THE CLIMATE GROUP

CDP
DISCLOSURE INSIGHT ACTION

Global States and Regions Annual Disclosure Update 2019

Annex | November 2019

Projected Impact of Disclosed Targets

Aim

The aim of the analysis is to project the potential impact of disclosed emissions reduction targets from states and regions using projected emissions trajectories to 2050. The analysis compares the ambition of disclosed targets from 49 states and regions to the ambition of the Nationally Determined Contributions (NDCs) and long-term targets of their national government counterparts. Additionally, the analysis compares the states and regions and national government trajectories to a 1.5°C trajectory to assess whether the targets are aligned with the 1.5°C goal.

State and Regional GHG Emissions Projections

	Total GHG Emissions (GtCO2)					
Scenario	**2010**	**2017**	**2020**	**2030**	**2040**	**2050**
NDCs Pathway		2.84	2.49	2.15		
Longer-Term Pathway				2.11	1.51	0.92
States and Regions		2.84	2.50	1.74	1.03	0.72
1.5°C		2.84	2.66	1.05	0.50	0.17
Historical Emissions	3.06	2.84				

Data Sources

- State and regional population and emissions data was primarily self-reported as part of the Annual Disclosure process through CDP's States and Regions 2019 questionnaire and was supplemented with data from official government websites.
- NDCs and Long-Term Pathway data was taken from the Climate Action Tracker (CAT)
- Data for 1.5°C Low Energy Demand trajectory was taken from IAMC 1.5°C Scenario Explorer hosted by IIASA
- National population projections were taken from The World Bank

1.5°C Low Energy Demand Scenario

The 1.5°C Low Energy Demand scenario is taken from a report by Grubler *et al.*, 2018, which assesses a world of limiting global warming to 1.5°C through a rapid phase out of fossil fuels and thus reducing energy demand to around 40% lower than today. This scenario excludes any negative emission technologies, relying on natural solutions to absorb carbon from the atmosphere. It was chosen as the scenario which could feasibly be achieved by states and regions; to account for their advancements in renewable energy, as well as the barriers preventing them from implementing negative emission technologies such as bio-energy with carbon capture and storage.

Data Requirements to be Included in the Analysis

States and regions:

1. At least one region-wide GHG emissions reduction target
2. Region-wide GHG emissions data at both base year and year of latest GHG inventory
3. Historical population records between 2010 and 2017
4. Projected population figures from 2017 up to 2050

National Governments:

1. GHG emissions from 2010 to year of latest GHG inventory
2. CAT NDC pathways to 2030
3. CAT long-term pathway to 2050
4. National population projections from 2010 to 2050

Step 1 – Population:

The first step of the analysis was to project the population for each state and region from 2010 up to 2050. By gathering and inputting population figures obtained from CDP's States and Regions 2019 questionnaire and government statistical websites, the gaps between two data points were filled using a Compound Annual Growth Rate (CAGR). Previous CAGR from the last interval has been used to project data in cases where population projections up to 2050 were not available.

Step 2 – Emissions:

The second step was to project emissions from 2010 to 2050. Here, we used disclosed emissions reduction targets to calculate what the emissions would be for each state or region in the specified target years assuming they met their targets. Following a similar process to step 1, the previous CAGR was used to fill in missing values and to project values up to 2050 if no long-term target was reported.

Step 3 – Business-As-Usual (BAU) emissions:

Using the resulting population and emissions data from steps 1 and 2, a BAU emissions projection was calculated for each state and region from 2017 to 2050. Here a GHG intensity value (GHG per capita) was calculated at 2017 for each state and region. This was then multiplied by the projected population value of each year from 2017 to 2050 to achieve a BAU projection. Totalling the BAU emissions projections for each state gave the total BAU projection. The purpose of the BAU projection is to use it in step 5 of the analysis to adjust national government targets to the state and regional BAU projection.

This is a simple projection assuming that as population increases, the emissions of that state or region will also increase proportionally. The BAU projection assumes that the GHG intensity of the disclosing governments would stay the same between 2017 and 2050 with no significant climate mitigation action taken.

Step 4 – Country Data:

From Climate Action Tracker, we downloaded scenario data for each country represented by the states and regions in this analysis: Australia, Brazil, Canada, the European Union, Mexico, Norway, and the USA. This data set provided us with the estimated emissions trajectories for the respective governments in each scenario. The data we used for the analysis were the historical emissions dating

back to 2010, and future emissions projections from both NDCs Pathway to 2030 and the Long-Term Pathway, beyond the NDCs, to 2050.

Step 5 – Vectors:

The total GHG emissions from the 7 countries is much larger and not accurately comparable to the total emissions from the 49 states and regions used in this analysis. For this reason, we projected a hypothetical emissions trajectory that assumes states and regions will implement only NDCs and Long-Term pathways laid out by their respective national governments. To do this, we calculated the emissions per capita of each country from 2017 to 2050 and used this to calculate vectors. We applied the vectors to the state and regional BAU emissions projection and adjusted it to reflect implementation of national targets. This approach allowed us to better compare the targets between the two groups.

