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001. cable	Climate Change: Argentine Target (2 pages)	09/09/1999	P1/b(1)

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OA/Box Number: 21607

FOLDER TITLE:

[Global Climate Change & Argentina] [loose] [2]

2017-1095-F

bg231

RESTRICTION CODES

Presidential Records Act - [44 U.S.C. 2204(a)]

- P1 National Security Classified Information [(a)(1) of the PRA]
- P2 Relating to the appointment to Federal office [(a)(2) of the PRA]
- P3 Release would violate a Federal statute [(a)(3) of the PRA]
- P4 Release would disclose trade secrets or confidential commercial or financial information [(a)(4) of the PRA]
- P5 Release would disclose confidential advice between the President and his advisors, or between such advisors [(a)(5) of the PRA]
- P6 Release would constitute a clearly unwarranted invasion of personal privacy [(a)(6) of the PRA]

C. Closed in accordance with restrictions contained in donor's deed of gift.

PRM. Personal record misfile defined in accordance with 44 U.S.C. 2201(3).

RR. Document will be reviewed upon request.

Freedom of Information Act - [5 U.S.C. 552(b)]

- b(1) National security classified information [(b)(1) of the FOIA]
- b(2) Release would disclose internal personnel rules and practices of an agency [(b)(2) of the FOIA]
- b(3) Release would violate a Federal statute [(b)(3) of the FOIA]
- b(4) Release would disclose trade secrets or confidential or financial information [(b)(4) of the FOIA]
- b(6) Release would constitute a clearly unwarranted invasion of personal privacy [(b)(6) of the FOIA]
- b(7) Release would disclose information compiled for law enforcement purposes [(b)(7) of the FOIA]
- b(8) Release would disclose information concerning the regulation of financial institutions [(b)(8) of the FOIA]
- b(9) Release would disclose geological or geophysical information concerning wells [(b)(9) of the FOIA]

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Mitigación de gases de efecto invernadero

PROYECTO ARG/95/G/31 - PNUD - SECYT

Buenos Aires / Diciembre de 1997



United States Department of State

*Bureau of Oceans and International
Environmental and Scientific Affairs*

Washington, D.C. 20520

16 February 1999

MEMORANDUM

TO: CEA Joe Aldy
DOE Bill Breed
Ray Prince
DOT Kevin Green
EPA Maurice Le Franc
Leianne Clements
ICF Barbara Braatz
USDA Margot Anderson

FROM: DOS Barbara De Rosa-Joynt *(Burd)*

SUBJECT: Conference call follow up to Argentina technical team visit

As a follow up to the recent technical team visit to Argentina, I have either spoken to you or left messages regarding a conference call tomorrow, Wednesday 17 February. The call will take place from 12:15 - 1:15 pm. We ask those attending the IWG to simply come to Dan's office afterward to participate. For those who will be in their offices when they join the call, please call 1-888-476-3752. Your "participant code" is 716689.

We plan to review with Phil Covington at the Embassy in Buenos Aires what we believe the next steps for the Argentines should be, in anticipation of a meeting he has in the near future with Sr. Castellini and others. In addition, I believe that Phil will be interested in hearing about any further contact people have had with their Argentine counterparts.

We look forward to having a productive call. Apologies for the short notice! If you have any questions or concerns, please contact me. I can be reached at (202) 647-4511. I look forward to speaking with you tomorrow.

*Arg. indifference curve
→ by Phil
Arg cost curve
- follow-up w/ Ray + Leianne*

*paper to Arg on inventory, other go
then send inventory team
3/8 or 3/15*



Lefranc.Maurice@epamail.epa.gov
09/01/99 07:05:11 AM

Record Type: Record

To: Joseph E. Aldy/CEA/EOP
cc: DerosaBM@state.gov
Subject: FW: Argentina Target Update 8/31

Joe:

Phil Covington asked that I forward this message to you. I'll call you later this morning before the meeting (if we still have one).

Maurice

----- Forwarded by Maurice LeFranc/DC/USEPA/US on 09/01/99
07:05 AM -----

CovingtonPS@state.gov on 08/31/99 06:39:12 PM

To: Maurice LeFranc/DC/USEPA/US@EPA, DerosaBM@state.gov
cc:

Subject: FW: Argentina Target Update 8/31

Could somebody please copy Joe Aldy on this? I seem to have lost his email address. Thanks! Philip

> -----Original Message-----

> From: Covington, Philip S
> Sent: Tuesday, August 31, 1999 6:00 PM
> To: 'Lefranc.Maurice@epa.gov'
> Subject: FW: Argentina Target Update 8/31

>

>

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> -----Original Message-----

> From: Covington, Philip S
> Sent: Tuesday, August 31, 1999 5:59 PM
> To: (OES) Miotke, Jeffery A; (OES) DeRosa, Barbara M; (OES) Hambley,
> Mark G
> Subject: Argentina Target Update 8/31

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- > I've just met with Vicente Barros, technical director of Argentina's GHG
- > target project. I'll be faxing and mailing a variety of more and less
- > complete reports from Vicente on inventory and economic projections,
- > probably no earlier than tomorrow OOB in Washington. Meanwhile, I wanted
- > to provide some general impressions.
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- > 1) Vicente foresees not one but several reports from him and his team
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- > Maria Julia Alsogaray and including more or less subsecretarial
- > representation from several GOA secretariats/ministries. (By very early
- > October, Alsogaray and the Commission are scheduled to make a final
- > recommendation to President Menem for announcement before/at COP-5.)
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- > 2) The first of these, critical from our point of view, will describe the
- > "formula" he and his team recommend for the target. Vicente has agreed to
- > hold off on delivering this until I (we) have a chance to look at it
- > Monday afternoon, but he will want to submit it as early as possible
- > thereafter.
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- > target representing a fixed percentage (10% is the number we've been
- > talking about) below a weighted average change in emissions (presumably
- > baseline year to budget period) for the following indices:
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- > -- consumption of energy (which historically has had and is projected to
- > have a near-constant relation to energy sector
- > emissions overall)
- > -- meat production (ditto for bovine emissions)
- > -- emission from waste (ditto for GNP)
- > -- other emissions
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- > Weights assigned would reflect percentages of overall emissions:
- > currently 51 + % for energy, 35 + % for meat, 6% for waste, and 8% for other
- > emissions sources (e.g. industry and agriculture).
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- > 4) Vicente is not factoring sinks/forestry into his accounting, because he
- > believes it can't/shouldn't be done given the lack of IPCC guidelines at
- > present, but he believes that, when computed, forest sinks could roughly
- > double the percentage reduction in the target. (It would seem to me that
- > we might want either somehow to help Barros factor sinks into the target
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- > in its target presentation a reference to the fact that they're not
- > included but will be when possible and the target adjusted accordingly.)
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- > 5) As described earlier, the GOA has focused on a 1997 baseline year, in
- > part because a 1990 base (when they estimate their emissions to have been
- > roughly 220 MMT of CO2 equivalent vis-a-vis 270 MMT in 1997) would produce
- > give them a BAU budget-period figure of +77% as opposed to +44% based on
- > 1997. Given Vicente Barros's belief that the GOA can realistically hope
- > to achieve 25-30 MMT in reductions through remediation from a BAU
- > budget-period project of 390 MMT, 1990, when emissions were about 220 MMT
- > would equal a roughly 65% growth target as opposed to around 35% with a
- > 1997 base.
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> 6) On the political front, Vicente mentioned that Raimundo Florin of the
> Argentine World Business Council Sustainable Development NGO here
> (representing about 20 blue chip firms) seems to be rallying the business
> sector (especially energy producers) to condition support for the
> Argentine target on a commitment from the GOA to some sort of credit for
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> 4790-4317.
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>
>

OPTIONAL FORM 89 (7-90)

FAX TRANSMITTAL		# of pages 2
To	Joe Aldy	From Barbara D-J
Dept./Agency	URGENT	Phone # 647-4511
Fax #		Fax #
NSN 7540-01-317-7368		5099-101
GENERAL SERVICES ADMINISTRATION		

Issue

Should we urge Argentina to take on an indexed target?

Background

We have formally and informally shared our views on indexed targets with the Argentines. We have not, however, pushed them to choose either an indexed target or a target set against a historic base year. Initially, the Argentines seem to have been considering only the latter type of target, with their analysis focussing on determining the base year and appropriate level. According to the Embassy in Buenos Aires, the Argentine technical team believes a target that is 33% above a 1997 baseline will be achievable.

Opposition parties, the business community and some higher levels in the Government, such as Elsa Kelley, remain skeptical about taking on a target. They remain concerned that a binding target could affect Argentina's development, particularly in light of their recent economic problems.

Recently, the Argentine technical team has expressed more interest in the concept of an indexed target. With their technical analysis coming to an end, the Embassy in Buenos Aires believes that now is the time to act if we wish to convince the Argentines to take on an indexed target. Once political consultations start, we will be less likely to influence the type of target proposed by the Argentines. The Embassy believes we must act within the next week if we are to influence the Argentine choice of target.

The Argentines do not want to join Annex I. They have also indicated an interest in participating in emissions trading. Both objectives could be achieved with either target.

Advantages of Indexed Target

- 1) Help to address concerns in Argentina about the economic risk posed by a binding target.
 - Help dissuade those proposing a domestic only target.
- 2) Further fuel the growing interest in new forms of targets.
 - Potentially most useful with Korea, Turkey and Mexico
- 3) Would distinguish Argentina from developed countries more than historic base year target.
- 4) Consistent with common but differentiated responsibility

5) Opens the door to other forms of targets

- e.g. transitional targets
- potentially useful to Annex I parties.

Disadvantages of Indexed Target

- 1) Dissimilar to existing targets, potentially causing confusion in Argentina.
 - Would need to mobilize some additional technical assistance very quickly to help solidify their analysis and understanding of such a target.
- 2) Could become the ceiling for first period commitments by developing countries.
- 3) Because it is different than current form of targets, will continue to be opposed by those Parties, such as Brazil, that stress the need for an organizing principle.
- 4) Will be opposed by some environmental groups, like EDF, which believe indexed targets do not require sufficient effort. *but indexing could mitigate concerns re so-called tropical hot air*
- 5) Argentines more likely to hold US responsible for success or failure of their effort to win acceptance for their target.

GHG EMISSIONS

Thousands of MTCE

	1990	1994	1997	%
ENERGY	29.088	34.622	37.782	50,6
Fuel Combustion	25.200	29.889	33.037	
Fugitive Emissions	3.888	4.733	4.725	
INDUSTRY	**816	**1.147	*1.282	1,5
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AGRICULTURE	2.670	3.530	5.070	6,7
Rice	140	170	260	
Fertilizers	220	760	1140	
Nitrogen Fixing crops	1180	1310	1990	
Incorporation of crop residues	1130	1290	1680	
WASTE	2470	4020	4440	5,9
TOTAL (Without Forestry and Use of land change)	60.414	69.427	74.894	100
FORESTRY	-9.390	-9390	-9450	

TOTAL	51.024	60.137	65.444
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ARGENTINA

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Opposition parties, the business community and some higher levels in the Government, such as Ambassador Elsa Kelley, Director General for Environmental Affairs at the Ministry of Foreign Affairs, remain skeptical about Argentina's ability to take on a target. They remain concerned that a binding target could negatively impact Argentina's development, particularly in light of their recent economic problems.

