



PBL Netherlands Environmental
Assessment Agency

Modeling the environmental impact of the financial crisis

Eric Drissen

May 08, 2012
TFIAM, Bilthoven

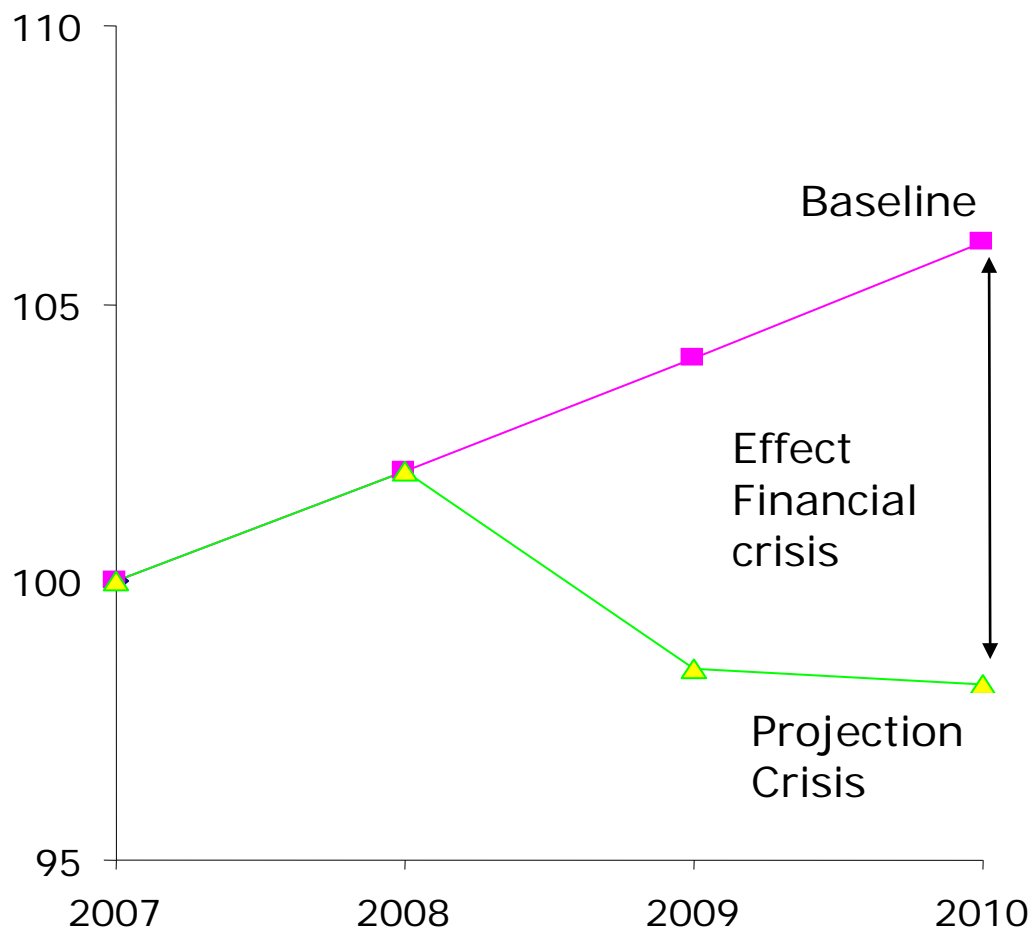


Modeling the environmental impacts of the financial crisis

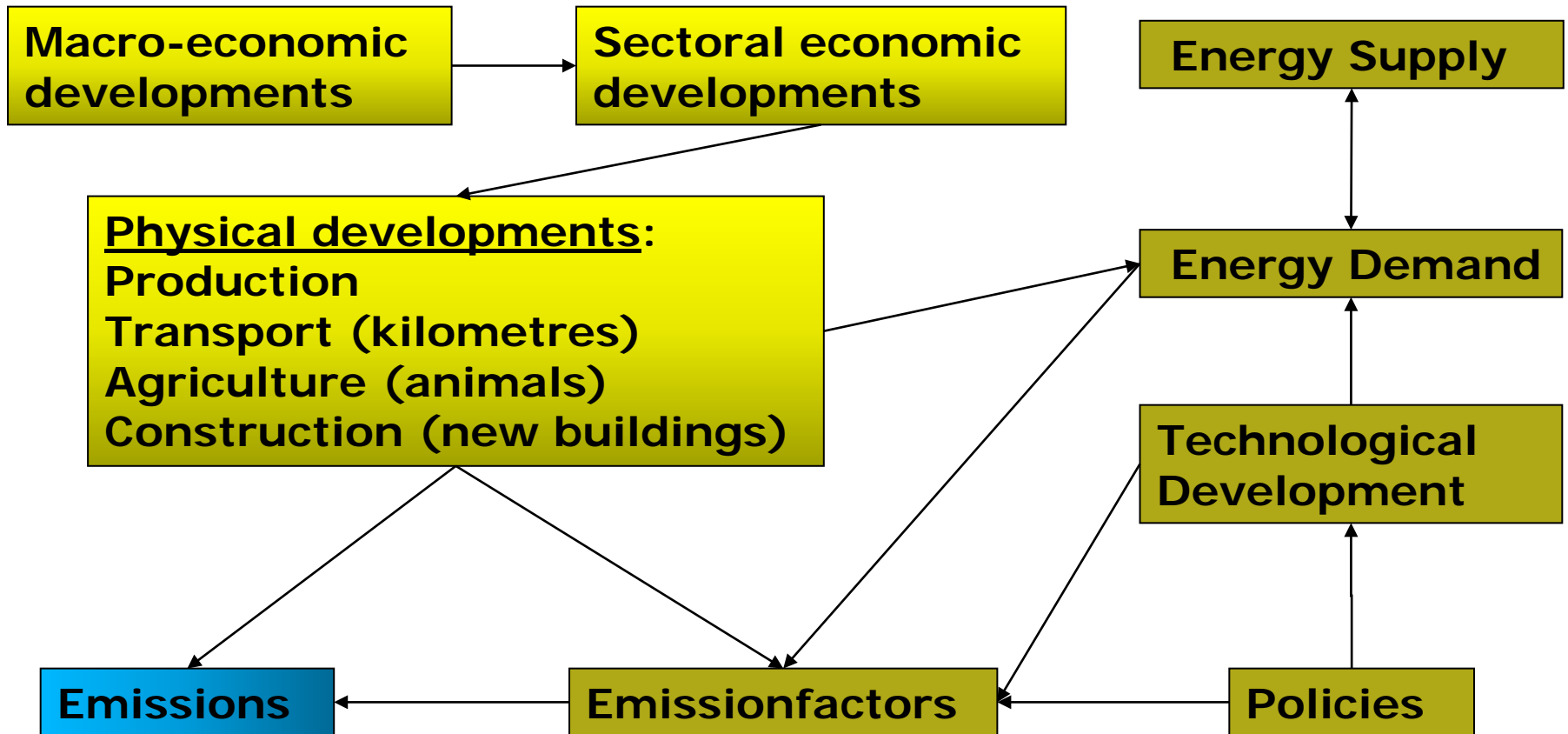
- Baseline for determining the impacts of the crisis
- Method for calculating emissions
- Available input for the projection of the impacts of the crisis
- Results of the projection
- Evaluating the projection
- Long term and short term impacts of the crisis



Determining short term effect crisis

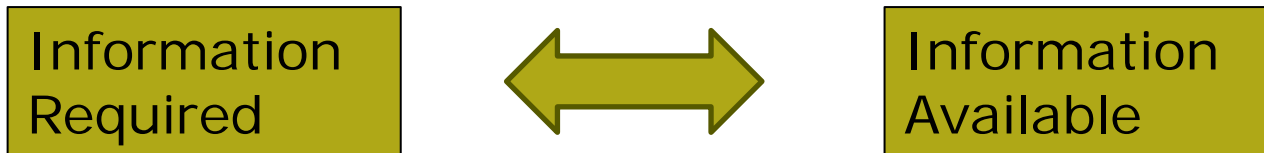


Calculating emissions



Calculating emissions

- Emissions derived from physical developments and not from macro-economic growth
- A projection of emissions requires information on the future development of these physical variables



