Spring 2021

Video shouldn't cost the earth

Reducing the climate impact from
TV and video production

SUSTAINABILITY
REPORT 2021

The climate emergency on our screens...

Scene – the Arctic. A polar bear struggles to hunt and find food for her cubs on melting sea ice. Camera pans out to show the ice sheet breaking up. Voiceover warns of a bleak future if the current rate of global warming continues.

It's an all-too-familiar scenario, along with the wildfires, floods, droughts and other climate-related disasters that were once rare events but now feature regularly on the news.

Yet even as global warming becomes more visible, it can also seem remote and hard to relate to real life. Albert, the BAFTA backed environmental organisation, has broken the impact down. It estimates that every hour of TV production generates 9.2 tonnes of CO2 and each tonne of CO2 results in the loss of 3m2 of sea ice.[1]

Multiply that by hundreds of thousands of hours of TV production every year worldwide. Add in the explosion in video streaming, and the power required to support it, and it's clear that the industry has a substantial and growing climate impact.

Awareness of the problem is rising and the industry is beginning to change. In recent years many broadcasters and video producers have committed to become carbon neutral. Most are embracing advances in technology that allow them to produce more TV remotely, which uses less equipment and energy and requires less travel and transportation.

This report looks at the challenges, how the industry is shaping up to meet them and how new technologies and advances in network capacity can help to reduce the carbon impact from video editing and post-production activity.

1. Albert Annual Report 2019-20 albert_AnnualReport_19-20.pdf (wearealbert.org)

1 hour TV production = **9.2 tonnes CO2 released** = **27.6m² sea ice loss**

The climate crisis in numbers

In 2021, the concentration of CO_2 in Earth's atmosphere will reach 417 parts per million (ppm) – 50% higher than before the industrial revolution.[2]

Half of the increase in CO_2 in the last 300 years has occurred since 1980.[3]

2. Met Office Atmospheric carbon dioxide to pass iconic threshold - Met Office

3. NASA http://climate.nasa.gov/news/2915/the-atmosphere-getting-a-handle-on-carbon-dioxide/#:~:text=The%20concentration%20 of%20carbon%20dioxide,it%20was%20near%20370%20ppm.

The Carbon Age

Carbon dioxide (CO_2) emissions from the burning of fossil fuels for energy and cement production. Land use change is not included.
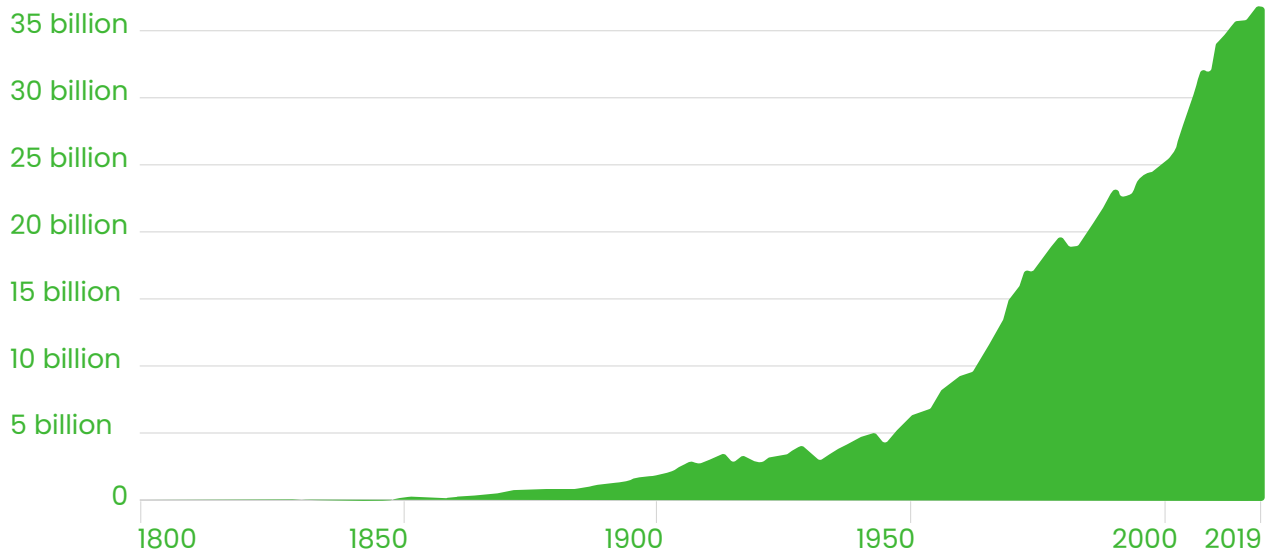
In metric tonnes

