Planbureau voor de Leefomgeving

National measures complementary to EU ETS

Assessment of unilateral and multilateral options

Corjan Brink

November 29, 2018

EU ETS post-2020 revision

- Revision EU ETS Directive:
  - faster annual decrease in overall number of allowances (cap)
  - strengthened working of the MSR
    - › doubling the intake rate of the MSR until 2023
    - › as from 2023, allowances held in the reserve above the total number of allowances auctioned during the previous year no longer valid

- Nevertheless EU ETS not in alignment with Paris agreement
- and impact on prices not sufficiently contributing to national targets and long-term ambitions of several member states …
- … so continuation of debate on additional measures at national level

National measures complementary to EU ETS

- Inefficient and ineffective drawbacks at EU-scale
  - relocation of emissions as economic activities (e.g. power production) move to other countries
  - 'waterbed effect': as long as total number of permits within EU ETS is unchanged, emissions may still occur at any place/time
- Generic competitiveness concerns (intra-EU and internationally)

Can these drawbacks be mitigated when taking complementary measures within a coalition of countries?

Complementary measures in the Netherlands

- Dutch government aims to raise the level of climate ambition
  - GHG emission reduction 2030: -49%
  - closure of five existing coal power plants by 2030 (5 GW)
  - carbon floor price for electricity sector:
    increasing from €18 (2020) to €43/ton (2030)
- PBL studies
  - impacts on European electricity market (partial equilibrium model)
    - emission reduction mainly because of coal shut-down
    - relocation of generation and emissions to neighbouring countries
  - macro-economic impacts (general equilibrium model)
    - carbon floor price also for industry within EU ETS
    - alternative options to prevent increasing emissions elsewhere
    - unilateral policy vs. coalition

Methodology

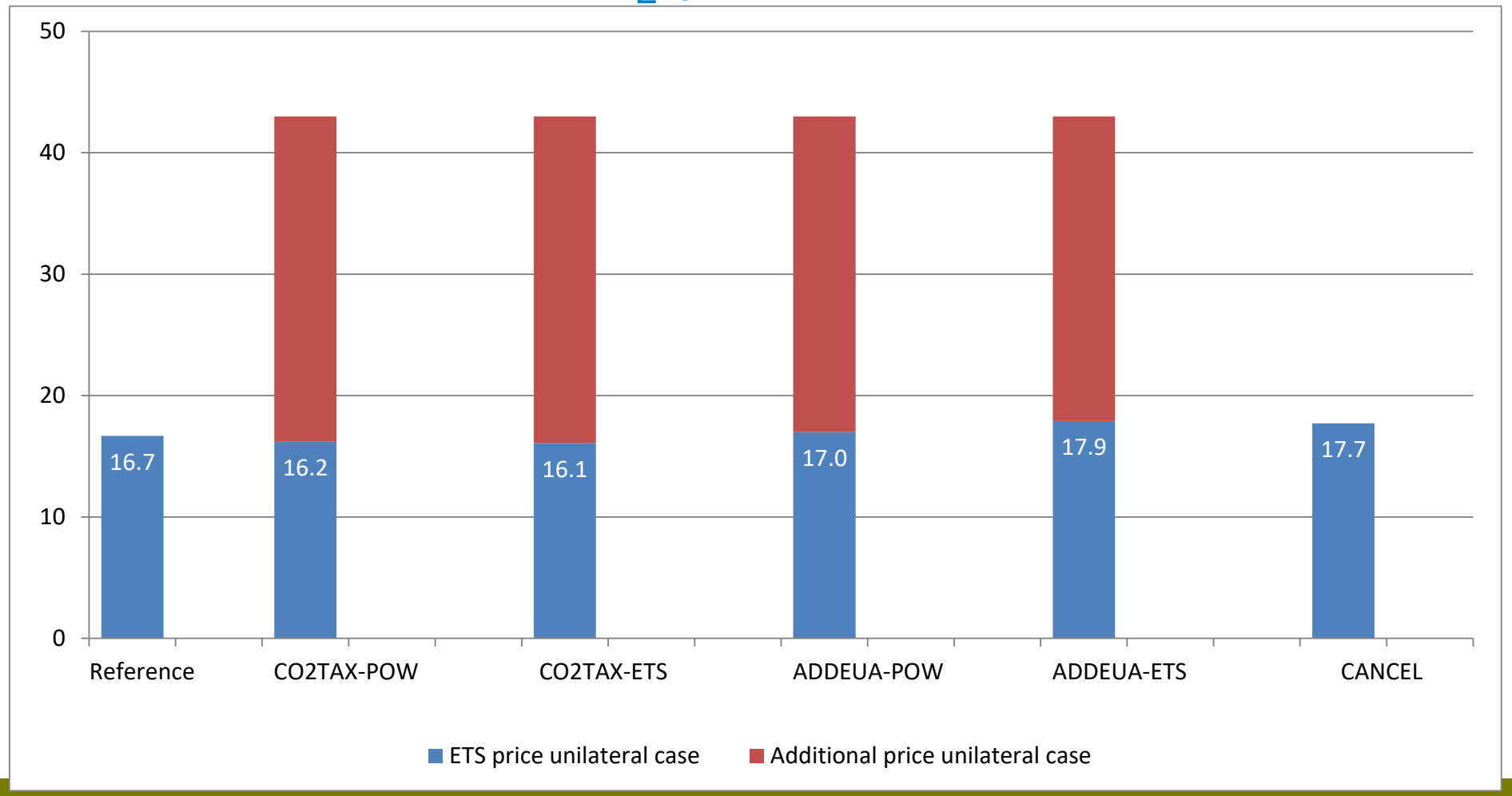
- Analysis by WorldScan:
  - Global computable general equilibrium (CGE) model to consider
    - Indirect effects in the economy
    - Impact on international trade
    - Domestic and international emissions (incl. 'emissions leakage')
  - most relevant features of EU ETS included:
    - supply of allowances over time and distribution over countries
    - possibility of banking allowances, market stability reserve
- **Reference scenario**:
  - Revised EU ETS Directive (LRF 2.2% and changes to MSR)…
  - … plus effect of 2030 energy targets
    - renewables (27%)
    - energy efficiency (30%)

