Carbon Disclosure Project Study 2010
The Telepresence Revolution

It gives me great pleasure to introduce this important and timely study, which demonstrates the extraordinary potential of telepresence, a critical new technology.

I have been intimately involved in the video communications industry since 1996. Over this period, our experience of video communications has appeared to be quite contradictory. There are many videophones that seem to work 100% effectively; we see them on TV news every day where people in different locations can communicate perfectly well. Yet business users have not been able to experience a quality of service that broadcast news providers had long ago perfected.

Fast forward to 2010 and things have completely changed. The technological advances made by companies in this space have resulted in the delivery of effective video communications. The implications are profound. As AT&T CEO Randall Stephenson has observed: "... work is an activity, not a place." AT&T is a global leader in providing telepresence solutions, and the company talks intriguingly of bringing work to people, not people to work.

Let us be clear about what is happening here:

First, high quality video communications are now available. Telepresence works and this will have considerable impact on how we live and work.

Second, the potential for widespread usage of this technology is vast. Corporate uptake is already growing rapidly and an acceleration of usage globally is inevitable.

Finally, in my view it is vital that government and industry throughout the world accept this historic challenge to proliferate a credible alternative to business travel as quickly as possible.

If China and India develop a transport infrastructure like Europe or the United States, the emissions created over time risk having a hugely negative impact on climate change. If however the emerging economies can leap to the next stage of technology, without needing to copy the old 19th and 20th century systems, we will be better able to manage emissions growth.

At the US Climate Action Symposium in March 2009, the US Government Special Envoy for Climate Change Todd Stern highlighted how India with a billion people had only 55 million telephones as recently as 2002, but leapfrogged the wired service that developed countries had, straight to cell phones. As of 2009 350 million Indians have phones without the need for a universal wired service.

Can we achieve a similar critical dematerialization of communications through telepresence as an effective substitute for much repetitive business travel? We need to do it, and we now have the technology to do it. So my best guess is – to coin a phrase – 'yes we can'.

Some argue that climate change creates limits to growth in the development of our economy. This report, The Telepresence Revolution, proves that responding to climate change issues will instead fuel the engine of growth.

This is an exciting time for video communications. And like any new technology, the change may lead to significant new investment opportunities.

Paul Dickinson
Chief Executive Officer
Carbon Disclosure Project

Executive summary

Today, companies are facing pressure from shareholders, the marketplace and regulators to 1) enable more energy efficiency choices, 2) reduce expenses and 3) limit carbon emissions. Recent studies have examined how Information and Communications Technology (ICT) products and services can help business achieve these goals. Technological innovation will play a vital role in driving our transition to a low carbon economy. ICT solutions such as video conferencing and telepresence enable more energy-efficient choices and reduce the carbon emissions associated with business travel and daily commuting.

For example, a 2008 study[1] by the Climate Group (commissioned by the Global e-Sustainability Initiative) – SMART 2020 – found that ICT solutions could reduce greenhouse gas emissions by 15% by the year 2020. The study identified four areas in which the ICT sector would have the most significant impact on emissions. One area was travel substitution, which includes the use of telepresence – high definition video conferencing that creates a virtual in-person meeting experience. This technology reduces the need for physical travel, enabling greenhouse gas emission avoidance.

This study picks up where the SMART 2020 report left off, to examine the capabilities of today's travel substitution technology, telepresence, to help meet the demands that today's companies face in the global market. Telepresence allows collaboration between numerous different end points around the globe and harnesses the power of ICT to effectively achieve the goal of moving work to people, instead of people to work.

This qualitative study commissioned by CDP and sponsored by AT&T explores the business opportunities for companies that make product and service choices that accelerate the transition to a low carbon economy.

It examines the environmental benefits and financial savings that immediately arise from using telepresence and projects the long-term environmental and economic benefits that would come from large scale adoption of the technology.

Key Findings

The study, produced by independent analyst firm Verdantix, used detailed case study evidence from 15 Global 500 companies that are early adopters of telepresence. This information was used to build a forecast model[2] which assesses the financial benefits and carbon reductions for a company[3] using four[4] telepresence rooms. The analysis also demonstrates how projected telepresence adoption would drive economy-wide business benefits from a financial and carbon reduction perspective in the US and the UK.

Telepresence can avoid millions of metric tons of CO_2

- An individual business implementing four telepresence rooms can reduce its CO_2 emissions by 2,271 metric tons over five years. These reductions are equivalent to the annual greenhouse gas emissions from over 400 passenger vehicles.
- From an economy-wide standpoint, US and UK businesses with annual revenues of more than $1 billion can cut nearly 5.5 million metric tons of CO_2 emissions by 2020 as a result of deploying a total of almost 10,000 telepresence units. These reductions are equivalent to the annual greenhouse gas emissions from over one million passenger vehicles.
- US firms can reduce CO_2 by 112,000 metric tons in 2010 to 963,000 metric tons in 2020, a total of almost 4.6 million metric tons in cumulative cuts in CO_2. These reductions are equivalent to the annual greenhouse gas emissions from almost 880,000 passenger vehicles.

- UK firms can reduce CO_2 by 23,000 metric tons in 2010 to 198,000 metric tons in 2020, a total of 940,000 metric tons in cumulative cuts in CO_2. These reductions are equivalent to the annual greenhouse gas emissions from almost 180,000 passenger vehicles.

Potential financial benefits from telepresence run into $ billions

- Through the global deployment of telepresence, US and UK businesses with annual revenues of more than $1 billion can achieve economy-wide financial benefits of almost $19 billion by 2020.
  - US firms can save over $15 billion in the next ten years; annual net financial benefits start at $315 million in 2010, rising to over $3.5 billion in 2020.
  - UK firms can save over $3.5 billion in the next ten years; annual net financial benefits start at $79 million in 2010, rising to over $894 million in 2020.

Telepresence delivers a rapid return on investment (ROI) – A firm[5] could achieve payback of its investment in as little as 15 months.

Reducing air travel, improving productivity, better work-life balance all drive telepresence use – Significant non-monetary benefits of telepresence include increased employee productivity, better work-life balance and faster decision making.

Companies are using telepresence in multiple locations throughout the world – While the study indicated that companies are using telepresence primarily between North America and Europe, East Asia shows growth as a telepresence location. Burgeoning economies of India and China are also popular telepresence locations.

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1. SMART 2020: Enabling the low carbon economy in the information age – http://www.smart2020.org/publications/
2. see appendix.
3. A $1billion plus revenue firm. $1b+ revenue companies represent the typical market for telepresence today.

4. Based on interview findings, four telepresence rooms was used as a typical number to first pilot a telepresence project before a full scale implementation.
5. Based on a firm implementing four telepresence rooms in multiple locations and with a ratio of 60% short haul – within the US or UK – flights and 40% long-haul – between the US and EU – flights. See appendix for model assumptions and variables.

Contents

Introduction

Innovation will help firms to deliver on sustainability programs that aim to cut costs and achieve environmental benefits. Telepresence is a proven example of a new technology that delivers on the sustainable business agenda while enabling companies to realize financial benefits. Executives should think of telepresence as a valuable option in the portfolio of sustainability investments their firms need to make to transition to low carbon business models.

So what is telepresence? Once used, the benefits of telepresence are clear, but for those unfamiliar with it, telepresence describes an innovative, immersive form of video conferencing. The technology, offered by firms like AT&T, Cisco, HP and Tandberg, offers a much richer "real life" visual experience, high-definition sound, simple set up and reliable connectivity.

Telepresence solutions typically require dedicated meeting rooms. These telepresence rooms vary in size from just one 56 inch screen to more immersive rooms with six screens – sometimes aligned on one side of the meeting room table to mimic a real meeting.

This study, conducted by the independent analyst firm Verdantix, provides detailed analysis on the return on investment of telepresence and carbon reductions. With the aid of a detailed model, we demonstrate how projected telepresence adoption would drive huge economy-wide benefits in two example countries – the UK and the US – from both a financial and carbon perspective.

