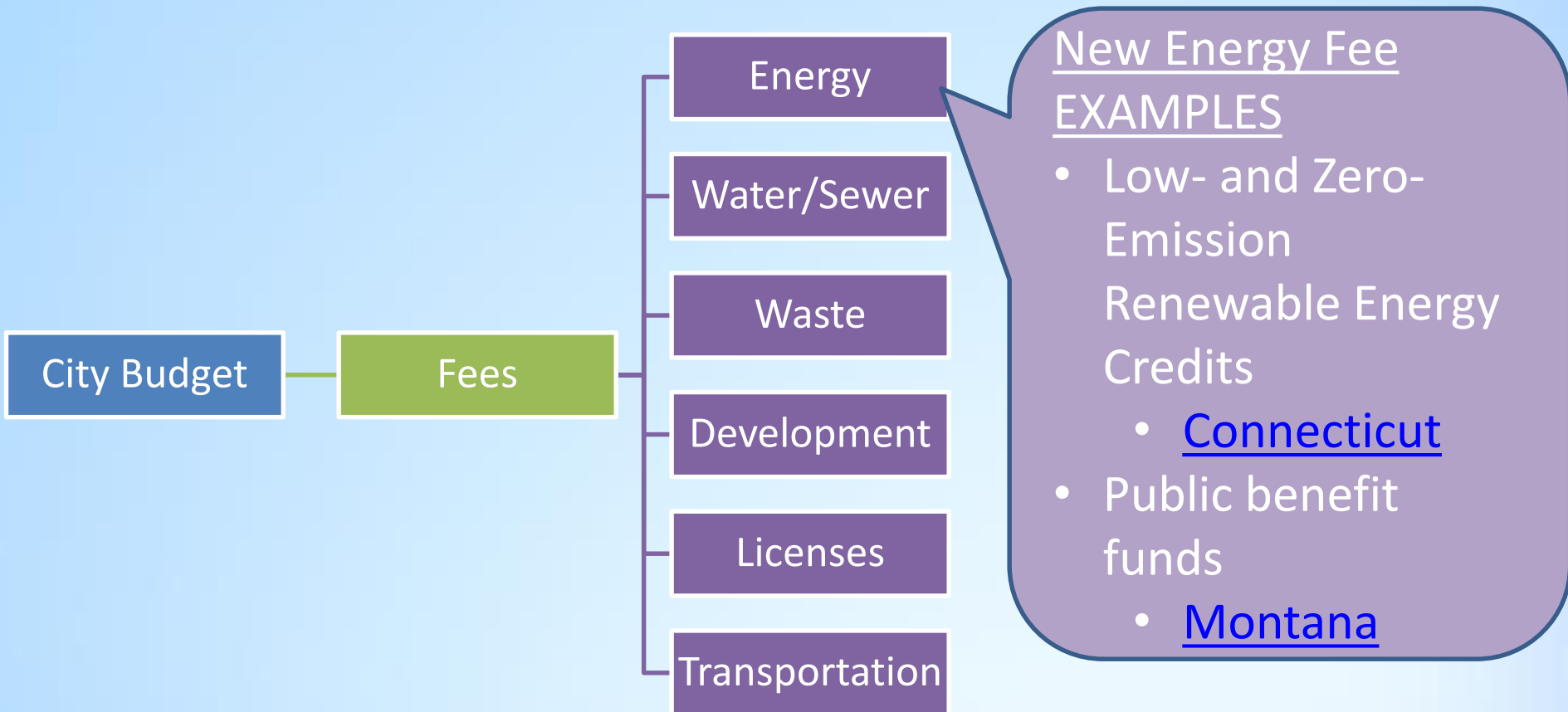


# City FEES Charge Users Directly for Services, which Also Frequently Tie to Sources of GHGs

## Sources of GHGs

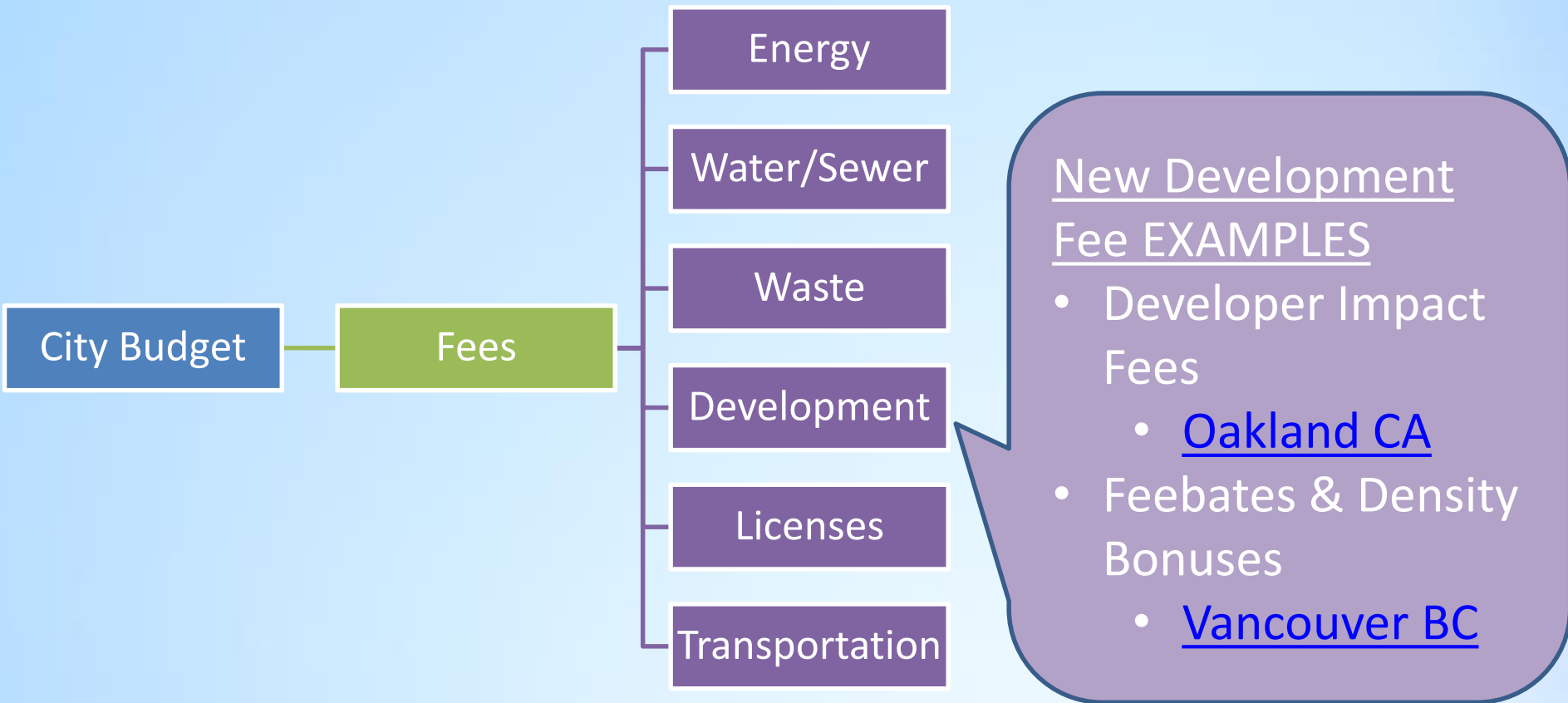


# New Types of City FEES Can Fund Climate Solutions More Easily from Direct Customers



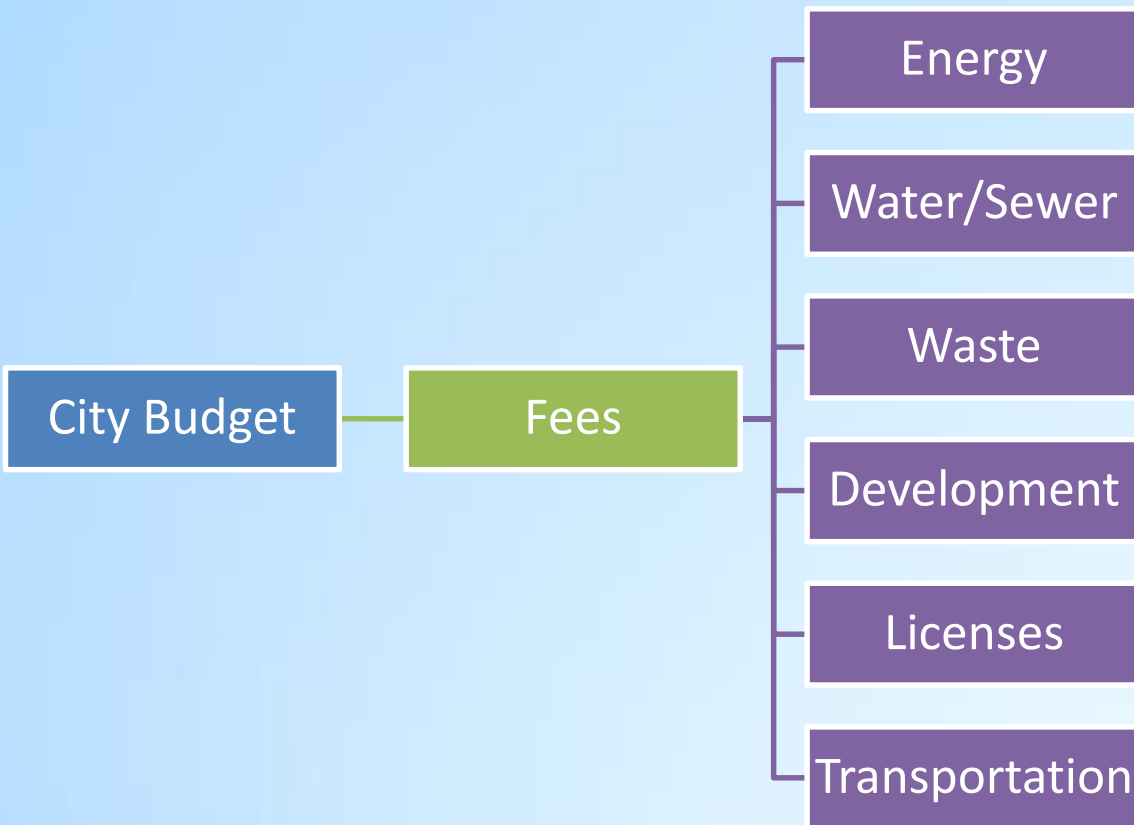
*Click the link to jump to that example*

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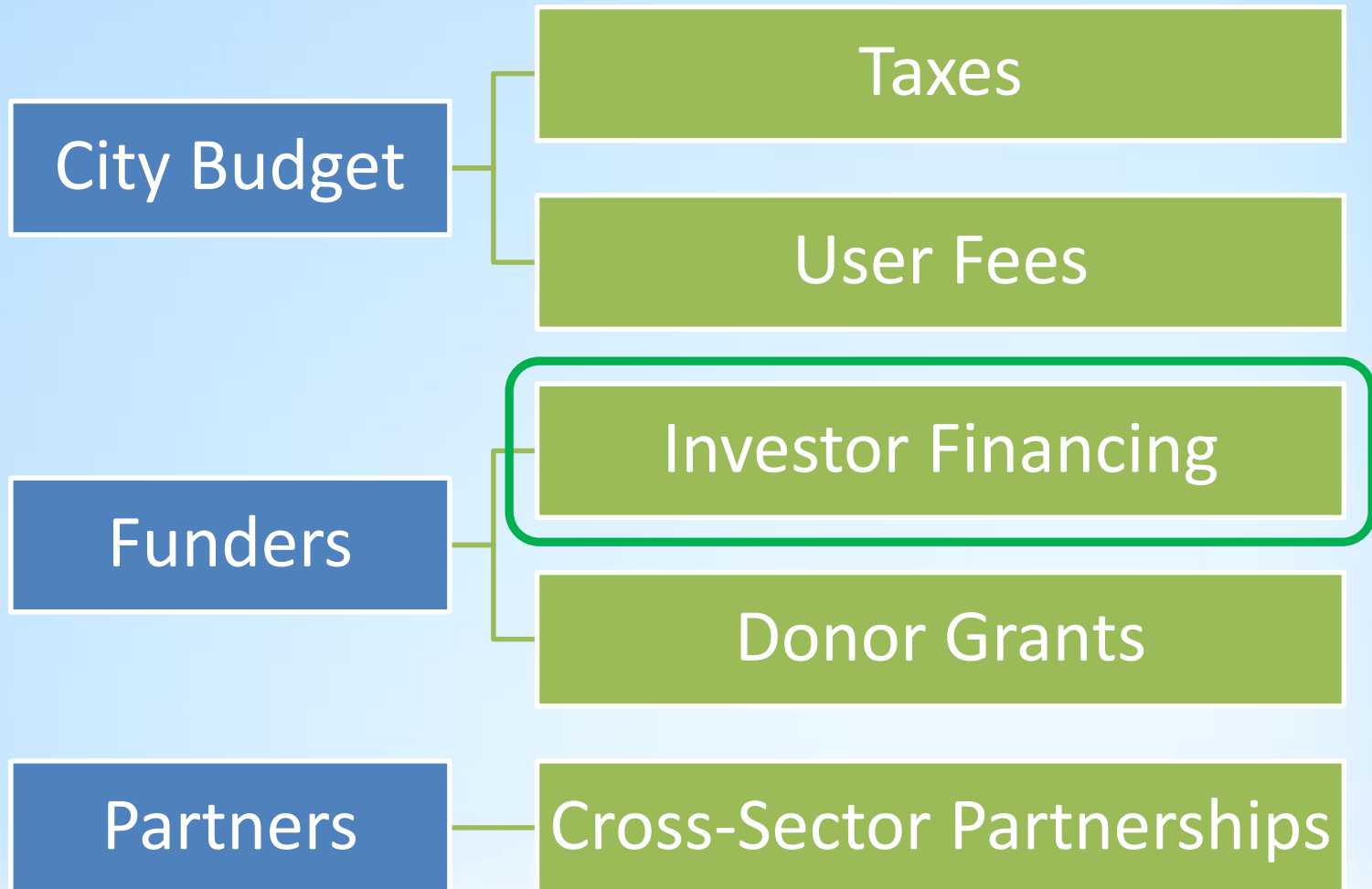


## New Transport Fee EXAMPLES

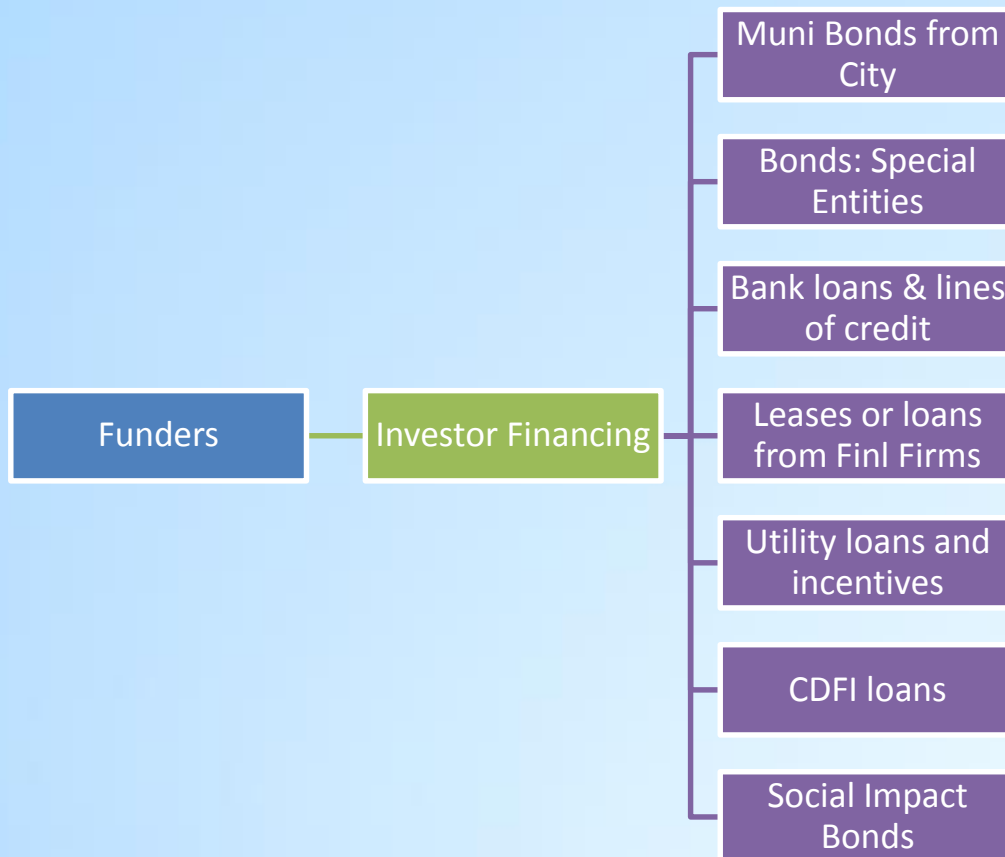
- Traffic Congestion
  - [Stockholm](#)
- Electric Vehicle (EV) Charging
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*Click the link to jump to that example*

# Investors Can Fund Climate Action, Especially If ROIs Are Positive



# Climate Action with Positive ROI Can Be Attractive for All Types of Bonds



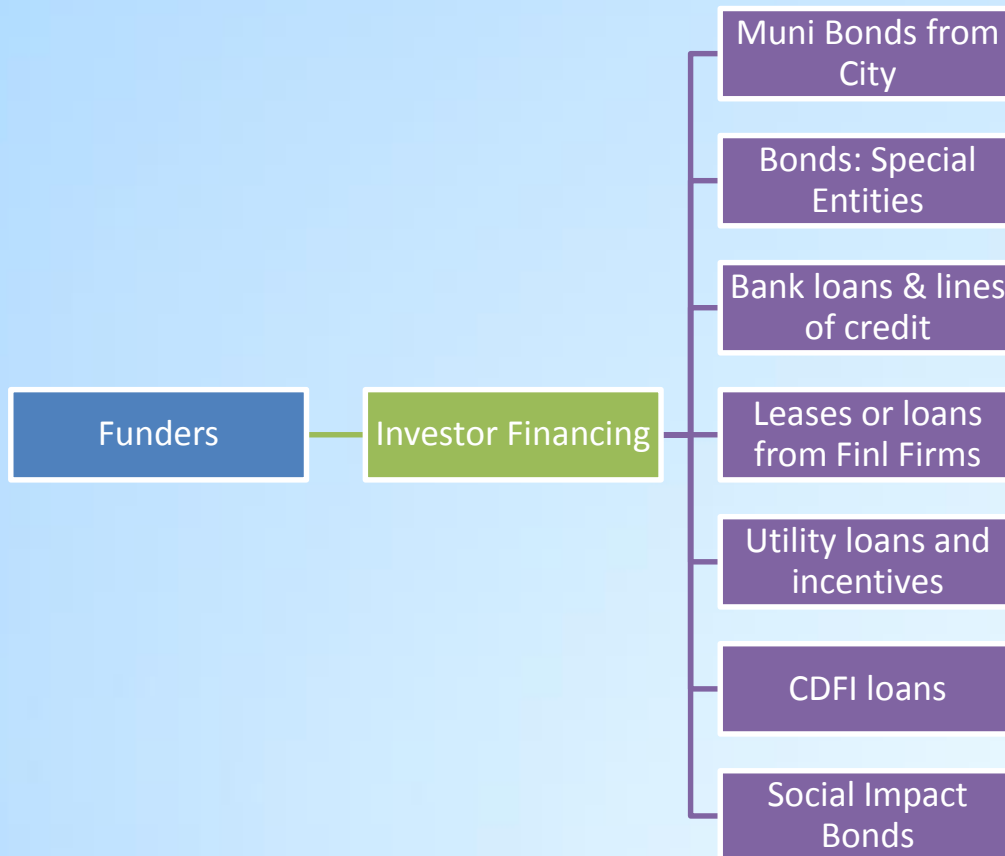
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# Climate Action with Positive ROI Can Be Attractive for All Types of Bonds

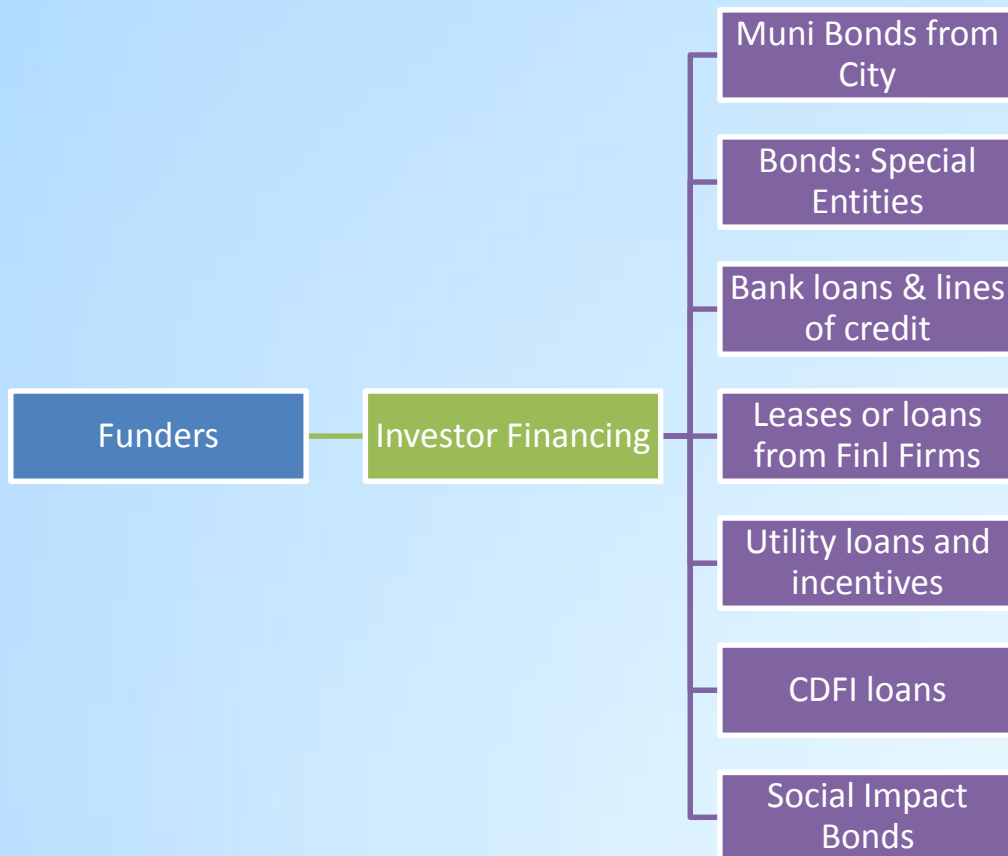


## More Bond EXAMPLES

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*Click the link to jump to that example*

# Climate Action with Positive ROI Can Be Attractive for All Types of Loans & Leases

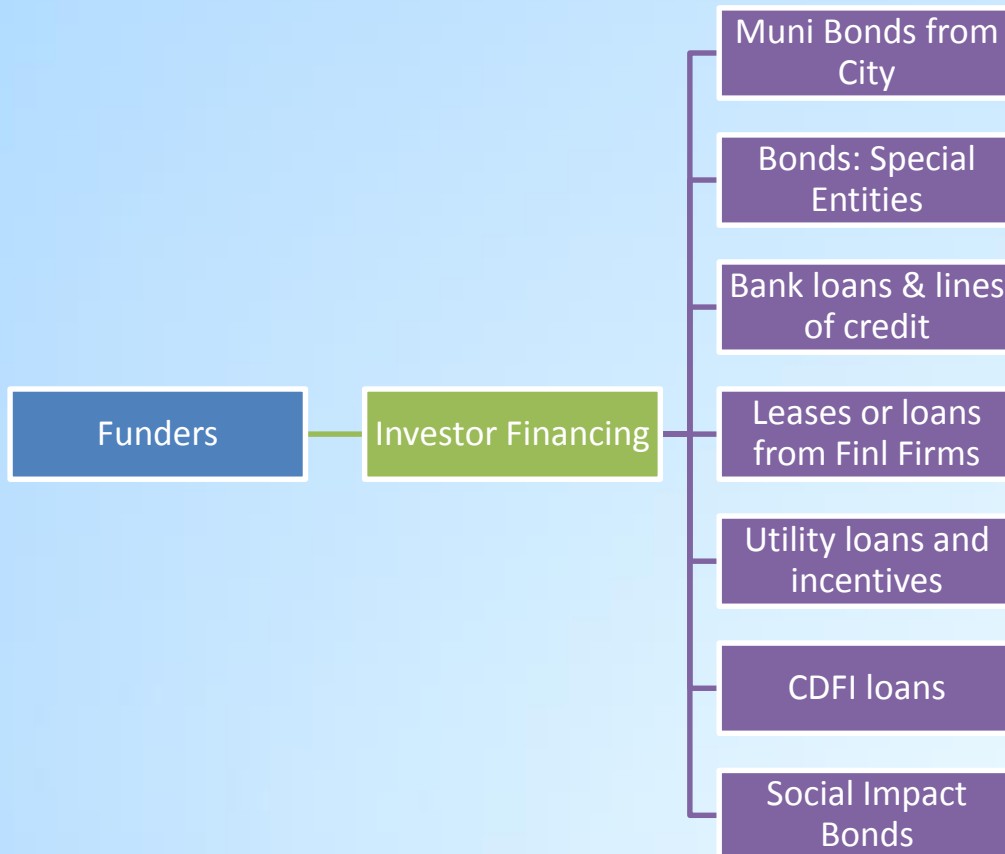


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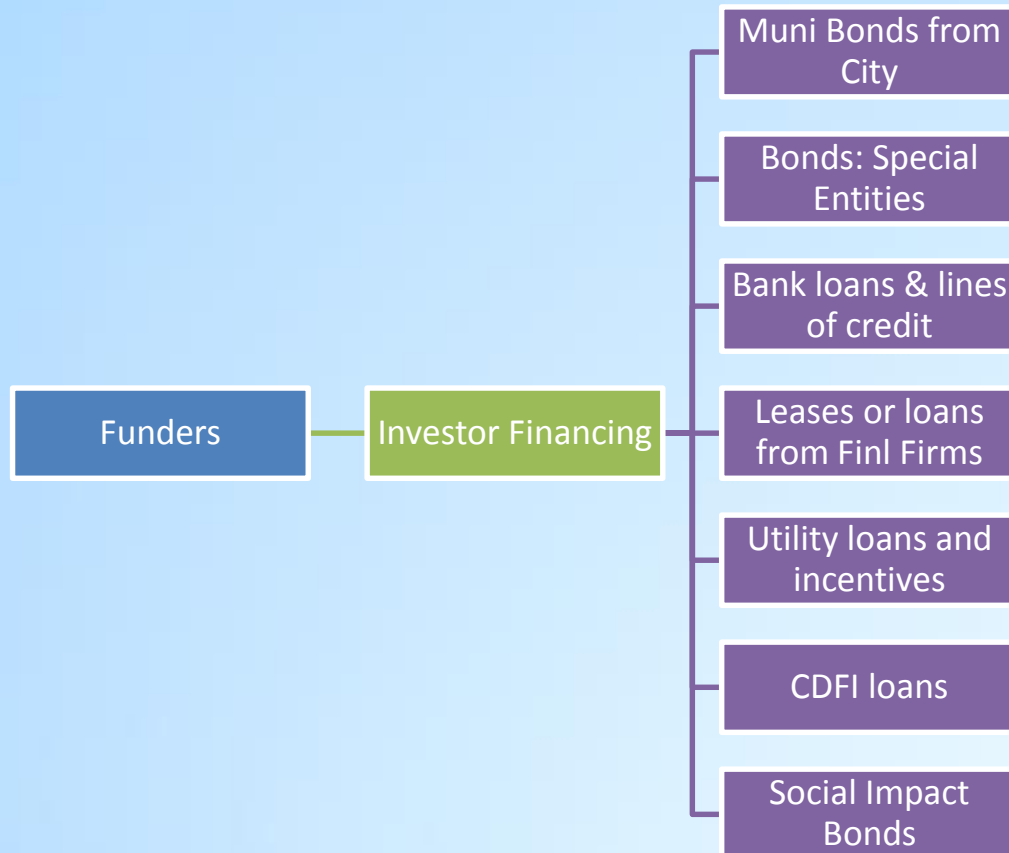


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*Click the link to jump to that example*

# Climate Action Solutions & Risks Can Be Financed by Innovative Investor Mechanisms

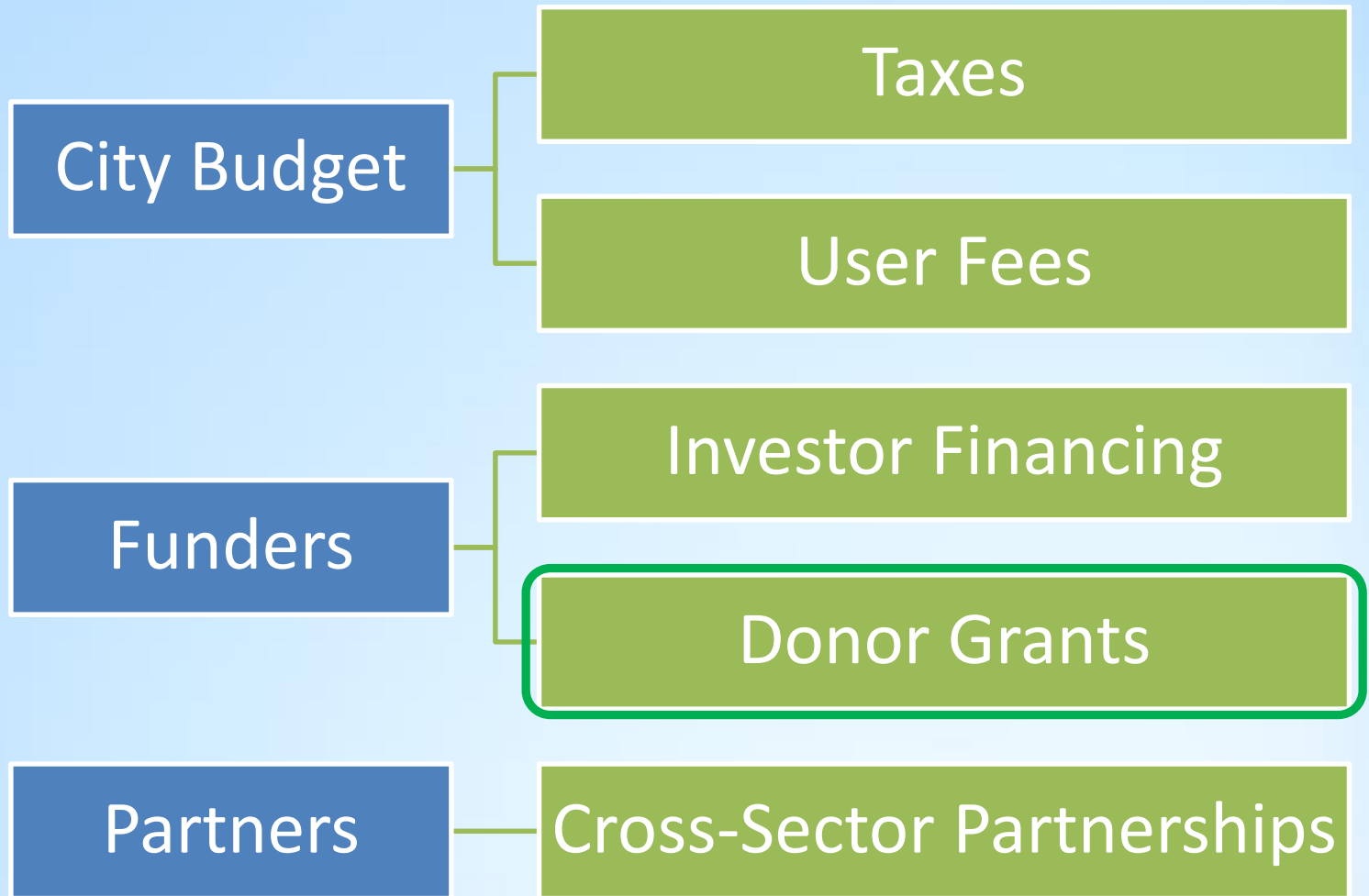


## More EXAMPLES

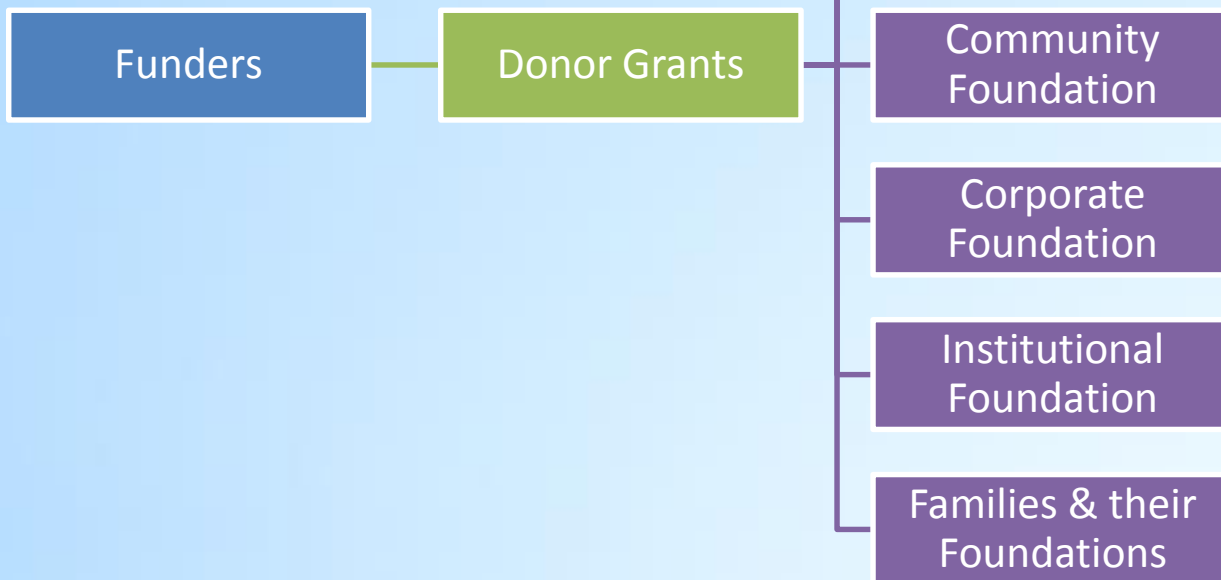
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  - [Kansas City](#)

*Click the link to jump to that example*

# Donors Who Focus on Climate Action Can Grant Funds to GHG-Reduction Initiatives



# Investors Seeking Tax Deductions, and Donors Seeking Impact Provide GRANTS

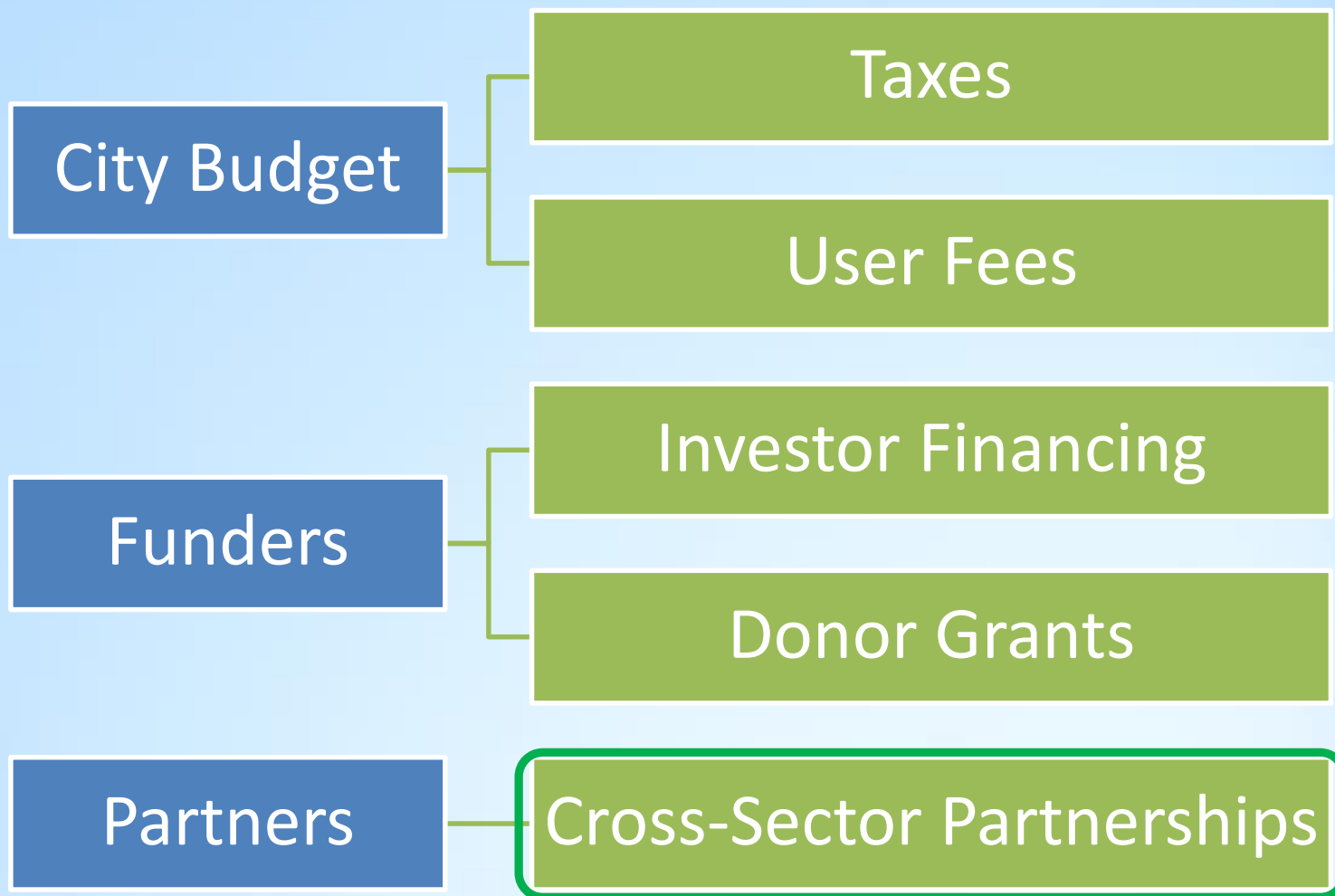


Donor Grant EXAMPLES

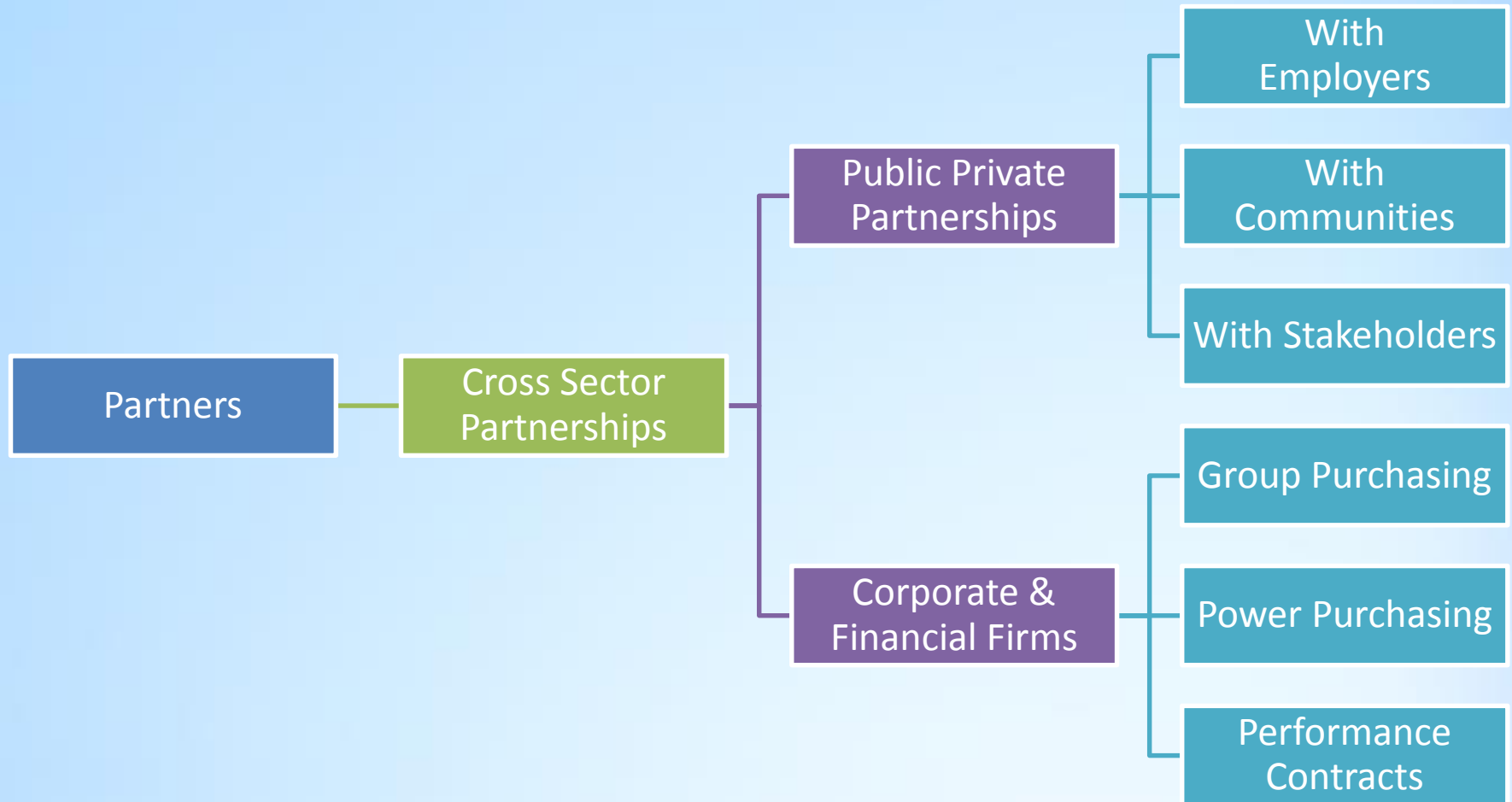
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- Donor-funded [competitions](#)
- Donor-funded [“accelerators”](#)

*Click the link to jump to that example*

# Partners From the Business and Social Sectors Can Team with Cities for Climate Action



# Creative Use of PARTNERSHIPS Can Unlock New Funding & Resources





# Examples of Cross-Sector Partnerships: Results from Joint Creative Approaches

- **Water Reclamation Partnership**  
[Apple Inc. + City of Sunnyvale CA](#)
- **Multi-Sector Partnership**  
[Mountain View CA + Google + CalStart + ABC + Motiv Power](#)
- **Multi-Company Financing for New York City**  
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- I. Setting Your Climate Action Goals
- II. Financial Sources & Mechanisms for Capital
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- IV. Potential Funders for Municipal Climate Solutions
- V. Five Steps to Funding Your Sustainable City Projects

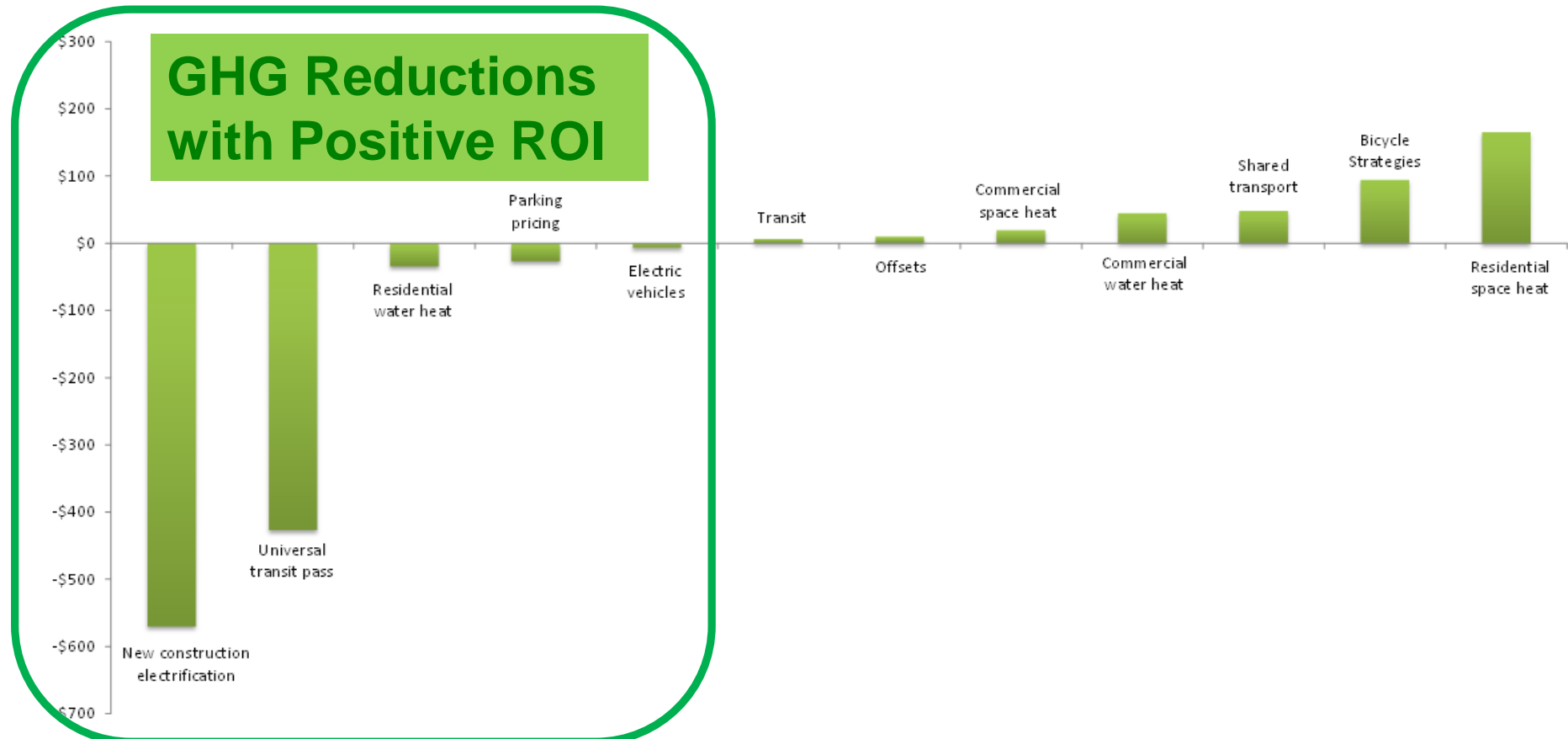
# Three Categories of Key Metrics Are Important for Financing Sustainable Cities

- **FINANCIAL** metrics, especially for investors
  - [Return on Investment, ROI](#) (%)
  - [Payback](#) (years)
  - [Net Present Value, or NPV](#) (\$)
  - [Internal Rate of Return, IRR](#) (%)
- **ENVIRONMENTAL** metrics, for climate solutions
  - GHGs as comprehensive measure (**tons**)
  - Impact from “externalities” (polluted water, air, land)
  - [Social cost of carbon](#) pollution, including impact on health (**\$/ton**)
- **CITIZEN** engagement, essential for support
  - Understand citizen-reported [top priorities](#) and build links to them

*Click the link to jump to that example*

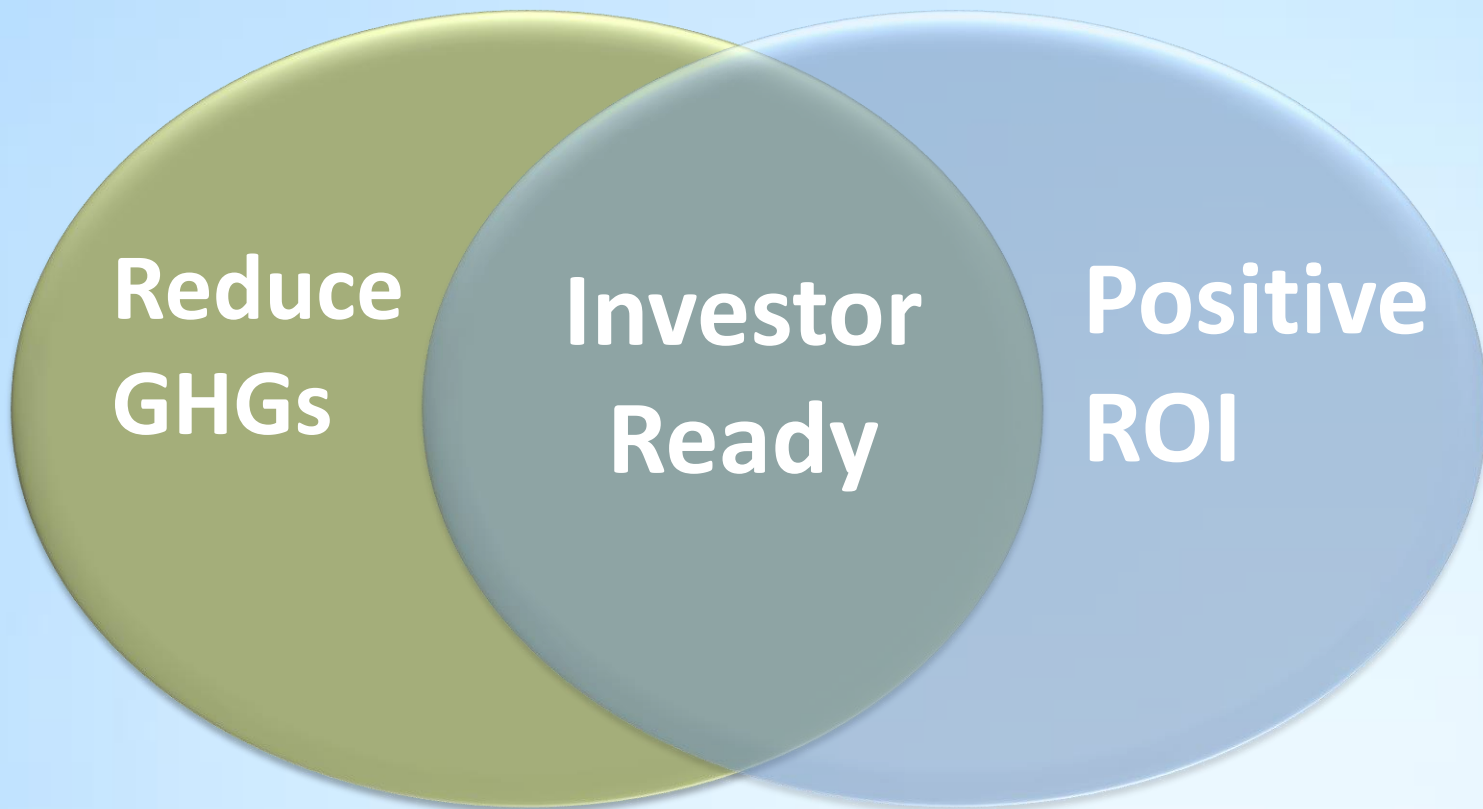
# Combining GHG and ROI In One View Focuses Attention on the Most Important Initiatives

GHG Abatement Cost Curve by 2030



City of Palo Alto Staff Report 1/25/2016: <http://www.cityofpaloalto.org/civicax/filebank/documents/50693>

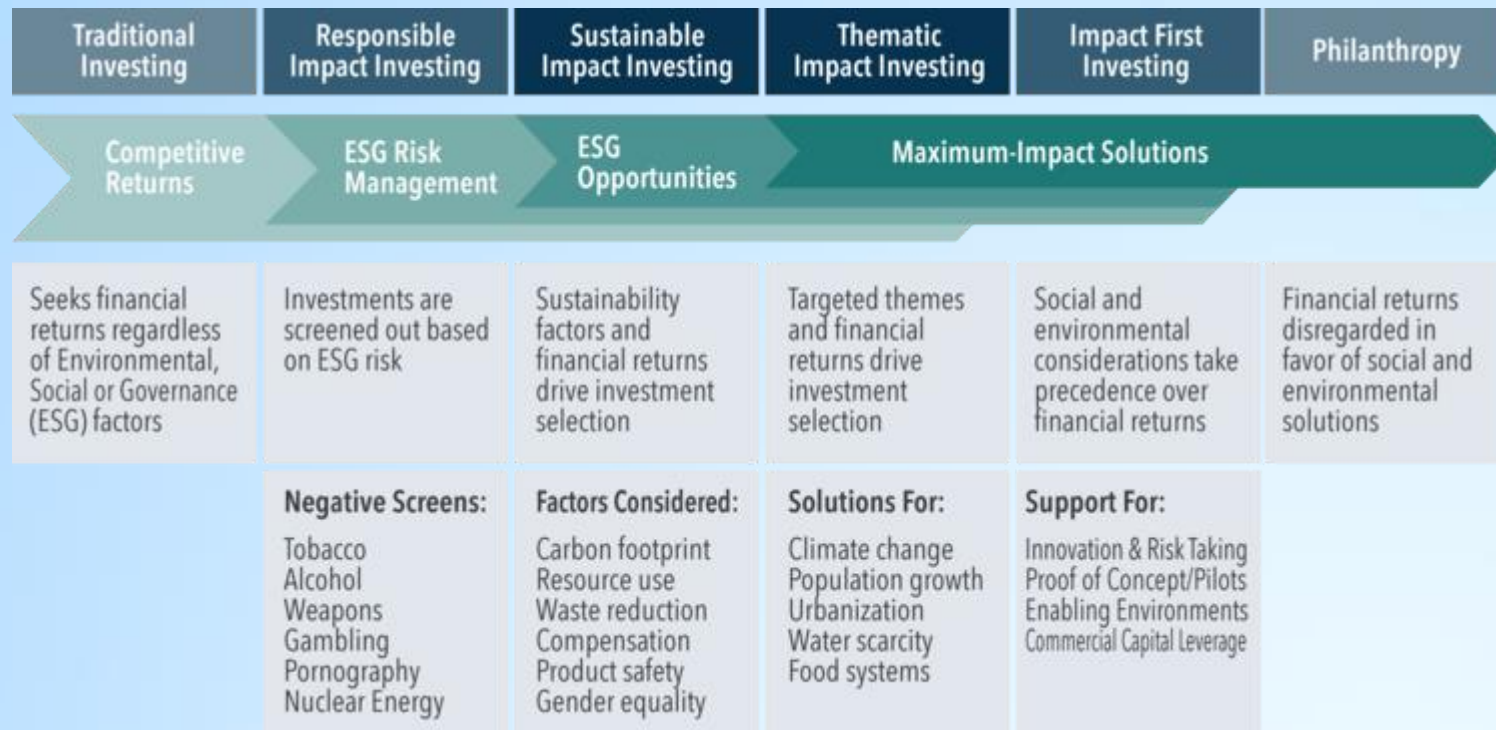
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# Investing Is Evolving to Explicitly Seek Out Environmental Solutions & Climate Action



Source: Sonen Capital; <http://www.scu-social-entrepreneurship.org/socent-blog1/2015/6/11/beyond-the-big-players>

# Investors: Seeking to Grow Capital While Solving Societal Problems

- An entire global industry has evolved for the prudent management of these assets, complete with tax policy, education and certifications, fiduciary duties, and investment and financial management tools.
- Across the spectrum of financial instruments, we expect to see a direct correlation between risk and return: the higher the potential risk, the greater the potential return. Some investors are naturally conservative and some are more long term growth oriented.