Complementary national measures

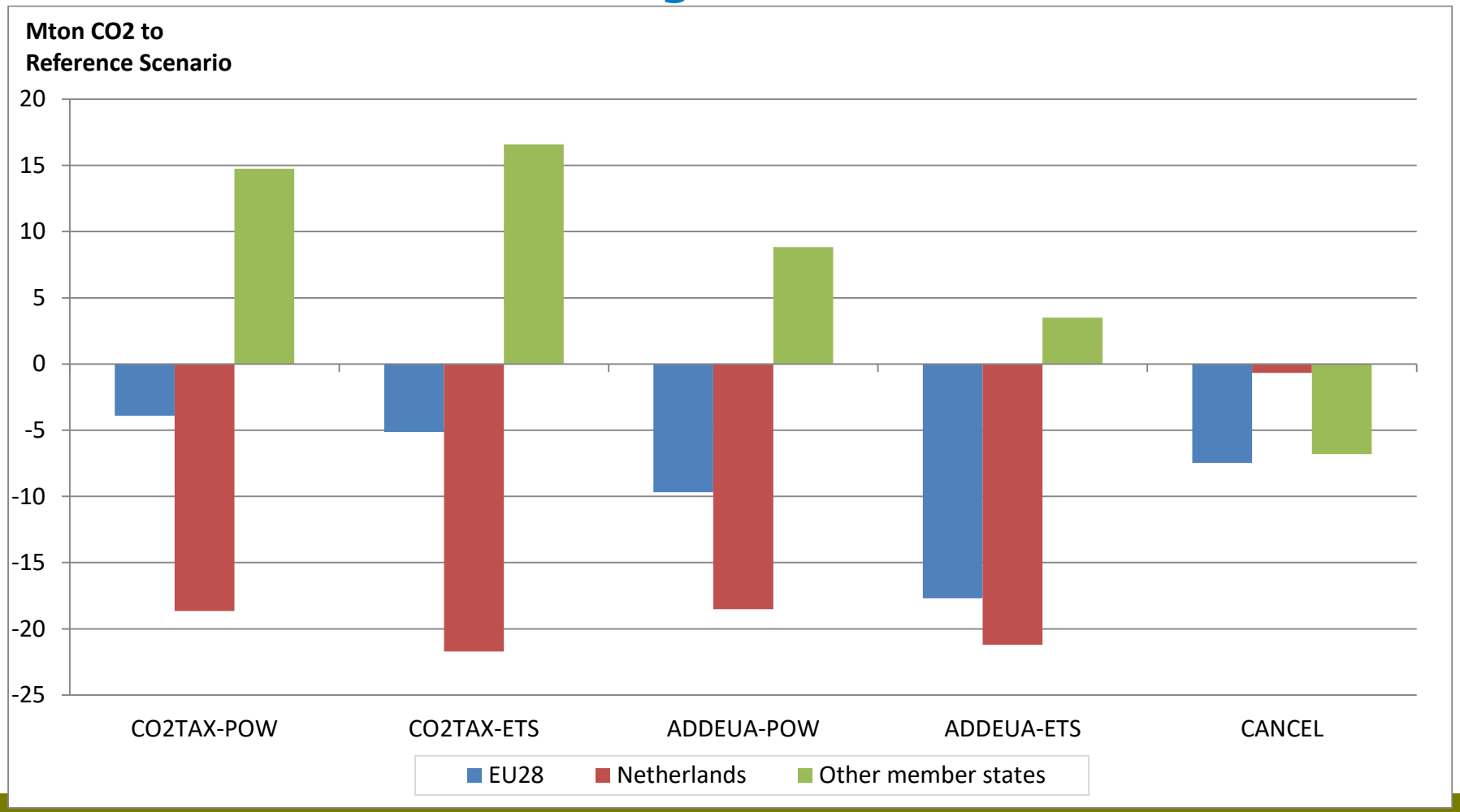
- Carbon price floor increasing to €43/tCO_2 in 2030
  - by carbon tax in addition to EU ETS price
    - for power sector only – **CO2TAX-POW**
    - for all ETS sectors – **CO2TAX-ETS**
  - by additional permits to be surrendered
    - by power sector only – **ADDEUA-POW**
    - by all ETS sectors – **ADDEUA-ETS**
- Buy and cancel allowances – **CANCEL**