Research methodology

The purpose of this study is to get first hand accounts of companies' use of telepresence and quantify the potential financial, environmental and productivity benefits that can be achieved from this technology. For energy and climate change policy-makers the analysis explains how telepresence can assist countries to reduce CO_2 emissions. This research[6] is based on:

1. In-depth case studies with 15 Global 500 multi-national corporations, across a broad spectrum of industries, who have invested in telepresence. Case study material was gathered through interviews with senior managers from IT, corporate sustainability and environment management teams.
2. A financial model built to calculate the ROI of telepresence based on up-front investment costs, operating costs and quantifiable business benefits from travel avoidance.
3. A carbon reduction model built to calculate carbon reductions from telepresence based on travel patterns, utilization rates and the ratio of meetings that substitute travel (substituted meetings) to meetings that are set up because the technology is available (stimulated meetings).
4. An economic model, based on financial data for over 3,000 global firms operating in the UK and the US that forecasts economy-wide financial and environmental benefits from telepresence over a ten year time horizon.

- Section 1 of this report reveals key findings from the 15 detailed case studies.
- In section 2, we provide a ten year forecast for telepresence financial benefits and carbon reductions for global firms with annual revenues greater than $1 billion operating in the UK and the US.
- Finally, section 3 makes recommendations and highlights best practices for firms to achieve both financial and environmental benefits.

6. Detail on the research and model used can be found in the appendix of this report.

1. Why firms invest in telepresence

Telepresence is a new technology but early adopters – those companies with one to three years experience using telepresence systems – span multiple industries and use telepresence across multiple locations. We conducted in-depth interviews with Global 500 firms in a diverse group of sectors: financial services, insurance, professional services, chemicals, healthcare, technology, utilities, consumer products and oil and gas (see Figure 1). Collectively, the companies interviewed are using the technology in over 40 countries worldwide (see Figure 2).

Travel patterns and a company culture open to innovation are the key determinants of the speed with which companies adopt telepresence.

How firms use telepresence

Is there a standard way to implement telepresence rooms? And does usage stop with the CEO and the global executive team? Is usage limited to one continent? Our detailed case studies with global firms found wide variations in implementation. Among the findings:

- The number of telepresence rooms in use varies from five in the smallest deployment to 80 in the largest global deployment. This reflects different stages of telepresence implementation and usage plans across firms.

- Telepresence connections most frequently link offices in North America and Europe, followed by networks that also incorporate East Asia. This reflects global office footprints, the cost of internet bandwidth, and the frequency of required senior level meetings (see Figure 2).
- Based on the interviews, on average 60% of telepresence usage is attributed to executives in the first year of operation. But with larger deployments and higher utilization rates driven by internal marketing and awareness campaigns, the share of usage by executives shrinks as a larger population of employees access the system.
- Global location of telepresence rooms is driven by location of senior executives, travel patterns and client activity.
- Critical mass to invest in telepresence can vary across different industries. For example in the financial and business services sectors, critical mass can be attained with as few as 25 employees using telepresence due to high travel costs, the value of employee time savings and any potential on-site client usage. In industries where travel needs and costs are considerably lower per employee, such as the consumer products sector, the minimum office size to justify investment in telepresence is approximately 500 employees.

Figure 1. Telepresence adoption spans multiple industries

1 Telecommunications
2 Financial services & insurance
3 Healthcare
4 Professional services
5 Personal & household goods
6 Technology
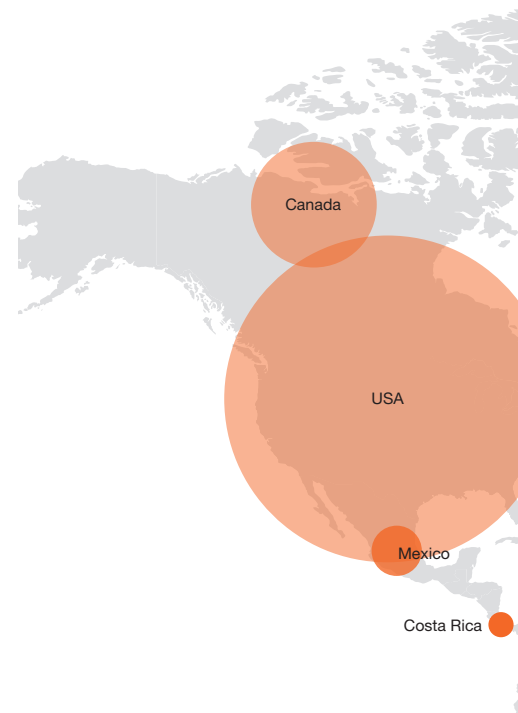7 Retail
8 Oil & gas
9 Utilities

Figure 2. US And UK preferred telepresence locations, Asia showing strong growth

Preferred telepresence locations

1 USA
2 United Kingdom
3 East Asia (Singapore, Hong Kong, Japan)
4 Switzerland
5 France
6 India
7 China
8 Australia

"The climate program further accelerated the telepresence initiative, with the aim of reducing travelling expenses and CO_2 emissions."

Dr. Achim Ilzhöefer,
Senior Project Manager, Responsible for the Bayer Climate Program
Bayer AG
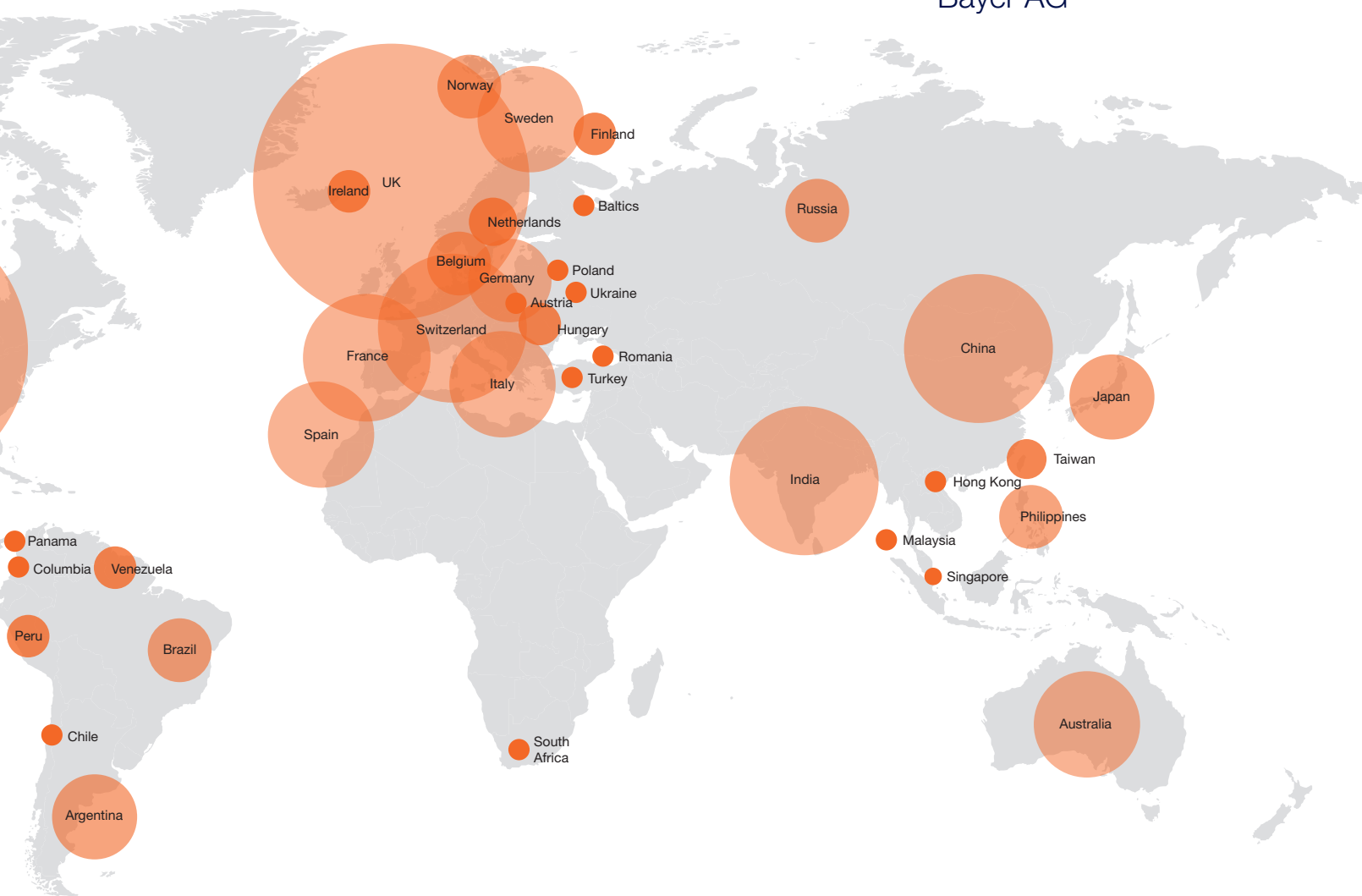
"We have many telepresence rooms around the world that we use to connect employees with our clients, employees with employees and our partners with their clients. The value and business benefits gained from this form of communication are immeasurable because it enables us to more efficiently communicate with and serve our customers."