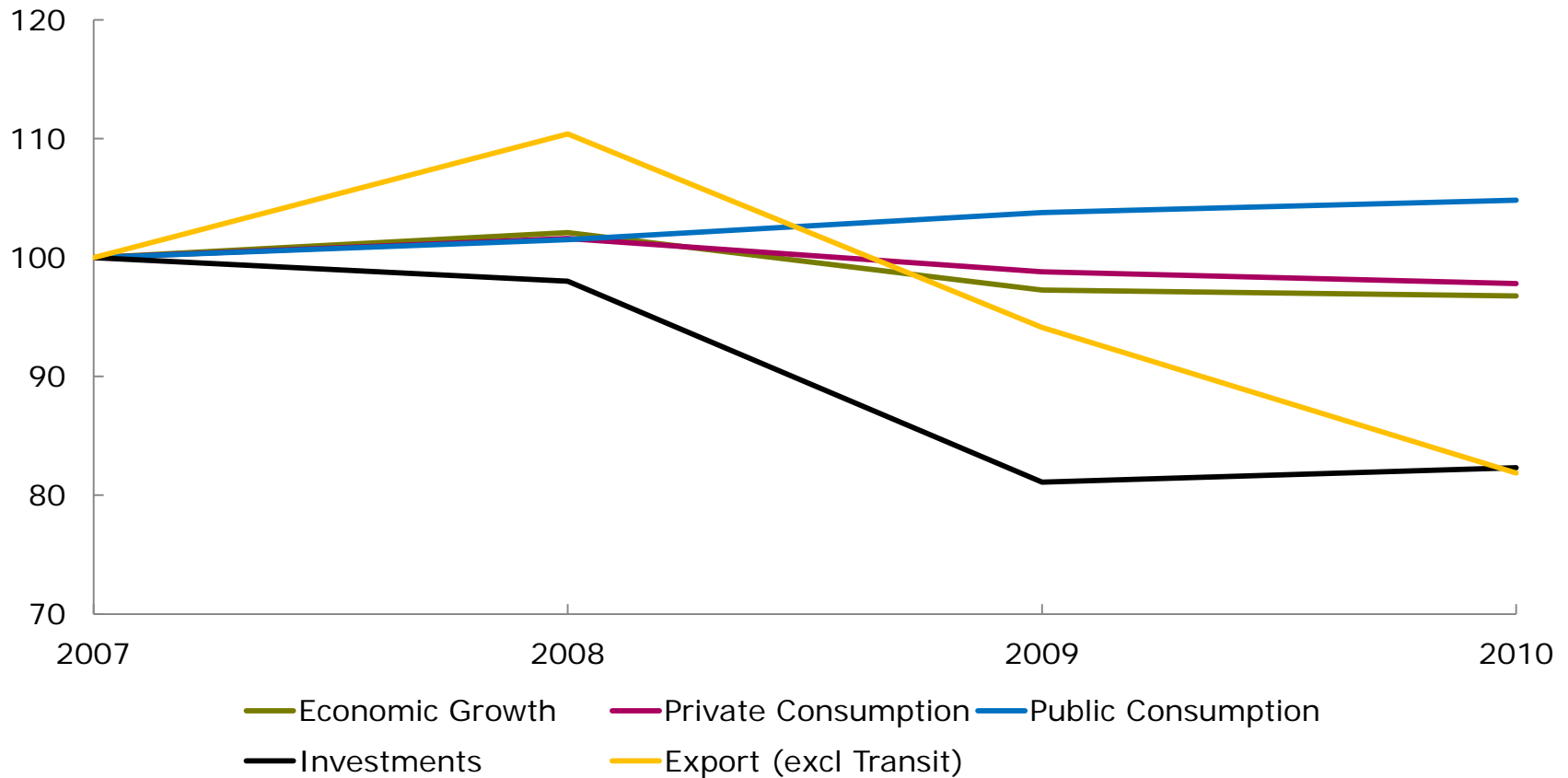


Projection of the impact of the financial crisis: information available ex ante

- Only macro-economic growth, no sectoral growth
- Also final demand on macro-level
 - Private Consumption
 - Public Consumption
 - Export
 - Investments
- Final demand distributed over sectors with distribution coefficients from earlier scenarios
- Final demand per sector used for calculating production per sector with a dynamic input-output model (DIMITRI)
- Impact on technological change is neglected
- No physical developments determined!!