- Unilateral or coalition of countries:
  - Netherlands only
  - Germany, France and Benelux

Unilateral case – CO_2 prices 2030

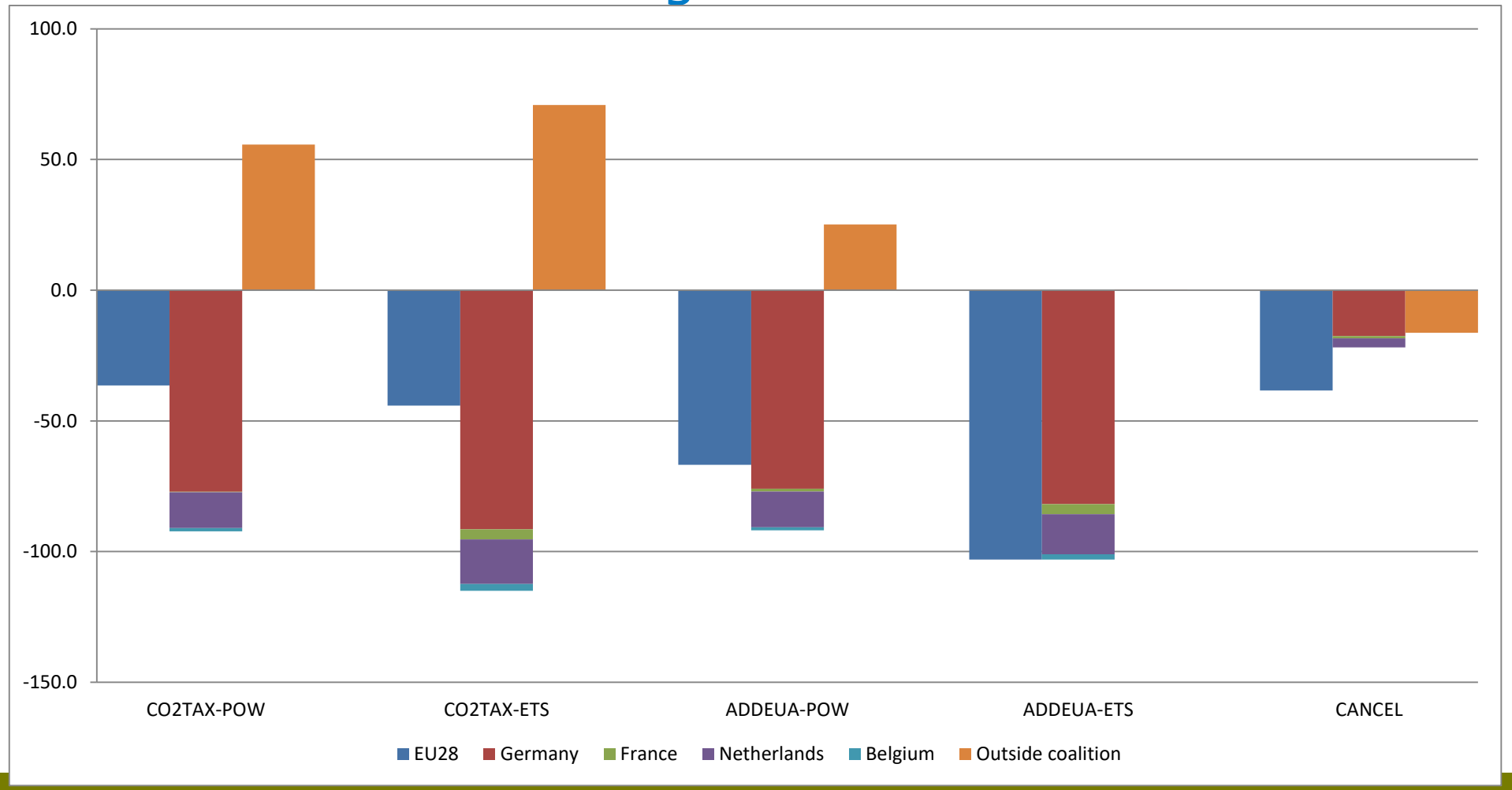


Unilateral case – change in GHG emissions 2030

