

## Appendix 3.3 Preliminary narrative review for case study cities

### New York City (NYC)

New York is on the east coast of the USA in New York State, with an estimated population of 8.55million, it is the most densely populated city in the USA. NYC is a member of both the C40 and 100 Resilient cities campaign with a C40 city advisor and a chief resilience officer to contact. Historically speaking, the C40 cities was established in NYC during Mayor Bloomberg's office and in 2011 received a grant from Bloomberg Philanthropies to continue its work. Further to C40, the 100 Resilient Cities was established in 2013 and funded by the Rockefeller Foundation, a financial organization based in NYC. In December 2016, the C40 city mayors have pledged to continue their work beyond the current political shift with President Trump in office. [http://www.c40.org/blog\\_posts/american-mayors-pledge-climate-leadership-in-response-to-united-states-presidential-election- Sept 2017](http://www.c40.org/blog_posts/american-mayors-pledge-climate-leadership-in-response-to-united-states-presidential-election- Sept 2017) and the NYC mayor has a strong jurisdiction with the built environment. With both organisations headquarters based in NYC, there is significant 'activity' demonstrated by the documentation produced and stakeholders to contact. The city is also a key office location for international design consultancies, institutions and other authorities (the UN). NYC is 5 hours behind GMT, so it is possible to hold telephone interviews and follow up with questionnaires or further interviews.

Both 100RC and C40 report that NYC has assessed its climate risks, shocks and stresses where flooding, storms and extreme (hot and cold) temperatures are classified as "severe" and has put into effect actions around extreme hot temperatures. New York is participating in all the C40 Initiatives, it has numerous documents for review and the recent **One NYC City Resilience Strategy report**. Beyond C40 and 100RC, **PlaNYC**: NYC's long term sustainability plan exists which comprises of 127 initiative in six key areas: Land, Water, Transportation, Energy, Air and Climate Change (website, 2010). There is also an initiative of 'greening the city's codes and regulations' supported by the Mayor's Office of Sustainability (Sustainability, 2017) with local laws LL84: Benchmarking and LI87: Audits and Retro-commissioning. See table 10 below for New York City's 100 RC and C40 profile.

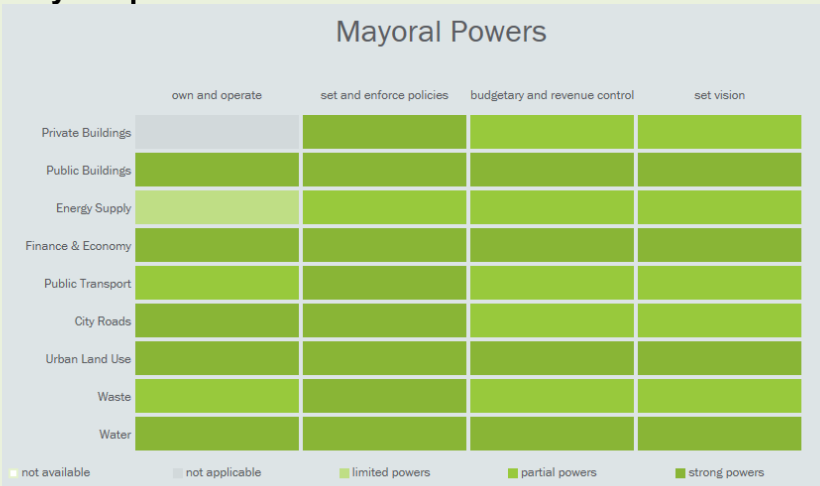
Table A: New York City

100 Resilient city profile			
Contact	Documentation	Shocks and Stresses Identified	
Chief Resilience Officer: Daniel Zarrilli	<b>One NYC- City’s Resilience Strategy</b> New York City: A living laboratory for Urban Resilience The Urban Resilience summit 2017	Aging infrastructure Climate Change Coastal/ tidal flooding Economic inequality Extreme heat Homelessness Hurricane/typhoon/cyclone Inadequate educational systems Inadequate health systems	Inadequate infrastructure Lack of affordable housing Population growth/overpopulation Poverty Power outage Rainfall flooding Sea level rise/ coastal erosion Severe storms Shifting macroeconomic trends

