Success story: +Responsible and competitive production in the Region of Madrid.

Study conducted by
creast.

FILM MADRID REGION

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01

Objective.

Our study aims to highlight the unique conditions existing in Spain and the Region of Madrid to naturally improve the sustainable production of films, series and other types of entertainment.

We will use available information on the environmental impact of the filming of 3 well-known television shows produced in Spain, based in the Region of Madrid, to simulate their environmental impact in 3 other countries. All of these countries have a significant tradition in film production and are audiovisual powerhouses. The idea is to avoid shortcomings in resources, professionals or knowledge affecting production sustainability, when similar technical conditions are recreated. The sites are also highly developed Western countries with a high standard of living, with similar natural conditions, in order to avoid extreme political, climatic or geographical conditions that could distort the results. Regions have been considered where it is also reasonable and natural to film the projects selected for the study.

Spain, France, United Kingdom and United States are the locations chosen to simulate the filming of the same series, with the same script and under the same artistic criteria, with exactly the same human, technical and material resources. This allows us to isolate each country's natural elements, infrastructure and characteristics as the single factor with a potential effect on production sustainability.

To note in Spain is the value offered by a specific region, the **Region of Madrid,** which acts as a connector to other Spanish regions or transport hub, thanks to its privileged geographical location, facilitating transport from the centre of the peninsula to all other locations, with a high-speed train network and world-class roads. We highlight this factor as one of the reasons why Spain should be selected for its efficiency, as the connecting city or transport hub in the

other 3 countries analysed is far removed from the centre, thus increasing travel distance and making connections more difficult. Paris, London, New York and Los Angeles are all located far from the geographical centre of their respective countries.

When comparing the conditions offered by these countries, we have chosen 3 popular shows, covering a wide range of variables. This ensures that the study is not limited to a single project and guarantees unbiased results with respect to highly similar projects. In addition, since all these productions have been filmed in Spain, initial parameters are real and simulate the exact same filming in the other 3 countries.

"The Walking Dead: Daryl Dixon" (season 3), **"El Inmortal"** (season 2) and **"La Unidad. Kabul"** are the 3 projects selected.

"The Walking Dead"'s famous **spin-off** is an American blockbuster from AMC, whose previous season was in fact filmed in France. It is characteristically demanding of a large number and variety of locations, set in a dystopian world, expecting top-notch set design, materials and characterisation, and requiring the involvement of many technicians, actors and extras. It is a complicated and demanding production for the host country, a good case for pushing each country's natural resources and infrastructure to the limit.

The second season of **"El Inmortal"** has been produced in Spain, a Movistar Plus+ original in collaboration with DLO. The story is set in Spain in the 1990s, which requires a

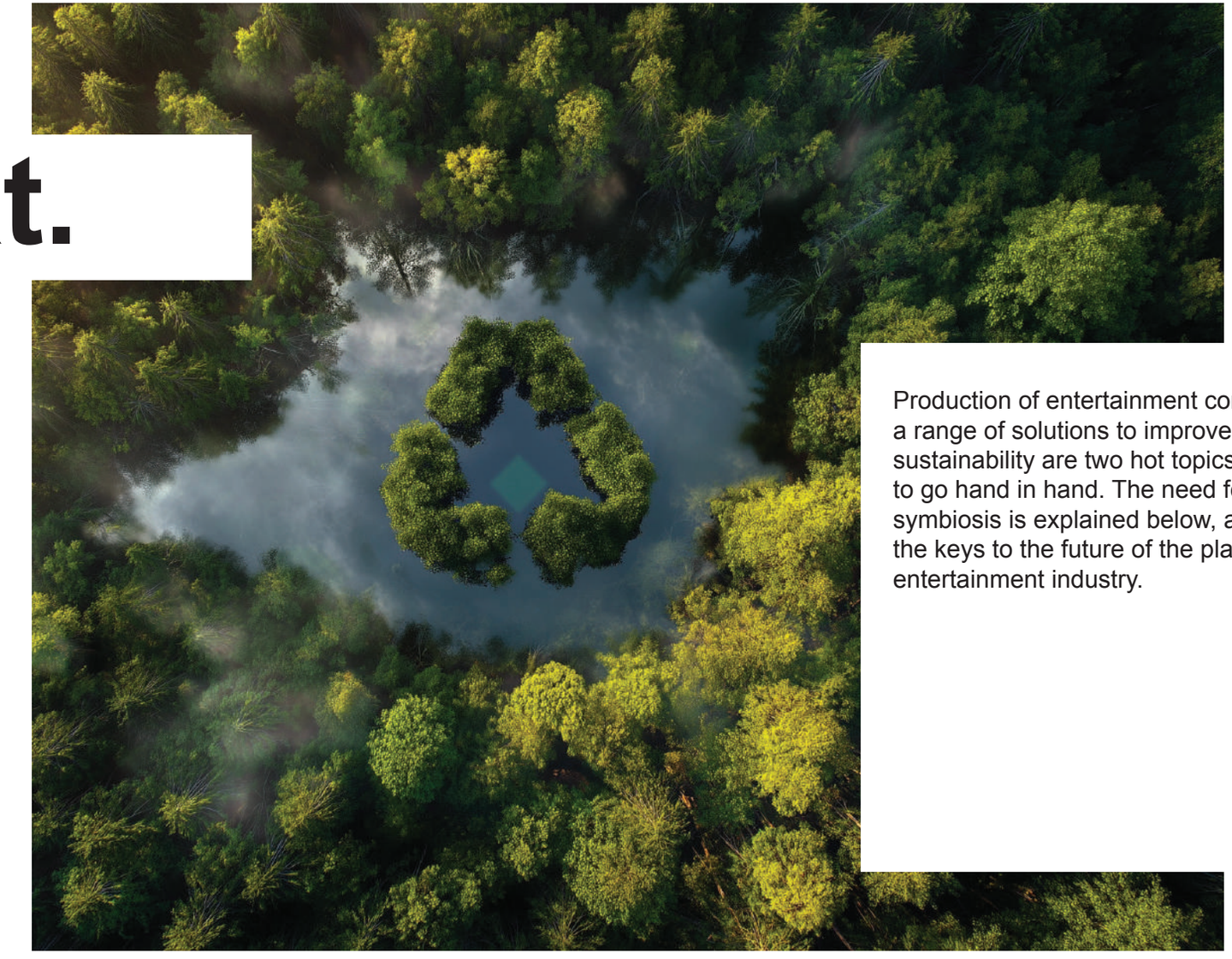
a moderate effort in terms of resources, materials, set design and characterisation. It is not as demanding as the post-apocalyptic world of **“The Walking Dead”**, but it does require effort. In addition, the second season includes scenes recreating Mexico, including the search for locations that resemble Veracruz. Although the scenes are not completely different from Spain’s landscape, careful planning is required.

Finally, **”La Unidad. Kabul”** is another Spanish production and Movistar Plus+ original, in collaboration with Buendía Estudios. The plot consist of an action-packed police thriller that takes place in the present day, without requiring a specific time setting. The project was chosen because it tackles the difficulty of recreating scenes in Afghanistan, in sharp contrast to the countries included in the study, once again posing a challenge when pushing the possibilities offered by these 4 countries to the limit.

Hypotheses had to be made to execute the simulations, described in detail below. In any case, the greatest significance here is not given to the exact calculation of each show’s impact in terms of environment and simulations, but how this environmental impact compares when the exact same parameters are reproduced in the 4 countries analysed.

02

Context.



Production of entertainment contents and a range of solutions to improve sustainability are two hot topics that need to go hand in hand. The need for this symbiosis is explained below, as one of the keys to the future of the planet and the entertainment industry.

Content production: steadily growing demand.

A recent study by Zenith Media has shown that humans spend an average of 8 hours a day consuming content worldwide. This means that leisure time exceeds the length of their work or sleep.

This insatiable demand is driving up production volumes year after year. The business opportunities offered by the entertainment industry for outstanding regions play a huge role in generating wealth and employment, in addition to building up their cultural heritage. Our commitment to making Spain a global production hub, by creating Spain Audiovisual Hub and a series of measures to attract local investment, is a wise move given the industry's performance, registering sustained global growth at an average annual rate of 5% for almost 5 decades.

Sustainability: Europe's 30-year plan.

Europe views sustainability as a priority for the continent's decarbonisation. For this, it has drawn up a strategy, ratified by all European Union member states, known as the . This initiative seeks to transform the continent's economy towards a more sustainable and environmentally-friendly model. The arrangement includes a set of policies and objectives essentially targeted at achieving Europe's climate neutrality by 2050. The European Green Deal includes the following key commitments:

Climate neutrality by 2050: Reducing net greenhouse gas emissions to zero, in order to achieve climate neutrality. This will turn Europe into the first climate-neutral continent.

Reduction in Emissions by 2030: The aim is to reduce greenhouse gas emissions by at least 55% compared to 1990 levels.

Circular Economy: Promoting a circular economy model that minimises waste, encourages recycling and reuse of materials, as well as reducing the environmental impact of industrial activities.

Renewable Energy: A significant increase in the share of renewable energy in the European energy mix, driving the transition from fossil fuels to cleaner energy sources.

Sustainable Transport: Developing more sustainable and innovative transport systems, reducing sector emissions and promoting the use of public transport and electric mobility.

Biodiversity: Protecting and restoring ecosystems and biodiversity by implementing measures to halt and reverse the loss of natural habitats.

Sustainable Agriculture: Promoting sustainable agricultural practices to ensure food security while reducing the agricultural sector's environmental impact.

Energy Efficiency in Buildings: Improving the energy efficiency of buildings through renovations to improve energy consumption rates.

The European Green Deal not only focuses on the environment, but also seeks to promote a fair transition for

employability and economic growth, ensuring that no one is left behind during this transformative process. The implementation of these policies aims to establish a framework for EU Member States to work towards a greener and more sustainable future.

A commitment to the film industry guarantees decarbonised leisure.

The moment has come to bring sustainability and entertainment production together: since leisure has proven to be the main daily occupation of the world's population (it accounts for a third of each person's day, with another third used to sleep), it is vital to reduce the environmental impact of our leisure time in order to fight climate change.

In turn, Creast has calculated the environmental impact of all types of leisure activities and has gathered evidence to prove that cinema and culture are among the most sustainable leisure options. Going to the cinema is about 8 times more sustainable than attending an event at a hotel without staying overnight, about 16 times less harmful to the environment than going to a music concert, and about 30 times more sustainable than going to a major sports event.

Ultimately, investing in cinema and promoting it as a leisure activity, improving the sustainability of entertainment content production, and turning Spain into the world's most important film set, all seem to be the best bet for generating wealth and employment (simultaneously complying with the European Green Deal and a low-carbon economy).

Global strategies within the audiovisual sector: sustainability has become a priority.

The circumstances outlined above have not gone unnoticed by major operators in the sector.

The long-term vision strategies adopted by leading entertainment content platforms, film production companies and advertisers indicate their main business concerns for the future, identifying sector trends, emerging challenges and key strategic priorities to secure competitiveness in a rapidly changing market. These strategies are evidence of how sustainability has risen in the industry's scale of priorities. Current trends in the sector include the following, in priority order:

- **Digital transformation** increases competition for consumer attention, requiring constant innovation.
- **Sustainability and social responsibility** are becoming central strategic issues.
- **Rapid technological evolution**, such as artificial intelligence and virtual reality, demands investment and adaptation.
- The protection of **intellectual property rights** and data management are becoming more and more important.

Of the 4 trends, indirect effects are derived from digital transformation, technological evolution and rights protection. Although leading companies in the sector strive to keep abreast in these areas, they are not directly impacted. On the other hand, sustainability and social responsibility do have a direct relationship. It is entirely up to sector companies and professionals to make their activities more sustainable.

These global trends have generated essential business concerns:

- **Sustainability and Social Responsibility**
  - Implementing **sustainable practices** in production and distribution.
  - Positioning each company as a driver of **inclusion, diversity, and responsible content.**

- **Adapting to Technological Changes.**
  - Incorporating **new technologies** to improve user experience and operational efficiency.
  - **Economies of scale** and partnerships in digital production and distribution.

- **To Attract and Retain Audiences.**
  - **Permanence** in a saturated environment that offers a global and fragmented range of services.
  - **Personalisation** of content and user experience.

- **Protection and Management of Rights.**
  - **Surveillance and protection** against piracy.
  - **Optimisation** of content **monetisation** and distribution **models.**

- **Investment in innovative content.**
  - Prioritising content that integrates **emerging technologies.**
  - Expanding into **emerging markets** and niches.

- **Regulation and Legal Compliance.**
  - **Regulatory adjustment in** privacy matters, digital rights, and local and international regulations.

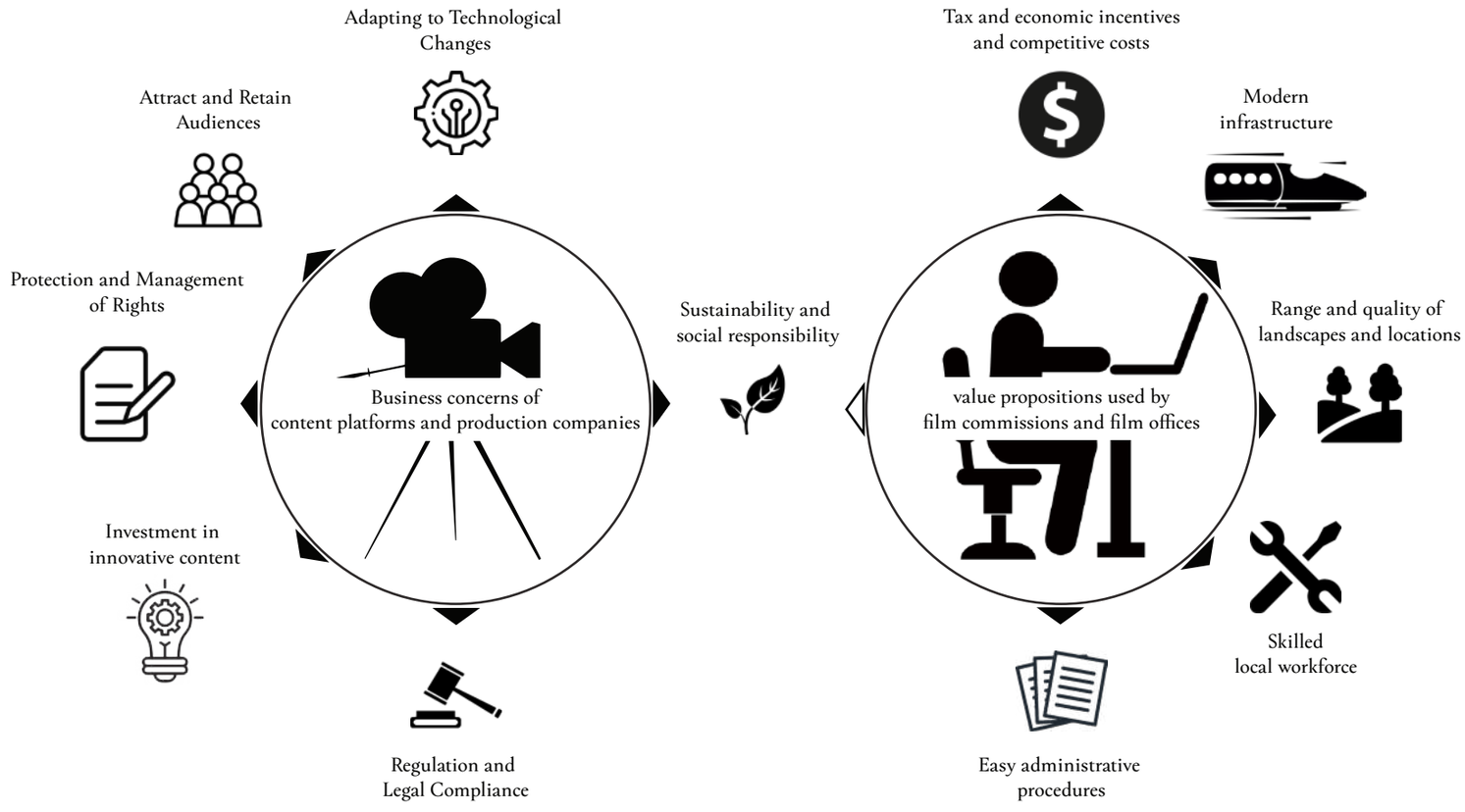
What are the value propositions that currently compete at a local level to attract film shoots?

In contrast to the foregoing, whilst different world regions attract film, television and advertising shoots by offering value propositions with competitive advantages, no region has yet differentiated itself by offering sustainable solutions to meet an essential demand expected of major global production companies.