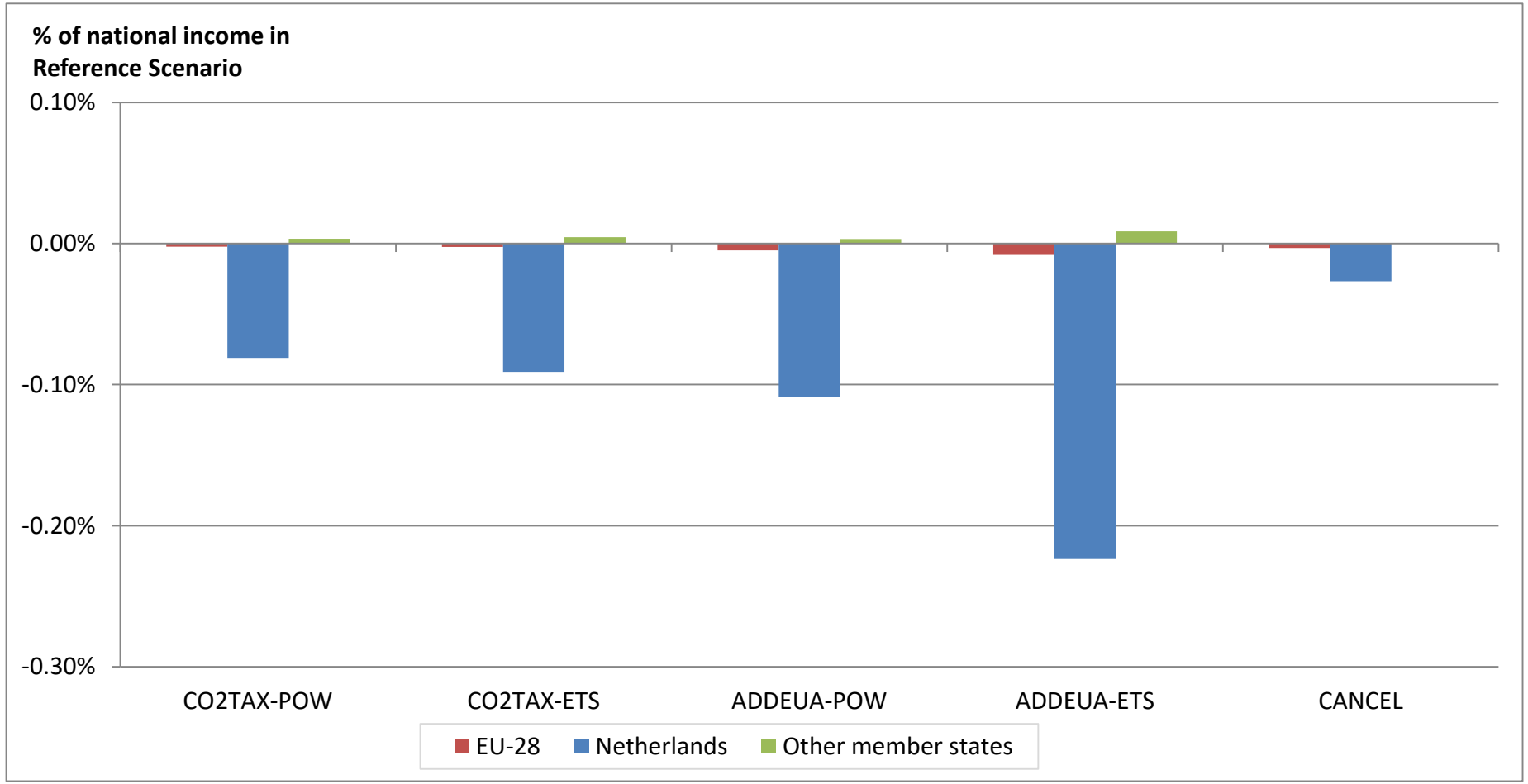


Unilateral vs Coalition case – CO_2 prices 2030

Coalition case – change in GHG emissions 2030

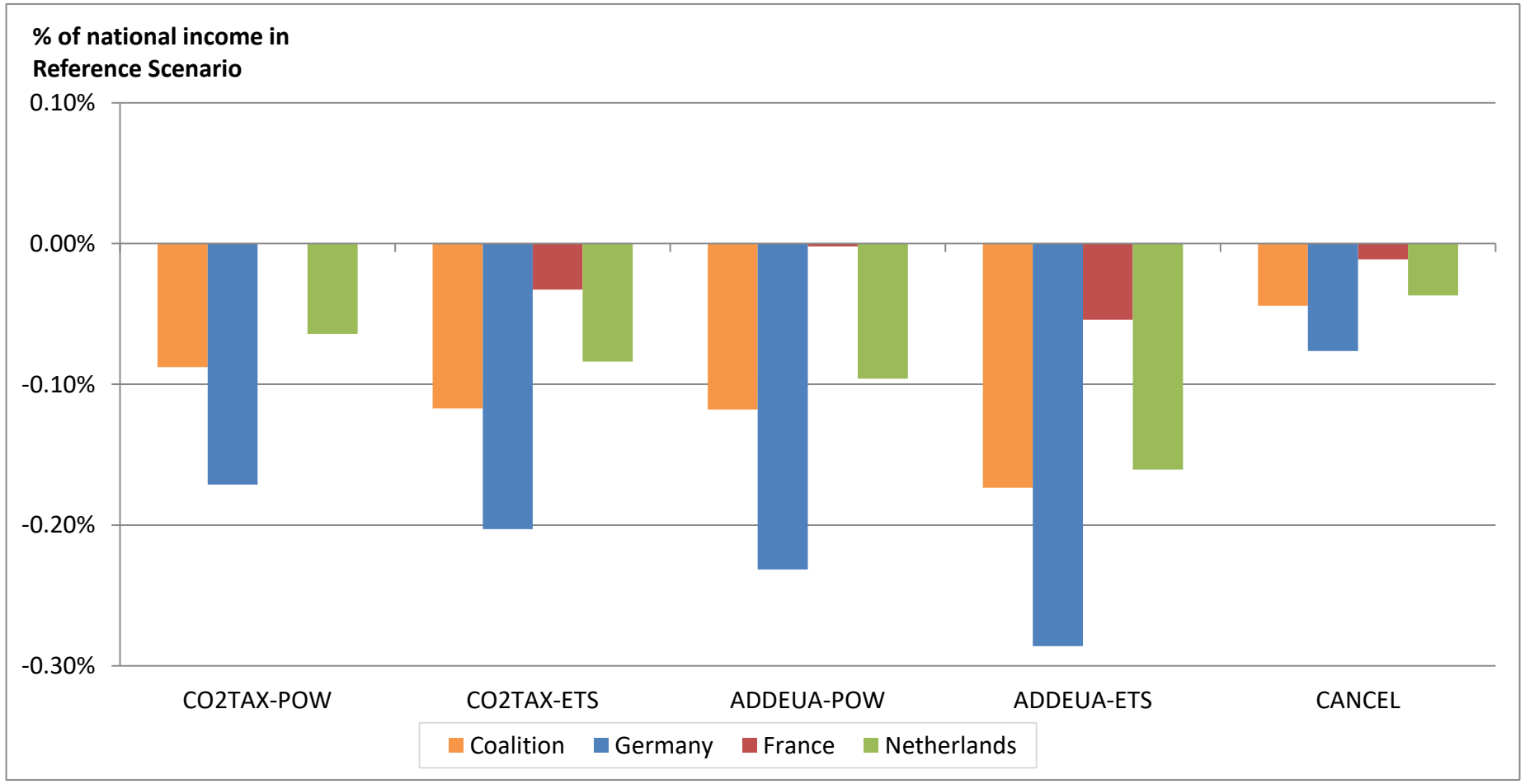


Unilateral case – compliance costs 2030*



* Hicksian equivalent variation measured as a percentage income change relative to the Reference Scenario (see Brink et al., 2016, Energy Policy 97)

