



WORLD
RESOURCES
INSTITUTE

ENERGY AND EMISSIONS: MAPPING THE IMPACTS

CARLEY CHAVARA, ALEX KOVAC

Agenda

1. Background
2. Policy and Action Standard
 1. Defining Policies and Projects
 2. Identifying the Effects and Mapping the Causal Chain
 3. Defining the Assessment Boundary
3. BEA City Example
4. Wrap-up and Q&A



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Purpose of this webinar

- Tools for Sustainability Webinar Series
- Objective: Learn process of conducting an impact analysis of BEA policies and projects
- Today's webinar, "Mapping the Impacts" is 2 of 4 in series
- Objective: Learn first steps of Policy and Action Standard

Building Efficiency Accelerator

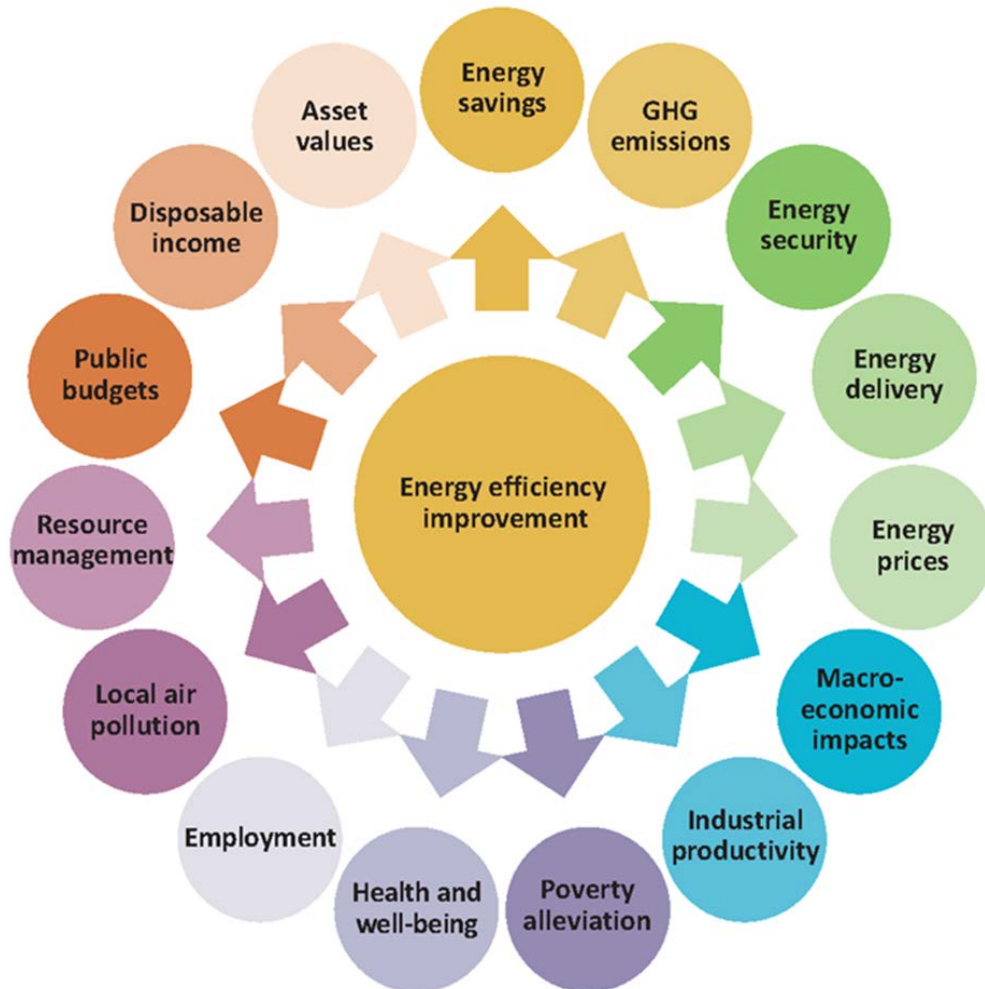
Types of Tracking Progress:

1. Selecting indicators & methods to track progress on BEA Actions
2. Methods for measuring impacts of city energy efficiency actions

Why tracking the GHG impacts of BEA actions?

- Understand effects of policies/projects
- Communicate progress towards goals
- Accountability and transparency
- Improving efforts and scaling up projects

The Multiple Benefits of Energy Efficiency (IEA)



*Energy
Efficient
Prosperity*

Energy efficiency as
a means to support
economic and social
development

Impact Estimation for BEA

- Impact estimation analyses for 7 cities
- Important to assess the potential effects of policies and projects in a relevant, consistent, and accurate way
- Process for cities:



- Potentially more guidance/resources for all cities with progress

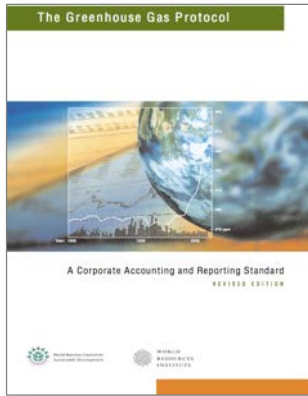
The Greenhouse Gas Protocol

- The GHG Protocol sets the global standard for how to measure, manage, and report greenhouse gas emissions
- Convened in 1998 by WRI and WBCSD
- Provides:
 - Greenhouse gas accounting and reporting standards
 - Sector guidance
 - Calculation tools
 - Trainings (webinar, e-learning and in-person training)
- Standards and tools available free of charge at www.ghgprotocol.org



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Greenhouse Gas Protocol standards