Michelle Kerby,
Director, Offer Marketing, EMC Corporation

"Telepresence is a great way of replacing face to face meetings, once the first in-person meeting has taken place."

Ron Brown,
CIO Corporate Functions, PepsiCo

The financial and business case for telepresence

Financial benefits and productivity gains drive telepresence usage

The 15 global companies using telepresence systems have pursued different strategies to get value from their investments (see Figure 3). They told us that telepresence investments are driven by:
- Direct requests from the CEO to implement the technology to improve their productivity and the productivity of the executive team more generally.
- Potential for immediate cost savings from travel budgets. For some firms in this study, the ROI on telepresence from travel and accommodation cost reductions is huge. For example, Aviva achieved a 29% year-on-year reduction in travel costs between 2008 and 2009, as a result of using telepresence combined with a travel reduction policy.

- Requirement to replace failing old video conferencing technology that did not deliver a reliable, high quality user experience and therefore resulted in low utilization rates (see Box 1).
- The benefits of reducing CO_2 emissions which improve the firm's sustainability performance and branding – even though such Scope 3 emissions[7] are outside current carbon reduction regulations.
- Innovative thinking on how inter-company telepresence connections will facilitate collaboration and strengthen relationships with customers, suppliers and partners. For example, some firms allow their top clients to use their own telepresence rooms. More commonly, it is a good tool to build and maintain relationships with partners and suppliers.

Figure 3. Reducing air travel is the biggest driver for implementing telepresence

Ranking reasons

1 Reduce air travel expenses
2 Improve executives' productivity
3 Improve employees' productivity
4 Reduce air travel greenhouse gas (GHG) emissions
5 Improve executives' work/life balance
6 Speeding up decision making and processes
7 Strengthening relationships with customers, suppliers and partners

7. Scope 3 covers indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc. Scope 1, 2 and 3 emissions are terms used under the GHG Protocol. For a full description see: GHG Protocol: A Corporate Accounting and Reporting Standard, available at www.ghgprotocol.org/files/ghg-protocol-revised.pdf.

Box 1. Differentiators with video conferencing tools

Video conferencing (VC) technologies are often shunned by executives who remain unconvinced by this legacy technology. However, telepresence differs in a number of ways, amongst which are its:

- **Simplicity:** with some of the newer telepresence solutions, once a meeting is scheduled it can be started with just a push of a button. This is refreshingly simple compared to some legacy VC systems which required dialing-in to IP addresses. This could be particularly challenging for multiple location meetings and dissuade employees even before using this technology.
- **Immersive Experience:** the high end telepresence solutions have the actual size, high definition screens plus spatial audio, special lighting, furniture and finely tuned equipment to provide a real sense of immersion that makes real time meetings as life-like as possible.
- **Reliability:** telepresence is significantly more reliable than VC. Dedicated bandwidth means that meetings are in real-time (with no latency issues), are not pixilated and, importantly, are not dropped unexpectedly.
- **Privacy:** many telepresence rooms are acoustically insulated and technically designed to maximize confidentiality of meetings. Security can be enhanced with various network and encryption implementations so executives are comfortable using them for board meetings and other confidential discussions.
- **Security:** telepresence systems use encrypted network channels, providing the required IT security to assure the confidentiality of meetings.

"Once you schedule a meeting, it just shows up on the phone and you press a button to start it. People value the simplicity."

Vid Byanna,
Executive Director,
Global Infrastructure
Accenture

"Before using telepresence we had video conferencing equipment which was rarely used: it was unpredictable, experienced delays and went wrong all the time. It was simply not used."

Zelda Bentham,
Senior Environment
Manager,
Aviva

Our interviewees, representing a broad mix of industries, confirmed that payback – a return on investment – periods range from a little under a year to three and a half years. The average payback based on our interviews was just under two years. The variation is primarily influenced by utilization rates, the mix of short haul and long haul flights and the volume of substituted meetings. However taking an example of a typical $1 billion plus revenue firm using four telepresence rooms, based on average utilization rates, 60% short haul flights (flights within the US or UK) and 40% long haul flights (flights between the US and the EU), gave an expected payback of just 15 months.

Case study evidence demonstrates how to build the business case for telepresence

The in-depth interviews with Global 500 firms provide the data to build an ROI analysis of telepresence deployments. To calculate the return on investment, the following factors should be considered (see Box 2):

- Upfront investment costs. Our model assumes a high-end telepresence installation costing $200,000 per room and $400,000 for installation and commissioning, which includes set up and testing of the technology.[8]
- Ongoing operating costs. We include the rental value of the room, bandwidth costs of $50,000 per year, electricity costs and technical support costing $35,000, which covers one full time employee dedicated to support per location.

- Number of business trips eliminated. Based on 250 working days there are 3,000 potential meeting slots of 1 hour. To determine the volume of business trips saved, it is important to look at room utilization rates – which may vary from 20% to 90% – and the proportion of telepresence meetings that are set up because the technology is available (stimulated meetings), as opposed to substituting face-to-face meetings that would have required travel (substituted meetings).
- Average cost of business trips. Our analysis includes the ratio of substituted meetings involving executives who travel business class versus a broader employee group, assumption on the pattern of long haul and short haul flights, hotel costs and other expenses.
- Productivity gains from time savings. The model also includes the value of time saved by executives who do not lose time in transit and in flight.

Box 2. The telepresence business case

A compelling and comprehensive business case is increasingly required. The business case is usually articulated by a manager or director within the IT department, the CIO himself, or more occasionally by the CFO. It mostly relies on the reduction of air travel spending and improving executives' productivity. Although payback and ROI were not consistently calculated in the past, the more pragmatic decision-makers now require clear facts before making a final decision to invest in telepresence.

8. The model used in this study is based on upfront investment costs. However, some companies also provide a managed service which includes procurement, installation and testing fees in monthly operating costs.

The environmental case for telepresence

Changed travel patterns deliver sizable carbon reductions

The business case analysis identifies cost savings from reduced air and road travel (see Box 3). This travel pattern data also supports the environmental business case for telepresence. Our analysis to calculate carbon reductions from telepresence includes:
- Number of air miles saved.
- Volume of CO_2 emissions reduced.
- Scope 2 emissions[9] from telepresence electricity usage.

"If we assume that one telepresence meeting has saved one person travelling, then telepresence has saved us around 800 tonnes of CO_2 in 2009, representing 15% of our travel emissions in 2008."

Kristian Højland,
CR Co-ordinator,
Danske Bank

Box 3. Travel needs justify equipment choice

One of our interviewees analyzed the total cost of ownership of the company's telepresence rooms, related those to travel patterns and costs and came to an interesting conclusion (per room):

"Looking at the monthly total cost of ownership of various rooms, analyzing travel patterns and average domestic and international trip costs, we came to the following conclusion: in order for you to make it worthwhile to invest in telepresence, you need to have for the following systems:
- 6 screen units: 25-30 domestic, or 4-6 international trips per month.
- 3 screen units: 11-15 domestic, or 2-3 international trips per month.
- 1 screen units: 2-3 domestic trips per month."

Although this may vary considerably from one company to another and depends on the brand of telepresence, supporting infrastructure and other important parameters, this quote nevertheless re-enforces our findings that long-haul trips build the strongest case for investing in high-end telepresence solutions.