Coalition case – compliance costs 2030*



Unilateral case – average cost per ton CO_2

Compliance cost to domestic emission reduction (euro per ton CO2)					
	CO2TAX-POW	CO2TAX-ETS	ADDEUA-POW	ADDEUA-ETS	CANCEL
Netherlands	45	43	60	108	413

Coalition case – average cost per ton CO_2

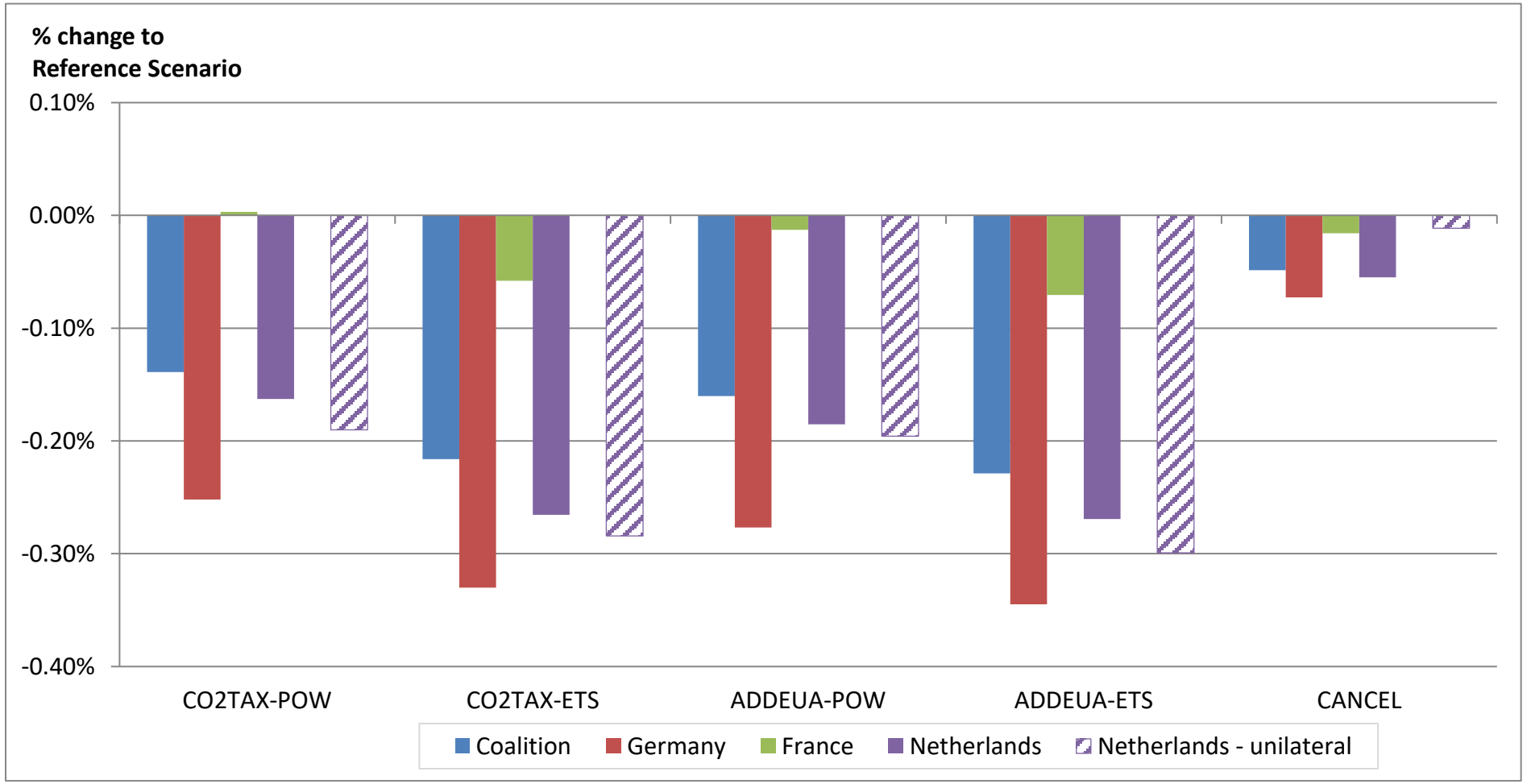
Compliance cost to domestic emission reduction (euro per ton CO2)					
	CO2TAX-POW	CO2TAX-ETS	ADDEUA-POW	ADDEUA-ETS	CANCEL
Coalition	92	98	124	162	192
Germany	93	93	128	147	183
France	16	305	76	505	460
Netherlands	48	50	72	107	109