The following popular strategies are currently used by film offices and film commissions to attract film shoots:

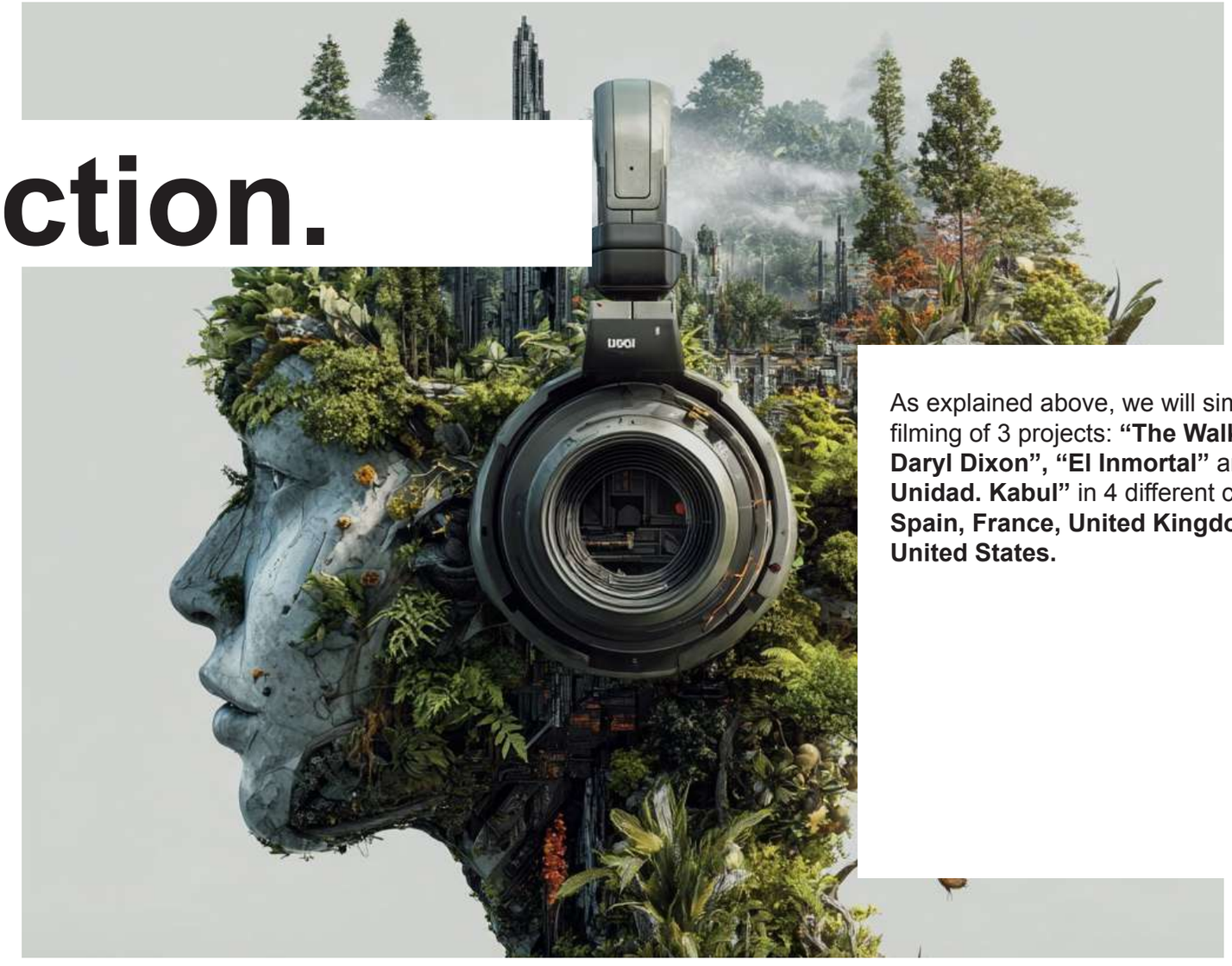
- Tax and economic **incentives.**
- Modern **infrastructure.**
- Range and quality of **landscapes and locations.**
- Skilled local **workforce.**
- Competitive **costs.**
- **Easy administrative** procedures.

Within this contextual framework, our study offers a new perspective on Spain's unique and excluding competitive advantage over any other country or region. This unique value proposition responds to a set of natural, climatic and structural variables that remain legally invariable (unlike tax breaks, for example), and which can determine why Spain should become a world power in entertainment content production.



03

Introduction.



As explained above, we will simulate the filming of 3 projects: **“The Walking Dead: Daryl Dixon”, “El Inmortal”** and **“La Unidad. Kabul”** in 4 different countries: **Spain, France, United Kingdom** and **United States.**

Our analysis seeks to compare the conditions offered by each of these 4 countries. It is not as important to determine the accuracy of carbon footprint calculations for each project, as to faithfully reproduce the same parameters used to produce the shows in Spain in each simulation located in the other 3 countries. This will isolate each country's natural and infrastructural conditions as the only factor affecting the sustainability of show production.

To this end, details will be given of the hypotheses presumed to simulate filming of the series in France, United Kingdom and United States, with the same artistic, technical and resource parameters used to produce each show in Spain. Thus, in the 3 simulations:

- The exact same number of **actors, extras and stunts** were used as for production in Spain.
- We simulated the participation of the **same number of technicians** needed to shoot the project in Spain, in a hypothetical shoot in the other 3 countries.
- We assigned the **same amount of materials** for decoration, costumes, make-up, characterisation and technical departments (such as camera, lighting, production, etc.) used during production in Spain, as a parameter to simulate production in France, United Kingdom and United States.
- We presumed that exactly the **same** amount of **waste** would be generated during the project shoot in each country.
- We assumed the **same number of vehicles** needed to transport actors, technicians and materials in the simulated shoots as those used in Spain.
- We kept the **same number of shooting days** and the same dates needed to complete the shoot in Spain, in the simulation in the other 3 countries.

We also preserved the same creative essence and the same story, with the necessary leeway to facilitate filming in other countries without environmental impact becoming a conditioning factor in impossible cases. For example, if medieval surroundings are needed (e.g. an ancient castle), and these are non-existent in the United States, travel to Europe would be required with a consequence increase in the carbon footprint. In this case, we would adjust the requirement in the same conceptual scenario, resorting to another type of ancient location that is able to preserve the story's meaning but is locally available, such as the ancient remains of the first Spanish colonists in North America.

In order to be historically accurate and to cover realistic problems that each country may face, if the script requires highly specific characteristics, such as a desert to simulate Afghanistan (the main plot is the fight against Islamic terrorism), such a site will be unavailable in a country without arid landscapes (as is the case in the United Kingdom), which is why our simulation will contemplate the team's relocation to a suitable site with the best connection and logistics. This is a natural consequence of all productions.

Consequently, this will ensure that the only factors affecting each country's simulation sustainability are:

- **Site geography and characteristics.** Specific locations are selected that are easily reached, meeting the needs of each set to simulate filming in France, United Kingdom and United States.

- **Infrastructure.** Train and road networks, airport networks, local accessibility required by each location, etc.

- **Food.** Access to local and seasonal produce (impact of seasonality and climate on supply), food transport and distribution, necessary imports, production processes or the impact of cold weather, energy and storage, among other variables.

- **Accommodation.** Impact of energy consumption and the national electricity mix, climate, efficiency of hotel facilities, type of accommodation according to the region where filming takes place and water management, all of which are factors affecting the impact of film crew accommodation.

- **Energy.** How the average temperature and extremes (air conditioning or heating required), relative humidity, actual hours of sunlight, solar radiation, wind, rainfall, seasonality and serious weather conditions, may all influence the environmental impact of a shoot's energy consumption.

- **Water consumption.** Climate and water availability, economic and industrial structure, technology and best practices, management and infrastructure, policies and governance, innovation and associated energy, are some of the variables that influence the impact of water consumption on each country's simulated production sustainability.

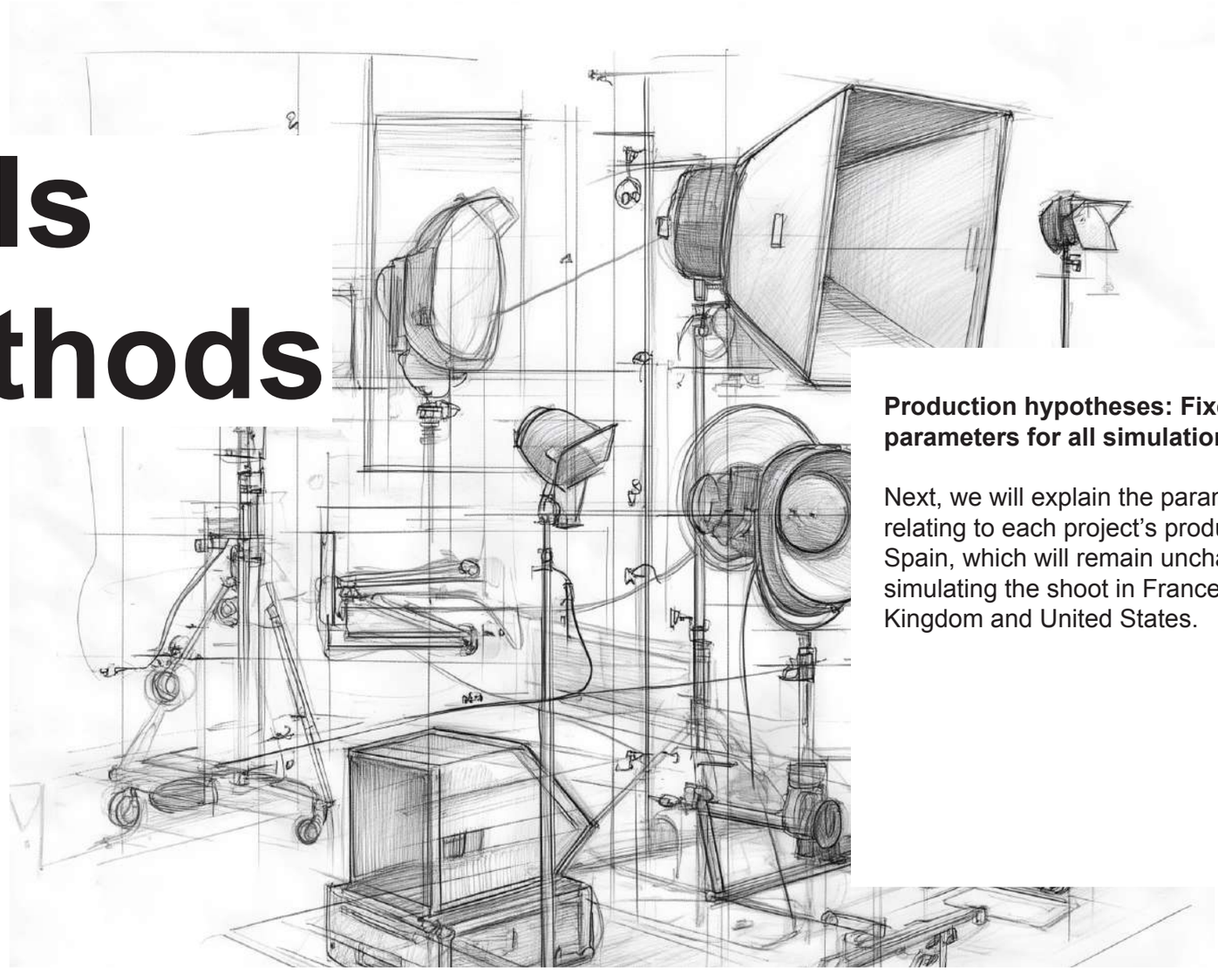
- **Waste.** The recycling rate, quality of recycled products and key practices (landfilling, incineration, etc.) all influence the impact of a country's waste management.

The key question we ask ourselves when undertaking this study is how the choice of one country over another affects sustainability in the same project. This is why all the hypotheses used try to rule out non country-specific sustainability variables, in order to find out which country is able to naturally generate more sustainability efficiency and by what percentage it is more efficient than other countries. The environmental impact of filming the same project in each country is not as relevant as the percentage increase or reduction in the carbon footprint, compared to filming the same project in other countries. The idea is to issue a country comparative while maintaining the same filming parameters.

We assume that all simulations maintain exactly the same environmental commitment, with the exact same sustainability measures. This ensures that work well done by a production's sustainability is not the differentiating factor; rather, we isolate this critical territoriality factor in order to focus on each country's natural conditions.

04.1

Materials and Methods



Production hypotheses: Fixed parameters for all simulations.

Next, we will explain the parameters relating to each project's production in Spain, which will remain unchanged when simulating the shoot in France, United Kingdom and United States.

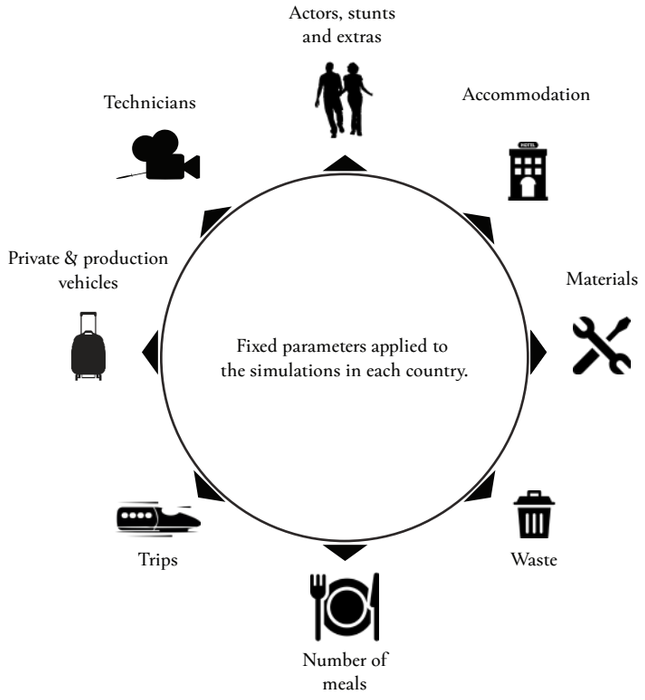
The Walking Dead: Daryl Dixon. Season 3.

AMC's production took place in Spain, but Creast was not involved in the show's sustainability management, unlike "El Inmortal" and "La Unidad. Kabul". However, we were given the sustainability plan that was implemented during the shoot and details of the technical and artistic team, the filming locations, the sets built in those locations, and the days of filming at each location. With this information and after setting up shop in the Region of Madrid, we will use the following hypotheses when replicating the parameters in the other 3 countries: France, United Kingdom, and United States.

Technical team.

The following hypothesis has been based on the number of professionals and statistics of source:

- **322 technicians** participated in the filming
- **3 Americans.**
- **3 Europeans.**
- **316 Spaniards,** of whom we estimate that **149 are Madrid residents** -travelling from Madrid and requiring accommodation outside the city-, and **167 are always local**, residing in the province where filming takes place. If the shoot is in Madrid, we assume that all Spanish technicians are local (without involving any travel or hotel accommodation).



Artistic team.

Range of actors, stunt performers and extras.

Based on information shared by AMC, the following parameters will be replicated in all countries:

- **70 actors.** An average of **50 actors per day of filming** will be needed. Applying the statistics shared by AMC, we estimate that of the 50 actors who film daily, **47 are Spanish** and **3 are American**. It is assumed that all Spanish actors reside in Madrid.
- **123 stunt performers** participated in the filming of the show. It is estimated that an average of **50 stunt performers** are needed per day of filming. Of these, **49 are presumed to be Spanish and 1 is foreign**. All Spanish stunt performers reside in Madrid.
- **2,491 extras** were needed to shoot season three of the show. It is estimated that an average of **200 extras** are needed per day of filming. All extras are presumed to be local, residing in the province where filming takes place, not requiring any travel or accommodation.

In total, it is assumed that 622 professionals will be on site each day.

Suppliers.

AMC's report itemizes the shoot's purchasing source. A total of 47% purchases were made in Madrid, accounting

Daily mobility.

622x pax

20x vans

84x petrol cars

84x diesel cars

13x trucks

7x motorhomes

for almost half of these. It is estimated that half of all materials are shipped from Madrid, requiring transport vehicles and accounting for the mileage necessary to transfer items from Madrid.

Estimated transport parameters:

- **Daily mobility of technicians and actors.**

In the same city, all filming professionals are presumed to travel an average of **10 km/day** to and from the site and their home/accommodation. The distance travelled is ideal, which is why we will presume that it has been well planned to ensure the minimum travel distance.

We presume that **20 vans** are necessary, able to hold **120 technicians and actors**. All other participants are divided by 3 to obtain the number of private vehicles required, with each vehicle carrying 3 people. Half of the resulting vehicles are presumed to be medium-sized petrol cars and the other half run on diesel.

The total private vehicles carry 502 people. At a rate of a 3-person car share, this would result in daily travel using **84 petrol** and **84 diesel cars**.

As an exception, in order to ensure that parameters set for all countries are consistent with the actual shoot, we will presume that the car used by the director or his/her assistant, location manager or other production staff will peak and generate high mileage some days. This is why each vehicle is expected to cover an average of **100 kilometres /day.**

Daily mobility of trucks and motorhomes.

Transport of materials and dressing rooms.

In the same city, **10 km** on average per day of filming is also presumed to carry actors' materials and motorhomes. The following vehicles are taken into account:

- 2 lighting trucks.
- 1 stagehand truck.
- 2 generator trucks.
- 1 catering truck.
- 1 camera truck.
- 1 costume truck.
- 1 truck with a washing machine and for setting up costumes.
- 2 art trucks to start.
- 1 prop truck.
- 1 motorhome for make-up and hairdressing.
- 6 motorhomes for actors.

* 1 art truck that will travel 150 km per day as an exception, for purchases and collections.

In total, 13 trucks and 7 motorhomes are expected to travel each day to the film set.

Transportation of the crew from one city to another. Filming locations have been documented, as well as the number of shooting days required in each city (information provided to Creast by AMC). When calculating mileage and the means of transport required to reach each location, we have followed these parameters:

Transfer vehicles

13x trucks.

7x motorhomes.

80% of the crew will travel by train.

10% of the crew will travel by plane

5x vans.

11x diesel cars.
11x petrol cars.

- Calculated **distance in kilometres from Madrid to the shoot.**

- **80% of the non-local crew is presumed to travel by high-speed train** (return trip), provided that the site is train-accessible. Otherwise, for journeys longer than 400 kilometres, this part of the crew will travel by plane. For journeys under 400 kilometres, the necessary vans will be used to travel by road.

- **10% travel by petrol car.** The number of people is divided by 2, presuming a car share of two people on average. Half the vehicles are taken to be medium-sized petrol cars and the other half diesel cars.

- It is presumed that, on average, **10% of the staff need to travel by plane. .**

- **5 vans** from Madrid are estimated, and **another 15 will be hired in the city where filming takes place.** This means that a total of 20 will be needed to transport staff to the filming location each day. The 5 vans from Madrid will also be used to carry materials and crew members.

In total, we have estimated **5 vans, 11 petrol cars and another 11 diesel cars** for inter-city travel, in addition to staff travelling by train and plane.

500 litres of diesel oil + difference from territorial variables.

Water consumed per capita in each country.

The same residue is simulated in all countries.

Truck transport.

As with passenger transport, **the distance from Madrid to the filming location is calculated in kilometres by road and doubled to include the return journey**. This distance applies to the trucks and motorhomes mentioned above, which always depart from Madrid.

In total, for inter-city travel, there are 13 trucks and 7 motorhomes.

A **return flight from the United States** is included **for American staff and from the United Kingdom for British staff.**

Energy consumption.

It is assumed that an average of **500 litres of diesel** are consumed each day of filming by the generators needed to provide electricity to the set and other production facilities, adding the difference derived from each country's characteristics (see below).

Water consumption.