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9. Indirect GHG emissions from consumption of purchased electricity, heat or steam. Scope 1, 2 and 3 emissions are terms used under the GHG Protocol. For a full description see: GHG Protocol: A Corporate Accounting and Reporting Standard, available at www.ghgprotocol.org/files/ghg-protocol-revised.pdf.

Sak Nayagam, Head of Climate Change Solutions, Sustainability Services EALA at Accenture.

Growing concern related to climate change is driving the actions of policy makers, investors, corporations, employees, customers and other stakeholders around the world towards a low carbon economy. In the drive towards this low carbon future, widespread sustainability trends can be seen throughout the corporate environment. The business suite of collaborative tools and digital communication now at the disposal of companies, is improving and changing the way in which individuals within and between organizations can work together, whilst also delivering environmental and business benefits from reduced travel requirements.

Over the years, Accenture has championed a broad range of collaborative technological innovations both for internal use and in partnership with our clients. This helps our people work better together and supports our clients' to become high performing businesses.

Accenture has always explored new avenues in order to achieve our goal of reducing per-employee carbon footprint by 40% from our fiscal 2007 baseline by fiscal 2012. The company supports technology-based collaboration innovations from telepresence through to office communicator conferencing which allows for reduced environmental impacts and improved internal and client communication.

Telepresence provides a unique example of leveraging technology to create face-to-face virtual meeting experiences. For such an extensive organization with over 181,000 employees worldwide, Accenture is a comparatively low environmental impacting company. With offices and operations in more than 200 cities and 52 countries, a substantial amount (65% in fiscal 2009) of our carbon footprint results from our corporate business travel of which 79% of that total was accounted for by air travel. Our strategy to reduce this by using technologies like telepresence was not so much about eliminating travel but travelling smarter, maximizing the time and value of our workforce. From our first telepresence suite installed in 2007, Accenture now enjoys an inclusive network of over 50 sites as well as an integrated telepresence business-to-business capability that further allows us to connect with our partnered clients.

By adopting telepresence, we have seen extensive business benefits such as improved productivity levels from reduced travel, and improvements in work/life balance for our employees, in many cases allowing our people to work smarter. Since adopting telepresence, Accenture has expanded its network to include more than 50 telepresence rooms across the globe. The travel saved through their use would have accounted for 6,200 metric tons of carbon dioxide emissions globally from November 2007 through August 2009. For us, it is not so much about eliminating travel but travelling smarter and maximising the time and value of our workforce.

In this new world, the role of digital media such as eLearning, podcasts, social networking sites, online expert networks, instant messaging, and video conferencing is enhancing collaboration and knowledge sharing between people. Accenture Sustainability and Climate Change practitioners work with our clients on a wide range of services from delivering Carbon Performance Management Strategies and Smart Technology implementations, through to Green IT and creating Energy Efficient Workforce programs. Through our work with our clients, we have developed a holistic view of sustainability across an organization and understand areas where action may be taken to enhance operations.

Ultimately, Accenture envisions a world with widespread adoption of technologies like telepresence, a world which is more sustainable – both economically and environmentally, and a world which is much more connected through enhanced virtual collaboration experiences.

2. How telepresence delivers economy-wide financial benefits and carbon reductions

Our interviews with owners of telepresence systems – firms such as Accenture, Aviva, Bayer, Danske Bank, EMC, Microsoft, PepsiCo and Zurich Financial Services – demonstrate financial benefits and the potential for significant emissions reductions. In this section we explain how evidence of financial benefits and carbon reductions achieved by early adopters of telepresence will translate into economy-wide[10] benefits and emissions reductions.

Telepresence delivers payback in 15 months, cuts 401 metric tons CO_2 in 1 year

Building on the detailed case study evidence on telepresence costs and benefits, we constructed a model to assess the financial benefits and carbon reductions for a $1 billion plus revenue firm, which represents the typical market for telepresence today, using four telepresence rooms (see Box 4 for typical costs).

This analysis finds that over five years of use the investment:
- Pays back within 15 months (see Figure 4).
- Saves 874 business trips in year one.
- Generates a yearly ROI of 77% to 85%.
- Reduces CO_2 emissions by 2,271 metric tons over five years. These reductions are equivalent to the annual greenhouse gas emissions from over 400 passenger vehicles.

Details of this case study can be found in the appendix, with the model assumptions and variables. The figures rely on four telepresence rooms spanning multiple locations, and a ratio of 60% short haul flights and 40% long haul flights.

Unquantifiable benefits were also made apparent through interviews, which nevertheless remain key drivers in the implementation of telepresence (see Box 5).

"We compared executives travelling from the 9 months prior to telepresence with the 9 months following implementation. From an air travel perspective, we observed a 25% carbon footprint reduction."

Zelda Bentham,
Senior Environment Manager,
Aviva

Box 4. Typical costs involved

Technology costs (two main types of payment plans exist):
1. Recurring, all inclusive monthly charges (includes the bandwidth, leasing the devices, etc)
2. Acquiring the devices with a high one-off cost, followed by smaller recurring costs. Telepresence rooms typically vary from $60,000 to $300,000 per device. The bandwidth can then follow two models:
   - Leasing a dedicated line. Typically simpler and more secure, guaranteeing sufficient bandwidth and security.
   - Company overlay network: using the current company's network infrastructure: cheaper, but demands more monitoring and supervision to ensure sufficient bandwidth is available.

Facilities costs: those additional costs should be taken into account, as they can effectively double the one-off investment costs:
   - Air conditioning
   - Painting, room, arrangement, acoustic insulation, etc.

Employee costs:
   - Employee time spent implementing the technology
   - Employee time spent maintaining the technology (reporting, support)

Box 5. Qualitative benefits of telepresence

The following are reported benefits from implementing telepresence that are difficult to quantify but are often, nevertheless, strong drivers for investing in the technology:
- Improve executives' and other users work/life balance'
- Speed up decision making and processes
- Strengthen relationships with customers, suppliers and partners

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10. Aggregated benefits for all 1 billion $ + companies within the specified country. Benefits are of two kinds: financial and emissions reductions.

Figure 4. Large investments are swiftly paid back

- Additional revenues (productivity gain)
- Total travel costs saved
- Operating costs
- Investment cost

Forecasting economy wide benefits in US and UK shows telepresence adoption offers a big economic boost

Firms that were interviewed for this study vouch for the financial benefits from using telepresence and its ability to cut carbon emissions. But what does this mean in terms of economy-wide and broader social benefits? To shed light on this bigger picture we built a telepresence adoption forecast model based on the interviews conducted:
- An algorithm that forecasts the adoption of technologies by a population of business customers.
- Assumptions about the speed of adoption of telepresence in different industries and the maximum number of telepresence rooms per $1 billion revenue.
- Financial data for 2,653 global firms with annual revenues in the US above $1 billion and 457 global firms with annual revenues in the UK above $1 billion.

Combining the telepresence adoption forecast, industry-level company data, the financial model and the carbon reduction model, we generated a forecast for economy-wide benefits and CO_2 reductions. Key financial findings from the analysis:
- By 2020 US firms with revenues of more than $1 billion are forecast to have deployed almost 8,000 telepresence units across their global operations. The global deployment of telepresence by UK firms with revenues of more than $1 billion is forecast to be almost 2,000 units. See Figure 5 which demonstrates the proportion of telepresence rooms used across industry sectors.
- Annual net financial benefits from telepresence to the US economy are forecast to be $315 million in 2010 rising to over $3.5 billion in 2020,