The challenge: an explosion in demand for content

We're living in a golden age for video content. There's never been so much choice in what to watch or how to watch it.

As well as traditional broadcast TV, we're seeing an explosion in platforms delivering video on demand (VOD).

With connection speeds doubling every year, and even faster increases in mobile device capacity, people expect to stream high quality video anywhere on any device. This has led to an exponential growth in demand for content.

• In a global study of viewing habits almost half of those surveyed (49%) said they watched over 5 videos a day.[4]

• The rate of increase is such that by 2022, video viewing will account for 82% of all internet traffic.[5]

• These trends accelerated during COVID-19. Streaming services saw a 10% rise in viewership during the first wave of the pandemic.[6]

82%
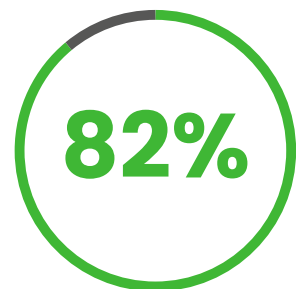
of internet traffic will be video by 2022

4. Promo.com 2019 Online Video Statistics and Trends New Study: 2019 Promo.com Online Video Statistics and Trends [Infographic] | Promo.com Blog
5. CISCO Visual Networking Index Complete Forecast Update 2017-22 Cisco Visual Networking Index (VNI)
6. Grandview Research Video Streaming Market Size, Share & Growth Report, 2021-2028 (grandviewresearch.com)

What's the carbon impact?

As we watch more, we inevitably use more energy too, especially as the industry moves towards higher definition resolutions that are more energy-intensive. Watching online video alone generates 300 million tonnes of carbon dioxide a year, equivalent to 1% of total global emissions.[7]

That's in addition to the carbon impact of watching regular TV, which still accounts for the majority of content viewed by most adults. The biggest share of carbon emissions comes from the energy needed to power streaming and the devices used to view content, as well as the delivery networks and data centres that support streaming, all of which contribute to net emissions.

How does production contribute?

As more content is produced, emissions from TV and video production will also increase. Significant emissions can come from:

Buildings and premises

Transportation

On-site equipment/trucks

Physical infrastructure

Network infrastructure (servers/storage)

Data centres, virtual servers and processors

Bandwidth requirements

CO2

7. BBC Future, **Why your internet habits are not as clean as you think** Why your internet habits are not as clean as you think - BBC Future

YouTube, Netflix and Sky are all committed to game-changing carbon reductions

Committing to change: the industry response

Climate-related disasters are pushing carbon reduction up the agenda with a renewed urgency in the 2020s. As well as highlighting the issue in programming, broadcasters and content producers are recognising their own impact and committing to change.

YouTube, through its parent Google, has committed to go entirely carbon-free by 2030, ensuring that all of its data centres are powered from renewable energy.[8]

Sky has committed to achieve net carbon zero in all of its TV production activity by 2030.[9]

Content providers such as global sports giant IMG are also committed to becoming carbon neutral (see case study).

Among the leading VOD platforms, Amazon has committed to net carbon zero by 2040 and Netflix is addressing its impact by matching its energy consumption with renewable energy certificates and carbon offsets.