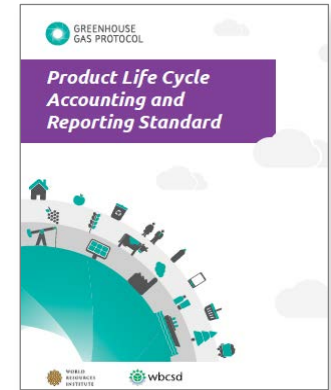
Corporate Standard



Project Protocol



Corporate Value Chain
(Scope 3) Standard



Product Standard



Policy and Action
Standard

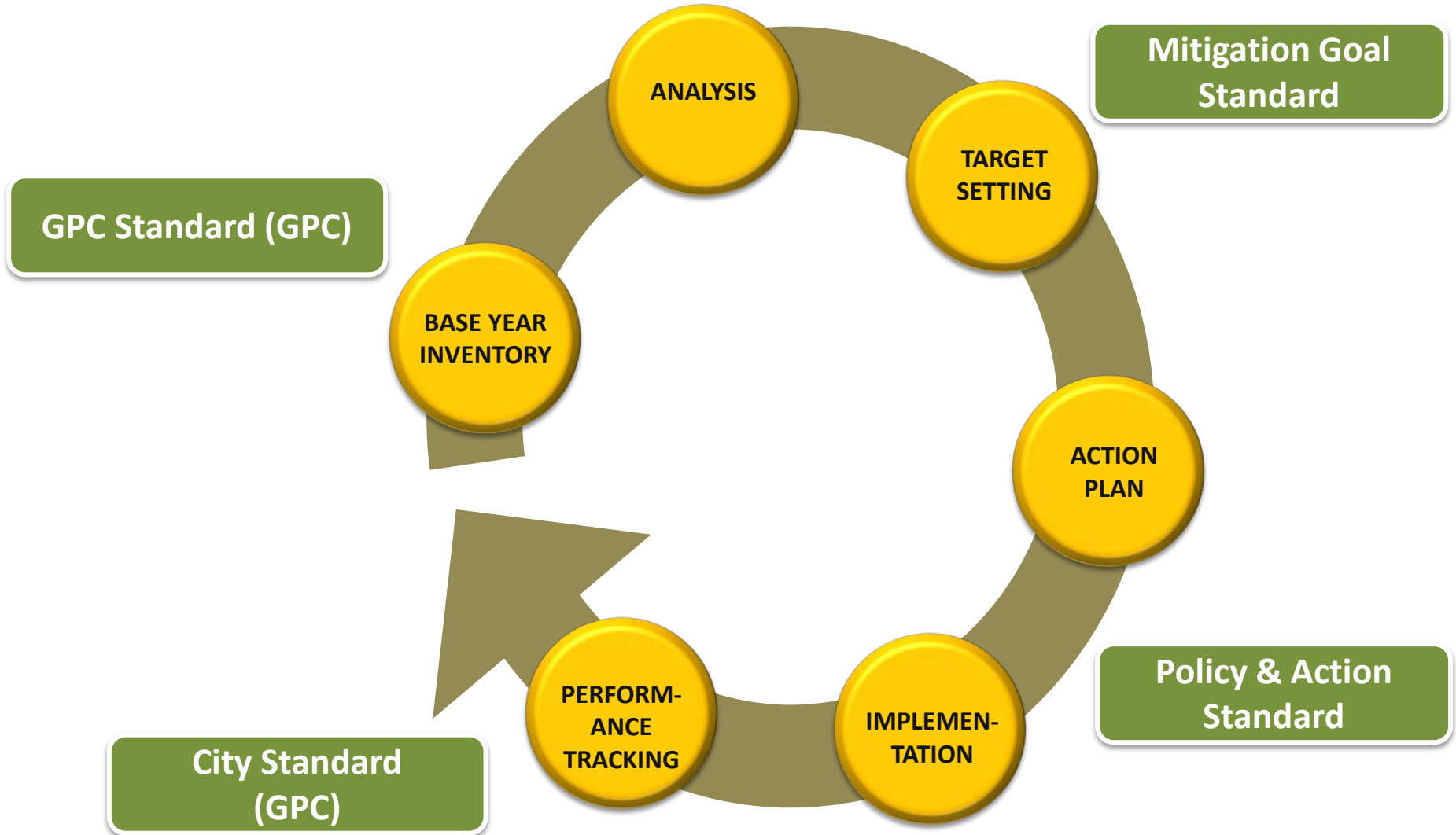


Mitigation Goal
Standard



Global Protocol for
Cities (GPC)

Application in low carbon cities planning and implementation



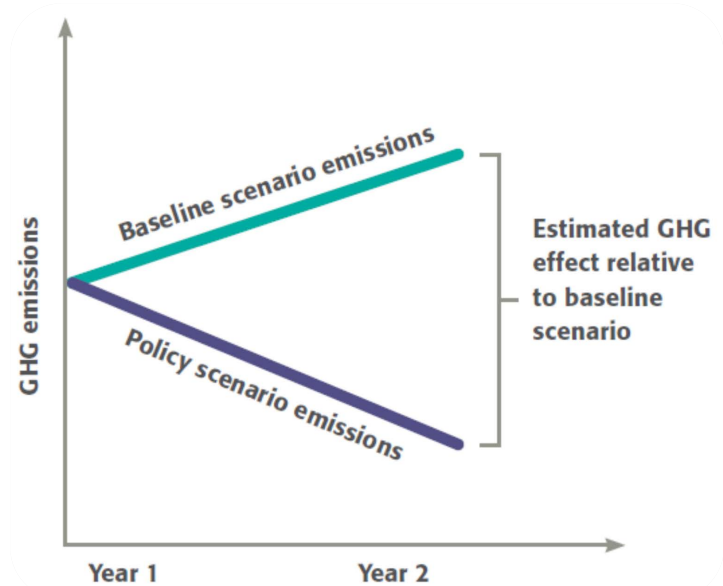
Policy and Action Standard

Policy and Action Standard

*An accounting and reporting standard
for estimating the greenhouse gas effects
of policies and actions*



A standard for estimating and reporting the change in GHG emissions and removals resulting from policies and actions



Policy and Action Standard

Policy and Action Standard

*An accounting and reporting standard
for estimating the greenhouse gas effects
of policies and actions*

The standard helps to answer the following questions:

- ❖ What effect is a given policy or action likely to have on GHG emissions in the future?
- ❖ Is a given policy or action on track and delivering expected results?
- ❖ What effect has a given policy or action had on GHG emissions?



Purpose of the standard

- To help users **assess the effects** of policies and actions in an accurate, consistent, transparent, complete, and relevant way
- To help policymakers **develop effective strategies** for managing and reducing GHG emissions
- To support consistent and transparent **reporting** of emissions impacts and policy effectiveness

Objectives of assessing policy/action impact

- **Inform policy selection and design** by comparing policy options based on their expected GHG effects
- **Evaluate policy effectiveness (and cost-effectiveness)** in delivering intended results
- **Report** on GHG effects of policies and actions
- **Attract and facilitate financial support** for mitigation actions by estimating GHG reductions

When to use the standard?