# Investors: Seeking to Grow Capital While Solving Societal Problems

Investors come in all flavors. Each investor type fills a role in the investment universe – and includes advisors and fund managers, as well as donor advisors.

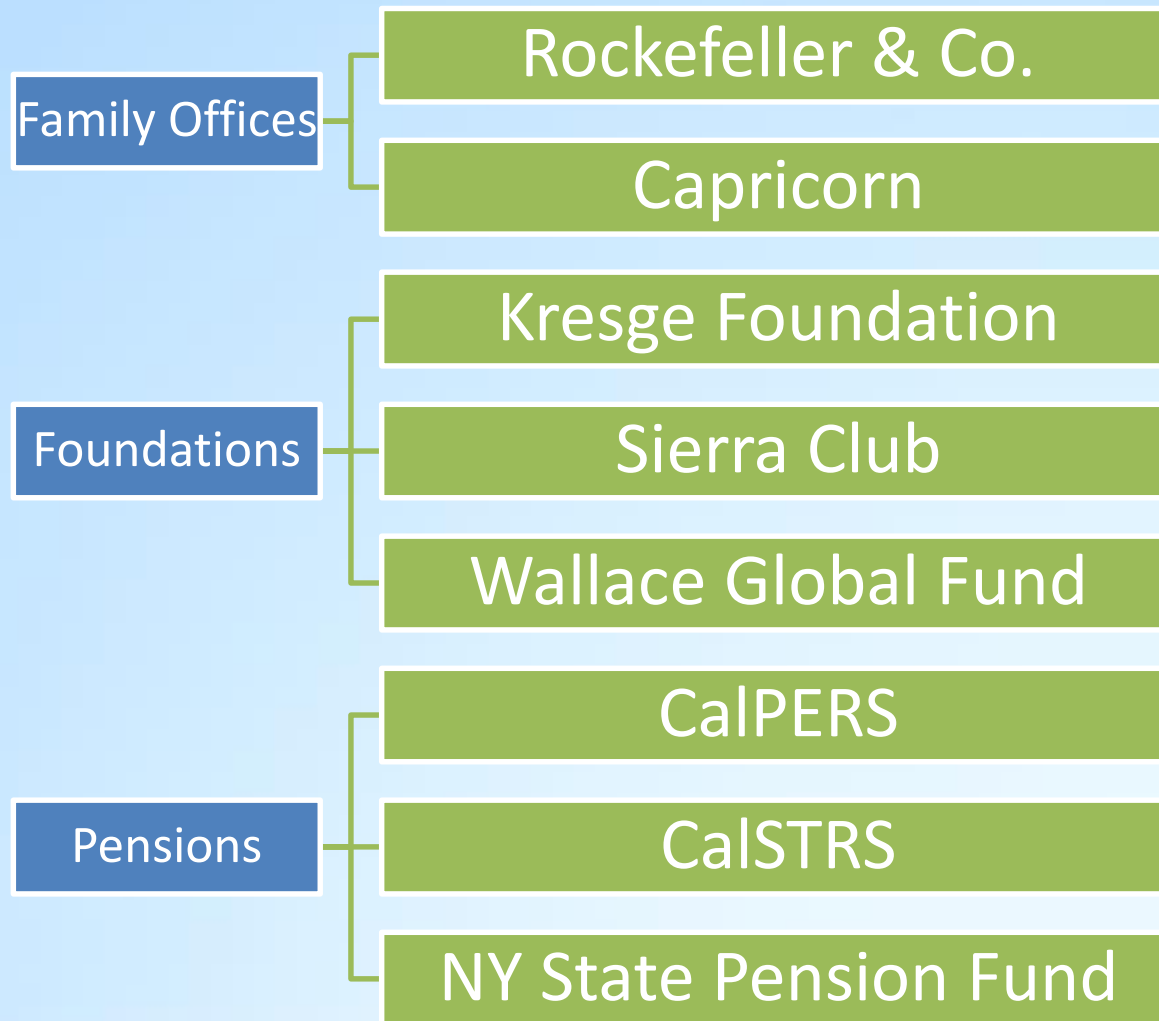
## INVESTORS

- Family offices
- Foundations
- Pensions & retirement plans
- Investor Networks
- Investment advisors
- Mutual fund managers
- Separate-account managers
- Private debt funds
- Private equity funds
- Big banks
- Community banking
- Sustainable banking
- New platforms for muni bonds

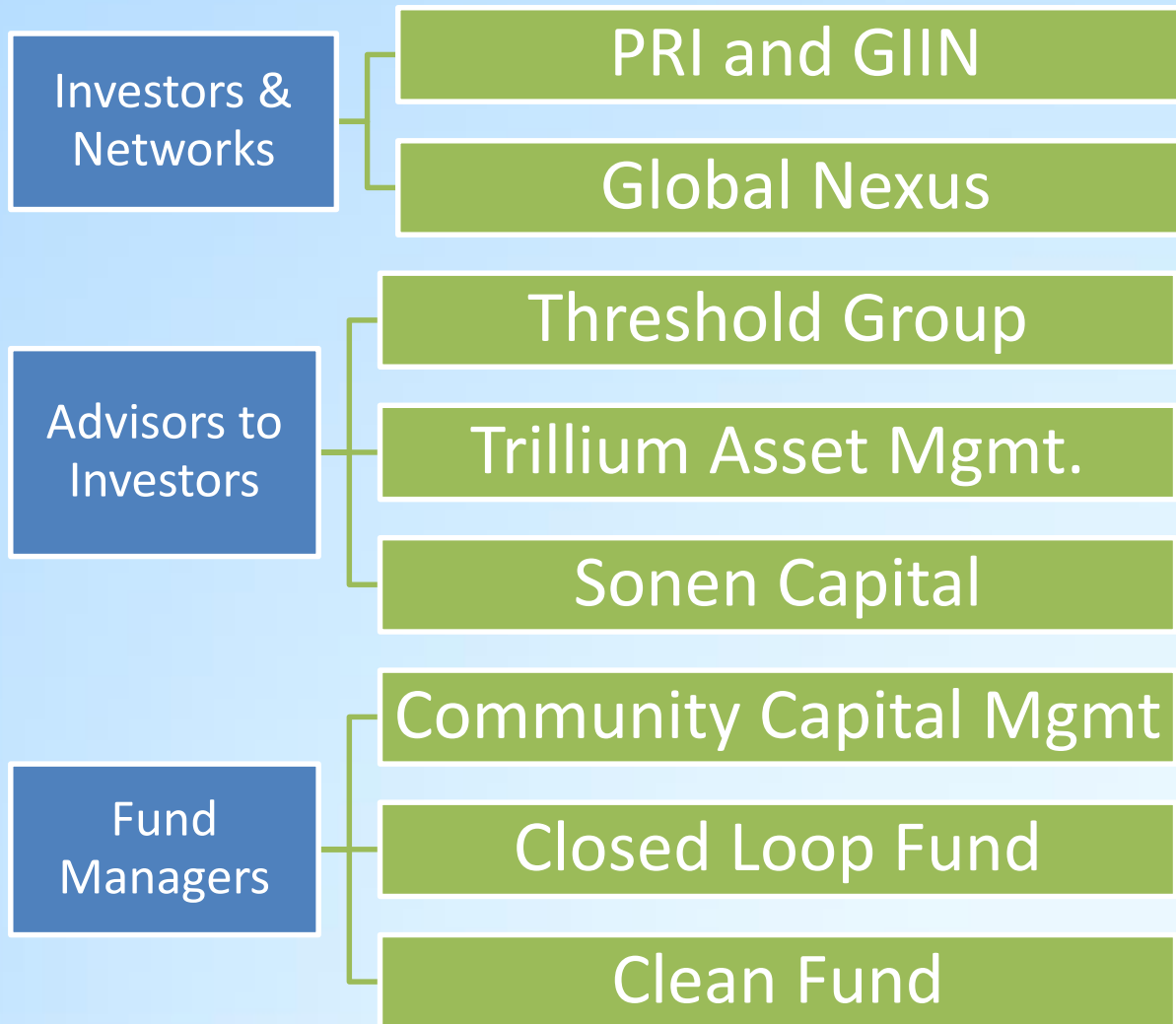
## DONORS

- Community Foundations
- Charitable Advisors
- Donor advised funds

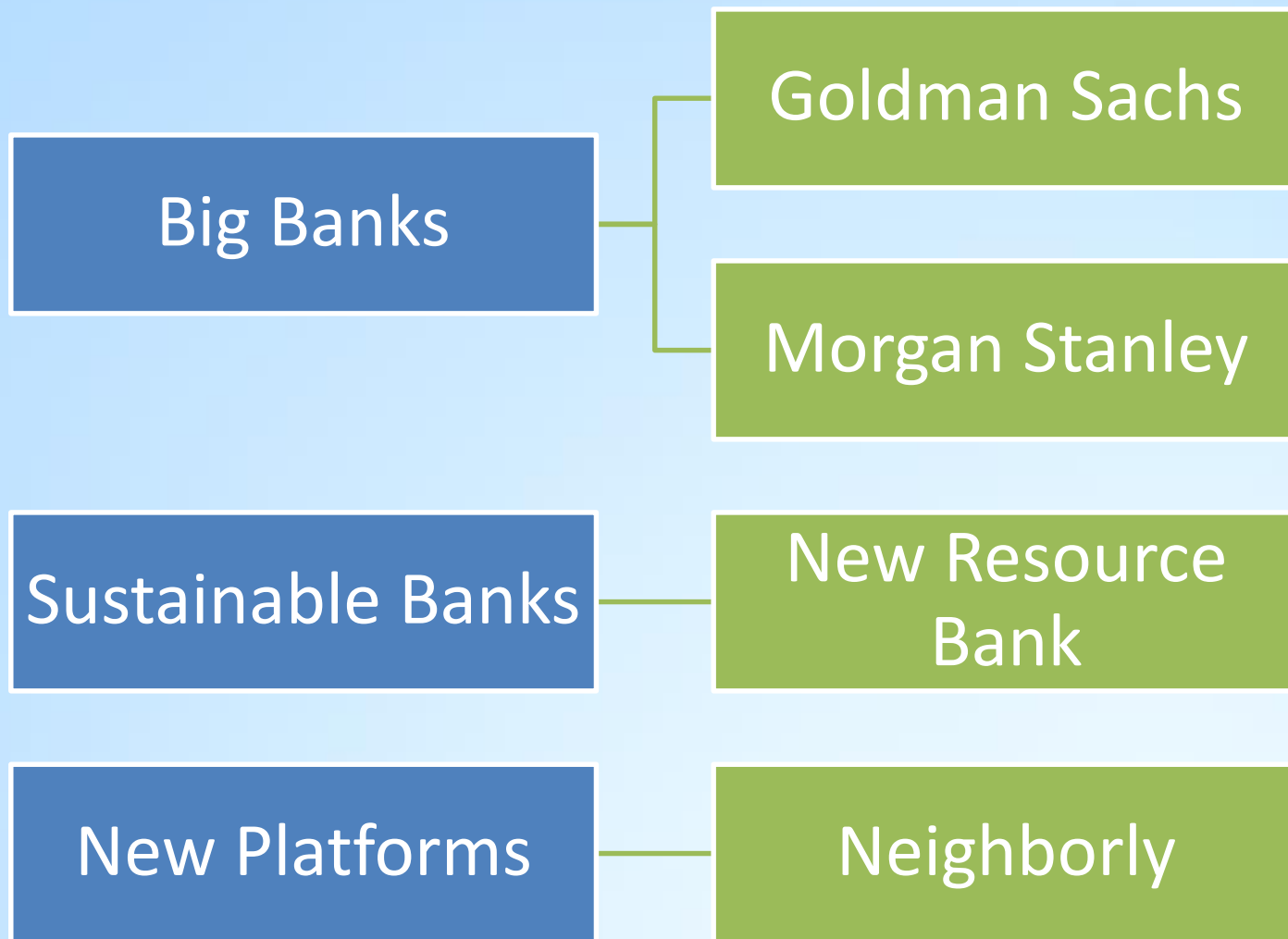
# Examples of Funders Seeking Climate Action



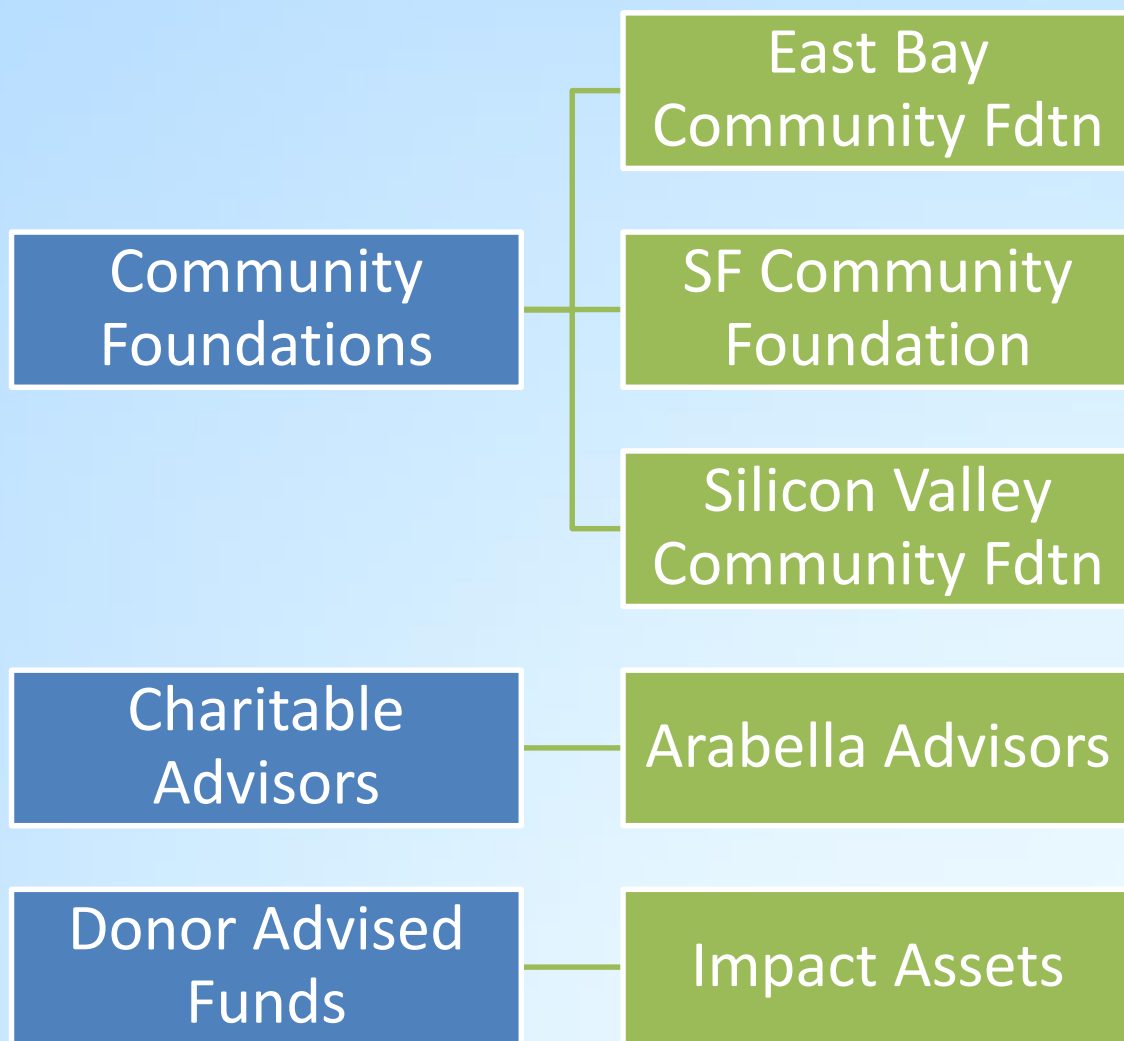
# Examples of Funders Seeking Climate Action



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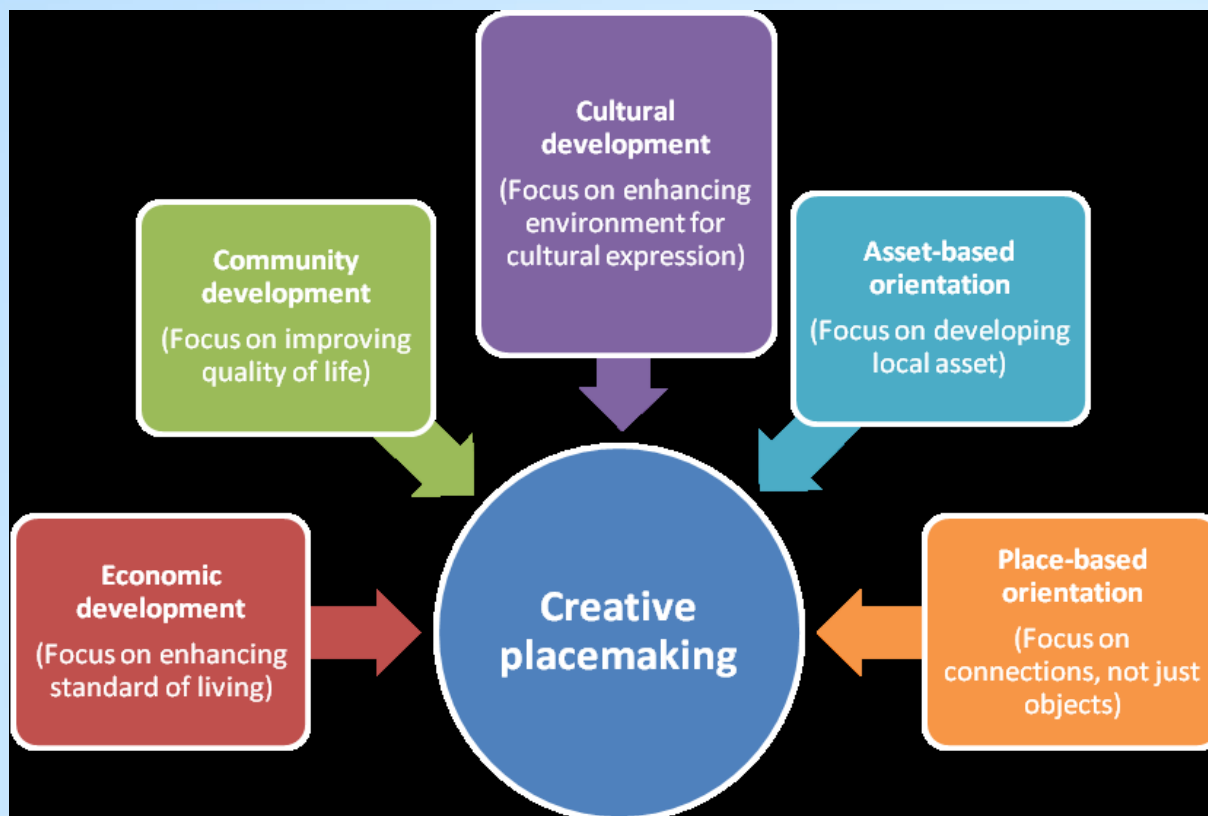


# Examples of Funders Seeking Climate Action



# Place-based Investing Is A Focused Approach for Impact Investors To Fund Climate-Action

- Local impact enables investors to see, hear and feel the benefits;
- Climate-action projects can be a focus of place-based investing



From Leonardo Vazquez, The National Consortium for Creative Placemaking; [www.artsbuildcommunities.org](http://www.artsbuildcommunities.org)

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# Five Steps to Funding Your Sustainable City Projects



- Following these 5 steps can lead to funding for sustainable city projects
- Each step has an explanation page in the Executive Summary and the Full Report...
- ...and, in the detailed Full Report, each step provides an example with details of how to pursue funding for sustainable city projects.



# Step 1: Answer 7 Questions

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

## Answer 7 questions:

1. Who are the **stakeholders**, and thus possible **partners** ?  
*(e.g. corporate, NGO, philanthropic, federal, state, utility, commission)*
2. **Who benefits** – and **who pays**?
3. What **revenue streams** can be collected and for how long?
4. What is the **timeframe** to implement the project?
5. What are the complete **lifecycle costs**?
6. Is there a positive **ROI, NPV, IRR and payback**? Is it in the budget?  
Or does it need a new financing tool?
7. How could you best match the **financing mechanism** to the project characteristics?

# Step 2: Build The Factsheet, with your Finance Team

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
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Determine  
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Execute The  
Financing

## FACT SHEET TEMPLATE

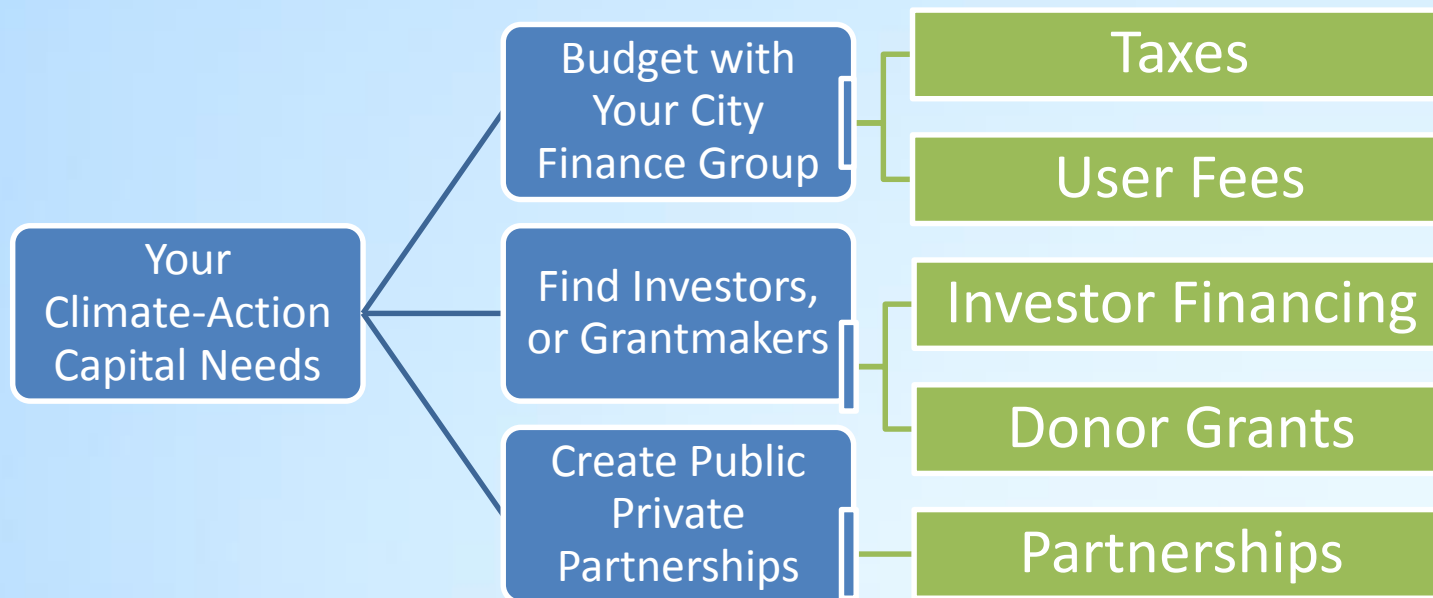
Climate Action Goal: (energy/waste/water) \_\_\_\_\_

Geography/Place: \_\_\_\_\_

City Lead / Opportunity Owner: \_\_\_\_\_

<p><u>Project Name – and Strategic Goal:</u></p> <p>Name: _____</p> <p>Strategic Goal: _____</p>	<p><u>How the Initiative Will Be Implemented</u></p>
<p><u>Where the Initiative Will Be Implemented:</u></p> <p>Description: _____</p>	<p><u>Timeline and Duration:</u></p> <p>Timeline to Setup: _____</p> <p>Expected Duration of Benefits: _____</p>
<p><u>ENVIRONMENTAL IMPACT: CLIMATE SOLUTIONS</u></p> <p>Energy = ____ (kilowatt hrs, megawatt hrs, joules)</p> <p>Waste = ____ (tons)</p> <p>Water = ____ (gallons)</p> <p>GHG = ____ (metric tons) ____ (metric tons/\$)</p>	<p>How does this project improve efficiency or benefit the environment:</p>
<p><u>COMMUNITY IMPACT:</u></p>	<p><u>BENEFICIARIES:</u></p>

# Step 3: Consult with Capital Sources, Starting with your City and Exploring Investors, Donors and Partners



# Step 4: Determine the Best Financial Mechanism with Your Experts

Answer The 7 Questions

Build The Factsheet

Consult With Capital Sources

Determine Financial Mechanism

Execute The Financing

Financing mechanisms are flexible, yet some may better match a particular need. The **sample template** highlights specific characteristics to help in deciding which financial mechanisms can fit your project – and a particular funder’s focus.

Characteristics of Financing Tools	User Fees			
Scope of Investable project/financing	Property Owner	Neighborhood	City	Region
		✓	✓	
Sources of Capital	Public	Philanthropic	Private	User Fees
				✓
Number of Financing Partners	One or a few			Many – the public
				✓
Difficulty/complexity in financing	easy			Difficult
	✓			
Time to develop and implement	Weeks	Months	Years	Partnering
	✓			
Expected life term of financing/project	Short 1-5 yrs	5-10 years	10-20 years	Long 20-30+ years
			✓	Depends on project
Investors’ risks	low			High
	✓			If fees are adequately set

# Step 5: Engage Investors & Partners, and Execute Your Financing Deal



- Your climate-action projects require working internally with city staff, and possibly with outside funders or partners.
- Executing the financing is an interactive, dynamic process.
- The financing mechanisms and case studies in this Toolkit provide a catalog of possibilities for your climate-action projects to be funded – and to deliver potential GHG reductions.

# About the Authors:

## Contact Us for Questions, or to Share New Examples

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**The Full Report starts on the next page.**

# FINANCING SUSTAINABLE CITIES SCAN & TOOLKIT



## *A Scan of Financing Mechanisms, Key Metrics, & Potential Funders for Climate Action*

*Executive Summary, pages 1 to 54*  
*Full Report, pages 56 to 251*

*October 2016*





# This Toolkit for Financing Sustainable Cities is for City Leaders in Sustainability & Finance

- *What:* **Financing Sustainable Cities: A Toolkit**
- *Who:* ***Leaders with sustainability initiatives in cities***
- *Why:* Learn how to craft investable deals that serve city needs for capital and investors' desire to achieve transformational climate action
- *Section Learning Goals:*
  - I) Specify your climate-action **goals**
  - II) Scan the spectrum of financing **mechanisms**
  - III) Understand meaningful **key metrics**, esp. ROI
  - IV) Learn about **investors**, advisors and **funders**
  - V) Follow the **5-Steps** of this Financing **Toolkit**

Your  
Goals

Financial  
Sources

Key  
Metrics

Potential  
Funders

Five Step  
Process

Each page will have this Tracker in the footer below so you know where you are among the 5 sections.

# Acknowledgments: Thank You to a Wide Collaboration of Leaders & Experts



**USDN:** Multi-national network of 155 cities in the Urban Sustainability Directors Network  
Funding and support for this project from **Global Philanthropy Partners (GPP)**

- **GPP:**



**City of Palo Alto CA** (Lead city)

- **Project cities:**

Ann Arbor MI; Berkeley CA; Ithaca NY;  
Milwaukee WI; Oakland CA; Phoenix AZ;  
Vancouver BC

- **Plus, Cities, Investors and Experts at the June 29, 2016 Convening**



**HIP (Human Impact + Profit) Investor Inc.:**  
Author of report; co-producer of Convening;  
Leader in sustainable finance,  
impact ratings & portfolios

# Why Is This Toolkit a Visual PPT Presentation?

- Visual presentations are **easier to read** for new, complex info
  - Each example of financing sustainable cities is typically one page.
  - Each financing mechanism is categorized by type of capital source.
- This toolkit is designed so you can **easily re-use the content and PPT** slides for your climate-action presentations
  - Find examples that match your goals and funding possibilities.
- You can also **more easily educate your city leaders** and colleagues using all or some of these presentation slides.

<b>TABLE OF CONTENTS</b>	<b>Page</b>
<b>I. Setting Your Climate Action Goals.....</b>	<b><a href="#">61</a></b>
<b>II. Financial Sources &amp; Mechanisms for Capital.....</b>	<b><a href="#">71</a></b>
<b>III. Key Metrics &amp; How to Calculate Them.....</b>	<b><a href="#">181</a></b>
<b>IV. Potential Funders for Municipal Climate Solutions .....</b>	<b><a href="#">198</a></b>
<b>V. Five Steps to Funding Your Sustainable City Projects ..</b>	<b><a href="#">232</a></b>
<b>VI. Additional Resources &amp; Scans.....</b>	<b><a href="#">249</a></b>

# Financing Sustainable Cities – A Toolkit

I. Setting Your Climate Action Goals

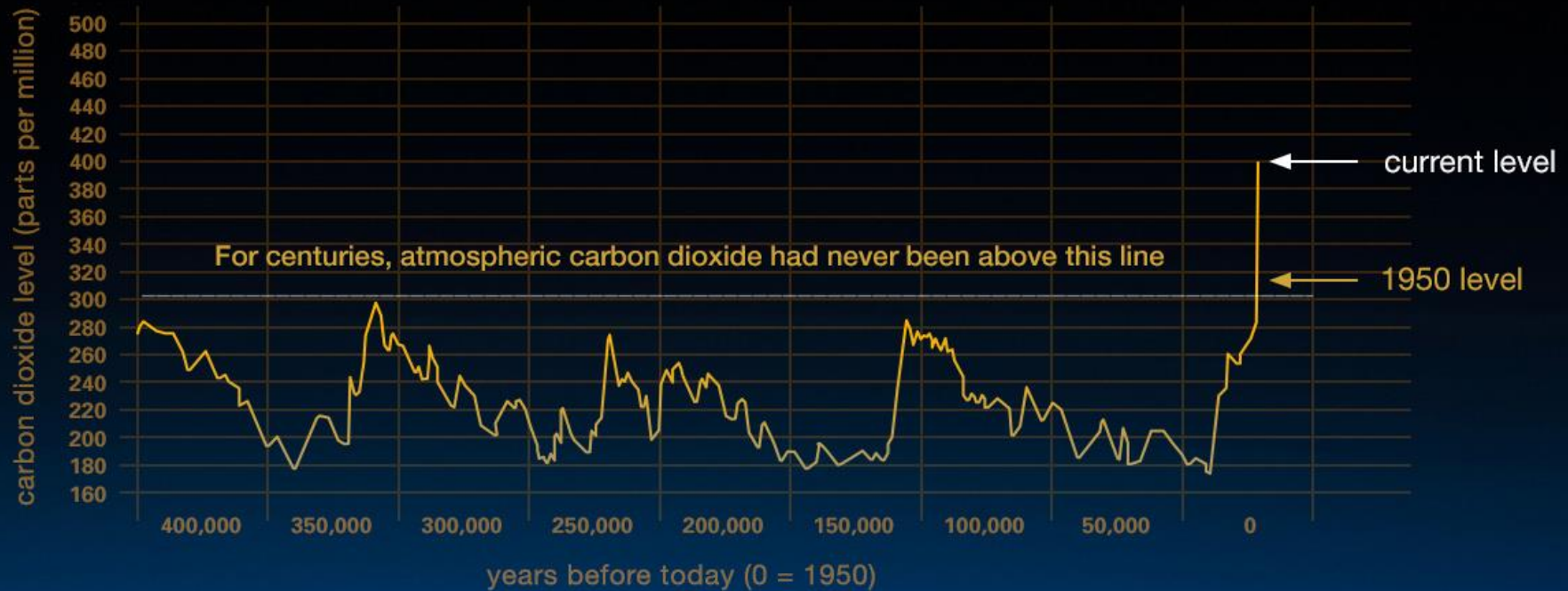
II. Financial Sources & Mechanisms for Capital

III. Key Metrics & How to Calculate Them

IV. Potential Funders for Municipal Climate Solutions

V. Five Steps to Funding Your Sustainable City Projects

# Dramatic 80% GHG Reductions Are Required to Stop the Rise in Global Carbon Intensity, Now 400+ PPM



[http://climate.nasa.gov/system/content\\_pages/main\\_images/203\\_co2-graph-021116.jpeg](http://climate.nasa.gov/system/content_pages/main_images/203_co2-graph-021116.jpeg)

## Cities Have Aggressive Climate Action Goals – Some Of Which Are Financially Attractive



# 80% GHG Reductions by 2050

(or sooner, like 2030 for Palo Alto)

## ...with Positive ROI

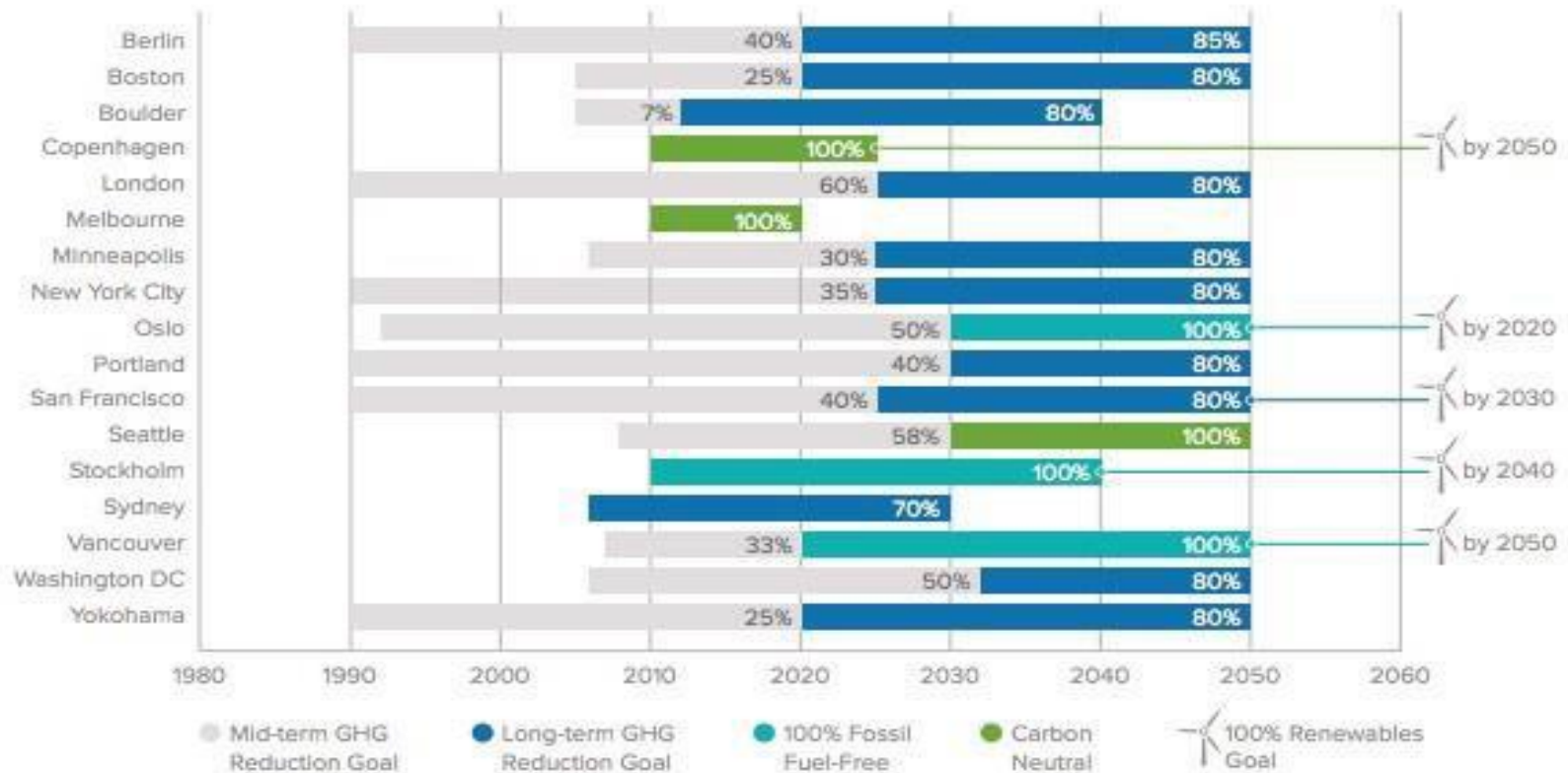
\* ROI = Return on Investment (see how to calc in [section III, p. 179](#))

**The goal of this Scan and Toolkit is to:**

- (1) share a catalog of financial mechanisms that can be used to fund climate action for your GHG goals; and***
- (2) share a 5-step process for matching investable opportunities with investors.***

# Cities in the Climate Neutral Cities Alliance (CNCA) Are Committed to 80%-100% GHG Reductions by 2050 or Sooner

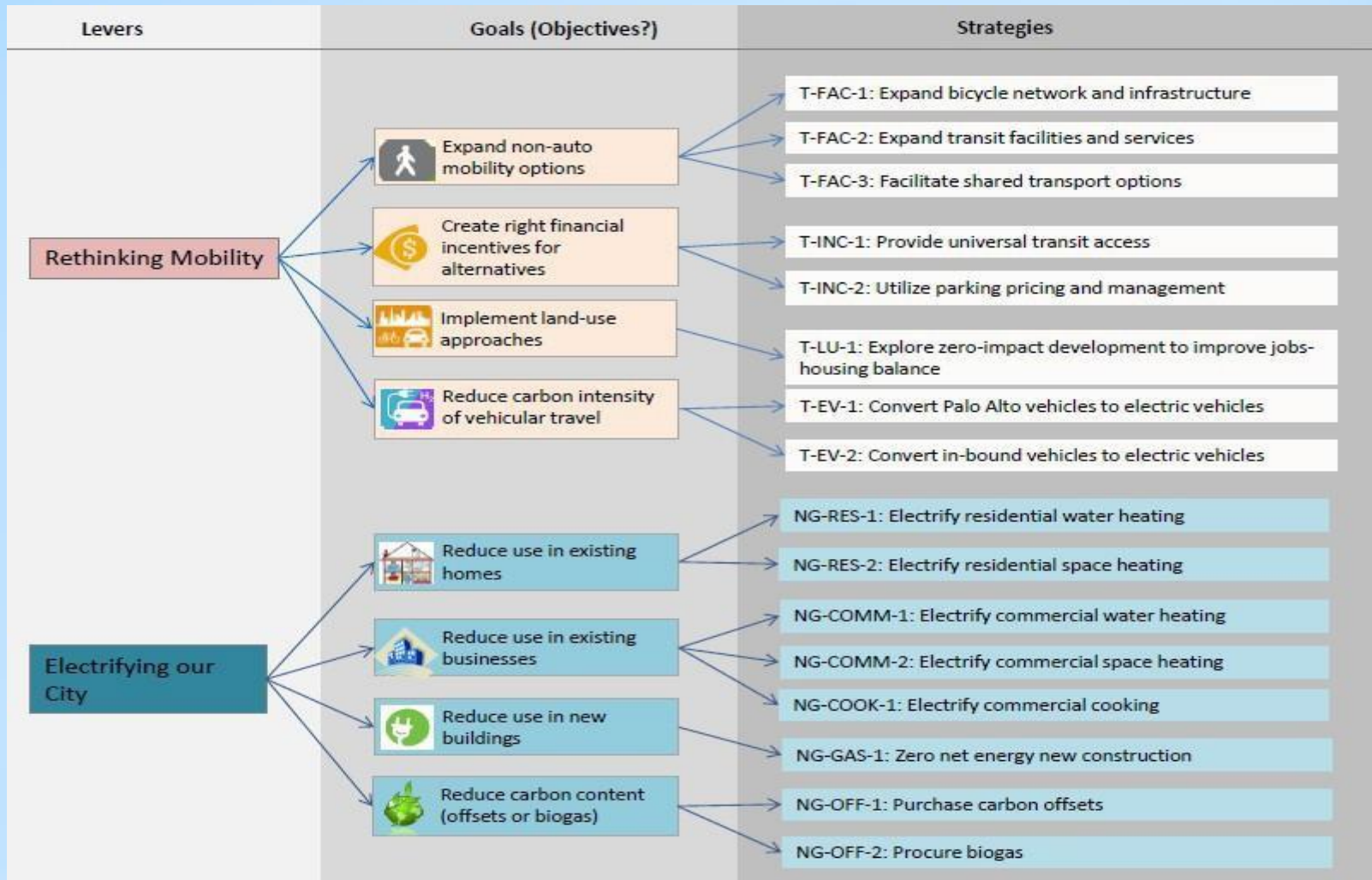
CNCA Cities' Long-Term and Interim GHG Reduction Targets



City of Palo Alto Staff Report 1/25/2016: <http://www.cityofpaloalto.org/civica/filebank/documents/50693>