In the UK, all broadcasters are required to measure their carbon impact using the calculator created by BAFTA's sustainability project, Albert. Along with the Digital Production Partnership (DPP), Albert provides tools and training to help the industry move towards zero carbon.

Reducing the carbon impact from production

As well as general energy saving and efficiency measures, broadcasters and producers are exploring a range of approaches to reduce the amount of carbon they emit from production activities, including:

- Switching to renewable energy sources and electric vehicles.

- Using local crews and facilities so there is less need to travel to locations/venues.

- Moving to remote production using cloud-based technology, so fewer people are required on-site, with less equipment, fewer trucks and miles.

Case Study

IMG – achieving sustainability goals through remote production

IMG is one of the largest producers of programming in the world, responsible for thousands of hours of content on behalf of more than 200 federations, associations and events. The company has committed to become carbon neutral by 2030 through remote production, energy saving and offsetting.

"We've been gradually reducing energy consumption and emissions for years," explains Brian Leonard, Head of Engineering Production and Workflows. "But those efforts are accelerating now, spurred on by projects like Albert in the UK, which enable us to share ideas and learn from what others are doing.

"Remote production means that IMG can cover events happening all over the world without having to send video editors and production staff thousands of miles to be there. That's a big gain, which also saves us money.

"The latest technologies, such as the Blackbird video editing platform, help us do more in the cloud without the need for extra storage or processing capacity, which further reduces our emissions when multiplied across hundreds of hours of programming every week. We aim to invest the money we save into more energy saving technology. It's a virtuous cycle."

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8. Carbon-Free Energy | Google Sustainability
9. Major broadcaster to make all TV shows carbon neutral | Living (euronews.com)

Watching online video generates 300 million tonnes of CO2 per annum

Into the cloud: towards cleaner video production

As internet capacity has increased, it is changing not just how content is delivered and streamed, but how it is produced. Editing and post-production workflows that were once tied to on premise equipment can now be performed from anywhere via the cloud.

This has huge potential for broadcasters, not only helping them work more flexibly and productively, but also helping them save energy and emissions by reducing the trucks, equipment and people required on site. The technology has come into its own during COVID-19, enabling video editors and post-production staff to work from home and continue to deliver programming.

The only barrier has been the capacity of the internet to handle the huge amounts of data generated by video. But rapid increases in internet speeds and cloud capacity, combined with advances in fibre networks, allow vast data transfers at lightning speeds, with no latency or loss of quality. This, in turn, enables more workflows – and even large-scale live sports events – to move to the cloud without worrying about capacity limits or processing speeds.

Limitations of hybrid cloud solutions

Using the cloud has been a huge leap forward. However, it is not without issues:

- Most cloud-based solutions substitute existing physical infrastructure and storage with virtual servers and processors in the cloud, which are more efficient but still consume a lot of energy.

- Giant cloud data centres can generate large amounts of CO_2. They need to be on 24/7 to ensure uninterrupted supply, which can reduce the sustainability benefits.

- Most solutions also require extra computer equipment and bandwidth to enable each user to connect to the cloud and publish from it.

However, new technologies have emerged which can leverage the freedom of the cloud and the growing speed and capacity of the internet to achieve the same result as current cloud-based solutions, without the need for extra equipment or infrastructure.


Case Study

Tata Communications – enabling complex live events to be produced in the cloud

Tata Communications is a global digital ecosystem enabler that powers today's fast-growing digital economy, with a subsea fibre network that carries 30% of the world's internet routes. Its media and entertainment business is a leading enabler of cloud-based remote video production and live broadcast, supporting over 5,000 events globally. With its global partnerships, it has reached over 2 billion sports fans with content delivered through 90% of global sports broadcasters.

"Things that were once unimaginable become possible once you have enough capacity," says Jeremy Dujardin, CTO Global Media and Entertainment Services. "Until recently, any live sports events with multiple camera feeds would have to be produced and edited on-site because the volume of data and processing complexity was too great.