Before policy implementation

- To estimate expected future effects of a policy or action
- Ex-ante assessment

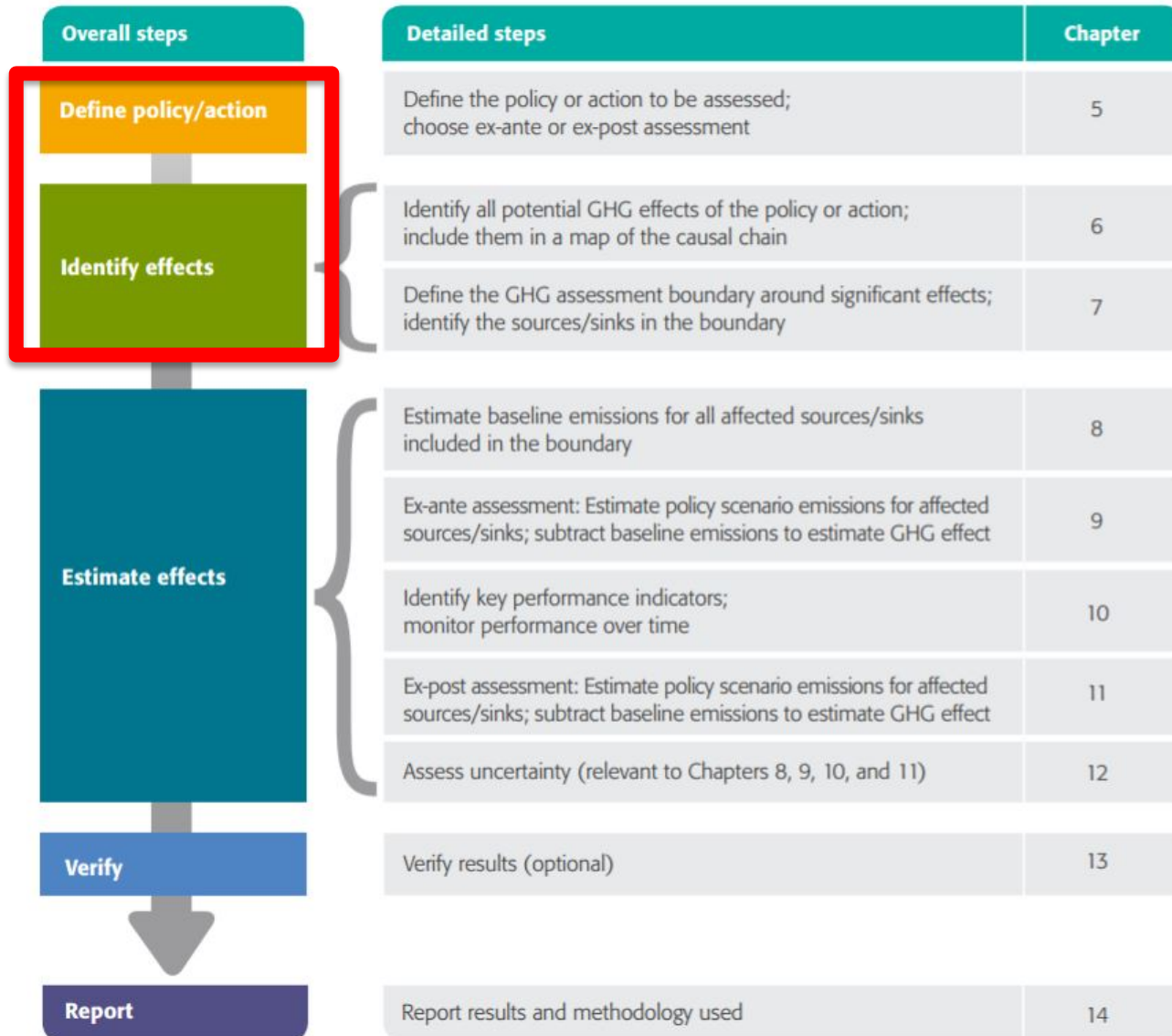
During policy implementation

- To estimate achieved effects to date, ongoing performance, and expected future effects of a policy or action

After policy implementation

- To estimate what effects have occurred as a result of a policy or action
- Ex-post assessment

Figure 3.1 Overview of steps



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Overview of steps



Types of policies and actions

Regulations and
standards

Taxes

Subsidies

Emissions trading
programs

Voluntary
agreements

Information
instruments

Infrastructure
programs

Implementation of
new technologies,
processes, or
practices

Financing and
investment

Clearly define the policy or action

- The title of the policy or action
- Type of policy or action
- Description of specific interventions
- The status of the policy or action
- Date of implementation
- Date of completion (if applicable)
- Implementing entity or entities
- Objective(s) of the policy or action
- Geographic coverage
- Primary sectors, subsectors, and emission source/sink categories targeted
- Greenhouse gases targeted (if applicable)
- Other related policies or actions



Overview



Timeline



Scope

Example Reporting Template

Information	Explanation	Example
Required information		
The title of the policy or action	Policy or action name	Federal subsidy for home insulation
Type of policy or action	The type of policy or action, such as those presented in Table 5.1, or other categories of policies or actions that may be more relevant	Subsidy
Description of specific interventions	The specific intervention(s) carried out as part of the policy or action	Subsidy of \$200 per household
The status of the policy or action	Whether the policy or action is planned, adopted, or implemented	Implemented
Date of implementation	The date the policy or action comes into effect (not the date that any supporting legislation is enacted)	2010
Date of completion (if applicable)	If applicable, the date the policy or action ceases, such as the date a tax is no longer levied or the end date of an incentive scheme with a limited duration (not the date that the policy/action no longer has an impact on GHG emissions)	2020
Implementing entity or entities	Which entity or entities implement(s) the policy or action, including the role of various local, subnational, national, international, or any other entities	Department of Energy of City X
Objective(s) of the policy or action	The intended effects(s) or benefit(s) the policy or action intends to achieve (for example, the purpose stated in the legislation or regulation)	Reduction in residential energy use
Geographic coverage	The jurisdiction or geographic area where the policy or action is implemented or enforced, which may be more limited than all the jurisdictions where the policy or action has an impact	City of X
Primary sectors, subsectors, and emission source/sink categories targeted	Which sectors, subsectors, and source/sink categories are targeted, using sectors and subsectors from the most recent IPCC <i>Guidelines for National Greenhouse Gas Inventories</i> or other sector classifications	Residential energy use (energy sector, IPCC category 1A4b, residential), grid-connected electricity generation (energy sector, IPCC category 1A1ai, electricity generation)
Greenhouse gases targeted (if applicable)	If applicable, which greenhouse gases the policy or action aims to control, which may be more limited than the set of greenhouse gases that the policy or action affects	CO ₂ , CH ₄ , N ₂ O

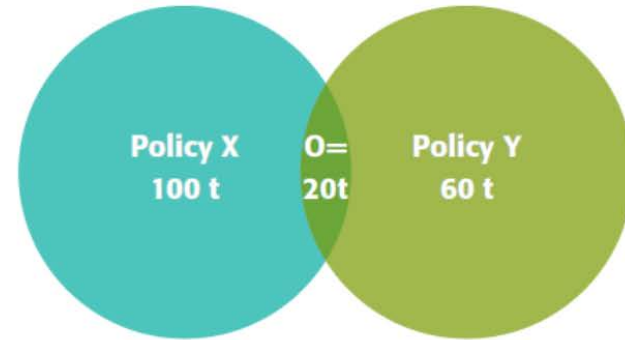
Decide to assess single policy or package of policies

Independent



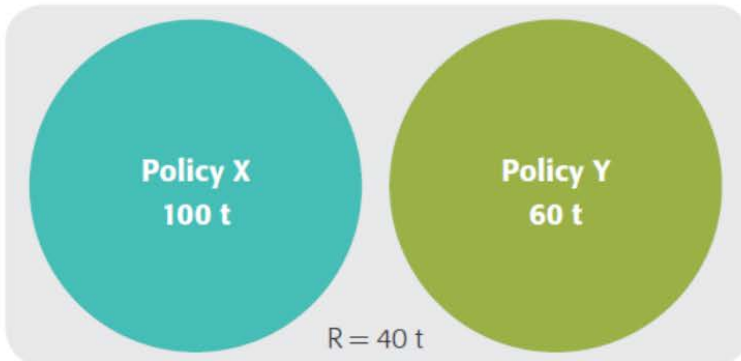
Combined effect = X + Y
 Combined effect = 100 + 60 = 160 t CO₂e

Overlapping



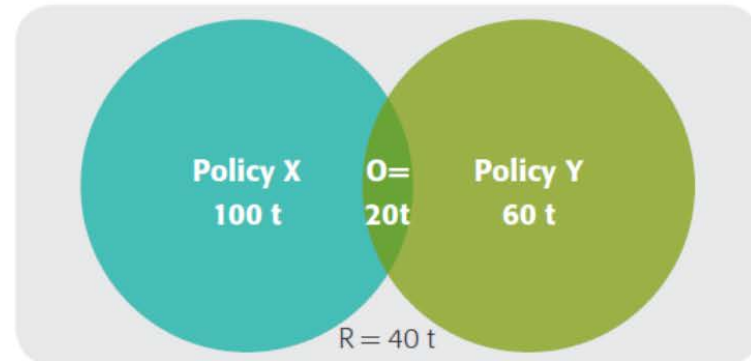
Combined effect < X + Y
 Combined effect = 100 + 60 - 20 = 140 t CO₂e