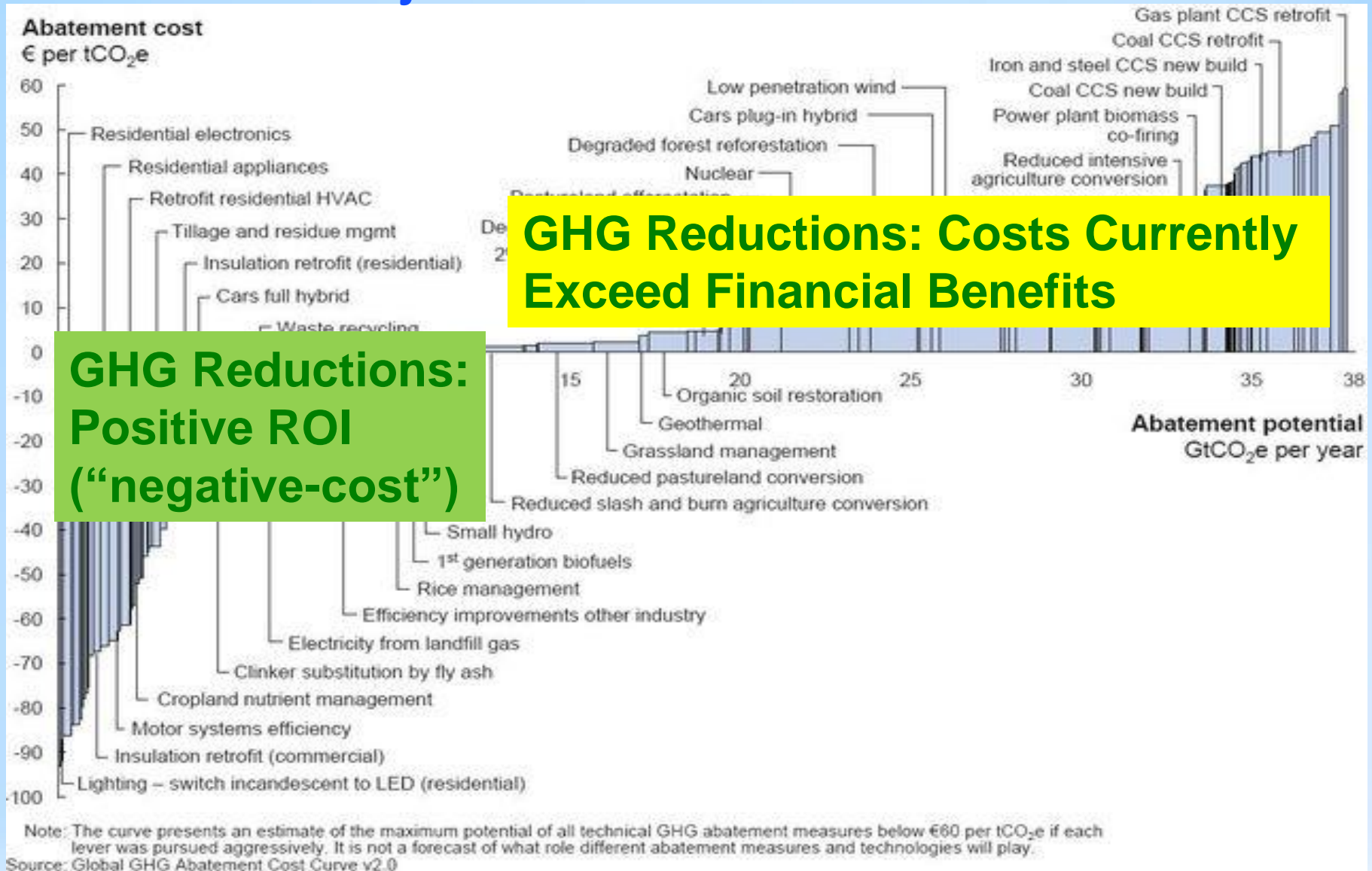


# To Pursue 80% Reductions, Cities like Palo Alto Have Designed Comprehensive Strategic Plans

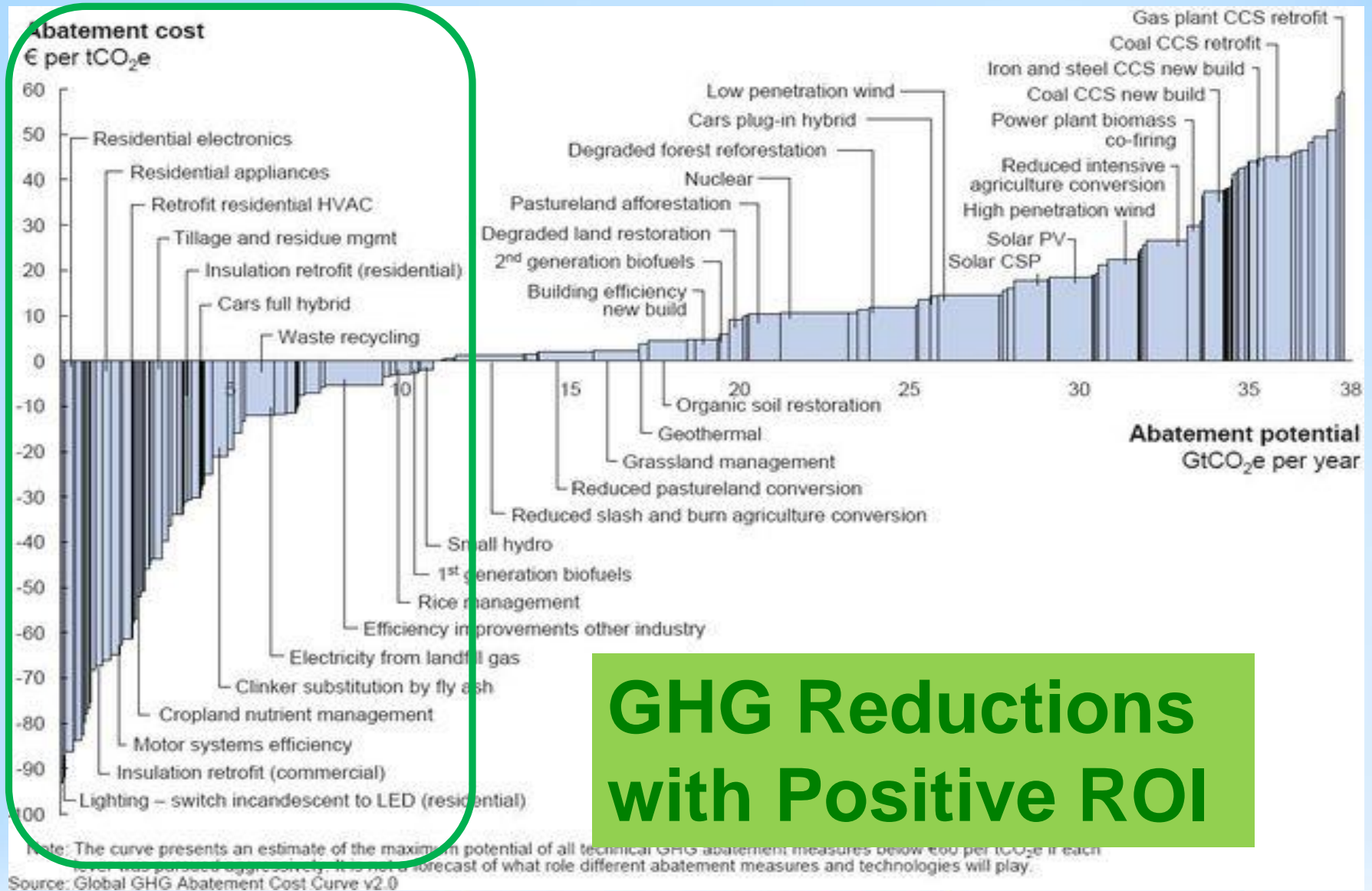


City of Palo Alto Staff Report 1/25/2016:  
<http://www.cityofpaloalto.org/civicax/filebank/documents/50693>

# Climate Actions That Reduce GHGs Offer Some Projects With Positive ROI

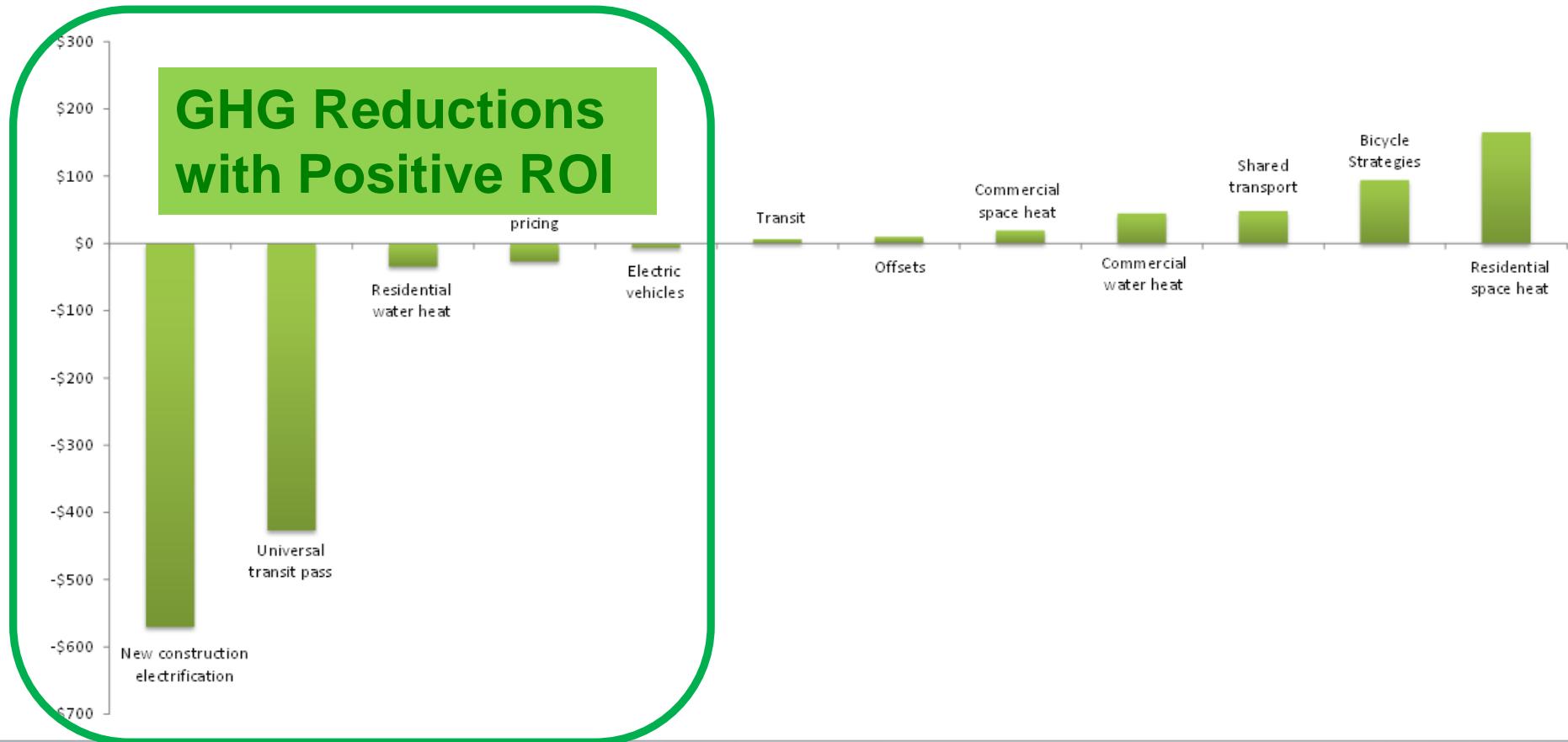


# Positive ROI Projects include LED Lighting, Retrofits and Recycling; These Actions Could Be Investor-Funded



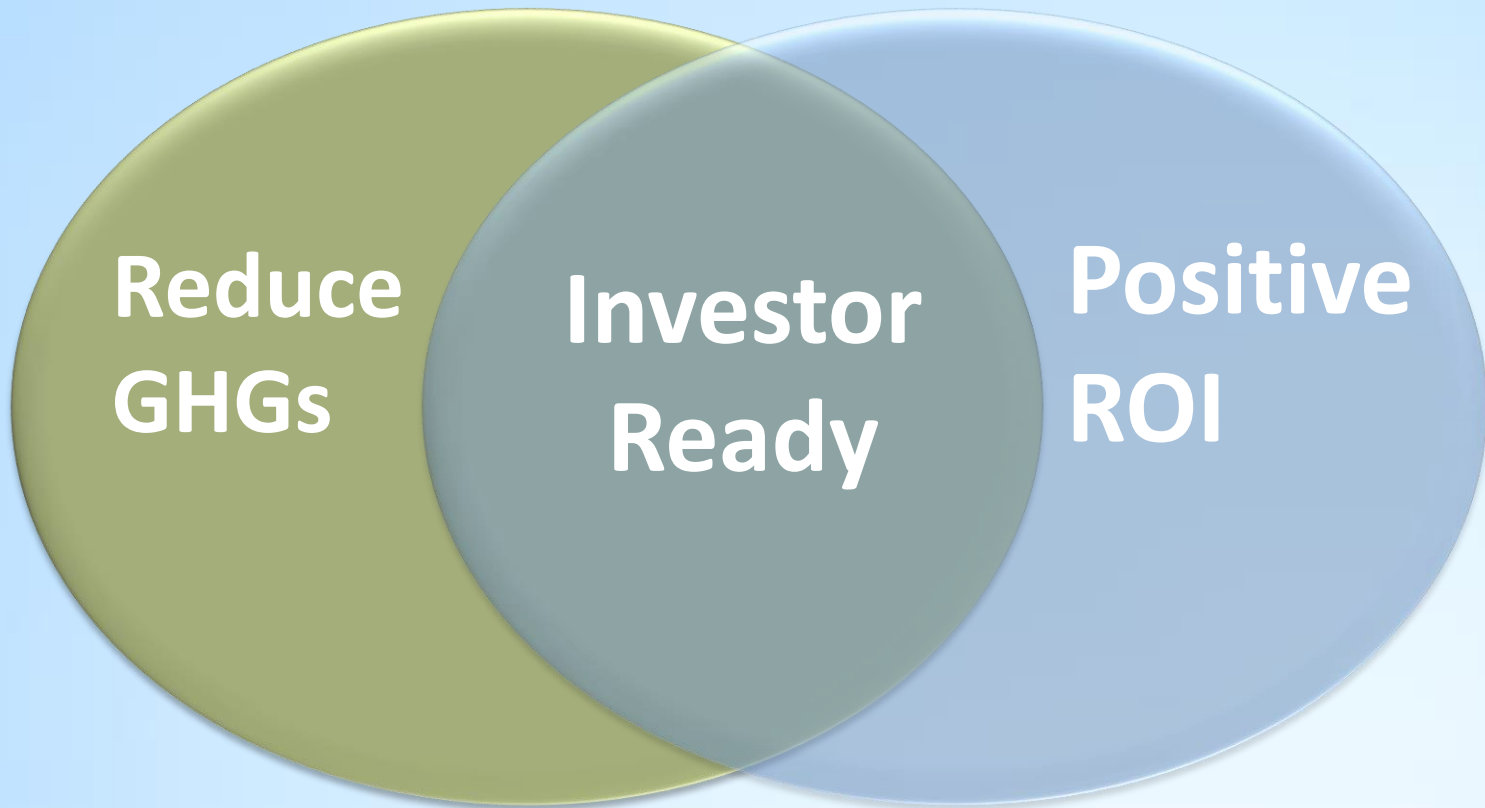
# You Can Construct A Similar View for Your City; In Palo Alto, Several Initiatives Are Positive ROI

GHG Abatement Cost Curve by 2030



City of Palo Alto Staff Report 1/25/2016: <http://www.cityofpaloalto.org/civicax/filebank/documents/50693>

# When Climate Action Reduces GHGs with Positive ROI, those City Initiatives Are Investor-Ready



# Climate Actions Can Seek Capital from 3 Sources: Your City Budget; Outside Funders; and Partners



***The next Section will describes  
Financial Sources & Mechanisms from all 3 Groups***

# Financing Sustainable Cities – A Toolkit

I. Setting Your Climate Action Goals

II. Financial Sources & Mechanisms for Capital

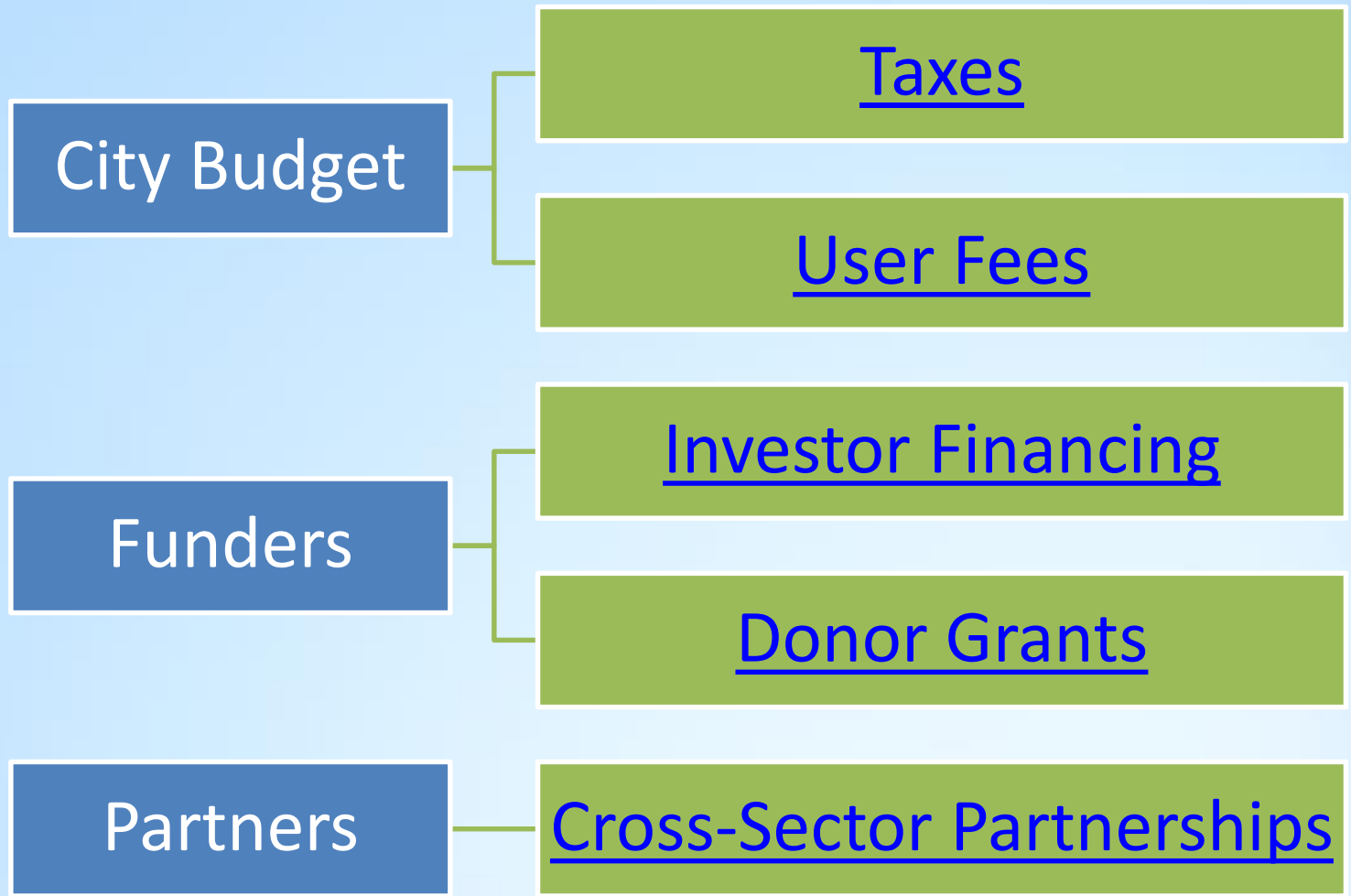
III. Key Metrics & How to Calculate Them

IV. Potential Funders for Municipal Climate Solutions

V. Five Steps to Funding Your Sustainable City Projects

# Climate Action Can Seek 5 Types of Capital: Taxes, Fees, Financing, Grants, & Partnerships

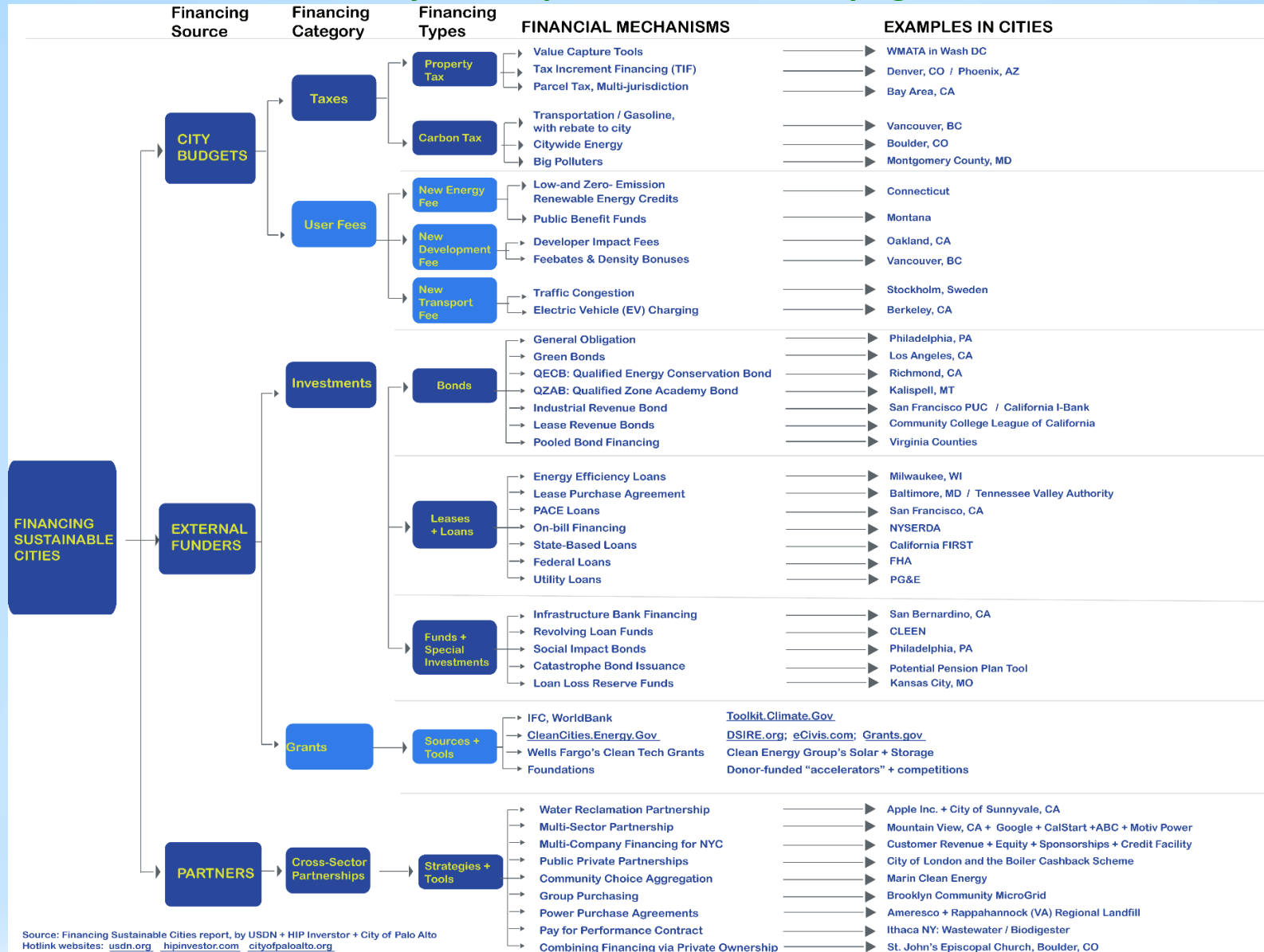
*Click the link to jump to that section*





# All Financing Mechanisms Summarized In this Scan

*This summary is also published as a one-page handout*



Source: Financing Sustainable Cities report, by USDN + HIP Investor + City of Palo Alto  
Hotlink websites: [usdn.org](#) [hipinvestor.com](#) [cityofpaloalto.org](#)

# All Financing Mechanisms Summarized In this Scan with Linked Examples (1 of 2)

*Click the link to jump to that example*

## New Property Tax EXAMPLES

- Value Capture Tools:
  - [WMATA in Wash DC](#)
- Tax Increment Financing (TIF)
  - [Denver CO](#)
  - [Phoenix AZ](#)
- Parcel Tax, Multi-jurisdiction
  - [Bay Area CA](#)

## LIVE Carbon Tax EXAMPLES

- Transportation / gasoline, with rebate to city
  - [Vancouver BC](#)
- Citywide energy
  - [Boulder CO](#)
- Big polluters
  - [Montgomery County MD](#)

## New Energy Fee EXAMPLES

- Low- and Zero-Emission Renewable Energy Credits
  - [Connecticut](#)
- Public benefit funds
  - [Montana](#)

## New Development Fee EXAMPLES

- Developer Impact Fees
  - [Oakland CA](#)
- Feebates & Density Bonuses
  - [Vancouver BC](#)

## New Transport Fee EXAMPLES

- Traffic Congestion
  - [Stockholm](#)
- Electric Vehicle (EV) Charging
  - [Berkeley CA](#)

## Bond EXAMPLES

- General Obligation
  - [Philadelphia PA](#)
- Green Bonds
  - [Los Angeles CA](#)
- QECCB: Qualified Energy Conservation Bond
  - [Richmond CA](#)
- QZAB: Qualified Zone Academy Bond
  - [KalisPELL MT](#)

## More Bond EXAMPLES

- Industrial Revenue Bonds
  - [San Francisco PUC](#)
  - [California I-Bank](#)
- Lease Revenue Bonds
  - [Community College League of California](#)
- Pooled Bond Financing
  - [Virginia Counties](#)

## LEASE & LOAN EXAMPLES (1 of 2)

- Energy efficiency loans
  - [Milwaukee WI](#)
- Lease Purchase Agreement
  - [Baltimore MD](#)
  - [Tennessee Valley Authority](#)
- PACE Loans
  - [San Francisco CA](#)

# All Financing Mechanisms Summarized In this Scan with Linked Examples (2 of 2) *Click the link to jump to that example*

## LEASE & LOAN EXAMPLES (2 of 2)

- On-bill Financing
  - [NYSERDA](#)
- State-Based Loans
  - [California FIRST](#)
- National Loans
  - [FHA](#)
- Utility loans
  - [PG&E](#)

## More EXAMPLES

- Infrastructure Bank Financing
  - [San Bernardino CA](#)
- Revolving Loan Funds
  - [CLEEN](#)
- Social Impact Bonds
  - [Philadelphia PA](#)
- Catastrophe Bond Issuance
- Loan Loss Reserve Funds
  - [Kansas City](#)

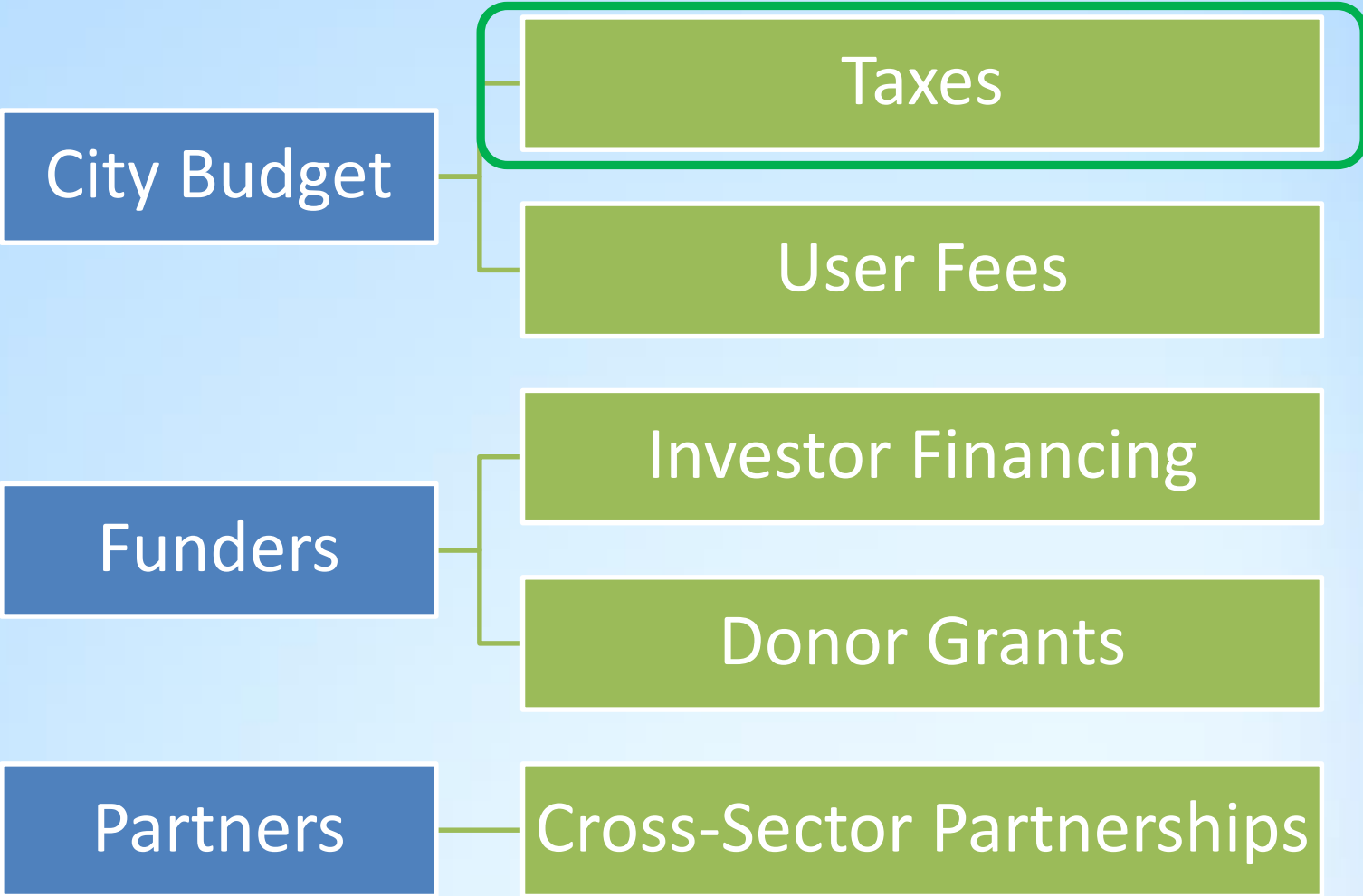
## Donor Grant EXAMPLES

- IFC, WorldBank
- CleanCities.Energy.Gov
- Toolkit.Climate.Gov
- [DSIRE.org](#); eCivis.com; Grants.gov
- [Wells Fargo Foundation's](#) Clean Tech Grants
- [Clean Energy Group's](#) Solar + Storage
- Donor-funded [competitions](#)
- Donor-funded ["accelerators"](#)

## PARTNERSHIP EXAMPLES

- Water Reclamation Partnership
- [Apple Inc. + City of Sunnyvale CA](#)
- Multi-Sector Partnership
- [Mountain View CA + Google + CalStart + ABC + Motiv Power](#)
- Multi-Company Financing for New York City
- [Customer Revenue + Equity + Sponsorships + Credit Facility](#)
- Public Private Partnerships
- [City of London and the Boiler Cashback Scheme](#)
- Community Choice Aggregation
- [Marin Clean Energy](#)
- Group Purchasing
- [Brooklyn Community MicroGrid](#)
- Power Purchase Agreements
- [Ameresco + Rappahannock \(VA\) Regional Landfill](#)
- Performance Contract
- [Ithaca NY: Wastewater/Biodigester](#)
- Creative Financing via Private Ownership
- [St. John's Episcopal Church, Boulder, CO](#)

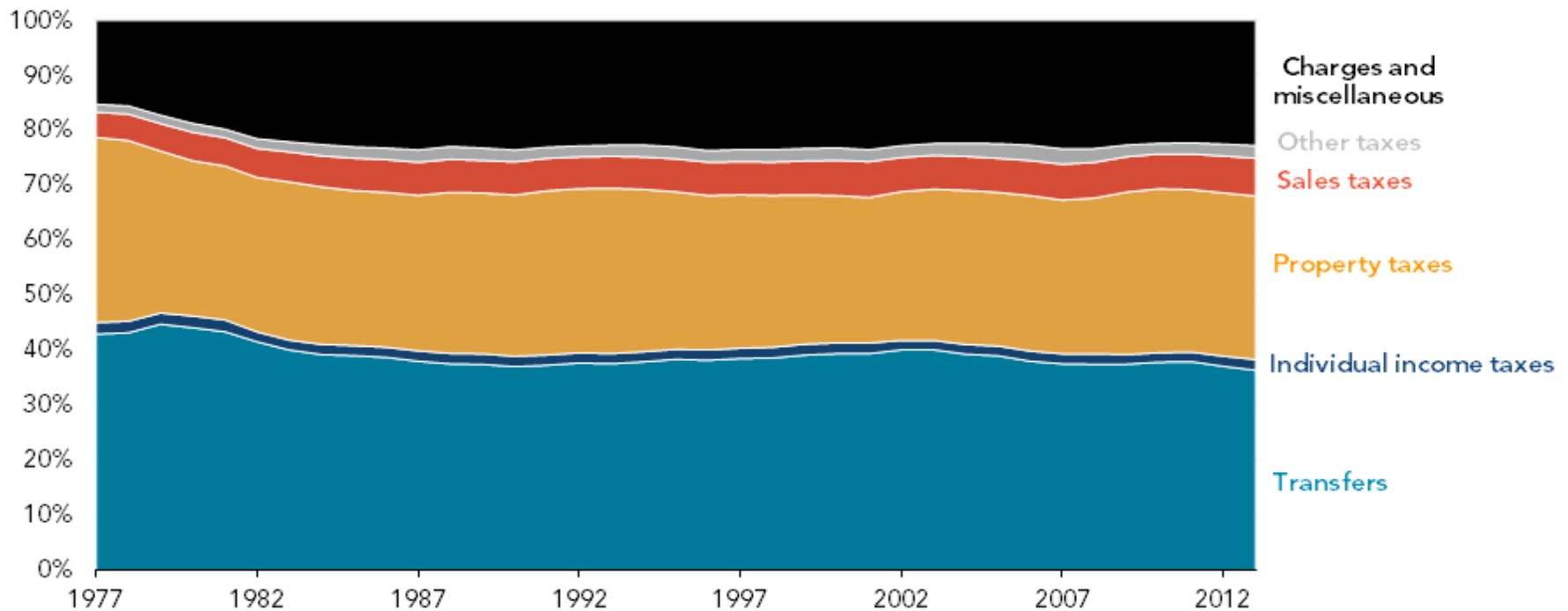
# With the Power to Create New Taxes, or Shift Existing Taxes, Cities Can Fund Climate Action



# US City Revenue Is Collected from Taxes, User Fees, and Govt. Transfers (From States and Counties)

FIGURE 2

Local General Revenue by Source  
1977–2013

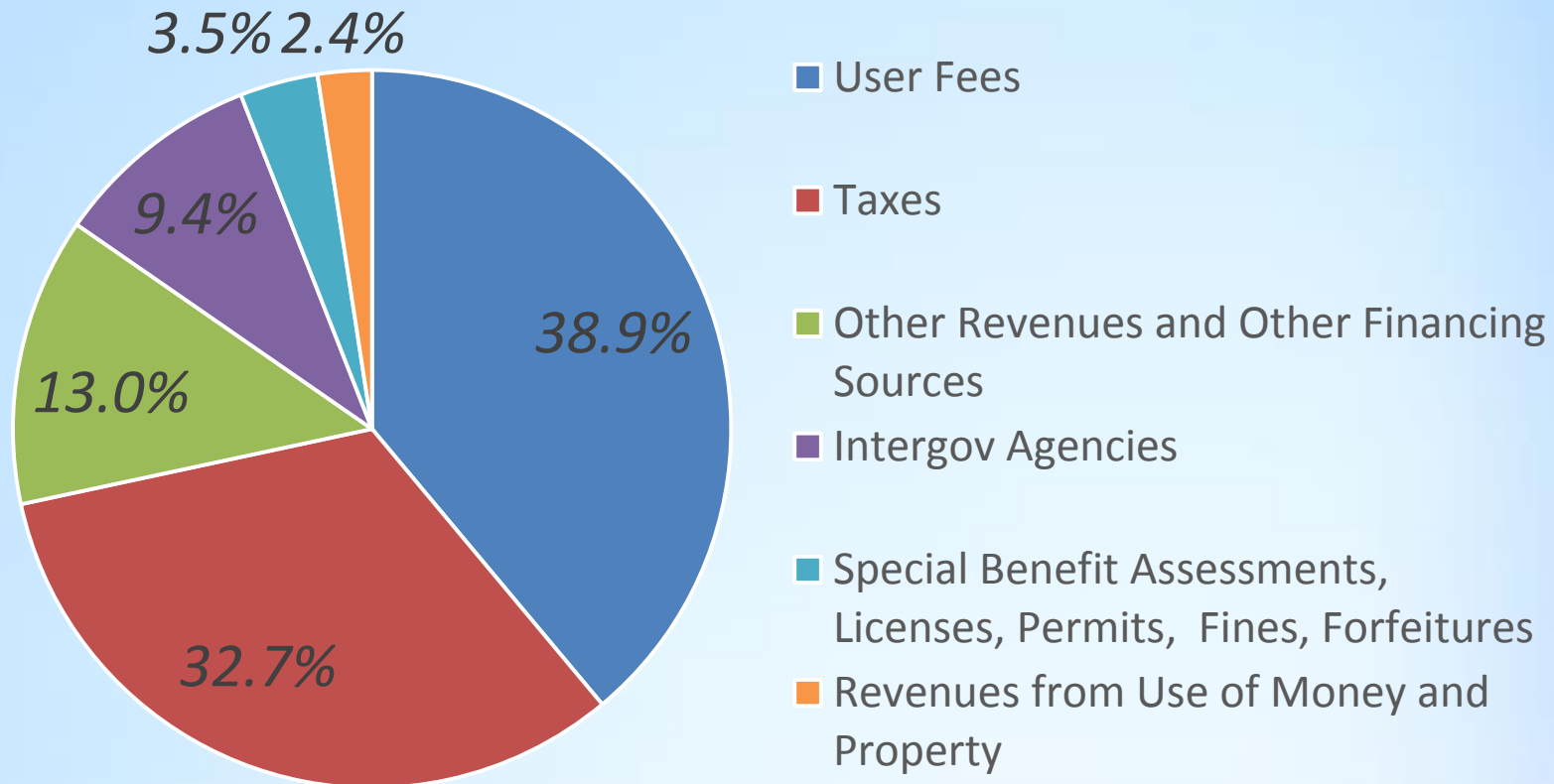


Sources: Urban-Brookings Tax Policy Center, State & Local Government Finance Data Query System.

Source: Tax Policy Center

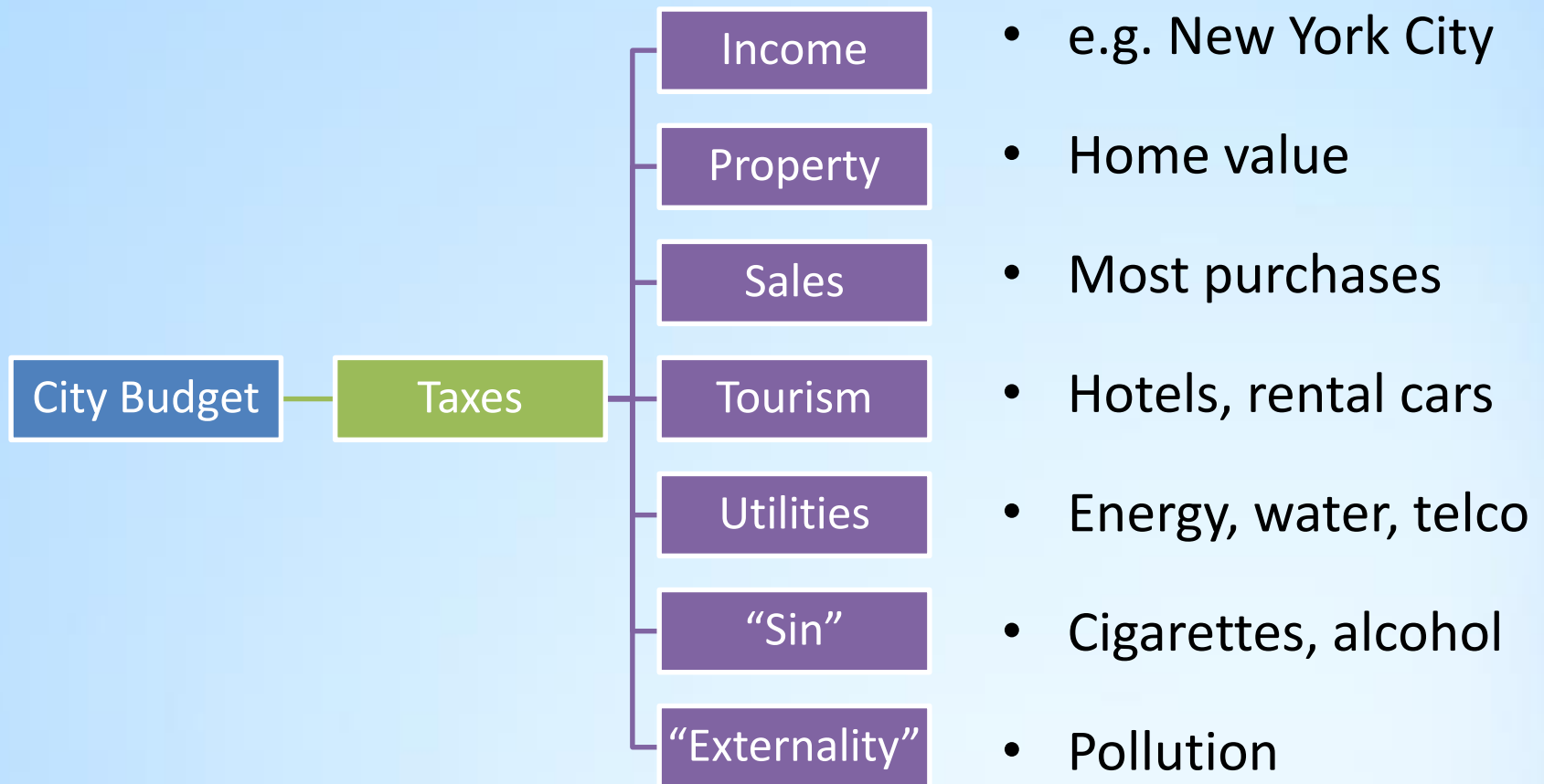
# In California, the Majority of City Revenues Are Primarily User Fees (39%), then Taxes (33%)

## City Revenue Sources (California)

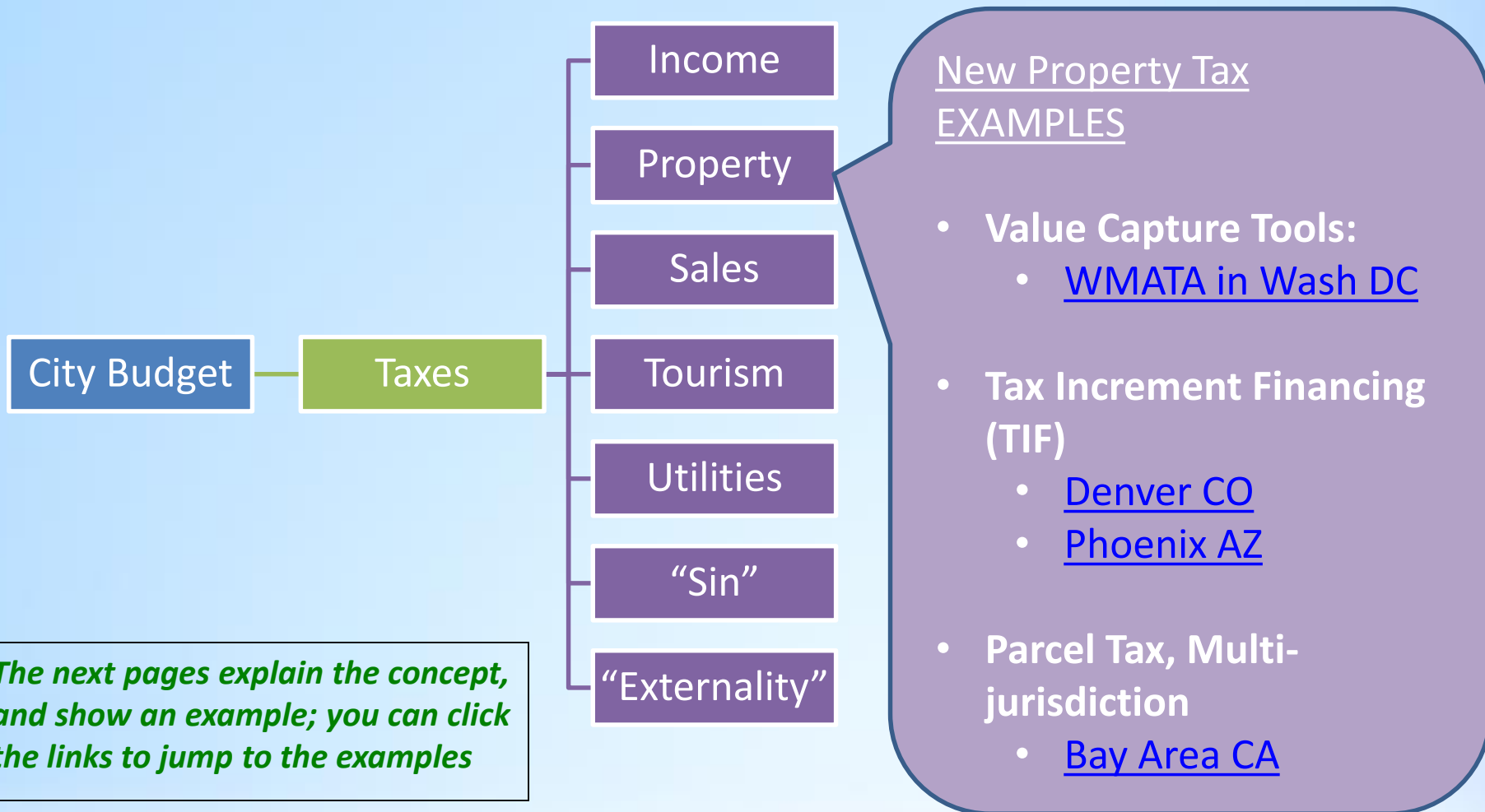


Source: Institute for Local Government (ca-ilg.org)

# Cities Generate Revenue from Taxes on Income, Property, Sales, & Other Sources



# As Climate Actions Improve Livability and Mobility, New Property Taxes Can Be Applied



*The next pages explain the concept, and show an example; you can click the links to jump to the examples*



# Value-Capture Tools

Value Capture is a broad name for the variety of financing tools that depend on the **increase in the value of the community or district because of a public investment in infrastructure.**

Value Capture Tools can take the form of **special assessments** or capturing a portion of the growth of **future property tax values**, which may be difficult to draw boundaries for, or impose new and future fees and taxes on a particular group or area.

The basic underlying premise is beneficiaries of large infrastructure investments (like property owners nearby an improved transit system) should contribute to its long term financing as they receive long term benefits of appreciating property values. This is a fundamental fairness concept, including in finance: those deriving the greatest benefit from a service should pay the most for it.

**Advantages:** Those reaping the benefits of an investment are the ones to pay

**Disadvantages:** Special assessment tax districts can be difficult to set up or approve

# Value Capture: Special Assessment

## Example: Washington, D.C. Metro System expansion

### Climate Action Challenge:

- Improve regional transportation Infrastructure, reduce traffic and associated GHGs

### Climate Action Solution:

- **Long-term property-based financing for transit infrastructure**



<http://www.metroplanning.org/news/6384/Value-Capture-Case-Studies-Washington-DC-Metro-expansion-to-Dulles-Airport>

### Deal Terms:

- *Washington Metropolitan Area Transit Authority (WMATA)* is constructing a 23-mile extension of the Metrorail system to Dulles Airport and nearby communities
- **Estimated \$5.2 billion cost**
- Commercial and Industrial property owners will be charged an **additional 22 cents per \$100 of assessed value** (in addition to normal property taxes), **special assessment** of five cents per \$100 of assessed value in the Phase 2 zone in 2010, rising to 20 cents per \$100 of assessed value.
- **Value Capture** as property values increase from regional investment

# Tax Increment Financing (TIF)

Another value-capture tool is Tax Increment Financing, or TIF.

TIFs are a popular financing tool in 49 states (not Arizona) because it allows for a municipality to **borrow money in anticipation of future tax revenues**.

Often a tool for blighted or underserved neighborhoods to attract private investment, TIFs can **fund the basic infrastructure in the district where the new growth is expected**, and can include funding for streets, sewers, parking facilities, land acquisition, planning expenses, job training, demolition and clean-up costs, and **including smart and green infrastructure**.

The original taxes on the property before the improvements are paid to the city as normal, and the **incremental new taxes are paid into a special fund that subsidizes portions of the new development** or repayment of the debt.