Following the same principles used for NDCs and Long-Term pathways, we also calculated vectors to adjust the 1.5°C scenario because this was originally based on a global emissions trajectory.

Assumptions and Limitations

Achieving targets:

Both the projections of national and state and regional governments assume that all governments will fully achieve their targets.

Long-term pathways:

For national, state, or regional governments without a long-term target beyond 2030, we have taken previous targets and assumed they will carry on with the same rate of decarbonisation to 2050 as set out in their mid-term targets.

BAU trajectory:

The BAU trajectory does not account for any economic, political, or large-scale climatic activity occurring within the region. Thus, we assume population growth based on the projections reported by governments. It is a simple projection assuming that emissions will increase proportionally to increases in population based on the emissions profile in 2017.

Land use, land use change and forestry (LULUCF):

CAT scenario data excludes all LULUCF emissions from national projections including carbon sinks. Due to limitations in measurement and reporting, the disclosed data varies across each state or region, with some governments including LULUCF emissions, others excluding just sinks, and others reporting net emissions.

Gross vs net emissions inconsistencies:

To overcome some of the inconsistencies in gross or net emissions being reported, we have tried to ensure that when projecting emissions of each state or region that we remain consistent by using gross emissions at base year to gross emissions in target year, or net to net. This helps to project an accurate trajectory and avoid under or over estimating the emissions trajectory.

Greenhouse gas reporting inconsistencies:

We have compared the projections to a 1.5°C CO2 trajectory which projects carbon emissions reaching zero around mid-century. Due to the increased potency and higher global warming potential of other

gases such as methane and hydrofluorocarbons, the IPCC projects that all GHG emissions will need to reach net-zero around 2070 to limit global warming to 1.5°C by 2100. Due to different reporting methodologies, we have seen differing results in what gases have been reported by state and regional governments. Some governments have reported all GHGs in their inventories and have set emission reduction targets focusing on all gases, whilst others didn't disclose which gases they have measured, and others focused solely on CO2.

States and Regions in the Projection Analysis

State / Region name	Country
Aland	EU
Andalusia	EU
Attica	EU
Australian Capital Territory	Australia
Azores	EU
Baden-Württemberg	EU
Basque Country	EU
Bavaria	EU
British Columbia	Canada
Brittany	EU
California	USA
Cantabria	EU
Catalonia	EU
Comunidade Intermunicipal do Médio Tejo	EU
Connecticut	USA
Drenthe	EU
Emilia-Romagna	EU
Galicia	EU
Hawaii	USA
Helsinki-Uusimaa	EU
Hesse	EU
Jämtland	EU
La Reunion	EU
Lombardy	EU
Lower Austria	EU
Minnesota	USA
Navarra	EU
New South Wales	Australia
New York State	USA
Newfoundland and Labrador	Canada
Nordland	Norway
North Brabant	EU
North Rhine-Westphalia	EU
Northwest Territories	Canada
Oregon	USA
Québec	Canada
Queensland	Australia

Rhineland-Palatinate	EU
Rio de Janeiro State	Brazil
São Paulo State	Brazil
Schleswig-Holstein	EU
Scotland	EU
South Australia	Australia
Victoria	Australia
Thuringia	EU
Wales	EU
Wallonia	EU
Washington	USA
Yucatán	Mexico

Table 1: region-wide GHG base year emissions reduction targets

Government	Base year	2020	2025	2030	2035	2040	2045	2050
Aland	2005			60%				
Andalusia	2005			26%				
Attica	2008	20%						
Australian Capital Territory	1990	40%	50%	65-75%		90-95%	100%	
Baden-Württemberg[1]	1990	25%		42%				90%
Basque Country	2005			30%				80%
British Columbia	2007			40%		60%		80%
Brittany	2012					51%		
California[2]	1990	25%		40%		65%		80%
Catalonia	2005 & 1990	25%[3]		40%		65%		100%
Comunidade Intermunicipal do Médio Tejo	2008	23%						
Connecticut	1990 & 2001	10%[4]		45%				80%
Drenthe	1990	20%						
Helsinki-Uusimaa	1990				80%			
Hesse	1990	30%	40%	55%				90%
Huánuco	1990							80%
Jämtland	1990	50%						
La Réunion	2011	10%						
Lombardy	2005	20%		40%				80%
Lower Austria	2005			36%				
Madeira	1990			30%				80%
Minnesota	2005							80%
Navarra	2005	20%		45%				
New York State	1990			40%				85%
Newfoundland and Labrador	1990 & 2005	10%		30%[5]				75%
North Brabant	1990			50%				
North Rhine-Westphalia	1990							80%
Northwest Territories	2005			30%				
Oregon	1990	10%						75%
Québec	1990	20%		37.5%				80%
Queensland	2005	20%						
Rhineland-Palatinate	1990	40%						

[1] GHG reduction targets of Baden-Württemberg have been added post annual disclosure period
[2] Target as described per Executive Order B-55-18
[3] Catalonia's 2020 target has a base year of 2005
[4] Connecticut's 2020 target has a base year of 1990
[5] Newfoundland and Labrador's 2030 target has a base year of 2005