The **daily average per capita consumption** for each country is assumed and applied to each person involved in the production for each day of filming, in the absence of further detail provided by the production company.

Waste.

We have taken the average rates of waste generated per person each day and stored in Creast's Big Data for similar projects. Exactly the same amount of generated waste will be used in each country's simulated production.

Materials.

When estimating materials, we have drawn information from the internet given the absence of details available from the production company. Most of the sets were established in Madrid, Castilla-León and Catalonia, with less set activity in other regions.

- Total area covered: 14,280 m2.
- Signage: 115 signs.
- Posters, fake street lamps: 26.
- Prop vehicles: 40.
- Control fencing: 1,040.
- Set rubble: 44 m³.
- Windows and doors: 48.
- Grafiti & Paint 440 m2.
- Rubbish containers: 94.
- Logistics cargo: 25 tonnes.

Estimated wood.
Rented as furniture and props. **50,000 kg.** .
Purchased: 42,840 kg.

Estimated metal.
Rented as weapons, props, structures and accessories: **300 kg**.
Purchased: 2% metal for heavy or large construction support structures, estimated for an area of 285 m2: **4,275 kg.**

Estimated paint.

The surface area is estimated to be four times larger, taking into account bases, primers and final finishing.

The 440 m2 base is added for graffiti preparatory work.

2,000 m2 are added as painted or repaired surfaces in interior decorations. 59,560 m2. 1 kg of paint covers an average of 10 m2.

Total estimated weight of paint: 5,956 kg.

Estimated ceramics.
Rented as props: **150 kg.**
Purchased as construction sand: **100 kg**.

Estimated plastic.
Rented: 500 kg.
Purchased: 250 kg.

Estimated aerosols.
4 coats x 440 m² (total surface area) = 1,760 m2. Each 0.400 l. cans covers 1 m², i.e. a total of **1,760 aerosol cans or 4,400 L.**

Estimated paper.
Packaging 10 kg/roll. 40 rolls = **400 kg.**
Signage and printed images **40 kg.**
Decorative props **60 kg.**
Total:500 Kg.

50 t of rented wood.
42.8 t of purchased wood.

0.3 t of rented metal.
4.3 t of purchased metal.

6 t of paint.

0.15 t of rented ceramics.
0.1 t of purchased ceramics.

0.5 t of rented plastic.
0.25 t of purchased plastic.

4,400 l of aerosols.

0.5 t of paper.

0.5 t of rented leather.
0.25 t of purchased leather.

5 t of rented textiles.
10 t of purchased textiles.

Estimated leather. For costumes and decoration.
Rented: 5 kg/garment. 100 garments = **500 kg.**
Purchased: 5 kg/garment. 50 garments = **250 kg.**

Estimated textiles.
Rented: 5,000 kg.
Purchased: 10,000 kg.

Estimated silicone and latex. 20 units/session/pax.
4 litres on average per unit x half of the extras, 1,245.
1245 x 20 x 4 = **99.680 l**

Gelatine. 10 units/session/pax.
20% of extras, at 0.5 l. of latex/unit.
498 x 10 x 0.5 = **2,490 l**

*Process times to complete **prosthetics.**
2h/ Walker.
30 min/ complex wound.

Estimated hazardous waste.
Non-reusable cleaning rags and props. **50 kg.**
Paint and solvent residues 2% of total paint. **119 l.**

***Transport of materials:** In regions where there is greater activity, suppliers of construction materials will be procured and presumed as purchased locally. Props and costumes are presumed as delivered from the Region of Madrid.

04.2

Materials and Methods

Narrative hypothesis: variable parameters when adapting each show in various countries. Locations and sets.

‘The walking dead: Daryl Dixon’.

Hypotheses based on information about the actual locations where the project was filmed in Spain, describing the sets behind the cities chosen to film the scenes. The Creast team was not present during filming, has not been able to watch the show and has no specific details of the work carried out at each location, which is why its hypotheses are applicable to subsequent simulations in other countries.

Castilla-León.
Segovia: Segovia, Sepúlveda y El Espinar.
Ávila: Navaluenga.

Madrid.
Central Madrid.
Las Rozas.
Lozoya.
Rascafría.
El escorial.

Aragón.
Teruel: Hijar and Samper de Calanda.
Zaragoza: Mediana de Aragón and Belchite.

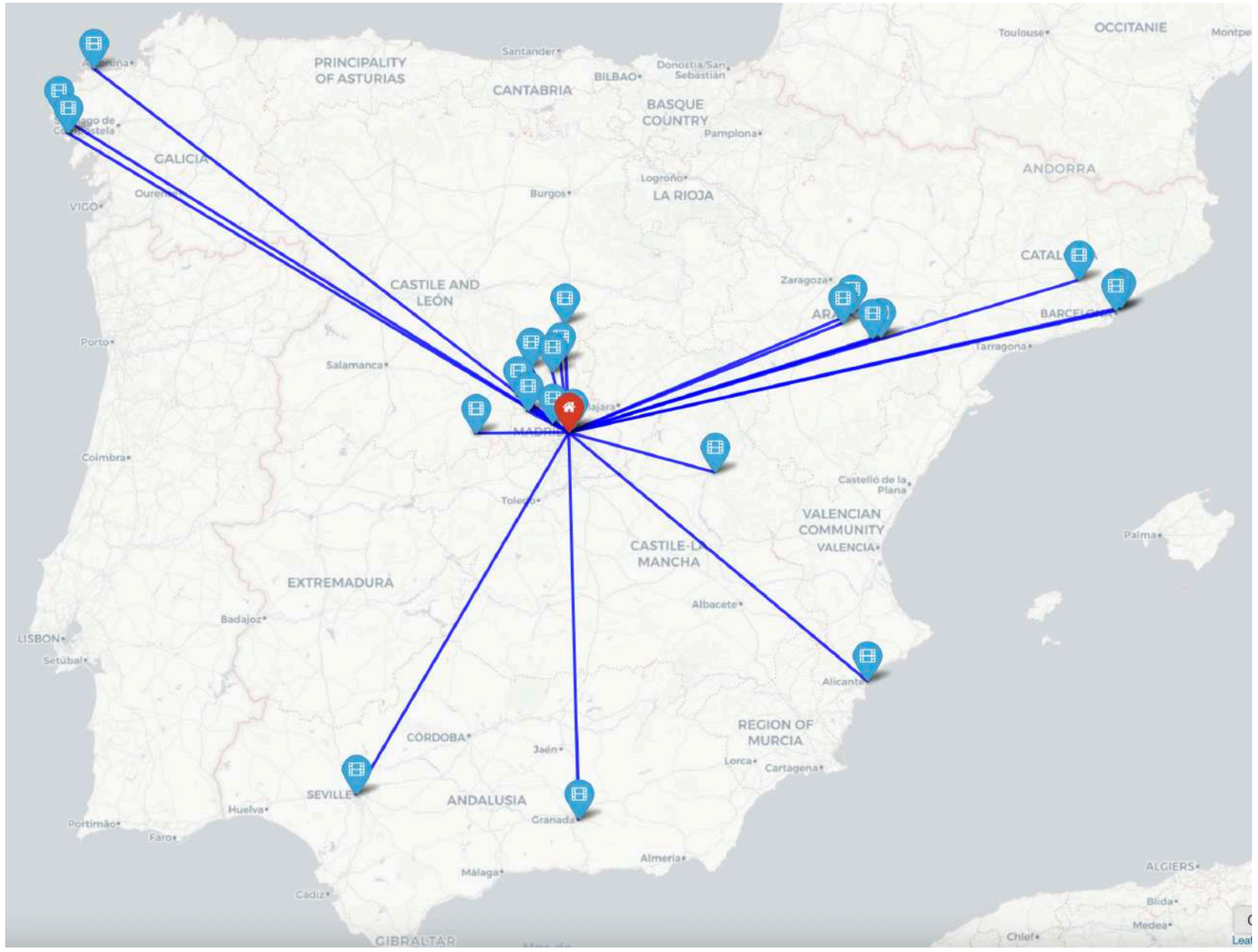
Galicia.
A Coruña: Malpica, Carnota and Cee.

Andalucía.
Sevilla.
Granada.

Alicante.

Barcelona.
Tibidabo, paseo de Colón, Sant Adriá de Besos. Marganell.
Road to Monserrat.

Cuenca.
Bridge.



Search for locations in France, the United Kingdom and the United States.

Once AMC has indicated its filming locations in Spain, describing the narrative of each location and sets planned for these locations, alternative locations are necessary to calculate mileage and the means of transport for the production team and the materials required for filming abroad. The same narrative must be upheld in order to finish the story in other countries simulating the production's environmental impact.

Several alternatives have been documented for each Spanish location, selecting the one that best fits the story and the most environmentally-friendly deployment of resources.

France.

The idea is to maintain the same parameters assumed to estimate the production's environmental impact in Spain, simulating a similar logistical approach.

Thus, the base is now Paris instead of Madrid, taking advantage of the city's great artistic, technical and infra-structure resources, and seeking alternatives to the other locations. We have recalculated the distances between Paris and the other locations, as well as the impact of the most efficient means of transport to transfer the crew.

The distance travelled each day within the city by the production team to and from the site is the same, in the awareness that commuting distance will probably be the shortest in Spain (when comparing Madrid with Paris, London or New York, for example). However, it seems unfair to not take into account the possibility of highly efficient transport planning in each foreign city to match the daily distance travelled in Spain to get to the set. This factor ought not to pose an advantage, nor is it particularly relevant to the subject of our study.

The same rules apply to carry equipment and materials, previously documented to estimate production transport in Spain.

United Kingdom.

The same parameters are followed when estimating the production's environmental impact in Spain, simulating a similar logistical approach.

Madrid is replaced by London as the base, taking advantage of the capital city's potential and seeking alternatives to other locations. We have recalculated the distances from London to other locations, as well as the impact of the most efficient means of transport available.

The distance travelled within each city on a daily basis by the production team for the filming is the same.

United States.

Again, we have applied the same parameters used to estimate the production's environmental impact in Spain, simulating a similar logistical approach.

Madrid is replaced by Boston as the base, a city with potential and a classic European feel, seeking alternatives to other locations. We have recalculated distances from Boston to the other locations, as well as the impact of the most efficient means of transport available.

The distance travelled within each city on a daily basis by the production team for filming is maintained.

Correspondence of locations between Spain and France.
Here are some examples of similarities between locations in France as alternatives to Spanish locations, to illustrate our search criteria.

01_Segovia ((Spain).

01_Occitania (France).

02_Sepúlveda (Spain).

02_Saint-Cirq-Lapopie (France).

03_El Espinar (Spain).

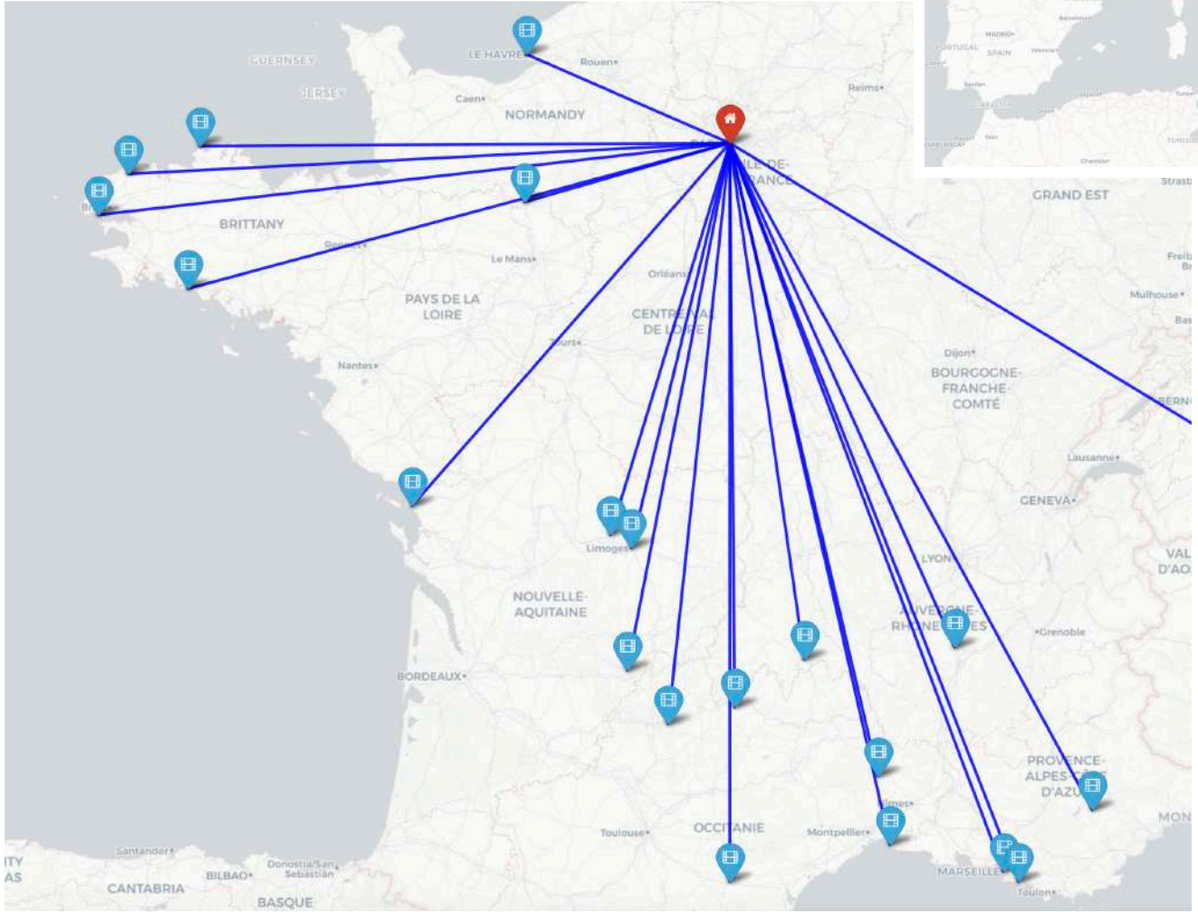
03_Limousin (France).

04_Navaluenga (Spain).

04_Normandía (France).

Alternative locations in France.

Perigord Noir, Dordogne (Sarlat-la-Canéda) > Segovia.
Conques, Aveyron > Sepúlveda
Limousin > El Espinar.
Normandía interior > Navaluenga.
París > Madrid.
Train à vapeur des Cévennes > Teruel.
Lebanon > Zaragoza (Desert).
Oradour-sur-Glane (Haute-Vienne) > Belchite.
Phare du Petit Minou (Brest, Bretaña) > A Coruña (Light-house).
Plage de l'Espiguette (Occitania) > A Coruña (Beach)..
Port de Doëlan (Bretaña) > A Coruña (Port)..
Carcasona (Occitania) > Sevilla y Granada.
Port de La Rochelle > Alicante.
Marsella > Barcelona (Tibidabo, paseo de Colón)
Le Havre > Barcelona (Sant Adriá de Besos).
Verdon (Provenza) > Barcelona (Road to Monserrat).
Viaduc de Garabit (Cantal) > Cuenca (Bridge).



Location correspondence between Spain and the United Kingdom.
Some examples of similarities between U.K. locations as alternatives to Spanish locations, in order to illustrate our search criteria.

01_Hijar (Spain).

01_North Yorkshire Moors Railway (United Kingdom).

02_Mediana de Aragón (Spain).

02_Errachidia (Morocco).

03_Belchite (Spain).

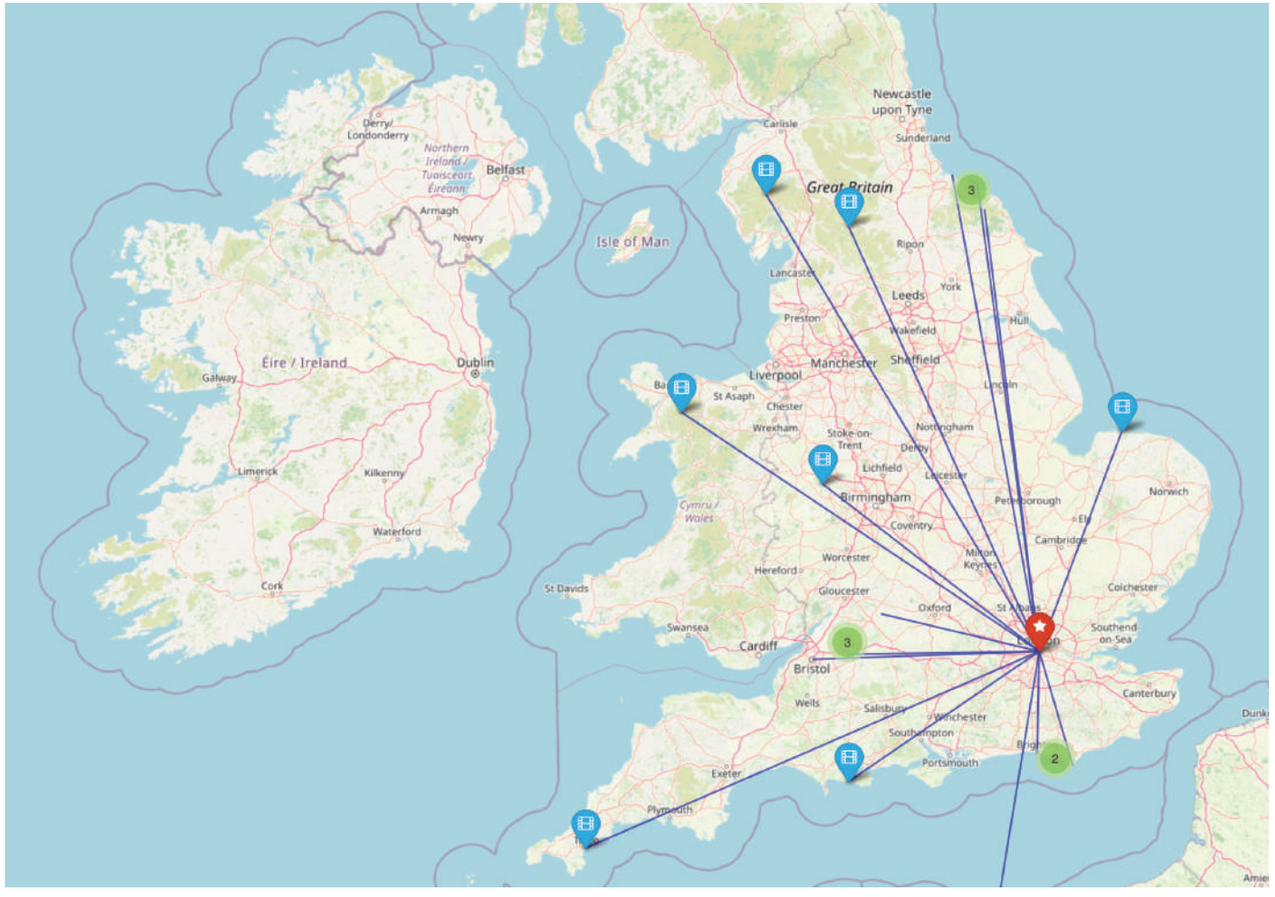
03_Tyneham (Dorset, United Kingdom).