**Advantages:** Does not cost the taxpayer any up front tax increases

**Disadvantages:** Can create gentrification issues and fairness issues

# Tax Increment Financing (TIF)

## Example: Denver Urban Renewable Authority (DURA)

### Climate Action Challenge:

- Fund redevelopment and urban renewal infrastructure

### Climate Action Solution:

- Use Tax Increment Financing to fund infrastructure development



<http://www.renewdenver.org/redevelopment/redevelopment-sections/how-tax-increment-financing-tif-works.html>;

### Deal and Terms

- DURA uses tax increment financing to support **redevelopment or rehabilitation of blighted real property** throughout Denver.
- As a result of the redevelopment, the assessed value of the property more than quintupled to \$5 million and generated more than \$380,000 in property taxes.
- With Tax Increment Financing, **DURA captured the net new / incremental increase in revenue** (in this case, \$300,000) and the original taxing entities continue to receive (appreciation-adjusted) revenue as if the site were still a vacant manufacturing site (\$80,000).
- <http://urbanland.uli.org/economy-markets-trends/tax-increment-financing-tweaking-tif-21st-century>

# Tax Increment Financing (TIF)

## Example: Phoenix Gateway EcoDistrict

### Climate Action Challenge:

- Redevelop 2 marginalized areas with efficient GHG approach

### Climate Action Solution:

- Finance infrastructure through increases in future property values



<https://ecodistricts.org/an-innovative-financing-model-for-communities>

### Deal and Terms:

- An innovative financing infrastructure for 2 underdeveloped areas to accommodate significant, high-density, mixed-use growth
- Meeting the area's **energy, water, local transportation, telecommunications and infrastructure** service needs.
- *Coming soon: Terms to be announced for Phoenix.*

# Parcel Tax, One or More Jurisdictions

A Property tax is a tax assessed on real estate and generally based on the value of the property owned, as assessed by municipal governments.

A Parcel tax is a specific form of property tax with a rate based on the characteristics of a parcel, rather than the value-based approach mentioned above.

A parcel tax is different than a traditional ad valorem property tax, in that it is imposed by local government on a per-parcel basis. **Parcel taxes are often used by special districts to impose taxes for the purpose of education or land conservation.** Most parcel taxes assess a flat fee on each parcel of property, no matter its size or value, making them regressive by definition: they put a larger burden on less expensive properties and lesser burden on wealthy property owners. (Parcel taxes are used in California to circumvent Prop. 13, which stated that property taxes based on the value of the house could not go up by more than 1% per year.)

**Advantages:** Potentially easier to pass, as it is the same rate for all owners

**Disadvantages:** Considered regressive, as it does not take into account house value or homeowner income

# Parcel Tax, Multi-Jurisdiction

## Example: Bay Conservation Development Commission (BCDC) for Regional Wetlands

### Climate Action Challenge:

- Wetlands restoration to fight sea level rise

### Climate Action Solution:

- Regional parcel tax on property owners to finance long term wetlands restoration

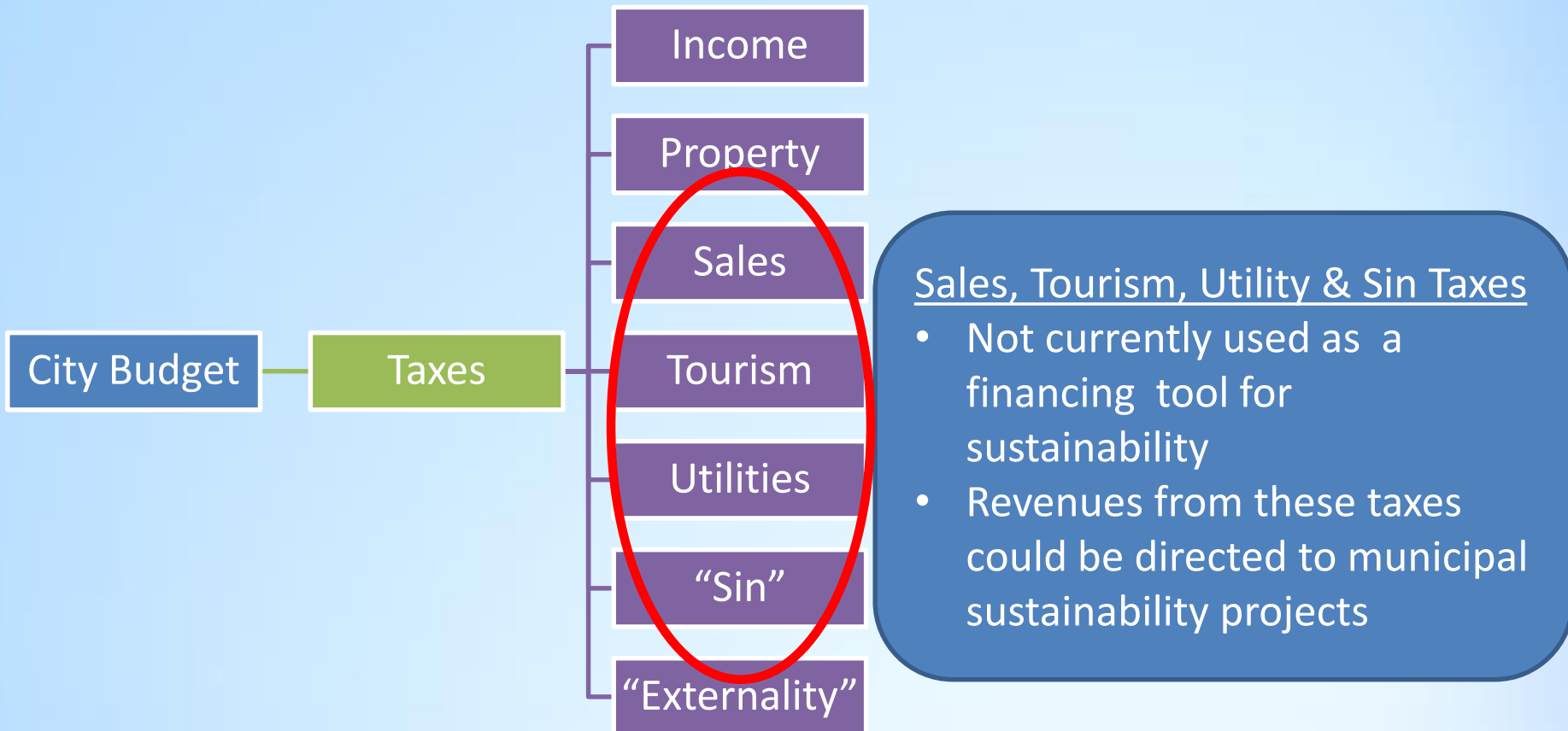


### Deal and Terms

- BCDC's **\$12 parcel tax** over 9 counties surrounding the Bay
- Raises \$500 million over the next 20 years
- To **build levees and restore thousands of acres of wetlands and tidal marshes as buffer to storm surges and floods** in all Bay Area counties
- Required a 2/3 majority vote, which was approved by voters in all 9 Bay Area counties in June 2016

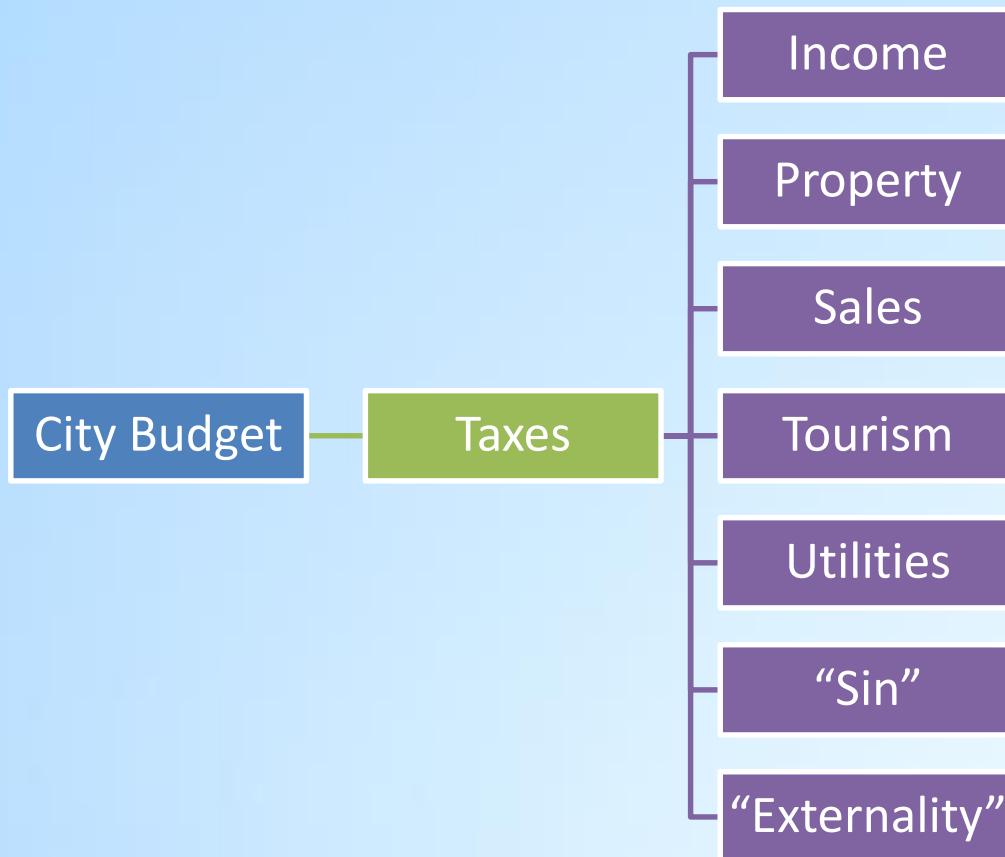
<http://www.bcdc.ca.gov> ; <http://www.marini.com/article/NO/20160126/NEWS/160129833> ; [www.adaptingtorisingtides.org](http://www.adaptingtorisingtides.org) ; <http://www.spur.org/news/2016-03-02/save-bay-again-vote-yes-measure-aa>

# While Products, Tourism, and “Sin” Categories Cause GHGs, No Climate Action Initiatives Benefit from Specific Taxes Yet (other than use of the General Fund)





# Several Version of a Tax on GHGs, or “Carbon Taxes,” Have Been Implemented



## LIVE Carbon Tax EXAMPLES

- Transportation / gasoline, with rebate to city
  - [Vancouver BC](#)
- Citywide energy
  - [Boulder CO](#)
- Big polluters
  - [Montgomery County MD](#)

*The next pages explain the concept, and show an example;  
you can click the links to jump to the examples*

# Carbon Taxes & Tools

**Carbon taxes, Cap & Trade, Cap & Dividend** are categories of financial tools that put a price on carbon emissions.

- **Cap and Trade** programs determine a maximum amount of acceptable emissions from many sources in the production or use of carbon and let the market determine the price for being under or over the assigned emission level.
- **Carbon taxes** tend to be based on taxing the production of carbon based energy at its source and using the proceeds as a dividend or rebate to residents and taxpayers to accommodate for higher energy prices. In both cases the emissions produced from fossil fuel are expected to cost more in the future and consumers and producers will be incentivized to reduce consumption of energy from fossil fuels.
- **Regional cap and trade programs**, like the Regional Greenhouse Gas Initiative, RGGI, in the U. S. Northeast, and the Western Climate Initiative, WCI, in the West, show that these programs can be effective in adding a price to carbon, and slowly changing behavior.

Adding a price for carbon will cause reductions in emissions. Use of the tools vary, heavily depending on the influence of fossil fuel companies in the region. Cap and trade may be more easily implemented since it may not require a vote, while carbon taxes may be more transparent if the proceeds are distributed equitably.

**Advantages:** Taxes the source of pollution

**Disadvantages:** Implementing requires overcoming vested interests in high-fossil areas

# Carbon Tax & Rebate to City

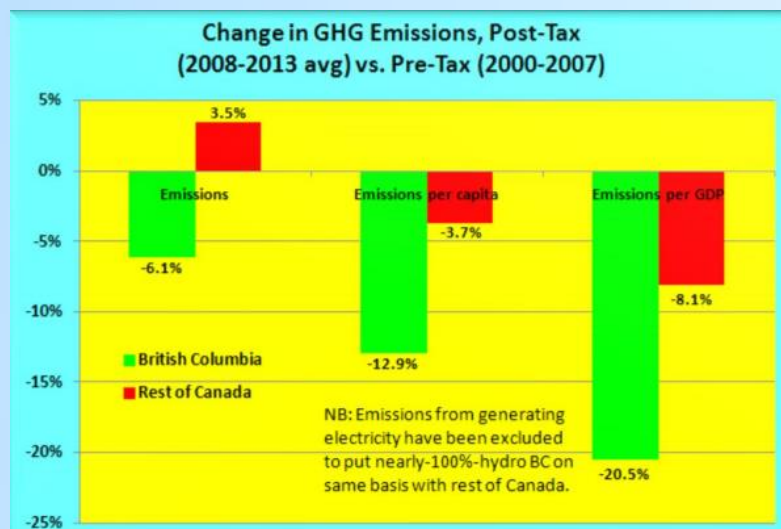
## Example: Vancouver, British Columbia

### Climate Action Challenge:

- Reduce GHG emissions

### Climate Action Solution:

- Tax fossil fuel usage, redistribute revenue to climate-action solutions



### Deal and Terms:

- All users pay a carbon tax, primarily on fossil fuel/gasoline.
- The Province of B.C. transfers and effectively “rebates” to the city nearly the full amount to fund the Sustainability Office, climate-action solutions, and grants in the community
- **The annual payments and rebates equal nearly \$900 million (Canadian \$)**
- Launched July 1, 2008 : C\$10 per metric tonne of CO<sub>2</sub>; tax grew by C\$ 5/tonne annually; reached current level of **C\$ 30 per tonne of CO<sub>2</sub>** in July 2012; has not risen since.
- At the U.S.-Canadian dollar exchange rate (1.00/0.75) in November 2015, and converting from tonnes to short tons, the provincial tax now equates to approximately **\$20.40 (U.S.) per short ton of CO<sub>2</sub>**

<http://www.carbontax.org/where-carbon-is-taxed/british-columbia>; <http://vancouver.ca/green-vancouver/climate-and-renewables.aspx>

# Carbon Tax: All Energy Bills

## Example: Boulder, Colorado

### Climate Action Challenge:

- Reduce GHG emissions

### Climate Action Solution:

- Tax electricity use, then rebate to finance upgrades



<http://insideclimatenews.org/news/02112015/boulder-taxed-its-way-climate-friendlier-future>

### Deal and Terms

- Boulder's carbon tax is levied on electricity users, reduces emissions by more than 100,000 tons a year
- At **\$18/ton** (or a penny a pound), Boulder collects \$1.8 million/year
  - Residential, \$21/yr, \$0.0049/kWh
  - Commercial, \$94/yr, \$0.0009/kWh
  - Industrial, \$9600/yr, \$0.0003/kWh
- Revenue funds business and homeowner rebates on energy efficiency equipment; expands bike lanes; new community-based solutions to reduce energy consumption.
- **82% of voters re-approved** the carbon tax after initial 5 years

# Carbon Tax: Big Polluters

## Example: Montgomery County, Maryland

### Climate Action Challenge:

- Reduce GHG emissions

### Climate Action Solution:

- Tax largest producer of CO<sub>2</sub>;  
fund energy efficiency

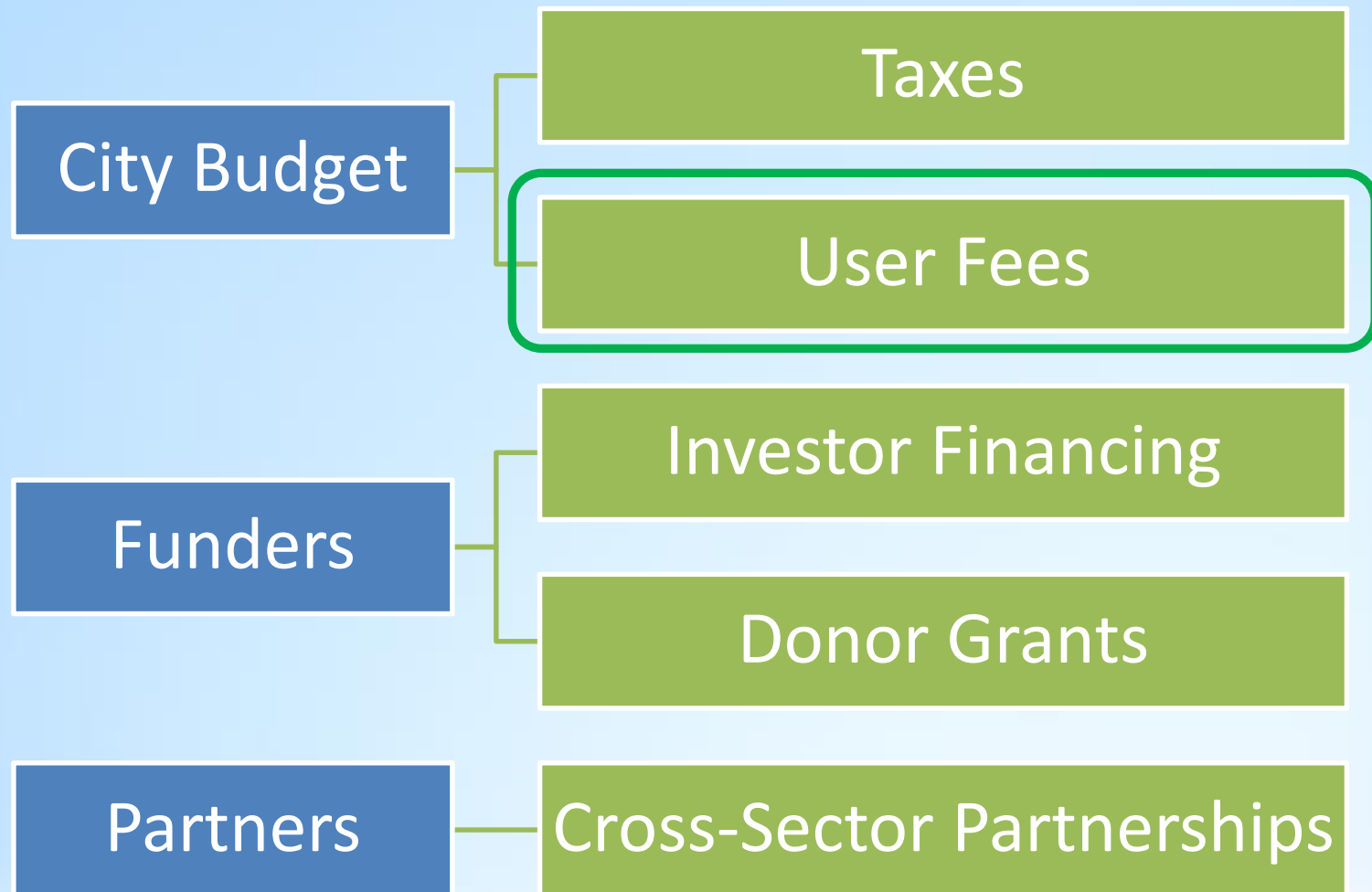


<http://insideclimatenews.org/news/20100525/maryland-county-carbon-tax-law-could-set-example-rest-country>

### Deal and Terms:

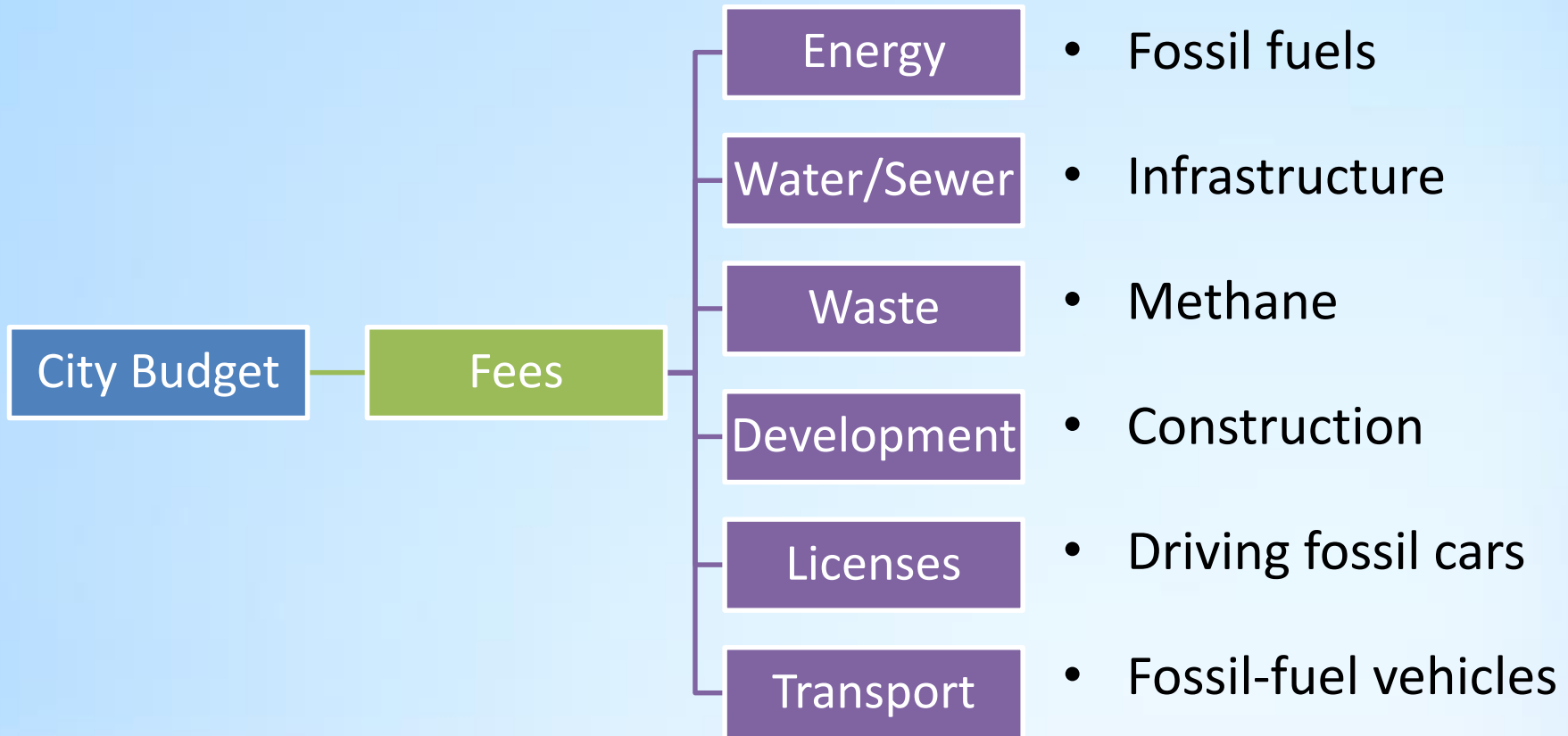
- Montgomery County, one of Maryland's most populous and wealthiest, expects to collect \$10 MM to \$15 MM annually from the **\$5 per ton** from **any stationary source emitting more than 1 million tons of carbon dioxide (CO<sub>2</sub>) per year**.
- The only source currently fitting that description is an **850-megawatt coal-fired power plant** in the area.
- Records show that the Dickerson plant releases **3 million tons of carbon dioxide per year**, the county's largest single stationary emitter.
- At least half of the \$10 million to \$15 million will **seed a low interest loan program** designed to improve residential energy efficiency with upgrades to windows, heating and ventilating systems, and solar photovoltaic panels.

# Cities Can Charge Fees to Users to Fund Climate Action



# City FEES Charge Users Directly for Services, which Also Frequently Tie to Sources of GHGs

## Sources of GHGs



# User Fees

Municipalities can impose user fees to **cover the costs associated with funding services or enhancements to increase the quality of life** and cover administrative and regulatory processes.

User fees can include tolls for drivers who use certain roads or bridges, licensing and use fees, parking tickets, etc., which bring new revenue to the municipality to improve services and infrastructure.

Cities need to consider the impact of user fees on the low income members who may not be able to afford the new fees.

**Advantages:** Easy to implement for payment of infrastructure projects or upgrades

**Disadvantages:** Can raise inequality issues for services accessed by lower incomes.



# User Fees

## Example: Toronto, Ontario: Uses Fees to Reduce Deficit

### Climate Action Challenge:

- To help smaller towns secure access to capital with lower costs

### Climate Action Solution:

- **Identify programs to create or increase fees on new or existing programs and services**



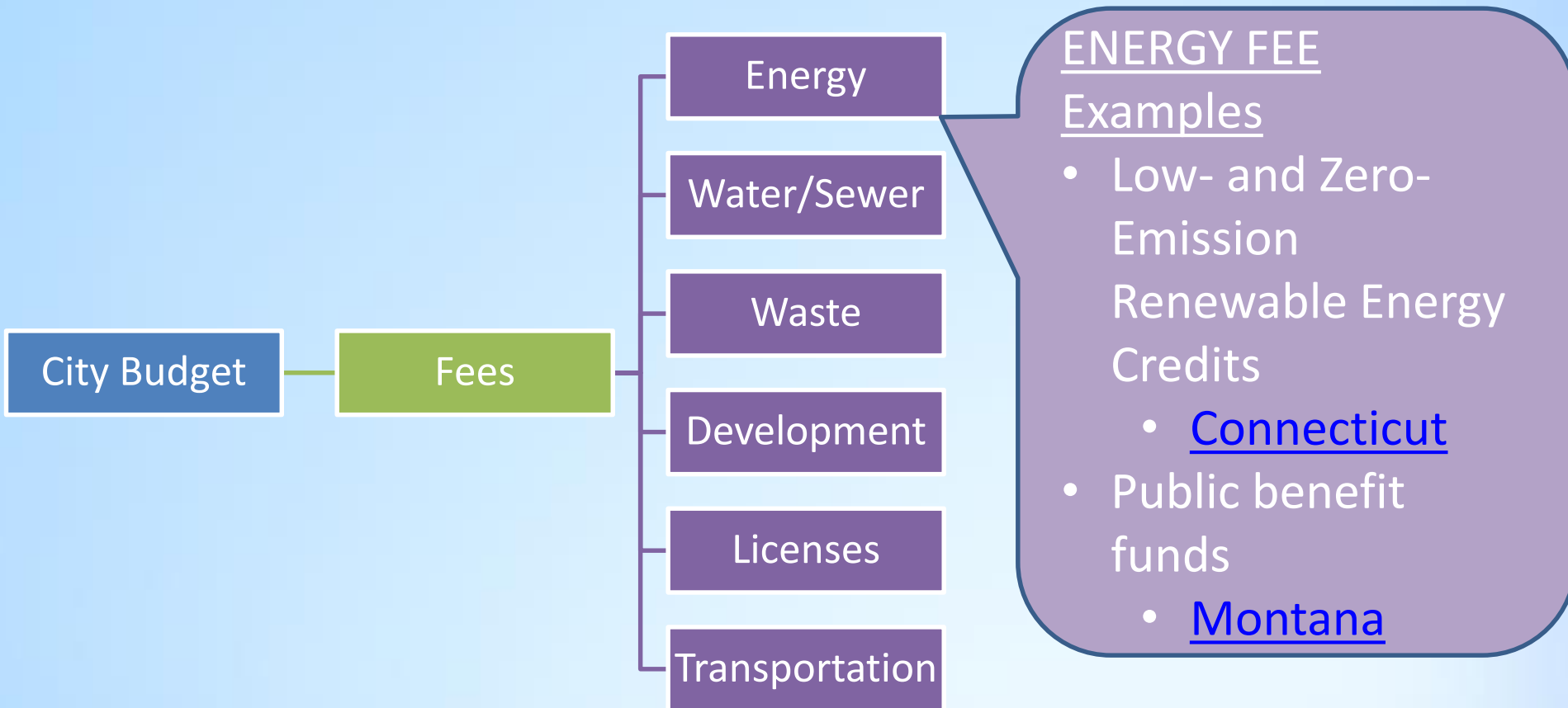
### Deal and Terms

Potential new or higher fees for:

- The convenience of paying a parking ticket by phone or online
- Property tax account changes charged a \$50 fee.
- City-run program or renting a city-run facility cost increased 3.7%
- A \$50 registration for families signing up for city recreation programs, gym rental fees and drop-in swim fees.
- **User fees can be linked more closely to GHG producing activities, so that higher fees could spur reduced GHGs**

<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=b3467729050f0410VgnVCM10000071d60f89RCRD>

# New Types of City FEES Can Fund Climate Solutions More Easily from Direct Customers



*The next pages explain the concept, and show an example;  
you can click the links to jump to the examples*

# Low- and Zero-Emission Renewable Energy Credit (REC) Purchases

## Example: L-REC and Z-REC in Connecticut

### Climate Action Challenge:

- Develop alternative energy revenue sources

### Climate Action Solution:

- Sell low- (L-REC) and zero-emission (Z-REC) renewable energy credits to utilities



<http://microgridknowledge.com/connecticut-lrec-rfp>

### Deal and Terms

- Connecticut's investor-owned utilities are **required to purchase \$1.02 billion in LREC and ZREC from clean energy projects over six years**, (the program is currently in its 5<sup>th</sup> year):
  - \$300 million for LRECs
  - \$720 million for ZRECs
- Utilities enter into 15-year contracts to buy the credits from behind-the-meter projects and pay a maximum of \$261.81/credit for ZRECs (ZREC projects between 100 kW and 1,000 kW) and a maximum of \$200/credit for LRECs (LREC projects that are up to 2,000 kW.)
- **A potential revenue source for microgrids and other clean energy projects.**

## Public Benefit Funds (PBFs)

Designed after the electric utilities were restructured in the late 1990s, Public Benefit Funds (PBFs) generally **aim to support renewable energy and energy efficiency programs.**

PBFs are pools of funds created by **small fees or surcharges on the utility bill**, but many of these PBFs were raided by legislators who were not fully obligated to follow the initial intent.

Easy to implement depending on the regulations, these can be a tool for funding innovative programs.

**Advantages:** Relatively easy to implement with cooperation of utility

**Disadvantages:** Funds could be captured by the political process for other purposes

# Public Benefit Funds

## Example: Montana's Universal System Benefits Program

### Climate Action Challenge:

- Build a fund to encourage development and adoption of cleaner energy and energy efficiency investments

### Climate Action Solution:

- Collect a small fee through the utilities to invest in community

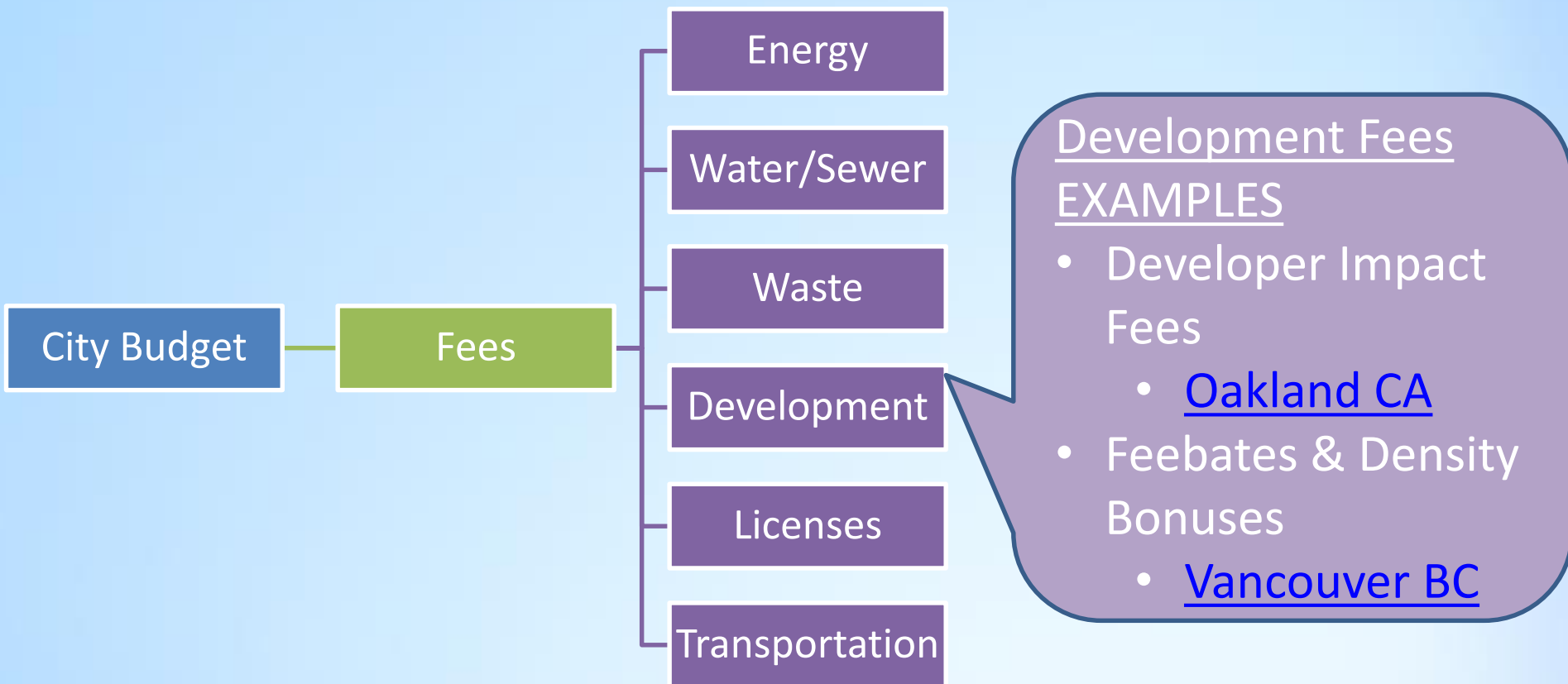


<http://energy.gov/savings/public-benefits-funds-renewables-and-efficiency>

### Deal and Terms

- The Montana program supports **cost-effective energy conservation, low-income customer weatherization, renewable-energy projects and applications, and R&D programs**
- The surcharge was set through electricity restructuring legislation and was based on 2.4% of electric utilities' 1995 revenues.
- All electric utilities -- including electric cooperatives -- must contribute revenue generated from a surcharge on customers' electricity use
- Approximately \$9.4 million collected in 2011

# New Types of City FEES Can Fund Climate Solutions More Easily from Direct Customers



*The next pages explain the concept, and show an example;  
you can click the links to jump to the examples*

## Developer Fees (part 1 of 2)

Governments can impose fees on developers to pay for the infrastructure services to be used in their developments. These fees help the municipality to offset the impact of the new development on the current population and cover the marginal cost increases. Fees can also serve to **help implement new policies and plans for sustainable growth**. Higher-income cities are increasingly using developer fees to impose affordable housing minimums.

Developer fees include:

**Dedication Requirements:** When developers start a new project, the municipality can require a specific land use criteria or payment-in-lieu to offset the impact of the development on long term goals, like open space per 1,000 people. A city may require a new development to **include smart, green, and intelligent design** that is built into the development, and the higher costs are then passed on to the purchaser. Costs for infrastructure like streets and sidewalks, and **green infrastructure policies like permeability and bio-swales can be put to the developer** to maintain the sustainability goals of the city for new developments.

**Tap Fees:** Improvements and upgrades to existing infrastructure from new developments. Tap fees can also be tied to water and sewer connections, sometimes as a one-time fee based on lot or building size.

*Continued on the next page...*

## Developer Fees (part 2 of 2)

**Linkage Fees:** Linkage fees represent assessments to the developer to offset the secondary impacts of the development, like in traffic congestion or the lack of affordable housing. It can be an effective tool for raising funds from large scale developments which the city can use to promote other objectives.

**Impact Fees:** Impact fees have continued to evolve as a tool for cities to raise new revenues from developers. Cities in particularly hot real estate markets can extract more fees from developers to fund additional service capacity requirements, such as increasing sewer capacity, affordable housing, new schools and even new roads. Cities can impose impact fees for **compliance with green infrastructure** policies but not for normal operations or programs. Legislation generally defines what fees can be imposed for what purposes.

**Advantages:** Easy to set fees through ordinances

**Disadvantages:** Developers resist higher fees, which could dampen development if fees become too high and the developments become uneconomical



# Developer Impact Fees

## Example: Oakland, CA

### Climate Action Challenge:

- Revenue for sustainable infrastructure & affordable housing

### Climate Action Solution:

- Charge impact fees to new developments



<http://www.sfgate.com/bayarea/article/Oakland-to-impose-impact-fees-on-new-housing-7280444.php>

### Deal and Terms

- Housing builders pay impact fees of between **\$750 and \$7,000 per market-rate unit**; lower rates in lower-income areas as incentive
- By 2020, impact fees will be **\$13,000 to \$24,000 per unit** (lower than neighboring cities of Emeryville & Berkeley, charging \$28,000 per market-rate unit)
- **Goal: Prompt developers to include affordable housing in more projects -- or pay a fee for every market-rate unit they build so the city can build its own affordable housing.**

# Feebates & Density Bonuses

## Example: Vancouver, BC

### Climate Action Challenge:

- Incentivize energy efficiency in homes

### Climate Action Solution:

- Develop Feebates and Density Bonuses that encourage developers to build smarter

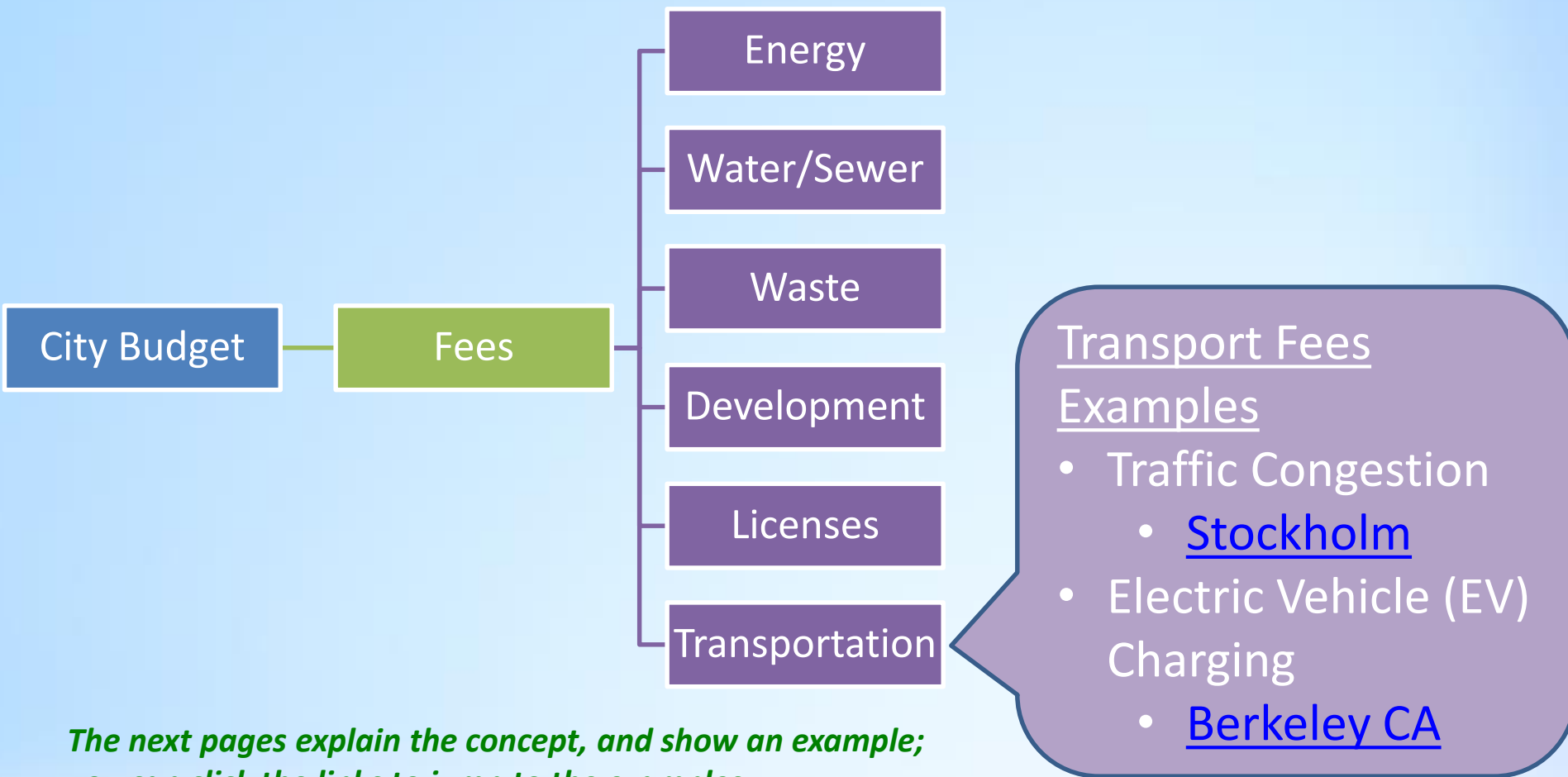


<http://www.cnv.org/City-Services/Planning-and-Policies/Land-Use/Density-Bonusing>

### Deal and Terms

- Proposed: a typical new home would incur about \$6000 in fees (all the various types of permits).
  - A revenue-neutral feebate system would charge all new homes \$3000 more per home at the time of permit
  - Then pay back the builder the \$3000 if the home meets a minimum standard
- Allows for “**density bonuses**” in multi-family homes by giving an extra floor of height in exchange for **exceeding the energy performance requirements** of the code
- The builder pays a deposit upfront, and then gets the deposit back if they meet the standard for a higher performing home

# New Types of City FEES Can Fund Climate Solutions More Easily from Direct Customers



*The next pages explain the concept, and show an example; you can click the links to jump to the examples*

# Traffic Congestion Fee

## Example: Stockholm, Sweden

### Climate Action Challenge:

- Reduce traffic congestion in the inner city

### Climate Action Solution:

- Charge vehicles owners when traveling in or out of the inner city during business hours



<http://www.accessmagazine.org/articles/spring-2011/political-public-acceptability-congestion-pricing-ideology-self-interest-sweden>;  
<http://www.toolsofchange.com/en/case-studies/detail/670>

### Deal and Terms

- Before the fee, congestion was 530,000 vehicles per day and 800,000 transit passengers each day
- Vehicle owners are required to pay the congestion fee if their vehicle passes a control point on way in or out of the Stockholm inner city area on weekdays between 6.30 a.m. and 6.29 p.m.
- 10 Swedish Crowns (SEK), or US\$1.50, charged for off-peak travel across the cordon boundary in both directions, and up to 20 SEK (US\$3.00) were charged for peak-hour travel, with a maximum charge of 60 SEK (US\$9.00) for a full day.
- **Traffic congestion reduction of 20% since implemented**

# MicroGrid Enhanced with Electric Vehicle (EV) Charging & Parking Fees

## Example: Berkeley, California

### Climate Action Challenge:

- Create energy assurance & reduce GHG emissions

### Climate Action Solution:

- Develop clean energy microgrid with solar power energy & EV charging stations in parking garages

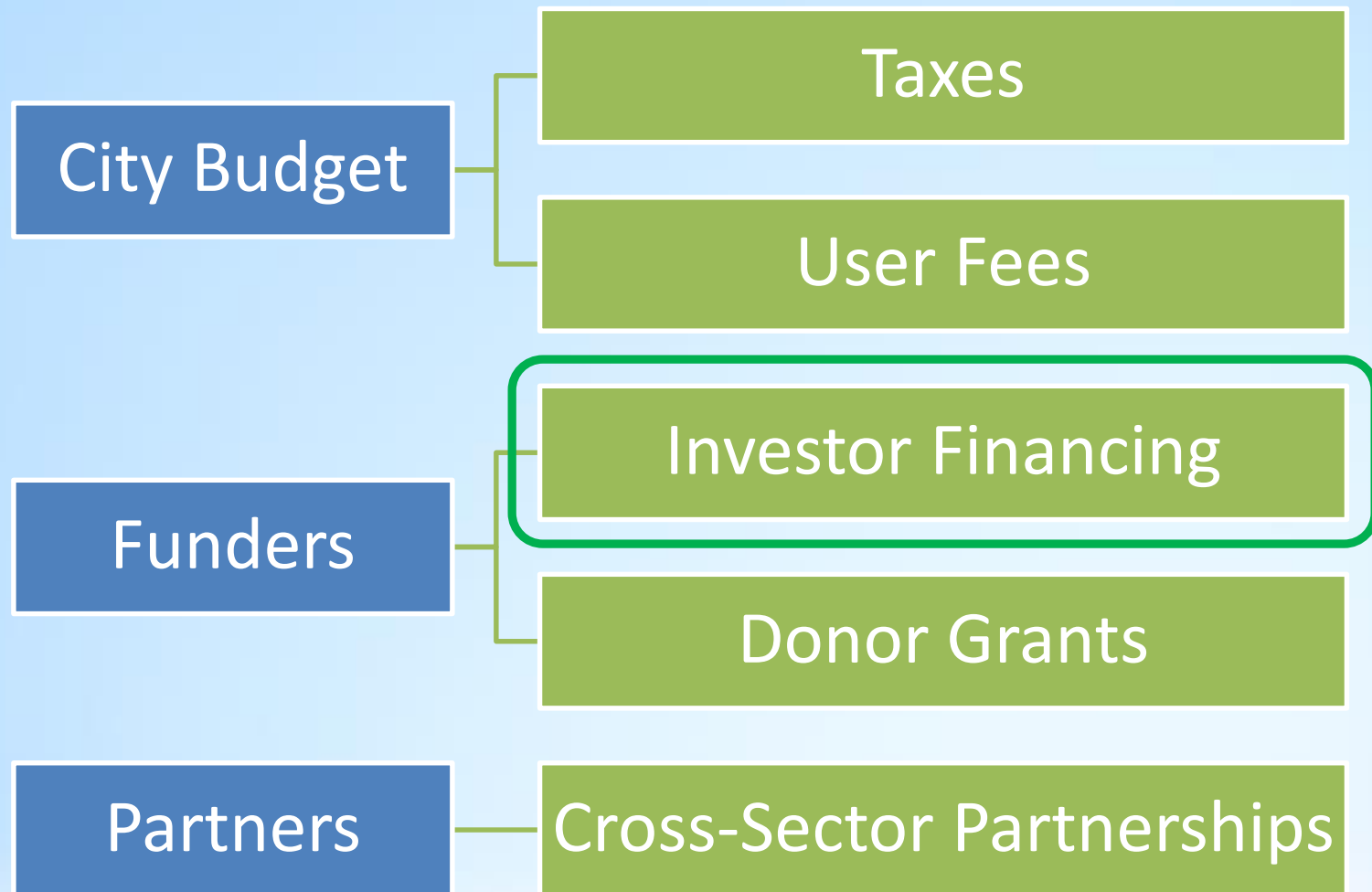


### Deal and Terms

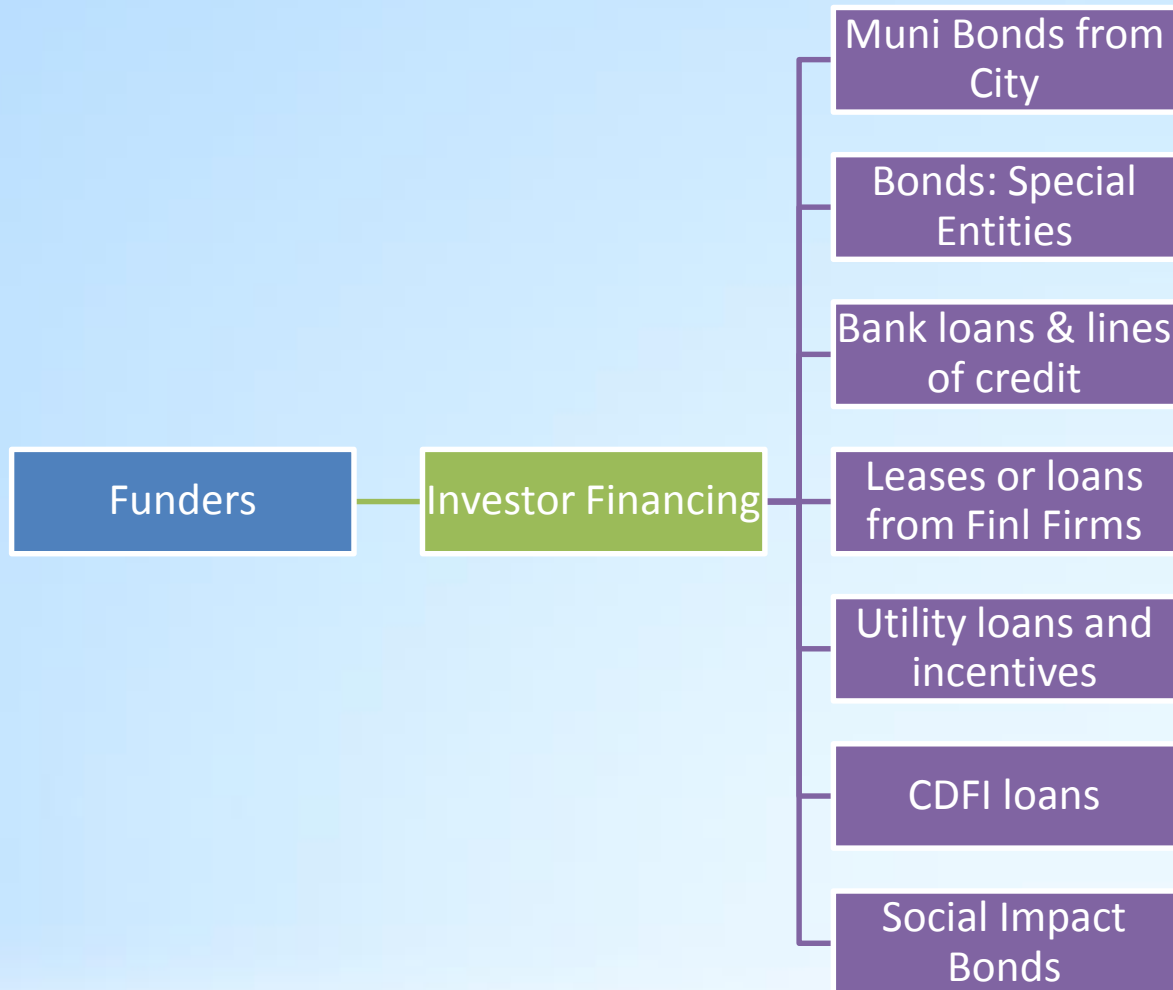
- Design and feasibility analysis to be grant funded. Funding for build, operation, and maintenance TBD. Exploring options for cross-sector and public- private partnership
  - Microgrid participants would buy energy from the grid
  - Allows for reduced energy costs to microgrid participants subsidized with parking and EVSE user fees
- Increases energy assurance for municipal and potentially privately owned buildings that require uninterrupted energy flow during an emergency