São Paulo State	2005	20%						
Sardinia	1990							83%
Schleswig-Holstein	1990	40%						
Scotland[6]	1990	56%		75%		90%	100%	
South Australia	1990							60%
Southern Ostrobothnia	2010	20%						
Thuringia	1990			70%		80%		95%
Ucayali	1990							80%
Victoria	2005	15%						100%
Wales	1990	40%						80%
Wallonia	1990							95%
Washington	1990				25%			50%
West Kalimantan	2000	29%						
Yucatán	2005			40%				

Table 2: region-wide GHG intensity emissions reduction targets

Government	Intensity Target
Gujarat	Reduce the emissions intensity of GDP by 33%–35% by 2030 below 2005 levels
Rio de Janeiro State	Reduce intensity of region-wide emissions to 0.13 tonnes CO2e/R$ 1,000 by 2030
Upper Austria	Reduce energy-related GHG emissions intensity by 33% by 2030
Upper Austria	Reduce energy-related GHG emissions intensity by 70-90% by 2050

Table 3: region-wide baseline scenario emissions reduction targets

Government	Baseline Scenario Target
Azores	Reduce region-wide emissions by 38% in 2030 compared to a business-as-usual (BAU) scenario
Chungcheongnam-Do	Reduce region-wide emissions by 28.9% in 2020 compared to a business-as-usual (BAU) scenario
Nordland	Reduce region-wide emissions by 30% in 2020 compared to a business-as-usual (BAU) scenario

Table 4: region-wide fixed level emissions reduction targets

Government	Fixed Level Target
Bavaria[7]	Bavaria aims to reduce emissions to under 5 tonnes of CO2e per capita by 2030
	Bavaria aims to reduce emissions to under 2 tonnes of CO2e per capita by 2050
California	California aims to reduce emissions to 1990 levels by 2020
California[2]	California's statewide goal is to achieve carbon neutrality as soon as possible, and no later than 2045

[6] Scotland's updated targets have been agreed by Parliament on 25 September 2019 but are not yet in force. The current statutory targets (42% by 2020, 80% by 2050) are in place for the transition year.
[7] GHG reduction targets of Bavaria have been added post annual disclosure period

Hawaii	Hawaii aims to reduce emissions to 1990 levels by 2020
Hawaii	Hawaii aims to achieve net zero emissions by 2045
Nord Trøndelag	Nord Trøndelag aims to achieve net zero emissions by 2050
Queensland	Queensland aims to achieve net zero emissions by 2050
Washington	Washington aims to reduce emissions to 1990 levels by 2020

Table 5: GHG reduction targets and progress towards them in states and regions with net-zero targets

State	Percentage reduction target	Target year	% progress towards target
Australian Capital Territory	40	2020	-13%
Australian Capital Territory	50	2025	-11%
Australian Capital Territory	65	2030	-8%
Australian Capital Territory	90	2040	-6%
Australian Capital Territory	100	2045	-5%
California[8]	40	2030	4%
California[8]	Net-Zero	2045	N/A
Catalonia	25	2020	91%
Catalonia	40	2030	-21%
Catalonia	65	2040	-13%
Catalonia	100	2050	-8%
Hawaii	1990 levels	2020	107%
Hawaii	Net-Zero	2045	N/A
Helsinki-Uusimaa[9]	80	2035	22%
New York[10]	40	2030	32%
New York[10]	85	2050	15%
Nord-Trøndelag	Net-Zero	2050	N/A
Queensland	30	2030	70%
Queensland	Net-Zero	2050	N/A
Scotland[11]	56	2020	84%
Scotland[11]	75	2030	62%
Scotland[11]	90	2040	52%
Scotland[11]	100	2045	47%
Victoria	15	2020	72%
Victoria	100	2050	11%
Thuringia[12]	70	2030	89%
Thuringia[12]	80	2040	78%
Thuringia[12]	95	2050	66%

[8] California's Executive Order B-55-18 aims to achieve carbon neutrality by 2045 and includes a target of 80% reductions in carbon emissions by 2050 and the removal of carbon dioxide from the atmosphere through sequestration in forests, soil and other landscapes

[9] Helsinki-Uusimaa aims to be carbon neutral by 2035 by reducing emissions by 80% and offsetting the remaining 20%

[10] New York state has committed to reduce emissions by 85% and offset the remaining 15%

[11] Scotland's updated targets have been agreed by Parliament on 25 September 2019, but are not yet in force

[12] Thuringia aim to pursue carbon neutrality by offsetting the remaining 5% of emissions through the development of natural carbon stocks

N/A indicates fixed level targets which do not specify gross emissions reductions, so progress cannot be calculated