04_Malpica (Spain).

04_Beachy Head Lighthouse (East Sussex, United Kingdom).

Alternative locations in the United Kingdom.

Bibury (Gloucestershire, Cotswolds) > Segovia.
Castle Combe (Wiltshire) > Sepúlveda
Yorkshire Dales (North Yorkshire) > El Espinar.
Lake District > Navaluenga.
Londres > Madrid.
North Yorkshire Moors Railway > Teruel.
Errachidia (Morocco) > Zaragoza (Desert).
Tyneham (Dorset) > Belchite.
Beachy Head Lighthouse (East Sussex) > A Coruña.
Holkham Beach (Norfolk) > A Coruña (Beach).
Staithes (North Yorkshire) > A Coruña (Fishing Port).
Royal Pavilion (Brighton) > Sevilla and Granada.
Falmouth (Cornwall) > Alicante.
Bristol > Barcelona (Tibidabo, paseo de Colón)
Redcar (Teesside) > Barcelona (Sant Adriá de Besos).
Snowdonia (Gales) > Barcelona (Road a Monserrat).
Iron Bridge (Shropshire) > Cuenca (Bridge).



Correspondence between locations in Spain and the United States.
Here are some examples of similarities between U.S. locations as alternatives to Spanish sites, in order to illustrate our search criteria.

01_Playa Carnota, A Coruña (Spain).

01_Cape Hatteras National Seashore, North Carolina (U.S.A.).

02_Cee, A Coruña (Spain).

02_Maine fishing villages (Camden, Rockport, U.S.A.).

03_Alcázar de Sevilla (Spain).

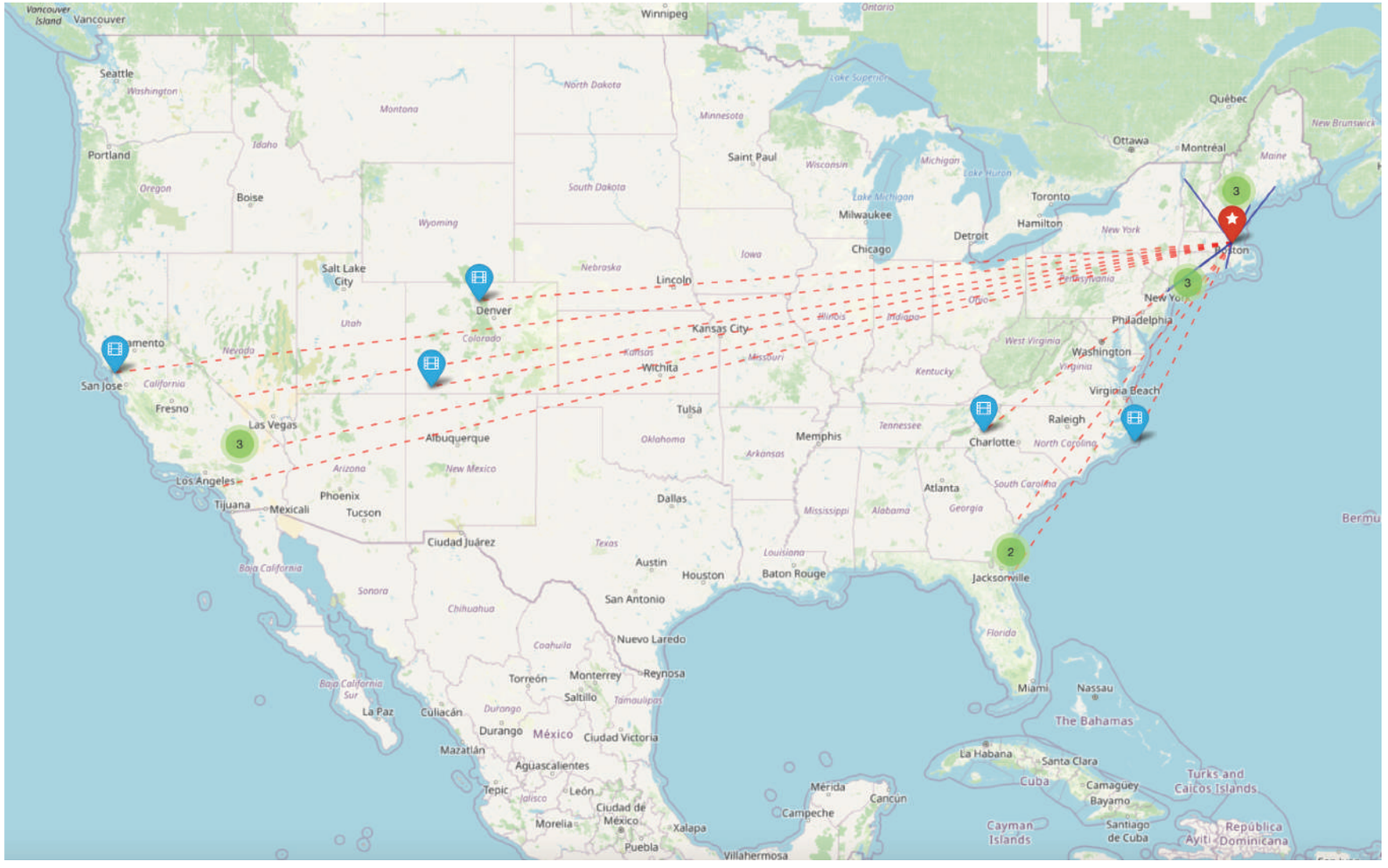
03_Mission San Juan Capistrano, California (U.S.A.).

04_Malpica (Spain).

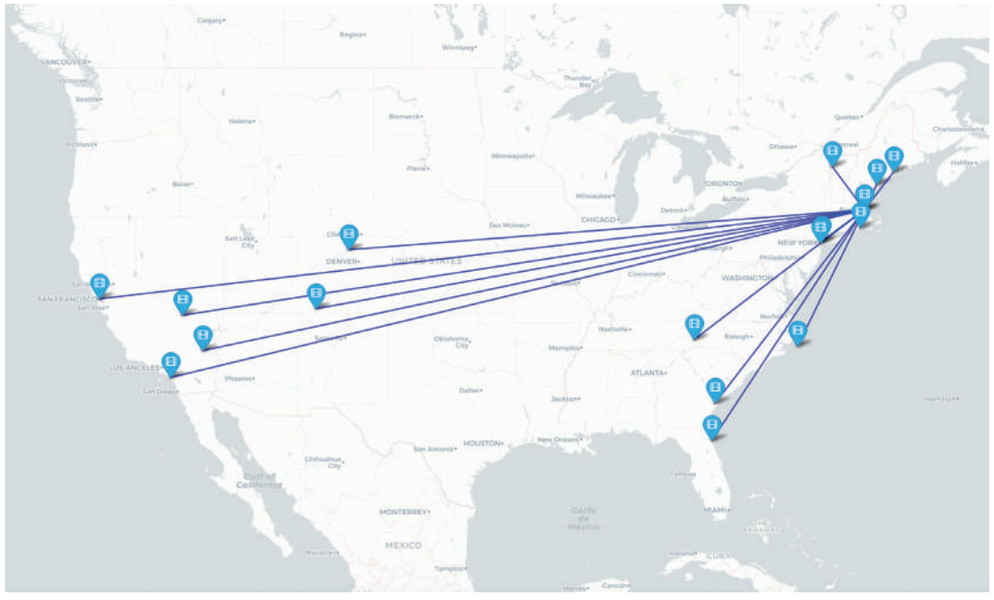
04_Beachy Head Lighthouse (U.S.A.).

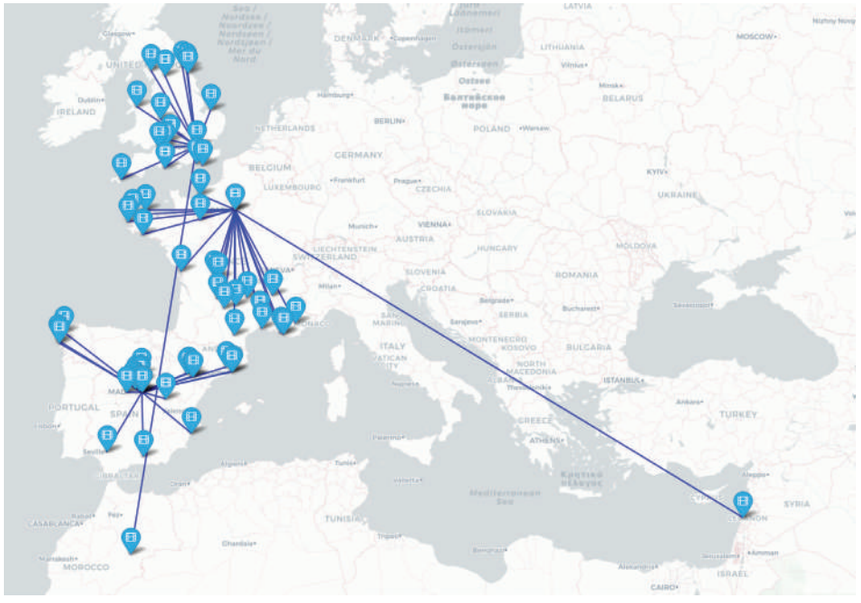
Alternative locations in the United States.

Savannah Historic District, Georgia > Segovia.
St. Augustine, Florida > Sepúlveda
Blue Ridge Mountains, Virginia > El Espinar.
New England (Vermont, New Hampshire) > Navaluenga.
Boston > Madrid.
Durango & Silverton Narrow Gauge Railroad, Colorado > Teruel.
Mojave Desert, California/Nevada > Zaragoza (Desert).
Rhyolite Ghost Town, Nevada > Belchite.
Portland Head Light, Maine > A Coruña.
Cape Hatteras National Seashore, North Carolina > A Coruña (Beach).
Maine fishing villages (Camden, Rockport) > A Coruña (Fishing Port).
Mission San Juan Capistrano, California > Sevilla and Granada.
Newport, Rhode Island > Alicante.
San Francisco, California > Barcelona (Tibidabo, paseo de Colón)
Red Hook, Brooklyn, NY > Barcelona (Sant Adriá de Besos).
Rocky Mountain National Park, Colorado > Barcelona (Road to Monserrat).
Hell Gate Bridge, New York > Cuenca (Bridge).

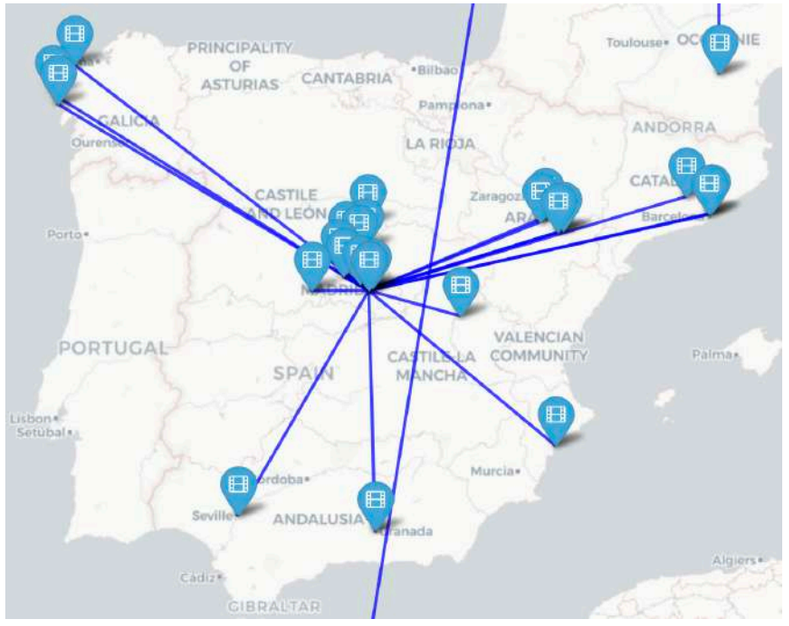


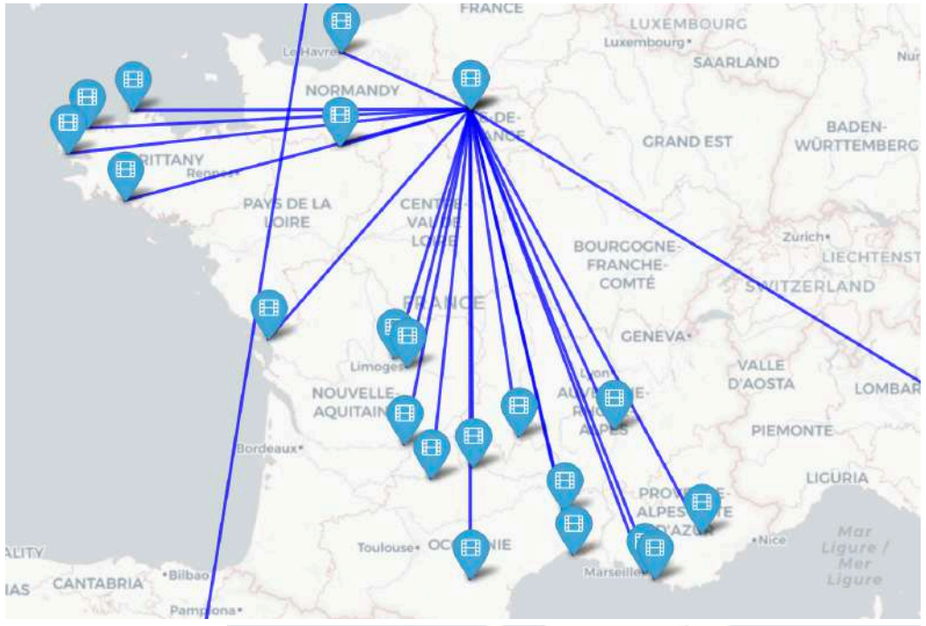
Graphical comparison of travel distances from the base to various locations.
The top pictures are on the same scale, to show the distance travelled from the base city to film in various locations.
The single bottom picture shows all countries and the travel distance to various locations.





Graphical comparison of travel distances from the base to various locations.
The pictures shared below show details of the 3 European countries on the same scale, to visually compare the travel distance required from the base city to shoot at various locations.





‘La Unidad: Kabul’.

“La Unidad. Kabul”, the original Movistar Plus+ series created by Dani de la Torre and Alberto Marini, premiered on Movistar Plus+ on May 18.

The new part of this successful fiction series completed filming in Pakistan, ending 10 weeks of shooting that also relocated the team to Almería and Madrid. “La Unidad. Kabul” once again involved a large production team.

Nathalie Poza, Marian Álvarez, Michel Noher and Fariba Sheikhan lead the cast, which also features performances by Mehdi Regragui, Shabnam Rahimi and Reyhane Noori.

The third season of “La Unidad” has been rewarded with two Iris Prizes from Academia de TV (best fiction and best direction) as well as the Actors' Union Award for Nathalie Poza (best leading actress) and Yassmine Othman (best supporting actress).

Although it involves a smaller-scale project than “The Walking Dead”, it is an important production for Spain, both in terms of resources and due to its success and impact.

Creast has calculated the production’s carbon footprint. As in the case of “The Walking Dead: Daryl Dixon”, exactly the same parameters used during filming in Spain will be used for simulations in other countries.

In this case, we used actual, not estimated, data. Amongst its most representative features, 200 technicians and an artistic team of 127 actors participated, completing 39 days’ filming at the locations in Spain described below.

Spain.

Madrid. A 21-day shoot in Madrid, taking advantage of the wide range of locations available in the Region of Madrid, as well as local talent, quality technicians and all available resources.

The Madrid locations were used to realistically recreate various scenes from the story that took place in Kabul, both indoors and outdoors.

Casarrubios Aerodrome, Toledo. One day of the shoot was completed in Toledo, a few kilometres away from Madrid, to recreate an aerodrome in Kabul.

Almería. 17 days’ filming. The show took advantage of the arid landscapes of this Andalusian province for a successful recreation of Kabul.

Francia.

The idea was to reproduce the same production plan in France, with the same daily transfers of the teams to the site.

We only considered the extra transfers involved in filming in an Afghanistan-simulated place. Unlike Spain, this sort of landscape is not available in France.

Paris: 17 days’ filming.
To recreate the same story in France, the production is located in Paris, recreating similar conditions to those of Madrid, including one day of filming at Coulommiers Aerodrome – Voisins (LFPK), a province adjacent to Paris, as was done with the Toledo aerodrome. We reduced the number of shooting days in Paris compared to those in Madrid because some outdoor scenes in Afghanistan could not be recreated (unlike Madrid). This involving relocating for four days in order to recreate Afghanistan for the shooting of these scenes.

Coulommiers Aerodrome – Voisins (LFPK). One day of filming. Fifty-five kilometres east of Paris.

To simulate the scene at Kabul airfield, which was filmed in Madrid at Casarrubios airfield in Toledo.

Lebanon. 21 days’ filming. 2,684 kilometres by plane.
As it is unfortunately impossible to recreate Kabul in France, all Afghan scenes needed to be simulated in the arid land of **Lebanon**, based in **Beirut**. Lebanon is a country with which France has close historical, emotional and commercial ties and filming there is relatively frequent (it acts as the audiovisual hub of the Middle East). As it is not possible to recreate the Afghan outdoors in Paris, as was the case in Madrid, the ratio of shooting days between Paris and Lebanon was reversed when compared to Madrid and Almería.