<https://building-microgrid.lbl.gov/projects/energy-assurancemicrogrid-project>

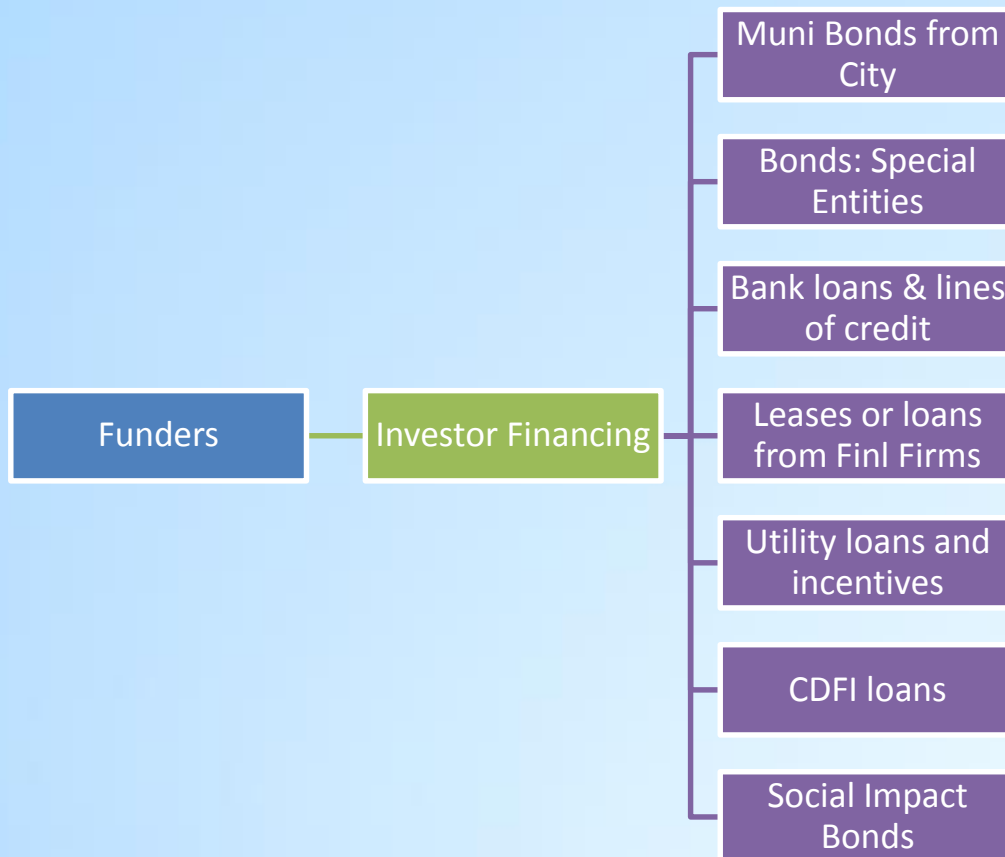
# Investors Can Fund Climate Action, Especially If ROIs Are Positive



# Investors Provide FINANCING to Cities via Bonds, Loans & Leases



# Climate Action with Positive ROI Can Be Attractive for All Types of Bonds



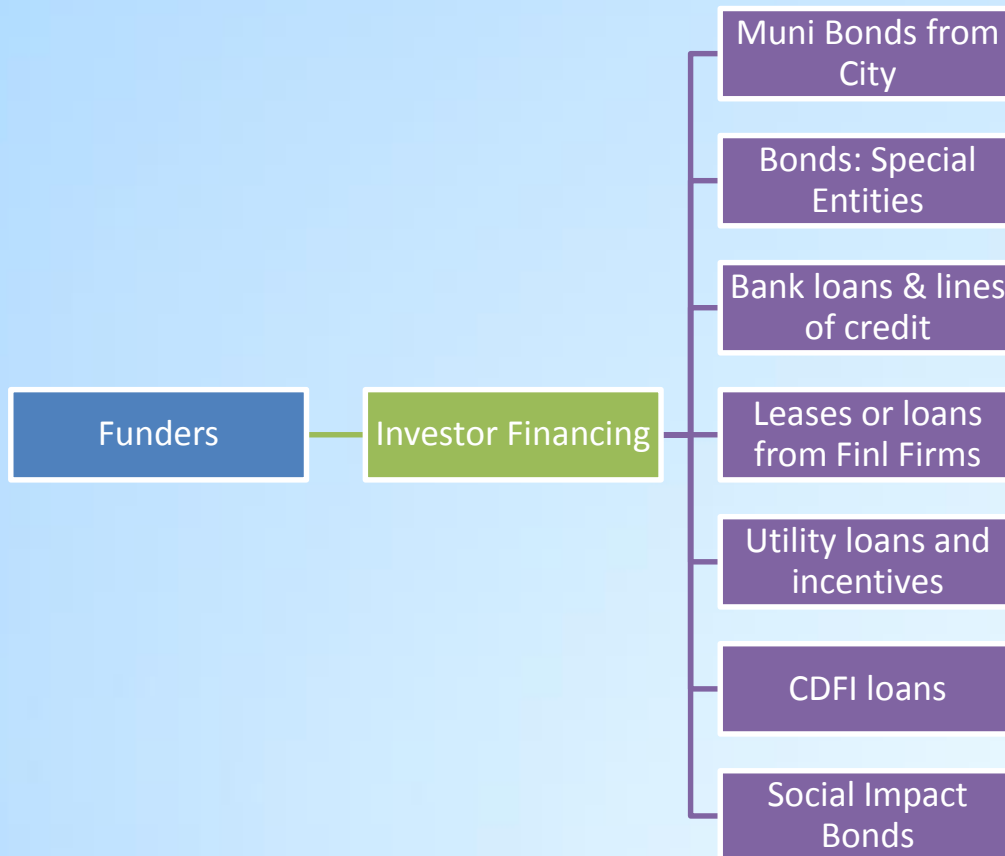
## Bond EXAMPLES

- General Obligation
  - [Philadelphia PA](#)
- Green Bonds
  - [Los Angeles CA](#)
- QECB: Qualified Energy Conservation Bond
  - [Richmond CA](#)
- QZAB: Qualified Zone Academy Bond
  - [Kalispell MT](#)

*The next pages explain the concept, and show an example; you can click the links to jump to the examples*



# Climate Action with Positive ROI Can Be Attractive for All Types of Bonds



## More Bond EXAMPLES

- Industrial Revenue Bonds
  - [San Francisco PUC](#)
  - [California I-Bank](#)
- Lease Revenue Bonds
  - [Community College League of California](#)
- Pooled Bond Financing
  - [Virginia Counties](#)



## General Obligation Muni Bonds

Bonds bring immediate capital to build projects that will be repaid over the life of the project asset. Municipalities (cities, counties, states, etc.) commonly issue General Obligation (G.O.) bonds to investors with the promise to repay the investor with a level of certainty (default risk), over a certain time period (maturity: 5 to 30 years) and with a certain return (coupon or yield – in today’s markets, can be as low as 2%).

Most ‘muni’ bonds are repaid by general tax revenues, and are a common tool for financing operations and long-term projects. Many taxable or private investors are attracted to muni bonds as the interest income is not taxed at the Federal or state level. Tax-exempt investors like endowments, foundations or pension plans generally are not interested in tax-free G.O. muni bonds, (unless there is a federal subsidy, as with the Build America taxable muni bonds of 2009). Yet low interest rates have spurred demand for taxable munis from European investors facing negative interest-rate yields.

**Advantages:** A traditional reliable source for funding cities’ operations and projects, paid for by the various taxes, fees and revenues collections over time.

**Disadvantages:** Affects debt limits, may be difficult to get new taxing approval

# General Obligation Muni Bonds

## Example: Philadelphia PA, \$500 million

### Climate Action Challenge:

- Improve livability of public spaces

### Climate Action Solution:

- Issue long term general obligation bonds to fund parks, libraries, city services



<https://nextcity.org/daily/entry/philadelphia-parks-libraries-recreation-initiative-kenney>

### Deal and Terms

- Philadelphia is proposing to sell \$300 million in bonds and secure an additional \$200 million in state and federal government and philanthropic funding
- To focus investment on **public infrastructure** in neighborhoods, improving parks and recreation centers
- A sale of city bonds requires voters to approve the initiative via a ballot question, or they can be sold through a municipal authority

# Green Bonds

Green bonds are traditional bonds in terms of structure (credit rating, coupon and maturity) that include a promise to **use the proceeds to invest in specific environmentally related projects**, such as clean power and technology and energy efficiency, renewable energy, carbon-reducing projects, climate change mitigation, public transport, water management, energy and waste management.

Globally, green bonds have been issued by multi-national or supra-national organizations (like the World Bank) and purchased by global insurance companies as a risk mitigation investment for their climate risk exposure. More private and institutional investors seek green bonds to align with their environmental, social and governance criteria in their portfolios, and private investors have a growing interest in tax-exempt green muni bonds. Repayment risk and general terms are likely to be nearly identical to other bonds issued by the municipality, so borrowing terms have been similar as well. Demand for green bonds is very strong currently.

**Advantages:** Global financial tool for funding 'green' projects. Could be a special issuance bond for green projects. Demand from investors is high.

**Disadvantages:** Greater scrutiny may come to the green bond sector for verification of 'greenness' and impact; currently no requirement to deliver GHG reductions.

# Water Infrastructure Green Bond

## Example: Los Angeles, CA \$100 million

### Climate Action Challenge:

- Enhance Water Infrastructure

### Climate Action Solution:

- Issue green-bonds which are in high demand by investors



<http://emma.msrb.org/ER890479-ER695548-ER1097054.pdf>

### Deal and Terms

- Los Angeles issued \$100 million in green bonds for wastewater system revenue bonds.
  - The City received ratings of “AA+/AA+/AA+” from S&P, Fitch, and Kroll
- Issued to finance the **construction and improvement of the wastewater collection and treatment system** of the City through the sustainable development of Green Projects.
- All-in TIC (True Interest Cost) = 3.945%, and an Average Life of 21.7 years for the 2015 A&B Bonds.
- Infrastructure includes 6,700 miles of mainline sewers, 7 main interceptor sewers, 44 pumping plants, and 4 City-owned water reclamation plants

# Qualified Energy Conservation Bonds (QECCBs) & Qualified Zone Academy Bonds (QZABs)

Created in 2008, QECCBs are a **taxable muni bond designed to fund energy efficiency projects or upgrades** on public facilities (like solar), fund green demonstration projects, or develop energy microgrids.

QZABs are a similarly structured muni bond **designed to fund public schools in low income areas – including for energy efficiency upgrades**. To participate in this program, schools must either be located in empowerment zones or enterprise communities, or have 35% or more of their student body on the free and/or reduced lunch programs, plus additional regulations from the US Department of Education.

In both instances, institutional tax-exempt investors would prefer these higher return bonds, while the **municipality relies on the federal government to pay the difference between the borrowing costs for a muni bond versus a taxable bond**.

**Advantages:** Low cost borrowing for energy conservation including for educational facilities in low income areas

**Disadvantages:** Can be complicated to get the federal subsidy or arrange for tax credit to investor

# Qualified Energy Conservation Bond (QECCB)

Example: Richmond, CA \$1 million

## Climate Action Challenge:

- Improve energy efficiency in streetlights

## Climate Action Solution:

- QECCB lease purchase agreement issued for LED lighting



<http://energy.gov/sites/prod/files/2014/06/f16/street-lighting-qecb.pdf>

## Deal and Terms

- Issued \$1.05 million of 15 year QECCBs to Bank of America as a lease-purchase agreement.
- Notes priced at 6.79%, and the city is receiving a 4.06% interest rate subsidy, for a **net interest rate of 2.73%**
- Over \$500,000 from the issuance used for street lighting upgrades
- **Average energy savings of 45% in street lighting**

# Qualified Zone Academy Bond (QZAB)

## Example: Kalispell Montana School District

### Climate Action Challenge:

- Improve energy efficiency in buildings

### Climate Action Solution:

- QZAB bond and private partnership for upgrades



[http://www.dailyinterlake.com/members/schools-plan-energy-saving-projects/article\\_cfe98750-aa3a-11e2-837c-001a4bcf887a.html](http://www.dailyinterlake.com/members/schools-plan-energy-saving-projects/article_cfe98750-aa3a-11e2-837c-001a4bcf887a.html)

### Deal and Terms

- Energy efficiency improvements in 12 public school buildings for an expected savings of over \$140,000 annually.
- Borrow roughly \$1.9 million in loans to be **repaid through energy savings.**
- Zero-interest rate (0%): U.S. Department of Education **Qualified Zone Academy Bonds**
- **Requires a 10% private match** that would be fulfilled through free services by private contractor.





## Revenue Bonds

Revenue bonds plan to repay the investor from revenues generated by the underlying assets for which the bond proceeds are dedicated (like parking lots and parking fees). Like a G.O. muni bond, a Revenue bond provides income (yield) that is tax-exempt to the private investor. The repayment risk can be estimated from the ability of the underlying asset to generate sufficient income to meet the bond obligations for the coupon and principal repayment.

Rating agencies and investors can assess and rank these risks, and interest rates on Revenue bonds are generally higher than those on G.O. bonds, given the potential added risk of repayment shortfalls by the underlying asset or by not being backed by the full faith and credit of the municipality.

**Advantages:** Revenue from the investment will be used to repay the loan. Often used for financing infrastructure that generates a revenue stream.

**Disadvantages:** Surplus revenue cannot be shared across other city financing needs.

# Municipal Industrial Revenue Bonds

IRBs are often issued by a municipality to promote economic development in the community, by providing funds to a private developer, for example, to provide some **upgrade to the 'built environment'** (capital improvements, renewable and energy efficiency upgrades) with the private firm holding ultimate responsibility to repay the bondholders. The municipality holds the asset as collateral until the debt is repaid, and generally does not charge property taxes, making it attractive to the developer. IRBs are generally tax exempt to the investor, meaning the developer gets access to lower cost financing, but higher than the rate on a G.O. muni bond.

**Advantages:** A helpful tool to stimulate development

**Disadvantages:** May affect debt limits or issuance ceilings/caps at cities

## Industrial Development Bonds (IDBs)

Industrial Development Bonds (IDBs) are tax-exempt securities issued up to \$10 million by a governmental entity to provide money for the acquisition, construction, rehabilitation and equipping of manufacturing and processing facilities for private companies. IDBs can be issued by the Infrastructure Bank, local Industrial Development Authorities, or by Joint Powers Authorities. ([http://www.ibank.ca.gov/industrial\\_dev\\_bonds.htm](http://www.ibank.ca.gov/industrial_dev_bonds.htm))

# Municipal Industrial Revenue Bonds

## Example: San Francisco PUC –

## Wastewater Infrastructure Bonds

### Climate Action Challenge:

- Build new waste water and storm water infrastructure

### Climate Action Solution:

- Long term muni revenue bond for water infrastructure



<http://www.ceres.org/press/press-releases/san-francisco-public-utilities-commission-issues-world2019s-first-certified-green-bond-for-water-infrastructure>

### Deal and Terms

- \$240 million Wastewater Revenue Bond will fund eligible projects in sustainable storm water management and wastewater projects
- **The first certified green water bond to finance sustainable water infrastructure**
- Green infrastructure is a **stormwater management tool that takes advantage of the natural processes of soils and plants in order to slow down and clean stormwater** and keep it from overwhelming the City's sewer system
- Working to maintain the 100+ year old, 900 mile long combined sewer system and 17 pump stations that collect **sewage and storm water**

# Industrial Revenue Bond IRB

## Example: California Infrastructure Bank

### Climate Action Challenge:

- Fund infrastructure

### Climate Action Solution:

- Infrastructure Bank provides long-term tax exempt financing for public benefit projects and growth



<http://www.bizjournals.com/sacramento/news/2016/03/28/packaging-company-plans-expansion-in-sacramento.html> : <http://www.ibank.ca.gov/bondmapandsearch.htm>

### Deal and Terms

- **DATE ISSUED:** 12/16/2015
- **BORROWER NAME:** Capital Corrugated, Inc.
- **COUNTY:** Sacramento
- **CITY:** Sacramento
- **BOND CATEGORY:** Industrial Development Bonds
- **AMOUNT ISSUED:** \$3,810,000
  
- Project financed by the bonds must meet **public-benefit criteria**
- Funds can be used for construction and take-out financing for land, buildings and equipment
- \$3.8 million in tax-exempt bonding to finance the acquisition and installation of the new press, which **saves energy and fuel**

# Lease Revenue Bond

## Example: Community College League of California

### Climate Action Challenge:

- Fund (sustainable) equipment and capital facilities projects

### Climate Action Solution:

- CCLC provides lease purchase funding plans for community colleges



<http://www.ccleague.org/14a/pages/index.cfm?pageid=3352>

### Deal and Terms

- Offers community college districts a cost-efficient method of financing equipment purchases and capital facilities
  - which can **fund sustainable improvements, and electric vehicles**
- LRB/lease purchase financing are two of the most successful methods developed in recent years to **address immediate needs for capital acquisitions** while improving the management of cash flow.
- By reducing interest rates, the tax-exempt feature of LRB/lease purchase financing has proven to be attractive to both borrowers and investors

# Pooled Bond Financing

**Pooled bond financing** is a tool to help keep borrowing costs low by aggregating the borrowing needs of several smaller jurisdictions into one larger financing.

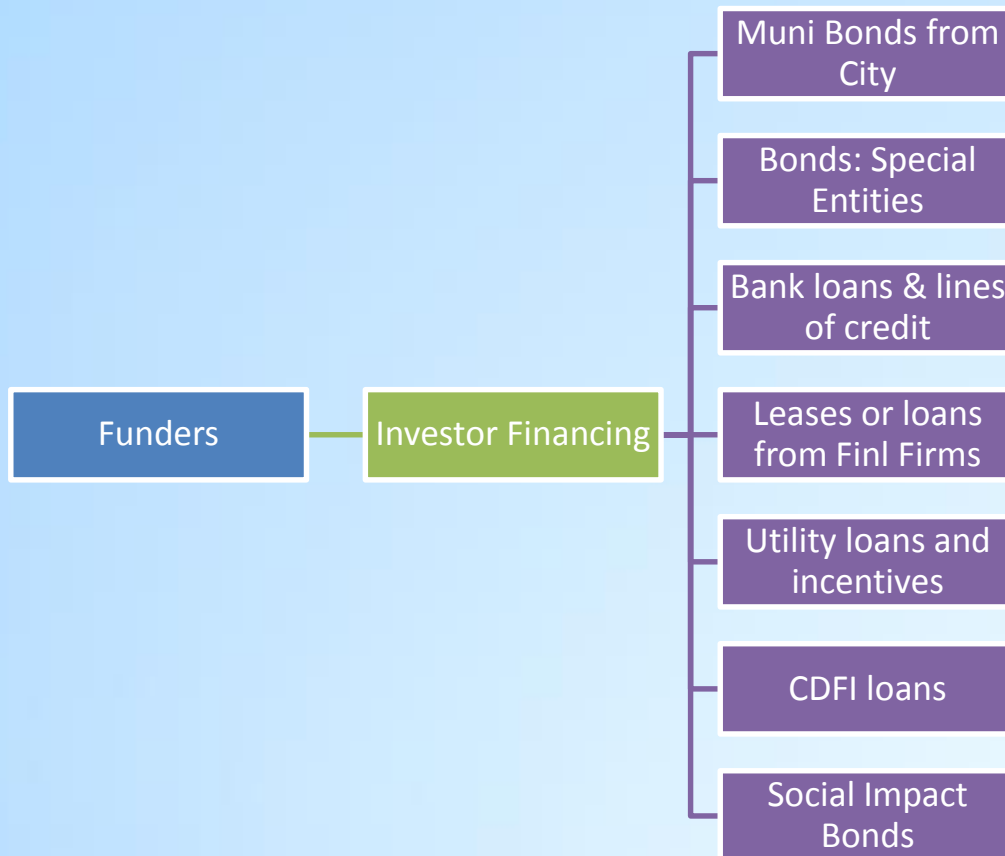
The credit rating, enhanced with bond insurance, can be higher than the individual municipalities in the pool. A debt service reserve fund of 5% also contributes to the higher credit strength. This tool is **often used for smart infrastructure projects.**

**Advantages:** Can create higher scale and lower costs for borrowing together among multiple jurisdictions

**Disadvantages:** Need to be careful to determine the mix of partners and their debt obligations



# Climate Action with Positive ROI Can Be Attractive for All Types of Loans & Leases



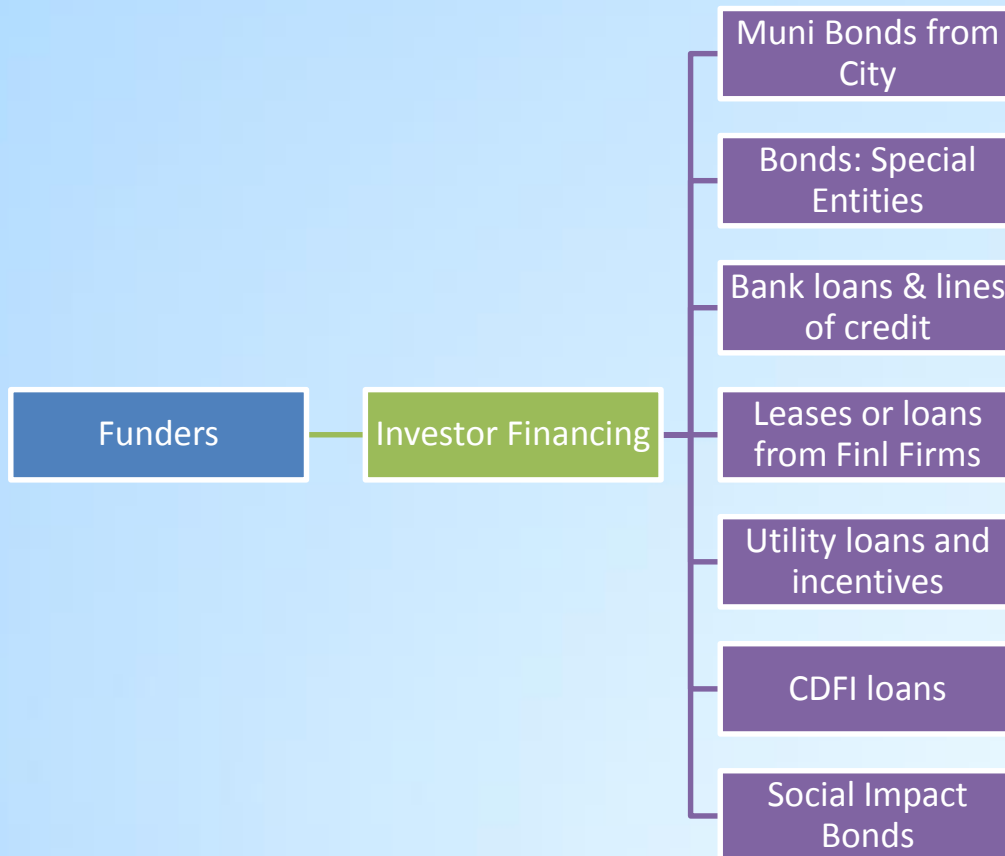
## LEASE & LOAN EXAMPLES (1 of 2)

- Energy efficiency loans
  - [Milwaukee WI](#)
- Lease Purchase Agreement
  - [Baltimore MD](#)
  - [Tennessee Valley Authority](#)
- PACE Loans
  - [San Francisco CA](#)

*The next pages explain the concept, and show an example; you can click the links to jump to the examples*



# Climate Action with Positive ROI Can Be Attractive for All Types of Loans & Leases



## LEASE & LOAN EXAMPLES (2 of 2)

- On-bill Financing
  - [NYSERDA](#)
- State-Based Loans
  - [California FIRST](#)
- National Loans
  - [FHA](#)
- Utility loans
  - [PG&E](#)

*The next pages explain the concept, and show an example; you can click the links to jump to the examples*

## Energy Efficiency Loans

Energy efficiency loans generally come from state or federal funds (sometimes through an intermediary) to make low interest rate loans to individuals or small businesses to **improve energy efficiency in their homes and workspace through more efficient HVAC, windows and doors, insulation**, etc. Each state's program specifics vary.

Borrowers repay the loan, get access to better efficiency and the state gets return of capital and small income and lower energy use/GHG emissions.

**Advantages:** Banking partners shift risks from cities; energy upgrades funded at lower cost

**Disadvantages:** Few programs have achieved large scale so far

# Solar Purchasing and Financing

## Example: Milwaukee Shines Loan-Loss Reserve Program

### Climate Action Challenge:

- Encourage homeowners to install solar energy system

### Climate Action Solution:

- Up to \$2 million in loan-loss reserve as a credit enhancement to help MKE homeowners finance solar energy systems



This is also an example of group purchasing

### Deal and Terms, benefiting from Credit Enhancement

- **Eligible Participants:** City of Milwaukee homeowners of 1 to 3 unit, owner-occupied residences
- **Loan Size:** Up to \$20,000
- **Interest Rate:** Low-interest, fixed rate (as low as prime + 1.50%)
- **Terms:** Up to 15 years to repay. No penalties for early payment, no fees, no down payments
- **Eligible Projects:** Solar electric systems (up to 6 kW), solar hot water systems (1-8 panels) or solar hot air.
- **Contributing to lean energy results:** more than 1.5 MW, exceeding goal of 1 MW, of solar energy in entire city of MKE

<http://www.milwaukeeshines.com>:

<http://city.milwaukee.gov/MilwaukeeShines#.V2sluLsrLIU>:

<http://city.milwaukee.gov/MilwaukeeShines/Get-Solar/Solar-Financing.htm#.V2sl-7srLIU>:

# Lease Purchase Agreements

Municipalities can use **Lease-Purchasing** for investing in property or equipment that can be leased on annual renewable contracts. This can be beneficial to access tax credits via the lessor.

Multiple jurisdictions can issue debt as a **pool** for the projects or assets linked to a stream of collective lease payments. This can also be structured as “**Certificates of Participation**” (**COPs**) in future lease revenues, and potentially acquire the assets at a low price at the end of the lease.

Generally, this pooled approach is beneficial for smaller projects to get access to lower interest rates and longer time frames.

**Advantages:** Good tool for smaller investments to pool together for scale

**Disadvantages:** Potential uncertain value of asset at end of lease, but can be negotiated

# Lease Purchase Agreements

## Example: Baltimore, Maryland

### Climate Action Challenge:

- Lease more efficient vehicles for fleet to reduce GHG and manage cash flow

### Climate Action Solution:

- Use lease financing to upgrade the city's fleet and manage the costs more efficiently



<http://generalservices.baltimorecity.gov/news/newsroom/2016-05-23-city-saves-millions-while-replacing-fleet-equipment-due-new-financing-model>

### Deal and Terms

- The new lease financing model both **modernizes and reduces the cost of maintaining the City's aging fleet**
  - Older fleets require a much higher investment in maintenance and repair costs, and are also associated with higher fuel costs due to older, less **fuel-efficient vehicles**.
- The purchase of every vehicle in the fleet is financed over its useful life.
- The transition to a debt financing model for vehicle purchases allowed for a onetime appropriation of \$30 million from the City's Mobile Equipment Fund
- **Upgrading the fleet has cut the expense of maintaining the City's vehicle fleet by \$1 million per year**

# Lease Purchase Agreements

## Example: Tennessee Valley Authority

### Climate Action Challenge:

- Finance cleaner energy

### Climate Action Solution:

- Arrange a lease purchase agreement with the private sector as part of the financing to build new combined-cycle



[https://www.tn.gov/assets/entities/tacir/attachments/2014\\_TVA\\_PILOTS.pdf](https://www.tn.gov/assets/entities/tacir/attachments/2014_TVA_PILOTS.pdf)

<http://www.knoxnews.com/business/tva-reaches-deal-to-lease-john-sevier-gas-fired-plant-ep-362305061-357262641.html>

### Deal and Terms

- In 2012, The Tennessee Valley Authority (TVA) completed a \$1 billion lease-purchase transaction for a natural gas-fired plant in Rogersville, TN
  - The transaction provided financing support for the development of the plant and **incrementally cleaner energy**.
- Financing for the lease purchase included a \$100 million equity investment and a \$900 million bond issue, both of which were secured by TVA's rental payments.
- TVA will lease the plant to John Sevier Combined Cycle Generation LLC, for which it will receive \$1 billion in proceeds.

# PACE Financing

One of the newer tools to finance clean energy, PACE (Property Assessed Clean Energy) programs allow the property owner (residential or commercial) to finance clean, renewable and efficient energy (and in some states, water efficiency and seismic retrofit) investments over the property tax bill.

Municipalities can promote or approve of programs to help property owners **improve their energy footprints** with repayment terms that will stay with the property even it changes ownership.

Commercial building owners can generally pass these **green improvements** and higher property tax bills on to their tenants, who are willing to pay more for a more environmentally efficient and healthier building.

For additional guidance on PACE solutions and setup, go to <http://PaceNation.US> and <http://BetterBuildingsSolutionCenter.energy.gov>

**Advantages:** Cities help finance energy upgrades over the life of the property, payments spread over property tax bills

**Disadvantages:** Education to mortgage holders about the status of the PACE loan in the ranking of property debt recovery in case of foreclosure is required

# PACE Financing

## Example: Commercial Buildings

### Climate Action Challenge:

- Reduce energy demand; decrease GHG emissions

### Climate Action Solution:

- Long-term financing for property owners to upgrade/retrofit buildings



[https://californiafirst.org/Home-Efficiency-Financing-welcome/?utm\\_term=%2Benergy%20%2Befficiency%20%2Bloan&utm\\_source=google&utm\\_medium=cpc&utm\\_campaign=16-BayArea-LG-HE](https://californiafirst.org/Home-Efficiency-Financing-welcome/?utm_term=%2Benergy%20%2Befficiency%20%2Bloan&utm_source=google&utm_medium=cpc&utm_campaign=16-BayArea-LG-HE) ; [www.cleanfund.com](http://www.cleanfund.com)

### Deal and Terms:

- Property owner finances the retrofits through the property tax bill over 20 years, and the obligation stays with the property even if transferred/sold
- Example: *644 Broadway, San Francisco*: **energy efficiency retrofit**
- PACE Financing: \$1.8 million, 20 years duration, provided by Clean Fund
- **Projected energy savings: 24%**
- Retrofits included HVAC replacement, LED lighting, building controls, cool roof envelope improvements (insulation, high performance windows), low flow water fixtures



# On-Bill Financing

On-bill financing is a tool used by utilities, encouraged by cities, to help residents **fund energy improvements through repayment of infrastructure or equipment improvements on the customers' utility bills.**

Generally, the local utility can identify the upgrade packages and monitor the implementation, helping consumers reduce overall emissions with easy repayment options.

**Advantages:** Straightforward to implement with a utility

**Disadvantages:** Utility may limit the list of green/energy improvements allowed for the program

# On Bill Financing

## Example: New York State Energy Research & Development Authority

### Climate Action Challenge:

- Reduce energy use

### Climate Action Solution:

- Utility on-bill financing funds energy efficiency projects with local community partners



<http://www.nyseda.ny.gov/All-Programs/Programs/Cleaner-Greener-Communities>

### Deal and Terms

- **\$90 million** program to fund implementation of large-scale, high-profile projects that support the goals of each region's sustainability planning efforts.
- Most of NYSERDA's funding is from ratepayers' System Benefit Charge on their utility bills, ranging 1-2 mills/KWH
- **Grant funding** to private developers, local governments, nonprofit organizations and other public and private entities.
- **Goal:** encourage communities to create **public-private partnerships** and develop regional sustainable growth strategies
  - in such areas as **emissions control, energy efficiency, renewable energy, low-carbon transportation, and other carbon reductions.**

# Residential Energy-Efficiency Financing

## Examples of 3 Types: FHA, California First and PG&E

### Climate Action Challenge:

- Encourage residential energy efficiency upgrades

### Climate Action Solution:

- Zero or low interest rate loans for homeowners from combo of federal, state and utility programs

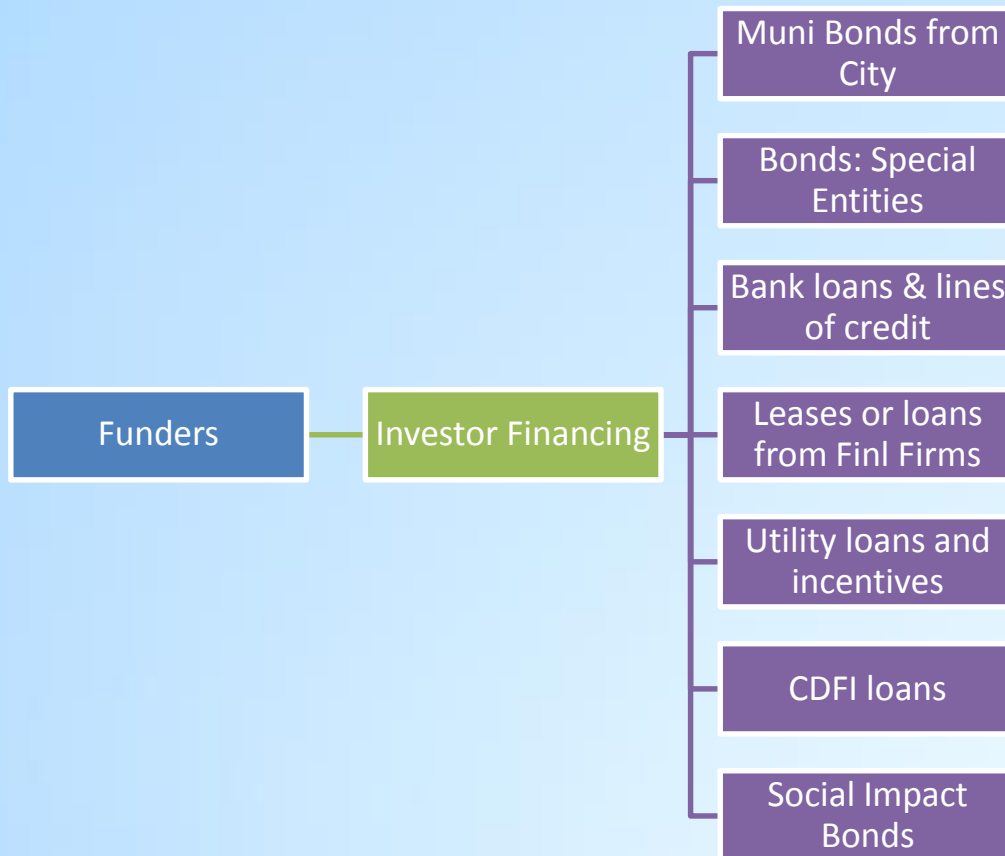


### Deal and Terms

- **Federal: FHA's Energy Efficient Mortgage Loan** program for homeowners enables adding energy-efficient improvements
- **State: CaliforniaFIRST** is PACE financing up to 25 years, and tied to the property value and paid through the property tax.
- **Utility: PG&E** offers incentives to homeowners who complete comprehensive energy-saving home improvements

[https://californiafirst.org/Home-Efficiency-Financing-welcome/?utm\\_term=%2Benergy%20%2Befficiency%20%2Bloan&utm\\_source=google&utm\\_medium=cpc&utm\\_campaign=16-BayArea-LG-HE](https://californiafirst.org/Home-Efficiency-Financing-welcome/?utm_term=%2Benergy%20%2Befficiency%20%2Bloan&utm_source=google&utm_medium=cpc&utm_campaign=16-BayArea-LG-HE)  
[www.fha.com/energy\\_efficient](http://www.fha.com/energy_efficient); [www.pge.com/en/about/environment/pge/energyefficiency/index.page](http://www.pge.com/en/about/environment/pge/energyefficiency/index.page);

# Climate Action Solutions & Risks Can Be Financed by Innovative Investor Mechanisms



## More EXAMPLES

- Infrastructure Bank Financing
  - [San Bernardino CA](#)
- Revolving Loan Funds
  - [CLEEN](#)
- Social Impact Bonds
  - [Philadelphia PA](#)
- Catastrophe Bond Issuance
- Loan Loss Reserve Funds
  - [Kansas City](#)

*The next pages explain the concept, and show an example; you can click the links to jump to the examples*

# Infrastructure & Economic Development Bank (I-Bank)

Infrastructure and Economic Development Banks **finance public infrastructure** and economic development that promote a healthy climate for jobs, contribute to a strong economy and improve the quality of life within their state.

The I-Bank has broad authority to issue tax-exempt and taxable revenue bonds, provide financing to public agencies, provide credit enhancements, acquire or lease facilities, and leverage State and Federal funds.

I-Bank's programs can include an Infrastructure State Revolving Fund (ISRF) Loan Program, Statewide Energy Efficiency Program (SWEEP), 501(c)(3) Revenue Bond Program, Industrial Development Revenue Bond Program, Exempt Facility Revenue Bond Program, Governmental Bond Program and the Small Business Loan Guarantee Program.

**Advantages:** Existing programs allow for accessing low cost financing

**Disadvantages:** Complexity and legislation required to for implementation; not every state has active Infrastructure Banks

# Long Term Water Infrastructure

## Example: San Bernardino CA & California I-Bank

### Climate Action Challenge:

- Improve water infrastructure, save energy

### Climate Action Solution:

- Borrow at low rates from state infrastructure bank



[http://www.ibank.ca.gov/res/docs/2012%20Meetings/8c\\_San%20Bernardino\\_MWD\\_Loan\\_Mod\\_SR.pdf](http://www.ibank.ca.gov/res/docs/2012%20Meetings/8c_San%20Bernardino_MWD_Loan_Mod_SR.pdf)

### Deal and Terms

- City of San Bernardino Municipal Water District approved to borrow **\$10 million loan from the California I-Bank's Revolving Loan fund**
  - 20 years, 2.61%
- For the Ogden Reservoir System Wide Pipeline Replacement Project
  - One Co-generation project has two clean-burning 750 KW generators fueled by methane gas generated from bio-solids produced at the Water Reclamation Plant and saves \$1,000 per day in energy costs.

# Revolving Loan Fund

A revolving loan fund (RLF) is a gap financing measure primarily used for development and expansion of small businesses.

An RLF is a self-replenishing pool of money, utilizing interest and principal payments on old loans to fund new loans.

Infrastructure Banks often use RLFs to stimulate development in municipal regions. RLFs can be grant funded or funded by long term loans.

**Advantages:** Capital is replenished by repayment of principal and interest

**Disadvantages:** Generally below market interest requires long term commitment of funds

# California Infrastructure Bank Revolving Loan Fund (e.g. CLEEN)

## Example: California Lending for Energy and Environmental Needs

### Climate Action Challenge:

- Fund energy efficiency projects

### Climate Action Solution:

- Low interest rate loans from the California Infrastructure Bank for energy efficiency projects



### Deal and Terms

- The Statewide Energy Efficiency Program (SWEET) is a CLEEN Center Program for small, medium and large-scale energy efficiency upgrades and projects (Energy Efficiency Projects) for California’s Municipalities, Universities, Schools and Hospitals (MUSH) borrowers.
- LED Street Lighting Program is a CLEEN Center program.
- Objectives:
  - **Provide low-cost financing vehicles, which reduce the cost of clean energy and energy efficiency projects.**
  - Leverage existing public programs and funds to attract private sector investment.
  - **Encourage private investment by reducing the overall risk of clean energy projects.**

<http://www.ibank.ca.gov/res/docs/CLEEN%20Center/Criteria.%20Priorites.%20and%20Guidelines%20for%20the%20Selection%20of%20Projects-CLEEN%20....pdf>



## Social Impact Bonds (SIBs)

A new instrument to the investment field, Social Impact Bonds (SIBs) and its counterparts Pay for Success (PFS) and Pay For Performance (PFP) seek to **use private capital to address a current problem and repay that capital from the future benefits (savings) of that program.**

Identifying the metrics and outcomes that will provide the measures of success and therefore repayment make SIBs difficult to structure. The SIB repayment is dependent on the outcomes (social or environmental) that are agreed upon at the onset between the borrower and the investor, with some outside independent verification and measurement transparency and feedback loop built into the agreement.

Another approach to creating socially or environmentally attractive programs is to align as partners where the municipality can share the future savings with the program provider: improve reclamation of recyclables from the solid waste stream and re-selling that to the open market, sharing the proceeds and reducing waste streams.

**Advantages:** Opens the door for innovative forms of financing and responsibility

**Disadvantages:** Very early stage of development and few track records of success

# Social Impact Bonds/ Environmental Impact Bonds

## Example: Potential Philadelphia EIB for Storm-water Runoff

### Climate Action Challenge:

- Shift program and outcome risks to the private sector

### Climate Action Solution:

- Finance programs but defer payment for improvements in social or environmental outcomes until they are successful



[http://ssir.org/articles/entry/bringing\\_social\\_impact\\_bonds\\_to\\_the\\_environment](http://ssir.org/articles/entry/bringing_social_impact_bonds_to_the_environment)

### Deal and Terms

- SIB payment is contingent on the social and environmental outcomes agreed upon by the investor and the issuer.
- Private investors assume the risk for improvements to outcomes.
- If the goals are achieved, the private investor reaps the payoff of the bonds. If goals are not achieved, the investors lose their investment in the bonds.
- **The City of Philadelphia**, for example, is revamping its system of **measuring (and taxing) storm-water runoff**, which has been shown to adversely impact the city's water quality. The city could adapt this metric for use in an EIB that focuses **on improving local water quality**.

# Catastrophe Bonds

As a securitized hedge to future environmental disasters, some large scale developers and utilities may seek additional insurance for their large infrastructure or renewable energy projects and could turn to catastrophe bonds instead of re-insurers to offset that increased risk.

**Catastrophe bonds are issued by the insurer to spread the risk.** In the event of a catastrophe, the insurer will use the bond proceeds to pay the claims not covered by the premiums of those insured and the investors won't be repaid. If no catastrophe happens, the bondholders should be paid at maturity.

Pension plans globally are taking an interest in purchasing these bonds because they are uncorrelated to the broad financial markets and can offer returns ranging from 2% to 15%, or even higher if the catastrophe does not occur.

**Advantages:** Reduced risk to insurance companies and local municipalities at risk for catastrophes

**Disadvantages:** Can be expensive

# Catastrophe Bonds

## Example: Potential Pension Plan Investment Tool

### Climate Action Challenge:

- Share risks associated with geographically focused projects and local disasters

### Climate Action Solution:

- Arrange for additional insurance to protect city infrastructure



<http://inthesetimes.com/article/18561/cat-bonds-cashing-in-on-climate-catastrophe>

<http://www.artemis.bm/blog/2016/01/05/ils-could-help-with-floridas-costly-rising-sea-levels-floods-and-surges/>

### Deal and Terms

- Insurers issued catastrophe bonds to private investors willing to assume the risk of losing their investment for the opportunity to earn substantial interest.
- May be a consideration for developers of utility-scale projects to **address large risk concentrations while implementing smart grids and other infrastructure improvements**
- Helps manage the financial risk from catastrophes and promote investment in resilient infrastructure projects that mitigate physical risks

# Loan Loss Reserve Fund (LRF), Debt Service Reserves & Loan Guarantees

**Loan Loss Reserve Fund:** LRFs can be set up to decrease the risk associated with making some kinds of **energy efficiency and retrofit loans to underbanked (higher risk) borrowers** to upgrade their homes with repayment commitments up to 30 years. The Federal Loan Loss Reserve Fund LRF was established in 2009 under the Dodd Frank banking bill to encourage small dollar loan programs. These programs can **reduce the interest rates** for unsecured lending to commercial real estate owners, sometimes repaying via utility bills.

**Debt Service Reserve:** Similar to a loan loss reserve fund, municipalities can create a debt service reserve fund from cash reserves (from the issuance) to **provide additional security** to the bonds' risk profile and **reduce the bonds' coupon rate**. These reserve funds can be used for the Clean Renewable Energy Bonds CREBs or the QECBs, and costs of issuance.

**Loan Guarantee:** By guaranteeing the repayment of a loan to a private investor, the government is virtually **eliminating the default risk of that loan**. The Department of Energy has awarded billions in loan guarantees for clean energy projects, but still needs oversight. This self-insures a potential default.

**Advantages:** Reduced risk and lower interest rates to borrowers; sets floor for risk for investors.

**Disadvantages:** Could become very expensive in the case of a default

# Loan Loss Reserves

## Example: Kansas City Streetcars

### Climate Action Challenge:

- Finance streetcars to reduce congestion, GHG emissions

### Climate Action Solution:

- Create loan loss reserves to help get better bond ratings and lower the costs of capital.