C40 City Profile<http://www.c40.org/cities/new-york#city-header>

- The existing mayor: Mayor Bill De Blasio(elected 2014)
- C40 city advisor

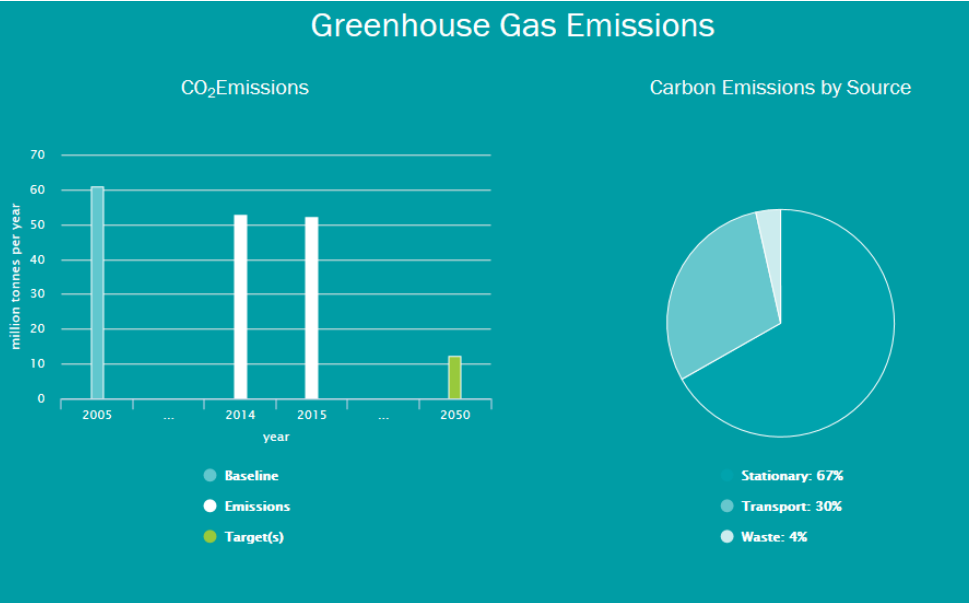
Mayoral powers



Climate Risks

Climate Risks			
Type	Hazard	Severity	Action Taken
Flood	Permanent inundation	Serious	■ ■
Storm	Rain Storm	Serious	■ ■ ■
Extreme Temperature - Cold	Extreme Winter Conditions	Serious	■ ■
Flood	Coastal Flood	Serious	■ ■
Extreme Temperature - Hot	Heat Wave	Serious	■ ■ ■ ■
Storm	Severe Wind	Not Specified	—
— Not specified or under consideration ■ Recognized, but not currently being considered ■ ■ Currently in effect and being piloted ■ ■ ■ Currently in effect at a significant scale across most of the city ■ ■ ■ ■ Currently in effect (city-wide)			

Green house gas emissions



Case study Literature

City Adviser Case Study Series: NYC- Buildings Technical Working Groups

Cities 100: NYC- Sustainability Agenda Protects Public housing

Cities 100: NYC- Innovation Data Analysis leads to coastline protection

Cities100: NYC- Data-Driven Outreach leads to buildings retrofits

Cities 100: NYC- Legal Ordinance for Solar powered buildings

C40 Good Practice guides: NYC- Mitigation banking program

C40 Good Practice Guide: NYC- Zero Waste NYC

C40 Good Practice Guide: NYC- Broadway Boulevard Project

C40 Good Practice guide: Data-driven approach to municipal building efficiency

C40 Good Practice Guides: NYC CoolRoofs Programme

New York City local law 84 saves energy and sets the foundations for one of the worlds largest building energy performance datasets

Cities 100: NYC-Green Campaigns change consumer behaviour

Cities 100: NYC - Energy efficiency, built to last

Cities 100: NYC- Planning for an equitable and sustainable city

Cities 100: NYC- Engaging communities in climate change adaptation

Cities 100: NYC- Zero Waste Plan to eliminate waste to landfill

NYC CoolRoofs

**In Focus City Reports: New York**

The Greener, Greater Buildings Plan

Green Codes Task Force

NYC Government- leading by example

NYC water supply watershed protection program

The NYC Green Infrastructure Plan

Summer Streets

Select Bus Service

NYC decision making is complex, there are three key stakeholders- the mayors office, NYC Planning and Department of Buildings. This appendix is a simple chronological list that compiles the programs and initiatives outlined by the NYC Mayors policies alongside codes of practice for design and planning. NYC Policy documents for the concepts of resilience and sustainability are most critical during Mayor Bloomberg's office (2001-2014) and Mayor Blasio Office (2014- onwards) and therefore previous policies are not historically tracked. However the codes of practice are of interest and these are listed. To facilitate reading, policy is shown with background shading with Mayor Bloomberg (black background and white text) and Mayor Blasio policies (grey background and white text).