This involved 327 additional flights of 500-3700 km, round trip, and 327 additional hotel nights per day of filming in Lebanon, for a total of 6867 additional hotel nights.

United Kingdom.

In the United Kingdom, the same simulation used in France will apply, establishing London as the base for indoor scenes.

As in the case of France, extra transfers are only necessary to relocate the team to locations where Afghanistan can be simulated, as it is again impossible to set these scenes anywhere in the United Kingdom.

London. 17 days' filming.
As in Spain and France, the filming base is located in the capital, London, due to its available resources.

Dunsfold Park Airfield, Surrey. 1 day of filming.
Located just 65 km from London (approx. 40 miles).

It is a functioning aerodrome with great flexibility for short or long-term filming. It offers specific infrastructure facilities for filming, such as a 747 field for shooting use only, as well as other aviation facilities and assistance.

Ouarzazate and surroundings, in Morocco. 21 days of filming.
(Drâa-Tafilalet region). 2268 km to Marrakech (4 hours) and 200 km from Marrakech to Ouarzazate (the alternative is a 4-hour drive)).

A region nicknamed "Gateway to the Desert" and known as the Moroccan Hollywood. It offers deserts, arid and mountainous landscapes similar to Afghanistan (including rocky valleys, arid plateaus and adobe villages).

Its additional film infrastructure, such as Atlas Studios and CLA, offers long-term experience in international film shoots (including productions such as "Gladiator", "Kingdom of Heaven", and "Game of Thrones").

This involved 327 additional flights of 500-3700 km (round trip), and 327 extra hotel nights per day of filming in Morocco, for a total of 6867 additional hotel nights.

U.S.A.

In the United States, the same production plan will be replicated, using New York as the production base and filming at an airfield on the outskirts to shoot outdoor scenes in Kabul, set in an arid landscape.

Nueva York. 17 days of filming.
The production will be based in New York to film the scenes that were shot in Madrid, Paris and London.

Republic Airport (East Farmingdale, Long Island). 1 day of filming. Located 60 minutes from Manhattan.

Widely used in audiovisual productions as a versatile and accessible location. It has two medium-sized paved runways (6833 and 5516 ft), hangars, a terminal, and historical aviation museums (American Airpower Museum), giving it an authentic feel.

New Mexico (Albuquerque, Santa Fe, Las Cruces). 21 days of filming. 2700 km (a 5-hour flight).

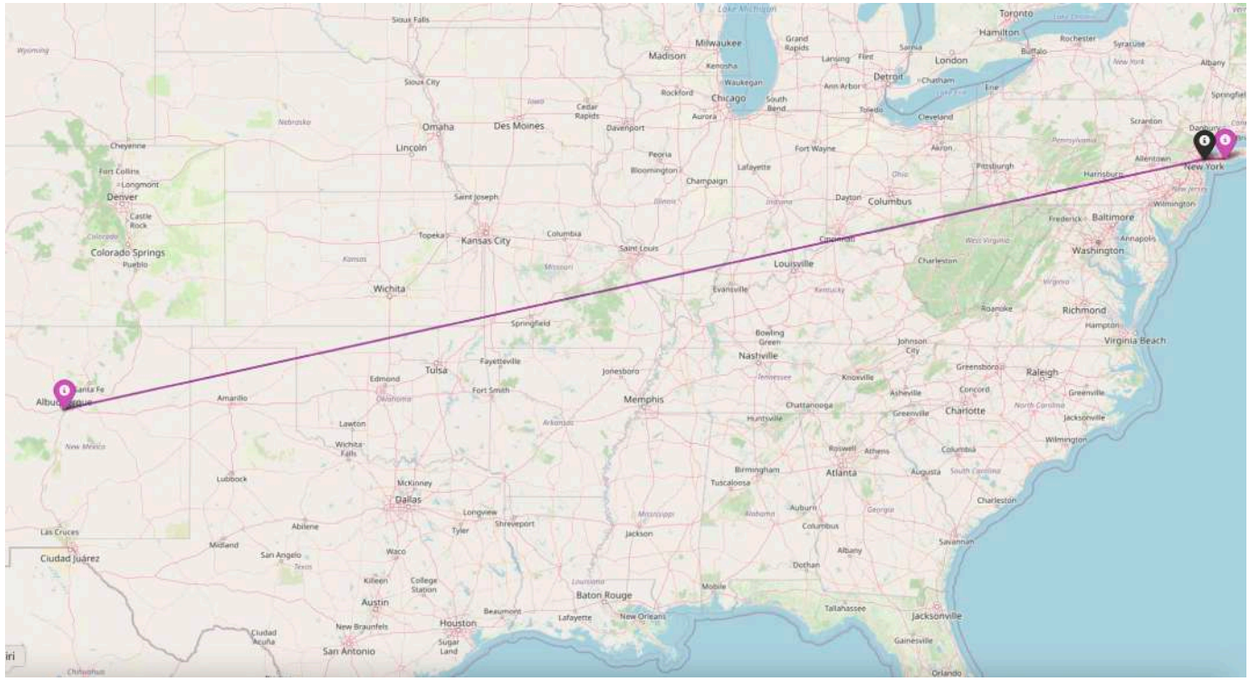
The region is a perfect balance between an Afghan landscape and good logistics. It offers attractive rocky deserts, canyons and arid mountain ranges that closely resemble central and eastern Afghanistan.

Locally, there is well-established audiovisual industry that has hosted acclaimed productions such as "Breaking Bad", "Better Call Saul" and "The Book of Eli". It is well connected to New York via direct flights.

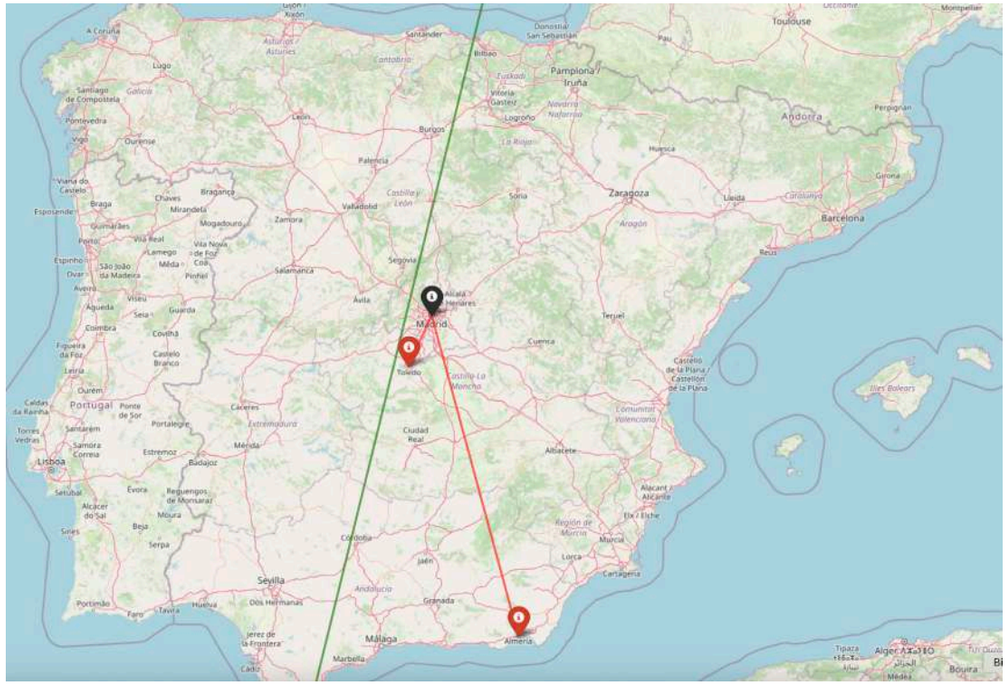
This would involve 327 additional flights of 500-3700 km (round trip), and 327 extra hotel nights per day of filming in the United States, for a total of 6867 additional hotel nights.

Location and travel map. “La Unidad. Kabul”.

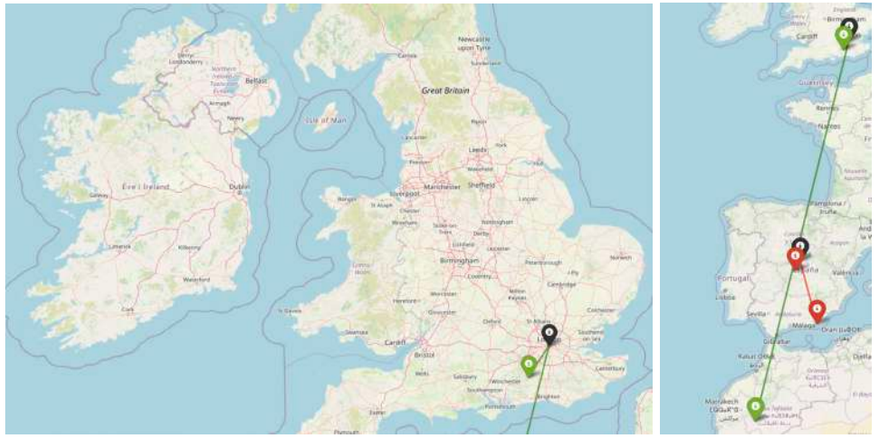
U.S.A.



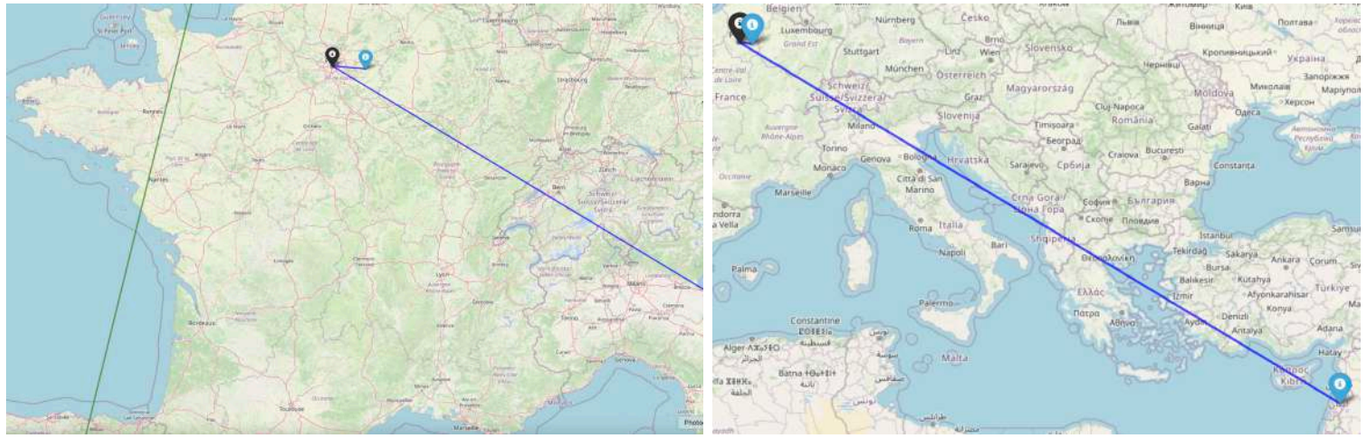
Spain (red).



United Kingdom (green).



France (blue).



‘El inmortal’.

Inspired by the life of 'Los Miami' gang leader, who operated in Madrid's nightclubs during the turbulent 1990s. The series shows the rise and fall of a criminal empire built on drug trafficking and extortion.

Álex García heads the cast, which includes Marcel Borràs, Emilio Palacios, María Hervás, Teresa Riott, Jason Day, Jon Kortajarena, Claudia Pineda, Iván Massagué and Francis Lorenzo. Joining them in this second season are Irene Esser, Richard Holmes, Jaeme Vélez, Moussa Echarif, Iria del Río and Manuel Manquiña.

“El Inmortal” is an original Movistar Plus+ series in collaboration with DLO Producciones, created by José Manuel Lorenzo and directed by David Ulloa and Rafa Montesinos.

The production recreates a story that takes place in varying locations, such as Madrid in the 1990s, Benidorm and Veracruz in Mexico (but only Madrid, Alicante, and Guadalajara were used to recreate the scenes, by the production company in Spain).

The Spanish production used real parameters, to include 90 technicians and 65 actors hired for the series. We will use the exact same parameters in production simulations in France, the United Kingdom and the United States, as was the case with “The Walking Dead: Daryl Dyxon” and “La Unidad. Kabul”.

Only filming locations in Spain will be adapted to bring the production in line with other countries. The locations where the series was produced in Spain are indicated below:

Spain.

Madrid. 21 days of filming.
This is the base location, where most of the story takes place. It concentrates all the resources, technicians and talent offered by the Region of Madrid, as well as easy access to other regions.

Alicante. 4 days of filming.
The location chosen to recreate Veracruz (Mexico), coastal and Benidorm scenes.

Guadalajara. 3 days of filming.
Close to Madrid and easily accessible, with landscapes to recreate a motocross club.

United Kingdom.

In the United Kingdom, most of the plot will be presumed to take place in London. In order for the simulation to be feasible, the story may potentially take place in London instead of Madrid. The fact that real events took place in Madrid is not taken into account, as a series "inspired by (not based on) real events".

Logically, Veracruz (Mexico) and all coastal scenes are recreated in Alicante, a city with many flights to London. This will involve additional relocation of the team and consequent accommodation.

Motocross club scenes will be simulated in the countryside near London, following the same pattern as Madrid and Guadalajara.

London. 21 days of filming.
The story will be presumed to take place in London, taking advantage of the capital’s resources, infrastructure and talent.

Alicante.4 days of filming. 1450 km flight (2½ hours).
The Mexican and coastal scenes will still be recreated in Alicante (very popular amongst the English), due to the absence of any British location that resembles Mexico, Benidorm or the idyllic coastline required for the story.

This involves 155 additional flights of 500-3700 km (round trip), with the same accommodation and maintenance that the Madrid team needed in Alicante.

Canada Heights (Swanley, Kent). 3 days of filming.
The Sidcup & District Motorcycle Club track, very close to London, is considered one of the best in the country, with natural terrain, technical jumps and challenging obstacles. It arranges motocross, enduro and trial events and hosts championships due to its excellent club infrastructure.

It is an ideal location, close to London, offering authenticity, perfect for motocross shoots with a strong scenic presence.

France.

In France, the United Kingdom approach will be replicated to enable simulation and comparison. The story will be

based in Paris, as a logical alternative to Madrid and London, looking for a nearby location for the motocross scenes. The team is expected to travel to Alicante because France lacks locations that resemble Mexico (Veracruz), despite its fantastic coastline (e.g. Mediterranean Côte d'Azur).

París. 21 days of filming.
La producción aprovechará los recursos, infraestructuras y talento disponible en la capital francesa, simulando que fuera posible cambiar la historia y basarla en París.

Alicante. 4 days of filming. 860 kilometres by air (around 2 hours).
As in the case of the United Kingdom, in artistic and aesthetic terms Mexico and the story's coastal scenes cannot be feasibly recreated, resorting once again to Alicante to host the scenes set in Veracruz, the Mexican coast and south-eastern Spain.

This involves 155 additional flights of 500-3700 km (return trip), with the same accommodation and maintenance provided to the Madrid team in Alicante.

Assevillers (región de Picardía). (Picardy region). 3 days of filming.
Pro-Stage MX, just 1.5 hours by car from Paris, located to the north of the city. This school offers motocross tracks ideal for beginners and professional courses. Its proximity to the capital and functionality render it the best location to shoot motocross club scenes.

U.S.A.

To replicate the simulation, the story will focus on New York, with conditions similar to those of Madrid, London or Paris. Despite the long distance, the city's strong identity and different appearance, it may play the same role in the United States as each European country's capital city.

New York. 21 days of filming.
The production will simulate New York as the main setting and operational base.

South Padre Island / Corpus Christi / Galveston (Texas). 4 days of filming. 1415 km flight from New York (about 4.5 hours).

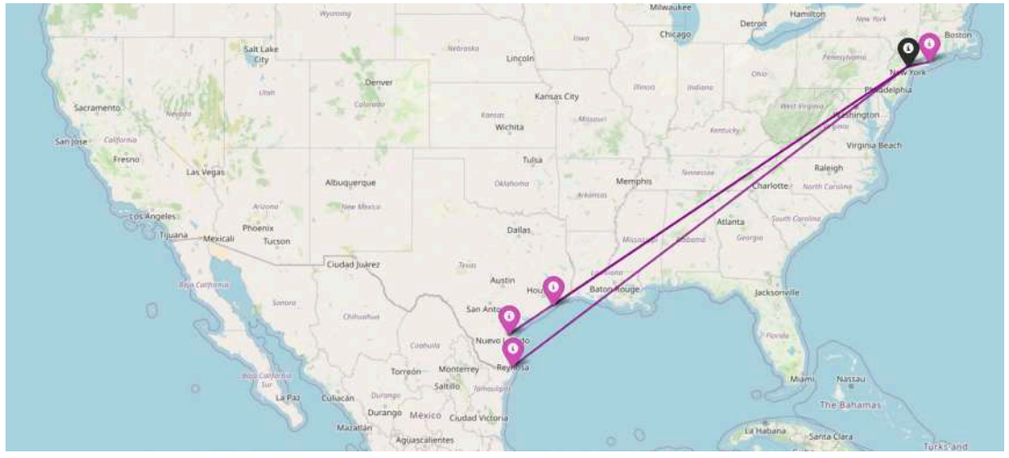
Located on the Gulf of Mexico, it offers great natural resemblance, with the same Gulf water and a sea and sand colour very similar to Veracruz. It has similar boardwalks and piers to the town of Veracruz and open stretches of dunes and beach. With direct flights from New York to Houston/Dallas (≈4h), then 1–2h by road, it is the best option in the U.S.

This involves 155 flights covering an additional 500-3700 km (round trip), with the same accommodation and maintenance provided to the Madrid team in Alicante, but in the United States (620 hotel nights).