"Today, once cameras are connected to lightning-fast fibre networks, editors can remote in to live video feeds from anywhere, using cloud-native platforms such as Blackbird, with no latency or loss of functionality. That removes the need to transport large crews and heavy equipment, contributing to the reduction of carbon footprint. It also increases productivity because the same crew can now cover multiple events on the same day from a central location.

"So far, this works for up to 10 cameras, but in the future, as the capacity continues to increase, we think that even the most complex live events, such as motorsport that have up to 100 cameras and really huge capacity requirements, will be able to go remote."
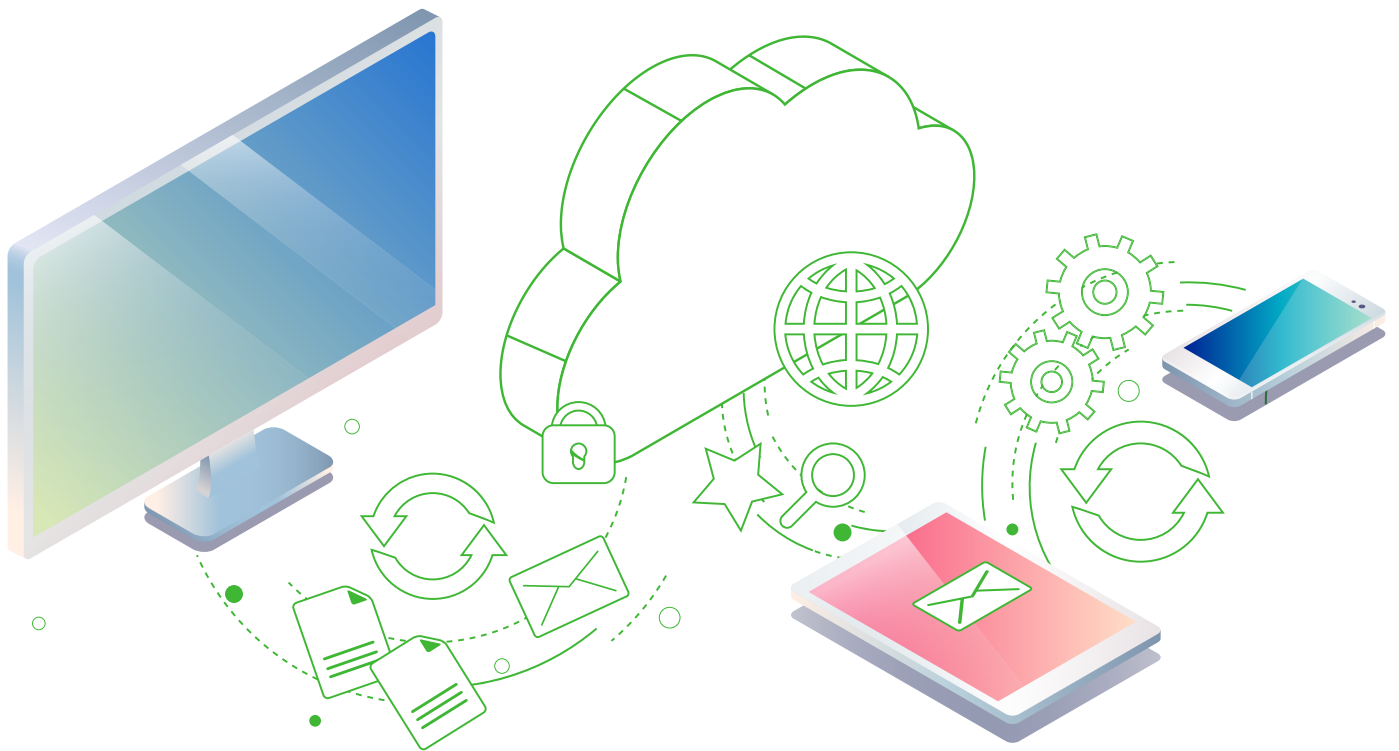
Cloud native: the next level of carbon reduction

Rapid advances in technology are expanding the boundaries of what's possible in the cloud. This is making it easier to migrate entire workflows without the need for connecting hardware, or even the virtual infrastructure within the cloud.