Table 6: progress towards 2020 GHG emissions reduction targets

Government	Base year	Total emissions of base year inventory (metric tonnes CO2e)	Current total gross emissions (excludes sinks)	Current total net emissions (includes sinks)	Percentage reduction target	BAU Emissions	Target year	Target Type	Predicted emissions in target year	Progress to target
Attica	2008	33,058,527	23,761,684.00	22,832,355.00	20		2020	Base year emissions	26,446,822	141%
Australian Capital Territory	1990	3,196,800	3,377,000.00	3,367,000.00	40		2020	Base year emissions	1,918,080	-13%
California	1990	431,000,000	424,097,419.00	-	1990 levels		2020	Fixed level	431,000,000	102%
Catalonia	2005	58,434,374	45,072,920.00	-	25		2020	Base year emissions	43,825,781	91%
Comunidade Intermunicipal do Médio Tejo	2008	1,322,979	1,056,111.00	-	23		2020	Base year emissions	1,018,694	88%
Connecticut	1990	45,531,547	41,131,888.00	-	10		2020	Base year emissions	40,978,392	97%
Drenthe	1990	3,750,000	3,605,600.00	-	20		2020	Base year emissions	3,000,000	19%
Hawaii	1990	19,080,000	21,280,000.00	17,750,000.00	1990 levels		2020	Fixed level	19,080,000	107%
Hesse	1990	51,500,000	-	40,400,000.00	30		2020	Base year emissions	36,050,000	72%
La Reunion	2011	4,700,000	4,838,348.00	4,328,512.00	10		2020	Base year emissions	4,230,000	79%

Lombardy	2005	86,500,000	69,100,000.00	66,500,000.00	20		2020	Base year emissions	69,200,000	116%
Navarra	2005	6,635,255	5,582,511.00	-	20		2020	Base year emissions	5,308,204	79%
Newfoundland and Labrador	1990	9,437,381	10,538,113.00	10,535,042.00	10		2020	Base year emissions	8,493,643	-117%
Nordland	2009	2,900,000	3,244,112.90	-	30	3,200,000.00	2020	Baseline scenario	2,240,000	-52%
Oregon	1990	56,128,149	64,561,358.00	-	10		2020	Base year emissions	50,515,334	-150%
Québec	1990	86,455,424	78,560,583.00	-	20		2020	Base year emissions	69,164,339	46%
Rhineland-Palatinate	1990	50,771,000	31,781,000.00	-	40		2020	Base year emissions	30,462,600	94%
Schleswig-Holstein	1990	33,987,000	25,380,000.00	-	40		2020	Base year emissions	20,392,200	63%
Scotland	1990	76,262,950	53,545,130.00	40,521,593.00	56		2020	Base year emissions	33,555,698	84%
Victoria	2005	127,800,000	123,689,076.39	113,951,991.67	15		2020	Base year emissions	108,630,000	72%
Wales	1990	55,729,784	42,141,638.60	41,746,912.34	40		2020	Base year emissions	33,437,871	63%
Washington	1990	90,498,300	97,758,400.00	58,130,200.00	1990 levels		2020	Fixed level	90,498,300	92%

Table 7: progress towards 2030 GHG emissions reduction targets

Government	Base year	Total emissions of base year inventory (metric tonnes CO2e)	Current total gross emissions (excludes sinks)	Current total net emissions (includes sinks)	Percentage reduction target	BAU Emisssions	Target year	Predicted emissions in target year	Progress to target
Aland	2005	260,000	180,000.00	-	60		2030	104,000	51%
Andalusia	2005	66,160,077	51,759,504.00	-	26		2030	48,958,457	84%
Australian Capital Territory	1990	3,196,800	3,377,000.00	3,367,000.00	65		2030	1,118,880	-8%
Azores[13]	2014	1,724,070	1,716,777.00	1,302,380.00	38	1,393,814.00	2030	864,165	1%
Basque Country	2005	25,505,208	20,046,519.00	19,646,519.00	30		2030	17,853,646	71%
British Columbia	2007	63,641,000	62,300,000.00	61,300,000.00	40		2030	38,184,600	5%
California	1990	431,000,000	424,097,419.00	-	40		2030	258,600,000	4%
Catalonia	1990	41,577,731	45,072,920.00	-	40		2030	24,946,639	-21%
Connecticut	2001	49,221,076	41,131,888.00	-	45		2030	27,071,592	37%
Hesse	1990	51,500,000	-	40,400,000.00	55		2030	23,175,000	39%
Lombardy	2005	86,500,000	69,100,000.00	66,500,000.00	40		2030	51,900,000	58%

[13] Not included in graph due to baseline scenario instead of percentage reduction target

Lower Austria	2005	13,071,000	18,247,000.00	11,640,000.00	36		2030	8,365,440	30%
Navarra	2005	6,650,328	5,582,511.00	-	45		2030	3,657,680	36%
New York State	1990	236,190,000	205,610,000.00	-	40		2030	141,714,000	32%
Newfoundland and Labrador	2005	9,861,170	10,538,113.00	10,535,042.00	30		2030	6,902,819	-23%
North Brabant	1990	21,113,000	25,300,000.00	-	50		2030	10,556,500	-40%
Northwest Territories	2005	1,564,000	1,260,000.00	-	30		2030	1,094,800	65%
Québec	1990	86,455,424	78,560,583.00	-	37.5		2030	54,034,640	24%
Queensland	2005	179,831,020	161,200,770.00	142,073,240.00	30		2030	125,881,714	70%
Scotland	1990	76,262,950	53,545,130.00	40,521,593.00	75		2030	19,065,738	62%
Thuringia	1990	33,800,000	12,641,000.00	-	70		2030	10,140,000	89%