Average cost per ton CO_2 – domestic vs EU-wide reduction

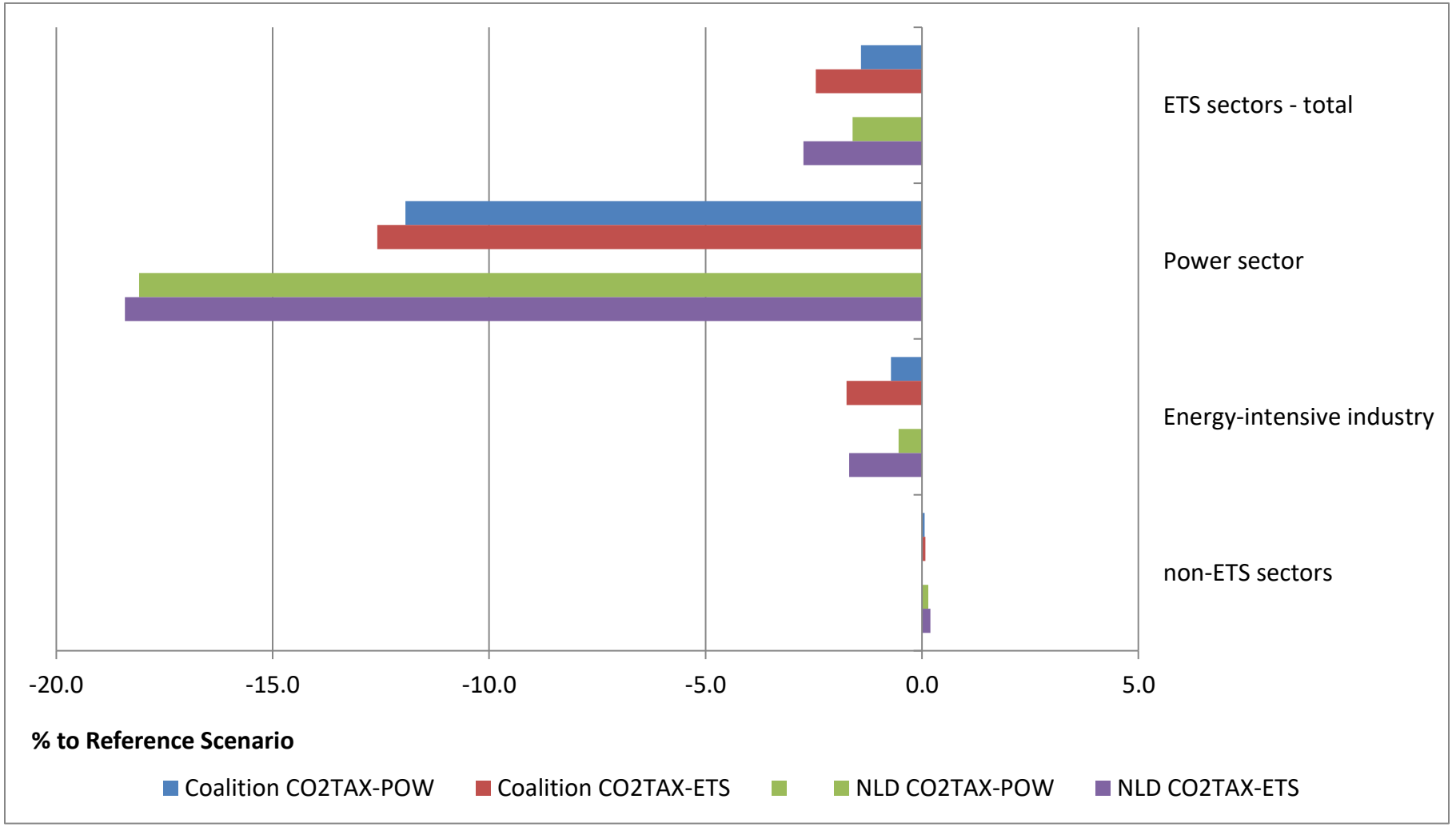
Compliance cost to domestic emission reduction (euro per ton CO2)					
	CO2TAX-POW	CO2TAX-ETS	ADDEUA-POW	ADDEUA-ETS	CANCEL
Netherlands - unilateral	45	43	60	108	413
Netherlands - coalition	48	50	72	107	109

Compliance cost related to EU28 emission reduction (euro per ton CO2)					
	CO2TAX-POW	CO2TAX-ETS	ADDEUA-POW	ADDEUA-ETS	CANCEL
Netherlands - unilateral	213	182	116	130	37
Coalition overall	232	256	170	162	111

