

**BP** Amoco



# Greenhouse Gas Emissions Trading in BP Amoco

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**“Our goal is to reduce our emissions of greenhouse gases by 10% from a 1990 baseline over the period to 2010”**

**“In our terms that target will now sit alongside our financial targets. That means it is a promise and, as with our financial targets, a promise is a personal commitment”**

Sir John Browne  
Yale School of Management - 18 September, 1998

**“One of the steps we’ve taken is to set up a trading system within the company to ensure we cut emissions in the most cost effective way possible. Over the next 18 months we’ll expand that system to include all the activities of BP Amoco”**

Sir John Browne  
Detroit Economic Club - 25 January, 1999

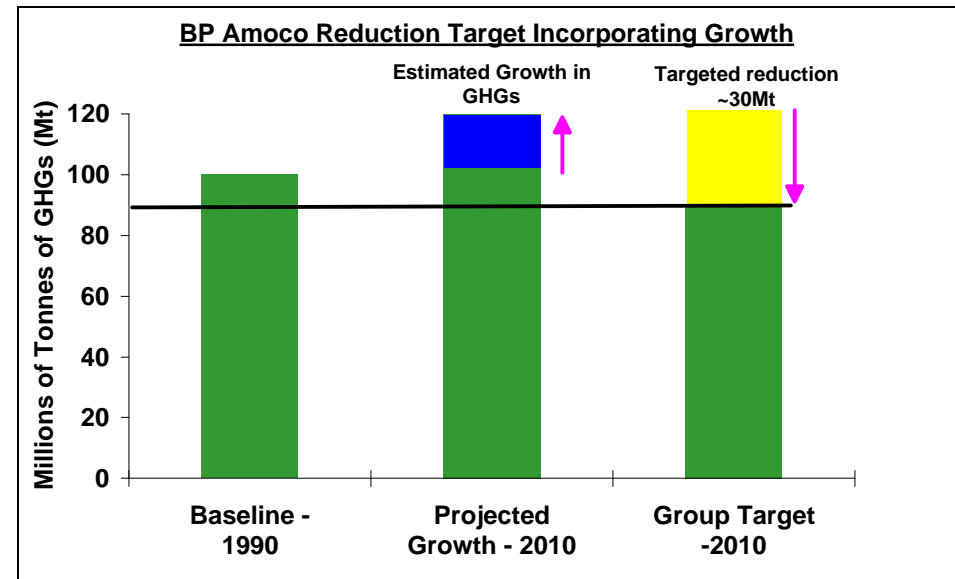
## Introduction

In September 1998 Sir John Browne, CEO of BP Amoco announced that BP would set itself the target of reducing its greenhouse gas (GHG) emissions to 10% below 1990 levels by 2010. Since the merger with Amoco on 1 January 1999, this target now extends to the whole BP Amoco group. Given the future business plans for the group, the target represents a much deeper cut on forecast emissions - a total in fact of some 30 million tonnes over the period to 2010 on a business as usual projection.

As Sir John Browne has made clear this 'target' is actually more than that. It is a commitment which *must* be met. But *how* it is met is left open in order to encourage individuals and businesses throughout the BP Amoco Group to use their ingenuity and experience to deliver the commitment in the most effective way possible. This is where emissions trading (ET) comes in. It offers the incentive and the opportunity to fulfil the obligation in a commercial and efficient manner.

That is why BP Amoco intends to use a system of group-wide emissions trading as a central tool to deliver this target in the most cost-effective way possible. It is intended that the system will go live on January 1<sup>st</sup> 2000. This will be the first ever global greenhouse emissions trading system actually put in place. This paper sets out the theoretical case for the use of trading to achieve environmental objectives; explains current thinking on the application of the system within BP Amoco and goes on to begin to draw out the possible lessons for the implementation of national and international trading systems.

BP has already been operating a pilot emissions trading system with 12 former BP Business Units since September 1998. The decision to move quickly to group-wide trading means that the pilot will be wound up - but the lessons from this experience are being fed into the design of the wider system.



## The case for emissions trading (ET)

Economic **theory** suggests that "trading" emissions should allow an environmental target to be achieved at the least cost to the economy. This is because firms for whom emissions reduction are cheap, can reduce their emissions and sell those emission rights to firms who would have to pay more to reduce their greenhouse gas emissions. Trading should be a better way of achieving the world's objectives than the suggested alternatives - command and control regulation which imposes the same standard on everyone, regardless of the costs they face; or taxation, which just raises the price to everyone, irrespective of whether they have a cheap alternative or not. These are both **blunt instruments**, whereas ET is a **precision tool**. It is less prescriptive in the methods employed to achieve reductions; but it is underwritten by an *obligation* to reduce emissions which neither regulations nor taxation can deliver.