Reinforcing



Combined effect > X + Y
 Combined effect = 100 + 60 + 40 = 200 t CO₂e

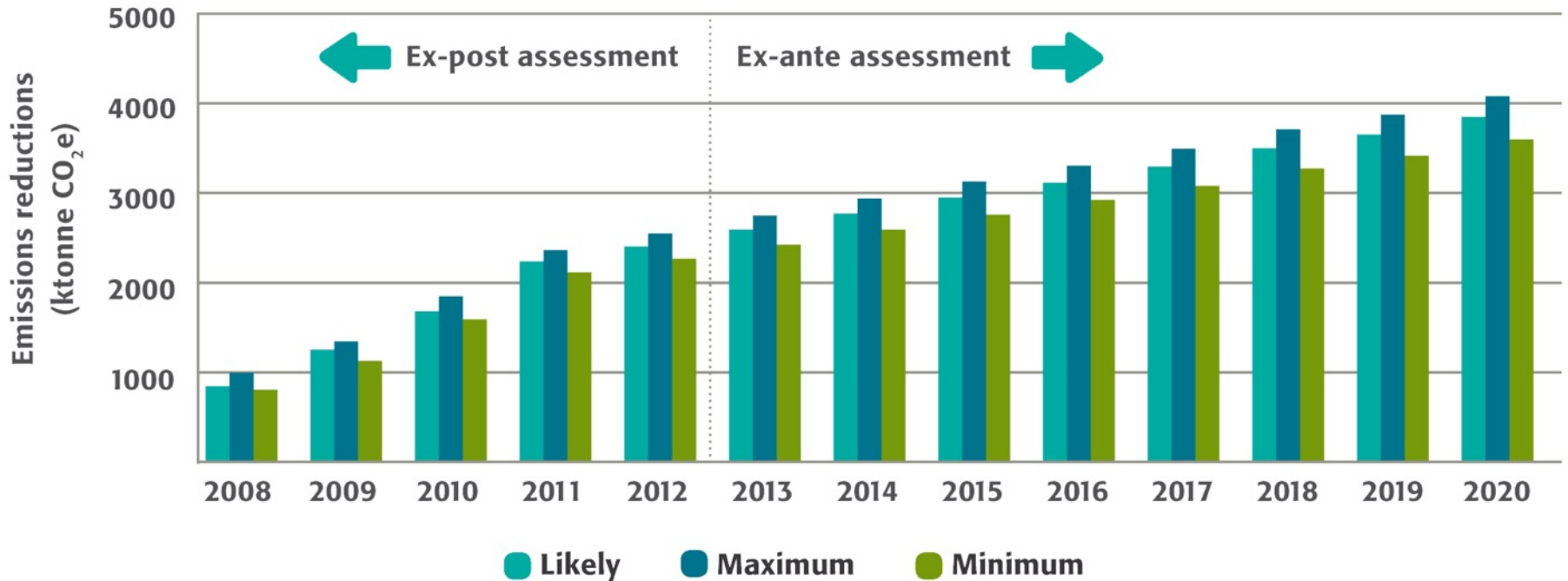
Overlapping and reinforcing



Combined effect may be > or < X + Y
 Combined effect = 100 + 60 - 20 + 40 = 180 t CO₂e

Choose ex-ante or ex-post assessment

Pilot example: Belgium's federal tax reduction for roof insulation



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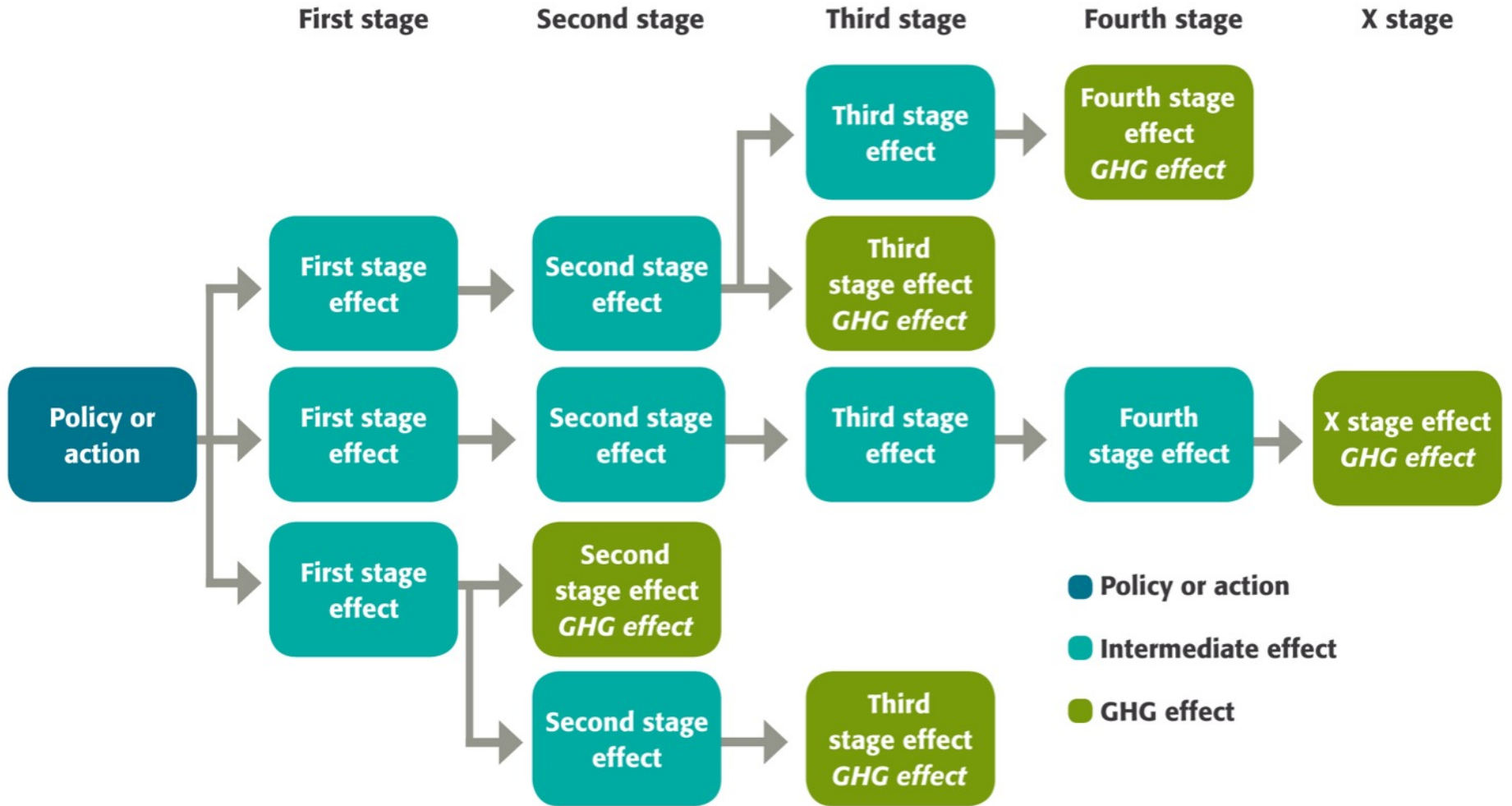