Progress towards target in Tables 5, 6 and 7 were calculated using reported base year emissions, current emissions and calculated target emissions using the following formula:

- Progress to target: (Emissions of base year – current emissions)/ (Emissions of base year – target emissions) x 100

Table 8: count of mitigation actions by sector

Sector	Number of actions currently being implemented
Energy	735
Buildings & Lighting	721
Transport	520
Waste	488
Land use	301
Governance	295
Industry	220
Agriculture	220
Finance & Economy	203
Water	92
Healthcare	26
Total	**3821**

Table 9: count of reported climate change impacts

Climate change impacts reported globally	Count
Increased water stress or scarcity	59
More hot days	52
More intense rainfall	50
Sea level rise	47
Flooding	39
Hotter summers	36
More frequent droughts	35
Declining water quality	31
Increased frequency of large storms	31
More frequent heat waves	31
Change in seasonality of rainfall	30
Warmer water temperatures	23
More intense droughts	21
More intense heat waves	21
Inadequate or aging infrastructure	20
Greater temperature variability	20
Drought	19
Reduced average annual rainfall	19
Coastal erosion	18
Reduced average annual snowfall	18
More frequent rainfall	12
Increased wind speeds	11
Increased average annual rainfall	11
Salinization of water bodies	9
Changes in humidity	8

Higher water prices	8
Soil salinization	7
Regulatory	5
Extreme winter conditions	5
Other	32
Total	**728**

Table 10: estimated magnitude of climate change impacts

Estimated magnitude of climate change impacts reported globally	Count	%
Serious	411	62.5%
Extremely serious	164	24.9%
Less serious	82	12.5%
Other: Seriousness of impact unknown	1	0.2%
Total	**658**	**100%**

Table 11: count of adaptation actions

Adaptation actions reported globally	Count
Community engagement/education	41
Conservation awareness and education	31
Crisis management including warning and evacuation systems	27
Flood mapping	27
Incorporating climate change into long-term planning documents	23
Investment in existing water supply infrastructure	20
Real time risk monitoring	20
Watershed preservation	20
Biodiversity monitoring	19
Heat mapping and thermal imaging	19
Projects and policies targeted at those most vulnerable	19
Stormwater management (natural or man-made infrastructure)	18
Diversifying water supply (including new sources)	16
Efficiency regulations or standards	16
Tree planting and/or creation of green space	16
Sea level rise modelling	14
Water use restrictions	14
Improving monitoring	12
Resilience and resistance measures for buildings	12
Flood defences – development and operation & storage	9
Municipal water efficiency retrofits	9
Restrict development in at risk areas	9
Conservation incentives	8
Water metering	8
Crisis planning and practice exercises	7
Disease prevention measures	7
Landslide risk mapping	7
Storm water capture systems	7

Water use restrictions and standards	7
Public preparedness (including practice exercises/drills)	6
Soil retention strategies	6
Hazard resistant infrastructure design and construction	5
Implementing nature-based solutions for water	5
Improve water supply distribution method	5
Promoting and incentivizing water efficiency	5
Awareness campaign/education to reduce water use	4
Use of non-potable water outside	4
Additional reservoirs and wells for water storage	3
Diversification of water supply	3
Maintenance/repair – leaking infrastructure	3
Shading in public spaces, markets	3
Water butts/rainwater capture	3
Water smart metering	3
Air quality initiatives	2
Retrofit of existing buildings	2
Water efficient equipment and appliances	2
Diversifying power/energy supply	1
Economic diversification measures	1
Green roofs/walls	1
Use of non-potable water indoors (within building)	1
Water extraction protection	1
Water use audits	1
Other	119
Total	**651**

Table 12: count of adaptation actions in response to top 10 globally reported impacts of climate change (N≥3)

Top 10 climate change impacts reported globally	Globally reported adaptation actions	Number of actions (N≥3)
Increased water stress or scarcity	Conservation awareness and education	21
	Diversifying water supply (including new sources)	12
	Watershed preservation	6
	Water use restrictions	6
	Efficiency regulations or standards	5
	Conservation incentives	4
	Investment in existing water supply infrastructure	4
	Water metering	3
	Municipal water efficiency retrofits	3
More hot days	Tree planting and/or creation of green space	8
	Heat mapping and thermal imaging	6
	Biodiversity monitoring	6
	Community engagement/education	5
	Crisis management including warning and evacuation systems	3
	Shading in public spaces	3
More intense rainfall	Flood mapping	14
	Flood defences – development and operation & storage	6
	Crisis management including warning and evacuation systems	5
	Storm water capture systems	4
	Restrict development in at-risk areas	3
	Real time risk monitoring	3
	Landslide risk mapping	3
Sea level rise	Sea level rise modelling	13
	Flood mapping	4
	Restrict development in at-risk areas	3
	Community engagement/education	3