By using fully cloud native solutions, broadcasters have the potential to achieve further reductions in the energy consumed and emissions generated by video production.

Key to this is the ability to compress the vast amount of data generated by video, so that it can be edited and produced entirely within the cloud without needing large storage or processing capacity or having to go back to a traditional video editing platform for any part of the process.

Professional editing in a web browser

Blackbird achieves this by transcoding video from live camera feeds or files into a lightweight proxy version that goes direct to the cloud in real time. This enables frame-accurate video viewing, editing and publishing, while reducing the need for the heavy virtual infrastructure associated with standard cloud-based editing solutions.

The platform can be accessed through a normal web browser, which means there is

no extra computer equipment or bandwidth needed at the user end. Any number of users can work at the same time on ordinary laptops using normal Wi-Fi strength bandwidth.

Taking all of these factors together, Blackbird's cloud native solution can offer significant energy and emission savings not only over a traditional on premise setup, but also when compared to most existing cloud-based video production platforms.

> **Moving to cloud native solutions, like Blackbird, will minimize the need for on premise equipment. This helps to reduce our carbon footprint as fewer vehicles are on the road and employees can stay at home.**

Suresh Kumar \ Director of Technology \ Sky News Arabia

Case Study

Sky News Arabia – reducing emissions from travel

Sky News Arabia is a 24-hour Arabic news channel, broadcasting to 50 million households across the Middle East and North Africa.

"When we talk about sustainability, it can start with even small things like switching off your lights or TVs after office hours," says Director of Technology, Suresh Kumar.

"Moving to cloud native solutions, like Blackbird, will minimize the need for on premise equipment. This helps to reduce our carbon footprint as fewer vehicles are on the road and employees can stay at home. We learnt a lot during the COVID-19 period and this has accelerated our move towards better sustainability as a side effect."

Video editing: comparing the carbon impact

To assess the carbon emissions from video production, environmental consultancy Green Element compared the impact of three different model workflows – on premise, cloud based and cloud native.

To make a true like-for-like evaluation, they based their calculation on a live event, which allows the most accurate comparison since each workflow is picking up the same video feeds in real time.

What are the calculations based on?

- Cloud native (Blackbird): Editors working remotely on regular laptops from the office or home, no extra physical or virtual hardware, servers or processors required.

- Cloud based: Editors working remotely in the office or at home, extra routers and computer hardware needed to access cloud systems, plus virtual servers and processing machines to edit and publish.

- On premise: Editors travelling and working on-site, physical video editing suites/trucks transported and powered on-site, network infrastructure including physical processors/servers required to manage high bit-rate video transfers.

- All models: carbon emissions from hardware are calculated based on the length of the event as a proportion of the average hardware life cycle of four years.

What do the results show?