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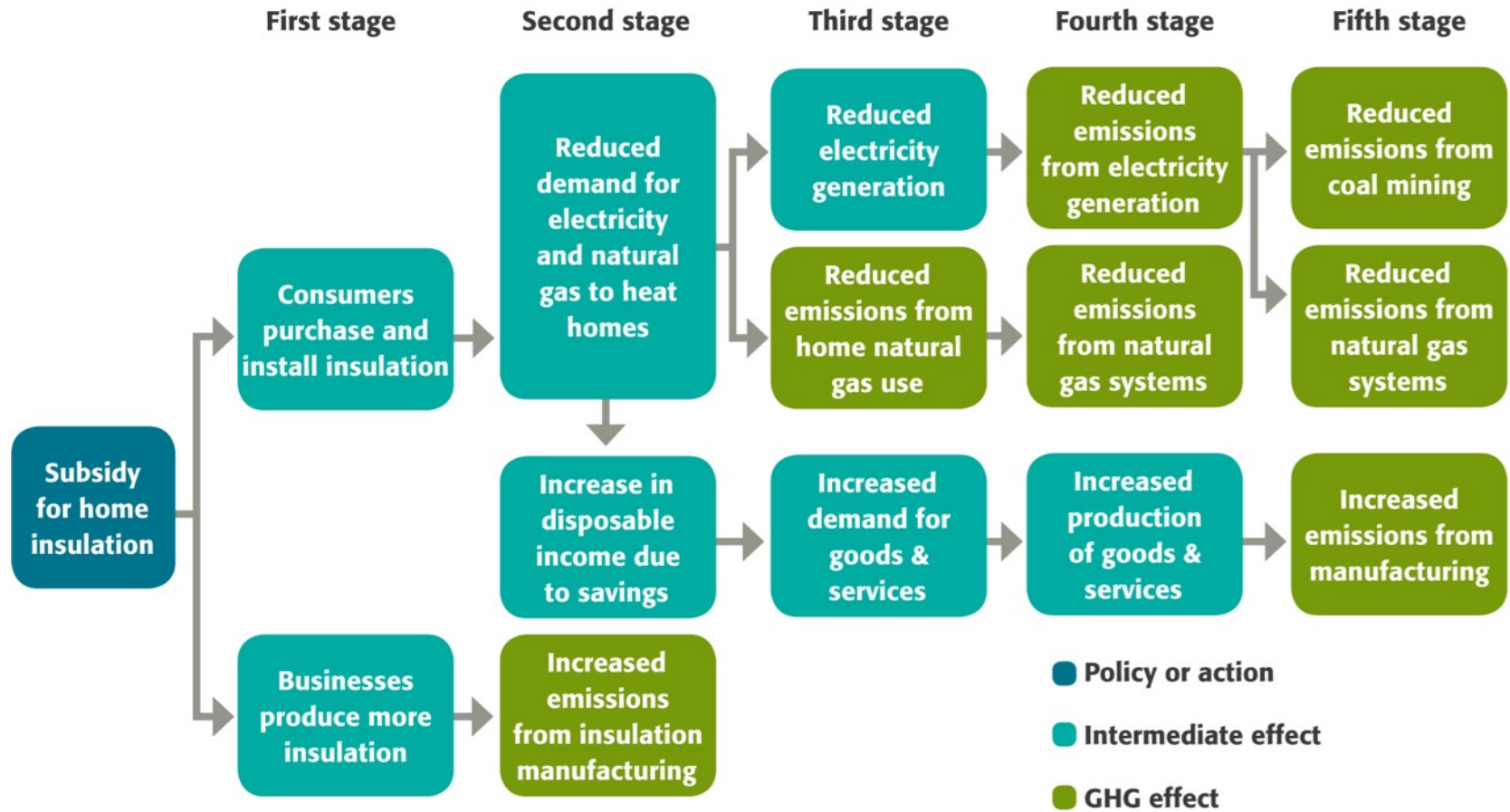
Types of effects

- Users should consider all possible types of effects:
 - Intended and unintended
 - Short- and long term
 - In-jurisdiction and out-of-jurisdiction
 - GHG increasing and GHG decreasing