Recently, the Argentine technical team has expressed more interest in the concept of an indexed target. With their technical analysis coming to an end, the Embassy in Buenos Aires believes that now is the time to act if we wish to convince the Argentines to take on an indexed target. Once the internal political consultations start in early September, we will be less likely to influence the type of target proposed by the Argentines. The Embassy believes we must act within the next week if we are to influence the Argentine choice of target.

The Argentines do not want to join Annex I, in part because they do not want to use a 1990 base year. They have also indicated an interest in participating in emissions trading. Both objectives could be achieved with either target.

Advantages of Indexed Target

- 1) Help to address concerns in Argentina about the economic risk posed by a binding target.
 - Help dissuade those proposing a domestic only target.
 - By assuaging concerns about economic risk you may increase the potential to curb the current opposition of business groups to Argentina's target-setting effort.
- 2) Would distinguish Argentina from developed countries more than by the Argentines simply having a different historic base year for their target.
- 3) Argentina may feel disadvantaged if it accepts an historic base year target but later other developing countries take on indexed targets.

- 4) Further fuel the growing interest in new forms of targets.
 - Potentially most useful with Korea, Turkey and Mexico
 - Serves as an "insurance policy" for all developing countries
- 5) Consistent with common but differentiated responsibility.
- 6) Opens the door to other forms of targets, e.g. transitional targets, which is potentially useful to Annex I Parties.
- 7) If we are not comfortable with an Argentine target that is 33% above a 1997 baseline, or if we do not believe the international community would view such an increase positively, an indexed growth target may be a better option for Argentina to present to the international community.
- 8) Ultimately the emissions are lower than they would have been without a target.

Disadvantages of Indexed Target

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- 2) Could become the ceiling for first period commitments by developing countries.
- 3) Because it is different than current form of targets, will continue to be opposed by those Parties, such as Brazil, that stress the need for an organizing principle.
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- 5) Argentines more likely to hold U.S. responsible for success or failure of their effort to win acceptance for their target.

trip - Log
CEA
EPA

lay out multilateral context

(OES) DeRosa, Barbara M

From: Covington, Philip S
Sent: Tuesday, August 31, 1999 4:59 PM
To: (OES) Miotke, Jeffery A; (OES) DeRosa, Barbara M; (OES) Hambley, Mark G
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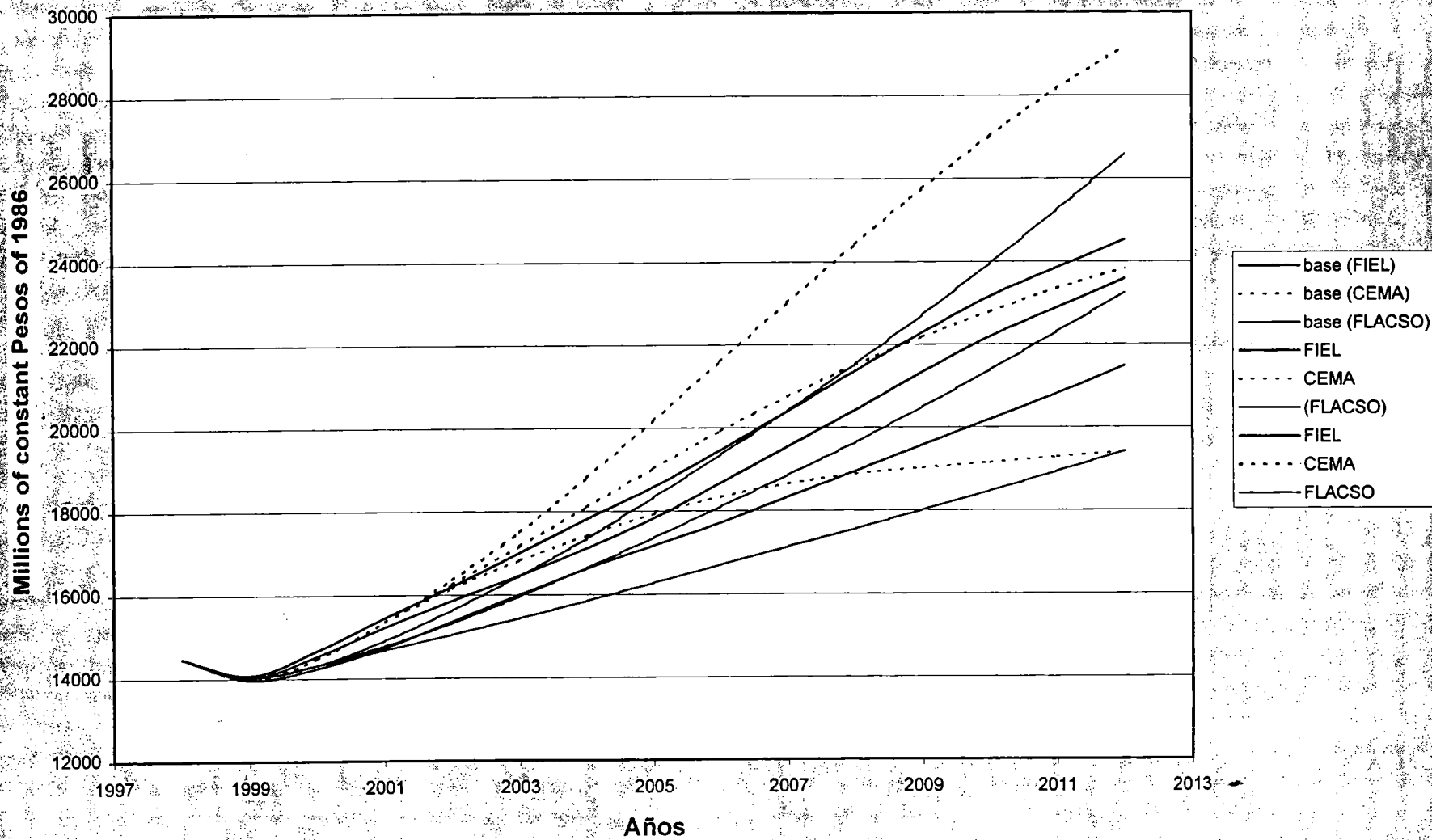
BASE

LOW

HIGH

year	base (FIEL)	base (CEMA)	FIEL	CEMA	FIEL	CEMA	FIEL	CEMA	FIEL	CEMA
1998	14472.3	14472.3	14472	14472.3	14472.3	14472	14472.3	14472.3	14472	14472
1999	14021.5	13963.1	14035	13968.4	13963.1	14035	14071.6	13963.1	14035	14035
2000	14539.2	14478	14318	14241.6	14478	14318	14670.1	14478	14318	14318
2001	15231.3	15356.6	14784	14737.1	15356.6	14677	15453	15356.6	14910	14910
2002	15859.4	16252.9	15317	15363.1	16144.6	15046	16199.3	16361.3	15631	15631
2003	16466.9	17169.3	15958	16006.4	16830.6	15435	17010.9	17508.7	16456	16456
2004	17116	18108.9	16643	16623.3	17414.2	15846	17812.6	18816.4	17349	17349
2005	17826.3	19035.3	17358	17173.3	17925.4	16270	18582	20184	18332	18332
2006	18677.8	19923.9	18101	17711.7	18338.3	16700	19463.9	21605.1	19356	19356
2007	19542.4	20746.2	18858	18330.1	18648.8	17132	20396.8	23025.1	20409	20409
2008	20421.6	21506.8	19638	18952.8	18881	17561	21362.4	24427.8	21529	21529
2009	21332.2	22177.6	20490	19576.2	19026.4	18006	22283.9	25763.3	22709	22709
2010	22181	22789.3	21376	20188.9	19153.3	18464	23151.9	27020.7	23945	23945
2011	22877.9	23343.7	22297	20803.7	19282.5	18935	23845.1	28164.8	25241	25241
2012	23576.5	23829.9	23252	21476.5	19412	19421	24520.5	29160.1	26595	26595

GNP PROJECTIONS (CEMA;FIEL &FLACSO)



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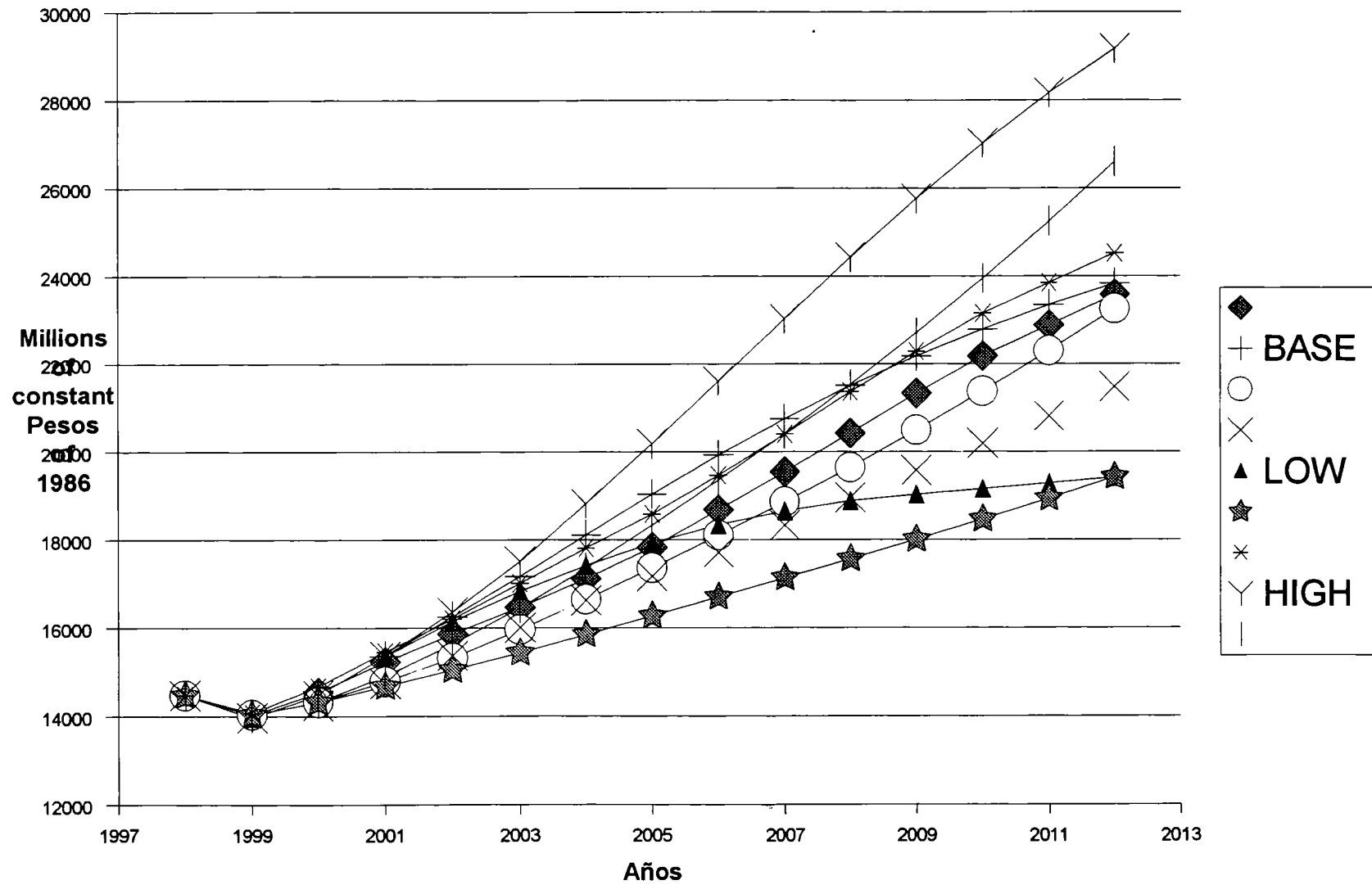
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- > 1997. Given Vicente Barros's belief that the GOA can realistically hope
- > to achieve 25-30 MMT in reductions through remediation from a BAU
- > budget-period project of 390 MMT, 1990, when emissions were about 220 MMT
- > would equal a roughly 65% growth target as opposed to around 35% with a
- > 1997 base.
- >