with a total of over $15 billion in ten years. This is based on deployments rising from 994 telepresence rooms in 2010 to 7,991 in 2020 (see Figure 7).
- For the UK economy, the growth in worldwide telepresence deployment by UK firms is forecasted to grow from 245 units by the end of 2010 to 1,966 in 2020. Annual net financial benefits for UK firms investing in telepresence is forecast to increase from $79 million in 2010 to $894 million in 2020, with a total of over $3.5 billion in ten years (see Figure 8).
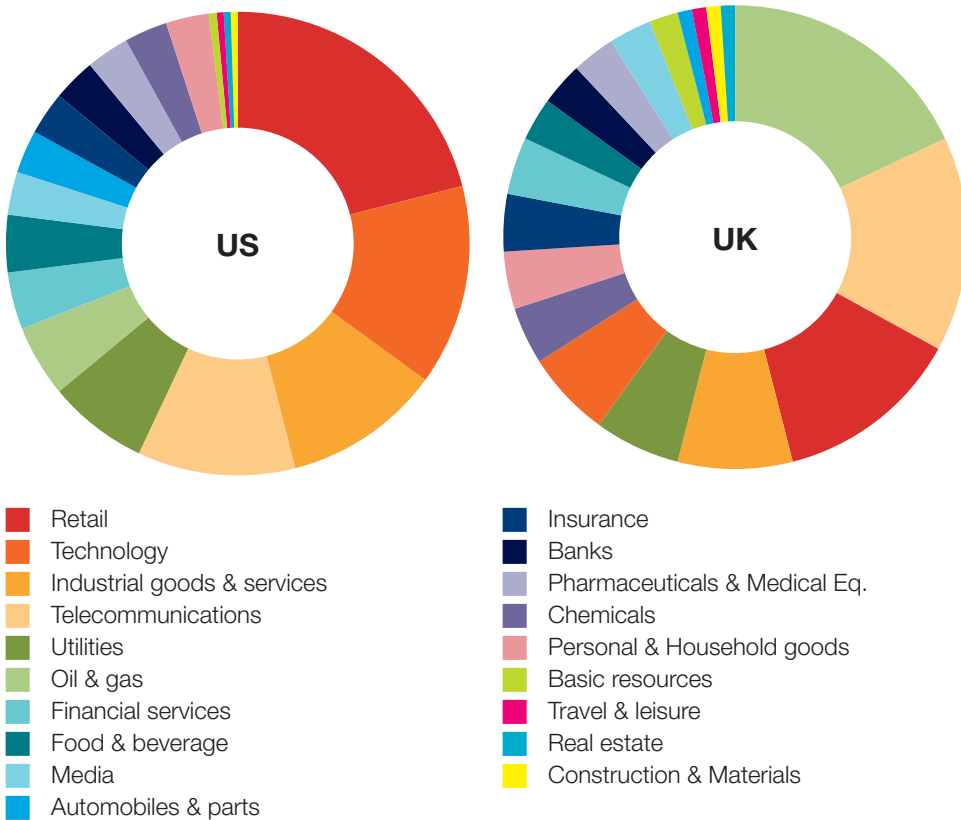
Potential carbon reductions from telepresence run into millions of metric tons CO_2

In step with the significant financial benefits from telepresence come the potential carbon reductions. Our forecast for the 2,653 global firms[11] operating in the US and the 457 global firms[12] in the UK identifies the potential to cut CO_2 emissions with telepresence as follows:
- CO_2 reductions in 2010 of 112,000 metric tons for global usage of telepresence by US firms and a reduction of 23,000 metric tons CO_2 for the UK firms in 2010 (see Figure 9 and Figure 10).
- Annual reduction of CO_2, compared to business as usual, in 2020 of 963,000 for global deployments by US firms and 198,000 metric tons CO_2 by UK firms.
- Cumulative cuts in CO_2 between 2010 and 2019 (inclusive) of almost 4.6 million metric tons for the US firms' worldwide telepresence usage and 940,000 for the UK firms, with a total of nearly 5.5 million metric tons CO_2. These reductions are equivalent to the annual greenhouse gas emissions from over a million passenger vehicles.
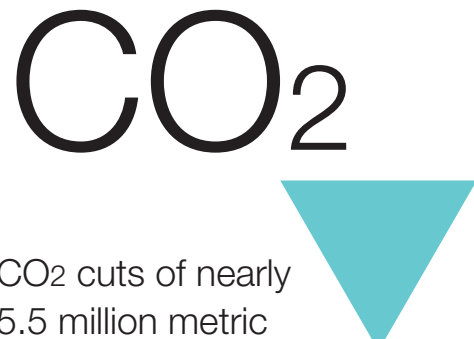
11. Numbers of firms with over $1 billion in revenue in the US.
12. Numbers of firms with over $1 billion in revenue in the UK.

Figures 5 & 6. Proportion of telepresence rooms in 2020 by industry sector

US

UK

- Retail
- Technology
- Industrial goods & services
- Telecommunications
- Utilities
- Oil & gas
- Financial services
- Food & beverage
- Media
- Automobiles & parts

- Insurance
- Banks
- Pharmaceuticals & Medical Eq.
- Chemicals
- Personal & Household goods
- Basic resources
- Travel & leisure
- Real estate
- Construction & Materials

$ ▲

By 2020 US and UK businesses can achieve economy-wide financial benefits of almost $19 billion as a result of deploying 10,000 telepresence units.

CO2 ▼

CO_2 cuts of nearly 5.5 million metric tons, equivalent to the annual GHG emissions from over a million passenger vehicles.

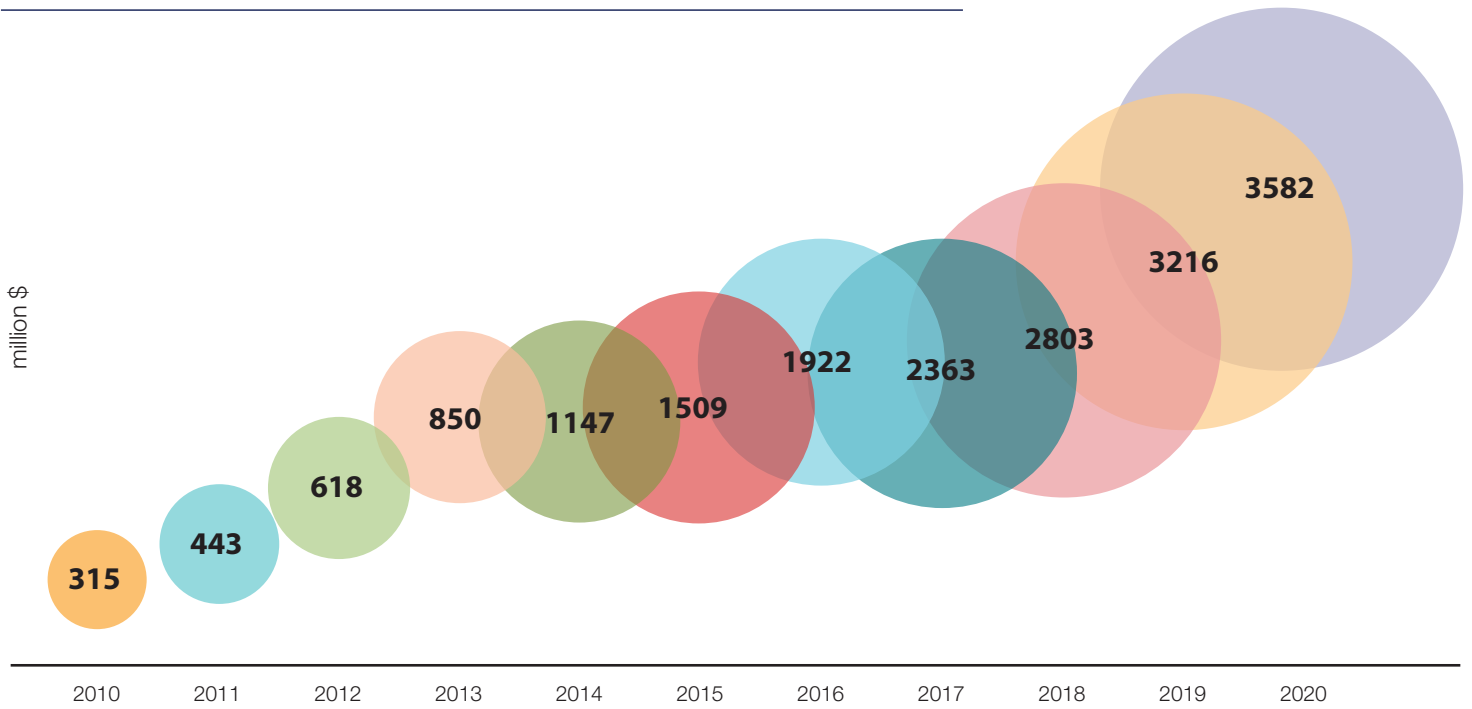**Figure 7. US economy-wide business benefits generated
by telepresence, 2010 - 2020**