Trading is an important policy alternative to taxation, and has the important advantage that it can work with other policy initiatives such as - voluntary agreements between industries and governments. It may also be possible for it to work with tax. The aim of both trading and

agreements is to motivate positive responses to a shared problem. In a system which trades emissions allowances for greenhouse gases, companies (assuming they are the trading entities) have their emissions capped at a certain level each year. The level itself is non-negotiable once it has been established; but trading does allow companies to, buy allowances from others to reduce their emissions in the most effective manner possible, or sell to others if they have an excess of allowances.

Trading is a market mechanism that has considerable appeal. It forces companies to look at what options they have available to reduce emissions, in a very quantitative way. And when the market exists, it makes companies ask themselves why competitors are finding lower cost options than they have found themselves. It is a stimulus to bringing new technology into practice, because it sets a real cost on emissions and provides market incentives to reduce that cost.

Greenhouse gases are **particularly appropriate** for trading. Unlike other pollutants, where the **local impact matters**, the impact of CO<sub>2</sub> is felt globally and it is **global concentrations** of CO<sub>2</sub> that must be reduced. It shouldn't matter whether emissions are reduced in Pittsburgh or Portugal, the North Sea or the Gulf of Mexico. If we wish to address this problem seriously and sensibly, what matters is that we achieve the biggest reductions most effectively and at least economic cost - and that means adopting a global perspective.

But there is only limited experience of emissions trading **in practice**. The most successful example of emissions trading is the United States **sulphur dioxide** trading scheme, which delivered the required emissions reduction faster and at less cost than had been predicted.

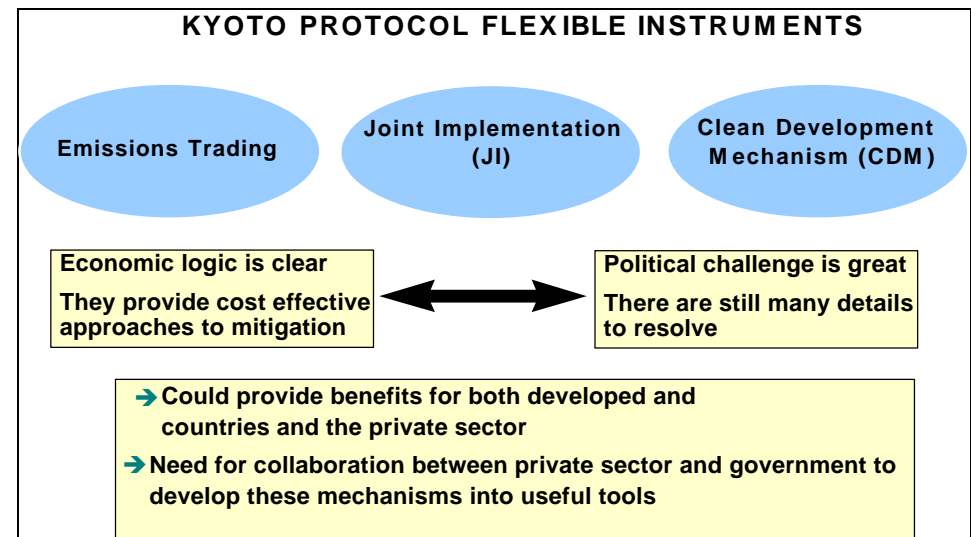
The agreement at Kyoto commits most OECD countries and the countries of Central Europe and Russia and Ukraine (the "Annex 1" countries) to targets for the period 2008-2012, and these targets embrace a basket of six greenhouse gases. They are differentiated, to take account of different national circumstances, but require, on average, approximately a 5 per cent cut from 1990 emissions levels. Since emissions would otherwise have been expected to grow, and in most cases are already higher than 1990 levels, the targets imply deeper

cuts compared to a "business as usual" base. Other countries were not given targets at Kyoto. The protocol makes provision for three types of "flexible mechanisms" or Kyoto mechanisms:

- in Article 17, for trading between Annex 1 countries;
- in Article 6 for Joint Implementation projects between Annex 1 countries;
- in Article 12 for credits to be earned for projects in non-Annex 1 countries through the Clean Development Mechanism.

Rules have yet to be developed for these three "mechanisms".

Several governments are looking at domestic emissions trading schemes - Norway, United Kingdom, Australia, New Zealand, Canada and others are exploring using emissions trading as a policy tool.