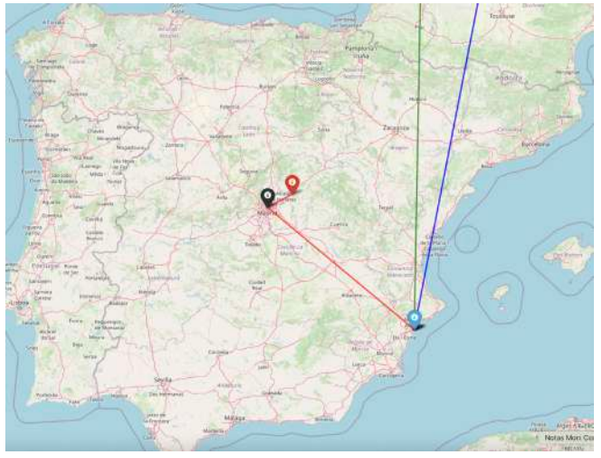
Calverton, Long Island, NY. 3 days of filming.

Calverton MX Track, located east of Long Island on a former naval base, with four circuits: peewee, 4×4, supercross and amateur. This artificial urban terrain with sand and abundant berms, is ideal for action scenes and visually dynamic shots. Its proximity to NYC is a logistical advantage from Long Island.

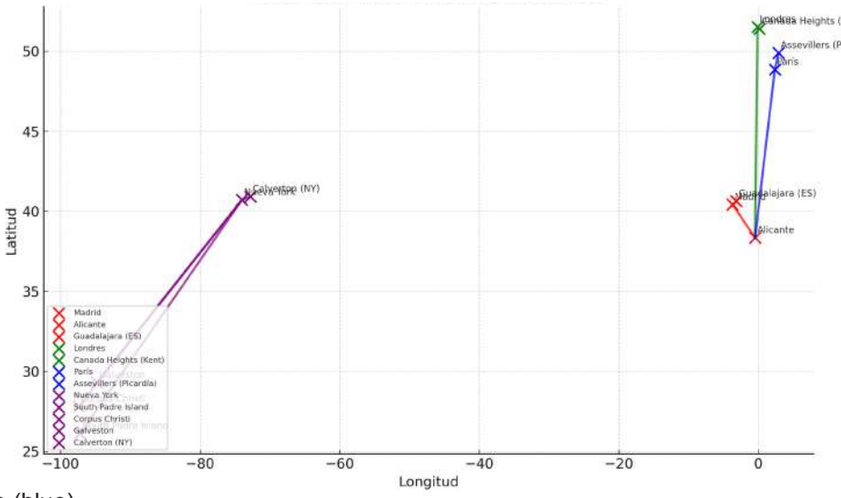
U.S.A.



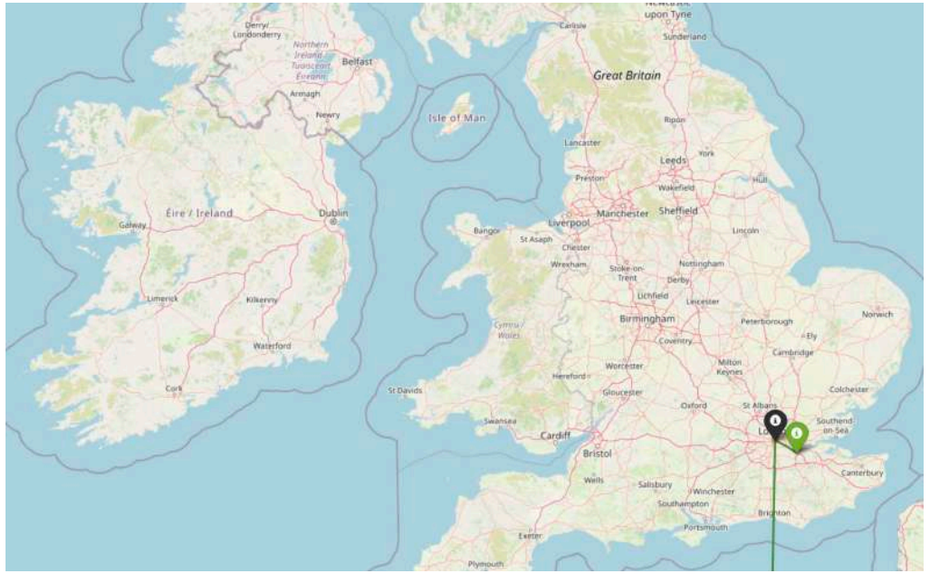
Spain (red).

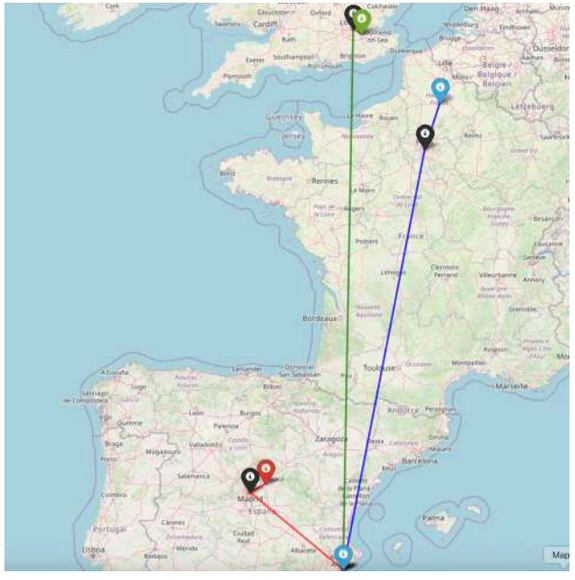


Map coordinates (routes from base cities to destination points).

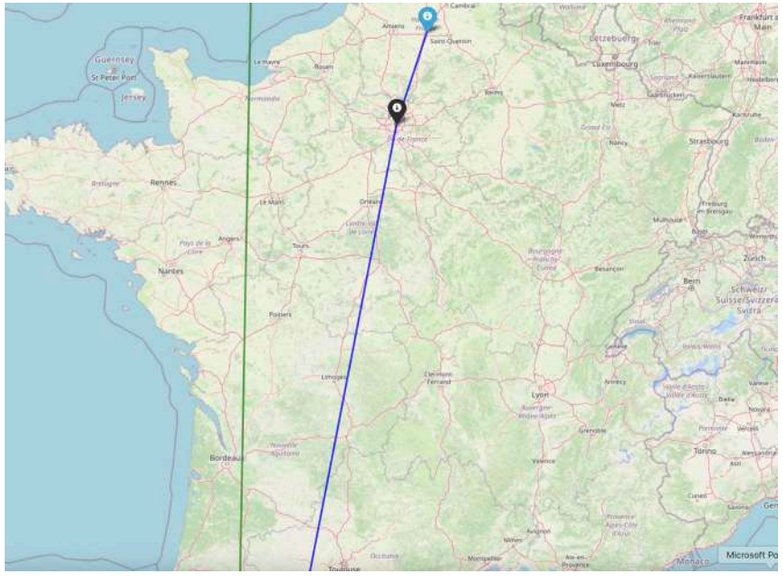


United Kingdom (green).



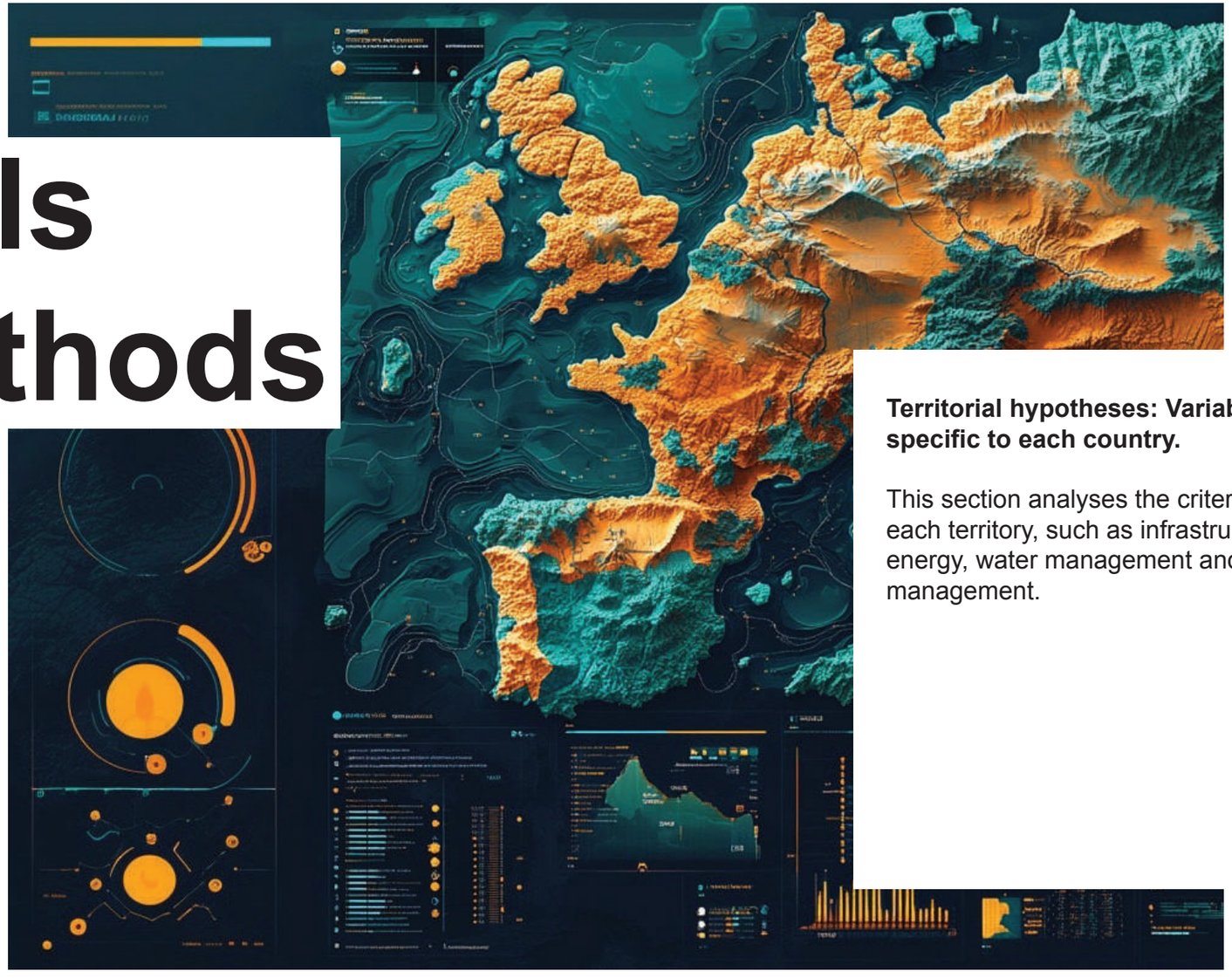


France (blue).



04.3

Materials and Methods



Territorial hypotheses: Variable parameters specific to each country.

This section analyses the criteria specific to each territory, such as infrastructure, food, energy, water management and waste management.

High-speed train.

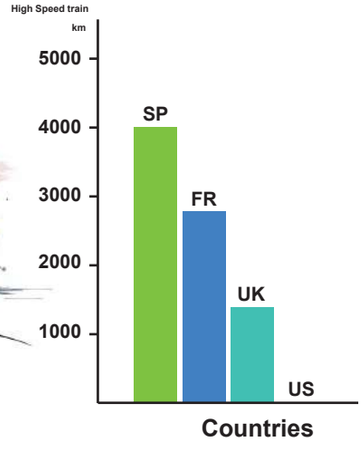
Below is an updated comparison high-speed rail (HSR) network kilometres in Spain, France and the United Kingdom, with recent and reliable data:

Length of operational high-speed networks (2025)

Country	Kilometres in operation	Base line / Source *
Spain	3,973 km	ADIF
France	2,800 km	UIC
United Kingdom	1,377 km	UIC

*Adif: Administrador de Infraestructuras Ferroviarias.

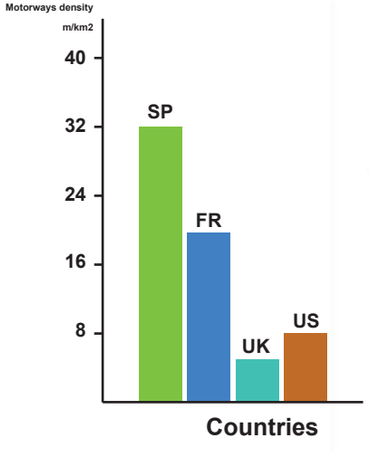
*UIC: International union of railways.



Spain undisputably leads with a broad operating network of almost **4,000 km**. The Spanish model is considered efficient, with considerably lower construction costs: €17.7 million/km compared to a European average of €45.5 million/km and €167 million/km for the British HS2 project. Spain is a world leader in high-speed rail and acts as a role model for many other countries.

Spain is the clear leader in terms of length and density (kilometres per inhabitant) among the 4 countries compared (Spain, France, the United Kingdom and the United States). It is also the fastest and most cost-effective.

France ranks second in Europe with just under 2,800 km of operational HSR lines. Although a historical pioneer in high-speed rail (its TGV dates from 1981), France still lags behind Spain in terms of total network length and deployment efficiency.



The **United Kingdom,** with a more limited network, has around **1,377 km** in operation, basically **High Speed 1** (connecting London to the Chunnel). It is currently undergoing expansion, with projects such as **High Speed 2 (HS2)** under construction but not yet operational. HS2 involves high costs, in contrast to Spain's cost-effectiveness.

The **United States** has been excluded from the comparison because its high-speed rail development is still incipient. The only section comparable to the European or Asian high-speed rail connects Boston to Washington, although the actual average speed is less than 135 km/h.

Road transport.

Road networks are likewise compared below.

Country	Roads	Motorways	Density (motorways/km²)
Spain	1,000,000 km	16,214 km	32.04 m/km²
France	950,000 km	11,392 km	17.78 m/km²
U.K.	422,000 km	6,016 km	3.85 m/km²
U.S.A	6,600,000km	75,000 km	7.79 m/km²

*Data source: RoadUsers / Eurostat, WorldData.info, European Commission, NationMaster y CEIC Data.

The **United States** has an extensive network driven by its territorial size and interstate systems, with a high rating in quality and speed. Cars and trucks play a very important role in American transport, resulting in extensive road infrastructure.

Spain is a European reference due to its large and rapidly growing motorway network, providing good territorial coverage in a short time.

France has a first-class motorway network, largely toll-based, well maintained and efficient. In practice, road transport is more expensive than in Spain on average per km, as high tolls are paid on most sections.

The **United Kingdom,** although it has a consolidated network, has shown **very little progress in new construction** over the last ten years, focusing on smart motorways that still suffer criticism in terms of safety and capacity.

Food.

Our study's premise is that the key to improving food sustainability with lower environmental impact is the composition of each menu (something that is scientifically endorsed). "What we eat matters more than where it comes from". While aspects such as food production process, transport and distribution, source and cold storage, among many other variables, have an influence on environmental impact, the greatest impact on the carbon footprint is which dishes are selected to feed the team and their ingredients.

As a hypothesis assumed in this study, we suggest that all countries commit to the same balanced, healthy and environmentally-friendly diet. This explains why the carbon footprint resulting from a diet composed of exactly the same dishes, ingredients, quantities and cooking processes differs from country to country.

Which country offers the greatest advantages for better food sustainability?

As an introduction to this section of the report, we will highlight a characteristic that defines each country's food.

France tends to have the **lowest electricity footprint** associated with refrigeration and storage thanks to its very low-carbon electricity mix, a major advantage for refrigeration and cold storage (≈44 gCO_2/kWh in 2023).

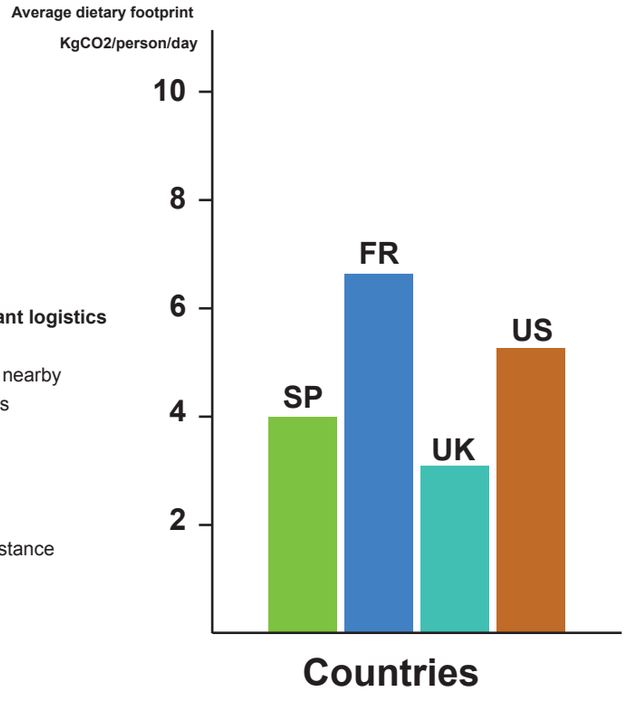
Spain Spain offers **favourable seasonality and availability of local product** (fruit and vegetables) all year round, reducing off-season imports. With a Mediterranean diet, its per capita dietary emissions is one of Europe's lowest. For "zero km" catering, it is probably the simplest and cheapest option.

The **United Kingdom** is more dependent on imports, especially for **fruit and vegetables** (≈40% of total food imports; only 17% of fruit and 55% of vegetables are produced locally), which **increases transport and refrigeration** in winter and requires careful planning of seasonal menus.

The **United States has long distances and truck-dependent logistics**; the electricity mix is more carbon-intensive than FR/ES/UK, so **refrigeration and storage** have a greater environmental impact. However, procuring local supplies may reduce this.

Country	Average dietary footprint ($kgCO_2e$/person/day)*	Cooling electricity (CO_2 intensity)	Dependence on food imports	Dominant logistics
Spain	4 Kg/person/day	150-200 gCO2/KWh	Low-medium	Road + nearby EU ports
France	6.5 Kg/person/day	44 gCO2/KWh	Medium	Road
U.K.	3.3 Kg/person/day	160-170 gCO2/KWh	High	Road
U.S.A.	5 Kg/person/day	370-385 gCO2/KWh	Medium	Road Long distance

* Sources and notes: Spain/France from pan-European survey; UK uses annual consumption based on recent studies (WRAP/others); US from dietary meta-analysis. Ranges vary depending on LCA method and consumption pattern.