million $

315 443 618 850 1147 1509 1922 2363 2803 3216 3582

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

**Figure 8. UK economy-wide business benefits generated
by telepresence, 2010 - 2020**

million $

79 111 155 213 287 377 480 590 699 802 894

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
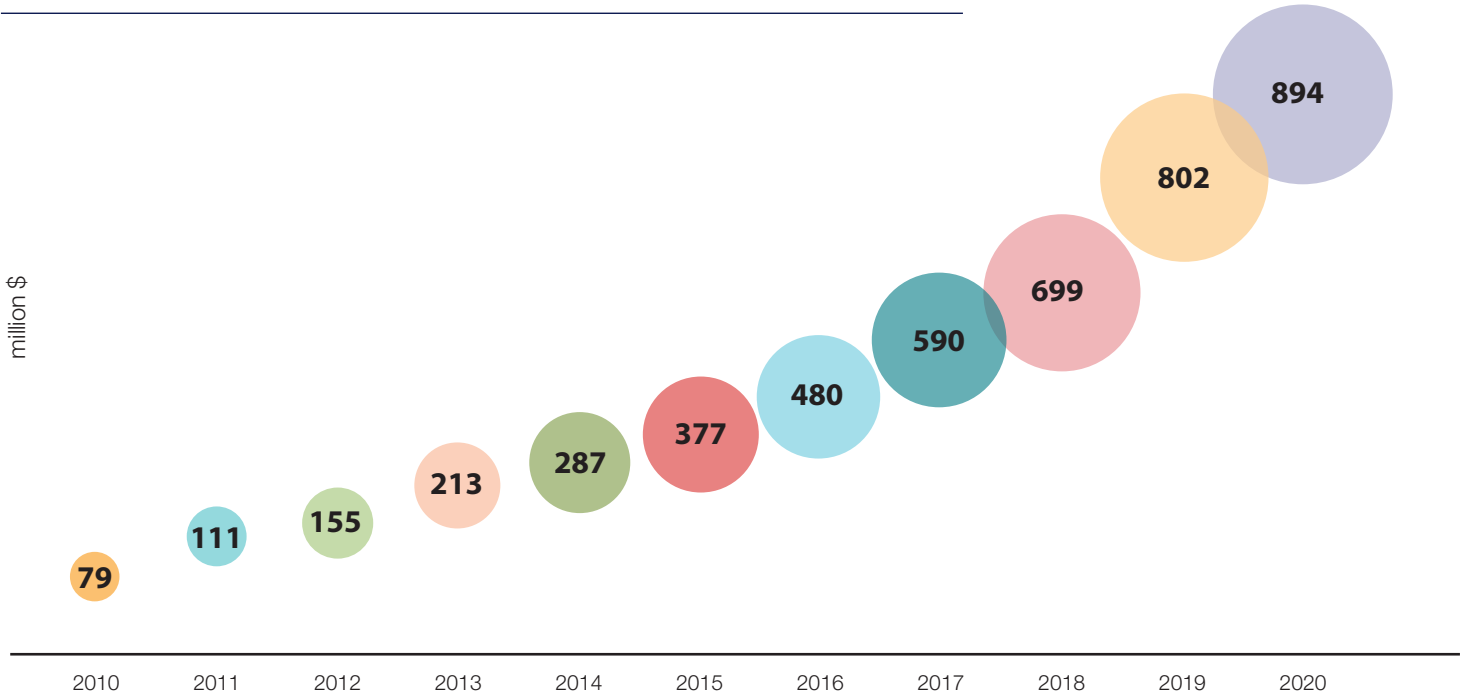
Figure 9. US economy-wide CO$_2$ emissions reductions, 2010 - 2020

1,000 metric tons

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
112	155	212	285	373	474	582	689	792	884	963
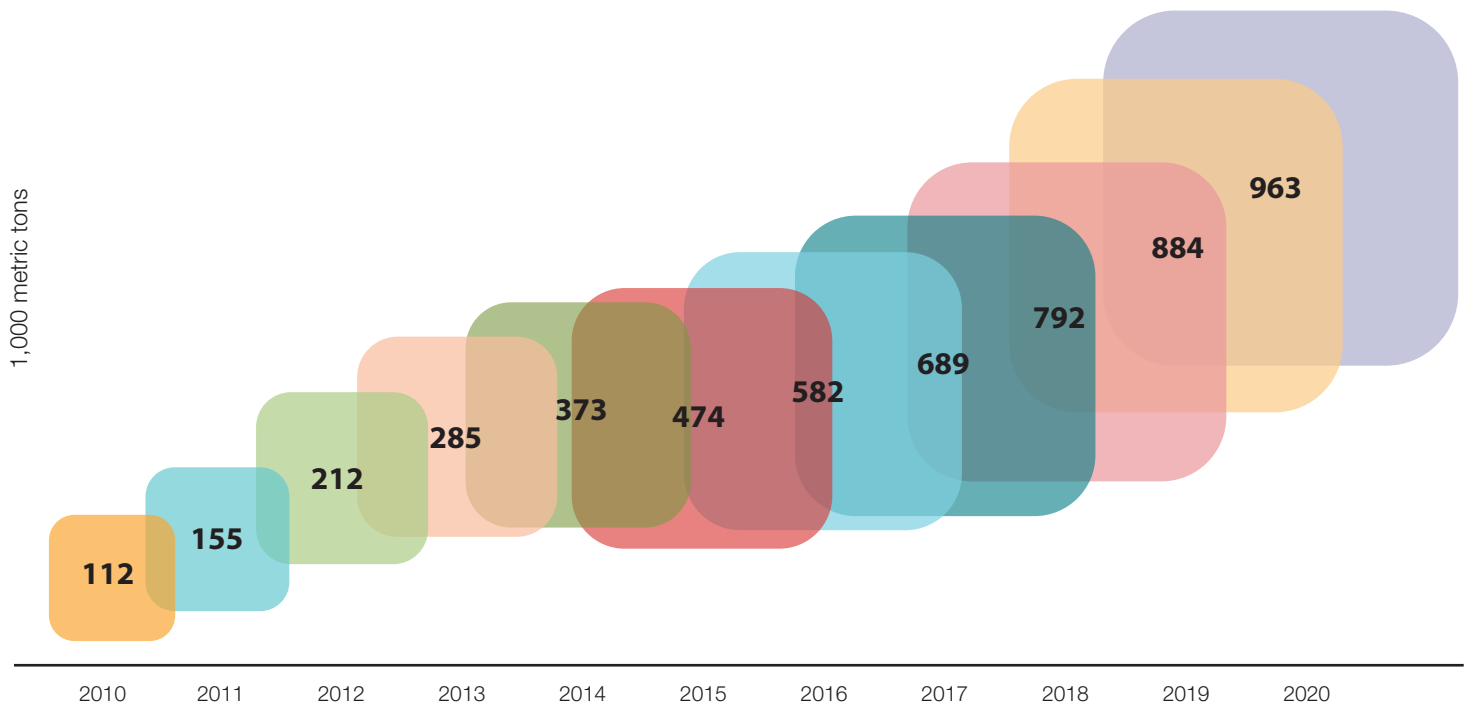
Figure 10. UK economy-wide CO$_2$ emissions reductions, 2010 - 2020