## Establishing the BP Amoco emissions trading system

BP Amoco's basic operating model lends itself to the implementation of an emissions trading system. The basic model consist of four business streams:

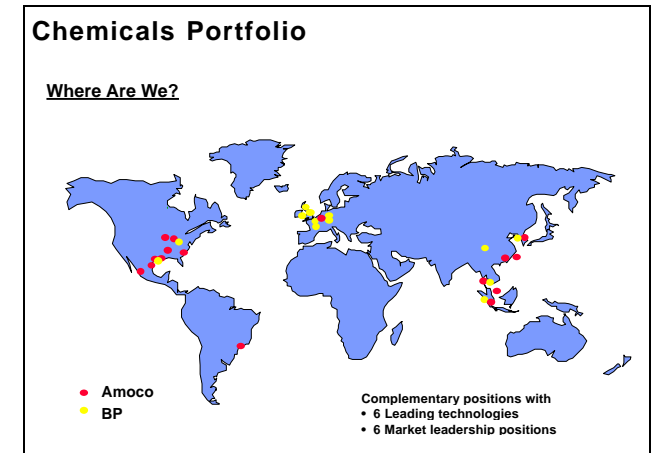
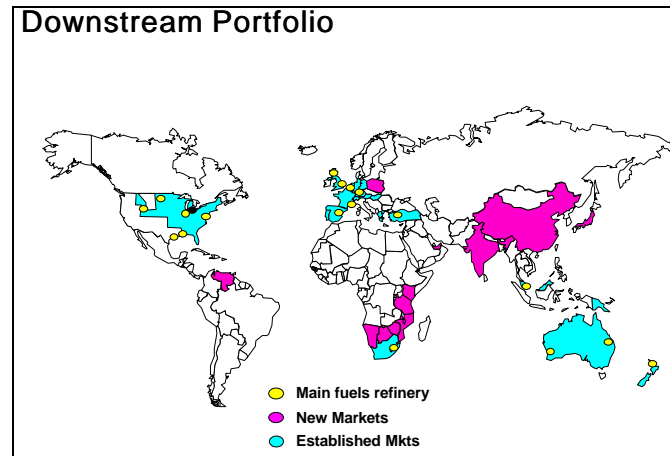
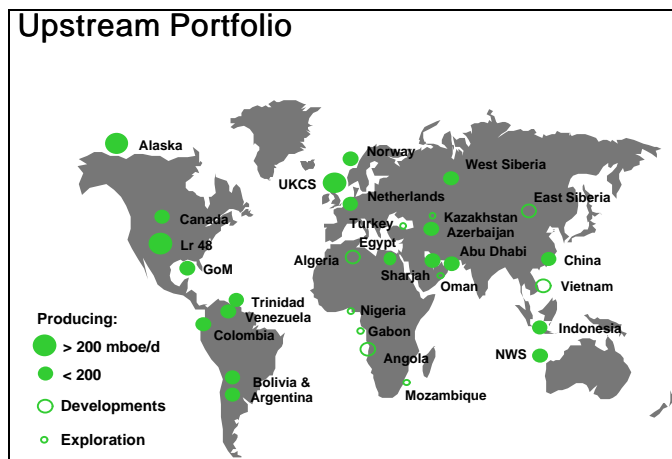
- exploration and production
- refining and marketing
- chemicals
- natural gas and power

Within each stream, individual business units (BUs) - which can almost be likened to independent businesses, accountable for their own decisions but operating within an agreed set of rules and obligations - have their own performance contracts to deliver agreed objectives. In BP Amoco there are currently 127 individual BUs, operating in 100 countries.

BUs vary greatly in their emissions, for example, 40 BUs account for approximately 80% of the total emissions. All BUs will be given an allocation in the BP Amoco emissions trading system.

BUs are organised into peer groups containing similar businesses to their own. The role of the peer group is to ensure performance delivery by the BUs through the processes of sharing best practice,

Two groups have been established to devise and implement emissions trading in BP Amoco. A high level taskforce brings in all the relevant functions and representative of the streams. The Taskforce is responsible for developing the policy options for approval by senior management. The implementation team consists of representatives from both group and business stream health safety and environment functions. It also includes representatives of commercial functions and of BP Amoco's trading arm, Oil Trading International, which plays the key role in running the system. The Environmental Defence Fund (EDF) - an independent, non-government organisation based in the United States - has played an important independent guiding role in the development of the system.



## Emissions Data - Measurement and verification

The cornerstone of a successful emissions trading programme is having a robust and credible system in place to measure, and where appropriate, verify the greenhouse gas data being used in the trading system. Each BU will be responsible for measuring or calculating its emissions. Standard reporting protocols for carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) have been used by the BUs to collect and report 1990 and 1998 emissions data, as part of our overall environmental performance reporting. A data audit and verification process is currently under development with a group of external partners (KPMG, DNV and ICF), selected to provide the appropriate skills from the financial and environmental auditing sectors.