Finally, the DOB operates a building bulletin system (BB) and local laws (LL), any that concern sustainability and resilience have been included because it demonstrates the rate of change of decision making in this city. The introduction of BBs is listed here because it marks the management of the transition between the 1968 code to 2008 code. BBs since their induction have been recorded annually by the DOB but are managing technicalities rather than policy.

These relative documents have been placed the table with their date of issue and revision, then classified as design practice, planning or policy document and who owns (issued it). Circumstantial events are not included (9/11, Hurricane Sandy, joining C40 and 100Resilient Cities). Also, practice led documentation is not tracked.

TABLE B: NYC pathway documents

Document Name	Contents (documents)	Practice (design)	Planning	Policy	Date of issue	source
1916 Building Zone plan			x		1916	(The city of New York 1916)
NYC Zoning Code- City Charter			x		1936	(Board of Estimate and Apportionment 1916)
1938 building Code		x			1938	
1961 Zoning Resolution			x			
1968 Building Code		x			1968	
LEED	Launched	x			1993	
LEED NC	V1.0	x			1995	
LEED NC	v.2.0	x			1998	
LEED NC	v 2.2	x			2005	
LL 86 of 2005				x	2005	
International Building Code		x			2006	
International Building Code		x			2007	
PlaNYC (2030- a greener greater nyc)	OpeNYC MaintaiNYC GreeNYC GreenCodes Task Force			x	2007	

LL 55 of 2007- Climate Protection Act						
		x			2007	
LL 17 of 2008 (Established OLTPS and a requirement for a sustainability plan)						
		X			2008	
LL 22 of 2008						
		x			2008	
Introduction of DOB Building Bulletins						
2008 NYC Building Code (Construction Code)		x			2008	
BB Aug 21, 2008	(Flood zone-1968 code is revised!)				2008	
LL 86 Rules (amendments)						
				x	2009	
LEED NC	V3- 2009	x			2009	
International Building Code		x			2009	
NYC Green infrastructure plan				x	2010	
International Building Code		x			2011	
Zoning the City 2011			x		2011	
LL84 LL85: NYC Energy Conservation Code (LL85 of 2009, LI48 of 2010 and LL01 of 2011) LL87 LL88 LL5 Executive Order 149						
	LL20				2011	
International Building Code		x			2012	
LEED NC	V4.0	x			2013	
2014 Construction Codes	General Administration Building Code Energy Code Fuel Gas Code Mechanical Code Plumbing Code					
	2014 Construction Codes Updates				2014	

LL 66 of 2014 (80 x50 law)				x		
International Building Code		x			2015	
NYC Cool Roofs		x		x	2015	
NYC Zero WastePlan		x		x		
NYC Engaging communities in climate change adaptation		x		x		
One NYC: The plan for a strong and just city	One City: Built to last 80 x50 Building by Building Executive Order 26 1.5 deg aligning NYC with the paris climate agreement One indicators			x	2015	
LL84				x	2015	
LL6 of 2016				x	2016	
LL133					2016	
One NYC2016 Progress Report				x	2016	
2016 NYC Energy Conservation Code		x		x	2016	
Cities 100:		x	x	x	2017	
LL233 of 2017						
LEED NC	v 4.1	x			2018	
International Building Code		x			2018	
Zoning Handbook 2018 Edition			x		2018	
LL32 of 2018					2018	
One NYC 2018 Progress Report					2018	
International Building Code		x			2021	

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## Boston

Boston, is on the East coast of the USA, north east of NYC in the bordering state of Massachusetts with similar geographical issues and time zones as NYC but it will have a different interpretation of federal policy to NYC. It has a population of 660,000 thousand (22<sup>nd</sup> populous city in the US, as a case study city it will be representative of a typical city scale as it is not classified as a mega city. Boston is a member of C40 and 100RC, which report that the mayor has strong powers with the built environment. Boston's C40 initiatives are: energy, finance and economic development, measurement and planning, transportation and urban planning and development'. Boston is a city of historical significance with the Mayflower landings with its first immigrants settling from the UK in the 1600's. The city has a high concentration of higher education with the internationally recognized Harvard University close by, as well as a strong economic base. It has similar reclamation of land issues to New York city. The city is 4- 5hours behind GMT, so it is possible to hold telephone interviews and follow up with questionnaires or further interviews.