> 6) On the political front, Vicente mentioned that Raimundo Florin of the
> Argentine World Business Council Sustainable Development NGO here
> (representing about 20 blue chip firms) seems to be rallying the business
> sector (especially energy producers) to condition support for the
> Argentine target on a commitment from the GOA to some sort of credit for
> the emissions reductions effected between 1990 and 1997 by
> newly-privatized utilities (basically in converting from oil to
> comined-cycle gas production). I would like for us to be able to suggest
> options for Argentina on early-credit programs that might address this
> concern. (One approach for such programs that interested me as a layman
> was the idea of emissions/output "efficiency ratios," as discussed in a
> March/April article by Alvin Alm and J. Bennet Johnson in "Environmental
> Forum," the magazine of the Environmental Law Institute As I understand,
> one of the advantages of this approach is that even improvements in
> efficiency achieved before the establishment of the program/s can be
> credited.).
>
> I hope the above, drafted on the run, is useful. I would welcome a call
> from any of you or anyone else with questions or perspective to offer on
> this subject. My number at work is 5411-4777-4533/4, x 2531 and at home
> 4790-4317.
>
>
>
>
>
>
>

GNP PROJECTIONS (CEMA;FIEL &FLACSO)



		BASE		
year		base (CEMA)		
1998	14472.3	14472.3	14472	14472.3
1999	14021.5	13963.1	14035	13968.4
2000	14539.2	14478	14318	14241.6
2001	15231.3	15356.6	14784	14737.1
2002	15859.4	16252.9	15317	15363.1
2003	16466.9	17169.3	15958	16006.4
2004	17116	18108.9	16643	16623.3
2005	17826.3	19035.3	17358	17173.3
2006	18677.8	19923.9	18101	17711.7
2007	19542.4	20746.2	18858	18330.1
2008	20421.6	21506.8	19638	18952.8
2009	21332.2	22177.6	20490	19576.2
2010	22181	22789.3	21376	20188.9
2011	22877.9	23343.7	22297	20803.7
2012	23576.5	23829.9	23252	21476.5

LOW			HIGH		
CEMA	FLACSO		CEMA	FLACSO	
14472.3	14472	14472.3	14472.3	14472	
13963.1	14035	14071.6	13963.1	14035	
14478	14318	14670.1	14478	14318	
15356.6	14677	15453	15356.6	14910	
16144.6	15046	16199.3	16361.3	15631	
16830.6	15435	17010.9	17508.7	16456	
17414.2	15846	17812.6	18816.4	17349	
17925.4	16270	18582	20184	18332	
18338.3	16700	19463.9	21605.1	19356	
18648.8	17132	20396.8	23025.1	20409	
18881	17561	21362.4	24427.8	21529	
19026.4	18006	22283.9	25763.3	22709	
19153.3	18464	23151.9	27020.7	23945	
19282.5	18935	23845.1	28164.8	25241	
19412	19421	24520.5	29160.1	26595	

8
9
10
11
12

GHG EMISSIONS

Thousands of MTCE

	1990	1994	1997	%
ENERGY	29.088	34.622	37.782	50,6
Fuel Combustion	25.200	29.889	33.037	
Fugitive Emissions	3.888	4.733	4.725	
INDUSTRY	**816	**1.147	*1.282	1,5
Cement			992	
Others			*290	
LIVESTCK	25.400	26.140	26.320	35,2
Cattle	24.540	25.600	25210	
Nitrogen Fixing Pastures	600	300	810	
Incorporation of pasture	260	240	300	
AGRICULTURE	2.670	3.530	5.070	6,7
Rice	140	170	260	
Fertilizers	220	760	1140	
Nitrogen Fixing crops	1180	1310	1990	
Incorporation of crop residues	1130	1290	1680	
WASTE	2470	4020	4440	5,9
TOTAL (Without Forestry and Use of land change)	60.414	69.427	74.894	100
FORESTRY	-9.390	-9390	-9450	

TOTAL	51.024	60.137	65.444
-------	--------	--------	--------

**** Values from former inventory. Experts working in the industrial sector presented their final report august 31. We did not have time to include it.**

Percentages are calculated for the 1997 values.

EMISIONES DE CO2 EQUIVALENTES

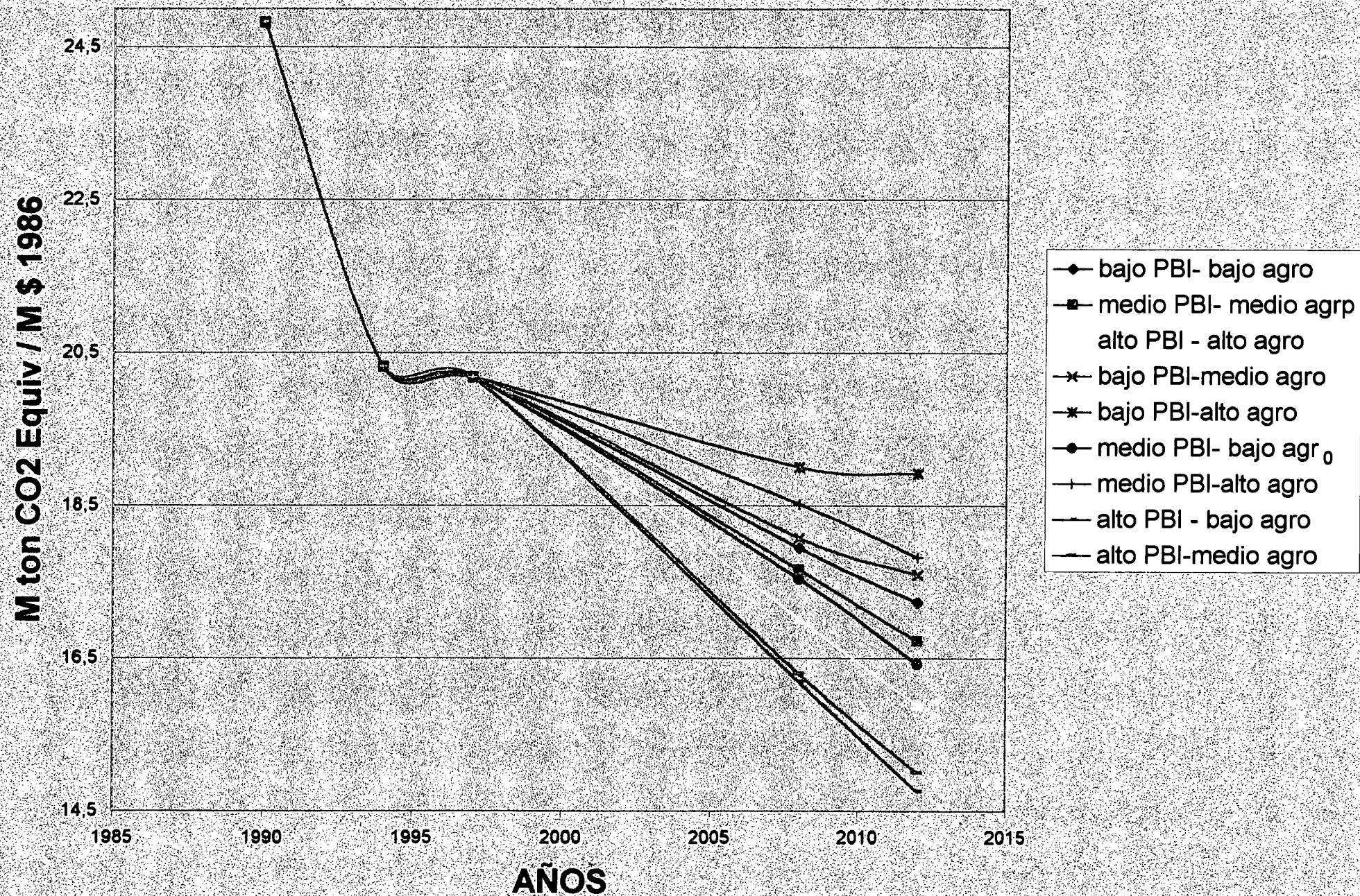
	1990	1994	1997	Escenario Bajo 2008	2012	Escenario Medio 2008	2012	Escenario Alto 2008	2012
Energia	109861	130724	139685	188133	196050	203406	238048	235666	276014
HFC	0	0	188	246	253	287	319	332	396
Cemento	0	0	3108	4483	4588	5027	6432	5640	6719
Hierro y acero	0	0	3256	5109	5332	6833	9522	6555	7808
Otras industrias	0	0	2616	3664	3764	3862	4459	4740	5658
Industria	6010	6160	8980	13502	13937	16009	20732	17267	20581
Suelos agricolas	12430	14300	21707	16793	18481	12082	12439	14674	14621
Directas	0	0	0	102	113	73	76	89	89
Inder Volatil	0	0	0	1	1	1	1	1	1
Indeir, Lixiv,	0	0	0	6	6	4	4	5	5
Arroz Ch4	513	623	953	54	58	63	71	66	77
Arroz	513	623	953	1136	1218	1136	1491	1390	1621
Ganado final	89980	93867	92437	101568	87308	108751	100443	123663	124026
Quema rastrojos	220	183	183	150	130	150	130	150	130
Desperdicios	9057	14923	16280	18717	18622	20244	22617	24215	27973
Total f(PBI)	124923	149387	164945	220352	228609	239659	281397	277148	324568
Total agropec	103143	108973	115280	118565	105977	121046	113083	138553	138855
Total susyf	228067	258361	280225	338916	334586	360705	394480	415701	463423
Bosques cultivados			-17490	-25378		-38453		-49419	
Conversión a TA			9826,7	9826,7		9826,7		9826,7	
Balance forestal			-7663,3	-15551,3		-28626,3		-39592,3	
				14,62%		24,53%		42,73%	
% de la energia			50%	57%		58%		58%	
%de ganaderia			34%	29%		29%		30%	
% residuos			6%	6%		6%		6%	
% industria			3%	4%		5%		4%	
% agricultura			8%	5%		3%		3%	