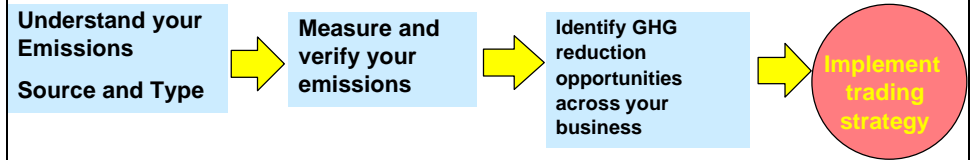
## Abatement costs

Understanding the cost of abatement on a project by project level is vital for BUs to engage in emissions trading. Guidelines for calculation methodology and assumptions have been developed for BUs to maintain some consistency in the approach. It will be each individual BU's responsibility to identify and know its cost of abatement. A database of greenhouse gas abatement projects has been constructed to share ideas on cost effective options throughout the Group.

## The emissions boundaries in our system

The GHG emissions boundaries for our ET system will be set on an equity and direct basis. This is the same for our GHG target. Equity means emissions from all equity stakes in operated and non-operated activities by BP Amoco. Direct means emissions which come directly from these operations, i.e. this excludes emissions from imported power used in our operations.

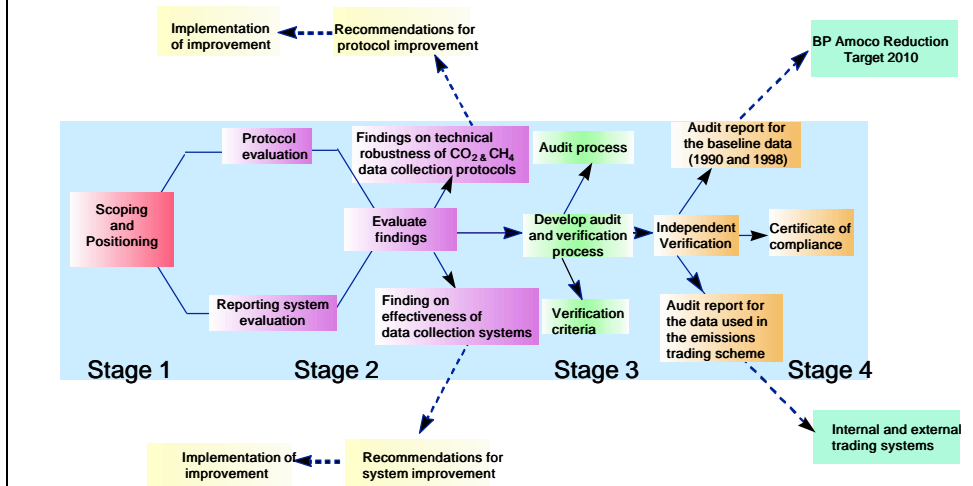
## Engaging in emissions trading



The key is to understand emissions from your business, where they are heading and the marginal cost of abatement then compare with the market price

- Some measures may have +ve economic impacts
- Need to re-think management of energy
- Engage employees to meet the challenge and identify solutions
- Communication and networking within and between BUs to identify best options - Collaboration

## Stages in the verification project



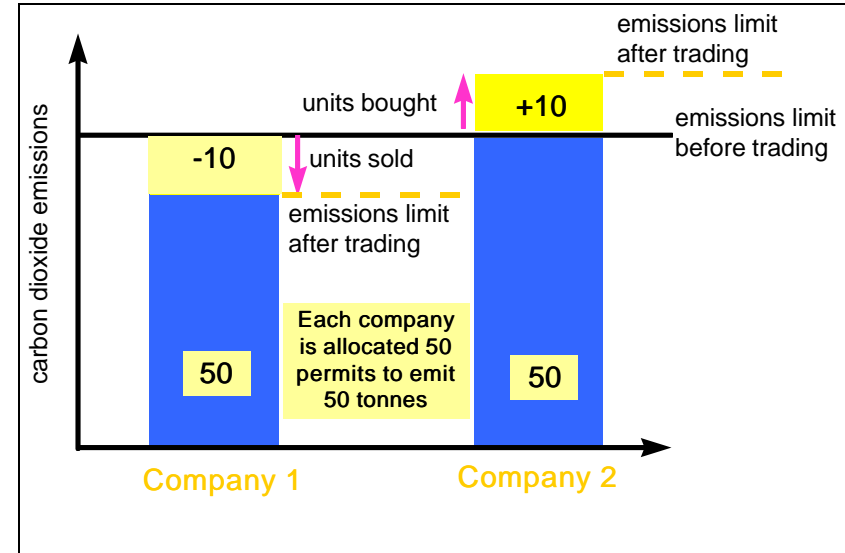
## A broad outline of the proposed system

BP Amoco's emissions trading system will be based on a cap and trade concept. In order to put such a system in place two key elements are needed - a target which sets the cap on emissions and a basic allocation of allowances to the participating BUs. Each BU will be allocated a fixed number of annual allowances to emit greenhouse gases. A BU must stay within its allocation annually - if its actual emissions are above its total number of allowances for that year the BU must buy allowances from the market to ensure compliance. If its emissions are below the allocation, it can sell allowances.