Both 100RC and C40 report that Boston has assessed its climate risks, shocks and stresses where storms (rain and snow), extreme cold are seen as serious but associated hazards with sea-level rise, storm surges and river and coastal flooding are classified as "extremely serious". Boston is less prevalent in its C40 and 100RC profile but there is documentation to review as well as the **Bristol Resilience Strategy** report (Cities, 2016). Boston has a Climate Action Plan launched in 2010- Greenovate Boston (Boston, 2014) which is supported by Mayor Walsh. The Boston Planning and Development Agency has created the Mayor's E+ Green Building Program (BPDA, 2017). See table C for Boston City's 100 RC and C40 profile and table D for the pathway documentation.

Table C: Boston's Profile

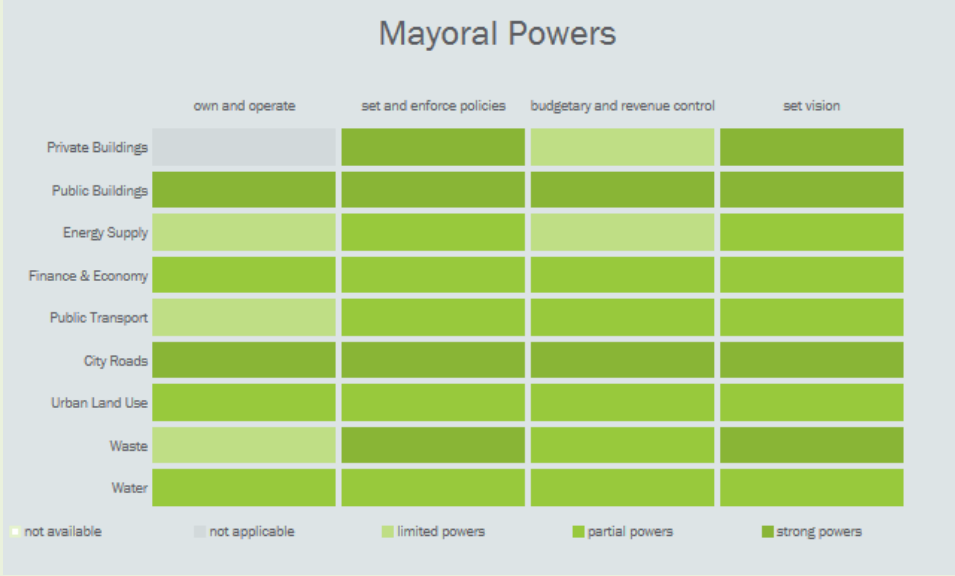
100 Resilient City Profile- <http://www.100resilientcities.org/cities/boston/>

Contact	Documentation	Shocks and Stresses Identified	
Chief Resilience Officer: Atyia Martin	The urban resilience summit 2017 Boston Globe: Walsh unveils 'resilient boston' report on systematic racism Mayor Martin Walsh and 100RD unveil citywide resilience strategy focused on addressing racial equity	Aging infrastructure Blizzard Climate change Coastal/Tidal flooding Cyber attack Economic inequality Ethnic inequality Extreme heat Inadequate educational systems Inadequate public transportation systems	Infrastructure failure Lack of social cohesion Population Growth/Overpopulation Poverty Rainfall Flooding Sea Level Rise/ Coastal Erosion Severe storms Storm Surge Structural Racism Terrorist Attack