PBI	1990 9185,4	1994 12712,2	1997 13884,2	2008 18881	20012 19412				
EMIS/PBI bajo	1990 24,8	1994 20,3	1997 20,2	2008 18,0	2012 17,2				
EMIS no Agro /PBI bajo	1990 13,6	1994 11,8	1997 11,9	2008 11,7	2012 11,8				
Emis no gan / PBI bajo	15,0	12,9	13,5	12,6	12,7				
EMIS no Agro /PBI medio	13,6	11,8	11,9	11,7	11,9				
Emis no gan / PBI medio	15,0	12,9	13,5	12,3	12,5				
EMIS no Agro /PBI alto	13,6	11,8	11,9	11,3	11,1				
Emis no gan / PBI alto	15,0	12,9	13,5	12,0	11,6				
bajo PBI- bajo agro	1990 24,8	1994 20,3	1997 20,2	2008 18,0	2012 17,2	2008 311536,5	2012 320298,0	2008-2012 315917,3	20833,8
medio PBI- medio agrp	24,8	20,3	20,2	17,7	16,7	336956,4	389012,3	362984,3	14608,1
alto PBI - alto agro	24,8	20,3	20,2	17,0	15,9	403058,7	481141,7	442100,2	-2538,0
bajo PBI-medio agro	24,8	20,3	20,2	18,1	17,6	311536,5	320298,0	315917,3	25627,5
bajo PBI-alto agro	24,8	20,3	20,2	19,0	18,9	311536,5	320298,0	315917,3	47266,9
medio PBI- bajo agr	24,8	20,3	20,2	17,5	16,4	336956,4	389012,3	362984,3	9814,3
medio PBI-alto agro	24,8	20,3	20,2	18,5	17,8	336956,4	389012,3	362984,3	36247,5
alto PBI - bajo agro	24,8	20,3	20,2	16,2	14,8	403058,7	481141,7	442100,2	-28971,2
alto PBI-medio agro	24,8	20,3	20,2	16,3	15,0	403058,7	481141,7	442100,2	-24177,4
CT de Energia	1459,0	1765,6	2041,8	2833,9	2986,7	3040,1	3534,3	3496,7	4083,1
CO2 Eq./CTE	73,1	71,9	68,4	66,4	65,6	66,9	67,4	67,4	67,6
Produccion de carne	3007000,0	2783000,0	2712000,0	2974580,0	2910890,0	3620810,0	3777630,0	4201800,0	4788650,0
Emisiones Ganado	89980000,0	93866667,0	92436666,7	101567720,9	87308070,5	108750820,6	100442956,5	123662807,1	124026410,5
Emis/Carne	29,9	33,7	34,1	34,1	30,0	30,0	26,6	29,4	25,9

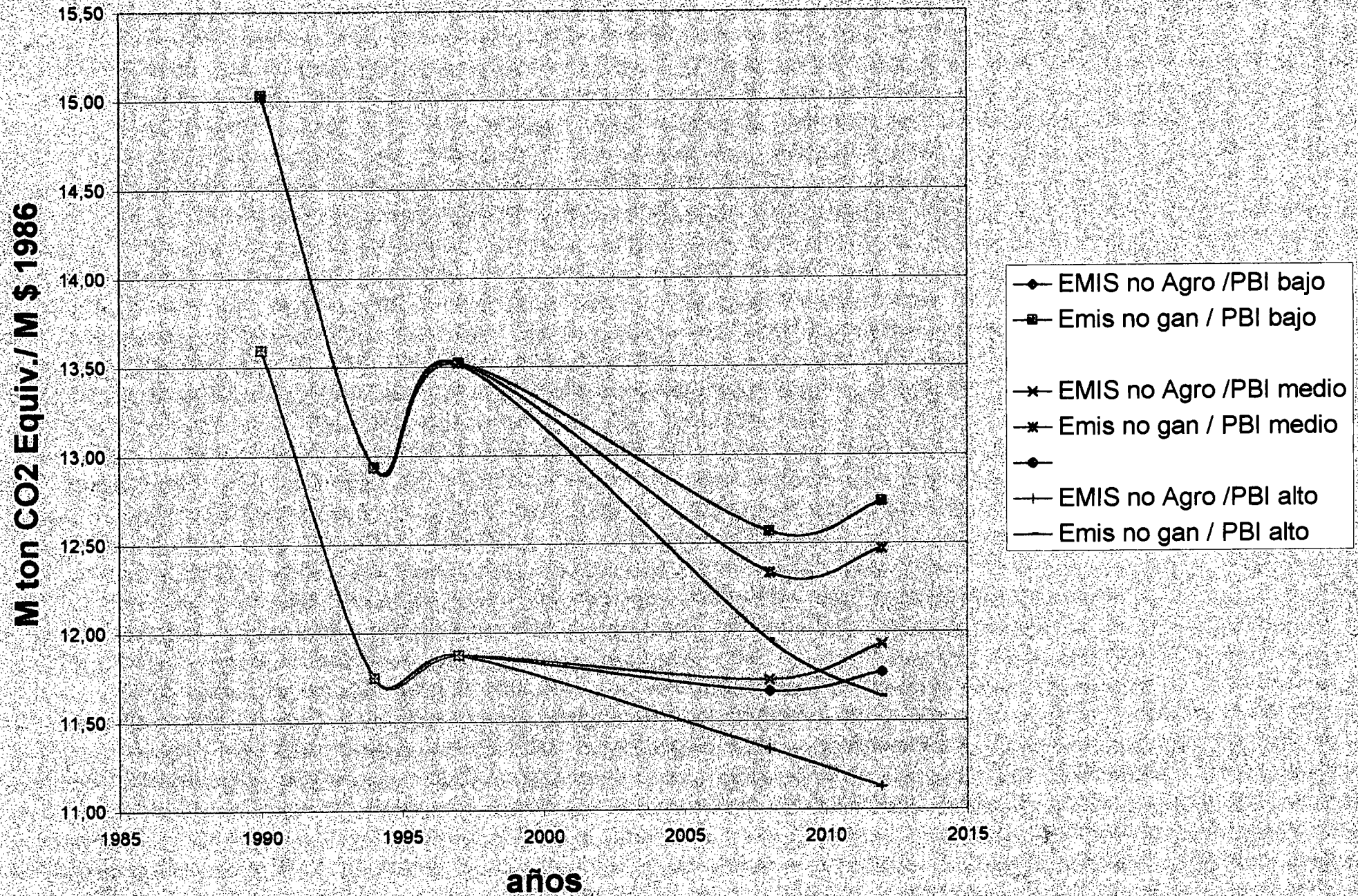
	1990	1994	1997	2008	2012	2008-2012		
bajo PBI-bajo agrop	228066,7	258360,7	280225,0	338916,3	334585,7	336751,0		
med. PBI-medagrop	228066,7	258360,7	280225,0	360705,1	394479,7	377592,4	377592,4	1,4
alto PBI-alto agrop	228066,7	258360,7	280225,0	415701,2	463423,1	439562,2	37759,2	
bajo PBI-medio agro	228066,7	258360,7	280225,0	341397,9	341691,7	341544,8	339833,1	1,2
bajo PBI-alto agro	228066,7	258360,7	280225,0	358904,7	367463,7	363184,2		
medio PBI- bajo agr	228066,7	258360,7	280225,0	358223,5	387373,7	372798,6		
medio PBI-alto agro	228066,7	258360,7	280225,0	378211,9	420251,8	399231,8	399231,8	1,4
alto PBI - bajo agro	228066,7	258360,7	280225,0	395712,9	430545,1	413129,0	39923,2	
alto PBI-medio agro	228066,7	258360,7	280225,0	398194,4	437651,1	417922,7	359308,6	1,3

	1990	1994	1997	2008	2012
bajo PBI-bajo agrop	228066,7	8,6	11,1	11,4	10,4
med. PBI-medagrop	228066,7	8,6	11,1	11,8	11,6
alto PBI-alto agrop	228066,7	8,6	11,1	12,3	11,8
bajo PBI-medio agro	228066,7	8,6	11,1	11,7	11,1
bajo PBI-alto agro	228066,7	8,6	11,1	13,5	13,6
medio PBI- bajo agr	228066,7	8,6	11,1	11,6	11,1
medio PBI-alto agro	228066,7	8,6	11,1	13,4	13,4
alto PBI - bajo agro	228066,7	8,6	11,1	11,0	10,1
alto PBI-medio agro	228066,7	8,6	11,1	11,2	10,5

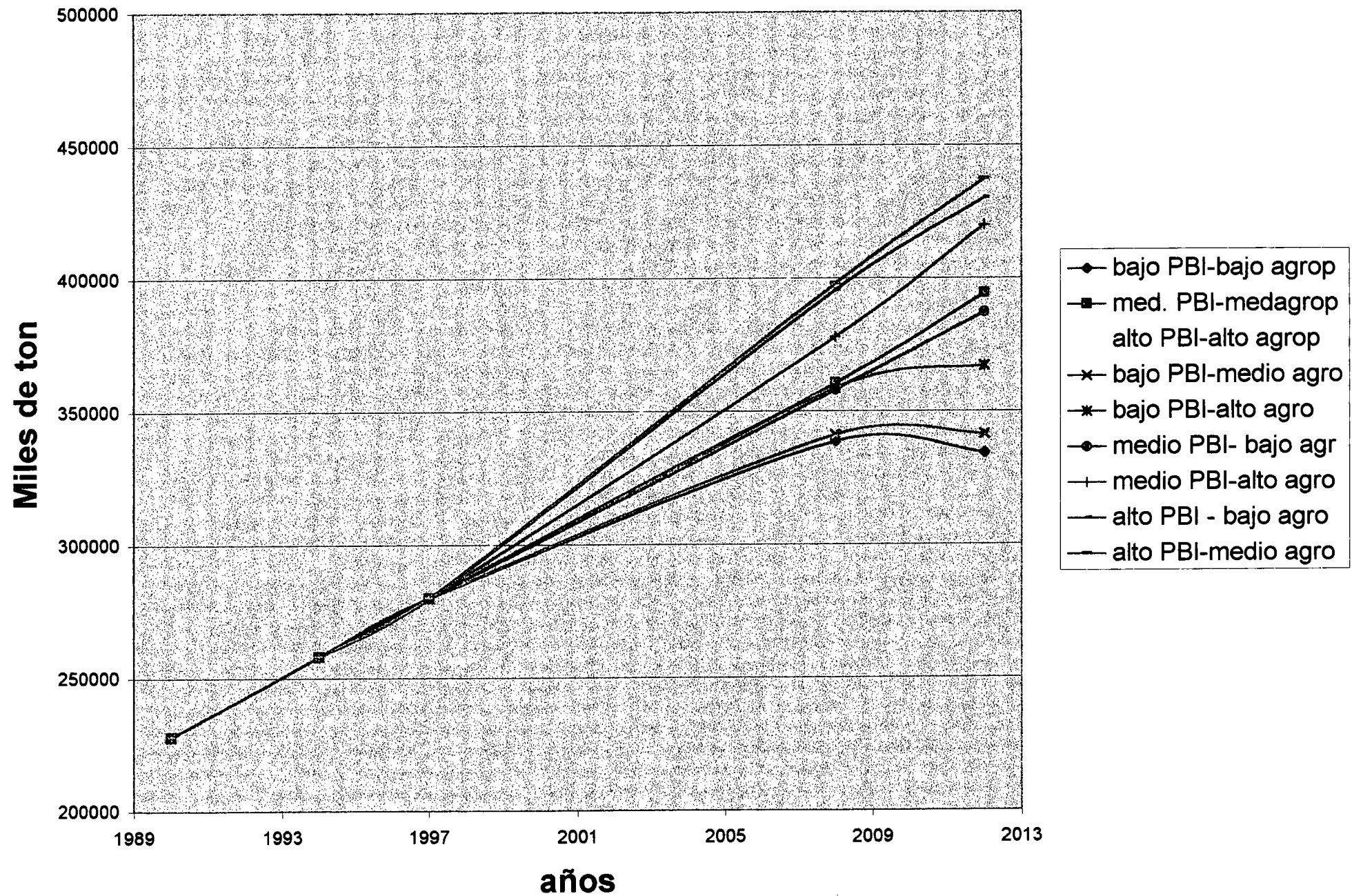
EMISIONES / PBI



INTENSIDADES DE EMISION



EMISIONES EN CO2 EQUIVALENTE



DYNAMIC INDEXES IN THE ARGENTINE CASE

Introduction

The basic challenge for developing countries in establishing GHG emissions abatement targets is overcoming the element of uncertainty and risk. In Argentina, overall economic uncertainties are compounded by particular problems arising from the role of the agricultural sector. A dynamic or indexed target based on an "efficiency ratio" relating emissions not simply to economic output but to the square root of economic output seems the best means of reducing uncertainty while ensuring substantial mitigation of emissions.