Throughout the year BUs will be able to trade allowances with other participants in the system through the central broker, buying up or selling out allowances to cover their projected emissions. All deals will be registered and traded through the broker, which is based in OTI - the oil trading arm of BP Amoco.

Both carbon dioxide (CO<sub>2</sub>) and (CH<sub>4</sub>) will be traded in the BP Amoco system. For reporting purposes CH<sub>4</sub> is reported in units of CH<sub>4</sub> but will be converted to CO<sub>2</sub> equivalent units for trading. CH<sub>4</sub> has a global warming potential (GWP) 21 times that of CO<sub>2</sub> - therefore a reduction of one tonne of CH<sub>4</sub> equates to 21 tonnes of CO<sub>2</sub>.

The unit that is traded in our emissions trading system will be called an allowance. BU's allowances will be held centrally at OTI in a GHG registry. One allowance will equate to one metric tonne of CO<sub>2</sub> equivalent and each will have a unique serial number that will be used as a tag to identify the vintage (year), the originating BU and country of origin. It will be important to keep a record of the flow of allowances between countries in the event that regulation takes place at the national level.



## Ensuring compliance in the BP Amoco system

Greenhouse Gas allocations will be fixed in the performance contracts which bind Business Unit Leaders (BULs) to the mutual commitments existing between themselves and BP Amoco's Managing Directors. Progress in meeting these targets will be reported in the financial performance indicators for the company. BULs are therefore accountable for meeting their targets on an annual basis - and the GHG performance sits alongside their financial performance and requires equal consideration. Thus, the performance contract is in effect the compliance mechanism in the BP Amoco system.

Costs and revenues from trades will flow through a BU's reporting process. These will be separately identified but will impact the BU's bottomline performance i.e. they will have real value.

## The Group Cap

A Group cap will be set annually to steer us towards the GHG target at 2010 - it is therefore the central link between the allocation process and the GHG target. It has two primary objectives:

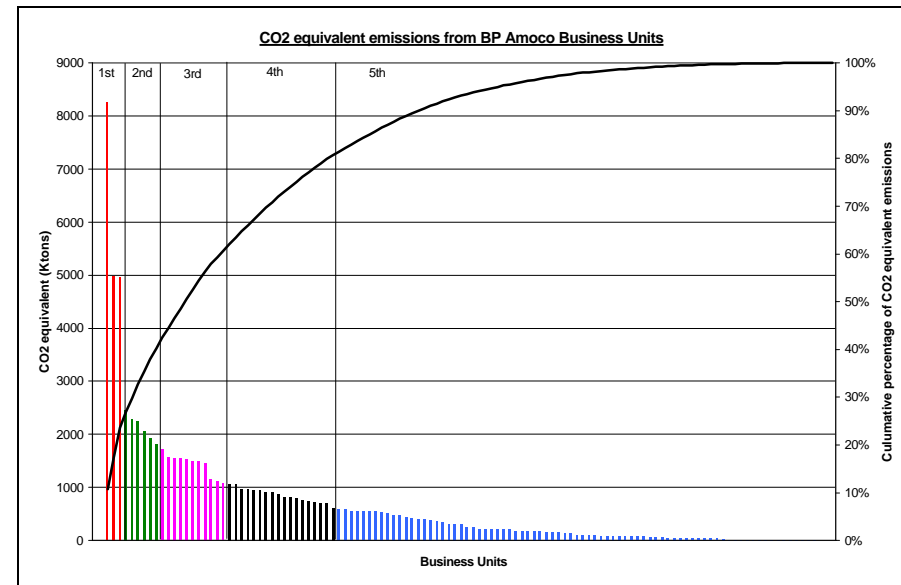
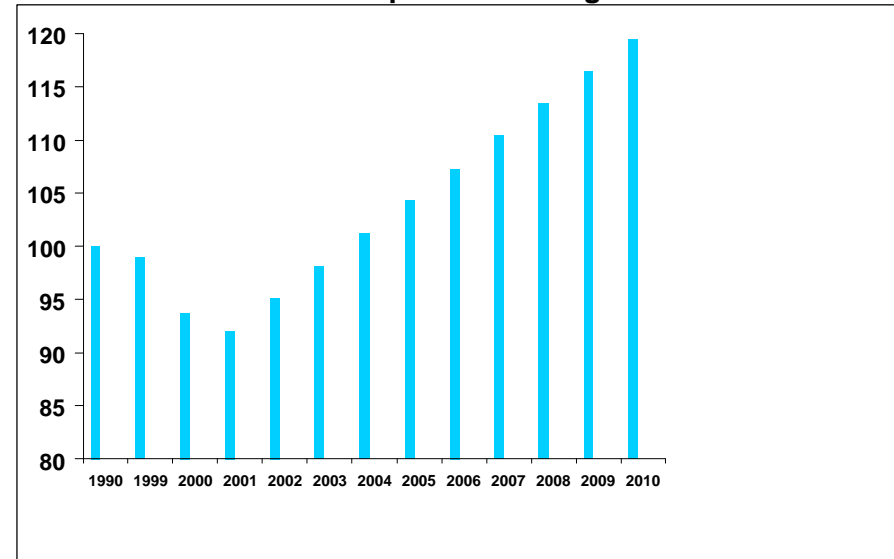
- It should incorporate a “real” annual reduction i.e. drive real operational reductions
- It should be managed to steer progress towards the 10% reduction target