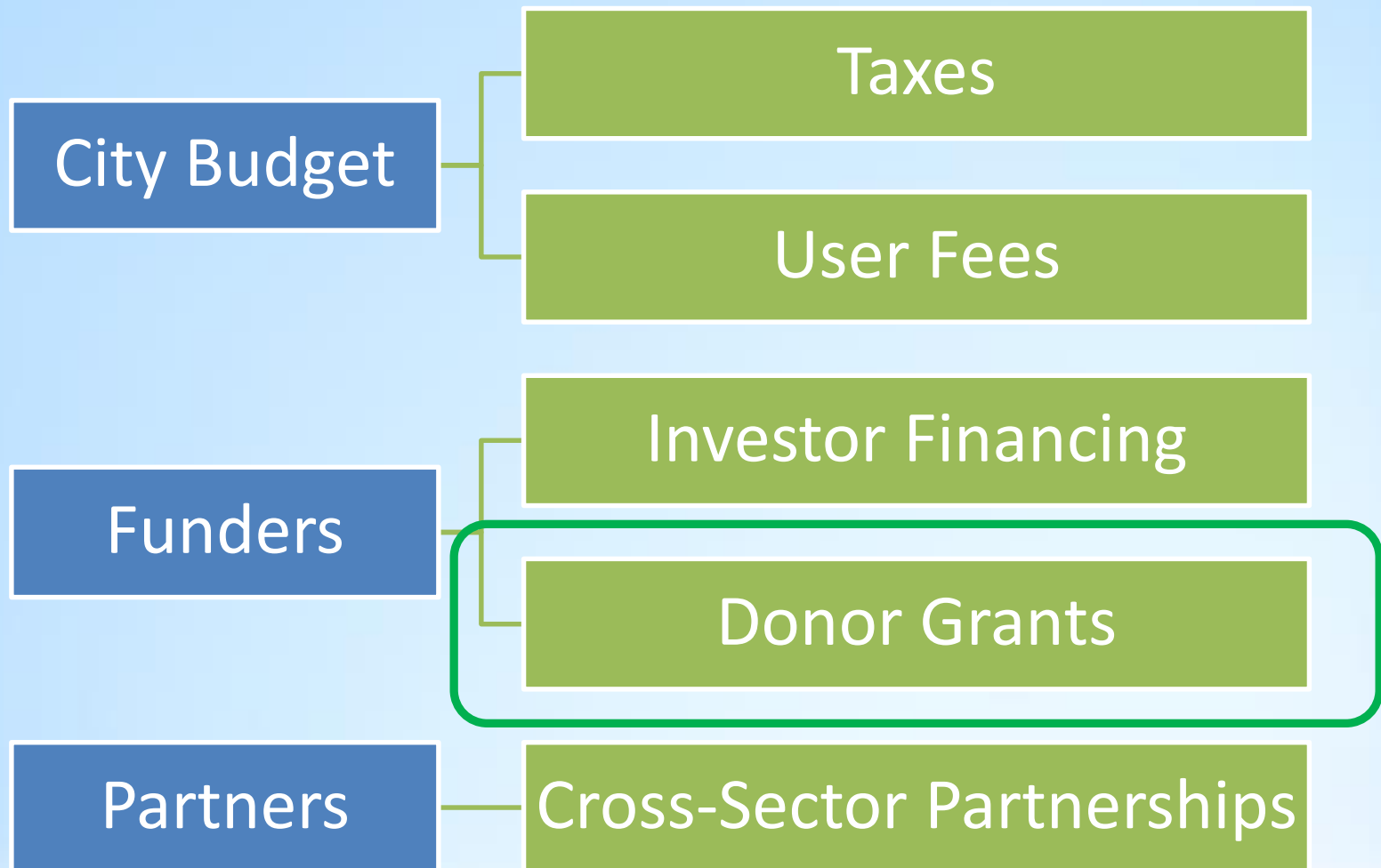


<http://www.bizjournals.com/kansascity/news/2014/02/28/k-c-council-signs-off-on-124m-bonds.html>

### Deal and Terms

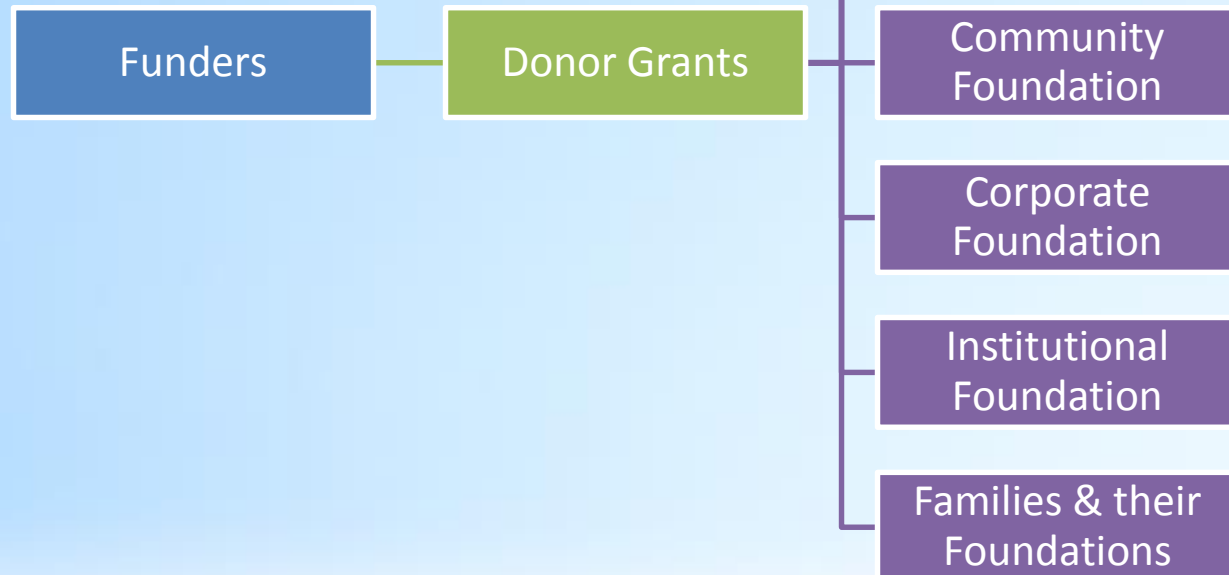
- Of \$71.5 million authorized from the issuance of \$124 million of special obligation bonds, \$62.9 million of special obligation bonds are for construction with the remaining \$8.6 million, if needed, toward the cost of issuance and as a **reserve fund** for debt services. Self-insures a default.
- Kansas City's Water Services Department will contribute \$14 million to help pay for water utility relocation under the streetcar route. Federal grants including Kansas City's \$20 million Transportation Investment Generating Economic Recovery (TIGER) grant will total \$37.1 million.

# Donors Who Focus on Climate Action Can Grant Funds to GHG-Reduction Initiatives



# Investors Seeking Tax Deductions, and Donors Seeking Impact Provide GRANTS

*The next pages explain the concept, and show an example; you can click the links to jump to the examples*



## Donor EXAMPLES

- IFC, WorldBank
- CleanCities.Energy.Gov
- Toolkit.Climate.Gov
- [DSIRE.org](https://www.dsire.org/); eCivis.com; Grants.gov
- [Wells Fargo Foundation's Clean Tech Grants](#)
- [Clean Energy Group's Solar + Storage](#)
- Donor-funded [competitions](#)
- Donor-funded ["accelerators"](#)



# Donors Grants

Many cities already recognize the opportunity in applying for grant funding when developing sustainability plans. Many grants currently come from governmental organizations – energy commissions, state pools of pilot funding grant programs, etc.

Cities can also consider and apply for grants from **for many sustainability projects**.

Green affordable housing projects can attract grant monies from a variety of donors.

By developing relationships with **mission-aligned organizations who seek to promote sustainability**, community engagement can improve access to funding for innovative programs.

**Advantages:** Funding at low to no cost; very helpful for pilot programs; could move quickly with individual or family donors; institutional foundations may take time; aligned with societal mission.

**Disadvantages:** Funds might be short term or pilot program; may require developing relationships with the foundation; need to be aware of political risks and real or perceived conflicts of interest (e.g. political donors giving grants).

# US Department of Energy

## Example: SunShot Initiative

### Climate Action Challenge:

- Reduce the price of solar energy and increase usage

### Climate Action Solution:

- Encourage innovation and partnerships with funding opportunities for solar



<http://energy.gov/eere/sunshot/about-sunshot-initiative>

### Deal and Terms

- SunShot Initiative goals:
  - reduce the total installed cost of solar energy systems to \$.06 per kilowatt-hour (kWh) by 2020
  - grow solar-generated power from less than 2% of the nation's electricity generation portfolio to roughly 14% by 2030 and 27% by 2050
- Since 2011, the average price per kWh of a utility-scale photovoltaic (PV) project has dropped from about \$0.21 to \$0.11.
- SunShot supports collaborative partnerships and innovative efforts by private companies, universities, and national laboratories to drive down the cost of solar electricity [reducing solar technology costs](#), [reducing grid integration costs](#), and [accelerating solar deployment nationwide](#).

# Energy Efficiency Grants

## Example: Houston Energy Efficiency Incentive Program

### Climate Action Challenge:

- Encourage commercial property owners to improve energy efficiency in buildings

### Climate Action Solution:

- Up to \$2 million in incentives to offset costs to improve energy efficiency in commercial buildings



<http://eeip.harc.edu>

### Deal and Terms

- Funds from **US Dept of Energy's Energy Efficiency and Conservation Block Grant**
- In Houston EEIP, commercial office buildings' owners may apply for funding to make permanent energy efficiency improvements to reduce utility expenses and greenhouse gases.
- The City incentives offset some up-front implementation costs (labor and materials), with incentives of up to \$500,000 per building
- **Smaller projects:** At least 60% of the total grant incentive awards will be set aside for projects under \$500,000.

# DSIREusa.org is an online catalog of Grants and Incentives by State

<u>Top State Programs</u>	<u># of Listings</u>
• California	208
• Colorado	101
• New York	92
• Wisconsin	62
• Arizona	58
• Michigan	48
• Idaho	31

Research your state and apply – and evaluate for potential collaborative partnerships with your city



Source: DSIRE.org; CleanCities.Energy.Gov

# CleanTech Innovation Grants From Corporate Foundations

## Climate Action Challenge:

- Reduce energy & develop reliable renewable energy sources for redeveloped area

## Climate Action Solution:

- Deploy MicroGrids for environmental and economic benefits in low-income areas



## Deal and Terms

- EXAMPLE: Wells Fargo Foundation, via CleanTechnology and Innovation Grant, has committed \$100 million by 2020 to eco-focused non-profits, colleges and universities
  - **\$150,000 grant to Clean Coalition to develop MicroGrid in low income area of San Francisco, Hunter's Point**
- Once deployed, the Hunters Point Community Microgrid will:
  - generate 50 MW from solar
  - serve about 20,000 residential and commercial utility customers
  - contribute \$233 million to the regional economy, \$100 million in local wages in the neighborhood
  - avoid \$80 million in transmission-related costs over 20 years
  - **reduce greenhouse gas (GHG) emissions by 1.5 billion pounds over 20 years**
  - save 15 million gallons of water annually.

<http://microgridknowledge.com/make-many-community-microgrids-hunters-point-model/>

<http://www.clean-coalition.org/our-work/community-microgrids/hunters-point-community-microgrid-project>

<http://www.clean-coalition.org/press-releases/hunters-point-community-microgrid-project-which-will-create-jobs-and-provide-25-percent-of-communitys-electric-energy-needs-gets-a-150000-boost/>

# Solar+Storage in Affordable Housing

## Example: Clean Energy Group's Resilient Power Project

### Climate Action Challenge:

- Develop reliable renewable energy sources for low income communities

### Climate Action Solution:

- Develop solar + storage projects for low & moderate income (LMI) areas



<http://www.cleanenergygroup.org/ceg-projects/resilient-power-project/>

### Deal and Terms

- Clean Energy Group (CEG) and its Resilient Power Project supports the deployment of **solar + storage**
  - to **low-income communities**,
  - multifamily **affordable housing** and
  - community facilities projects
- Grant funding supports 3rd party technical services to determine the technical and economic feasibility of the projects.
- Solar + Storage can provide additional positive economic return on par with energy efficiency or stand-alone solar

# Retrofit Accelerator

## Example: New York City, NY

### Climate Action Challenge:

- Improve building energy and water efficiency

### Climate Action Solution:

- Provides advisory services to privately owned buildings going green



### Deal and Terms

- This program is a one-stop resource for free technical assistance and advisory services for building owners for **critical energy efficiency, water conservation, and clean energy upgrades.**
- **GOAL: Reduce citywide greenhouse gas emissions (GHGs)** by roughly 1 million metric tons per year by 2025
- Accelerates retrofits in up to 1,000 properties per year by 2025 (the equivalent of almost 200,000 passenger vehicles taken off the roads)
- Saves New Yorkers an estimated \$350 million a year in utility costs

<http://www1.nyc.gov/office-of-the-mayor/news/651-15/mayor-de-blasio-launches-retrofit-accelerator-providing-key-support-buildings-go-green>; <http://www1.nyc.gov/nyc-resources/service/5303/nyc-retrofit-accelerator>; <http://www.guardian-service.com/mayor-de-blasio-builds-on-nyc-clean-heat-success-launches-ambitious-building-efficiency-program>

# Community Competition for Buildings

## Example: Green Office Challenge, Houston, TX

### Climate Action Challenge:

- Improve energy efficiency and reduce GHG emissions from buildings

### Climate Action Solution:

- Corporate sponsored community competition encourages energy efficiency by building owners and tenants



<http://www.greenpsf.com/go/community/index/houston/?q=node/47>

### Deal and Terms

- The City of Houston's Sustainability Challenge is designed to help businesses and buildings **reduce energy, water, and waste** through friendly competition for funding.
- The challenge provides resources to improve the energy efficiency of buildings and office spaces through educational programs, technical assistance, measurement and certification, and recognition.
- Made possible by **financial support from local corporate sponsors**: Shell, International Council for Local Environmental Initiatives (ICLEI USA); Office Depot; and Green PSF



# Competition for Smart Grid Ventures

## Example: New York City, NY

### Climate Action Challenge:

- Seek innovative energy efficiency solutions

### Climate Action Solution

- The competition fosters pilot opportunities with smart cities and smart grid industry partners

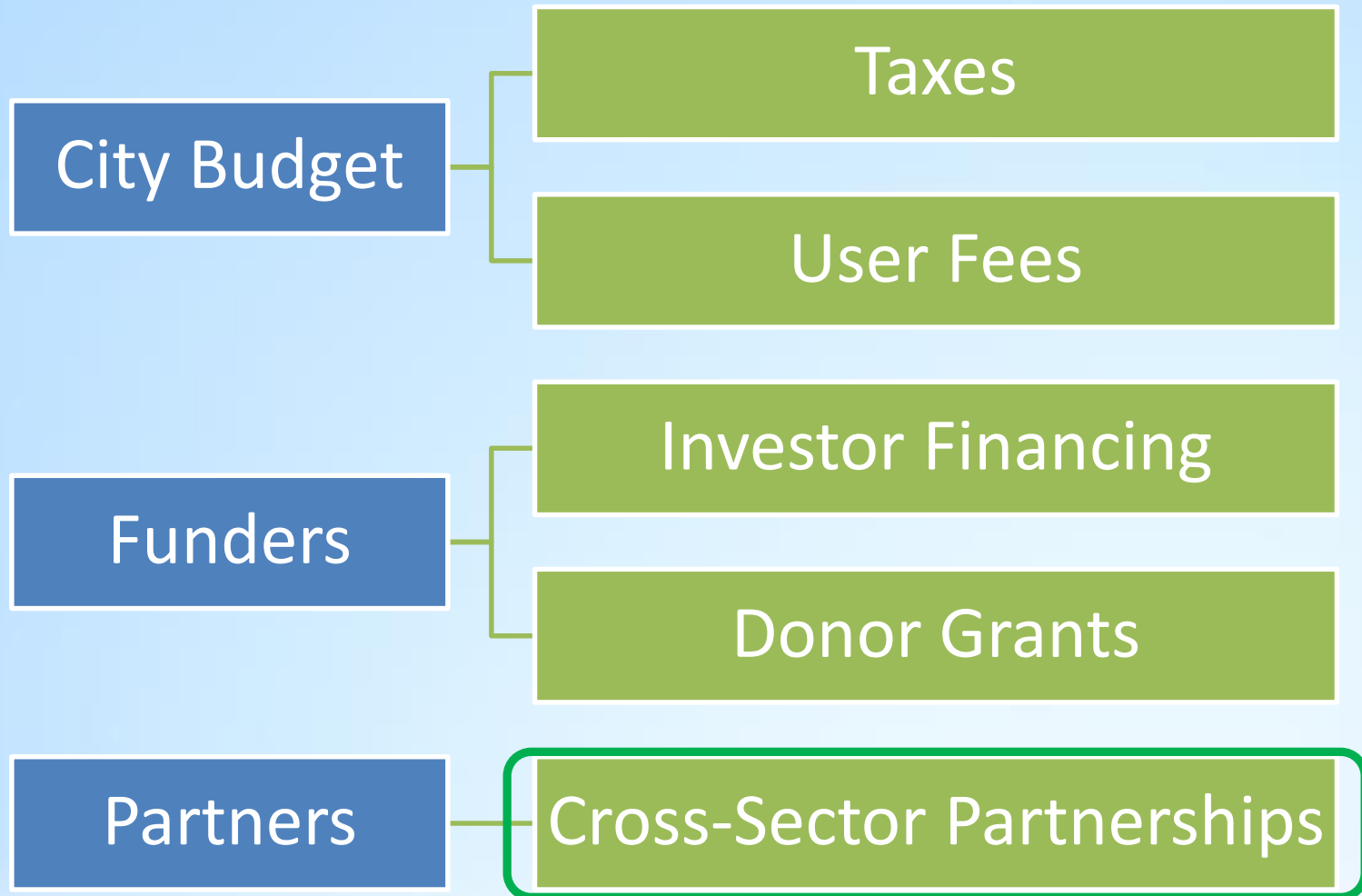


<http://ufl.nyc/competition>

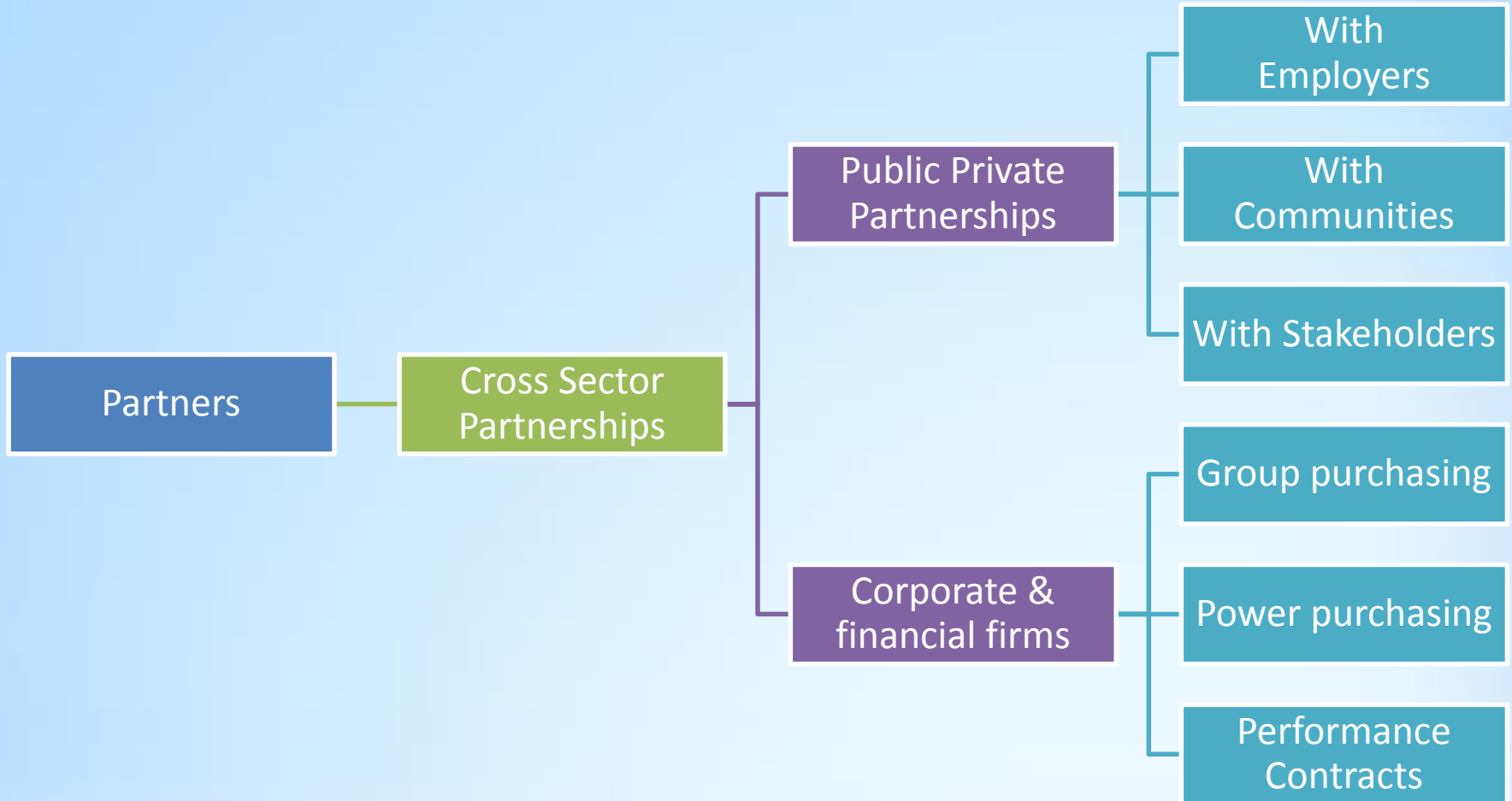
### Deal and Terms

- The 2016 Urban Future Competition is a new Smart Cities and Smart Grid business competition in New York.
- Startups with transformative business solutions for global urban energy and sustainability challenges will compete to pitch their solutions to a jury of investors
- Market partners and successful entrepreneurs to win two \$25,000 awards, one for each category: Smart Cities and Smart Grid.
- Winners will also join as members of the ACRE incubator: NYC's premier cleantech incubator, funded by NYSERDA, NYU Tandon and corporate partners.

# Partners From the Business and Social Sectors Can Team with Cities for Climate Action



# Creative Use of PARTNERSHIPS Can Unlock New Funding & Resources



# Public-Private Partnerships (PPPs or P3)

Public-private partnerships (PPPs, or P3s) are agreements between the public sector and the private sector for the delivery of services to the public.

These partnerships bring together the needs of the city with the private market's expertise and discipline to achieve a common goal, but can be complicated to develop.

Large scale infrastructure developments can be kept on budget and on schedule with proper alignment of goals and oversight. **Cities and their private partners can work together to develop broad based community infrastructure that is highly dependent on private capital.**

The entire process can include the full life cycle costs of major infrastructure improvements with the Design, Build, Finance, Operate and Maintain (DBFOM) model for better long term metrics, rather than the shorter term lowest-bid process for cities.

**Advantages:** Can open up new opportunities for infrastructure expansion

**Disadvantages:** Can be complicated to set up and monitor; potential culture clashes.

# Examples of Cross-Sector Partnerships: Results from Joint Creative Approaches

*You can click the links to jump to the examples*

- **Water Reclamation Partnership**  
[Apple Inc. + City of Sunnyvale CA](#)
- **Multi-Sector Partnership**  
[Mountain View CA + Google + CalStart + ABC + Motiv Power](#)
- **Multi-Company Financing for New York City**  
[Customer Revenue + Equity + Sponsorships + Credit Facility](#)
- **Public Private Partnerships**  
[City of London and the Boiler Cashback Scheme](#)
- **Community Choice Aggregation**  
[Marin Clean Energy](#)
- **Group Purchasing**  
[Brooklyn Community MicroGrid](#)
- **Power Purchase Agreements**  
[Ameresco + Rappahannock \(VA\) Regional Landfill](#)
- **Performance Contract**  
[Ithaca NY: Wastewater/Biodigester](#)
- **Creative Financing via Private Ownership**  
[St. John's Episcopal Church, Boulder, CO](#)

# Water Reclamation Partnership

## Example: Apple Inc. + City of Sunnyvale CA

### Climate Action Challenge:

- Secure water delivery for increased demand (via recycled water)

### Climate Action Solution:

- Partner with local employers for capital and create reliable access to water supply



[http://www.mercurynews.com/business/ci\\_27778101/water-district-board-consider-recycled-water-apple-campus](http://www.mercurynews.com/business/ci_27778101/water-district-board-consider-recycled-water-apple-campus)

### Deal & Terms:

- New water pipeline, and booster pump linked to water treatment station – and avoids demands on fresh water supply of Cupertino.
- Total project capital: including planning, design and construction = **\$17.5 million**
- Capital-contributions:
  - Apple Inc. = \$4.8 million
  - Cal-Water = \$1.5 million
  - City of Sunnyvale: \$2.1 million
  - California Department of Water Resources: \$2.5 mm grant
  - Santa Clara Valley Water District: \$6.6 million.
- Apple has a **10 year guarantee for recycled/reclaimed water** to irrigate its campus, and run the buildings

# Multi-Sector Partnership

Example: City + Google + CalStart + ABC Cos.

+ Motiv Power Systems

## Climate Action Challenge:

- Improve local transit and congestion with renewable fuel sources

## Climate Action Solution:

- Implement a free, downtown electric shuttle service



## Deal and Terms

- City of Mountain View partners with:
  - **Google Inc.**, to fund 2-year pilot of Electric Vehicle shuttle buses
  - **CALSTART.org**, a membership of 150 companies, administers the program,
  - Funded by grants from the **California Energy Commission (CEC)** for the EV drive trains and batteries
  - Designed by **Motiv Power Systems**
  - **ABC Companies** operates the buses as a supplier to the city
- 4 all-electric, 16-seat blue-and-white shuttle vehicles, all equipped with:
  - a wheelchair lift,
  - space for two wheelchairs,
  - two exterior bicycle racks,
  - free Wi-Fi onboard
- 95% on-time rate; Monthly ridership has increased from 6,500 to 11,000+ per month

<http://planetsave.com/2015/02/05/google-launches-free-ev-shuttles-mountain-view-ca/>

# Multi-Source Financing for NYC

Example: Customer Revenue + Equity  
+ Sponsorships + Credit Facility

## Climate Action Challenge:

- Reduce GHG of transportation with local bike options

## Climate Action Solution:

- Implement a city-wide bike sharing program



<http://www.citigroup.com/citi/news/2014/141028b.htm>

## Deal and Terms

- Citi Bike: nation's largest bike share program; 8,000 bikes, 500 stations across Manhattan, Brooklyn, Queens and Jersey City.
- Apr. 2013: 5,000 Citi Bike **founding memberships** sell out in 30 hours
- Oct. 2014: New **owner pledges more private capital (\$30mm)** to improve the program with increased **sponsorship from Citi (\$70mm)** and an increase in the **credit facility from the Goldman Sachs Urban Investment Group (\$15mm)** to allow for expansion.
- May 2016: Citi Bike gains its 100,000<sup>th</sup> **annual member (\$155 per year)**, with discounts for Housing Authority residents



# Public Private Partnerships

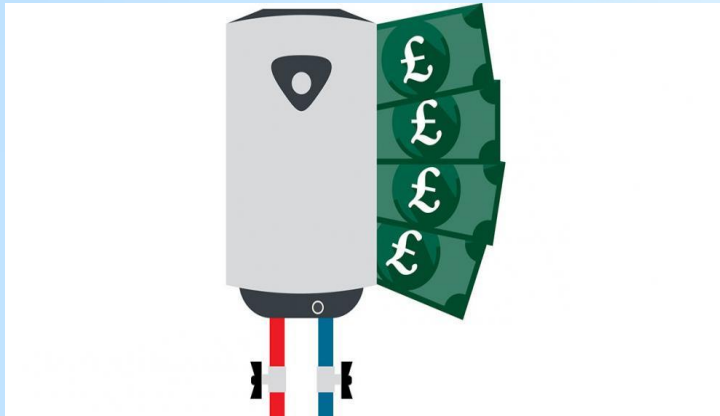
## Example: City of London and the Boiler Cashback Scheme

### Climate Action Challenge:

- Reduce GHG emissions from older, inefficient boilers

### Climate Action Solution:

- Incentivize property owners to replace old boilers with more efficient models



<https://www.london.gov.uk/WHAT-WE-DO/housing-and-land/improving-quality/london-boiler-cashback-scheme>

### Deal and Terms

- City govt. offers **£400 (US\$520) cashback to private landlords and homeowners** for installing a modern, high efficiency gas boiler in their home or property
- Upgrading to a new, high efficient gas boiler **reduces annual energy bills by £340 (US\$440)** for participating households
  - **20% less heating required**
- Corporations like e.on and British Gas followed on with offerings of rebates to stimulate purchases.
- **City program successfully exhausted all 125,000 vouchers**

## Evaluate Your Local Employers for Partnerships:

*Who are Your Largest Employers?*

*What Creative Partnerships Can Your City Create?*

## Companies w/500+ employees, based in Palo Alto, California:

- City of Palo Alto
- CPI
- Google
- Hewlett Packard
- Lucile Packard Children's Hospital
- Nordstrom
- Palantir
- SAP
- Silicon Valley Bank
- Stanford
- SSL
- Tesla
- Varian Medical
- VM Ware

# Community Choice Aggregation (CCA)

Community Choice Aggregation (CCA) is a type of group purchasing, organized by the local governmental authority to combine the demand of all of its members of the community for better purchasing power, generally with the local electric/gas monopoly utility, and usually with a particular focus on purchases of energy from renewable power sources.

CCA enables local communities to aggregate electricity demand within their jurisdictions in order to procure alternative energy supplies while maintaining the existing electricity provider for transmission and distribution services

So far, seven states have approved the legislation for CCAs: California, Illinois, Massachusetts, New Jersey, Ohio, New York and Rhode Island.

More detail available at:

<http://www.energy.ca.gov/2006publications/CEC-500-2006-082/CEC-500-2006-082.PDF>

**Advantages:** Increased bargaining power and access to renewable energy

**Disadvantages:** Requires legislative action and negotiation with utilities

# Community Choice Aggregation Marin Clean Energy

## Climate Action Challenge:

- Reducing GHG emissions through renewable energy

## Climate Action Solution:

- The CCA aggregates buying power for renewable energy sources across nearby cities



<https://www.mcecleanenergy.org/>

## Deal and Terms

- MCE is a public agency and not-for-profit electricity provider that gives customers the choice of having **50% to 100% of their electricity supplied from clean, renewable sources such as solar, wind, bioenergy, and hydroelectric at competitive rates.**
- Reduces greenhouse gas emissions by roughly 1 million metric tons per year by 2025
- PG&E will continue to deliver energy through their standard power lines, and repair and maintenance teams in area still provide the same service.

# Group Purchasing

Group purchasing by city procurement groups of climate-action solutions, including renewable energy, allows individuals, businesses, and municipalities to reduce the cost of installation and acquisition, sometimes dramatically, by leveraging collective purchasing power.

As an example, pooling together collective energy demand enables a number of entities or individuals to secure discounted pricing by buying in bulk.

By integrating the group purchasing scheme with other emerging solar financing mechanisms, such as solar leases or PACE, group buyers can often install solar at no or little up-front cost.

**Advantages:** Cheaper prices when purchased in bulk

**Disadvantages:** Requires alignment, communication and cooperation among cities in product purchasing

# Group Purchasing

## Brooklyn Community MicroGrid

### Climate Action Challenge:

- Develop more renewable energy for the community

### Climate Action Solution:

- Create a Community Microgrid to develop, share and purchase community based renewable energy



<http://brooklynmicrogrid.com>; <http://www.seeker.com/neighbors-got-solar-panels-buy-power-from-them-1770997070.html#news.discovery.com>

### Deal and Terms

- Brooklyn Microgrid is currently developing a community micro grid to be:
  - independent of the utility,
  - use renewable resources,
  - retain power in extreme weather and other events and
  - keep money in the local economy.
- Greater choice for consumers; residents buy and sell energy over a peer-to-peer network
- Helps individuals become local energy providers by selling their excess rooftop solar electricity production to other local residents or businesses.

# Power Purchase Agreements (PPAs)

A power purchase agreement (PPA) is a contract between two parties, one which generates electricity (the seller) and one which is looking to purchase electricity (the buyer). The city could be the buyer of power, or it could be the seller of power (as you will see in the example of energy from landfill gases, an untapped resource).

The PPA defines all of the commercial terms for the sale of electricity between the two parties, including when the project will begin commercial operation, schedule for delivery of electricity, penalties for under delivery, payment terms, and termination. A PPA is the principal agreement that defines the revenue and credit quality of a generating project and is thus a key instrument of project finance.

With a PPA, a developer (or a city partnered with a developer) installs a renewable energy system on agency property under an agreement that the agency will purchase the power generated by the system. The agency pays for the system through these power payments over the life of the contract. After installation, the developer owns, operates, and maintains the system for the life of the contract.

**Advantages:** No/Low upfront costs, steady energy prices & cheaper renewable energy

**Disadvantages:** Most of the risks, and thus the rewards, are held by the energy producer

# Power Purchase Agreements (City as Producer)

## Example: Ameresco + Rappahannock (VA) Regional Landfill

### Climate Action Challenge:

- Capture the value of the methane gas at the landfill

### Climate Action Solution:

- Develop a partnership to capture and sell the methane gas captured from the landfill



<http://www.ameresco.com/solution/power-purchase-agreements>  
<http://energy.gov/eere/femp/federal-site-renewable-power-purchase-agreements>

### Deal and Terms

- The Rappahannock Regional Solid Waste Management Board (*R-Board*) in Virginia partnered with Ameresco to develop a **20-year power purchase agreement that converts landfill gas to energy.**
- Two generators built at the landfill capture methane gas and convert it to electricity, generating 2.14 megawatts of energy, enough to power 1,500 homes.
- Over the term of the contract, the region's *R-Board* will receive an estimated \$1.6 million for selling power from the facility to Constellation New Energy.



# Performance Contracts:

## Pay For Success (PFS) or Pay For Performance (PFP)

Pay for Success (PFS) financing can help a city get improvements made with little or no up-front costs. Usually a provider outside of government will execute a service, like an energy upgrade, and be compensated over time through the energy savings of that upgrade.

Each PFS contract will have the performance expectations well defined outcome described as well as the risks associated with it. These PFS contracts could be more costly over time than traditional municipal financing but generally does not add to a city's indebtedness.

The public authority is often the source of payment if agreed upon outcomes are achieved. Repayment may come from future savings that result from the implemented program/intervention. PFS contracts allow for flexibility on outcome metrics.

**Advantages:** Public needs can be addressed with private capital, no public funds at risk

**Disadvantages:** Can be expensive to create and monitor; cost savings are shared with partner/expert.

# Pay for Performance Contract

## Example: Ithaca NY: Wastewater/Biodigester

### Climate Action Challenge:

- Reduce GHG emissions, improve the energy efficiency and the reliability of mechanical and electrical systems.

### Climate Action Solution:

- Negotiate and implement energy performance contract



<http://www.cityofithaca.org/428/Sustainability-Projects-at-IAWWTP>

### Deal and Terms

- Enhance capacity to produce energy and heat from the conversion of high-strength organic wastes generated at the facility
  - Included co-generation system, building efficiency upgrades, biodigester
- **Positive return on investment (ROI):**
  - Total project costs are estimated at about \$8 million
  - Savings generated: nearly \$9.8 million over the next 20 years
- Reducing approximately 997 tons of eCO<sub>2</sub>
- **Partnered with Johnson Controls** and its corporate expertise for an energy performance contract

# Combining Financing Options

In reality, many projects are financed using a **combination** of tools.

The term, or life of the asset, is a key factor in financing the various components of an infrastructure project and flexibility and creativity can be helpful.

For example, libraries can be expected to last many decades and should be financed with long term structures (muni bonds repaid by community taxes), but the solar panels have a shorter life and could be financed separately under a different tool (short term loan or lease-purchase).

The combination of the financing tools represent the entire package for the library or parking lot, with grants, tax credits, revenue bonds, lease purchase for solar and EV parking, biking and green infrastructure grants, etc.

**Advantages:** Can receive benefits from certain approaches while minimizing the risks from others

**Disadvantages:** Complexity can make this prohibitive to traditional financiers

# Combining Financing Options

## Example: Boulder, Colorado

### Climate Action Challenge:

- Develop and fund solar energy for non-profits

### Climate Action Solution:

- Establish private for-profit LLC to capture tax credits, then sell power to non-profits



<http://www.stjohnsboulder.org/index.php/parish-life/links/35-uncategorised/189-solar>

### Deal and Terms

- St. John's Episcopal Church in Boulder **created its own Limited Liability Company (LLC)** funded by 11 parishioners
- LLC is the purchaser and owner of the solar array, and **as a for-profit organization, can use of the Federal tax credit**, and then sells clean power to the non-profit church each month
- The LLC purchased 77 high efficiency panels to generate 25KW, about 40% of the church's annual electric needs
- The non-profit church will **save ~\$100 per month on energy** -- and can purchase the solar array at a much reduced price after the tax credits expire in 6 years
- Potential to apply this 3<sup>rd</sup> party structure to cities outsourcing or selling off infrastructure which is then financed by private investors.

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- IV. Potential Funders for Municipal Climate Solutions
- V. Five Steps to Funding Your Sustainable City Projects

# Three Categories of Key Metrics Are Important for Financing Sustainable Cities

- **FINANCIAL metrics, especially for investors**
  - [Return on Investment, ROI](#) (%)
  - [Payback](#) (years)
  - [Net Present Value, or NPV](#) (\$)
  - [Internal Rate of Return, IRR](#) (%)
- **ENVIRONMENTAL metrics, for climate solutions**
  - GHGs as comprehensive measure (**tons**)
  - Impact from “externalities” (polluted water, air, land)
  - [Social cost of carbon](#) pollution, including impact on health (**\$/ton**)
- **CITIZEN engagement, essential for support**
  - Understand citizen-reported [top priorities](#) and build links to them

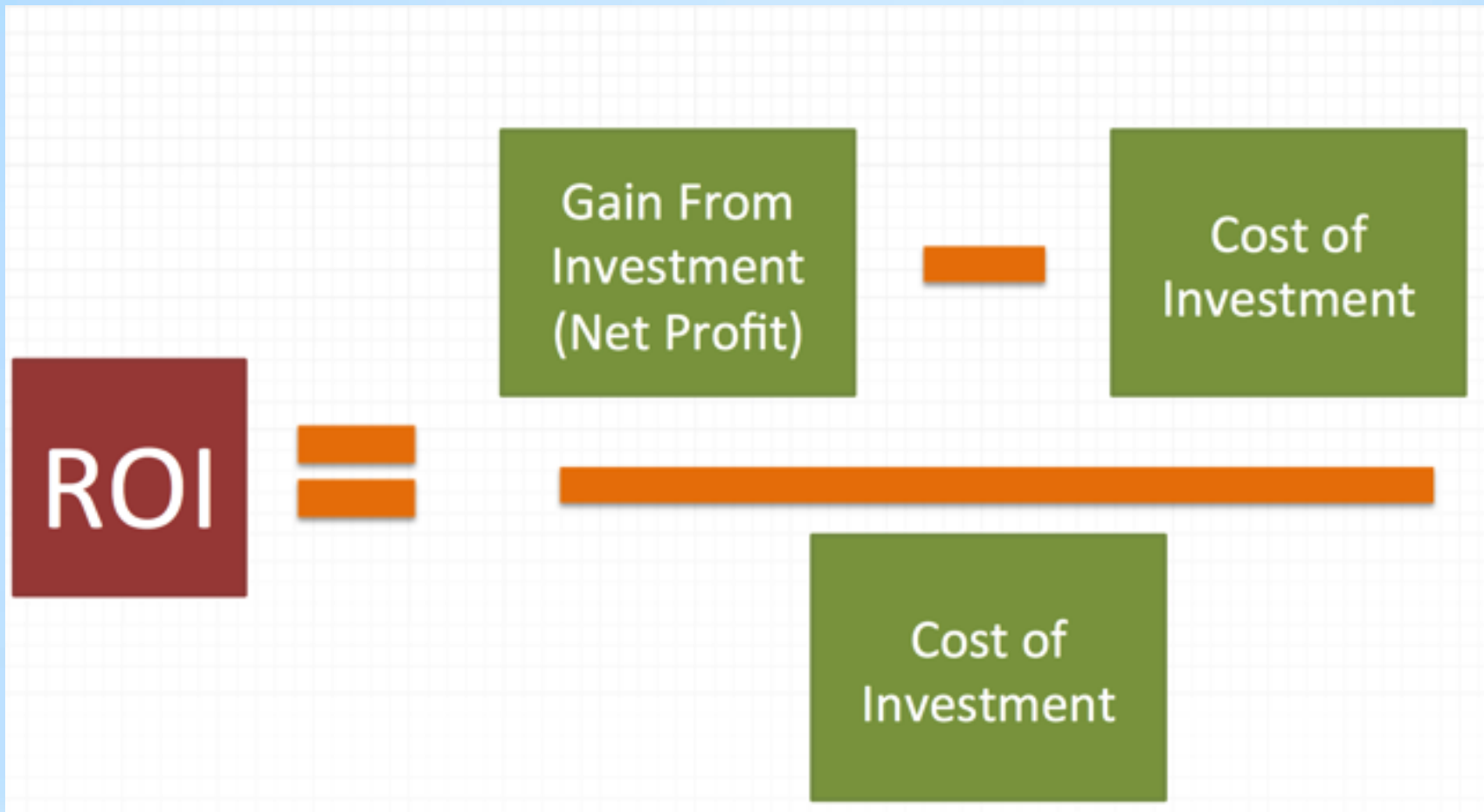
*Click the link to jump to that example*

# Compelling Financials Ratios

## Attract Investors

- **FINANCIAL metrics, especially for investors**
  - Return on Investment (%)
    - **Higher is better; any ROI in double-digits is compelling**
  - Payback (years)
    - **Shorter is better; any Payback less than 2 years is attractive**
  - Net Present Value, or NPV (\$)
    - **Positive is better; any NPV greater than zero is a positive for investors**
  - Internal Rate of Return, IRR (%)
    - **Higher is better, any IRR in double-digits is compelling**

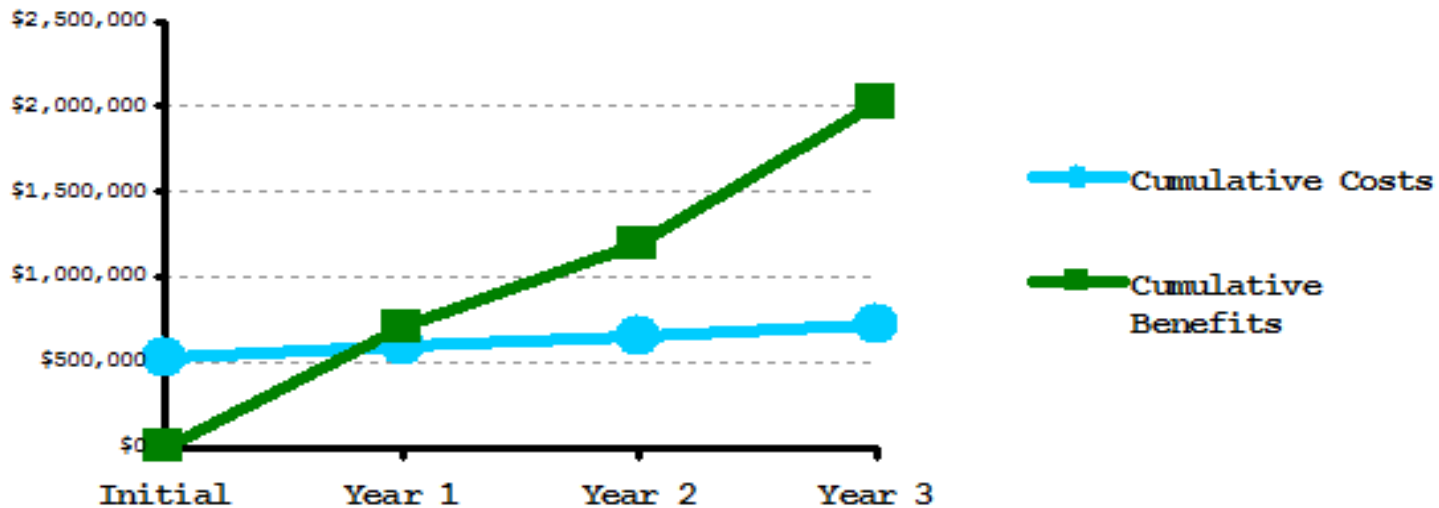
Return on Investment (ROI) = The Percentage (%) of the Net Gain Divided by the Comprehensive Cost (Higher is Better)





# Payback = The Time, in Years, to Recover Your Initial Investment (Shorter is Better)

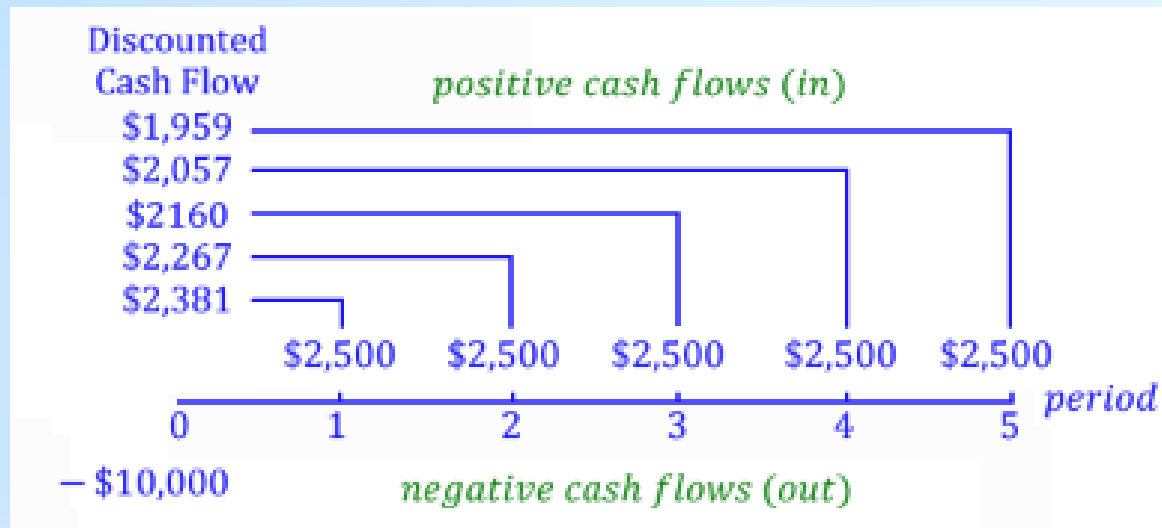
$$\text{Simple Payback in Years} = \frac{\text{Initial Investment}}{\text{Annual Savings}}$$



<http://blog.alinean.com/2010/08/payback-period-defined.html>

# Net Present Value, in \$, Is Today's Value of Future Cash Flows (Higher is Better)

- Net Present Value (NPV) is the result of:
  - Estimating the future inflows (\$2500 x 5 years) and outflows (\$10k up front)
  - Discounting those future cash flows by a discount rate (%), as an estimate of financing costs and risks
  - Calculating the net results: if positive, then the project is a Go.