Background

In the two decades preceding this year's externally-generated recession the Argentine economy experienced a long period of stagnation, followed by another of rapid expansion. During the 1980s, the rate of growth of gross domestic product (GDP) was near zero, even slightly negative, while between 1990 and 1997 the mean annual growth rate was 7.3 %. A smaller rate of growth is expected for the 1997-2000 period. These economic changes have been caused by internal policies and structural reforms, but also by external factors. Macroeconomic projections from four prestigious institutes predict a wide range of values for GDP for the 2008-2012 period. Therefore, (GHG) emission projections are correspondingly widely dispersed, implying a high degree of uncertainty.

Another fundamental analytical problem for designers of an Argentine GHG target is the problematic role of agriculture. While agricultural emissions are responsible for not much less than half of all emissions, the agricultural sector of the Argentine economy accounts for less than seven percent of national economic output. Historically, moreover, changes in agricultural output and emissions have not tracked at all closely with changes in GDP and overall emissions. Livestock emissions, which account for all but five percent of the 40% of overall emissions contributed by agriculture, are particularly difficult to predict, because their growth responds more directly to changing export prospects and incentives than to other factors. One recent development whose impact is difficult to predict, for example, is the fact that Argentine cattle are now free of hoof-and-mouth disease and their meat acceptable in previously inaccessible international markets. Another compelling but unpredictable variable is international meat prices.

Figure 1 shows nine projected emissions curves for 2008-12 under three scenarios for economic growth: high, medium, and low. The projections result from applying these scenarios to "GDP-insensitive" agricultural emissions and emissions generated by other, GDP-sensitive economic sectors: energy, industry, and waste management. These projections imply a wide range of overall emissions outcomes, spanning, at the time of the commitment period, 100 million tons of CO₂ equivalent (MTCE), more than 25% of the expected emissions in the medium scenarios. 25 of these 100 million tons can be attributed to uncertainty in the agricultural sector, primarily livestock.

Given the high degree of uncertainty which Fig. 1 illustrates, it is clear that it would be inconvenient and unrealistic for Argentina to adopt a fixed target for GHG emissions, independent of economic conditions. While a relatively undemanding fixed target would reduce the risk of non-compliance, it would also run the risk of necessitating little or no actual mitigation of GHG emissions. Moreover, from the point of view of the international community, such an undemanding target would not be a strong argument in favor of granting Argentina access to the emissions trading and joint implementation mechanisms. A too-demanding target, on the other hand, would commit Argentina beyond its capacity to achieve mitigations. In addition, it would be difficult or impossible to win domestic social and political consensus for such a target, which would require draconian measures to implement and, if not met, could eventually result in real non-compliance costs.

2. Efficiency Ratio Target

For all of the above reasons, a preferable alternative to a fixed target would be a dynamic or indexed one, based on some relation between emissions and GDP. In arithmetic terms, the simplest such "efficiency ratio" target would relate the rate of emissions (E) and GDP (P) in a formula, $E = KP$, in which the value of K would be fixed and the target depend, in effect, on the average level of GDP during the commitment period, 2008-2012. Based on this formula, Figure 2 shows, for the same 9 projections as depicted in Figure 1, the index K prediction for the commitment period. The range of outcomes between extremes is equivalent to roughly 80 MTCE in the case of a medium-growth GDP scenario.

Unfortunately, the reduction of uncertainty resulting from this simple efficiency ratio target formula as opposed to a fixed target is surprisingly quite modest -- a range of emissions outcomes only 20 MTCE narrower than the 100 MTCE for a comparable fixed target as described above. Figure 3, shows the emissions reductions that would occur under business-as-usual scenarios as functions of GDP accumulative annual growth with a target corresponding to emissions reductions of 10 % under one of the most probable scenarios, the one with medium GDP growth and high agriculture growth. Emissions reductions under this scenario would be higher as agricultural emissions rose, which is a satisfactory result. However, in the scenarios of lower economic growth, the emissions reductions would be greater overall, while they would disappear entirely in scenarios of high GDP growth. Hence, in addition to failing sufficiently to reduce uncertainty, the simple efficiency ratio target would have the effect of creating "hot air." These aspects are discussed mathematically in Annex I.

Clearly, another index related to GDP, which better explains the dynamics of Argentine GHG emissions, must be explored. Fortunately, such an index exists. It is the ratio between emissions (E) and the square root of GDP (P). Thus, $I = E/\sqrt{P}$. In Annex 1, the behavior of this modified index is discussed mathematically

The outcomes which this new index predicts for the nine scenarios are shown in figure 5. Encouragingly, the range of emissions levels predicted for the commitment period spans only 30 MTCE -- instead of 100 MTCE for a fixed target and 80 MTCE for a simple efficiency ratio target. This means that uncertainty has been substantially reduced. As in the scenario discussed above (high growth of agriculture, medium growth of GDP), the

target was chosen in a way that would result in a 10% emission reduction. The resulting emission reductions for the nine scenarios are shown in figure 4. As in the above case, overall reductions would be higher with higher emissions from the agricultural sector, which is appropriate. But, in addition, the use of this index creates emission projection curves that correctly track expected trends in economic growth and results in substantial actual emissions reductions both in the low- and high-GDP growth scenarios.

Conclusion

As argued above, the adoption of a dynamic target fixing the value of the index $I = E / \sqrt{P}$ seems appropriate for the Argentine GHG abatement target.

This is due to the fact that, as mentioned, an important fraction of Argentine GHG emissions are from the agricultural sector: 40 % in 1997 and projected to be around 30 % during the 2008-2012 period under the different scenarios. The key point and basic problem in this regard is that agricultural emissions are not a linear function of GDP. That is to say, agricultural emissions historically have not closely tracked nor are they projected to track closely with GDP. (Of course, GDP is not altogether independent of the agriculture sector, but the share of agriculture in economic output is only 6.5 % { though having an indirect effect on the rest of the economy.}) Another problem is that agricultural emissions are expected to grow at most 20% *(from when to when), much less than emissions from other sectors and much less than GDP.

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"Covington, Philip S" <CovingtonPS@state.gov>
10/07/99 10:36:52 AM

Record Type: Record

To: Joseph E. Aldy/CEA/EOP, "Maurice Le Franc (E-mail)" <lefranc.maurice@epa.gov>, "(OES) Miotke, Jeffery A" <MiotkeJA@state.gov>, "(OES) DeRosa, Barbara M" <DerosaBM@state.gov>
cc: "Smith, Daniel" <SmithD2@state.gov>, "Rocha, V. Manuel" <RochaVM@state.gov>
Subject: Text of Latest Draft of Target Announcement

(Dan, please pass to Nigel.)

Here's my unofficial translation of the text which should be going to Alsogaray within the next very few days. I've been going back and forth with Vicente on it for the last week or more

Thoughts: I'm not sure we need it, but one alternative to para 2 which we could probably get would be to say that the target, based on an index related to GDP, will assure real reductions from BAU in the most likely scenarios for economic development and emissions, leaving the actual formula, along with the 151.2 and the 2% to 10% off BAU figures, to a back-up technical paper to be distributed to the delegates at the time of MJA's speech (and, of course, explained in detail at the post-Ministerial-segment workshop on the target.) Second, would it be preferable in the last paragraph to say only that the target would become intl'lly binding when Argentina is permitted to participate in flexmex and the Protocol enters into force, skipping the bit about once the 3rd way is implemented, which I'm sure is Elsa Kelly's idea?

I'm looking forward to a conference call or whatever, today if at all possible, so that I can go back to Vicente (and Maria Julia) with our last thoughts.

begin text

Target for GHG Emissions

In conformity with the objectives of the Framework Agreement of the UNFCCC, Argentina, bearing in mind its differentiated responsibilities, its right to sustainable socioeconomic development, and the particular characteristics of its productive structure and generation of emissions, and in its status as a non-Annex I member of the Convention and non-Annex B member of the Kyoto Protocol, voluntarily commits itself not to exceed in its net anthropogenic emissions of greenhouse gases a quantity which is denominated as the target of emissions.

The target will be achieved during the period 2008-12 and will be applicable to the annual average of the emissions in this period. The target will be

equal to the product of an index multiplied by the square root of the average GDP of the five years of the commitment period. The index will be fixed at 151.5. This value implies an effective reduction in the GHG emissions of Argentina with respect to emissions in the most likely scenarios resulting from projections which do not include intervention measures which is estimated at between 2 and 10%,

GDP will be calculated at market prices and expressed in 1993 pesos, as in the national accounts of Argentina.

Greenhouse gas emissions^{cor} will be considered in aggregate and expressed in metric tons of carbon equivalent in accord with Article 5 of the Kyoto Protocol. In the context of this commitment, GHG gases are understood to be those included in Annex A of the said Protocol.

The emissions will be composed/constituted by the sectors and categories of sources described in Annex A of the afore-mentioned Protocol, along with the net variations of emissions from sources and their absorption by sinks of the human activities directly related with the use of the earth and forestry. By forestry is understood forestation, reforestation and deforestation.

} reference
Article 3

The emissions and captures of GHG gases will be calculated in accord with the methodology adopted by the UNFCCC.

This commitment will constitute an international obligation when the COP of the UNFCCC puts in place/instruments a new alternative which enables non-Annex I parties which like Argentina wish to adopt an emissions target to participate in the mechanisms established in Articles 4, 6 and 17 of the Kyoto Protocol and the same has entered into force.

End text.



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Date: October 12, 1999

17 pages including cover

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WH/CEA - Joe Aldy
Fax: 202-395-6870

From: EST Counselor - Philip Covington

Herewith, Vicente Barros' paper on mitigation options, which I've so far only scanned, as they say, cursorily.

OPCIONES DE MITIGACION

1 Introducción

En este documento se realiza una síntesis de los análisis realizados por los expertos, rescatando los aspectos más relevantes para la adopción de la meta de emisión de GEI. Se presentan en primer lugar los resultados de las opciones analizadas y luego se realiza el análisis general de las mismas en el contexto de ciertos escenarios base que de acuerdo a la metodología de la determinación de la meta resultan clave. En un documento separado se describe y discute esa metodología.