The charts show the relative carbon impact of each model based on one-day, four-day and two-week long sports events. As expected, the on premise model, which includes travel to the venue and on-site production rigs produces much higher emissions than either of the cloud workflows – 11 times more than the Blackbird cloud based solution in the 2 week event.
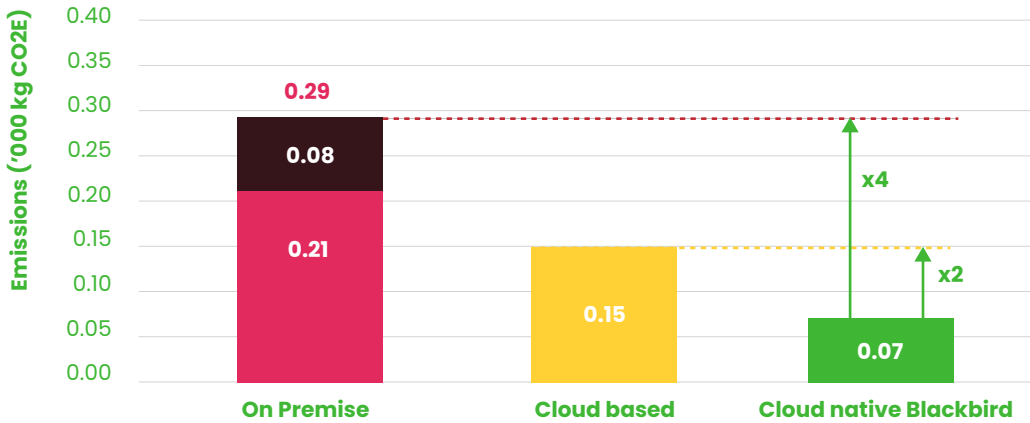
However, there is also a significant gap between the two remote production models. In the one-day example, emissions from Blackbird are less than half that of the cloud based model. This gap increases dramatically with the length of the event. Over a two-week event, the cloud based solution produces six times more carbon than Blackbird. This is because the cloud based solution transmits much more data and needs more hardware over a longer time period, while the power required by Blackbird's low data, low bandwidth solution does not increase significantly.

FACT FILE

Blackbird generates up to 91% less CO2 compared to an on premise workflow for a 2 week sports event
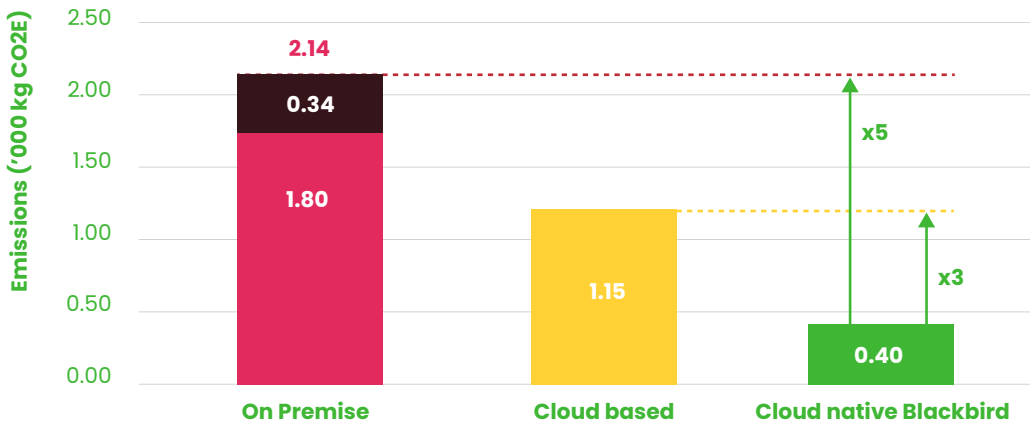
Comparison of emissions for sporting events

One-day sports event

Emissions ('000 kg CO2E)

- 0.40
- 0.35
- 0.30
- 0.25
- 0.20
- 0.15
- 0.10
- 0.05
- 0.00

0.29

On Premise: **0.08** / **0.21**
Cloud based: **0.15**
Cloud native Blackbird: **0.07**, x4, x2

- 40 hours of TV
- 5 editors
- emissions from 100km travelled by on premise editors (average size diesel car) represented by ■

Up to
75% less
CO2 with Blackbird

Four-day sports event

Emissions ('000 kg CO2E)

- 2.50
- 2.00
- 1.50
- 1.00
- 0.50
- 0.00

2.14

On Premise: **0.34** / **1.80**
Cloud based: **1.15**
Cloud native Blackbird: **0.40**, x5, x3