C40 City Profile - <http://www.c40.org/cities/boston#city-header>

- Existing Mayor: Martin J.Walsh Elected 2013

Mayoral powers

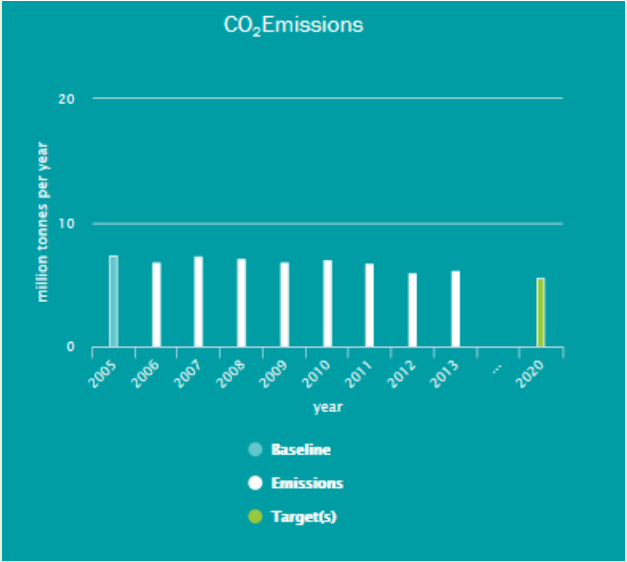


Climate Risks

Climate Risks			
Type	Hazard	Severity	Action Taken
Storm	Rain Storm	Serious	—
Storm	Heavy Snow	Serious	■ ■ ■
Extreme Temperature - Cold	Extreme Winter Conditions	Serious	■ ■ ■
Extreme Temperature - Hot	Heat Wave	Extremely Serious	—
Flood	River Flood	Serious	—
Sea Level Rise	Sea Level Rise	Extremely Serious	■ ■
Wave Action	Storm Surge	Extremely Serious	■ ■
Flood	Coastal Flood	Extremely Serious	—

Legend: — Not specified or under consideration  
■ Recognized, but not currently being considered  
■ ■ Currently in effect and being piloted  
■ ■ ■ Currently in effect at a significant scale across most of the city  
■ ■ ■ ■ Currently in effect (city-wide)

Green House Gas Emissions



Case Study Literature (8)

Urban Efficiency II: Boston- Renew Boston Trust Commercial Cities 100: Boston- Data and Stakeholders build adaptation roadmap  
Cities 100: Boston- energy performance contracting finances resilient infrastructure  
Cities 100: Boston- New media engages residents in climate action  
Cities 100: Boston- Filling the Finance Gap for Buildings upgrades  
Renew Boston  
Boston Bikes



This appendix is a simple list that compiles the programs and initiatives outlined by the City of Boston's Environment Department (City of Boston, 2019). These initiatives have been placed in a table name, date of issue and revision, classifies it as design practice, planning or policy document and who owns (issued it). Added to the table is BPDA article 80 and 37, and information on Massachusetts Building 780 CMR Code and LEED. Circumstantial events are not included. To facilitate reading, policy is shown with background shading.

Table D: Boston pathway documents

Document Name	Secondary Initiatives/ Stakeholders	Practice	Planning	Policy	Date of issue
Massachusetts 780CMR Code	1st Edition				1975
Massachusetts 780CMR Code	2nd Edition				1975
Massachusetts 780CMR Code	3rd Edition				1979
Massachusetts 780CMR Code	4th Edition				1980
Massachusetts 780CMR Code	5th Edition				1991
LEED	Launched	x			1993
LEED NC	V1.0	x			1995
Article 80			x		1996
	6th Edition				1997
LEED NC	v.2.0	x			1998
LEED NC	v 2.2	x			2005
International Building Code		x			2006
International Building Code		x			2007
article 37			x		2007
Massachusetts 780CMR Code	7th Edition-Base Volume				2008
Massachusetts 780CMR Code	7th Edition- Residential Volume				2008
Climate Action Plan- Greenovate Boston 2014 Climate Action Plan Update	Renew Boston			x	2009
Renew Boston				x	2009
LEED NC	V3- 2009	x			2009
International Building Code		x			2009
Massachusetts 780CMR Code	8th Edition- Base Volume				2010
A climate of Progress				x	2011
Massachusetts 780CMR Code	8th Edition- Residential volume				2011
International Building Code		x			2011
International Building Code		x			2012
LEED NC	V4.0	x			2013
Climate Action Plan- Greenovate Boston 2014 Climate Action Plan Update	Greenovate Boston			x	2014