Es necesario aclarar que las opciones de mitigación estudiadas en el desenvolvimiento de este Proyecto no abarcan el total de las podrían ser factibles de implementar en la Argentina. Dada la naturaleza voluntaria de las metas que el país adoptará, no se está frente a la necesidad de alcanzar un nivel de emisiones determinado por un proceso de negociación colectiva. Por ello y en virtud de los recursos y tiempos limitados con los que se materializó el estudio, el análisis sólo se focalizó en opciones de mitigación a escala macro, que a priori, se consideraron importantes por su magnitud y que, a la vez, podían ser examinadas en tiempos relativamente cortos. Esta aproximación, deja un importante repertorio de acciones como consecuencia de las cuales podrían lograrse reducciones de emisiones no consideradas en este análisis. Su posterior concreción eventual sólo puede traer beneficios para el país, en el marco de los mecanismos de flexibilización de la Convención.

Una somera enunciación de algunas de esas posibles opciones puede dar una idea de su importancia: Uso racional de la energía en el sector industrial, utilización de biocombustible en el transporte, en particular alcohol, sustitución entre modos en el transporte, uso del metano de los rellenos sanitarios para la producción de energía, reducción de las emisiones fugitivas en las redes de transporte y distribución de gas natural, reducción de las pérdidas domiciliarias del gas natural, utilización de arquitectura solar y ambiental, planificación urbana y conservación del bosque nativo. Finalmente, hay un gran número de medidas de mitigación de pequeña escala que sumadas pueden constituir un importante volumen adicional de mitigación.

Los escenarios de base incorporan la mejora de la eficiencia tecnológica, asumiendo que la mejor tecnología presente ha de ser utilizada cada vez que deba realizarse una incorporación de nuevo equipamiento o método de trabajo. Esta mejor tecnología es sólo parcialmente introducida en los escenarios ganaderos, por una variedad de razones cuya enunciación excede el marco de este documento sumario. De esta forma, las innovaciones tecnológicas que aún no están siendo utilizadas por el mercado y que se introduzcan hasta el período de compromiso, contribuirán a reducir las emisiones originándose de esta forma una mitigación implícita de significación.

2. Sector forestal

Aunque la Argentina no está comprometida a seguir los lineamientos de los compromisos acordados en el Protocolo de Kioto para los países del Anexo B, en particular en el caso forestal, es conveniente revisar los mismos de modo de tenerlos como referencia al elegir el modo de incorporación de este sector en el compromiso a asumir.

el análisis que sigue se considera esta opción simple de mitigación, no teniéndose cuenta la posibilidad de generar energía con el metano y sus eventuales beneficios.

Tabla 3

COSTOS DE EXTRACCION Y QUEMADO DE GAS DE RELLENOS SANITARIOS					
CONCEPTO	AÑO 0	AÑO 1	AÑO 2	AÑO 3	AÑO 4
Costo Inversión Inicial					
Captación y conducción de gas	1.200.000				
Equipamiento	250.000				
Obras complementarias	350.000				
Contingencias	320.000				
SUBTOTAL	2.120.000				
Recupero de costos					-175.000
Costos Operación y Mantenimiento		310.000	310.000	310.000	
TOTAL	2.120.000	310.000	310.000	310.000	-175.000
VALOR PRESENTE NETO	2.519.452				
COSTO DEL QUEMADO					
COSTO POR TON DE CH ₄					
EFICIENCIA DE CAPTACION					
	METANO Tm	METANO \$/Tm	CO ₂ Ton	CO ₂ \$/T	C \$/T
50%	142.875	17,83	2.614.613	0,96	3,53
60%	171.450	14,89	3.137.535	0,80	2,94
70%	200.025	12,80	3.660.458	0,69	2,52
80%	228.600	11,02	4.183.380	0,60	2,21
90%	257.175	9,80	4.706.303	0,54	1,98
VOLUMEN DE EMISIONES MITIGABLES					
(En MT)					
	METANO BAJO	METANO MEDIO	METANO ALTO		
PRODUCIDO POR ENTERRAMIENTO					
Año 2008	0,632	0,720	0,818		
Año 2012	0,616	0,757	0,925		
Promedio	0,624	0,738	0,872		
PRODUCIDO POR BASURA EN SUPERFICIE					
Año 2008	0,238	0,244	0,238		
Año 2012	0,248	0,320	0,248		
Promedio	0,243	0,282	0,243		
	METANO QUEMADO				
PRODUCIDO POR ENTERRAMIENTO	70% de lo producido				
Año 2008	0,442	0,504	0,573		
Año 2012	0,431	0,530	0,648		
Promedio	0,437	0,517	0,610		
PRODUCIDO POR BASURA EN SUPERFICIE	90% de lo producido				

En la tabla 1, "deforestación" se refiere específicamente a la deforestación de los bosques nativos para su sustitución por actividades agropecuarias. Como es casi imposible estimar la evolución de esta actividad, se supuso que permanecerá constante e igual al valor de 1997, dependiendo la misma de las políticas que se adopten.

El costo de esta mitigación es de muy difícil estimación y depende fundamentalmente de los supuestos que se realicen. Como en ciertos casos, la actividad es rentable aún sin subsidios estatales, no habría ningún costo fiscal para el aumento del stock del carbono para esos casos. Se adopta aquí la óptica del costo fiscal atribuyéndole totalmente el aumento del stock del carbono, cuando en realidad el subsidio se entrega por otros motivos: incremento de actividad económica, generación de empleo, mejora del balance comercial, etc. De este modo el computo que se realiza es en todo caso sólo una cota superior del costo de la mitigación.

Una primera aproximación al costo del secuestro forestal puede ser computada como resultante de los últimos años de la política fiscal de promoción de la actividad. Dado el aumento del stock de carbono, entre 1990 y 1999, y el costo fiscal que totalizara para el período 227,6 millones de pesos, el valor es de 15,2 \$/ton de carbono

Para estimar el costo fiscal de las emisiones que pueden ser evitadas, se calcularon los montos de carbono secuestrado por plantaciones subsidiadas desde 1990 al 2012 y se computaron tanto los subsidios otorgados como los que probablemente se otorguen en el futuro. Para este último caso se ha supuesto que a partir del año 2000 la superficie sin subsidio a ser plantada habrá de ser de 50.000 hectáreas por año, aumentando según el escenario durante el año 2011 y 2012. La tabla 2 ilustra los costos fiscales del secuestro de carbono por el aumento del stock en las plantaciones subsidiadas.

Tabla 2

Costo fiscal por el aumento del stock de carbono en las plantaciones incentivadas
Subsidio total del período 1990/2012 y diferencia de stock entre 2008 y 2012

ESCENARIOS	KTC	HISTÓRICO \$	PROYECTADO \$	TOTAL \$	\$/TON. CARBON
ALTO	54855	227.609.000	233.197.000	460.806.000	8,40
MEDIO	46315	227.609.000	134.174.000	361.784.000	12,80
BAJO	33730	227.609.000	42.070.000	269.680.000	12,50

Se aprecia que el Costo de la tonelada de carbón resulta alrededor de 10 \$ la tonelada.

No se estiman efectos desfavorables de este proceso de creciente forestación pues el mismo se está produciendo sobre ambientes que en la actualidad son no forestales. La ley que regula los subsidios exige un estudio ambiental previo y que no se plante sobre superficies con bosque nativo. En algunos suelos podría haber eventuales impactos negativos.

3. Manejo de Residuos

Las emisiones de metano de los rellenos sanitarios pueden ser quemadas a costos relativamente muy bajos, evitando el efecto invernadero de este gas que es mucho mayor que el del dióxido de carbono que se produce en la combustión del mismo. En

Año 2008	0,119	0,122	0,119	
Año 2012	0,124	0,160	0,124	
Promedio	0,122	0,141	0,122	
	CO2 EQUIVALENTE EVITADO			COSTO
PRODUCIDO POR ENTERRAMIENTO				\$/TON DE C
Año 2008	8,1	9,2	10,5	2,5
Año 2012	7,9	9,7	11,8	2,5
Promedio	8,0	9,5	11,2	2,5
PRODUCIDO POR BASURA EN SUPERFICIE				
Año 2008	2,2	2,2	2,2	22,7 (1)
Año 2012	2,3	2,9	2,3	22,7 (1)
Promedio	2,2	2,6	2,2	22,7 (1)
(1) Incluye el costo total del proceso de enterramiento a \$5.70 la tonelada de residuos				

(1) Incluye el costo total del proceso de enterramiento a \$5.70 la tonelada de residuos

Para calcular el monto de metano que se puede quemar se adoptó un índice del 70% del metano generado por la basura enterrada y del 50% en la basura depositada a cielo abierto, para los escenarios de base. En este último caso el escenario de mitigación supone que la basura a cielo abierto es enterrada y luego el metano quemado. Todo el costo de manejo y disposición de la basura se adjudica a la mitigación con lo cual este costo debe ser visualizado como un costo máximo.

No se prevén impactos ambientales negativos importantes por estas medidas, al margen de la generación de óxidos de nitrógeno en la combustión. El enterramiento de los residuos, en ciudades medianas y pequeñas, para la quema posterior del metano redundaría en claros beneficios ambientales y sanitarios.

4 Sector agropecuario

4.1 Ganadería

Las medidas de mitigación de la ganadería contemplan en primer lugar una mayor eficiencia del sector por intensificación de la producción, con mejor alimentación y en cierta medida con un mayor grado de confinamiento. Estas medidas no son neutras y favorecen la mayor eficiencia del sector ganadero, por lo cual implican una mayor competencia por el suelo con la agricultura.

En la tabla 4, se aprecia que existen ciertas disminuciones en las emisiones de la agricultura por este efecto, según se desprende de los resultados del modelo utilizado. En la ganadería misma, en algún caso las medidas pueden resultar contraproducentes con respecto a las posibilidades de mitigación, como se observa en el caso del escenario medio. Esto es así, pues si bien las emisiones específicas por unidad de producción se reducen, la mayor competitividad del sector ganadero promueve una mayor expansión de la actividad y por ende puede esperarse una mayor emisión. Esto no ocurre ni en el escenario bajo ni en el escenario medio en cuyo caso se obtendrían apreciables reducciones de las emisiones por un mejor manejo.

Otra opción de mitigación es la utilización de ionóforos, sustancias que están permitidas y ya se encuentran disponibles en el mercado argentino. Esto último solo resulta posible bajo condiciones de confinamiento de la hacienda, lo que ocurriría en mayor proporción en el escenario mas alto. Se ha considerado que en este último escenario, el 30 % del ganado en terminación estaría en feed-lots, por lo que la proporción de cabezas vacunas a las que se podría suministrar los ionóforos sería aproximadamente el 9% del stock ganadero.

Tabla 4

MEDIDAS DE MITIGACION									
(En MT CO ₂)									
ESCENARIO									
SECTOR	ALTO			MEDIO			BAJO		
	BASE	MITGAC.	DIF.	BASE	MITGAC.	DIF.	BASE	MITGAC.	DIF.
AGROPECUARIO									
Agricultura									
N ₂ O Directo	26,80	25,80	1,00	24,00	23,15	0,85	30,02	29,87	0,15
N ₂ O Indirecto	1,71	1,88	0,08	1,45	1,40	0,05	1,96	1,95	0,01
Arroz	1,51	1,51	0,00	1,40	1,40	0,00	1,17	1,17	0,00
SUBTOTAL	30,02	28,98	1,05	26,85	25,95	0,90	33,15	33,00	0,16
GANADERIA									
Fermentación Entérica	77,23	74,05	3,17	65,04	65,79	(0,75)	58,68	57,65	1,03
N ₂ O Directo	26,73	25,87	0,86	23,08	22,68	0,40	21,08	20,33	0,74
Manejo de Estiércol	1,48	1,82	(0,35)	0,84	1,04	(0,20)	0,57	0,69	(0,12)
N ₂ O Indirecto	13,84	13,39	0,24	11,80	11,50	0,10	10,50	10,21	0,29
SUBTOTAL	119,07	115,14	3,93	100,56	101,01	(0,44)	90,82	88,87	1,94
Ionóforo		0,67	0,67		0,59	0,59		0,52	0,52
TOTAL	149,08	144,77	5,65	127,41	127,55	1,05	123,97	122,39	2,82

Se observa que en el escenario agropecuario más alto las mitigaciones posibles de lograr serían de 5,6 millones de toneladas de carbono equivalente. Como las estrategias analizadas son todas conducentes a una mayor eficiencia en la producción de carne y leche, se considera que las mismas constituyen una opción sin perjuicio económico.