1,000 metric tons

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
23	32	44	59	77	97	119	142	163	182	198
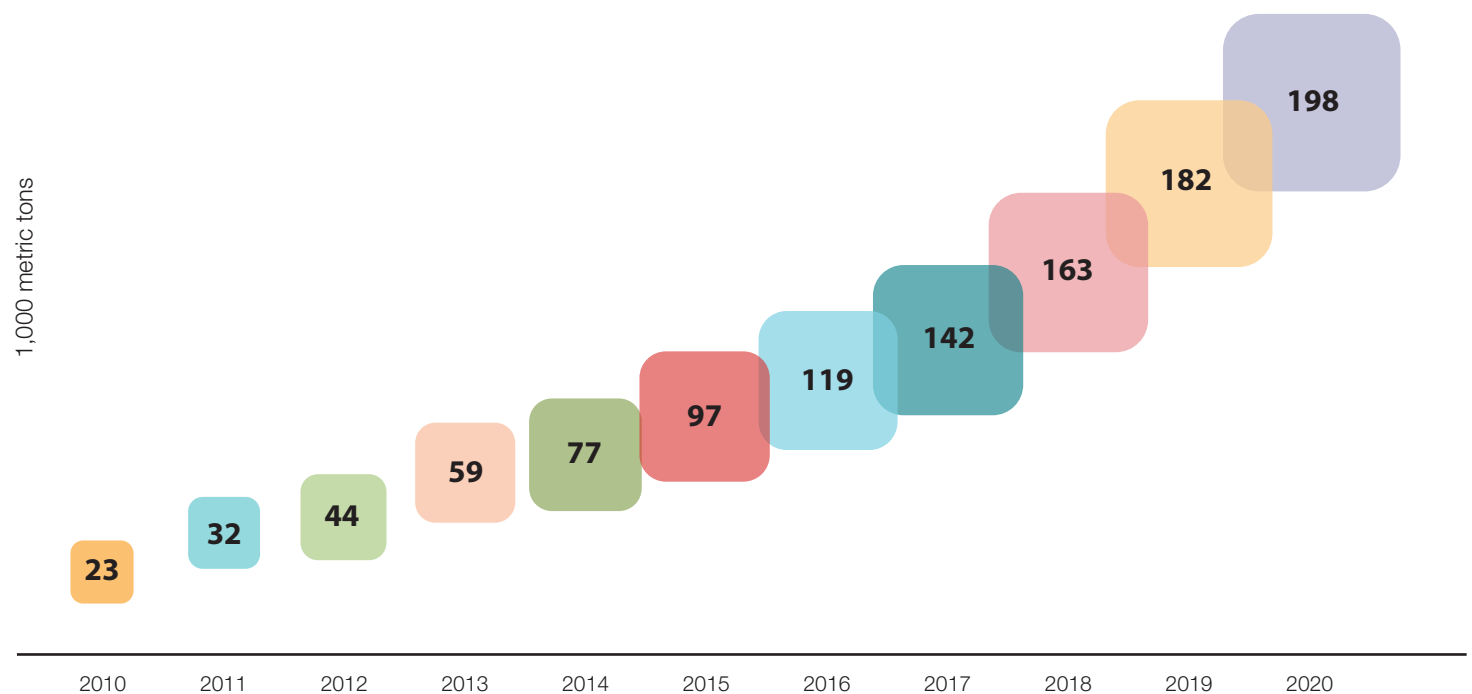
3. Recommendations to maximize telepresence benefits

"Reducing travelling is part of our executives' personal objectives – telepresence is a very welcome aid to meeting those targets."

Zelda Bentham,
Senior Environment Manager,
Aviva

"Seeing is believing"

Michael Nicholus,
Director, Global Environment Program
Accenture

"Raising employee awareness through internal campaigns is key to increasing adoption."

Christian Sturm,
Service Delivery Manager,
Zurich Financial Services

Telepresence holds promise for firms seeking to dovetail financial payback and environmental benefits. Drawing on the detailed case studies and insights from the financial and carbon reduction models, the following are recommendations that help maximize telepresence investments (see Figure 9):

- When deploying telepresence following a pilot project, it will be important to establish a sufficient number of telepresence rooms throughout a company's operations, so that there is availability for employees to actually use this technology. Having just a couple of rooms would not be enough to change employee behavior nor to impact travelling patterns.
- Raising employee awareness and having an internal marketing strategy. This includes examples such as organizing demos to get the skeptics in front of the system or advertising telepresence capabilities on company travel portals. Some companies even include travel reductions in their executives' quarterly goals, a strong enticement to use substitute technologies such as telepresence.
- Involve and prioritize executives; their costs are the highest.
- Establish a clear corporate policy for telepresence utilization. Depending on seniority and purpose of the meeting, employees should be encouraged to use telepresence as an alternative solution to travelling, unless a viable reason justifies travel.

- Put in place a solid administrative support system. Although telepresence is considerably simpler to use and more reliable than legacy VC, high quality support will encourage the less technology-aware employees to welcome this additional collaboration tool.
- In-depth reporting and metrics, based on surveys, reflecting utilization and travel data are vital in understanding how efficiently the company's telepresence infrastructure is being used. For example, measure utilization rates, including the split of telepresence users who would have travelled, from those who use the technology for the convenience only. Surveying each user is the easiest way of acquiring crucial monitoring information.
- Monitoring and reporting help maximize utilization: look for areas of user concern to better understand reasons for low utilization. Be also on the lookout for correlations between usage and dips in the travel budget.
- If marketing the technology is not enough to set in motion the right behaviors, a requirement to implement is the next logical step. This is generally not needed, but an example of this is making telepresence use requirement to employees without manager approval. Monitoring and reporting will help implementation of regulations.

Figure 11. Critical parameters that affect your ROI

Factor	Explanation
Utilization rates	Drive utilization by raising awareness through marketing. Good quality support will help maintain high rates.
Substituted meetings	Survey users to identify how many would actually have travelled for a meeting, follow utilization and analyze employee needs.
Travel patterns	Analyze most common travel locations and sites with most client activity. Along with critical mass, this will help identify key locations to implement telepresence.

4. Appendix

Interviewed companies

15 Global 500 companies were interviewed for this research. Companies included Aviva, Accenture, Bayer, Danske Bank, EMC, Ericsson, GE, JP Morgan Chase, Microsoft, Novartis, PepsiCo, Zurich Financial Services and 4 non-disclosed companies.

Model description

The model created relies on a number of parameters that relate directly to financial and environmental benefits of using telepresence as a partial substitute to travelling. The assumptions and variables are based on the 15 interviews and Verdantix desk research and include parameters such as flight costs, flight emissions, hotel costs, days spent travelling (in terms of productivity), telepresence costs, utilization rates, power requirements, support costs and other expenses. These are included in the table below.
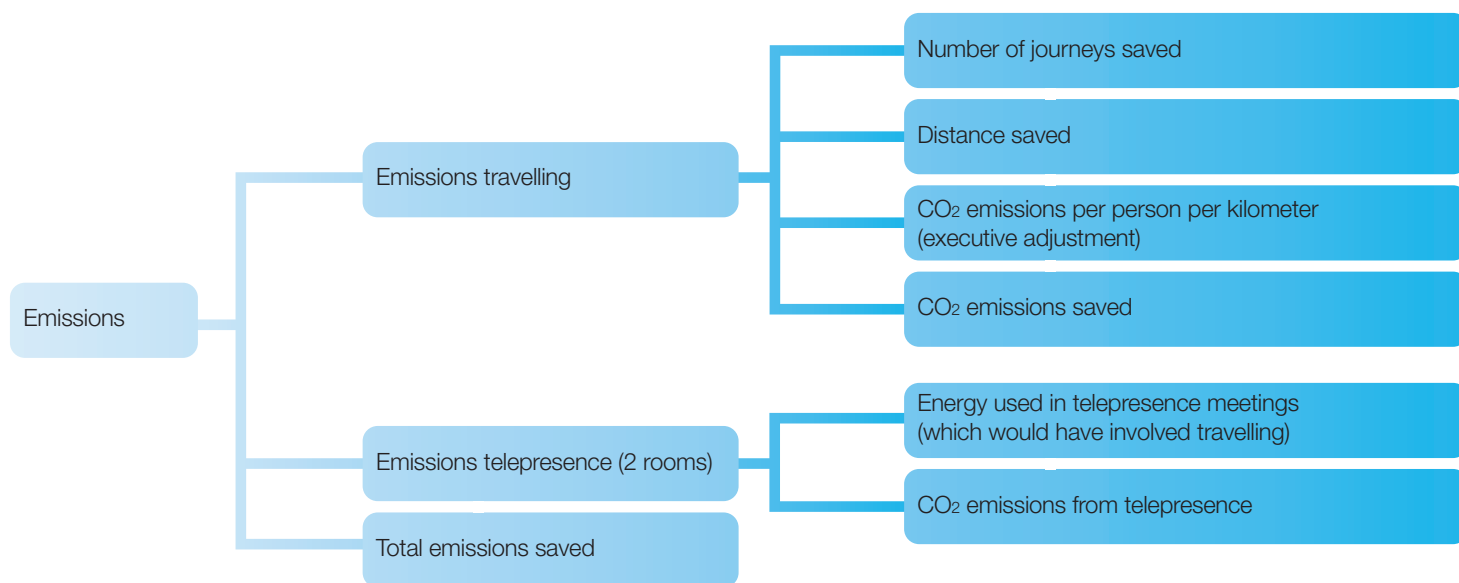
Scenario parameters							Source
Scenario modelled:	4 telepresence executive huddles 2 person meetings Installation modelled as one-off cost (rather than leasing)						
	US: 60% of trips Intra US, assumed NY to Chicago (1150km distance)						Distance based on google maps. Ratio set based on interview findings.
	40% of trips US-EU, assumed NY to London (5600km distance)						Distance based on google maps. Ratio set based on interview findings.
	UK: 60% of trips Intra Europe, assumed London to Amsterdam (350km distance)						Distance based on google maps. Ratio set based on interview findings.
	40% of trips EU-US, assumed London to NY (5600km distance)						Distance based on google maps. Ratio set based on interview findings.