<https://brainmass.com/business/net-present-value>

## Internal Rate of Return, in %, Is Rate at Which Net Present Value is Zero (Higher is Better)

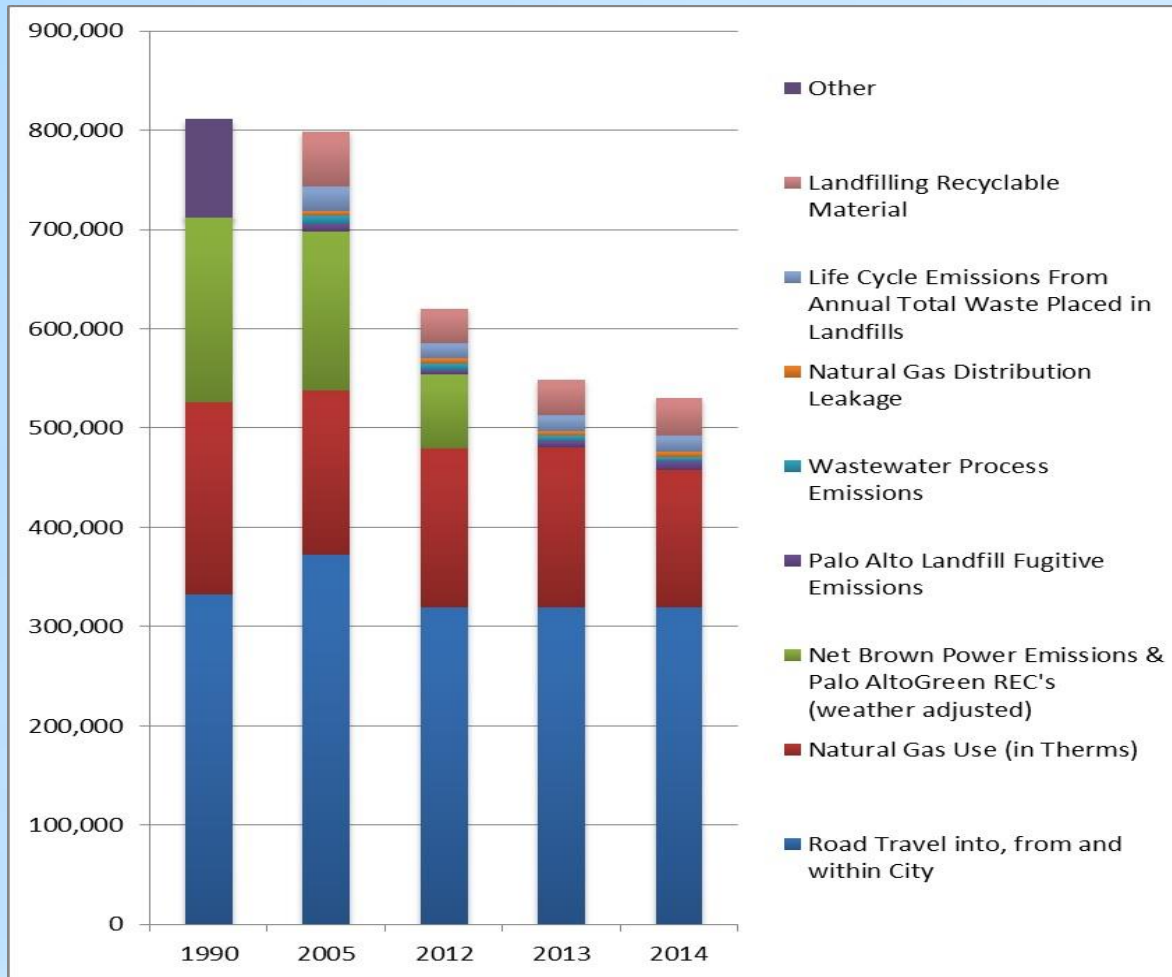
- Internal Rate of Return (IRR) is the rate at which Net Present Value (NPV) is zero
  - If higher than the cost of capital, then it should be a positive project financially
  - However, IRR is not appropriate to compare when cash flows are both negative and positive in future years



<http://slideplayer.com/slide/4582571>

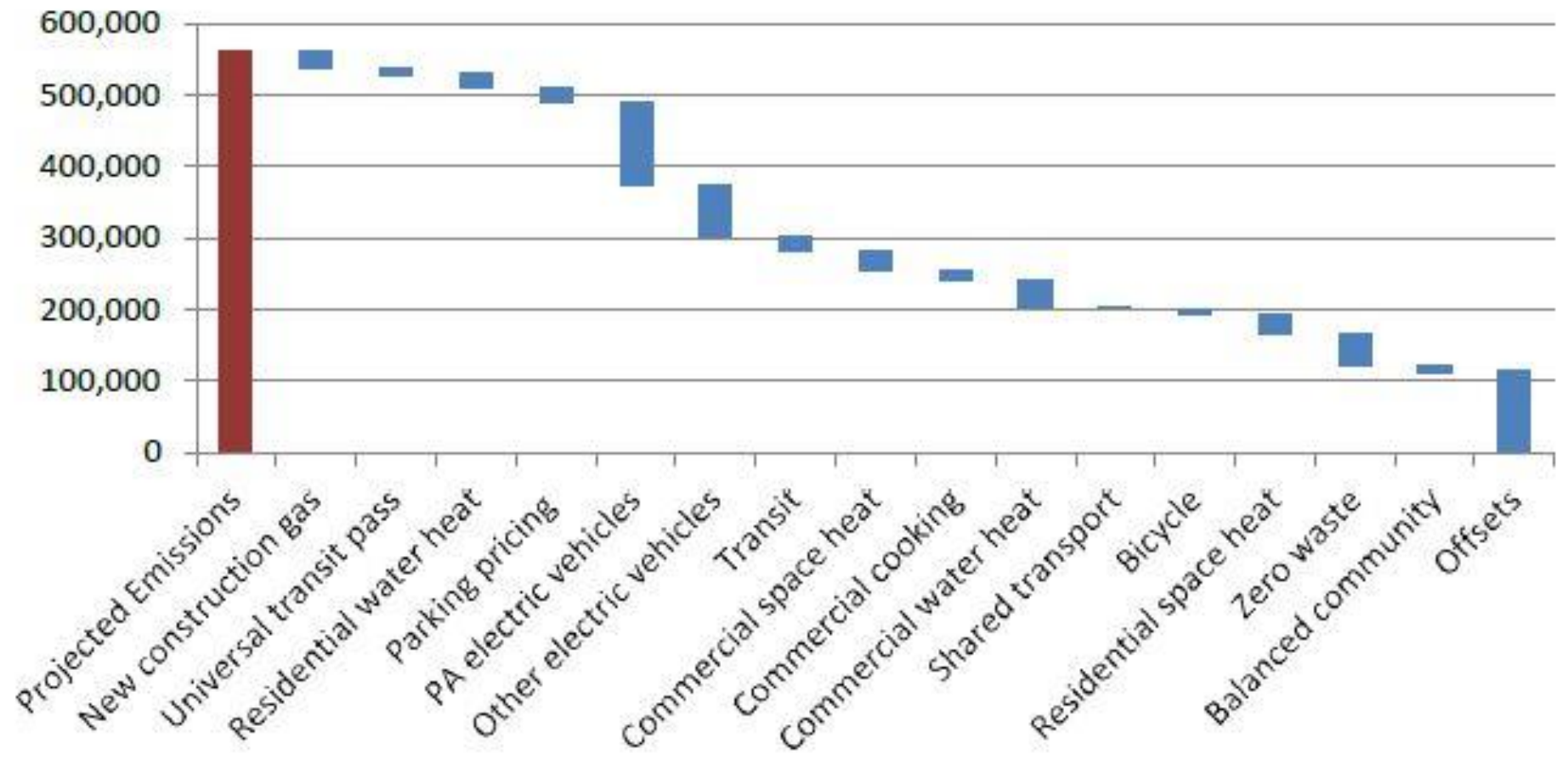
[http://ts1.mm.bing.net/th?q=The+Net+Internal+Rate+Of+Return+Net+IRR+Definition+ /](http://ts1.mm.bing.net/th?q=The+Net+Internal+Rate+Of+Return+Net+IRR+Definition+/)

# Calculating GHG Emissions Over Time Shows How A Community Is Progressing



City of Palo Alto Staff Report 1/25/2016: <http://www.cityofpaloalto.org/civicax/filebank/documents/50693>

# Forecasting Reductions of GHGs Shows Largest Potential Improvements



City of Palo Alto Staff Report 1/25/2016: <http://www.cityofpaloalto.org/civicax/filebank/documents/50693>

# Social Cost of Carbon Has an Estimated Value Specified by the U.S. EPA

The SC-CO<sub>2</sub> is meant to be a comprehensive estimate of climate change damages and includes changes in net agricultural productivity, human health, property damages from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. However, given current modeling and data limitations, it does not include all important damages. The IPCC Fifth Assessment report observed that SC-CO<sub>2</sub> estimates omit various impacts that would likely increase damages. The models used to develop SC-CO<sub>2</sub> estimates, known as integrated assessment models, do not currently include all of the important physical, ecological, and economic impacts of climate change recognized in the climate change literature because of a lack of precise information on the nature of damages and because the science incorporated into these models naturally lags behind the most recent research. Nonetheless, the SC-CO<sub>2</sub> is a useful measure to assess the benefits of CO<sub>2</sub> reductions.

The table below presents the current SC-CO<sub>2</sub> estimates for certain years.

## Social Cost of CO<sub>2</sub>, 2015–2050 <sup>a</sup> (in 2007 Dollars per metric ton CO<sub>2</sub>)

Source: [Technical Support Document](#) (PDF, 21 pp, 1 MB): Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 (May 2013, Revised July 2015)

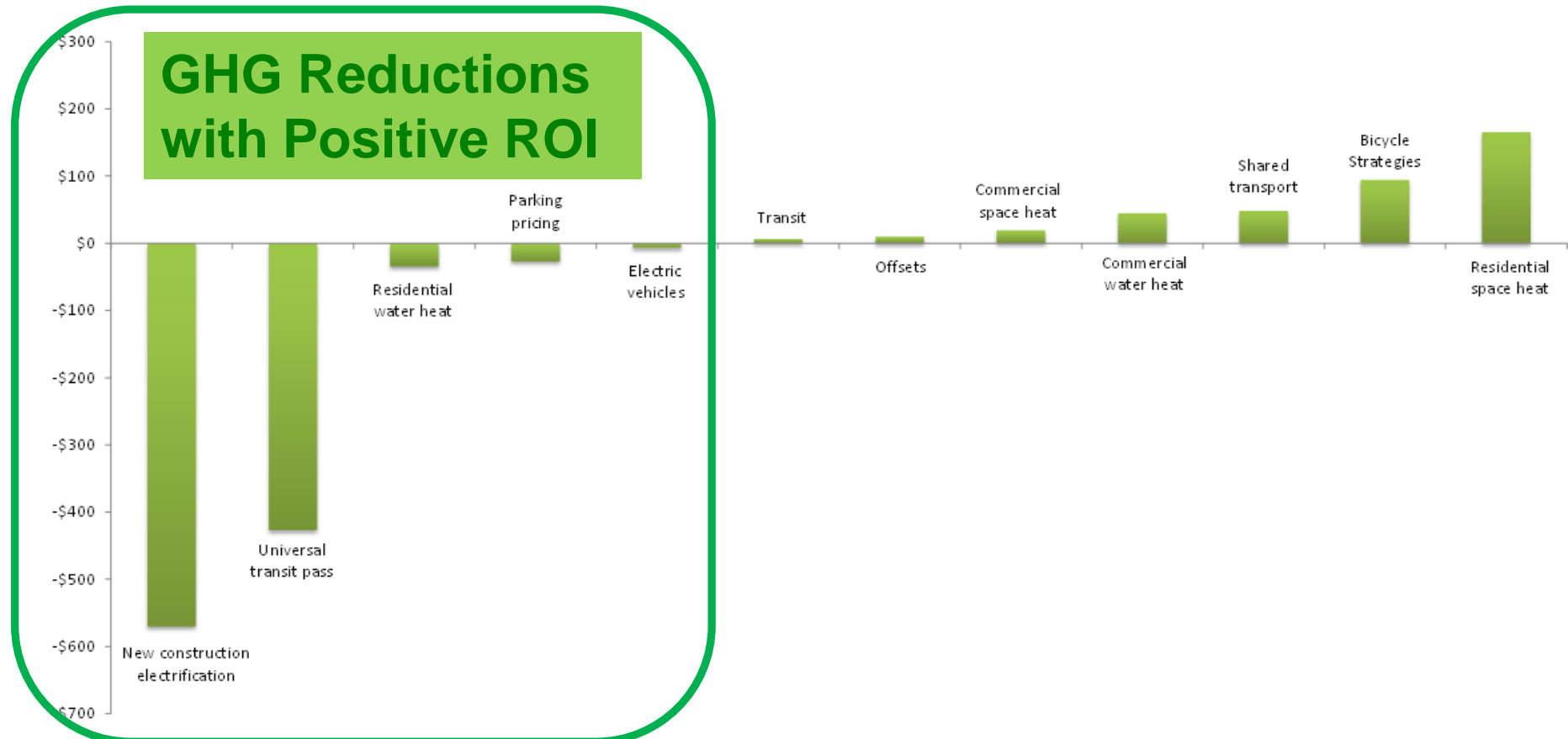
Year	Discount Rate and Statistic			
	5% Average	3% Average	2.5% Average	3% 95 <sup>th</sup> percentile
2015	\$11	\$36	\$56	\$105
2020	\$12	\$42	\$62	\$123
2025	\$14	\$46	\$68	\$138
2030	\$16	\$50	\$73	\$152
2035	\$18	\$55	\$78	\$168
2040	\$21	\$60	\$84	\$183
2045	\$23	\$64	\$89	\$197
2050	\$26	\$69	\$95	\$212

<sup>a</sup> The SC-CO<sub>2</sub> values are dollar-year and emissions-year specific.

Source: U.S. EPA, <https://www3.epa.gov/climatechange/EPAactivities/economics/scc.html>

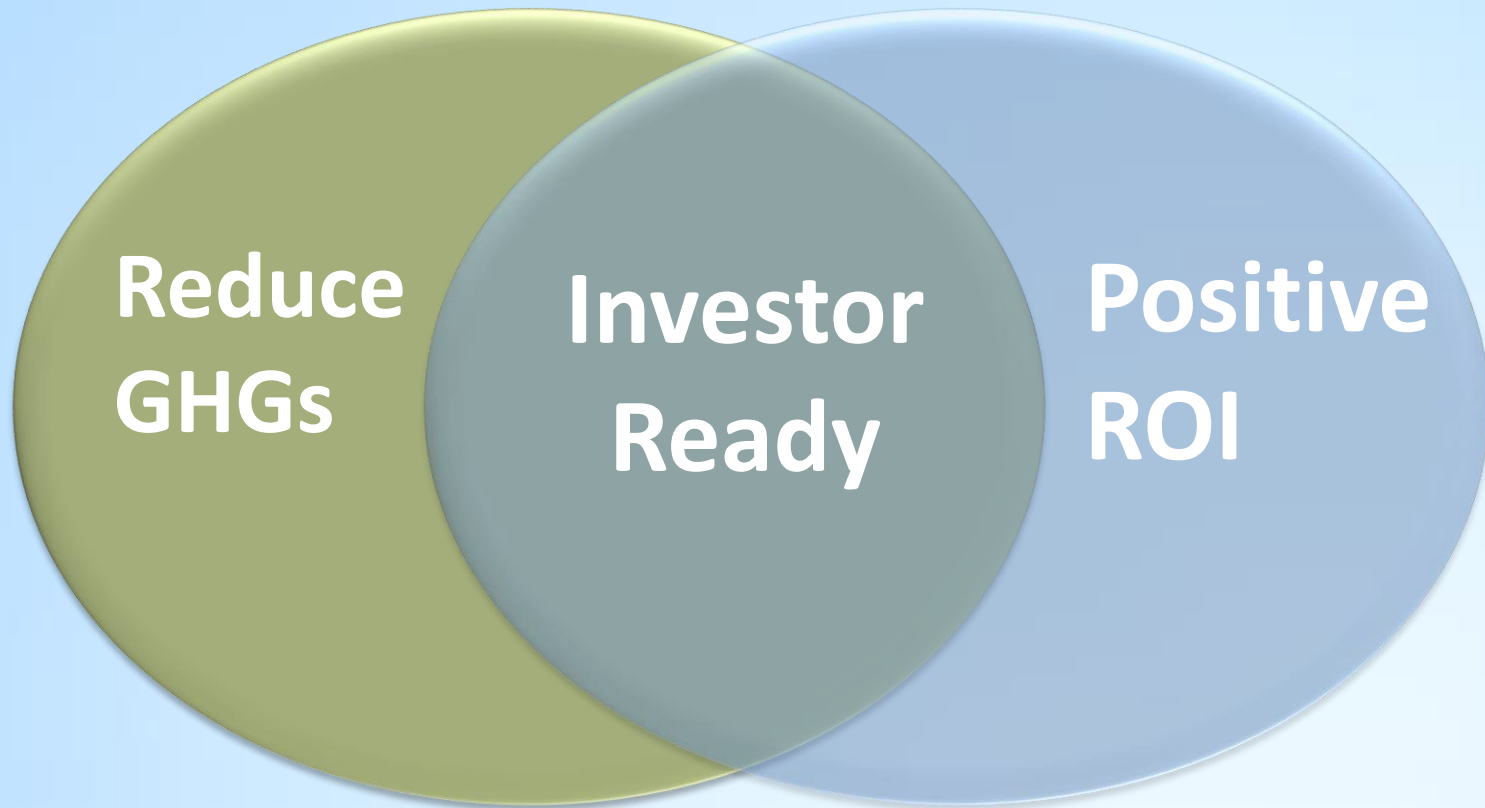
# Combining GHG and ROI In One View Focuses Attention on the Most Important Initiatives

GHG Abatement Cost Curve by 2030



City of Palo Alto Staff Report 1/25/2016: <http://www.cityofpaloalto.org/civicax/filebank/documents/50693>

## When Climate Action Reduces GHGs with Positive ROI, those City Initiatives Are Investor-Ready





# Being Investor-Ready in Cities Also Requires Being Citizen-Ready

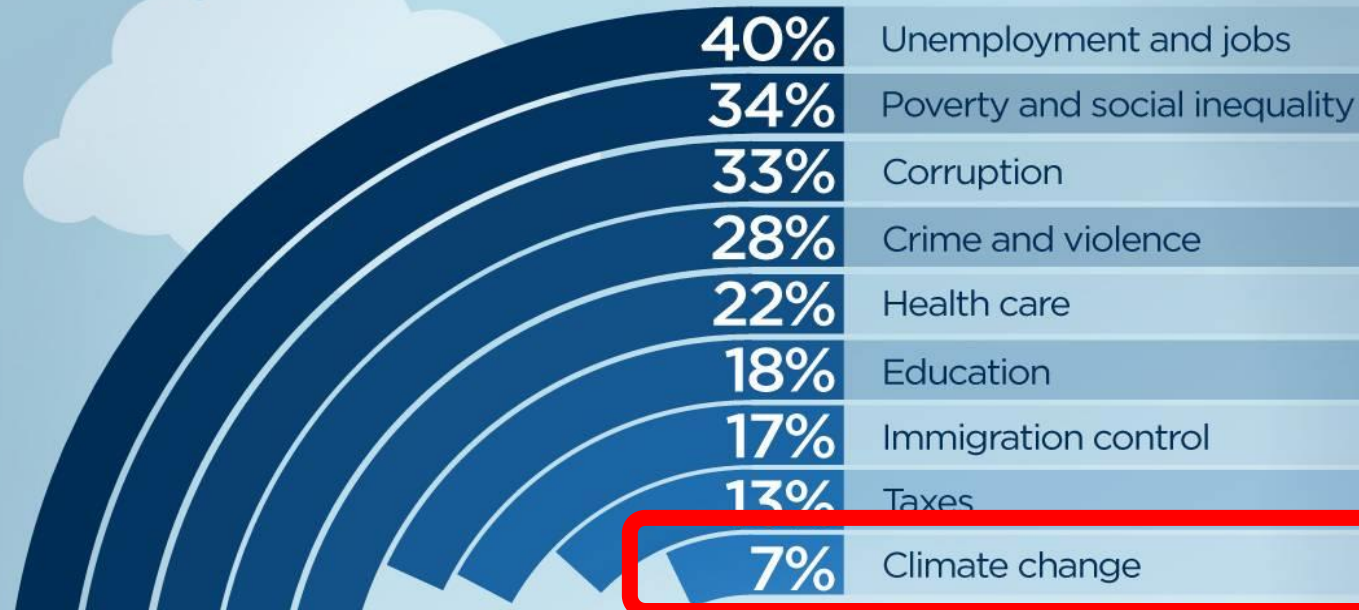
- In many communities, citizens are more concerned with jobs, poverty, and health, than with climate action
  - Climate action is ranked last in some surveys!
- Health agencies have linked climate inaction to health risks
  - Thus, appeal to the health benefits to citizens as a primary message as well
- When your climate-action solutions can connect to high-priority everyday issues, focus on communicating those more explicitly
  - Possibly shifting the communicated benefits to those higher citizen-reported priorities, with climate solutions as an added bonus
  - Consider neutral language like “natural resource efficiency” or “cost savings from reduced usage of energy and water”

# Citizens Are More Concerned About Jobs & Poverty Overall Than Climate Change and Solutions

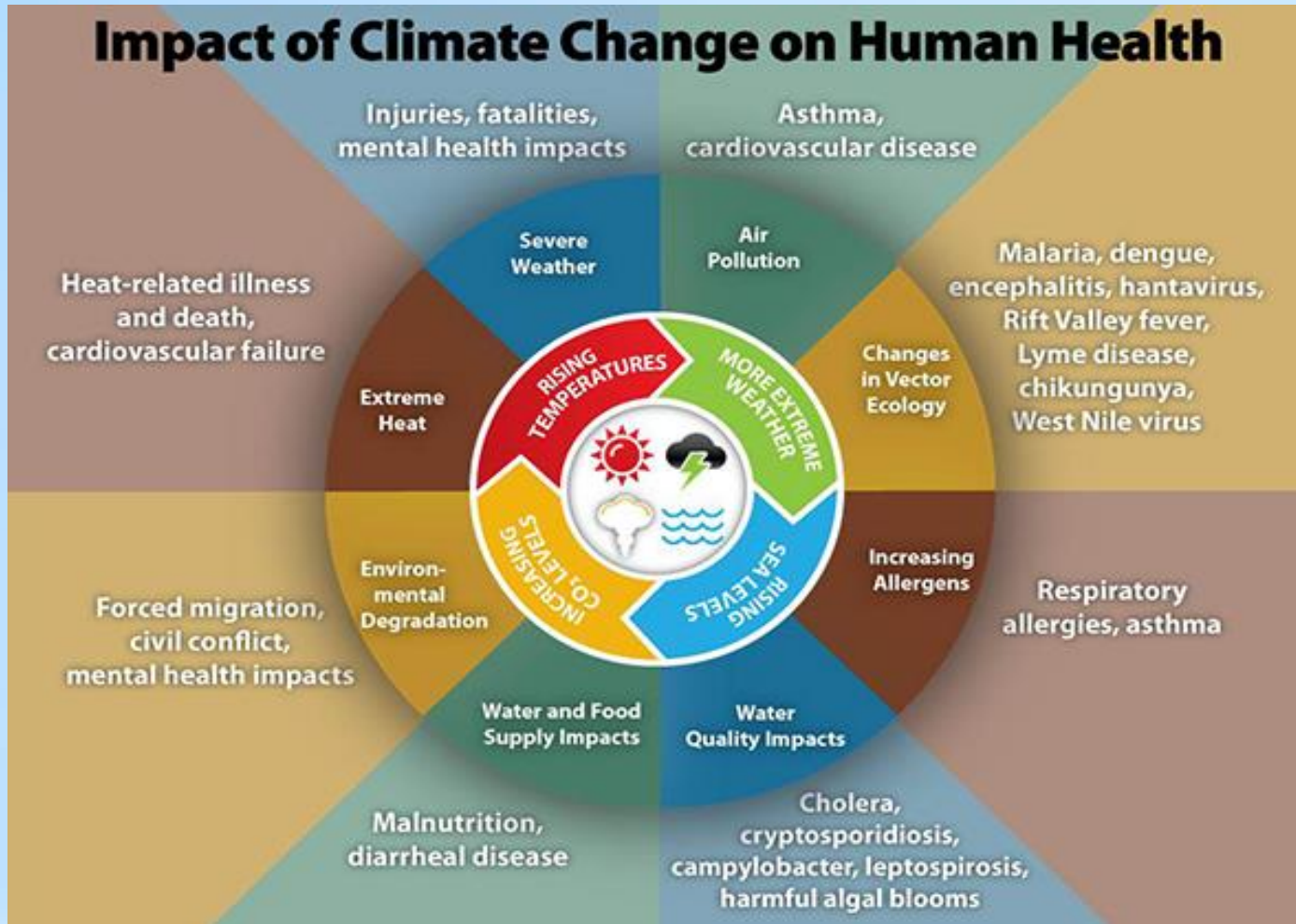
How **concerned** are people worldwide about **climate change**?

Worldwide, people are much less concerned about climate change. Developing countries in particular rank it low.

Percentage of times each issue appeared in the top three worries for respondents:

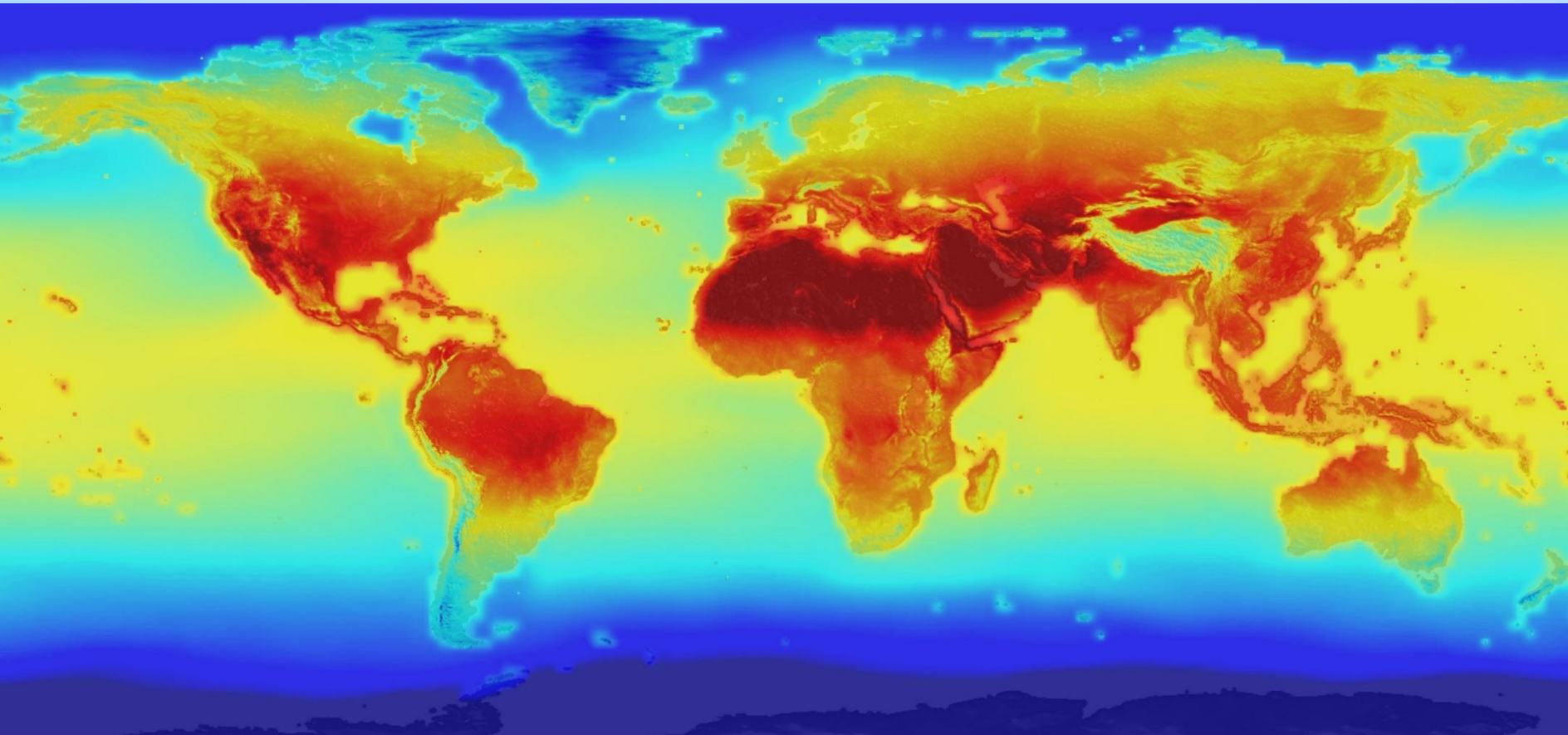


# You Can Raise Awareness of Climate Change by Also Highlighting Health Risks



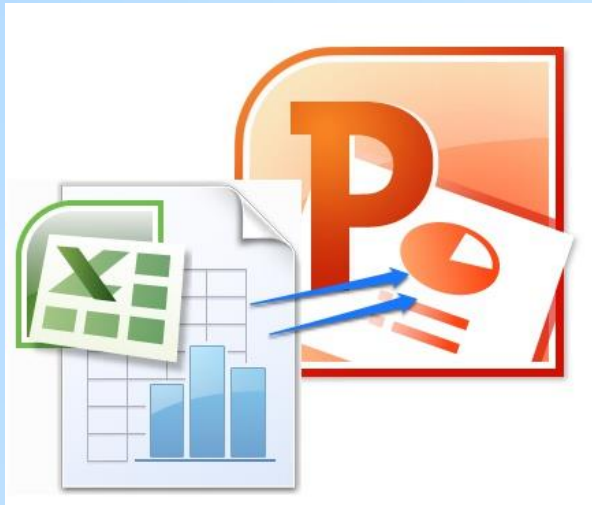
Source: CDCP (Centers for Disease Control and Prevention)

# Using Scientific Visuals from NASA.gov Are Compelling (Global Temperatures Rising; Climate Action Needed)



Source: NASA.gov

# Use Excel and PPT: Calculate GHGs Reductions and ROI in Excel to Strengthen Visual Storytelling in PPT



- Investor PPTs need to tell your story visually about the benefits.
- To be successful with investors, sustainable projects need ROI calculations.
- When sustainable projects deliver both GHG reductions and positive ROI, then investor interest will be higher.
- Work with your finance group to present Excel grids and graphs in your visual story of sustainable and financial benefits.

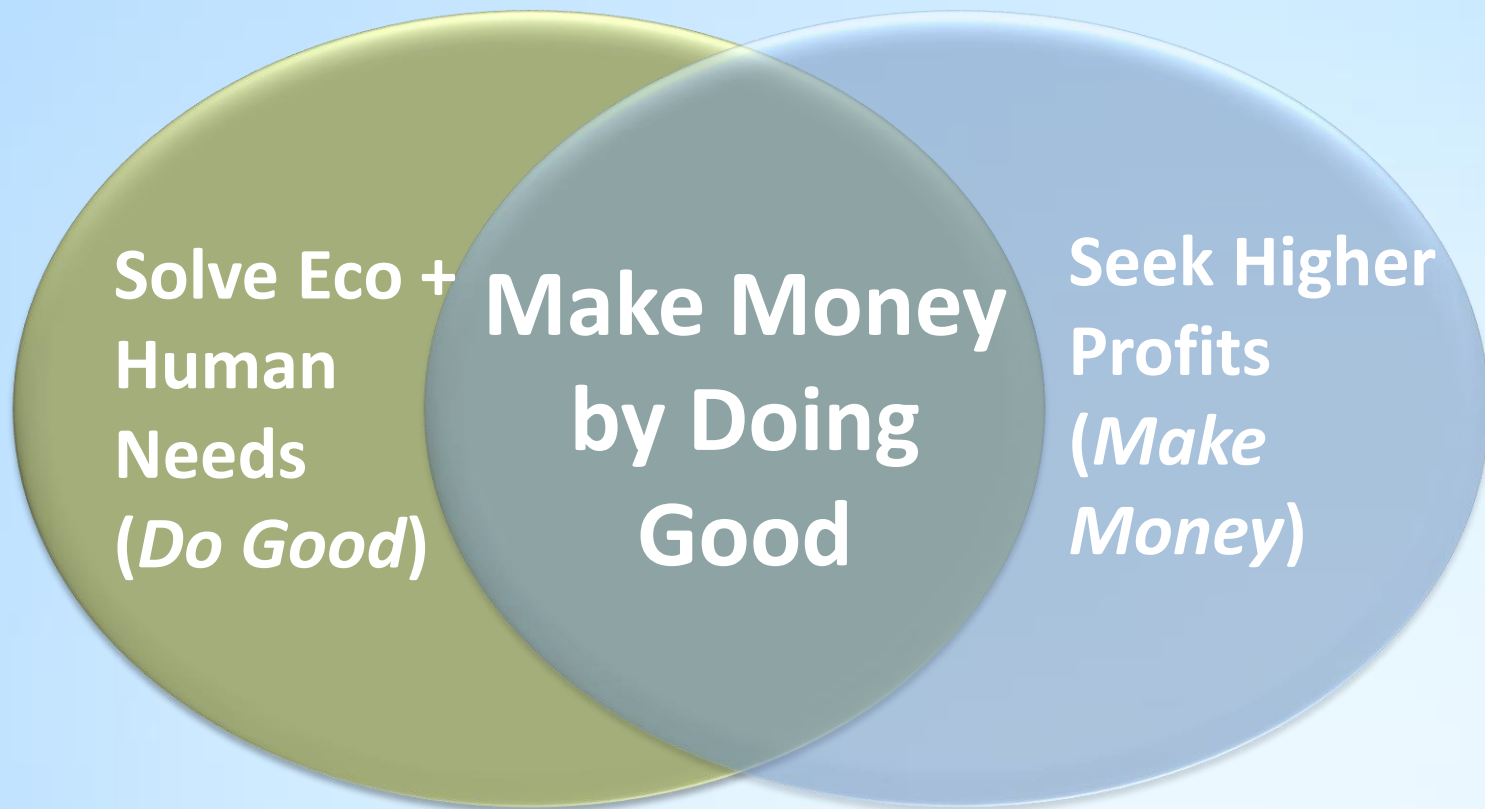
# Financing Sustainable Cities – A Toolkit

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# Investors: Seeking to Grow Capital While Solving Societal Problems

- An entire global industry has evolved for the prudent management of these assets, complete with tax policy, education and certifications, fiduciary duties, and investment and financial management tools.
- Across the spectrum of financial instruments, we expect to see a direct correlation between risk and return: the higher the potential risk, the greater the potential return. Some investors are naturally conservative and some are more long term growth oriented.

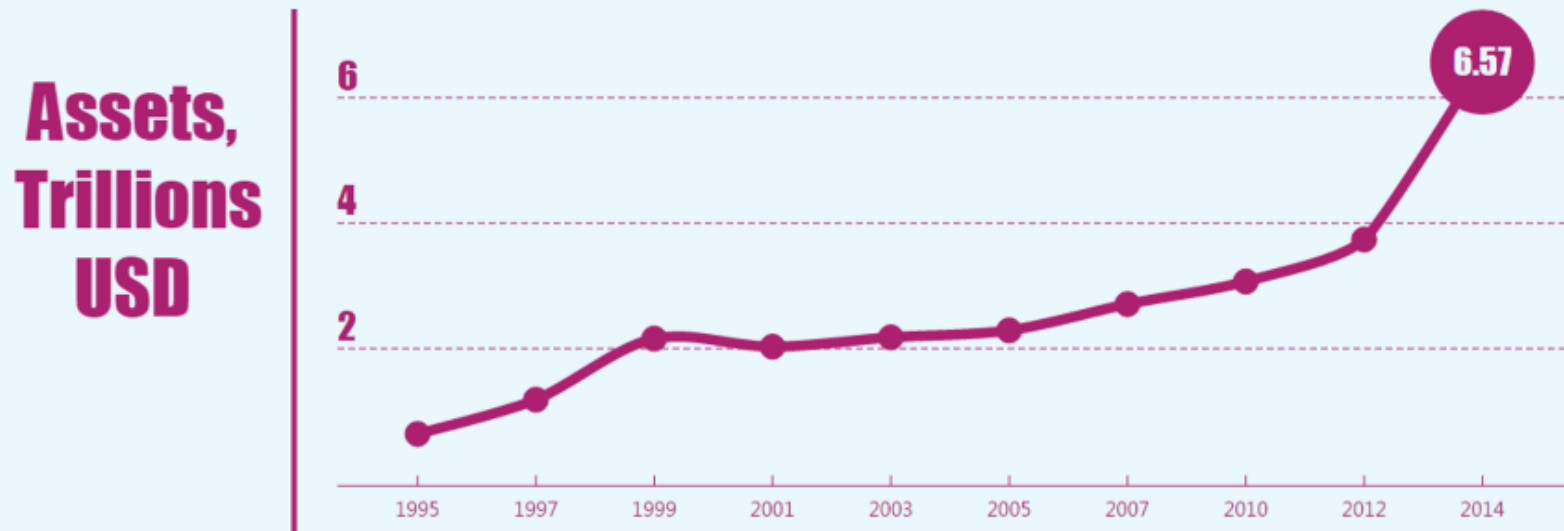
# Impact-Focused Investors Are Seeking Climate Action, Especially Where It Can Be Profitable Too





# Investing for Environmental and Social Benefit is Growing

## Socially Responsible Investing Since 1995



TOTAL SRI ASSETS IN 2014:

**\$6.57 Trillion**

**SOCIALLY RESPONSIBLE INVESTING IS ON THE UPSWING**

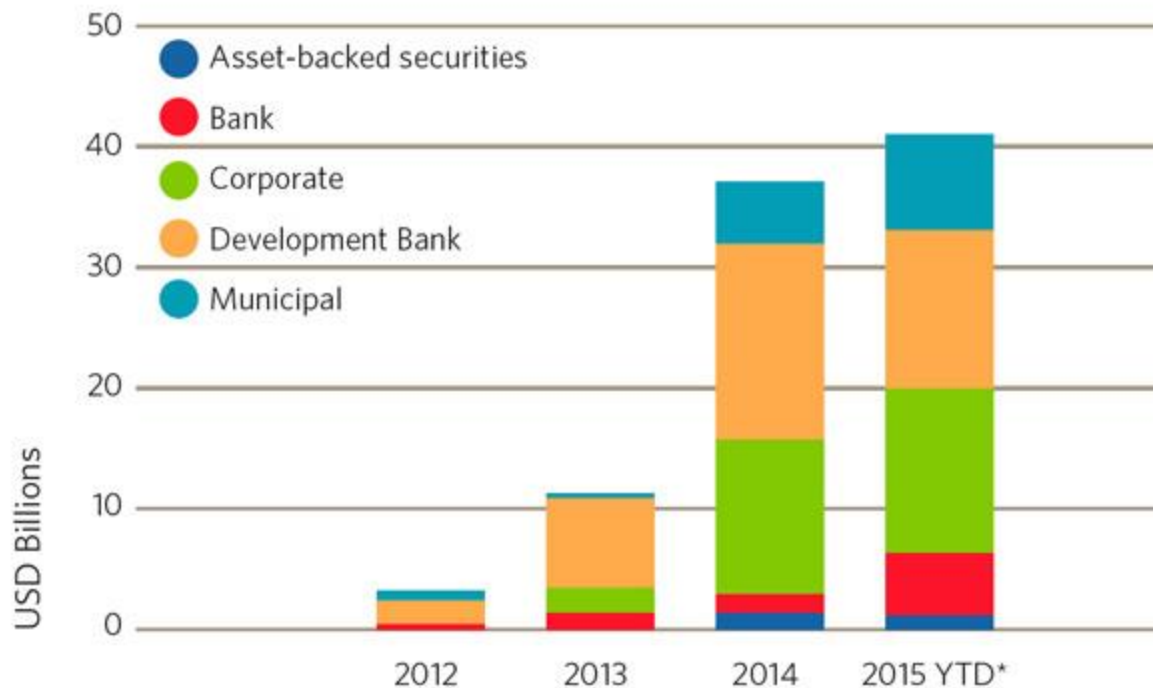
Tenfold growth since 1995

Data source: US SIF

Data source: US SIF Image source: <https://www.hedgeable.com/img/investing/whitepapers/impact2.png>

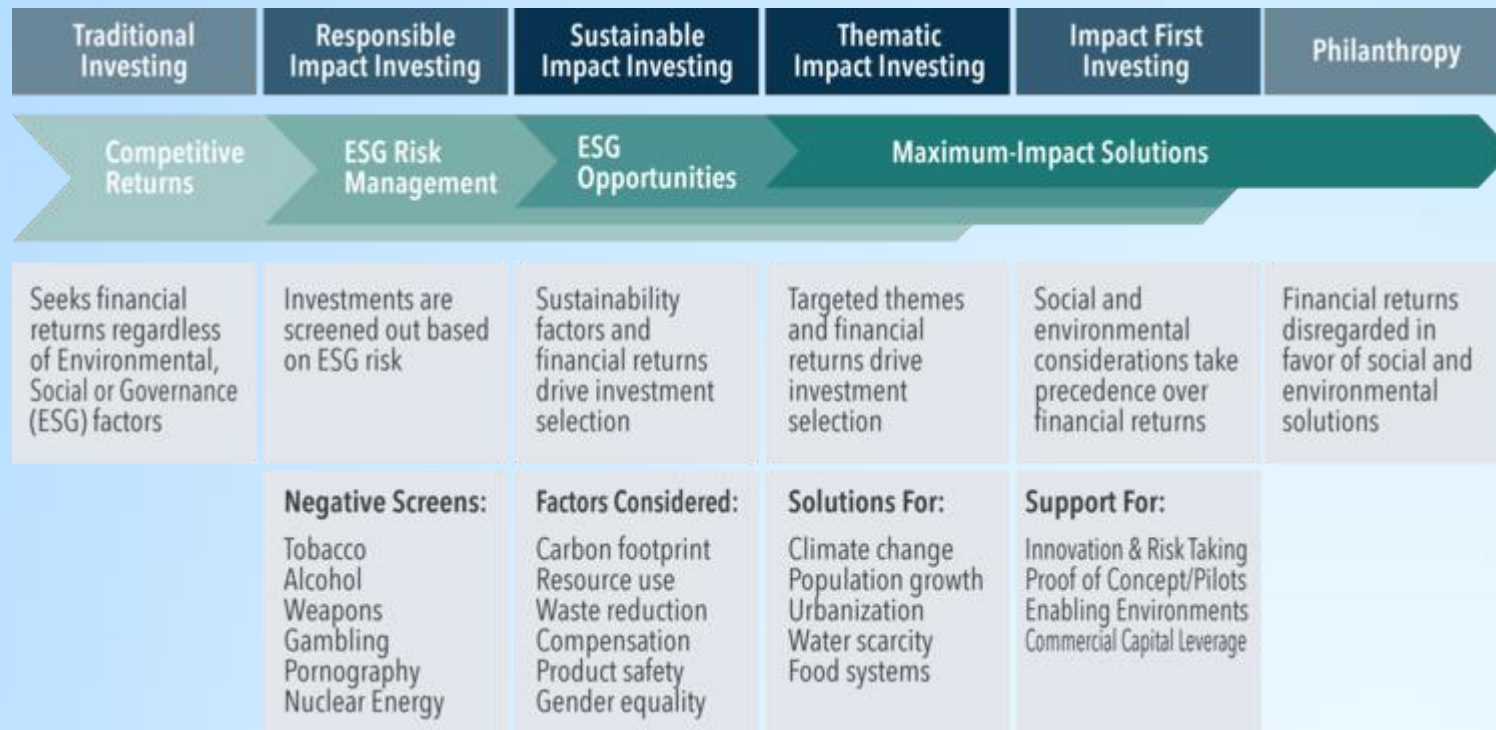
# Green Bonds Are Growing, Though Biggest Share Is from Corporates and Development Banks

## Growing momentum in green bond issuance



<http://www.thefifthstate.com.au/wp-content/uploads/2016/01/green-bond-growth.jpg>

# Investing Is Evolving to Explicitly Seek Out Environmental Solutions & Climate Action



Source: Sonen Capital; <http://www.scu-social-entrepreneurship.org/socent-blog1/2015/6/11/beyond-the-big-players>

# Investors Cover All Forms of Financing: Cities Can Fit with Lower-Risk, Income-Yielding Opportunities

## Mission Investment Asset Classes

Debt												
Conditional Investments		Deposits		Loans					Fixed Income Securities			
Loan Guarantee	Recoverable Grant	Insured Deposit	Linked Deposit	Senior Loan	Subordinated Loan	Line of Credit	Senior Loan Fund	Subordinated Loan Fund	Bond	Bond Fund	Mortgage Backed Security	Other Asset Backed Security

Equity						
Real Estate		Public Equity		Private Equity		
Real Estate (individual investments)	Real Estate Fund	Public Equity Fund (includes SRI Funds)	Direct Public Equity (individual companies)	Direct Private Equity (individual companies)	Private Equity Fund	Venture Capital Fund

<http://www.scu-social-entrepreneurship.org/socent-blog1/2015/6/11/beyond-the-big-players>

# Some Investors Are Willing to Consider Lower ROI Initiatives If Impact Is Higher



<https://www.missioninvestors.org/mission-investing>

# Investors: Seeking to Grow Capital While Solving Societal Problems

Investors come in all flavors. Each investor type fills a role in the investment universe – and includes advisors and fund managers, as well as donor advisors.

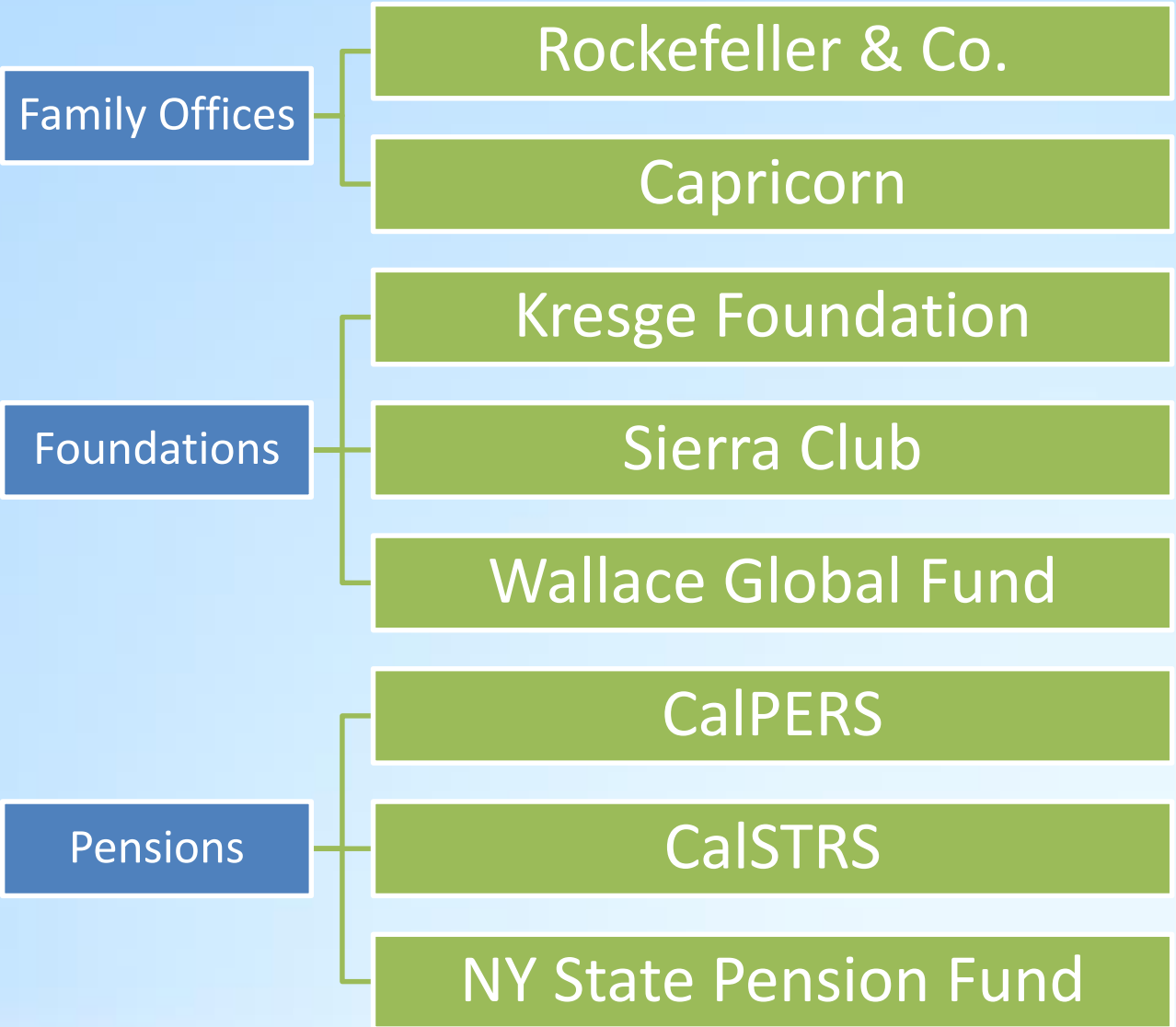
## INVESTORS

- Family offices
- Foundations
- Pensions & retirement plans
- Investor Networks
- Investment advisors
- Mutual fund managers
- Separate-account managers
- Private debt funds
- Private equity funds
- Big banks
- Community banking
- Sustainable banking
- New platforms for muni bonds

## DONORS

- Community Foundations
- Charitable Advisors
- Donor advised funds

# Examples of Funders Seeking Climate Action



# Family Offices

- Family offices are built to manage the accumulated wealth of rich families (typically billionaires and hundred-millionaires) and will likely have
  - Long term goals that may be aligned with a mission that directs its grants and/or investments.
  - May invest across the broad spectrum of low risk-to-high risk instruments, and in some cases will have a need for both taxable and tax-exempt instruments.
  - Are highly sophisticated and should be treated as investment professionals with strict investment guidelines.

## EXAMPLES: FAMILY OFFICES INVESTING FOR IMPACT

- **Rockefeller & Co.:** <http://www.rockco.com> Rockefeller family
  - John D. Rockefeller established a family office in 1882 to manage his growing investment needs and the future needs of his family. Today, Rockefeller & Co. has approximately \$16.1 billion in assets under advisement for individuals and families, family offices, nonprofit organizations, foundations, endowments, and global institutions. Rockefeller's descendants are investing in clean energy.
- **Capricorn Investment Group** [www.CapricornLLC.com](http://www.CapricornLLC.com) (founded by Jeff Skoll, first president of eBay Inc.), is focused on sustainable solutions – including greener, cleaner energy – across all asset classes.