Es muy posible que en el futuro, y antes del período de compromiso, se produzcan innovaciones tecnológicas en este sector, por cuanto se desarrollan investigaciones sobre una serie de alternativas para aumentar la eficiencia de la producción del ganado bovino reduciendo las emisiones de metano.

Hay beneficios económicos adicionales muy importantes debido a la mayor eficiencia productiva que conllevan las medidas de mitigación. Los efectos desfavorables se pueden generar, a escala local, debido al sistema de producción en feed-lot.

4.2 Siembra directa

La incentivación de las prácticas de labranza mínima y labranza cero, comúnmente conocidas como siembra directa, conducirá a un menor consumo de combustibles en las labores agrícolas. En la tabla 5 se presentan las reducciones de emisiones de CO₂ por una mayor utilización de la labranza mínima en los tres escenarios agropecuarios.

La expansión de la ganadería en todos los escenarios supone una reducción de la superficie agrícola. Esto se verifica con mayor intensidad en el escenario de alta expansión de ganadería. Debido a ello, la superficie con labranza mínima en los

escenarios de base aparecen reducida respecto del presente. De cualquier modo, la reducción de las emisiones de CO₂ es más o menos similar en todos los escenarios.

La mitigación que se produciría por la labranza mínima presupone -en el escenario de mitigación- un incremento máximo del 50 % del porcentaje del área cultivada. Este nivel se alcanzaría sin ningún incentivo fiscal. Los costos de mitigación serían inexistentes por cuanto la labranza mínima es una práctica rentable y cuya expansión se debe esencialmente a las condiciones del mercado. Un 100 % de incremento de la participación de la agricultura con labranza mínima sería totalmente factible pero tal vez requeriría de algún tipo de incentivo. En consecuencia, el potencial de mitigación de la siembra directa, por reducción del consumo del gas oil, se puede estimar en el doble que lo indicado en la tabla 5, pero en este último caso habría un costo adicional cuya magnitud resta determinar.

La siembra directa tienen un elevado impacto positivo sobre la conservación de los suelos. La mayor utilización de agroquímicos en los primeros años tiende a equilibrarse posteriormente a niveles similares a los de la agricultura tradicional.

Un importante beneficio para el clima es que, al contrario de la agricultura tradicional, secuestra CO₂. Una estimación aproximada, a partir de una proyección de 14 millones de hectáreas bajo siembra directa en el 2010, ubicaría el secuestro de carbono en alrededor de 15 millones de toneladas de carbono por año, es decir, unos 55 millones de CO₂ equivalente. Puesto que aún no hay una metodología acordada y aceptada por la Convención para esta cuestión, en este análisis se lo considera por separado.

Tabla 5

EMISIONES DE CARBONO POR CONSUMO DE GAS OIL EN LA AGRICULTURA					
VARIACION DE EMISIONES POR EXPANSION DE LA SIEMBRA DIRECTA					
AGROPECUARIO ALTO					
ESCENARIO BASE		CON EXPANSION		DIFERENCIA	
Area	Total	Area	Total	Total	
Siembra	Emisiones	Siembra	Emisiones	Emisiones	
Directa	CO ₂	Directa	CO ₂	CO ₂	
(000 ha)	TON	(000 ha)	TON	MILLONES TON	
Año 2008	7.340	8.349.633	9.899	5.878.130	0.472
Año 2012	8.827	8.028.059	9.987	5.440.881	0.586
Promedio	7.088	8.187.846	9.943	5.659.506	0.528
AGROPECUARIO MEDIO					
ESCENARIO BASE		MITIGACION		DIFERENCIA	
Area	Total	Area	Total	Total	
Siembra	Emisiones	Siembra	Emisiones	Emisiones	
Directa	CO ₂	Directa	CO ₂	CO ₂	
(000 ha)	TON	(000 ha)	TON	MILLONES TON	
Año 2008	6.440	5.759.314	8.688	5.338.438	0.423
Año 2012	8.149	5.671.585	9.011	6.033.300	0.536
Promedio	6.284	5.665.455	8.850	5.184.869	0.481
AGROPECUARIO BAJO					
ESCENARIO BASE		MITIGACION		DIFERENCIA	
Area	Total	Area	Total	Total	
Siembra	Emisiones	Siembra	Emisiones	Emisiones	
Directa	CO ₂	Directa	CO ₂	CO ₂	
(000 ha)	TON	(000 ha)	TON	MILLONES TON	
Año 2008	8.118	7.064.502	10.836	6.674.234	0.420
Año 2012	8.063	7.299.561	11.797	6.609.583	0.890
Promedio	8.091	7.197.032	11.368	6.641.899	0.855

6. Emisiones Fugitivas

La Secretaría de Energía tiene en vigencia una resolución por la cual se obliga a reducir las emisiones de gas natural en boca de pozo. Estas emisiones sumaban 7,5 millones de ton de CO₂ equivalentes en 1997. Las empresas del sector consideran que es imposible reducir estas emisiones a los límites exigidos por esta resolución a partir del año 2000. Ese límite implicaría menos de 0,2 millones de toneladas equivalentes al año. Desde 1997 hasta el presente las empresas han ido informando una baja sustancial de estas emisiones, por lo que a juicio de los expertos es factible llevar estas emisiones a solo 1,6 millones de toneladas de CO₂ equivalente. En consecuencia el monto de la mitigación factible es de 5,9 millones de toneladas de CO₂ equivalentes. De acuerdo a las proyecciones del escenario energético sectorial, la producción de petróleo en el periodo 2008-2012 no será sustancialmente diferente a la actual. Por lo tanto, y dado que las emisiones fugitivas en boca de pozo, se originan casi totalmente en los pozos petroleros se estima que la cantidad de 5,9 millones de toneladas de CO₂ equivalente es la magnitud de la mitigación que se puede lograr en el sector.

La industria ya ha realizado reducciones importantes en las emisiones por venteo en boca de pozo, habiendo invertido aproximadamente 400 millones de pesos con tal fin. Opiniones expertas estiman que para llegar a la meta de 1,6 millones de toneladas de CO₂ equivalente, la industria deberá invertir otros 400 millones de pesos. Suponiendo que la vida media de estas inversiones sea de 10 años y que los costos de mantenimiento sean relativamente despreciables, el costo de la tonelada de CO₂ equivalente alcanzaría a \$6,78, esto es \$24,81 por tonelada de carbón.

El análisis hasta aquí desarrollado se refiere solo a las emisiones en boca de pozo y no considera el abatimiento de las emisiones que podría originarse en la transmisión y distribución del gas natural.

6. Energía hidráulica

Se ha examinado cada una de las obras hidroeléctricas para las cuales se dispone de estudios que permitan estimar los costos de mitigación. Sin embargo, en la tabla 6, sólo se presentan los cálculos correspondientes a las tres obras más grandes.

Tabla 6

PROYECTO	POTENCIA Mw	ENERGIA Gwh	FACTOR DE UTILIZACION	CO ₂ AHORRADO MILLONES TON	COSTO INVERSION MILLONES DE \$	TASAS	COSTO INCREMENTAL \$/ TON CO ₂
YACIRETA	1000	6132	0,7	2,23	800	8%	-12,5
					720	10%	-8,9
					3475	12%	-0,7
GARABI	800	3750	0,476	1,15	720	8%	7,4
						10%	21,8
						12%	33,3
CORPUS	2880	18000	0,75	8,22	3475	8%	0,8
						10%	10,2
						12%	20,7
TOTAL				11,60			

Se aprecia que a una de retorno del 10 %, Yacintá no implica ningún costo incremental. Corpus, por su parte tendría un costo de \$10,2 por tonelada de CO₂ y Garabí de \$21,8. Con estos valores, el potencial de reducción de CO₂ originado en el sector hidroeléctrico sería de 11,60 millones de ton CO₂.

7. Energía eólica

El potencial de energía eólica de la Argentina, susceptible de aprovechamiento, es equivalente a varias veces la capacidad instalada actual. Sin embargo, por diversos motivos, entre ellos algunos vinculados con sus costos, su aprovechamiento es actualmente insignificante. El sector empresario estima que la capacidad instalada en el año 2010 debería ser aproximadamente de 2 *GW*

Progresivamente la energía eólica se tomará más competitiva debido a la disminución de los costos de los equipos y al aumento del precio del gas natural. Por ello de aquí al 2012 se distinguen 3 períodos en los que el costo incremental, respecto al costo de la energía del escenario de base, se va haciendo cada vez menor.

Tabla 7

PERIODO	REDUCCION DE CO ₂ MILLONES TON.	TASAS	COSTO INCREMENTAL EN \$ / TON CO ₂ EQUIVALENTE
Primero	0,48	8%	52,0
		10%	62,6
		12%	73,8
Segundo	1,12	8%	21,7
		10%	26,8
		12%	30,8
Tercero	1,53	8%	13,7
		10%	17,5
		12%	21,8
TOTAL	2,11		

Cabe recordar que existe una ley nacional que contempla el subsidio de la energía eólica y que la provincia de Chubut, a su vez, tiene una legislación equivalente. Por ello es probable que, a pesar del costo, la energía eólica se desarrolle en la forma prevista por la industria. Esto es aún más probable hacia el período de compromiso en el que los costos incrementales tienden a disminuir sensiblemente.

Otros beneficios de esta opción, consisten en el ahorro de combustibles y eventualmente en la generación de empleo, si se alcanza un alto grado de desarrollo, se comienza la fabricación local de equipos. El impacto estabilizador de la economía regional puede ser, por ende, muy importante en ciudades petroleras o mineras.

8. Cogeneración

La cogeneración ofrece una importante posibilidad de mitigación en las actividades industriales. Al igual que en el caso de la energía eólica, se presenta su potencial de mitigación discriminado en tres períodos desde el presente hasta el año 2012.

Tabla 8

PERIODO	REDUCCION DE CO2 MILLONES TON.	TASAS	COSTO INCREMENTAL EN \$ / TON CO2 EQUIVALENTE
Primero	2,3	8%	-10,0
		10%	-10,8
		12%	-11,8
Segundo	0,8	8%	-2,4
		10%	-2,1
		12%	-1,9
Tercero	0,9	8%	-2,3
		10%	-2,1
		12%	-1,9
TOTAL	4,0		

Esta alternativa, como se desprende de la Tabla 8, constituye una opción sin costos positivos. Otros beneficios adicionales derivan del ahorro de combustibles y de la menor contaminación local por combustión.

9. Penetración del gas natural en el Transporte

A partir de la proyecciones del escenario de base y de un escenario de mitigación que contempla medidas de incremento en los impuestos al gas-oil, se obtiene un cuadro resumen de los costos totales en ambos escenarios desde 1998 al 2012.