1. Quality and availability of local produce (zero km)
España (Madrid/Barcelona/Bilbao/Valencia/Seville) has a huge network of wholesale markets (e.g. Mercamadrid) and **an abundance of local fruit and vegetables all year** round (solar greenhouses, with no intensive heating in the south-east), which facilitates fresh menus with a low carbon footprint. Spain follows a traditional thousand-year-old Mediterranean diet. Scientists see a correspondence between **a Mediterranean diet and a lower carbon footprint**. Although menu composition is not quantified in this study, Spain's qualitative assessment indicates that it has the most sustainable diet of the 4 countries analysed.

France (Paris/Lyon/Occitania) is a food/agricultural reference with great regional variety; its cooling logistics using low GHG emissions electricity means that food can be **stored for longer periods** of time with less relative impact.

The **United Kingdom** (London/Manchester/Glasgow) has good quality certified food, but the **winter season** requires the import of key products (salads, fruits, tomatoes, etc.), which considerably increases the environmental impact of transport/cold storage (this dependence has been officially confirmed). The biggest problem with imports is air transport, which is inevitable in the United Kingdom due to its isolation from the continent by sea.

U.S.A. (Boston base).: there is a broad range of domestic food by region (NE, Florida, California) but **very long distances** are involved due to the country's large size when compared to the other 3. There are high **imports** of fresh fruit and vegetables, especially off-season. However, unlike the United Kingdom, imports are usually transported by land, through road and truck-predominant logistics.

As already noted, even when simulating exactly the same menu composition in the 4 countries, the Spanish diet has the lowest environmental impact. Of relevance here is the fact that "zero km + seasonal" menus are easier to design in **Spain** and **France** than in the **United Kingdom** or the United States.

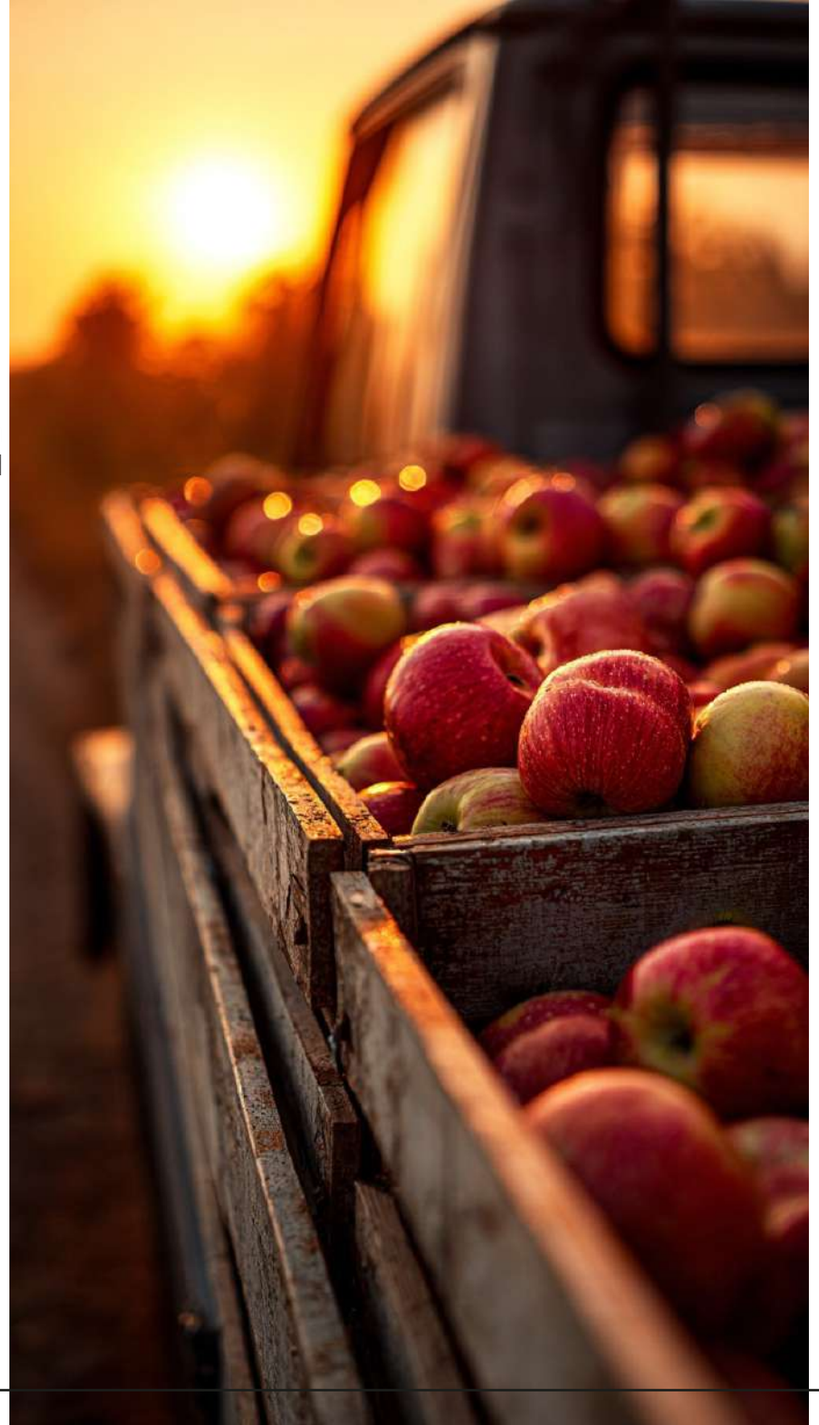
2. Seasonality and climate (local product supply all year long).

Spain offers a wide range of local supply, from open fields and solar greenhouses in the south-east, which **avoid** intensive **heating** (unlike heated greenhouses in northern Europe). This reduces the winter carbon footprint of tomatoes/cucumbers, etc., as sectoral evidence reflected in LCA comparisons and a public, well-known and widespread fact in the scientific and sustainability community.

France has good seasonal supply, although not as plentiful as Spain's, and storage with **cleaner electricity** that reduces the impact of inter-seasonal cold. This is its main advantage over other countries.

Climate in the **United Kingdom** suffers a significant **winter gap**, forcing it to increase imports (usually from Spain, the Netherlands or Morocco) and thus increasing transport and cold chains. The British Government's own reports point to this as an environmental risk, a highly debated issue there.

The vast expanse of the U.S. enables it to offset seasonality with **"cross-country" chains** ("internal imports", an exchange of raw materials within the country itself), whereby products are exchanged between California/Arizona/Florida and the East Coast. It also has a long-standing tradition of importing from countries such as Mexico, Peru and Chile, which greatly increases the average travel distance of each product from source to its end destination.



3. Transport and distribution (infrastructure and distance).

To note is the traditional consensus amongst the scientific community that transport is usually secondary to production; diet composition also has a greater impact on the carbon footprint than a commodity's source. However, in countries isolated by sea with a high level of importation (United Kingdom) or which require long-distance travel (United States), en route transport and cold storage become more important and have a greater impact.

In the **U.S.**, with **truck-dominated logistics**, approximately 44% of all distribution is completed by truck, as compared to 19% by rail (the second most common means of freight transport). Greenhouse gas emissions generated by trucks, quantified in tonnes per kilometre, exceed by far those of rail transport. However, transport by air is still the means of transport with the greatest environmental impact in the chain.

The **United Kingdom, France and Spain,** as per our specific transport analysis, have much denser logistics networks than the United States. Although trains are rarely used for last-mile fresh produce, **EU proximity** reduces the amount of intra-Community imports, covering moderate distances with trucks/ro-ro (loading onto ferries and transport by ship). The United Kingdom casuistical isolation by water increases market exposure to the air transport of food.

4. Imports (footprint and exposure).

Beyond the obvious impact of transport within the food industry value chain, there are other under-reported aspects that also increase the carbon footprint.

In the **United Kingdom**, around 40% of all supply is imported, mainly fruit and vegetables (which are particularly dependent). A large part is shipped from r**egions that are vulnerable to climate change**, which makes the footprint/waste riskier and more unstable. This means that more raw materials are lost during transport, as there is a greater risk of waste, increasing the average carbon footprint of food.

In the **U.S.**, **60% of all fresh fruit and 33% of all vegetables are imported**, with a greater off-season dependence on imports. These 2 countries have the greatest impact on food chain imports.

5. Production processes.

Ruminant meat and dairy products account for a large part of future warming from our diet (methane), while **legumes, cereals, fruits and vegetables** have a much lower impact. Simple changes in menus may significantly reduce the footprint.

The hypothesis assumed in this study clones a low environmental impact menu in all 4 countries, without prejudice to the fact that actual diet studies by country show that **Spain** generates the **lowest average emissions** on the European continent (around 4 $kgCO_2e/d$), whereas

France is among the highest (around 6.5 $kgCO_2/d$) due to a greater consumption of animal products.

The **United States** ranks above Spain (approximately 5 $kgCO_2/d$) due to its high consumption of meat. In the **United Kingdom**, with less accurate reports, the results indicate between 3 and 4 $kgCO_2/d$, albeit with a less healthy and more fluctuating diet.

6. Cold storage and energy (the great "hidden" item in a shoot).

Whilst cold storage prevents losses, minimises the risk of perishable raw materials, and reduces the average final carbon footprint of food, it also emits greenhouse gas. Recent estimates place emissions from the agricultural/food cold chain at around 1.3 $GtCO_2e$ (2022 data) worldwide, including households, the largest segment in this emissions category. Minimising excessive time and temperature is key to reducing environmental impact.

Electricity mix carbon intensity has a great impact on refrigeration. In France, where the average is around 44 gCO_2/kWh, the impact of the food preservation process is considerably less than in the United Kingdom (between 160 and 170 CO_2/kWh), Spain (ranging between 150 and 200 CO_2/kWh) and the U.S. (where it peaks at 385 CO_2/kWh). In other words, the same cold storage room, used for the same amount of time, emits several times less greenhouse gas in France.

Another critical fact is that **extending storage** time causes emissions to skyrocket. It is estimated that the impact increases by between 16 and 27% for each extra month (this impact varies depending on the product). Fruit subject to six months' climate control can double the carbon footprint. This factor gives Spain an advantage, as the country has more seasonal produce and a faster turnover.

Practical recommendations by country.

To mitigate the carbon footprint of food, **Spain** would only need to continue with its **Mediterranean** diet (menus based on legumes, fish, poultry, olive oil, and seasonal fruit and vegetables). Produce from **Andalusia and Levante** should be prioritised in winter, as these regions have more solar greenhouses, avoiding products that require air transport for production and distribution, such as off-season wild berries or asparagus. The outcome of the Spanish diet guarantees a very low carbon footprint with no additional costs.

Low CO_2 electricity should be used in **France** for cold storage and cooking, with a slight menu adjustment **to reduce the consumption of ruminants and cured cheese** and to introduce more local legumes (Lentilles du Puy, etc.). Products ought to be selected with shorter distribution chains. France guarantees a moderate carbon footprint in food supply.

More effort is involved in improving food sustainability in the United Kingdom, requiring a master seasonality plan. Winter menus should not be dependent on imported leafy greens, focusing instead on root and cruciferous

vegetables, local preserves and efficient freezing. Contracts should be negotiated with European suppliers (from Spain and Portugal, for example) to import products by road, avoiding air transport.

In the **United States** a regionalisation-based approach is needed, prioritising products from the north-east in summer/autumn and products from Florida/Georgia and preserved/frozen products in winter. Produce from the west should only be used if cost-effective or if distribution is guaranteed by sea/coastal shipping. A thorough study of raw materials should be carried out to minimise long-distance transport by truck, insisting on a **lower intake of red meat.**

Conclusion and outcome of the environmental impact of food, applying a relative increase hypothesis.

Spain guarantees the best conditions for reducing the environmental impact of food. We have followed the hypothesis that all 4 countries would consume the exact same menu, cooked in the same way with the same ingredients and quantities. The key lies in Spain's high seasonal availability and "zero km" supply (fruit and vegetables) nearly all year long, which **guarantees lower imports and prolonged storage.**

The large number of solar greenhouses in south-east Spain (which do not use intensive heating) in the winter months, its dense logistics network and moderate distance for food transport, Madrid's role as a distribution hub in a geographically privileged location for delivering food anywhere in the country, and a medium-low and declining

carbon footprint for electricity to offset cold storage, all guarantee efficient food production.

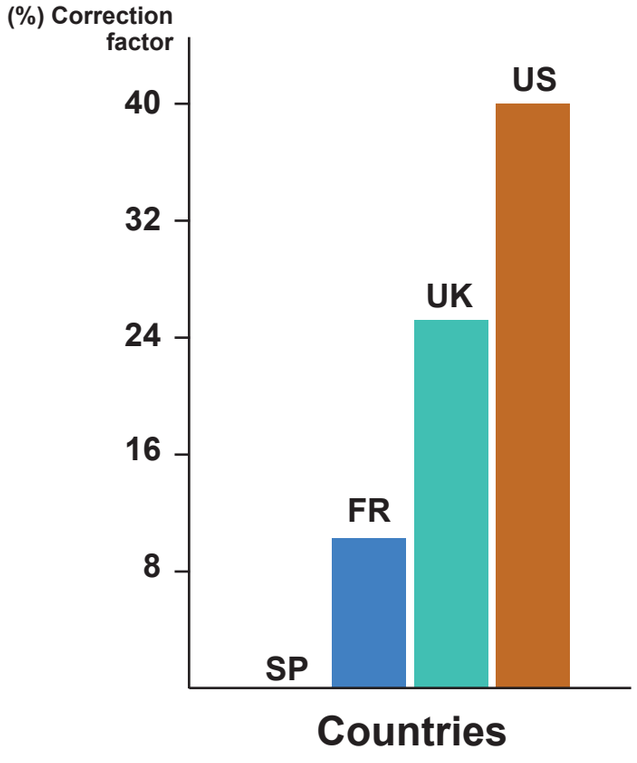
Secondly, in terms of environmental food efficiency, **France** would rank second, surpassing Spain's carbon footprint by **10%** in environmental impact terms. France has the great advantage of very low CO_2 electricity, greatly reducing the impact of cooling (in chambers, kitchens, storage, etc.).

In turn, food production in France requires more winter storage for certain products, uses heated and illuminated greenhouses instead of solar facilities (for climate reasons) and has a greater dependence on some fresh produce imports. The net result is that the impact of food in France is only slightly higher than Spain's, but very close. In the absence of accurate figures, we have estimated a 10% increase with the help of Creast's Artificial Intelligence and other AI tools.

The **United Kingdom** would lag behind slightly, increasing the single menu's environmental impact by **25%**. The food paradigm in the British Isles differs from Mediterranean countries, due to its **high dependence on imports**, especially in winter and particularly for fruit and vegetables. The distribution process involves much more mileage and this greatly increases the cold chain. Compounded with the fact that its electricity generates significantly more CO_2 than France or the same or slightly higher amount than Spain, cold storage is more "carbon expensive" here.

Although Britain's logistics network is efficient, it is not equivalent to that of France, let alone Spain (see Infrastructure above). Furthermore, its imports also involve **sea and air carriage** for off-season products, which always increase the final average carbon footprint.

Food.



Finally, the **United States** would offer exactly the same menu as the other 3 countries, but with an impact **40%** greater than Spain. Obviously, long-distance travel and a truck-dominated logistics system add tonnes of CO2 per kilometre to ensure the same menu ingredients.

Electricity in the U.S. does not help compensate the country's size either, as it has a much higher CO_2 intensity (on average). This makes **storage and refrigeration** more "environmentally expensive", both unavoidable in long-term distribution. In addition, the market is highly dependent on imported raw materials, registering a seasonal increase and incorporating cross-country distribution flows, particularly between California, Florida and the East Coast.

It is particularly important in the U.S. to ensure highly regionalised purchases and seasonal menus.

These figures have an indicative margin of uncertainty of ±5 pp in France and the United Kingdom, and ±8 pp in the U.S., depending above all on the actual mix of suppliers, specific seasonality and the strictness of cold chains and distribution.

Brief explanatory summary of how the hypothesis behind these figures is estimated.

Further to LCA research, keeping **agricultural production** constant (same recipe), these are the biggest differences between countries:

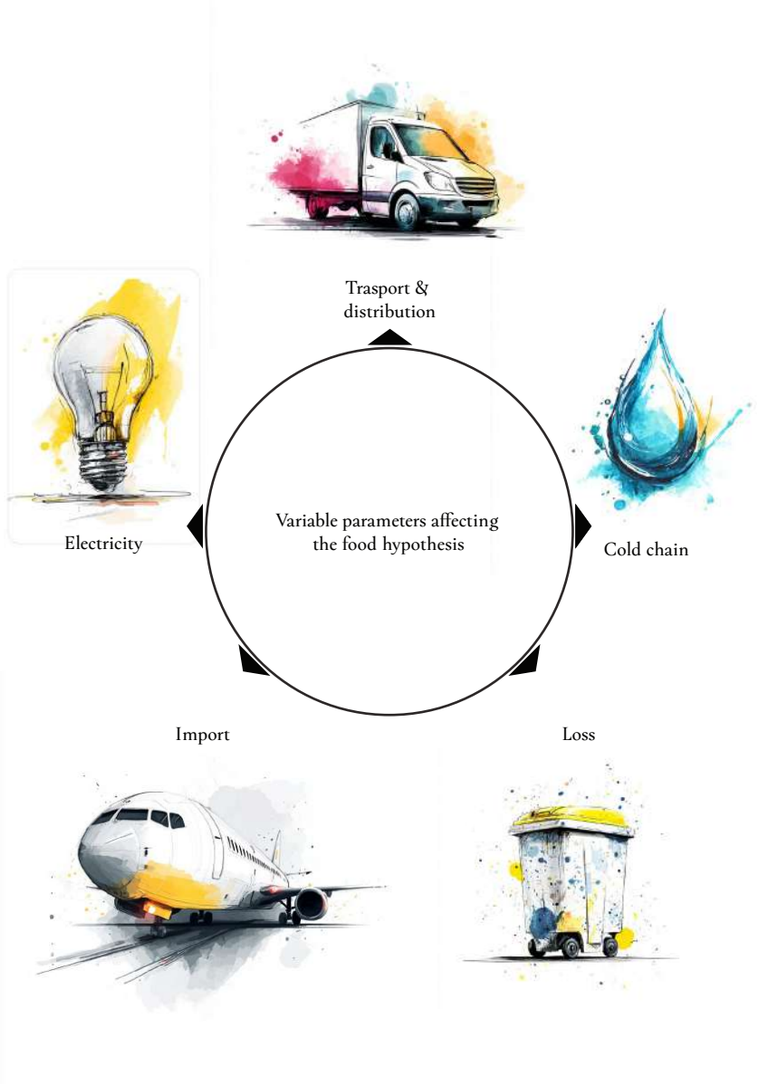
- **Transport and distribution** (t/km, mode: truck/rail/-ship/air).
- **Cold chain and storage** (hours/months in cold storage × CO_2 intensity of electricity).
- **Imports** (when substituting local/seasonal supply).
- **Waste** (losses during transport and storage).