	Incorporating climate change into long-term planning documents	3
Flooding	Stormwater management (natural or man-made infrastructure)	15
	Improving monitoring	4
	Watershed preservation	3
	Implementing nature-based solutions for water	3
Hotter summers	Heat mapping and thermal imaging	3
More frequent droughts	Improve water supply distribution method	3
	Community engagement/education	3
Declining water quality	Improving monitoring	6
	Watershed preservation	5
	Efficiency regulations or standards	5
Increased frequency of large storms	Crisis management including warning and evacuation systems	6
	Projects and policies targeted at those most vulnerable	3
	Resilience and resistance measures for buildings	3
	Community engagement/education	3
More frequent heat waves	Community engagement/education	4
	Heat mapping and thermal imaging	4
	Crisis management including warning and evacuation systems	3

Table 13: drivers of deforestation and forest degradation reported by continent[14]

Drivers of deforestation and forest degradation	Count of drivers across different regions				
	Africa	**Europe**	**Latin America**	**North America**	**Total**
Small-scale agriculture and colonization	1		16	2	**19**
Fires	1	1	11	4	**17**
Livestock	1	1	11	3	**16**
Unsustainable logging	2		10	2	**14**
Mining	1	2	8	1	**12**
Large-scale agriculture	1		8	2	**11**

[14] Analysis of the drivers of deforestation/forest degradation includes information provided by publicly disclosing governments in the comments field in addition to the drivers reported

Infrastructure		1	7	3	**11**
Charcoal and fuelwood	2		3		**5**
Hydroelectric power			2		**2**
Pulp plantations			1		**1**
Totals	**9**	**5**	**77**	**17**	**108**

Table 14: renewable electricity/energy targets by year and region

Government	Target type	2020	2025	2030	2040	2045	2050
Abruzzo	Renewable energy production	19%					
Aland	Renewable electricity consumption			60%			
Aland	Renewable energy consumption			60%			
Andalusia	Renewable energy consumption	25%					
Australian Capital Territory	Renewable electricity consumption	100%					
Azores	Renewable energy production	35%[15]					
Azores	Renewable electricity production		61%[16]				
Baden-Württemberg	Renewable energy consumption	25%					80%
Baja California	Renewable electricity production	10%					
Basque Country	Renewable energy consumption			21%			40%
Bavaria	Renewable electricity production		70%				
California	Renewable electricity consumption	33%		60%			
Cantabria	Renewable energy production	42%					
Catalonia	Renewable energy consumption			50%			100%
Chhattisgarh	Renewable energy production		100%[17]				

[15] Azores' target is a 2019 target

[16] Azores' target is a 2023 target

[17] Chhattisgarh's target is a 2022 target. It covers government-operations only and is not a region-wide target.

Connecticut	Renewable electricity consumption			48%			
Drenthe	Renewable energy production			40%			
Estado De México	Renewable electricity consumption			35%			
Flevoland	Renewable energy consumption	44%					
Gujarat	Renewable electricity production			40%			
Hawaii	Renewable electricity production					100%	
Hesse	Renewable energy consumption						100%
Hesse	Renewable electricity consumption	25%[18]					100%
Jämtland	Renewable energy consumption			100%			
La Reunion	Renewable electricity production	50%					
Lombardy	Renewable energy consumption	16%					
Lower Austria	Renewable electricity consumption	100%					
Lower Saxony	Renewable energy consumption						100%
Madeira	Renewable electricity production	50%					
Minnesota	Renewable electricity production		28%				
Navarra	Renewable electricity consumption			50%			
New Caledonia	Renewable electricity consumption			100%			
New York State	Renewable electricity production			70%			
North Brabant	Renewable energy production			50%			
North Denmark Region	Renewable energy production						100%
Northwest Territories	Renewable energy consumption			40%			
Occitanie	Renewable energy production						100%

[18] Hesse's target is a 2019 target

Oregon	Renewable electricity consumption				50%		
Québec	Renewable energy production			25%			
Queensland	Renewable energy production			50%			
São Paulo State	Renewable energy production	69%					
Scotland	Renewable electricity consumption	100%					
Scotland	Renewable energy production			50%			
South Holland	Renewable energy production	9%					
Victoria	Renewable energy production	25%	40%	50%			
Thuringia	Renewable energy consumption				100%		
Tocantins	Renewable electricity production			20%			
Upper Austria	Renewable electricity consumption			80%-97%			
Wales	Renewable electricity consumption			70%			
Washington	Renewable electricity consumption	15%					
Yucatán	Renewable energy production		25%[19]				

Table 15: renewable electricity/energy targets by year and region (absolute values)

Government	Target type	2020	2030
Brittany	Renewable energy production	17143 GWh	
North Kalimantan	Renewable electricity production		9000 MW
South Holland	Renewable electricity production	2.17 GWh	
Wales	Renewable energy production		1 GW
Wallonia	Renewable electricity consumption	5555 GWh	10081 GWh

[19] Yucatán's target is a 2024 target

Table 16: region-wide electricity generation breakdown by energy source (%)