## Setting the Group cap

The Group cap will determine the total aggregate allowances available to the BUs. It is intended that the Group cap will be set at the 1998 GHG emission level. This is sometimes referred to as a **grandfathered** approach - i.e. allocating back to some historic point in time. 1998 has been chosen as the base year as it is the latest and most accurate set of data for the BP Amoco Group and most relevant to how the company looks today. The aggregate total is also very similar to the total in 1990 which is the base year for our GHG target.

The group cap will be set to take account of change within the organisation. Allowances associated with divestments or closures will be cancelled. Conversely new acquisitions will be given allowances based on their 1998 emissions but will also be faced with a reduction target. The group cap will steer progress towards the GHG target.

## BP Amoco emissions after portfolio change





## How the allocation will be made to the individual BUs

The starting point of allocations will be BUs' actual emissions in 1998. "Emissions" for this purpose are direct emissions from BP Amoco assets, apportioned according to the BP Amoco equity share in the facility.

The total of those emissions will be added up at stream level and then adjusted:

- to reflect portfolio changes between 1998 and 2000 - i.e. to eliminate excess allowances from the system;
- to share the impact of emissions growth across the Group.

The streams may then adjust the BUs' initial allocations to fit the total stream cap, to give individual BUs recognition for an early action prior to 1998, take account of efficiency and to reflect future plans for the Stream. This allows streams to use various methods of allocation (under their grandfathered cap) to provide "fairness" to their participating BUs. (See adjacent boxes)

When this process is complete, the BUs will register that allocation with the Broker in OTI. That will then be the cap that the BU must live within, by its own actions, or by trading.

This approach fits well with the basic business processes in BP Amoco:

- it gives flexibility to the streams and peer groups - it allows them to make readjustments to suit their long term objectives
- It is similar to the allocation of capital across the group

The processes also mirror the way we would envisage emissions trading at government level - with an initial grandfathered allocation to individual sectors/ companies which they would then allocate more flexibly according to business needs.

### Allocation by grandfathering direct to BUs

**Description:** Allocation for each BU set by reference to their 1998 reported emissions. There would be a fixed percentage reduction each year, with adjustments possible for portfolio changes, new starts and growth. (BUs deemed as special circumstances would be given extra allocations)

#### Advantages

- Its transparent
- Its convenient (simple)
- Will drive trades in the more 'dynamic' parts of the business

#### Disadvantages

- There's no account of relative efficiency of the BU's
- Efficient BU's may be penalised, even with credit for early action

### Allocation on an 'efficiency' basis

**Description:** Apply allocation caps based on CO<sub>2</sub> equivalent per BoE or unit of throughput in refineries - i.e. 'benchmark' to take account of efficiency. Allocation would take into account production forecast

#### Advantages

- Targets least efficient BUs
- Drives 'new starts' to be efficient
- More equitable financial impact of trading

#### Disadvantages

- Not equally applicable to all Streams

## Banking

The carrying-over of allowances from one year to the next will be allowed but will be regulated. An initial threshold of a maximum of 5% of an individual BUs allocation may be banked. This will be reviewed as BP Amoco better understands the dynamic of the trading market.

## Credit Based Trading (CBT)

While allowance trading will be the basic building block of the system, BP Amoco also want to understand the contribution that credit based trading (CBT) can make. This is may be valuable to learn more about the practical implementation of Joint Implementation (JI) and the Clean Development Mechanism (CDM). In CBT CO<sub>2</sub> equivalent credits are generated when a specific project is undertaken that results in a CO<sub>2</sub> reduction being made. A forestry project for example is a credit based approach - credits are generated when the forest sequesters carbon. Another example could be the case of BP Amoco undertaking an energy efficiency project with a third party that is not in the trading pool and capture credits generated in the activity.

CBT is the underlying approach in the concepts of Joint Implementation (JI) and the Clean Development Mechanism (CDM) that are outlined in the Kyoto Protocol.

Credit based trading allows an additional element of flexibility in the BP Amoco ET system by allowing BUs to undertake projects outside its operations, and to generate credits at a lower marginal cost than they may be facing in their operations or the current trading price in the in the BP Amoco ET market. CBT also addresses the global nature of the climate change issue and widens the “scope” by which BP Amoco activities can drive towards the most cost effective and efficient reductions in GHGs.