Climate Action Plan- Greenovate Boston 2014 Climate Action Plan Update	Go Boston 2030				2015
International Building Code		x			2015
Climate Action Plan- Greenovate Boston 2014 Climate Action Plan Update	Imagine Boston 2030			x	2016
Climate Action Plan- Greenovate Boston 2014 Climate Action Plan Update	Climate Ready Boston			x	2016
Climate Ready Boston	Climate Ready East Boston			x	2016
Climate Ready Boston	Climate Ready Charlestown			x	2016
Climate Ready Boston	Climate Ready South Boston			x	2016
Climate Ready Boston	Moakley Park Vision Plan			x	2016
Renew Boston	Imagine Boston 2030			x	2016
Renew Boston	Carbon Free Boston			x	2017
Massachusetts 780CMR Code	9th Edition (base and residential volumes)				2017
article 37 update			x		2017
Building Energy Reporting and Disclosure ordinance				x	2018
Renew Boston	Zero Waste Boston			x	2018
LEED NC	v 4.1	x			2018
International Building Code		x			2018
International Building Code		x			2021
Climate Ready Boston	Resilient Design Guidelines			x	17-Oct-18
Climate Ready Boston	Resilient Design Guidelines- Vegetated Berms			x	17-Oct-18
Climate Ready Boston	Resilient Design Guidelines- Arboreal (raised seawall)			x	17-Oct-18
Climate Ready Boston	Resilient Design Guidelines- Raised Roadways and temporary flood barriers			x	17-Oct-18
Climate Ready Boston	Resilient Design Guidelines- Deployable Flood barrier guidance			x	17-Oct-18
Climate Action Plan- Greenovate Boston 2014 Climate Action Plan Update	Green Ribbon Commission- (organisation)				
Renew Boston	Renew Boston Trust (organisation)				

From this table and a trend perspective, it would appear that practice has been ahead of policy. Policy has rapid development between 2014-ongoing, then at the same time the IBC and LEED v.4.1 have been relaunched. The IBC is already working on its 2021 code.

It is difficult to review historical policies beyond 2009 which suggests that most of today's thinking was initiated from 2009.

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## Chicago

Chicago is in Illinois State, with a population of 2.7million (3<sup>rd</sup> populous USA city), the city is located on the shore of Lake Michigan (a Great Lake) and connected to the Mississippi River Watershed, the city was considered as a Port Town. It is architecturally iconic with its skyscrapers and Frank Lloyd Wrights domestic building, it is known for being windy (due to the microclimate of the Great Lake). Chicago is a member of C40 and 100RC, which report that the mayor has strong-partial powers with the built environment. Chicago's C40 initiatives are: energy, transportation and 'urban planning and development'. The city is 5-6 hours behind GMT, so it is possible to hold telephone interviews and follow up with questionnaires or further interviews.

Both 100RC and C40 report that Chicago has assessed its climate risks, shocks and stresses where storms (rain and snow) flash floods and heat waves are classified as serious, then river flooding and wind storms as less serious. Chicago has a similar C40 and 100RC profile as Boston where **Sustainable Chicago 2015** is the city's most recent sustainability plan, which supersedes Chicago Climate Change Action Plan launched in 2008 and a resilience city strategy is currently being developed by the city's resilience officer. "Green" construction is supported by the City of Chicago's Green benefit tier permit and Green permit program. See table E for Chicago's 100 RC and C40 profile and table F for the pathway documentation.

Table E: Chicago's Profile

100 Resilient City Profile- <http://www.100resilientcities.org/cities/chicago/>

Contact	Documentation	Shocks and Stresses Identified	
Chief Resilience Officer: Aaron Koch	The Urban Resilience Summit 2017 Cities affirm their commitment to goals of the Paris Climate accords Learning form the planet’s largest multi-system green roof	Aging Infrastructure Crime/Violence Economic Inequality Financial/ Economic Crisis Inadequate Educational Systems Infrastructure Failure Poverty	Rainfall Flooding Riot/Civil Unrest Severe storms Shifting macroeconomic trends Structural racism Terrorist attack Unemployment