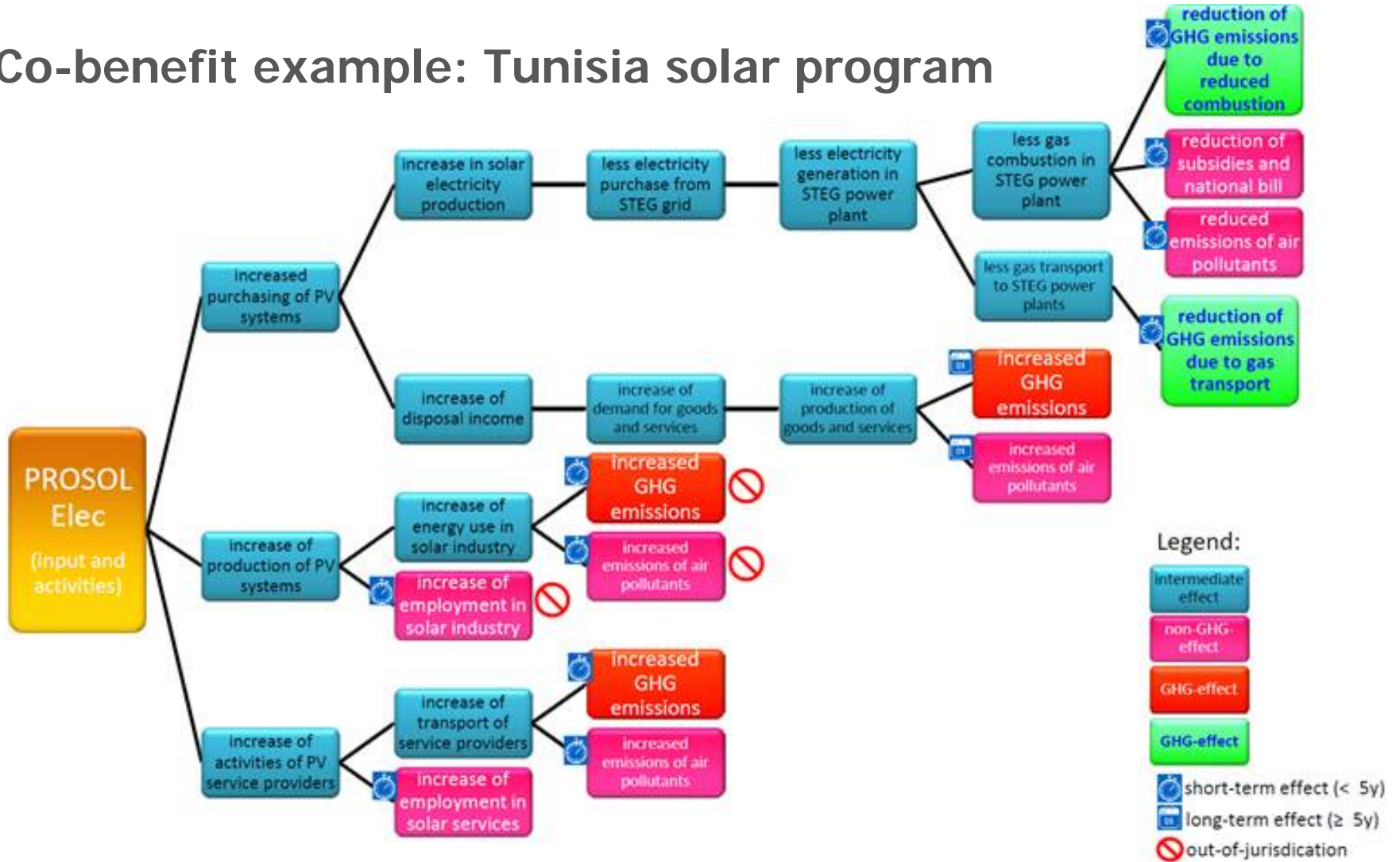
Mapping the causal chain



Example: Home insulation subsidy



Co-benefit example: Tunisia solar program



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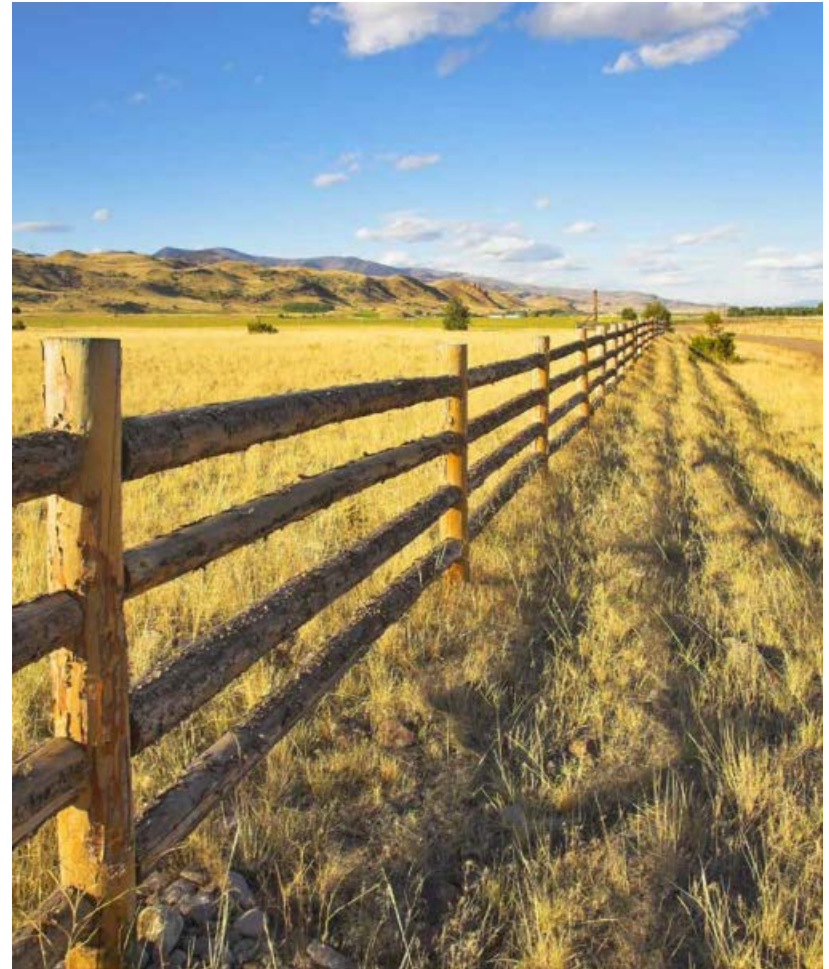
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Assessing significance

- In order to identify significant effects, users should assess each potential GHG effect in terms of both:
 - The **likelihood** of each GHG effect occurring
 - The **relative magnitude** of each GHG effect

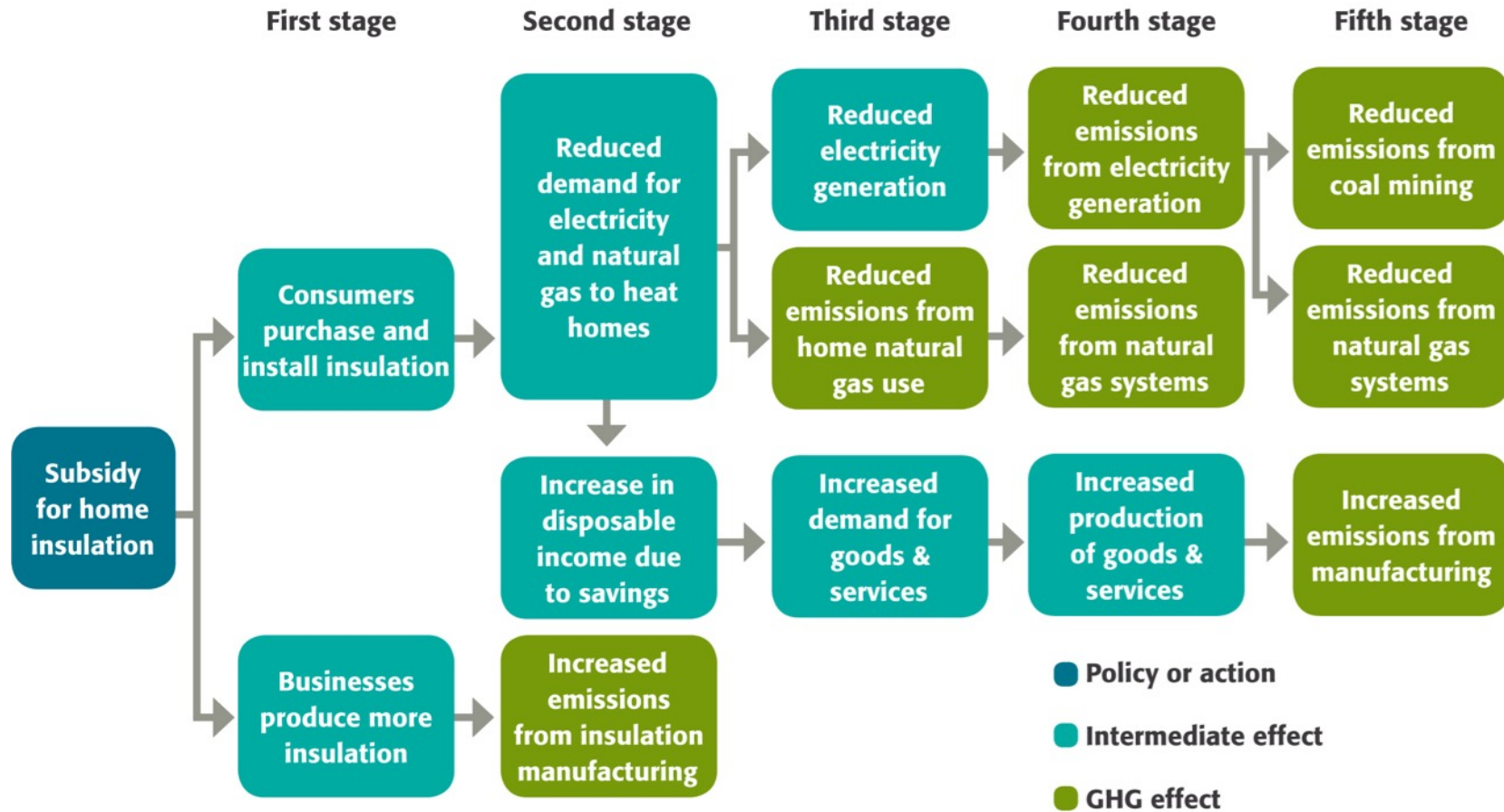


Determine significance of effects

Likelihood	Magnitude		
	Minor	Moderate	Major
Very likely	May exclude	Should include	
Likely			
Possible			
Unlikely	May exclude		
Very unlikely	May exclude		