State and region	Coal	Gas	Oil	Nuclear	Biomass	Geothermal	Hydro	Solar	Wind
Abruzzo	0	38.9	0	0	0	0	32.7	16.9	7.6
Acre	4	13	5	1	8	0	65	0	4
Akershus	0	0	0	0	0	0	100	0	0
Aland	0	0	4.6	0	0.6	0	0	0	94.8
Amazonas	0	0	0	0	0	0	92.2	0	0
Amazonas (Brazil)	0	49	47	0	0	0	4	0	0
Andalusia	28.6	35.2	0	0	3.8	0	1.5	10.6	19.5
Attica	50	30	10	0	0	0	3	4	3
Australian Capital Territory	42	6	0	0	0	0	4	3	45
Azores	0	0	65	0	0	23	3	0	9
Baja California	0	45.87	0.6	0	0	47.94	0	0	0
Basque Country	0	81.7	0.7	0	5.6	0	5.5	0.5	6
British Columbia	0	3	0	0	5	0	90	0	2
Brittany	0	0	0	0	10	0	15	6	47
California	0.13	40.65	0.02	8.24	2.76	5.32	19.68	16.37	5.9
Campeche	0	20	80	0	0	0	0	0	0
Cantabria	5.43	62.3	0	0	1.6	0	27.57	0.08	3.02
Catalonia	0	29.1	0	53.6	0	0	8.3	1.1	6.1
Chhattisgarh	95.76	0	0	0	0	0	4.05	0.19	0
Colima	15	85	0	0	0	0	0	0	0
Comunidade Intermunicipal do Médio Tejo	45	4	0	0	5	0	24	1	17
Gotland	0	0	0	0	0	0	0	0	93
Greater Wellington Regional Council	0	0	0	0	0	0	0.5	0.1	97
Hawaii	13.2	0	68	0	3.1	3.2	1	2.1	5.5
Huánuco	0	0	0.2	0	0	0	99.8	0	0

Jalisco	28.1	0	0	0	6.6	0	48.4	4.5	12.4
Jämtland	0	0	0	0	1	0	88	0	11
Loreto	0	0	0	0	0	0	0	0	0
Lower Austria	5	11	4	0	7	0	51	2	20
Lower Saxony	16.3	16.4	0.3	25.1	11.8	0	0.3	3.75	24
Madeira	0	16	53	0	4	0	11	4	12
Madre de Dios	0	0	0	0	0	0	0	0	0
Minnesota	38.97	14.71	0.04	23.43	1.61	0	1.89	0.02	17.95
Navarra	0	39.25	0	0	4.78	0	5.67	5.29	45.01
New Caledonia	41	0	47.3	0	0.02	0	9.1	1.3	1.3
New York State	1.1	43.8	0.1	30.3	0	0	19.1	0	2.9
Nord-Trøndelag	0	0	0	0	0	0	98	0	2
Nordland	0	0	0	0	0	0	99	0	1
North Denmark Region	23	11	0	0	2	0	0	2	60
North Rhine-Westphalia	69.6	13.5	1	0	3.7	0	0.4	3.1	8.1
Northwest Territories	0	3.4	19.2	0	0	0	71.4	2.3	3.7
Nuevo León	0	90.02	0	0	0.05	0	0	0.03	9.9
Occitanie	0	0	0	54	2	0	31	5	7
Oppland	0	0	0	0	4.2	0	95.8	0	0
Oregon	2.8	24		0	0.6	0.3	61.1	0.3	9.9
Pernambuco	39.03	0	0	0	7.25	0	35.15	18.32	0.25
Piura Region	0	0	0	0	0	0	100	0	0
Québec	0	0.06	0.28	0	1.01	0	94.12	0	4.53
Queensland	74	18	2	0	2	0	1	3	0
Queretaro	0	88	12	0	0	0	0	0	0
Rhineland-Palatinate	0.5	54.5	0	0	5.8	0	4.7	8.9	25.6
Rio de Janeiro State	8	30	11	46	0.3	0	4	0.3	0.4
Rio Grande do Sul	24.06	0	0	0	0	0	57.37	0	18.57
San Martín	0	0	0	0	0	0	18	0	0
Santa Catarina	76	0	6	0	18	0	0	0	0

São Paulo State	0	6	1	0	9	0	78	0	0
Sardinia	36	0	35	0	6	0	4	6	13
Schleswig-Holstein	8	3.4	1.7	17.7	9.5	0	0	3.8	55.9
Scotland	0.2	8.9	1.4	36.6	4	0	10.9	0.6	34.8
Sonora	38	19	40	0	0	0	2	0	0
South Australia	0	51.3	0	0	0	0	0	8.2	39
South Holland	32	45	4	3	13	0	0	0	0
Victoria	71.2	5.5	0	0	1.5	0	5.7	5.1	11
Thuringia	0	29.75	0	0	9.05	0	1.96	10.99	26.99
Tocantins	0	0	0	0	2	0	98	0	0
Tucuman	0	84	0	0	0.02	0	15.98	0	0
Ucayali	0	0	0	0	0	0	1.3	0	0
Wales	8	69	1.4	0	2	0	1.1	2.9	14.2
Wallonia	0	16.4	0.1	70	2.1	0	0.9	2.9	5.1
Washington	13.39	10.83	0.11	4.19	0.6	0	67.68	0.01	2.84
Western Cape	85.7	3.2	0	5.2	0	0	0	0.9	0.9
Yucatán	0	0	100	0	0	0	0	0	0