Additionally, with the BP Amoco greenhouse gas target set on a direct basis (i.e. emissions from imported power are not included in BUs targets) this does not encourage BUs to engage in more efficient uses of power on site. Counting only direct emissions gives the incentive to BU's to import their power requirements - it discourages them from investing in more efficient power generation such as CHP on site as this would increase their direct emissions. By allowing BUs to capture credits from engaging in more efficient energy production on site may be a way of incentivising activities that actually contribute to “global reductions” in GHGs.

## CBT guidelines

There will be limits in the contribution CBT can make to achieving the overall GHG objective. Any CBT project must first gain approval from the Climate Steering Group the senior group which oversees the climate change programme. In the first few years of the BP Amoco ET system only a limited number of CBT projects will be undertaken to understand how this approach could best be utilised. The table below outlines the initial thoughts on the broader rules of CBT.

Possible Guidelines for Credit Based Trading	
<b><u>In the case of CHP projects credits will be calculated on the following basis:</u></b>	
Before the project total emissions (Directs + Indirects)	A
After the project total emissions (Directs + Indirects)	B
Credits from project	=A-B
Lifetime of credits being generated will = X years	
<b><u>In the case of new power facilities</u></b>	
Country specific generation performance standard (kg/kWh)	A
Project specific generation performance standard (kg/kWh)	B
Credits from project = A - B x output (kWh)	
Generation performance standards could be tightened over time as new technology becomes available.	
<b>Forestry projects</b>	
Only a limited number of forestry projects will be included. These will be verified externally under IPCC guidelines	

CHP = Combined Heat and Power or cogeneration

## Summary

What we have discovered at BP Amoco is that it is important to make a start and learn from practical experimentation with emissions trading. Our approach presented in this paper is a step in moving our understanding forward. We accept that there may be deficiencies in our system but the only way to start is with a simple framework that will encourage our businesses to participate. Development of our approach involved an extensive consultation process with the BP Amoco's BUs - their input from a wide range of disciplines and from varying types of business was crucial.

BP Amoco remains convinced that trading has considerable potential to reduce greenhouse gas emissions at least economic cost. The creation of a new business asset through emissions trading likely to create the right incentives to innovation and investment, and which cannot be matched by command and control regulation, taxes or even tax breaks.

We will monitor and evaluate the system closely during 2000 and capture this learning for both BP Amoco and the external community which is following the development of this flexible mechanism. It is quite clear in the international negotiating process that these policy tools are crucial in the development of any international agreement to address potential climate change.

## Key advantages of emissions trading:

- the method by which emissions are reduced is not prescribed and therefore allows flexibility to achieve the most economically efficient emissions reductions;
- provides the appropriate price 'signal' for emissions abatement and therefore the incentive to invest in abatement technology;
- the "market" for emissions will price emissions appropriately and give the right signals for efficient investments to meet the required target;
- under a cap and trade system there is greater certainty that prescribed targets will be achieved since there is a determined finite number of permits allocated.

## ET - What we have learnt at BP Amoco

- Putting a value on greenhouse gases has:
  - ◆ Raised awareness of the climate change issue - Engaged a wider "audience" throughout the company
  - ◆ Created innovative business strategies to find cost effective solutions
  - ◆ Enabled us to quantify financially the GHG implications of investment decisions - "value" on the environment
- The key:
  - ◆ Keep things simple, Get started, Learn from practical experience
  - ◆ Engage stakeholders in the formative stages