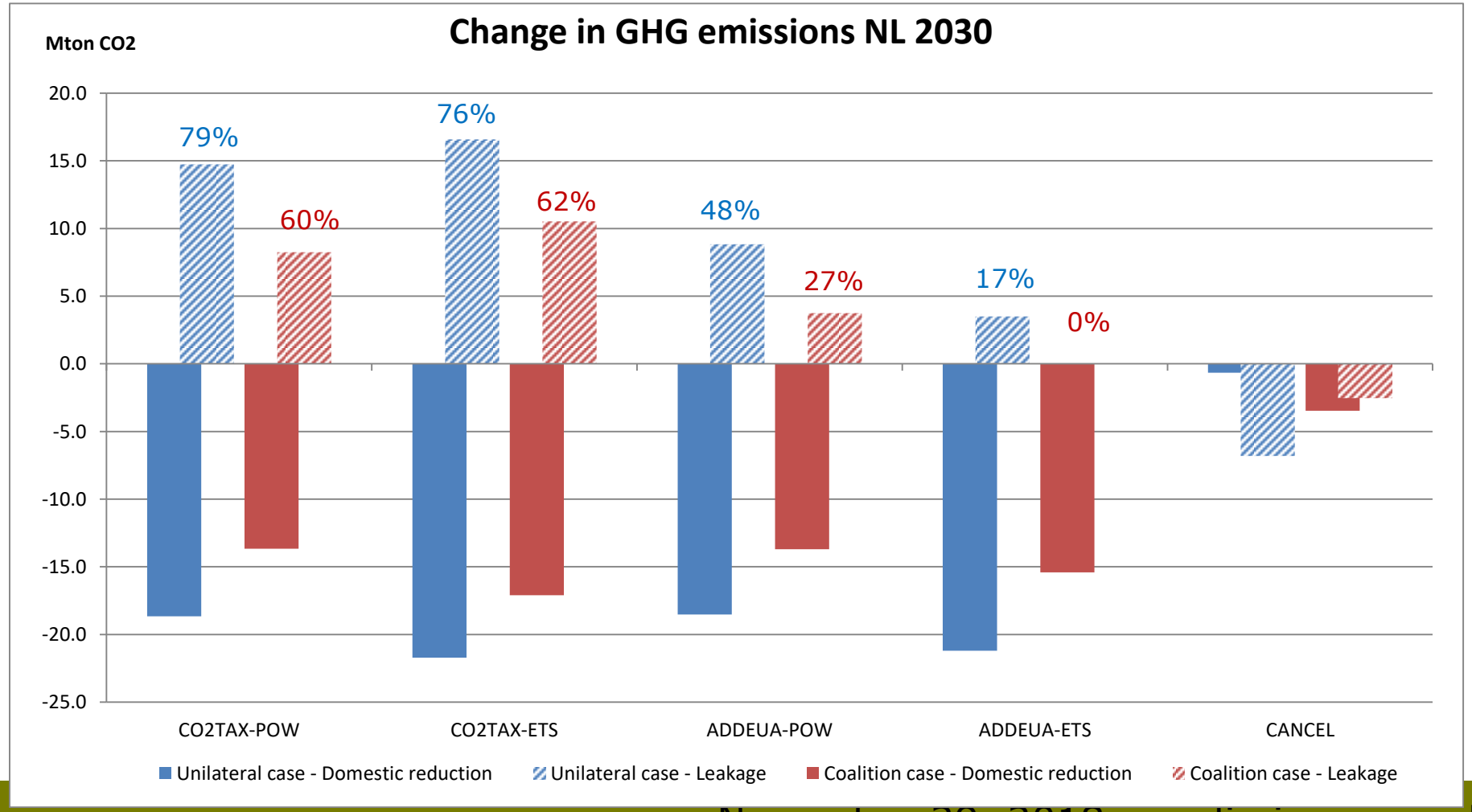
Change in GDP 2030



Change in production Dutch sectors 2030



Compare various options for the Netherlands



Findings

- not one unambiguous 'most cost effective' option
  but trade-offs:
  - emission reduction vs costs
  - domestic reduction vs reduction EU wide
- including industry:
  larger emission reductions, larger economic impact
- unilateral vs coalition:
  - less domestic emission reduction...
  - ...but smaller leakage rates and lower cost
- relatively high costs in Germany
  - CO2-intensive power sector compared to France
  - lower existing energy taxes compared to the Netherlands

Corjan Brink

PBL Netherlands Environmental Assessment Agency
corjan.brink@pbl.nl