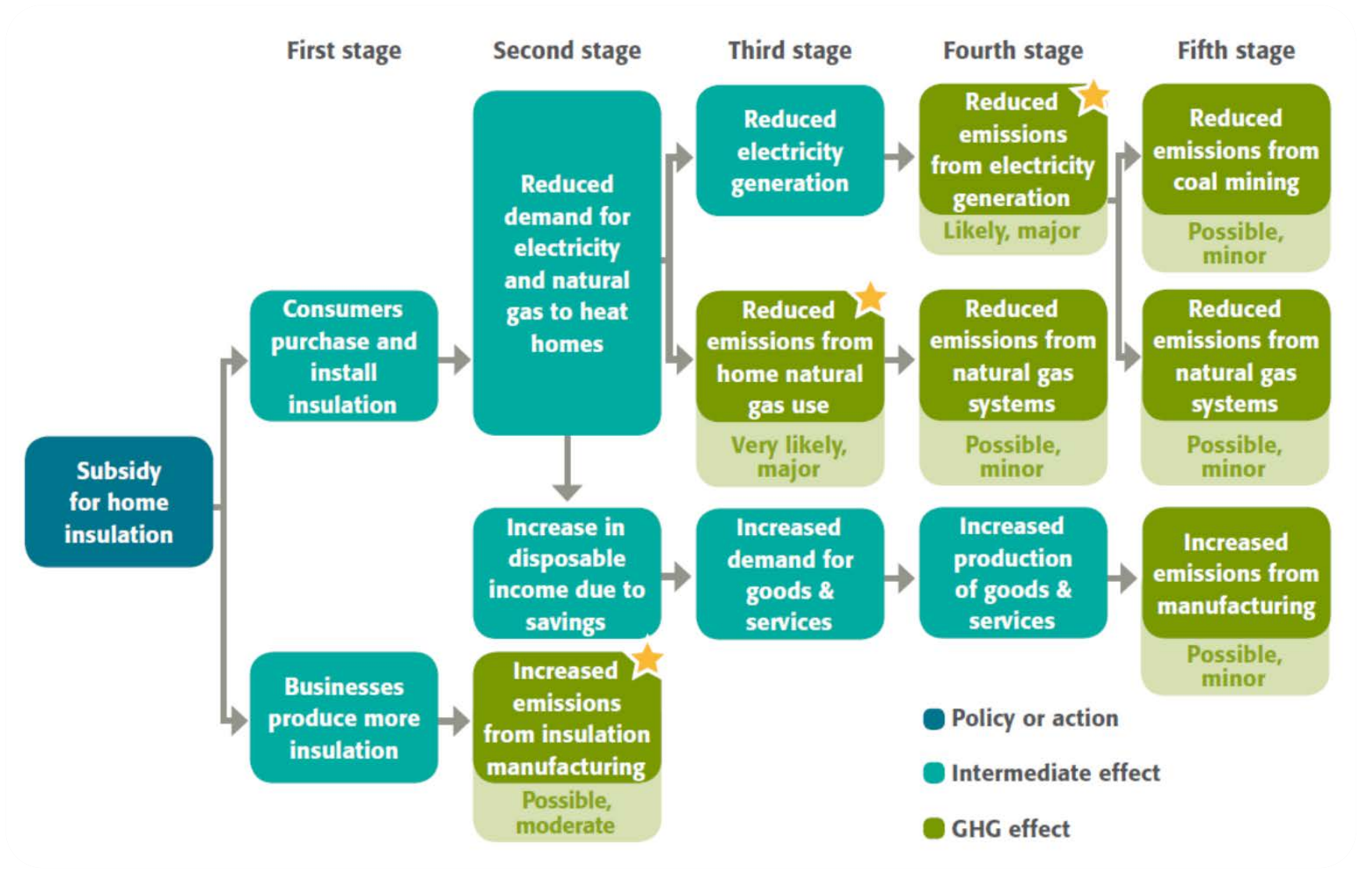
Note: The area shaded green corresponds to significant GHG effects.

Example: Home insulation subsidy



GHG effect	Likelihood	Relative magnitude	Included?
Reduced emissions from electricity generation			
CO ₂	Likely	Major	
CH ₄	Likely	Minor	
N ₂ O	Likely	Minor	
Reduced emissions from home natural gas use			
CO ₂	Very likely	Major	
CH ₄	Very likely	Minor	
N ₂ O	Very likely	Minor	
Increased emissions from manufacturing of goods and services			
CO ₂	Possible	Minor	
CH ₄	Possible	Minor	
N ₂ O	Possible	Minor	
Increased emissions from insulation manufacturing			
CO ₂	Possible	Moderate	
CH ₄	Possible	Minor	
N ₂ O	Possible	Minor	
HFCs	Possible	Moderate	

Example: Home insulation subsidy



Summary of effects, sources/sinks and gases included

GHG effect included	Sources	Sinks	Greenhouse gases
Reduced emissions from electricity generation	Fossil fuel combustion in grid-connected power plants	N/A	CO ₂
Reduced emissions from home natural gas use (space heating)	Residential natural gas combustion (space heating)	N/A	CO ₂
Increased emissions from insulation manufacturing	Insulation manufacturing processes	N/A	CO ₂ , HFCs

Broader sustainable development impacts can be assessed

Category	Examples of non-GHG effects	
Environmental effects	<ul style="list-style-type: none"> • Air quality and air pollution (such as particular matter, ozone, carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen oxides (NO_x), lead, and mercury) • Water quality, water pollution, and water scarcity • Ozone depletion • Waste 	<ul style="list-style-type: none"> • Toxic chemical/pollutants • Biodiversity/wildlife loss • Loss or degradation of ecosystem services • Deforestation and forest degradation • Loss of top soil • Loss or degradation of natural resources • Energy use
Social effects	<ul style="list-style-type: none"> • Public health • Quality of life • Gender equality • Traffic congestion 	<ul style="list-style-type: none"> • Road safety • Walkability • Access to energy, thermal comfort, fuel poverty • Stakeholder participation in policy-making processes
Economic effects	<ul style="list-style-type: none"> • Employment and job creation • Productivity (such as agricultural yield) • Prices of goods and services (such as decreased energy prices) • Cost savings (such as decreased fuel costs) • Overall economic activity (such as GDP) 	<ul style="list-style-type: none"> • Household income • Poverty reduction • New business/investment opportunities • Energy security/independence • Imports and exports • Inflation • Budget surplus/deficit

Additional resources

- Sample reporting template
 - <http://www.ghgprotocol.org/policy-and-action-standard>
- E-learning course
 - <http://www.ghgprotocol.org/compact-mayors-online-training-course>
- Excel calculation tool
 - <http://www.ghgprotocol.org/policy-and-action-standard>
- Sector guidance document on Residential and commercial building
 - <http://www.ghgprotocol.org/policy-and-action-standard>

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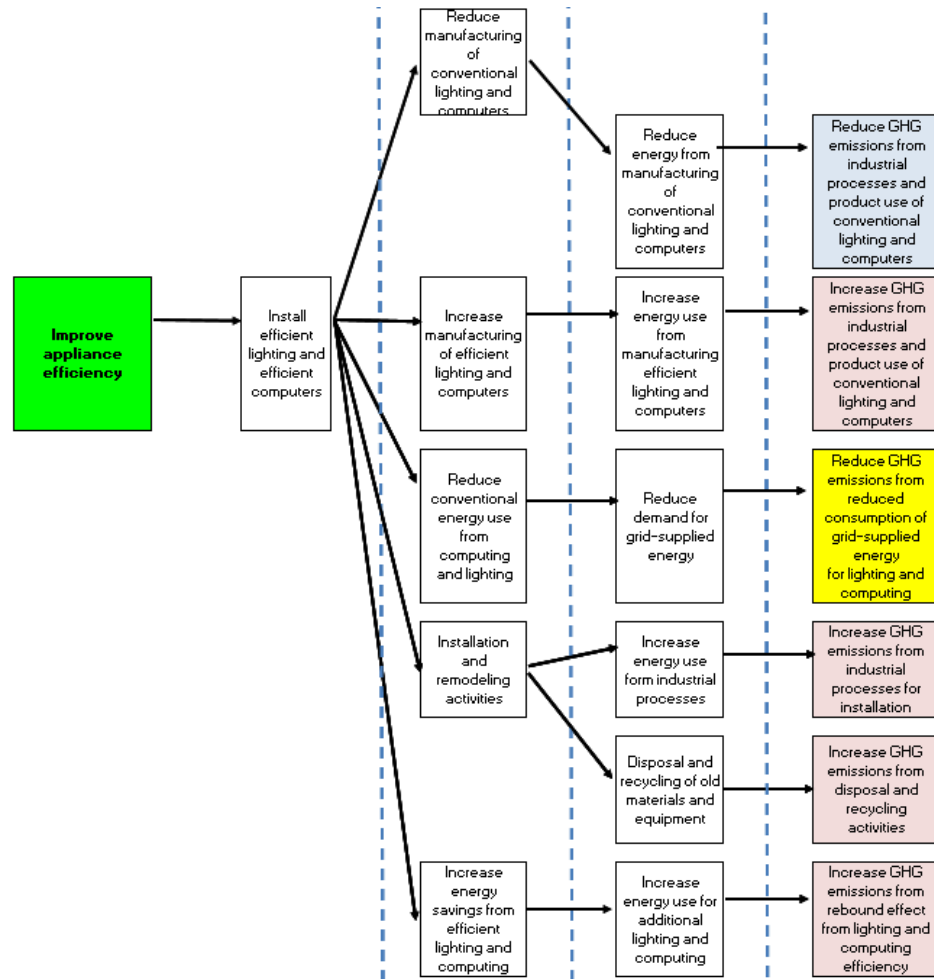
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Defining the Project