- 200 hours of TV
- 10 editors
- emissions from 200km travelled by on premise editors (average size diesel car) represented by ■
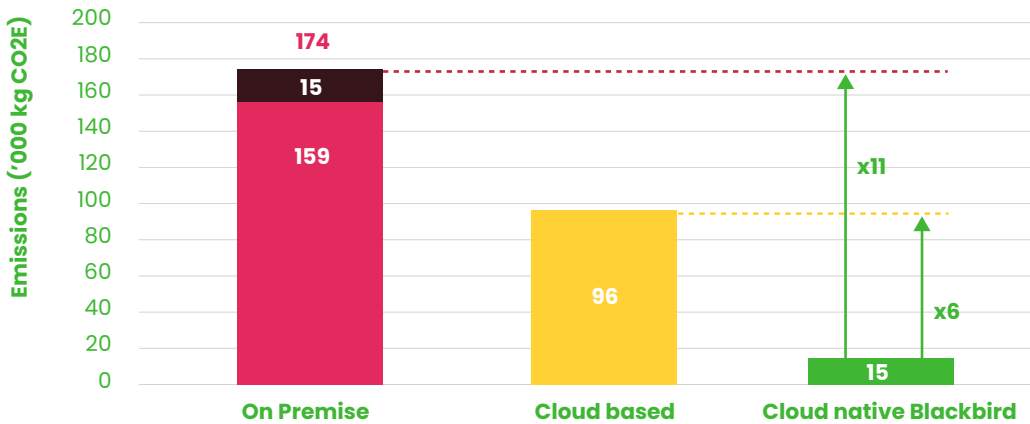
Up to
80% less
CO2 with Blackbird

Two-week sports event

Emissions ('000 kg CO2E)

- 200
- 180
- 160
- 140
- 120
- 100
- 80
- 60
- 40
- 20
- 0

174

On Premise: **15** / **159**
Cloud based: **96**
Cloud native Blackbird: **15**, x11, x6

- 4,000 hours of TV
- 50 editors
- emissions from 2,000km travelled by on premise editors (economy class plane travel) represented by ■

Up to
91% less
CO2 with Blackbird

A 25% reduction of carbon emissions from UK public service broadcasters' programme making would save over 200,000m² of sea ice per year[10]

1 0. Blackbird calculation using annual Public Sector production hours sourced from
www.ofcom.org.uk/__data/assets/pdf_file/0010/200503/media-nations-2020-uk-report.pdf) and 27.6 square metres of sea ice per hour
of video produced (see Page 2: 1. Albert Annual Report 2019-20 albert_AnnualReport_19-20.pdf (wearealbert.org)
2. Met Office Atmospheric carbon dioxide to pass iconic threshold - Met Office)

Conclusions

As the effects of the climate emergency become increasingly visible, they also become measurable, and therefore undeniable.

What this means for humans is that carbon reduction has to be at the core of everything that we do. It is the consistent and cumulative effect of sustainable development that will keep us from the edge of a climate disaster.

The TV and video industries are not exempt from this. They certainly need to change, as other industries are. If the five main public service broadcasters in the UK reduced carbon emissions from their programme making by a quarter, it would save over 200,000 square metres of sea ice per year.

Most broadcasters and major content producers are now routinely using the cloud for some of their editing and post production. It's an important transition, needing less physical infrastructure and fewer people in specific facilities or locations. But this approach still calls for significant energy-sapping hardware, and merely replicating on-premise workflows if the cloud is used inefficiently still leaves a large carbon footprint.

Hybrid solutions will never be as efficient as native technologies such as Blackbird, which are architected specifically to be optimized for the cloud environment. The result is a game-changing reduction in carbon emissions.

As is so often true with sustainable options, there are other fundamental benefits to cloud native solutions too: flexibility, scalability, resilience and convenience.

With cloud native technology, making video doesn't cost the earth.

Want to know more?

Contact us at:
sustainability@blackbird.video
www.blackbird.video/sustainability

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Through awareness, collaboration and commitment in the industry, we can make a meaningful reduction of carbon emissions. If the technologies that exist today are leveraged correctly, it would result in a large, positive and immediate impact. We owe it to future generations to act as leaders and collectively focus and prioritise cleaner video production that will benefit our environment. "

Ian McDonough
CEO
Blackbird

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