Projection Economic Growth and Growth Final Demand in the Netherlands during the Crisis



Projection impact financial crisis on emissions 2008-2010 (projection - baseline)

| | Agriculture | Industry | Energy sector | Traffic | Consumers | Total |
|-----------------|-------------|----------|---------------|---------|-----------|--------|
| CO ₂ | -15,9% | -24,4% | -8,7% | -8,7% | -4,6% | -11,4% |
| NH ₃ | 0,0% | -23,6% | | -2,1% | 0,0% | -0,6% |
| NO _x | -13,7% | -24,6% | -9,8% | -6,6% | -2,9% | -9,3% |
| SO ₂ | | -23,2% | 0,0% | -4,7% | | -8,9% |
| PM10 | 0,0% | -14,4% | -11,0% | -9,6% | -2,9% | -7,9% |
| NMVOC | -12,0% | -15,3% | 3,3% | -10,1% | -7,6% | -11,0% |

Evaluating the projection of the impact of the crisis

- Emissions in 2007 and 2010 (in kton)

| | 2007 | 2010 Baseline | 2010 Crisis Projection | 2010 Realization |
|-----------------|--------|------------------|---------------------------|---------------------|
| CO ₂ | 172658 | 181500 | 160830 | 181700 |
| NH ₃ | 135 | 128 | 127 | 122 |
| NO _x | 299 | 265 | 241 | 276 |
| SO ₂ | 61 | 43 | 39 | 34 |
| PM10 | 37 | 35 | 32 | 29 |
| NMVOS | 164 | 157 | 140 | 151 |

Evaluating the projection of the impact of the crisis

- Economic growth and final demand:
Projection and realization 2008-2010 (annual changes)

| | Projection | Realization |
|-----------------------|------------|-------------|
| Economic Growth | -0,6% | 0,0% |
| Private Consumption | 0,3% | -0,3% |
| Public Consumption | 1,4% | 2,9% |
| Investments | -4,3% | -2,2% |
| Export (excl Transit) | -2,6% | 1,1% |

Evaluating the projection of the impact of the crisis

Production levels of some industrial sectors:
Projection and realization 2008-2010 (annual changes)

| | Projection | Realization |
|------------------|------------|-------------|
| Food | -1,8% | -0,6% |
| Chemical | -1,8% | -2,2% |
| Metal | -4,3% | -3,7% |
| Oilrefineries | -4,5% | -6,7% |
| Other industry | -3,9% | 3,9% |
| Minerals | -2,7% | 1,1% |
| Public Utilities | -2,6% | 2,4% |
| Total Industry | -3,4% | -3,3% |



Differences between projection and realization

- Projection of the growth rates for the final demand categories was not accurate
- Translation from macro developments to sectoral developments not accurate enough
- Skipped the physical developments step in the calculation
- A crisis is an exceptional occurrence with exceptional implications
- Impact financial crisis on technological change neglected



Long term versus short term impact of the crisis

- In the short term the crisis reduces emission levels, but this may not be the case in the long term
- In the short term volume effects are more important than technological effects, but in the long term technological effects will dominate
 - Emission levels decreased in the past two decades because technological improvements outweighed increasing volumes



Impact of financial crisis on technological change

- Negative impact:
 - Financial institutions are less eager to give loans for environmental investments
 - Governments have large deficits and have less abilities to subsidize environmental technological change
 - The crisis reduces the CO₂-price and the oilprice, which makes environmental investments less beneficial

- Positive or negative impact:
 - Replacement of machines and other assets
 - › Acceleration after the second oil crisis but now
 - Dutch industry more competitive
 - Current crisis does not lead to higher energy costs (although other developments do)