Table 17: region-wide energy efficiency targets (as a decrease in energy use)

Government	Percent decrease in energy use	Base year	Target year
Abruzzo	2.6%	2005	2020
Baden-Württemberg	50%	2010	2050
Brittany	28-32%	2012	2040
Cantabria	16.80%	Trend scenario	2020
Catalonia	20%	Trend scenario	2020
	27%	[20]	2030
Hawaii	100%	2009	2019
Lombardy	10%	2005	2020
Navarra[21]	20%	Trend scenario	2020
	10%	Trend scenario	2025
	10%	Trend scenario	2030
New Caledonia[22]	20%	2014	2030
	25%	2014	2030
North Denmark Region	35%	2012	2020
Occitanie	40%	2015	2050
Piedmont	27%		2030
Scotland	12%	2005[23]	2020
	30%	2015	2030
Wallonia	18%	2007	2020
	23%	2005	2030

Table 18: region-wide energy efficiency targets (as an increase in energy efficiency)

Government	Percent increase in energy efficiency	Base year	Target year
Basque Country	33%	2016	2030
Piedmont	30%		2030
Québec	0	2013	2030
	[24]	2018	2030
Upper Austria	1.5 to 2% per year	2014	2050
Victoria	[25]	2015	2020

[20] Law 16/2017, of 1 August, on Climate Change (Art. 19.1.a): Reduce final energy consumption almost 2% per year to achieve a minimum of 27% in 2030, excluding non-energetic uses.
[21] Navarra's targets are the same as those established at European Union scale: achieve a 20% efficiency target in 2020, and additional 10% in 2025 and 2030.
[22] New Caledonia's 20% target covers primary energy consumption while the 25% target covers final energy consumption.
[23] Scotland's 12% reduction target in total final energy consumption by 2020 is based on a 2005-2007 baseline.
[24] Improve the average energy efficiency of Québec society by 1% per year, for the period between 2018 and 2023.
[25] The metric used is tonnes of GHG avoided. The Victorian Energy Upgrades program uses greenhouse gas emissions avoided as the metric, one certificate represents one tonne of emissions avoided by activities undertaken under the program.

Table 19: calculated emissions trends since base year

Government	Base year	Inventory Year	Calculated emissions reduction since base year
Abruzzo	2006	2012	-18%
Acre	2010	2014	-14%
Aland	2005	2015	-31%
Andalusia	2005	2017	-22%
Attica	2008	2016	-31%
Australian Capital Territory	1990	2017-2018	5%
Azores	1990	2015	21%
Baden-Württemberg	1990	2017	-12%
Baja California	2005	2011-2012	0%
Basque Country	2005	2017	-24%
Bavaria	1990	2015	-91%
British Columbia	2007	2016	-4%
Brittany	2010	2016	-6%
California	1990	2017	-2%
Cantabria	2005	2017	-14%
Catalonia	1990	2017	8%
Chungcheongnam-Do	2005	2016	86%
Colima	2005	2015	-59%
Comunidade Intermunicipal do Médio Tejo	2008	2014	-20%
Connecticut	1990	2016	-9%
Drenthe	1990	2017	-4%
Estado De México	2010	2016	-22%
Gotland	1990	2017	-6%
Greater Wellington Regional Council	2001	2014-2015	-44%
Guanajuato	2005	2013	-21%
Hawaii	1990	2015	-7%
Helsinki-Uusimaa	1990	2016	-18%
Hesse	1990	2016	-21%
Jämtland	1990	2015	-37%
La Réunion	2011	2015	-13%
Lombardy	2005	2017	-23%
Lower Austria	2005	2017	-48%
Lower Saxony	1990	2015	-14%
Minnesota	2005	2016	-20%
Navarra	2005	2017	-16%
New Caledonia	2014	2018	49%
New York State	1990	2016	-13%
Newfoundland and Labrador	1990	2017	12%
Nordland	2009	2017	12%
North Brabant	2010	2017	-6%

North Denmark Region	2010	2016	-15%
North Rhine-Westphalia	1990	2017	-25%
Northwest Territories	2005	2017	-19%
Oaxaca	2013	2013	-74%
Oregon	1990	2017	15%
Québec	1990	2016	-9%
Queensland	2005	2016-2017	-21%
Rhineland-Palatinate	1990	2015	-37%
Rio de Janeiro State	2005	2015	40%
Schleswig-Holstein	1990	2017	-25%
Scotland	1990	2017	-47%
Sonora	1990	2014-2015	54%
South Australia	1990	2016-2017	-39%
South Holland	1990	2017	14%
Victoria	2005	2015	-11%
Thuringia	1990	2016	-61%
Wales	1990	2017	-25%
Wallonia	1990	2017	-38%
Washington	1990	2015	-36%
Western Cape	2009	2015-2016	3%

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