

**IDDRI**



## Why Methane Matters (and is usually underestimated)

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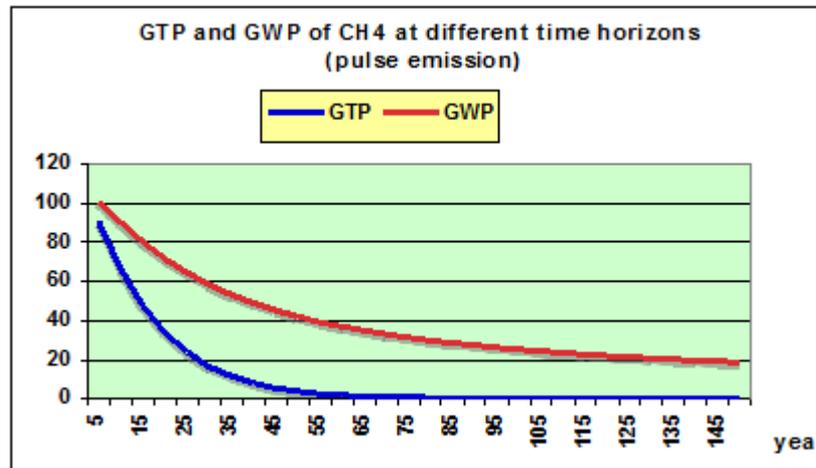
[www.iddri.org](http://www.iddri.org)

# Comparing Methane and CO2

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- Methane has a higher radiative efficiency, but shorter life-time in atmosphere => impact on climate depends on the time horizon chosen
- Common metric?
  - GTP : radiative forcing of a pulse of 1T at t=0, at a given time horizon, / 1T CO2
  - GWP : time-integrated radiative forcing due to a pulse of 1T, at t=0, at a given time horizon / 1T CO2
- Everybody has in mind 1 T CH4 = 21 T CO2 (GWP<sub>100</sub>)

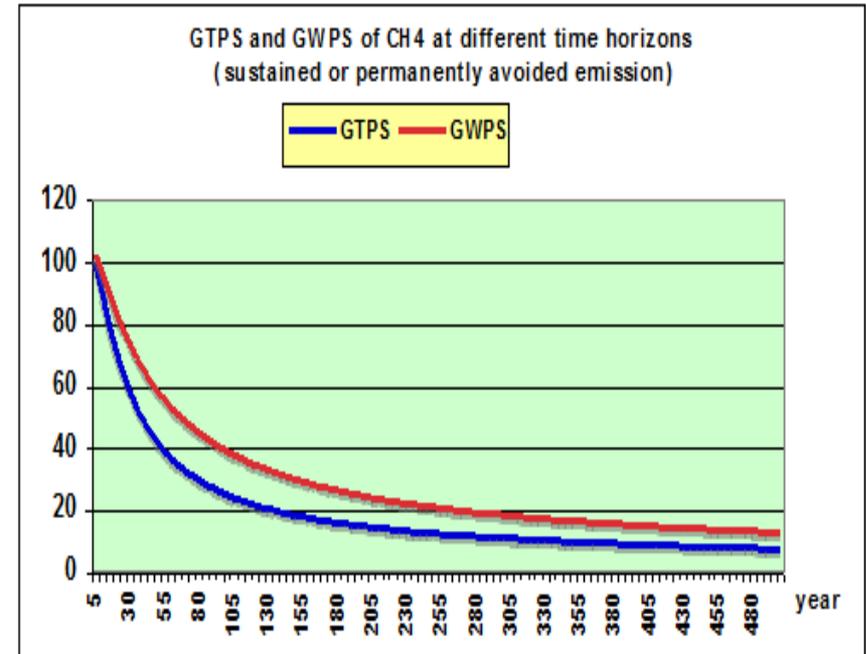
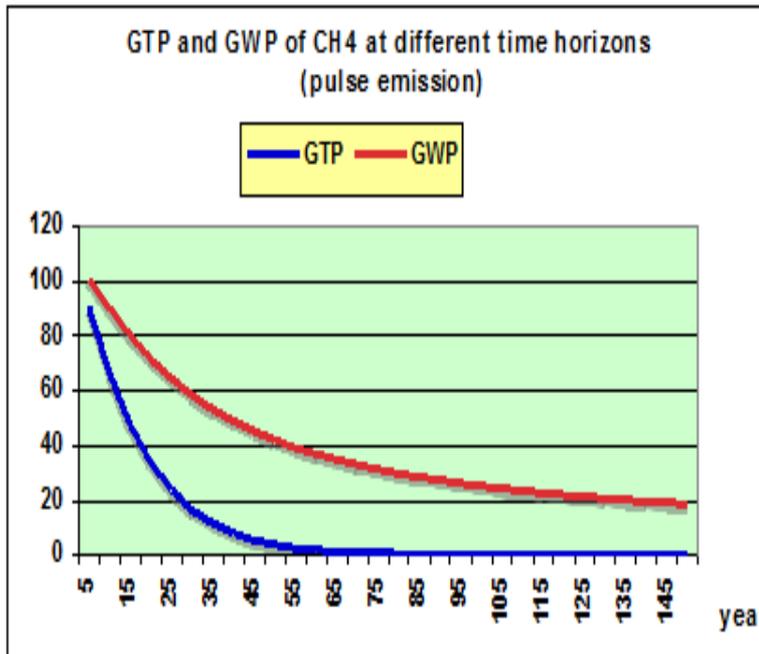
# GWP and GTP provide different, complementary information



GWP : approach to long term impact of the emission, when the evolution of the system depends on the cumulative effect of radiative forcing (thermal expansion of deep ocean for instance)

GTP : approach to temperature impact for a given year, where the relative, instantaneous concentration of the different GHGs matters

# Mitigation action is not about « pulse »



Mitigation programmes typically « lock in » emission reductions for years or decade (at least the life time of the investment). As a result, the impact (as represented on the right figure) is much higher, in particular on the temperature for a given year

# The IPCC has revisited the impact of methane

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GWP and GTP depend on the radiative forcing of CH<sub>4</sub> compared with CO<sub>2</sub>, and the decay curve of each gaz

But IPCC AR5 has now taken into account the indirect impact of CH<sub>4</sub> (changes in OH, tropospheric ozone and stratospheric vapour concentrations)

As a result,

	now (AR5)	AR4
The radiative forcing is	0.97 W/M <sup>2</sup>	0.48 W/M <sup>2</sup>
The responsibility of CH <sub>4</sub> in GW	33%	16%

# Consequences for policy making

Time horizon	20	30	50	100
GWP AR5	84	68	48	28
GWPS AR5	97	85	68	45
Kyoto	(70)			21

Time horizon	20	100
GTP AR4	34	0.07
GTPS AR4	70	11
GTP AR5	72	25
GTPS AR5	84	34

- The CH<sub>4</sub>/CO<sub>2</sub> equivalent is widely used in assessing options and identifying policies (cf IPCC group 3)
- It is also used in reporting, evaluation of policies
- It's been used in creating a common currency on carbon markets

# references

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IPCC AR 4 and 5

Dessus B., Laponche B., Le Treut H. The importance of a methane reduction policy for the 21st century, Climatic Change 2009

<http://www.global-change.org/Effet-de-serre-n-oublions-pas-le-methane>