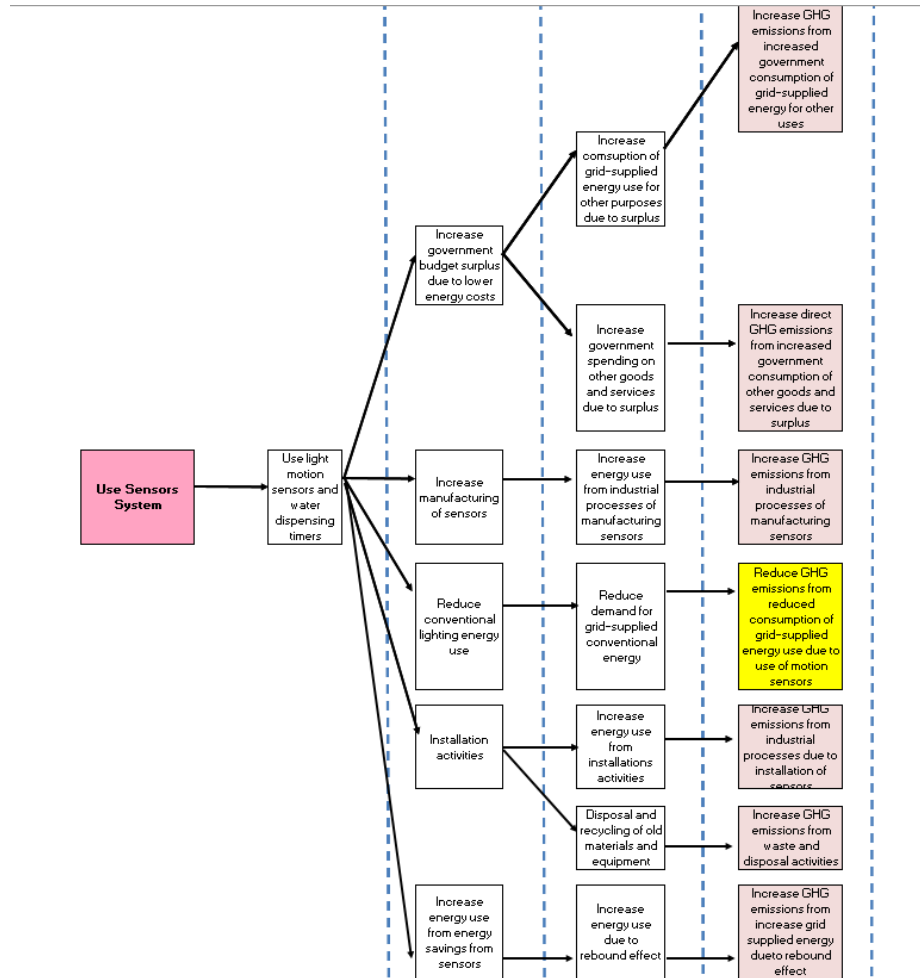
Action Description

City	Mexico City / Ciudad de Mexico		
Title of action	Mexico City Building Retrofits		
Action category	Sector	Buildings	
	Activity	Energy Efficiency	
	Action	Retrofits	
Type of action	Retrofitting 4 public buildings		
Geographic coverage	4 buildings in Mexico City		
Status of action	Planned		
Implementing organization(s)	SEDEMA		
Implementation period	2017		
Assessment Period	2018 to	2030	
Type of assessment	ex-ante		
Year of assessment	2017		
Action Description	Using energy efficiency as a strategy to solve several of the problems of energy consumption in public sector buildings		
Action Objectives	Create a more competitive, affordable and liveable Mexico City through implementing improvements in building efficiency which reduce costs and pollution		

Mapping the Causal Chain



Mapping the Causal Chain



Defining the Assessment Boundary

1) Use sensors system

GHG effect	Likelihood	Relative magnitude	Jurisdiction	Included?
Increase GHG emissions from increased government consumption of grid-supplied energy for other uses	Unlikely	Minor	In Jurisdiction	N
Increase direct GHG emissions from increased government consumption of other goods and services due to surplus	Unlikely	Minor	In Jurisdiction	N
Reduce GHG emissions from industrial processes and product use of conventional lighting and computers	Possible	Moderate	Out of Jurisdiction	N
Reduce GHG emissions from reduced consumption of grid-supplied energy for lighting and computing	Likely	Major	In Jurisdiction	Y
Increase GHG emissions from industrial processes and product use of conventional lighting and computers	Possible	Minor	Out of Jurisdiction	N
Increase GHG emissions from industrial processes for installation	Possible	Minor	In Jurisdiction	N
Increase GHG emissions from rebound effect from lighting and computing efficiency	Unlikely	Minor	In Jurisdiction	N
Increase GHG emissions from disposal and recycling activities	Very Likely	Minor	Out of Jurisdiction	N

3) Improve appliance efficiency

GHG effect	Likelihood	Relative magnitude	Jurisdiction	Included?
Increase GHG emissions from increased government consumption of grid-supplied energy for other uses	Unlikely	Minor	In Jurisdiction	N
Increase direct GHG emissions from increased government consumption of other goods and services due to surplus	Unlikely	Minor	In Jurisdiction	N
Increase GHG emissions from industrial processes of manufacturing sensors	Possible	Minor	Out of Jurisdiction	N
Increase GHG emissions from industrial processes due to installation of sensors	Possible	Minor	Out of Jurisdiction	N
Reduce GHG emissions from reduced consumption of grid-supplied energy use due to use of motion sensors	Likely	Major	In Jurisdiction	Y
Increase GHG emissions from disposal and recycling activities	Very Likely	Minor	Out of Jurisdiction	N
Increase GHG emissions from increase grid supplied energy due to rebound effect	Unlikely	Minor	In Jurisdiction	N

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BEA Webinar Series for Cities: Tools for Sustainability

- Webinar #1: Standards to Achieve City Sustainability (April 26/27)
- **Webinar #2: Energy and Emissions: Mapping the Impacts (May 23)**
- Webinar #3: Using Data to Measure Policy Impacts (June 27/28)
- Webinar #4: Reporting Results for Success (July 18)



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Thank You

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Now: Q&A session