## Appendix: GHG emissions trading guidelines - Qs and As

### Guidelines for Group-wide trading of greenhouse gases

<b>How does emissions trading fit in with our climate change commitments?</b>	BP Amoco have announced a Group-wide greenhouse gas (GHG) target of 10% below 1990 levels by 2010 <sup>1</sup> . Emissions trading (ET) provides a tool to assist the Group to achieve the necessary reductions cost effectively. In addition emissions trading should demonstrate leadership on climate change as well as contributing to the policy debate on greenhouse gas reductions.
<b>What is the basic approach of the BP Amoco GHG trading system?</b>	The approach builds on the successful pilot system which began in September 1998 and included 12 BP Business Units (BUs). BUs will be given an annual allocation of emissions allowances to emit a certain quantity of GHGs. If a BU's actual GHG emissions are greater than the allocation it must purchase additional allowances from the market or undertake an emissions reduction project to comply. Conversely if a BU's actual emissions are lower than its allocation it can sell any excess permits on the market. Carbon dioxide (CO <sub>2</sub> ) and methane (CH <sub>4</sub> ) will be reported in CO <sub>2</sub> equivalent units.
<b>When will ET start?</b>	1 January, 2000 This will include all BUs from BP Amoco
<b>What will the trading unit be?</b>	The unit that is traded in our emissions trading system will be called an allowance. BU's allowances will be held centrally at OTI in its GHG registry. One allowance will equate to one metric tonne of CO <sub>2</sub> equivalent and each will have a unique serial number that will be used as a tag to identify the vintage (year), the originating BU and country of origin. Prices will be in US dollars.
<b>Through whom will trades be made?</b>	All deals will be registered and traded through the broker which is based at OTI - the trading arm of BP Amoco. Bids/offers will be placed on an intranet site at OTI. OTI will develop appropriate control and compliance for trading. BUs will be provided with reports detailing their trades.
<b>Who will be able to trade?</b>	The trading entity will be the BU but, for multi-business sites, some flexibility will be agreed between the BU's and the site, to allow for site optimisation. All BUs will be given an allocation but all may not necessarily need to trade if they stay within their allocations.
<b>How will Group caps be set?</b>	The Group cap will be set on an annual basis to move us towards our GHG target in 2010. The Group cap will determine the total aggregate allowances available to the BUs. The 1998 GHG emission level will be used as the reference point from which reductions will be made in all subsequent years. 1998 has been chosen as the base year as it is the latest and most accurate set of data for the BP Amoco Group and most relevant to the current structure of the company. The aggregate total is also very similar to the total in 1990 which is the base year for our GHG target.

<sup>1</sup> This is set on an equity and direct basis. Equity means that the target covers emissions from all equity stakes in operated and non-operated activities by BP Amoco. Direct means emissions which come directly from these operations, i.e. this excludes emissions from imported power used in our operations.

<b>How will the allocation be made to the individual BUs?</b>	<ul style="list-style-type: none"> <li>→ An initial allocation detailing individual BU's allowances for 2000 plus indicative numbers for 2001-2004. This will be based on their 1998 actual emissions (on a <b>direct and equity basis</b>) minus a reduction after any portfolio change</li> <li>→ Streams will have the flexibility to re-adjust these numbers if they wish. The HSE stream advisers in GBC will initially act as the key contact with their management in any reallocation process.</li> <li>→ BUs should have an indication of their allocation by the end of September</li> </ul>
<b>Will there be allocations for future years?</b>	Allocations will be fixed for the current year and indicative allocations for the following five years will be given. The projected caps will provide assumption data for capital planning of abatement projects.
<b>Will it be possible to trade in advance?</b>	It will also be possible to trade allocations for future years. This will enable BUs to buy allowances in advance to cover emissions that may arise from specific projects undertaken in future years. BUs however will not be able to borrow from the future to cover current emissions.
<b>How long will the allocations be valid for? Is banking allowed?</b>	<p>The compliance period is one year. BUs must purchase all necessary allowances annually if they exceed their cap for that year. Abatement projects will "capture" reductions over future years i.e. a reduction project will be recognised in future years' allocations and generate allowances over the life of the project or the specific timeframe that the stream considers appropriate.</p> <p>The carrying-over of allowances from one year to the next will be allowed but will be regulated. An initial threshold of a maximum of 5% of an individual BUs allocation may be banked. This will be reviewed as BP Amoco better understands the dynamic of the trading market</p>
<b>How will BP Amoco ensure compliance to the limits that are set?</b>	Emissions data will be monitored and verified by external consultants. Trades will be registered through OTI. At the end of the compliance period true emissions will be compared with allowance plus or minus any trades.
<b>Will credit trading also be allowed in the system?</b>	A limited number of credit based projects <sup>2</sup> will be allowed in the initial years of the ET system - these will be carefully evaluated to understand the pros and cons of this approach
<b>What will a BU have to do to participate</b>	<p>A number of steps will be required:</p> <ul style="list-style-type: none"> <li>→ Ensure accuracy when reporting GHG emissions</li> <li>→ Identify reduction options on site</li> <li>→ Evaluate the marginal cost of abatement for your various operations - Construct cost curves</li> <li>→ Network with other BUs to spread good ideas</li> <li>→ Use the environmental reporting database to learn more about what other BUs are doing</li> <li>→ Designate a key person to act as a trader and co-ordinator of emissions reduction activity on site</li> </ul>

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<sup>2</sup> Credit based projects are projects that generate credits from a specific baseline case i.e. they can be forestry and energy efficiency projects

## Contact details

If you want to know more about our system contact:

Simon Worthington, email: [worthis@bp.com](mailto:worthis@bp.com)  
Charles Thomas, email: [thomasc32@bp.com](mailto:thomasc32@bp.com)

Or write to them at:  
Britannic House,  
1 Finsbury Circus,  
London,  
EC2M 7BA, United Kingdom

Or visit our Website at:  
[www.bpamoco.com](http://www.bpamoco.com)