C40 City Profile- <http://www.c40.org/cities/chicago>

Existing Mayor: Rahm Emanuel, Elected 2011

Mayoral powers

Mayoral Powers

	own and operate	set and enforce policies	budgetary and revenue control	set vision
Private Buildings				
Public Buildings				
Energy Supply				
Finance & Economy				
Public Transport				
City Roads				
Urban Land Use				
Waste				
Water				

not available

not applicable

limited powers

partial powers

strong powers

Climate Risks

Type	Hazard	Severity	Action Taken
Flood	Flash or surface flood	Serious	
Extreme Temperature - Hot	Heat Wave	Serious	
Flood	River Flood	Less Serious	
Storm	Rain Storm	Serious	
Storm	Severe Wind	Less Serious	
Storm	Heavy Snow	Serious	

Not specified or under consideration

Recognized, but not currently being considered

Currently in effect and being piloted

Currently in effect at a significant scale across most of the city

Currently in effect (city-wide)

GreenHouse Gas Emissions

CO<sub>2</sub>Emissions

Year	Baseline	Emissions	Target(s)
1990	32		
2005		36	
2010		33	
2020			24
2050			6

Case Study Literature

Urban Efficiency II: Chicago- Retrofit Chicago energy Challenge  
City adviser case study series: City of Chicago-sustainability strategies and energy programs through Direct Support Partnership  
Cities100: Chicago-Adsorptive Playgrounds Foster social cohesion  
Cities 100: Chicago- energy savings fund efficiency investments  
Cities 100: Chicago- Integrated Campaign Boosts Energy Efficiency  
LED traffic lights reduce energy use in Chicago by 85%  
Chicago City Boiler “tune-Up” cuts gas bill and CO2 Emissions

Other

This appendix is a simple list that compiles the programs and initiatives outlined by the Mayors Office Chicago, Department of Planning(DPD). These initiatives have been placed in a table name, date of issue and revision, classifies it as design practice, planning or policy document and who owns (issued it). Circumstantial events are not included. To facilitate reading, policy is shown with background shading. Sources: IBC, USGBC, City of Chicago and <https://www.chipublib.org/blogs/post/the-chicago-municipal-code-how-to-find-and-research-historical-codes/>

Table F: Chicago pathway documents

Document Name	Secondary Initiatives/ Stakeholders	Practice	Planning	Policy	Date of issue
City Plan			x		1830
City Charter				x	1837
- the laws and ordinances of City of Chicago					1839
Amendments to city charter					1837- 1841
Charter of the City of Chicago with amendments					1849
Revised Charter and Ordinance					1851
The charter and ordinances of the City of Chicago					1856
					1858
					1866
					1873
Municipal Code of Chicago					1881
Supplement					1887
Laws and Ordinances governing the City of Chicago					1890
Revised municipal code of Chicago					1905
The Chicago Code of 1911					1911
Burnham City Plan			x		1909
The Chicago municipal code of 1922					1922
Revised Chicago Code of 1931					1931
Municipal Code of Chicago					1939- 1984
Municipal Code of Chicago					1990
LEED	Launched	x			1993
LEED NC	V1.0	x			1995

LEED NC	v.2.0	x			1998
Illinois Green Alliance Formed	USGBC Chapter	x			2002
LEED NC	v 2.2	x			2005
International Building Code		x			2006
International Building Code		x			2007
Climate Change Action Plan				x	2008
LEED NC	V3- 2009	x			2009
International Building Code		x			2009
Illinois Green USGBC Member		x			2010
Chicago 2011 Transition Plan				x	2011
Healthy Chicago				x	2011
Nature and Wildlife Plan				x	2011
Chicago Sustainable Industries				x	2011
International Building Code		x			2011
International Building Code		x			2012
2012-2016 Capital Improvement Plan Chicagopark District				x	2012
A plan for economic growth and jobs				x	2012
LEED NC	V4.0	x			2013
Sustainable Chicago				x	2015
International Building Code		x			2015
Illinois Green Strategic Plan		x			2016
LEED NC	v 4.1	x			2018
International Building Code		x			2018
Chicago Climate Change Charter				x	2018
Resilient Chicago				x	2019
International Building Code		x			2021

From this table and a trend perspective, it would appear that practice has been ahead of policy. Policy has rapid development between 2014-ongoing, then at the same time the IBC and LEED v.4.1 have been relaunched. The IBC is already working on its 2021 code.

It is difficult to review historical policies beyond 2009 which suggests that most of today's thinking was initiated from 2009.



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