# Foundations

- Foundations are tax-exempt pools of assets created by individuals, corporations, or quasi- governmental non-profits like health care districts that are required to give away 5% of their assets annually to retain their tax status and serve their mission.
- Foundations are aligned with a mission for which to use their assets. Investments are not required to be aligned with the purpose, but progressive foundations are pursuing that goal.
- Foundations give grants as well as two newer categories of mission aligned investments : **Program Related Investments (PRIs)** and **Mission Related Investments (MRIs)**. These instruments can be tied to a mission and need not be expected to produce a 'market rate of return'.
- The bulk of a Foundation's assets, when invested, will need to meet fiduciary standards as well as the investment policy and goals of the fund itself. The corpus of the asset base will be tax-exempt and seek market rates of return commensurate with the appropriate level of risk

## EXAMPLES: FOUNDATIONS INVESTING FOR IMPACT

- **Kresge Foundation** [www.kresge.org](http://www.kresge.org)
- **Sierra Club Foundation** [www.SierraClubFoundation.org](http://www.SierraClubFoundation.org)
- **Wallace Global Fund** [www.WGF.org](http://www.WGF.org)

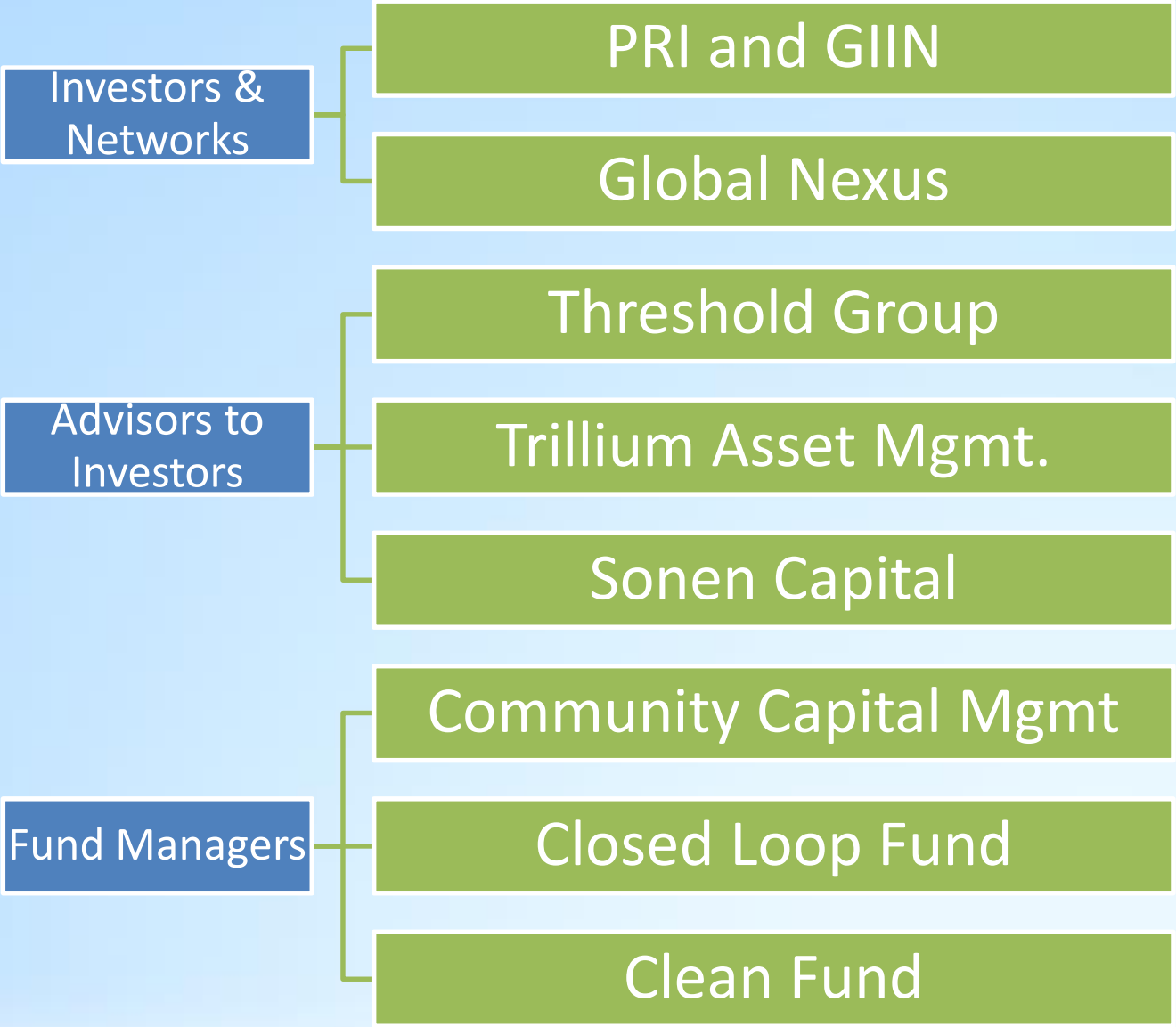
# Pensions, including Retirement Plans

- Pension plans have grown to be some of the largest institutional asset owners worldwide. Sophisticated investment terms and tools have evolved since 1973 when pension plan rules were created (ERISA). Since then the Department of Labor and the SEC have evolved strict rules of behavior for the participants in the pension plan investment industry. Each has its part to play to finance a global economy in need of fluid capital.
- Pension plans are tax-exempt institutions and therefore unlikely buyers of tax-free muni bonds. There are other categories in which pension plans can participate in financing local sustainability needs, but the market will have to address the various factors in the deals as with any investment – based on the risk and return features – and only secondarily seek a local, ancillary positive impact with the investment.

## EXAMPLES: PENSIONS INVESTING FOR IMPACT

- **CalPERS:** California Public Employees Retirement System [www.calpers.ca.gov](http://www.calpers.ca.gov)
- **CalSTRS:** California State Teachers Retirement Systems, [www.calstrs.com](http://www.calstrs.com)
- **New York State Pension Fund** <https://www.osc.state.ny.us/pension/>

# Examples of Funders Seeking Climate Action



# Advisors to Investors

**Trusts and Multi-family offices:** Multi-family and trust offices are often the result of one family office opening its doors and expertise to other families.

- Combining the assets under one management structure leads to operational efficiencies and co-investing opportunities.
- These advisors will seek to meet the investment and mission objectives of their clients and can often be mission or place-based investors with both taxable and tax-exempt asset pools.
- Generally open to investing across the risk and return spectrum, these investment pools and advisors might be open to unique opportunities, including possible grant and partnership roles.

## EXAMPLES: MULTI-FAMILY OFFICES INVESTING FOR IMPACT

- **Threshold Group** [www.thresholdgroup.com](http://www.thresholdgroup.com)

# Investment Advisors

- Investment advisors are registered with the SEC to perform investment services for their clients. Some are associated with big banks and will have access to a wide variety of investment options.
- Investment advisors are obligated to serve the best interests of the client. Some investment advisors will have clientele who are taxable investors and will have a preference for tax-exempt muni bonds.

## EXAMPLES: ADVISORS SEEKING IMPACT INVESTMENTS

- **Montcalm TRC** [www.MontcalmTCR.com](http://www.MontcalmTCR.com)
- **Sonen Capital** [www.SonenCapital.com](http://www.SonenCapital.com)
- **Trillium Asset Management** [www.trilliuminvest.com](http://www.trilliuminvest.com)

# Trillium Asset Management

**Trillium Asset Management** offers Sustainable & Responsible Investing, Green Investing, Impact Investing, SRI, ESG.

- Trillium works with individual investors to combine investment performance, along with environmental and social impact, into well-diversified investment portfolios.
- Community impact investing provides their clients with the opportunity to support community economic development, revitalization, growth, and sustainability
- [www.trilliuminvest.com](http://www.trilliuminvest.com)

# Mutual Fund Managers and Separate Account Managers

- Large mutual funds are pools of assets gathered by the manager from various investors.
- Some mutual funds have specific investment goals and missions and will seek to invest those assets in accordance with supporting that mission.
- Depending on the investment criteria and goals of the mutual fund, they may be seeking to invest in tax-exempt or taxable issues with a local impact.
- These mutual funds can be broadly diversified and have lower fees to investors, and even meet some mission goals.

## EXAMPLES: FUND MANAGERS INVESTING FOR IMPACT

- **Community Capital Management** specializes in investing in government, state and municipal bonds in the U.S. [www.ccmfixedincome.com](http://www.ccmfixedincome.com)

# Private Debt Funds

- Private debt is a financial tool to borrow and lend money among a small group of participants, and is not listed on the public debt markets for trading.
- Private debt funds gather investment dollars from investors and seek to loan those dollars to small and medium sized businesses whose growth plans seek some funding.
- Different pools of debt may center on different objectives. Expertise in the private debt market, and all the other due diligence criteria, will inform the investor of the risk and benefits associated with private debt fund managers.

## EXAMPLES: PRIVATE DEBT FUNDS INVESTING FOR IMPACT

- **Closed Loop Fund** [www.ClosedLoopFund.com](http://www.ClosedLoopFund.com)
- **Clean Fund** [www.cleanfund.com](http://www.cleanfund.com)



# Private Debt Funds Examples

- **Closed Loop Fund**

- Closed Loop Fund (CFL) is a social impact fund investing \$100 million in solutions to increase the recycling of products and packaging. Launched in 2014, it provides zero interest loans to cities and below market loans to companies for infrastructure that supports recycling, with a particular focus on enhancing existing infrastructure and closing the loop on materials.  
[www.ClosedLoopFund.com](http://www.ClosedLoopFund.com)

- **Clean Fund**

- CleanFund’s flexible financing program enables property owners to install modern energy and water technology with no up-front cost, increasing property cash flows and value. CleanFund’s capital is delivered through property assessed clean energy (PACE) financing, a property tax law provision adopted in 32 states that allows property owners to repay investments for building upgrades and new construction via a new line item on their property tax bill. Commercial landlords are able to pass through some or all of the increased property taxes to their tenants in a true “win-win” formula for generating lasting property value. [www.cleanfund.com](http://www.cleanfund.com)

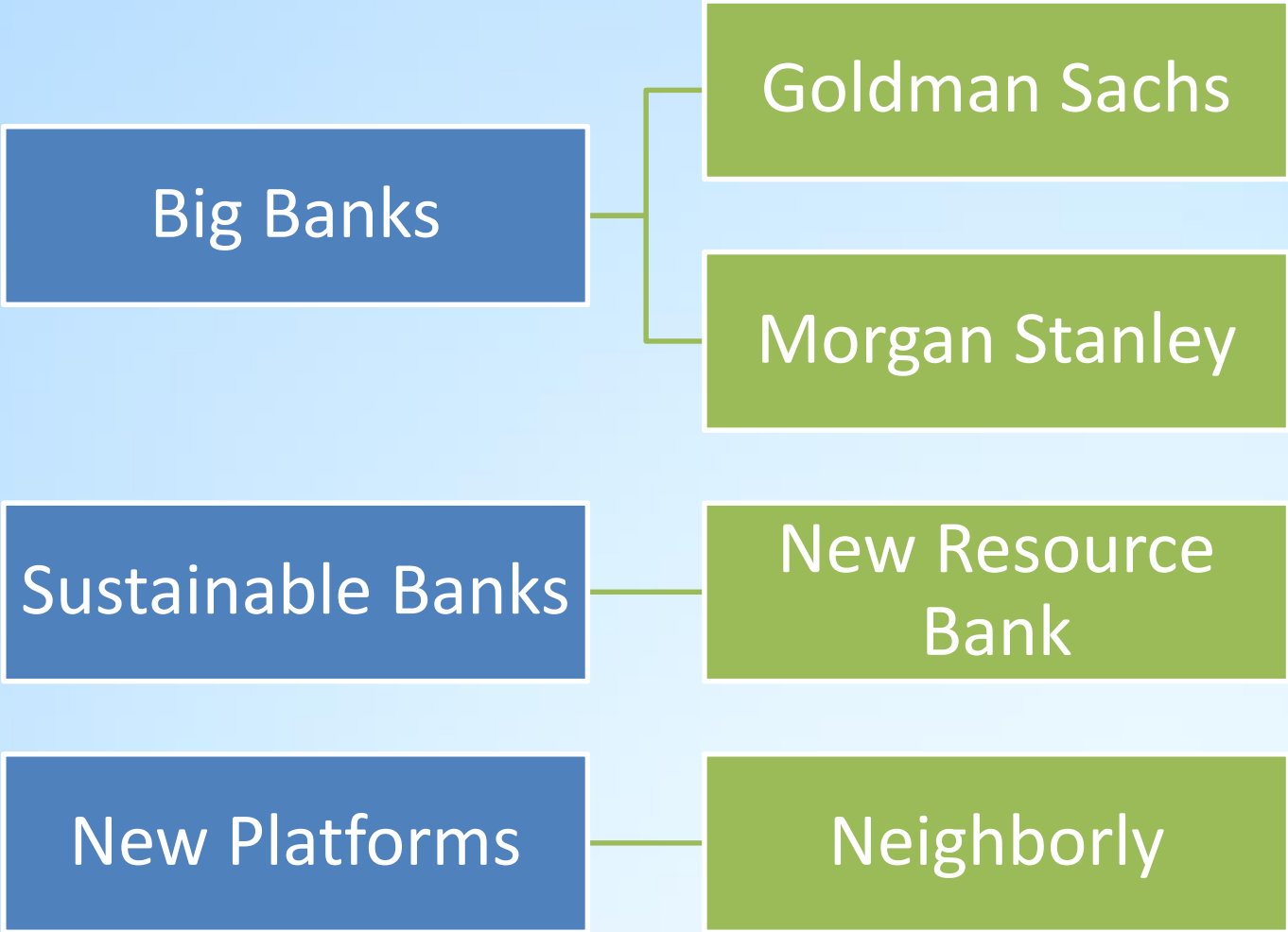
# Private Equity Funds

- Private equity is the asset class that includes venture capital. Some investors focus in categories such as climate action, clean and green tech, infrastructure and energy efficiency, including software solutions.
- Most private equity investors are very large investors who can allocate a portion of their portfolios to such high risk investments.
  - Accredited investors must have \$1 million in net worth
  - Qualified investors must have \$5 million in investable capital
- Investors in early stage start-ups (e.g. venture capital) can experience returns ranging from a complete loss to very high 20% to 30%.
- Private equity investments for institutional investors can have significant fees, lock-up periods (capital cannot be removed easily) and varying transparency.
- Some private equity capital funds may be possible partners for participating in public/private partnerships.

## EXAMPLES: PRIVATE EQUITY FUNDS INVESTING FOR IMPACT

- **Athena Capital** [www.AthenaCapital.com](http://www.AthenaCapital.com)

# Examples of Funders Seeking Climate Action



# Big Banks

Big global investment bank facilitate the creation and distribution of a variety of financial instruments for a variety of financial participants.

- They may also advise many private clients through their wealth management arms.
- Specialty departments within investment bank can include Municipal Finance (helping cities structure deals and raise funds), clean energy investments (green and clean tech financing), tax consulting, bond issuance, etc.
- Some big bank foundations focus on environmental related themes

## EXAMPLES: BIG BANKS INVESTING FOR IMPACT

- **Goldman Sachs** [www.GS.com](http://www.GS.com)
- **Morgan Stanley** [www.ms.com](http://www.ms.com)
- **JP Morgan** [www.jpmorgan.com](http://www.jpmorgan.com)
- **UBS** [www.ubs.com](http://www.ubs.com)

## EXAMPLES: BIG BANK FOUNDATIONS for GRANTS

- **Wells Fargo Foundation Environmental Grants** <https://www.wellsfargo.com/about/corporate-responsibility/community-giving/environmental-grant-program/>
- **Citi Foundation, Urban Transformation** <http://www.citigroup.com/citi/foundation/about/2016-Citi-Foundation-Guidelines.pdf>

# Community Banking

- Banking authorities have mandated that large banks reinvest a portion of their assets in their local community, and meet a minimum investment level defined by the **Community Reinvestment Act**. To this end, large banks and community foundations can place their deposits in a community bank or loan fund and know that it will be reinvested in the local community, and will therefore gain them credit for the Community Reinvestment Act requirements of our banking system.
- **Community banks** are regular banks with a local presence and mission, encouraged by the government to make small business loans to small businesses and non-profits, that large more tightly regulated banks would not make, and are allocated some level of New Market Tax Credits to apply to loan packages. These 'higher-risk' loans are managed carefully at these institutions and, being aligned with mission, are often provided with mentoring and technical advice for better risk outcomes.
- Cities can work with local branches of national banks and with local community banks and other **CDFIs (Community Development Financial Institutions)** and develop banking relationships for city funds as well as programs for loans in the community.

## EXAMPLES: COMMUNITY BANKS INVESTING FOR IMPACT

- **Community Bank of the Bay** [www.BankCBB.com](http://www.BankCBB.com);
- **New Resource Bank** [www.nrb.com](http://www.nrb.com)
- **California Organized Investment Network:** [www.insurance.ca.gov/0250...coin/Index.cfm](http://www.insurance.ca.gov/0250...coin/Index.cfm)

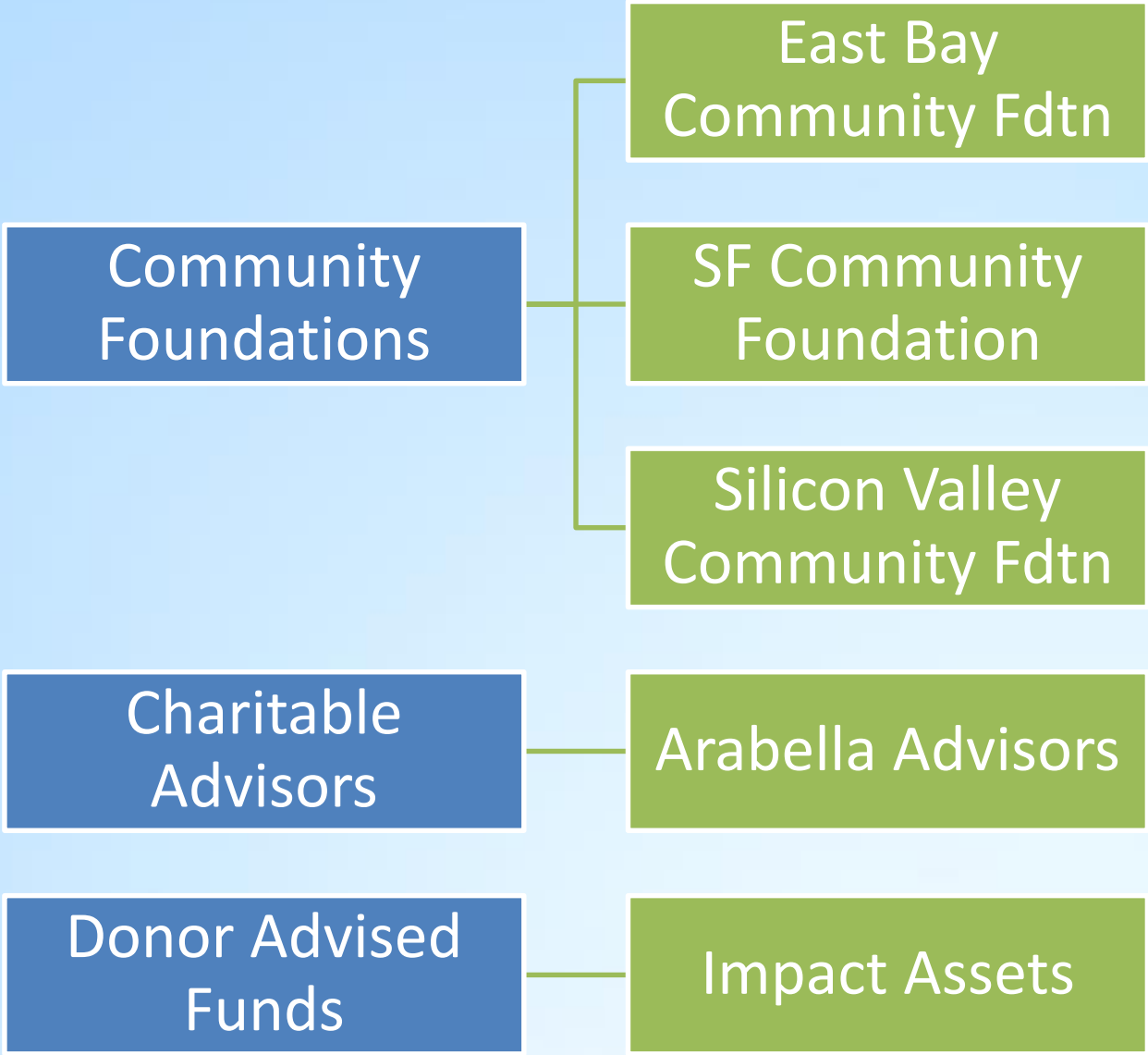
# Sustainable Banking

- One focus of Sustainable Banking is lending, loans and CDs that connect to climate action solutions, as well as funding projects with societal benefits
- Over 200 financial institutions are part of the UN Environmental Program focused on banks and financial firms <http://www.unepfi.org/>
- A global community of several dozen sustainable banks is the *Global Alliance for Banking on Values* [www.gabv.org](http://www.gabv.org)
- **EXAMPLE: New Resource Bank**, <https://www.newresourcebank.com>
  - New Resource Bank is a triple-bottom-line bank serving values-driven businesses and nonprofits that are building a more sustainable world.
  - Views money as an agent of positive social, environmental and economic change and believe banking can transform the economy
  - Puts more than \$200 million of deposits to work for good by lending more than \$180 million to organizations that seek to benefit communities and preserve the planet

## New Platforms for Muni Bonds

- New online platforms are connecting investors with opportunities for financing climate action solutions, that offer potential financial returns along with direct environmental benefit
- **EXAMPLE: NEIGHBORLY** [www.Neighborly.com](http://www.Neighborly.com)
  - Neighborly.com offers a new way for all types of investors to invest in their own communities through municipal bonds.
  - An online platform seeking to bring transparency, efficiency, and widespread access to the \$3.8 trillion in muni bonds and public finance markets.
  - Neighborly's ultimate vision is to democratize not only the municipal bond market but eventually the broader fixed-income market as well
  - Currently 11,000 investors on Neighborly, with access to 50,000 muni bonds listings online

# Examples of Funders Seeking Climate Action





# Community Foundations

Community foundations gather donations for long term investments and grants with a local (or donor mandated) mission.

- Provide grants to local non-profits and social programs, possibly using MRIs and PRIs, and even tilting some of their investments to local community banks and loan funds, help recycle money in the local geography.
- Different pools of assets at community foundations will dictate what sort of financial instruments they will be interested in across the spectrum.
- Partnership opportunities with community foundations and their network could be extremely fruitful for cross-cultural objectives.

## EXAMPLES: FOUNDATIONS INVESTING FOR IMPACT

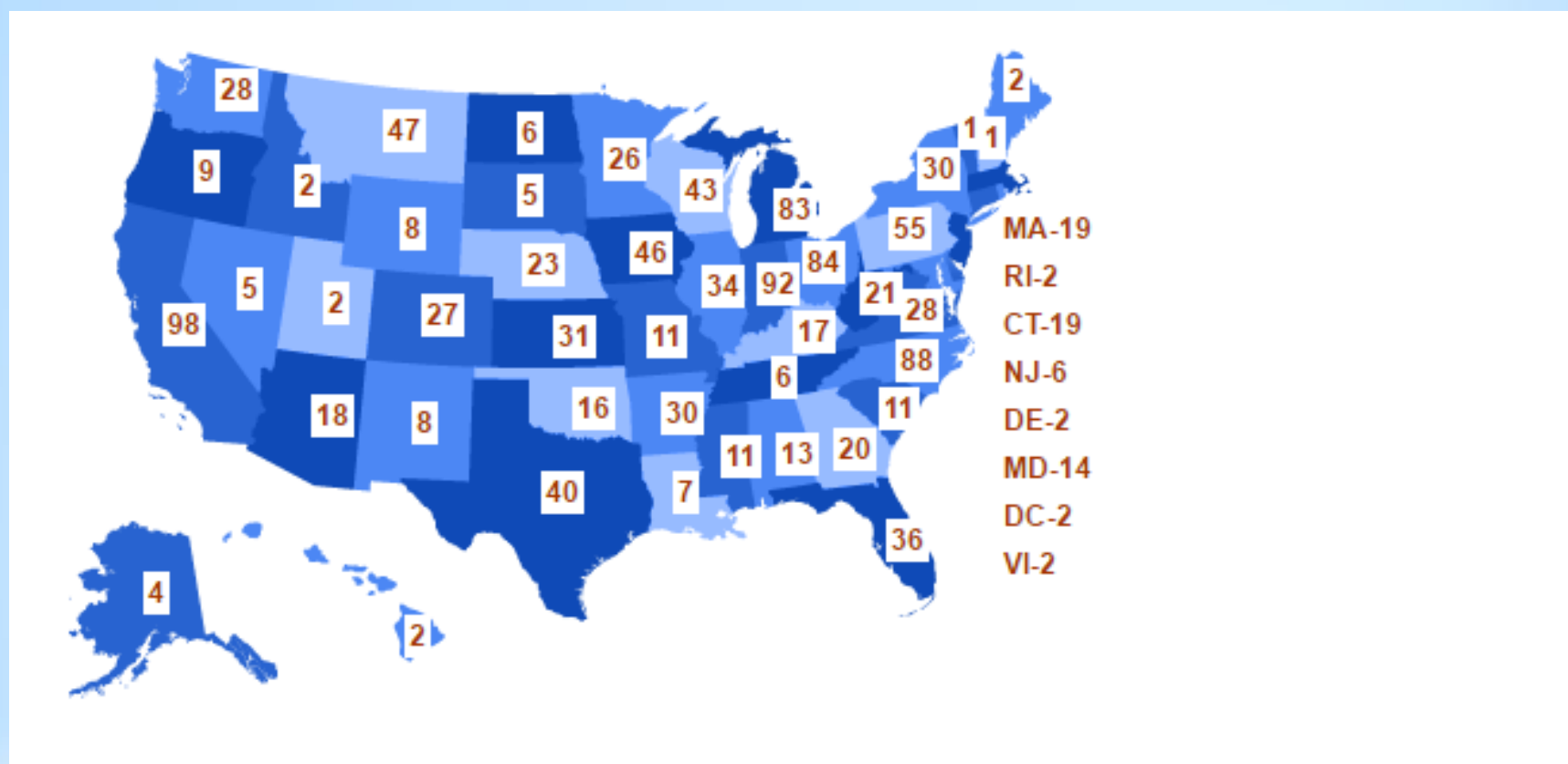
- **East Bay Community Foundation** [www.EBCF.org](http://www.EBCF.org)
- **The San Francisco Foundation** [www.SFF.org](http://www.SFF.org)
- **Silicon Valley Community Foundation** [www.siliconvalleycf.org](http://www.siliconvalleycf.org)

# Find Your Community Foundation

## Community Foundations

- Check your local community, where community foundations may apply to city, country or region:

<http://www.cof.org/community-foundation-locator>



# Impact and Charitable Advisors

- Impact and charitable advisors are a newer specialty consultant to wealth pools with a mission.
- By offering advice on aligning the grants with impact on the mission, and aligning the investments to also have an impact on the mission, these advisors are a new breed of consultant
- Can provide feedback on offerings and a channel to some families and institutional assets on impact investments in the local market.

## EXAMPLE: ADVISORS WITH CLIENTS INVESTING FOR IMPACT

- **Arabella Advisors** [www.ArabellaAdvisors.com](http://www.ArabellaAdvisors.com)

# Donor Advised Funds

- Community Foundations
  - Families, individuals, businesses, and nonprofit groups establish funds within **community foundations** into which they can contribute a variety of assets to be used for charitable purposes.
  - Clients designate the beneficiaries of their Donor Advised Funds, also known as “DAFs”
- Donor Advised Funds
  - The **ImpactAssets** Giving Fund is an innovative donor advised fund that leverages the power of impact investing to put more money to work for social and environmental benefit. [www.ImpactAssets.org](http://www.ImpactAssets.org)

# Place-based Investing Is A Focused Approach for Impact Investors To Fund Climate-Action

- Local impact enables investors to see, hear and feel the benefits;
- Climate-action projects can be a focus of place-based investing



From Leonardo Vazquez, The National Consortium for Creative Placemaking; [www.artsbuildcommunities.org](http://www.artsbuildcommunities.org)

# Innovative Impact Investing Approach: Place Based Investing led by Investors

- Threshold Group's **Place-Based Platform**:
  - With Threshold's place-based platform, **Invest NW**, investments focus on the social, environmental, and regional economic development of regions; the Pacific Northwest is active, and Threshold clients in Northern California and mid-Atlantic are now pursuing it too.
- **"The Chicago Model"** is a \$100 million commitment for place-based investing in the nation's 3<sup>rd</sup> largest city, led by MacArthur Foundation, Calvert, and Chicago Community Trust
  - This approach could be applied to Climate Action solutions
    - <http://impactalpha.com/the-chicago-model/>
- The **Partners for Places Fund** matches funds 1:1 for community-based initiatives, including climate-action
  - Managed by the Funders' Network and supported by [Bloomberg Philanthropies](#), [The JPB Foundation](#), Kendeda Fund, [The New York Community Trust](#), [The Summit Foundation](#), and [Surdna Foundation](#).
    - <http://www.fundersnetwork.org/partnersforplaces/>

# Additional Resources: Funders Focused on Climate Action

- **Family offices, foundations, and fund managers for impact**
  - [http://www.ussif.org/files/Publications/Family\\_Offices.pdf](http://www.ussif.org/files/Publications/Family_Offices.pdf)
  - <http://www.MissionInvestors.org>
- **Foundations**
  - <https://www.nptrust.org/statistics-for-foundations-and-grants/25-largest-foundations-in-the-us-by-total-assets>
  - <http://www.insidephilanthropy.com/home/2014/7/16/the-9-top-finance-guys-in-environmental-philanthropy.html>
- **Networks of investors**
  - <http://www.greenfunders.org>
- **Green private equity funds**
  - <http://www.thegreenmarketoracle.com/2012/08/top-12-green-private-equity-firms.html>

# Financing Sustainable Cities – A Toolkit

- I. Setting Your Climate Action Goals
- II. Financial Sources & Mechanisms for Capital
- III. Key Metrics & How to Calculate Them
- IV. Potential Funders for Municipal Climate Solutions
- V. Five Steps to Funding Your Sustainable City Projects



# Five Steps to Funding Your Sustainable City Projects



- Following these 5 steps can lead to funding for sustainable city projects
- Each step has an explanation page in the Executive Summary and the Full Report...
- ...and, in the detailed Full Report, each step provides an example with details of how to pursue funding for sustainable city projects.

# Five Steps to Funding Your Sustainable City Projects: Example

## Example Project from Oakland, CA: **Electric Vehicle Support Equipment (EVSE) in Owner-Occupied Multi-Unit Dwellings (MUDs)**

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

**EXAMPLE – OAKLAND, CALIFORNIA:** Oakland’s Sustainability team developed a pilot program for encouraging Electric Vehicle Support Equipment (EVSE) such as charging stations in small, owner-occupied multi-unit dwellings (minimum of 3 units) to promote the adoption of electric vehicles that would permanently reduce GHG emissions in Oakland. Oakland’s sustainability team constructed an 8 page summary analysis of the proposed pilot program. The following exercise shows how this Toolkit and How-To Guide can point to financing solutions.

## Step 1: Answer 7 Questions

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

### Answer 7 questions:

1. Who are the **stakeholders**, and thus possible **partners** ?  
*(e.g. corporate, NGO, philanthropic, federal, state, utility, commission)*
2. **Who benefits** – and **who pays**?
3. What **revenue streams** can be collected and for how long?
4. What is the **timeframe** to implement the project?
5. What are the complete **lifecycle costs**?
6. Is there a positive **ROI, NPV, IRR and payback**? Is it in the budget?  
Or does it need a new financing tool?
7. How could you best match the **financing mechanism** to the project characteristics?

# Step 1, Question 1:

## Stakeholders and Partners

Answer The  
7 Questions

Build The  
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Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

### 1. Who are the **stakeholders**, and thus possible **partners** ? (e.g. corporate, NGO, philanthropic, federal, state, utility, commission)

- Envision potential partnerships for a common goal, and outline the net benefits of collaborating together.
- Seek out aligned groups in your community: corporate partners, engaged environmentalists, faculty and students at local universities, other NGO or government entities, and even regulatory bodies.
- Partners may have resources to share: e.g. human capital and talent; financial capital in a partnership; natural capital like wetlands or riparian corridors; and the desire to test pilot projects to prove the goals.
- Use financial toolkits like this How-To Guide, and funding wizards and searchable databases (e.g. <https://fundwiz.ice.ucdavis.edu>, and <http://www.dsireusa.org>)

- EXAMPLE – OAKLAND, CALIFORNIA:** For Oakland, there are several possible ideas.
- A non-profit could provide the initial funding to start the pilot.
  - Then the city could partner with a financial intermediary to manage a revolving loan fund.
  - Additionally, the non-profit may provide a loan guarantee to offset the first potential losses of the fund and reduce the interest rate needed for the program.
  - State and Federal agencies, like the California Infrastructure Bank, can also fund energy related projects and programs.
  - The California Energy Commission, similarly found in many other states, has funds to possibly support alternative energy uses.

# Step 1, Question 2: Beneficiaries and Payers

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

## 2. Who benefits – and who pays?

Fairness doctrine connects the users of a project, service or benefit to the cash flows for it. If the benefit accrues to all members of the community, then all members could be part of paying for that service. Municipalities provide many services and their residents pay for them mainly in the form of taxes (on property, income, purchases) or fees (garbage, water etc.) that provide income to the city for its people and services. If however, some civic investment is directly aimed at a certain neighborhood or district, for example a small water facility, then the direct users of that service could be the primary payers.

For example, if benefits will accrue to:

- The entire community = **Apply Taxes**: sales, property and assessments
- A special group = **District Assessments**
- Specific users or beneficiaries = **User Fees**

**EXAMPLE – OAKLAND, CALIFORNIA:** In Oakland's case, to promote the EVSE pilot,

- the grantor/donor could provide the funds and the owner occupied/property owner and its tenants would benefit from the installation.
- In the long run, the community as a whole would benefit from lower GHG emissions and better energy management.
- Consequently, examining a combination of the property owner and the City's finances to determine the appropriate partners for this transaction could be fruitful.
- The City's choice of partners in the grant or Revolving Loan Fund can provide validation to the program.

# Step 1, Question 3: Mapping Revenue Streams

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

## 3. What **revenue** streams can be collected and for how long?

Increasingly, direct revenue streams are linked to specific projects rather than the general city fund. Determining whether a financing stream can be tapped for repayment helps to define how risky that investment may be. If the project is likely to bring a long term broad benefit to the community, like a major transit hub that will benefit the nearest businesses and property owners, assessment districts can be used to capture the increasing property values. Also users of that transit can be assessed user fees for parking and riding the transit. Projected property values and fees can be earmarked for future debt payments, and revenue or industrial development bonds or fees can be wrapped into a financial security. Look for:

- Increased future values and taxes
- Self funding from future savings
- Creation of a new revenue stream, for example, reselling the recycled waste

### EXAMPLE – OAKLAND, CALIFORNIA:

Owners of these multi-unit dwellings with new EVSE charging stations will benefit from significantly reduced energy costs for their vehicles.

Property owners may also be able to charge tenants with a 'user fee' for charging their vehicles, helping to recover costs that exceed the grant.

After the pilot grant program ends, the revolving loan fund is expected to provide return of capital over the following 15+ years.

# Step 1, Question 4: Timeframe and Complexity

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

## 4. What is the **timeframe** to implement the project?

Long-lived assets like infrastructure can be financed so the costs incurred for the project be spread over a similar timeframe as the life of the project -- and better allocate the costs to the people who will benefit from the projects or services.

Short term projects or fixes can be financed by shorter term vehicles, like fees or short term borrowings.

Some newer projects require complex negotiations and long term arrangements for cooperation.

Generally the greater the number of partners involved in any transactions means more complexity and time necessary to execute the deal and start the investment. Common goals and values need to be embedded, and strict monitoring or quarterbacking is necessary for complex projects

### EXAMPLE – OAKLAND, CALIFORNIA:

It could take 3-5 years to roll out the EVSE for MUDs pilot program and install the new charging equipment in 5% of Oakland's multi-unit dwellings; potentially to be followed with a larger installation target with financial support.

This project is focused on a small target group, and does not require complex financing tools.

Risks are relatively low from the lenders' and borrowers' point of view, and the overall dollar amount is relatively small.

# Step 1, Question 5: Complete Lifecycle Costs

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

## 5. What are the complete lifecycle costs?

- Many municipal developments have been accomplished with a Design/Build-at-the-lowest -cost mindset. Accepting the lowest bid may not include all the long term costs of financing, operating and maintaining that project. By including the long term, entire life-cycle costs, more sustainability can be built into a project that will offer a total lower overall cost because it includes sustainable savings in the total lifecycle.
- “DBFOM”: Design, Build, Finance, Operate, Maintain = long term partnership
- Up front one-time costs may generate on-going savings, particularly in energy costs
- Annual maintenance costs should be counted as part of the project’s lifecycle costs
- Cost savings can include avoidance or mitigation of future costs

**EXAMPLE – OAKLAND, CALIFORNIA:** The primary costs for the charging stations will be the installation of the equipment at each new location. Future upgrades to the equipment, as they develop, will be minor compared to the cost of installing the basic infrastructure. Technological developments will impact the long term costs of those upgrades, as well as to how the storage of energy can help the local grid manage supply and demand better in the community. Each EVSE charging station would cost about \$1700 and the installation is estimated at \$4452 in the Bay Area. Given an expected level of support in the pilot program of \$5000, an estimate of the upfront cost to install EVSEs in 5% of these targeted buildings is \$2.575 million.



# Step 1, Question 6: Key Financial Metrics for Funders

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

**6. Is there a positive ROI, NPV, IRR and payback? Is it in the budget? Or does it need a new financing tool?**

With many city budgets as tight as they are, financing new sustainability projects and priorities sometimes must yield to other competing programs -- or must find a new financing source. Understanding current budget requirements may indicate where funding for new projects can be found. Often with sustainability projects and investments, energy cost savings can be used to fund new programs, like LED lighting. Substituting long term carbon-based energy with renewable energy sources (like reducing GHG emissions from city fleets as it switches to EV) can make economic sense when the whole cost structure is analyzed over the life of the investment. Additionally, many estimates on such cost savings projections are continually being revised as technological improvements force changes to core assumptions.

**EXAMPLE – OAKLAND, CALIFORNIA:** The pilot program is expected to rely on a grant to prove the concept that efficient at-home electric recharging will encourage the acquisition of electric vehicles and in the long term have a great impact on reducing GHG emissions in the community – and test the assumptions of ROI, NPV and payback. Grants will start the new program, build community support and positive evidence of success. In the second phase of the plan, a Revolving Loan Fund can provide low interest rate loans to property owners to add such EVSE, which can be repaid by energy savings and pass-through to users, which supports a positive ROI and NPV estimate.

# Step 1, Question 7: Ideas for Financing Mechanisms

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

## 7. How could you best match the **financing mechanism** to the project characteristics?

Each project or investment in sustainability should be structured to match the life term of the project to the term of the financial instrument and also to match the beneficiary of the service to the payor of that service.

- Short term may be 1-5 years
- Longer term may be over 10 or 20 years
- Infrastructure projects can be up to 30-50 years

Understanding the replacement time frame for different target interventions can help in the planning process to meet long term goals. Estimate the duration of a project's benefits, which can be in terms of GHG emissions reductions, vehicle miles travelled reductions, energy use improvement, etc. For example, for a city to switch over the fleets to electric vehicles, staging purchases over time or funding the entire fleet at once would use different financial instruments.

**EXAMPLE – OAKLAND, CALIFORNIA:** It is estimated to take 3-5 years to roll out the pilot program and install the new charging equipment in 5% of Oakland's multi-unit dwellings; potentially to be followed with a larger installation target with financial support.

# Step 2: Build The Factsheet, with your Finance Team

## (1 of 2)

Answer The  
7 Questions

Build The  
Factsheet

Consult With  
Capital  
Sources

Determine  
Financial  
Mechanism

Execute The  
Financing

### FACT SHEET TEMPLATE

Climate Action Goal: (energy/waste/water) \_\_\_\_\_

Geography/Place: \_\_\_\_\_

City Lead / Opportunity Owner: \_\_\_\_\_

<p><u>Project Name – and Strategic Goal:</u></p> <p>Name: _____</p> <p>Strategic Goal: _____</p>	<p><u>How the Initiative Will Be Implemented</u></p>
<p><u>Where the Initiative Will Be Implemented:</u></p> <p>Description: _____</p>	<p><u>Timeline and Duration:</u></p> <p>Timeline to Setup: _____</p> <p>Expected Duration of Benefits: _____</p>
<p><u>ENVIRONMENTAL IMPACT: CLIMATE SOLUTIONS</u></p> <p>Energy = ____ (kilowatt hrs, megawatt hrs, joules)</p> <p>Waste = ____ (tons)</p> <p>Water = ____ (gallons)</p> <p>GHG = ____ (metric tons) ____ (metric tons/\$)</p>	<p>How does this project improve efficiency or benefit the environment:</p>
<p><u>COMMUNITY IMPACT:</u></p>	<p><u>BENEFICIARIES:</u></p>

# Step 2: Build The Factsheet, with your Finance Team

## (2 of 2)

Answer The  
7 Questions

Build The  
Factsheet

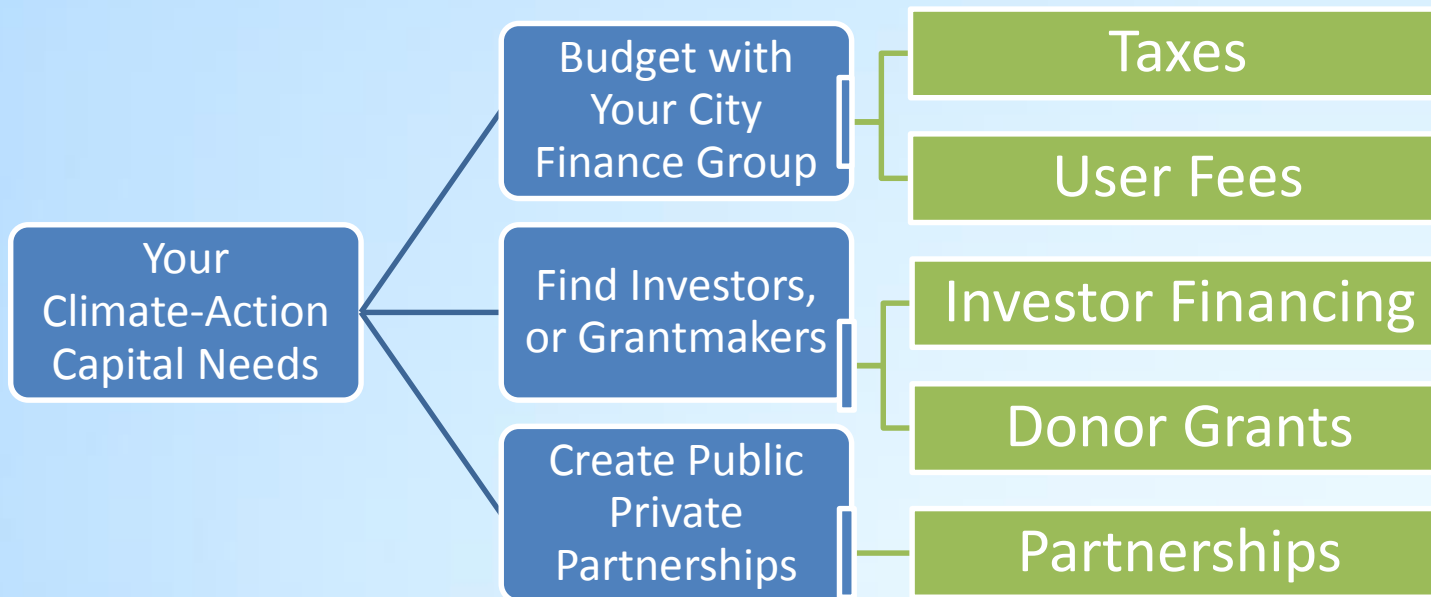
Consult With  
Capital  
Sources

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Financial  
Mechanism

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Financing

<u>COMMUNITY IMPACT:</u>	<u>BENEFICIARIES:</u>
<u>FINANCIAL CAPITAL REQUIRED (estimate)</u> Total capital required: Description:	<u>FINANCIAL RETURNS AND RATIOS</u> Return on Investment (ROI) = ____ % Net Present Value (NPV) (30 year term) Discount rate <u>x%</u> = 5 ____ *determined by the risk of the project Financial Pay Back period (months, years) _____
<input type="checkbox"/> Revenue <input type="checkbox"/> Grant <input type="checkbox"/> Debt <input type="checkbox"/> Equity	<u>Financial Analysis and Benefits over time:</u> <u>Revenue</u> <u>Cost reductions</u> <u>Changes in CapEx</u> <u>Expected Cash Flows</u>
<u>Comments</u>	

## Step 3: Consult with Capital Sources, Starting with your City and Exploring Investors, Donors and Partners



# Step 4: Determine the Best Financial Mechanism with Your Experts (1 of 2)

Answer The 7 Questions

Build The Factsheet

Consult With Capital Sources

Determine Financial Mechanism

Execute The Financing

Financing mechanisms are flexible, yet some may better match a particular need. This **sample template** highlights specific characteristics to help in deciding which financial mechanisms can fit your project – and a particular funder's focus.

Characteristics of Financing Tools	User Fees			
Scope of Investable project/financing	Property Owner	Neighborhood	City	Region
		✓	✓	
Sources of Capital	Public	Philanthropic	Private	User Fees
				✓
Number of Financing Partners	One or a few			Many – the public
				✓
Difficulty/complexity in financing	easy			Difficult
	✓			
Time to develop and implement	Weeks	Months	Years	Partnering
	✓			
Expected life term of financing/project	Short 1-5 yrs	5-10 years	10-20 years	Long 20-30+ years
			✓	Depends on project
Investors' risks	low			High
	✓		If fees are adequately set	
Issuer's Risks	low			High
		✓	If fees are adequately set	

# Step 4: Determine the Best Financial Mechanism with Your Experts (1 of 2)

Answer The 7 Questions

Build The Factsheet

Consult With Capital Sources

Determine Financial Mechanism

Execute The Financing

	✓		If fees are adequately set	
Tax implications of instrument	Taxable			Tax-exempt
	NA			
Tax characteristics of Investor	Taxable			Tax-exempt
	NA			
Impact on City's balance sheet	No impact: off balance sheet			Direct impact on balance sheet
	✓			
Source of payment/repayment	Stable			None
	✓			
Environmental metrics	Energy	Waste Reduction	Water	GHG
	NA			
Advantages	Easy to implement for payment of infrastructure projects or upgrades			
Disadvantages	Can raise equity issues for payment of service or access by all			

# Step 5: Engage Investors & Partners, and Execute Your Financing Deal



- Your climate-action projects require working internally with city staff, and possibly with outside funders or partners.
- Executing the financing is an interactive, dynamic process.
- The financing mechanisms and case studies in this Toolkit provide a catalog of possibilities for your climate-action projects to be funded – and to deliver potential GHG reductions.



# Read these Additional Educational Resources for “Financing Sustainable Cities”

- **The Smart Cities Council: Smart Cities Financing Guide**
  - <http://smartcitiescouncil.com/resources/smart-cities-financing-guide>
- **The ICLEI Resilient Cities guide** (<http://www.iclei.org/activities/projects-initiatives.html>) consisting of a range of tools, guidebooks, conferences, seminars and networks, as well as access to financing opportunities, offers tailor-made climate resilience strategies to local, regional and national governments. <http://resilient-cities.iclei.org>
- **The Sustainable Cities Collective:** <http://www.sustainablecitiescollective.com>
- **California Financial Opportunities Roundtable scan: Access to Capital** (sources available in CA) <http://www.rd.usda.gov/files/CA-CalFOR.pdf>
- **C40 Climate Action and Climate Finance Reports**
  - <http://www.c40.org/researches/unlocking-climate-action-in-megacities>
  - <http://www.siemens.com.sg/zdoc/corporatecommunications/new%20perspectives%20lr.pdf>

# Financing Sustainable Cities – You Have Completed The TOOLKIT

- I. Setting Your Climate Action Goals
- II. Financial Sources & Mechanisms for Capital
- III. Key Metrics & How to Calculate Them
- IV. Potential Funders for Municipal Climate Solutions
- V. Five Steps to Funding Your Sustainable City Projects

## About the Authors:

### Contact Us for Questions, or to Share New Examples

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