El costo se refiere a las inversiones y los costos en combustibles de los usuarios. En términos fiscales, se reciben mayores impuestos. Otras alternativas conducentes a los mismos resultados pueden ser instrumentadas, tales como un posible impuesto a los vehículos diesel.

El escenario de mitigación resulta de la hipótesis de una modesta pero creciente penetración del gas natural en los automóviles particulares y de una importante participación de este combustible en el transporte público urbano de pasajeros al igual que en el de carga liviana.

La emisión evitada en el escenario de mitigación representa 4 millones de toneladas de CO2 equivalente.

Tabla 9
Período 1998-2012

ITEM	Escenario de base Millones de \$	Escenario de Mitigación Millones de \$
Costos de Inversión en el Parque Automotor	62.371	68.898
Gastos de Operación y Mantenimiento	1.339.729	1.326.772
Inversiones en Estaciones de Servicio	2.735	3.351
TOTAL	1.404.834	1.399.021

El costo total menor en el escenario de mitigación, por lo que u opción sin perjuicio monetario. Tiene a la vez importante impacto favorable para el medio ambiente ciudadano y de la salud de la población

10. Resultados Integrados

En las tablas del Anexo A se incluyen los resultados para los 9 escenarios que resultan de la combinación de 3 escenarios macroeconómicos: alto, medio y bajo PBI y otros 3 escenarios correspondientes a la evolución proyectada del sector agropecuario (alta, media y baja).

Se listan las opciones de mitigación ordenadas por costo aún cuando la metodología de cálculo no las hace siempre comparables. En la consideración del sector forestal se ha optado por el caso de secuestro neto (plantaciones y deforestación) no discriminando si las plantaciones fueron realizadas antes de 1990. De todos modos, va a resultar muy difícil, en el período 2008-2012, comprobar que porción del stock de carbono corresponde a plantaciones anteriores o posteriores a esa fecha.

Cuando se compara con la Figura 5 del documento "Indicadores Dinámicos en el Caso Argentino" se observa que en todos los escenarios hay una amplia posibilidad de cumplir la meta analizada en ese documento y vinculada a la raíz cuadrada del PBI sin riesgos.

ANEXO A

ESCENARIO BAJO FBI-BAJO PECUARIO			
OPCION	COSTO		MITIGACION
	PARCIAL		ACUMULADO
	\$/TON CO2 EQUIVALENTE	MILLONES, DE TON, CO2 EQUIVALENTE	MILLONES, DE TON, CO2 EQUIVALENTE
COGENERACION	-10,8 / -2,1	4	4
YACIRETA		2,2	6,2
GAS EN EL TRANSPORTE	S/C	4	10,2
EFICIENCIA GANADERIA	S/C	2,8	12,8
SIEMBRA DIRECTA	S/C	0,6	13,4
FORESTACION	3,4	33,2	46,8
RESIDUOS I	0,7	8	5,8
RESIDUOS II	6,3	2,2	58,8
EMISIONES FUGITIVAS	6,8	5,9	62,7
CORPUS	10,2	8,2	70,9
GARABI	21,8	1,2	72,1
EOLICA	17,5 / 62,8	2,1	74,2

ESCENARIO BAJO FBI-MEDIO PECUARIO			
OPCION	COSTO		MITIGACION
	PARCIAL		ACUMULADO
	\$/TON CO2 EQUIVALENTE	MILLONES, DE TON, CO2 EQUIVALENTE	MILLONES, DE TON, CO2 EQUIVALENTE
COGENERACION	-10,8 / -2,1	4	4
YACIRETA	-8,9	2,2	6,2
GAS EN TRANSPORTE	S/C	4	10,2
EFICIENCIA GANADERIA	S/C	1,1	11,3
SIEMBRA DIRECTA	S/C	0,5	11,8
FORESTACION	3,4	33,2	45
RESIDUOS I	0,7	8	53
RESIDUOS II	6,3	2,2	55,2
EMISIONES FUGITIVAS	6,8	5,9	61,1
CORPUS	10,2	8,2	69,3
GARABI	21,8	1,2	70,5
EOLICA	17,5 / 62,8	2,1	72,6

ESCENARIO BAJO PIB-ALTO PECUARIO			
OPCION	COSTO		MITIGACION
	\$/TON CO2		PARCIAL
	EQUIVALENTE	MLLONES DE TON, CO2 EQUIVALENTE	ACUMULADO MLLONES DE TON, CO2 EQUIVALENTE
COGENERACION	10.8 / -2.1	4	4
YACIRETA	-8.8	2.2	6.2
GAS EN TRANSPORTE	S/C	4	10.2
EFICIENCIA GANADERIA	S/C	5.6	15.8
SIEMBRA DIRECTA	S/C	0.5	16.3
FORESTACION	3.4	32.1	48.5
RESIDUOS I	0.7	8	57.5
RESIDUOS II	6.3	2.2	59.7
EMISIONES FUGITIVAS	8.8	5.9	64.8
CORPUS	10.2	8.2	72.8
GARABI	21.8	1.2	74.2
EOLICA	17.5 / 62.6	2.1	76.1

ESCENARIO MEDIO PBI-ALTO PECUARIO			
OPCION	COSTO \$/TON CO2 EQUIVALENTE	MITIGACION	
		PARCIAL MILLONES DE TON, CO2 EQUIVALENTE	ACUMULADO MILLONES DE TON, CO2 EQUIVALENTE
COGENERACION	-10.8/-2.1	4	4
YACIRETA	-6.0	2.2	6.2
GAS EN TRANSPORTE	S/C	4	10.2
EFICIENCIA GANADERIA	S/C	5.6	15.8
SIEMBRA DIRECTA	S/C	0.5	16.3
FORESTACION	3.5	45.8	62.1
RESIDUOS I	0.7	9.5	71.6
RESIDUOS II	6.3	2.6	74.2
EMISIONES FUGITIVAS	6.8	5.9	80.1
CORPUS	10.2	6.2	83.6
GARABI	21.8	1.2	89.5
EOLICA	17,882.6	2.1	91.6

ESCENARIO MEDIO PBI-BAJO PECUARIO			
OPCION	COSTO	MITIGACION	
		PARCIAL	ACUMULADO
	\$/TON CO2 EQUIVALENTE	MILLONES DE TON, CO2 EQUIVALENTE	MILLONES DE TON, CO2 EQUIVALENTE
COGENERACION	-10.8/-2.1	4	4
YACIRETA	-8.9	2.2	6.2
GAS EN TRANSPORTE	S/C	4	10.2
EFICIENCIA GANADERIA	S/C	2.6	12.8
SIEMBRA DIRECTA	S/C	0.6	13.4
FORESTACION	3.5	45.8	59.2
RESIDUOS I	0.7	9.5	68.7
RESIDUOS II	6.3	2.6	71.3
EMISIONES FUGITIVAS	6.8	5.9	77.2
CORPUS	10.2	8.2	85.4
GARABI	21.8	1.2	86.6
EOLICA	17.5 / 62.6	2.1	88.7

ESCENARIO MEDIO PBI-MEDIO PECUARIO			
OPCION	COSTO	MITIGACION	
		PARCIAL	ACUMULADO
	\$/TON CO2 EQUIVALENTE	MILLONES DE TON, CO2 EQUIVALENTE	MILLONES DE TON, CO2 EQUIVALENTE
COGENERACION	-10.8/-2.1	4	4
YACIRETA	-8.9	2.2	6.2
GAS EN TRANSPORTE	S/C	4	10.2
EFICIENCIA GANADERIA	S/C	1.1	11.3
SIEMBRA DIRECTA	S/C	0.5	11.8
FORESTACION	3.5	45.8	57.6
RESIDUOS I	0.7	9.5	67.1
RESIDUOS II	6.3	2.6	69.7
EMISIONES FUGITIVAS	6.8	5.9	75.6
CORPUS	10.2	8.2	83.8
GARABI	21.8	1.2	85
EOLICA	17.5/62.6	2.1	87.1

ESCENARIO ALTO PBI- BAJO PECUARIO			
OPCION	COSTO	MITIGACION	
		PARCIAL	ACUMULADO
	\$/TON CO2 EQUIVALENTE	MILLONES DE TON. CO2 EQUIVALENTE	MILLONES DE TON. CO2 EQUIVALENTE
COGENERACION	-10,8/21	4	4
YACIRETA	-6,9	2,2	6,2
GAS EN TRANSPORTE	S/C	4	10,2
EFICIENCIA GANADERIA	S/C	2,6	12,8
SIEMBRA DIRECTA	S/C	0,6	13,4
FORESTACION	2,3	54,3	67,7
RESIDUOS I	0,7	11,2	78,9
RESIDUOS II	6,3	2,2	81,1
EMISIONES FUGITIVAS	6,8	5,9	87
CORPUS	10,2	8,2	95,2
GARABI	21,6	1,2	96,4
EOLICA	17,5/82,6	2,1	98,5

ESCENARIO ALTO PBI - MEDIO PECUARIO			
OPCION	COSTO	MITIGACION	
		PARCIAL	ACUMULADO
	\$/TON CO2 EQUIVALENTE	MILLONES DE TON. CO2 EQUIVALENTE	MILLONES DE TON. CO2 EQUIVALENTE
COGENERACION	-10,8/21	4	4
YACIRETA	-6,9	2,2	6,2
GAS EN TRANSPORTE	S/C	4	10,2
EFICIENCIA GANADERIA	S/C	1,1	11,3
SIEMBRA DIRECTA	S/C	0,5	11,8
FORESTACION	2,3	54,3	65,1
RESIDUOS I	0,9	11,2	77,3
RESIDUOS II	6,3	2,2	79,5
EMISIONES FUGITIVAS	6,8	5,9	85,4
CORPUS	10,2	8,2	93,6
GARABI	21,6	1,2	94,8
EOLICA	17,5/82,6	2,1	96,9

ESCENARIO ALTO PBI - ALTO PECUARIO			
OPCION	MITIGACION		
	COSTO	PARCIAL	ACUMULADO
	\$/TON CO2 EQUIVALENTE	MILLONES DE TON, CO2 EQUIVALENTE	MILLONES DE TON, CO2 EQUIVALENTE
COGENERACION	-10,8/-2,1	4	4
YACIRETA	-8,9	2,2	6,2
GAS EN TRANSPORTE	S/C	4	10,2
EFICIENCIA GANADERIA	S/C	5,6	15,8
SIEMBRA DIRECTA	S/C	0,5	16,3
FORESTACION	2,3	64,3	70,6
RESIDUOS I	0,6	11,2	81,8
RESIDUOS II	6,3	2,2	84
EMISIONES FUGITIVAS	6,8	5,9	89,9
CORPUS	10,2	8,2	98,1
GARABI	21,8	1,2	99,3
EOLICA	17,5/62,8	2,1	101,4

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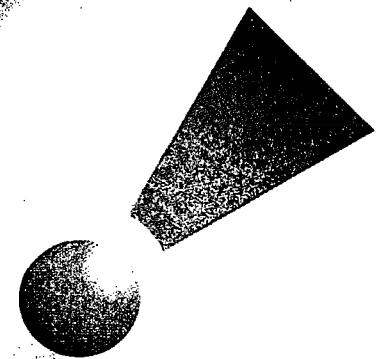
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