5 year variables		Year 1	Year 2	Year 3	Year 4	Year 5	
	Utilization rates	26%	32%	40%	50%	60%	Utilization rates set based on interview findings.
	Stimulated meetings	44%	50%	55%	61%	66%	Stimulated meetings set based on interview findings.
	Senior execs utilization	40%	30%	20%	15%	15%	Senior execs utilization ratio set based on interview findings.

Year 6 onwards: rates are considered stable (identical to year 5)
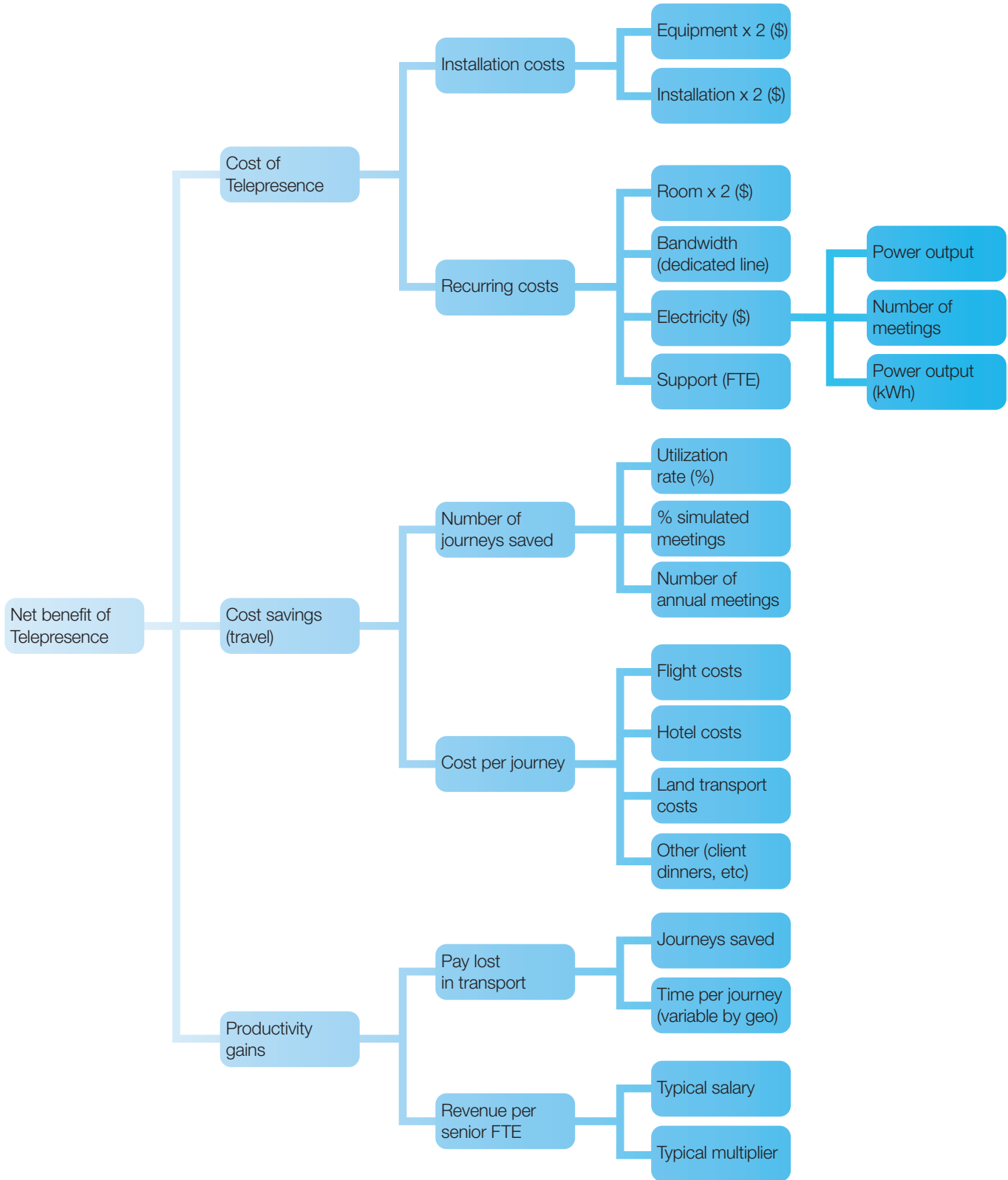
Travel cost assumptions | | | | | Source

Number of business days in a year	count	250			Based on US count.
Typical Senior Exec salary	k$	200			Verdantix estimate.
Typical Employee salary	k$	80			Verdantix estimate.
Duration of business trip (ratios applied)	days	1.8			Verdantix estimate.
US flight costs (ratios applied)		Economy	Business		
	k$	0.912	2.942		Flight costs based on Expedia bookings, during business hours, reserved 14 days in advance.
UK flight costs (ratios applied)		Economy	Business		
	k$	0.93	2.99		Flight costs based on Expedia bookings, during business hours, reserved 14 days in advance.

Hotel costs (ratios applied)	k$				Verdantix estimate.
Time spent travelling (ratios applied)	days	0.7			Based on travel patterns.

Telepresence cost assumptions | | | | | Source

Cost of bandwidth (per room, per annum)	k$	50			Based on interview findings.
Cost of electricity:					
US	$/kWh	0.12			Average cost across the USA based on Verdantix findings.
UK	$/kWh	0.15			Average cost across the USA based on Verdantix findings.
One room nominal power output	kW	6.6			Average output based on manufacturer information.

Emissions
- Emissions travelling
  - Number of journeys saved
  - Distance saved
  - CO$_2$ emissions per person per kilometer (executive adjustment)
  - CO$_2$ emissions saved
- Emissions telepresence (2 rooms)
  - Energy used in telepresence meetings (which would have involved travelling)
  - CO$_2$ emissions from telepresence
- Total emissions saved

Emissions				Source
Emissions for electricity generated	metric tons CO$_2$/kW	0.00075		Average emissions based on desk research.
Flight carbon emissions (ratios applied)	metric tons CO$_2$/km	Economy 0.000132	Business 0.000198	Desk research – flight emissions based on industry averages.
Notional cost of CO$_2$ (per metric ton)	k$	0.015		Verdandix estimate.

About the Carbon Disclosure Project (CDP)

The Carbon Disclosure Project launched in 2000 to accelerate solutions to climate change by putting relevant information at the heart of business, policy and investment decisions. We further this mission by harnessing the collective power of corporations, investors and political leaders to accelerate unified action on climate change. 2,500 organizations in some 60 countries around the world now measure and disclose their greenhouse gas emissions and climate change strategies through CDP, in order that they can set reduction targets and make performance improvements. Data is made available for use by a wide audience including institutional investors, corporations, policymakers and their advisors, public sector organizations, government bodies, academics and the public.
For more information please see: **www.cdproject.net**

This study was produced by Verdantix

Verdantix is an independent analyst research firm that helps senior executives and change leaders with its strategic and commercial analysis of climate change, sustainability and energy issues. Verdantix clients include managers, advisers and entrepreneurs in blue-chip corporates, services firms, new ventures and government agencies. For more information please see: **www.verdantix.com**

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