For a standard annual menu, we have ranked the magnitude of the print's **non-productive** fraction as follows:

- **Transport & distribution:** 10–20%
- **Cold chain & storage:** 5–15%
- **Cooking/onsite energy & packaging:** 5–10%

Country factors (↑/↓) are then applied to these groups:

- **Electricity** (cooling and cooking): FR (very ↓), ES (↓), UK (↔/↑), US (↑↑).
- **Seasonal imports:** ES (↓), FR (↔), UK (↑), US (↔/↑ depending on the region).
- **Distance & mode:** ES/FR/UK (moderate; EU ship/truck), US (↑cross-country and truck dependency).
- **Risk of long-chain loss:** UK and US (↑ if not managed with freezing/rotation plan).



Accommodation.

Comparative of the environmental impact of accommodation.

We will replicate this infrastructure and food study to analyse accommodation during a long-term shoot (hotels, residences, temporary apartment rentals, etc.), and how its environmental impact varies in Spain, France, United Kingdom and United States.

These are the most decisive factors in the environmental footprint of accommodation:

1. **National electricity mix,** which determines the impact of energy consumption (heating, air conditioning, hot water, lighting).

2. **Climate,** which logically affects the greater or lesser use of heating (north/UK/NE USA/winter in France) or more air conditioning (Spain/south USA).

3. **Efficiency of the hotel/residential stock,** defined by the degree of modernisation, energy efficiency of equipment and appliances, the use of renewable energies and the implementation of solar panels for self-consumption, insulation, etc.

4. Type of accommodation according to the filming location, whether urban hotels, beach resorts, rural accommodation, apartment hotels, tourist rentals, corporate residences, etc.

5. Waste and water management, calculated according to the management level in the tourist sector.

Spain.

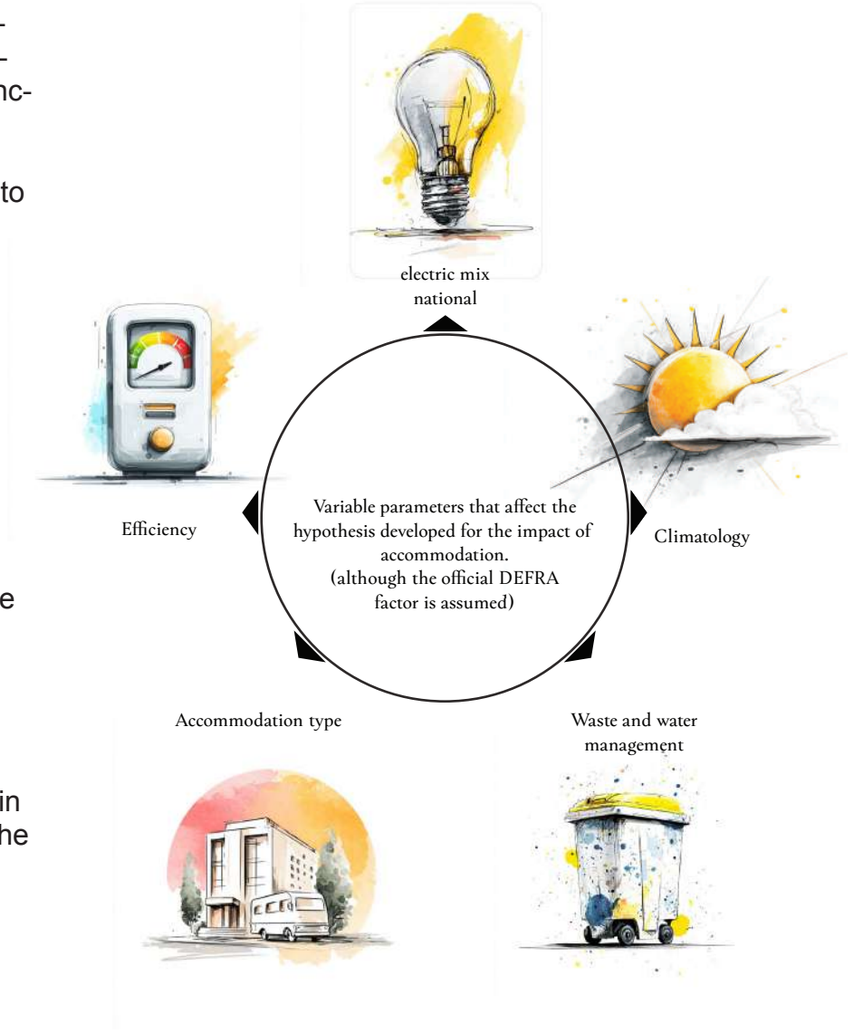
Its electricity mix can be averaged between 150 and 200 gCO_2/kWh (2023 data with renewables below 45%).

Its climate is mild, with limited heating in the south/east, and colder during the winter inland. On the other hand, summer air conditioning is essential in many regions.

Spain is a reference in hotel efficiency, leading sustainable tourism. Environmental certifications (LEED, ISO 14001, Biosphere, etc.) are widespread and the hotel stock is constantly renovated in tourist areas.

As a result, Spain ranks in the medium-low range within Europe. Its seasonal climate means that there are peaks in electricity consumption, mainly due to air conditioning in the summer, which are offset by increasingly renewable electricity. Even so, this is still a disadvantage for Spain.

Base reference (0%).



France.

Its electricity mix averages around 44 gCO_2/kWh (data also from 2023), thanks to a combination of nuclear and renewable energy. It has the cleanest energy consumption of the four countries.

Its climate requires heating in the winter (especially in northern and central France) and a moderate use of air conditioning, which is less widespread than heating.

In terms of hotel efficiency France follows good sustainability policies, although its stock is more heterogeneous than in Spain (including many historic and generally less-efficient buildings).

As a result, the impact is **15% lower than Spain**, mainly due to a highly clean electricity mix that reduces the footprint of air conditioning and hot water. This is France's great advantage.

One limitation is that many hotels are situated in old buildings in historic cities, which complicates insulation and increases energy consumption.

Spain = 0% → France: –15%

United Kingdom.

In Britain, the average electricity mix ranges between 160 and 170 gCO_2/kWh (2023 data, with a growing rate in renewables and gas still playing a significant role).

Its climate, cold and wet when compared to the other 3 countries, means that there is a heavy reliance on heating for most of the year, and air conditioning is marginally used.

In terms of hotel efficiency, its hotel stock is not homogenous and includes many old buildings with poor insulation and fossil fuel (gas) heating.

As a result, its potential impact could be **20% higher than Spain.**

Key assessment factors include greater dependence on heating (where gas is still the predominant fuel) and less efficiency in older buildings.

Spain = 0% → United Kingdom: +20%

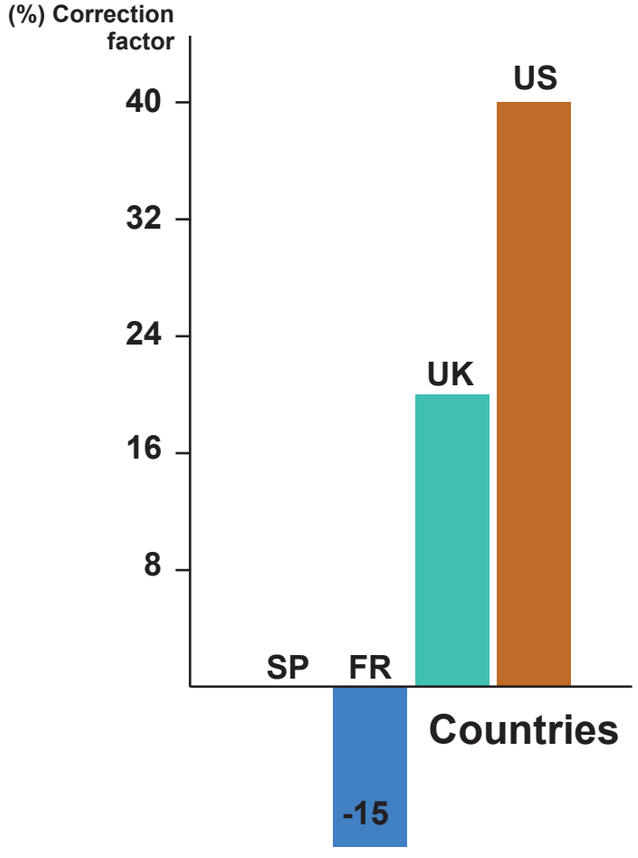
4. United States.

The U.S. electricity mix ranges from 370 to 385 gCO_2/kWh (2023 data) on average, as is still highly dependent on gas and coal (except for some regions that use a large amount of hydro, wind or nuclear energy).

Its climate is highly variable. On the east coast, the Boston location selected as the base for simulated filming, winters are cold and highly dependent on intense heating; summers are hot, entailing a massive use of air conditioning.

Hotel efficiency is based on a highly developed hotel chain with modern standards in large cities. However, the average hotel and motel uses high-intensity centralised air conditioning.

Accommodation.



The impact of accommodation is also a disadvantage in comparison with other countries, as it is around **40% higher than Spain.**

Key assessment factors are a dirtier electricity mix and more intensive air conditioning, which results in high consumption per guest.

Spain = 0% → U.S.A.: +40%

Conclusion for production.
It is more sustainable to host a year-long film shoot in **France** or **Spain**, with France being the best option due to cleaner electricity.

It is more environmentally costly in the **U.S.**, unless the selected hotels are LEED/Green Key-certified and use renewable energy.

The **United Kingdom** is an intermediate option, but its cold climate and gas used for heating make it less favourable than Spain and France.

Nevertheless, we will use **DEFRA**'s official emission factors for accommodation, based on each night's accommodation and the host country, considering each country's proportional impact that is similar to our study results, validating all the data sources used.

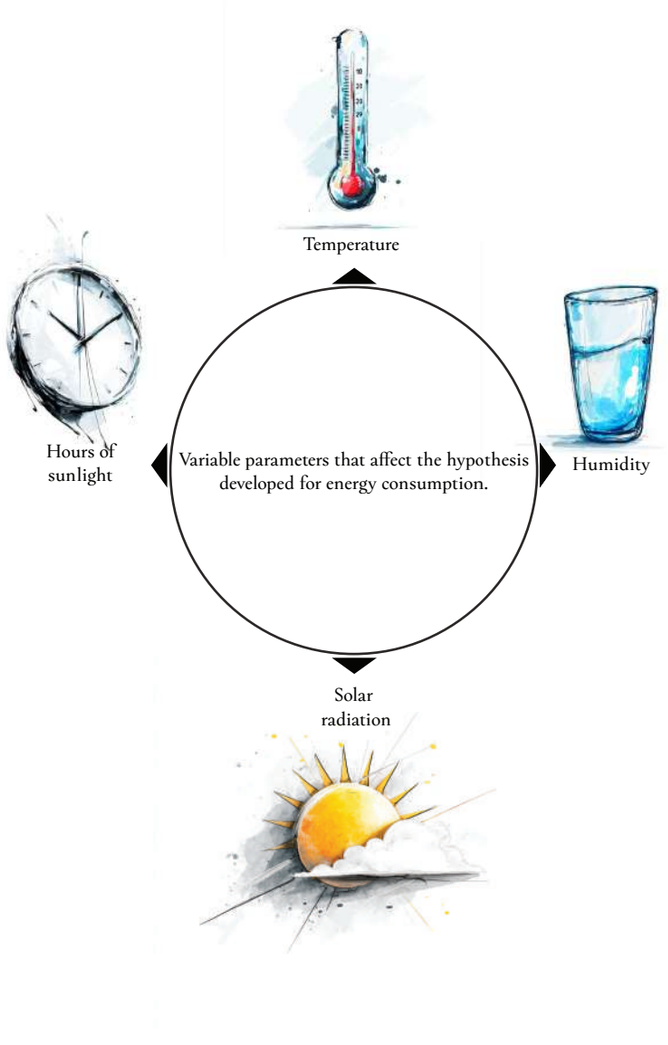
Energy.

The entertainment industry, including film, television, advertising and events, characteristically requires a lot of energy to carry out its activities. One of the factors with the greatest impact on a film shoot's carbon footprint is energy consumption.

In the vast majority of film shoots energy is produced by generators, given the absence of clear regulations allowing connection to the public grid. Since the very beginning, generators have been used to supply the necessary energy for filming. Each generator supplies energy to the set for spotlights, connecting electronic equipment, temperature control (cooling or heating depending on the region and season), lighting common areas, workshops, kitchens, etc.

The amount of energy consumed during a film shoot depends on countless factors. If internal production, logistical, operational, artistic and aesthetic factors are removed, and genre-related conditions (horror and comedy have different energy consumption needs), production style or size (given that the same production will be simulated with the same script, professionals and resources for filming in 4 different countries) excluded, energy consumption would depend solely on external factors related to different production sites.

These external factors, later used to compare the 4 countries where we are simulating the shoot of the show, include the following:



1. Average and extreme temperatures.
Intense cold requires more heating in accommodation, offices, dressing rooms and catering; it also increases the risk of water or equipment freezing.

Extreme heat increases the need to cool surroundings (A/C, forced ventilation), the consumption of ice and cold water, and raises energy demand in catering cold rooms, for example.

2. Relative humidity.
High humidity means more energy expenditure on indoor dehumidification and air conditioning.

Low humidity, in turn, also has its negative implications. For example, it leads to higher water consumption for artificial misting, increases the risk of outdoor dust, and requires more hydration of equipment.

3. Hours of sunlight.
The more natural light there is, the less artificial lighting is needed (lower electricity consumption).

When there are **fewer hours of daylight** (at high latitudes or in winter), more artificial lighting and heating are needed.

4. Solar radiation.
Greater solar radiation facilitates portable solar energy and multiplies its efficiency (batteries, chargers, energy accumulators).

On the other hand, it can pose a risk to the crew, requiring more awnings or shelters to provide shade, more cooling of sensitive equipment, etc. In addition to increasing the materials used, transport, storage, assembly and disassembly times, it also involves more water and cleaning detergents.

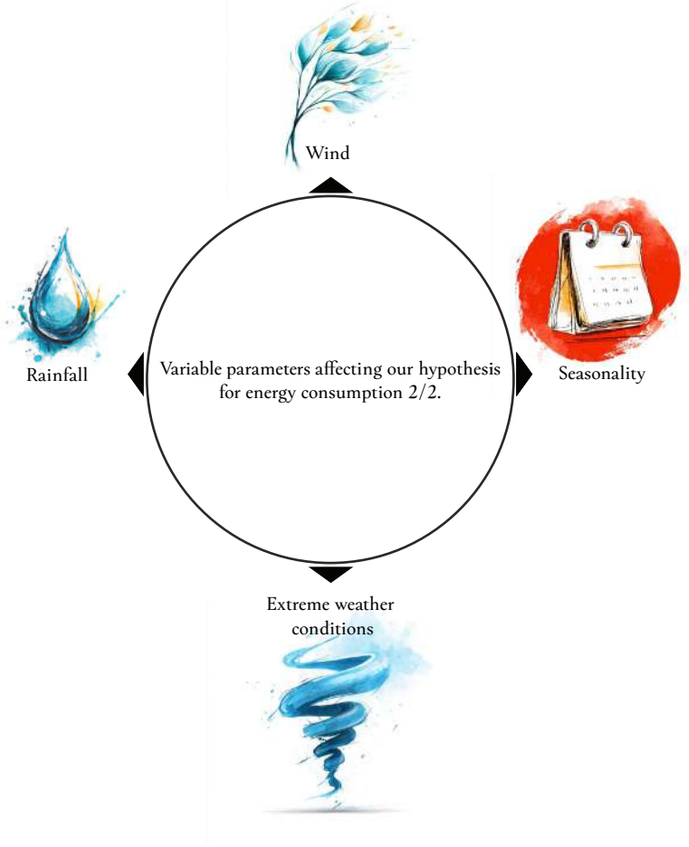
5. Wind.
Strong winds also increase the need for heavier and safer structures, which translates into more transport and materials and longer assembly, dismantling and cleaning.

It also has an impact on energy consumption, as it requires additional heating or cooling due to heat loss.

6. Rainfall.
Rain and snow cause delays and changes in plans, which is why the most expensive insurance policies for a film shoot are those that offer coverage against unforeseen weather events. The most important unit for production calculation purposes is a “day’s filming”: budgets are multiplied by a “day’s filming"; technicians and suppliers charge by a “day’s filming" (for weeks of movie filming). Rainfall requires more days’ filming, each one of which multiplies total energy consumption and production costs.

Rainfall also requires shelter for the film crew and technical and electronic equipment, which involves **tents, generators, heating, drying of costumes and equipment**, etc.

Obviously, rainfall also means greater energy consumption for heaters and dryers in temporary indoor spaces.



Obviamente las precipitaciones suponen también un aumento de gasto energético por calefactores y secadores en interiores temporales.

7. Seasonality.
In Mediterranean climates, with **mild winters and hot summers**, there are peaks in energy consumption due to the use of air conditioning, which is offset by lower dependence on heating.

In Atlantic or continental climates there is a more even need for air conditioning, but heating consumption increases in winter.

In the U.S., due to the country’s size and extreme climates, extreme heat and cold may overlap, increasing the need for temperature control.

8. Extreme weather conditions.
Storms, heat waves, snowfalls, hurricanes and any other extreme weather phenomena require reinforced safety, improvising the relocation of equipment or cancelling shooting days, which drives up budgets and energy consumption. This is one of the most critical risks faced by any filming.

Each sudden change increases energy inefficiency and involves standby generators (a form of energy consumption that is completely sterile), as well as additional transport, catering waste, accommodation for the crew, etc.

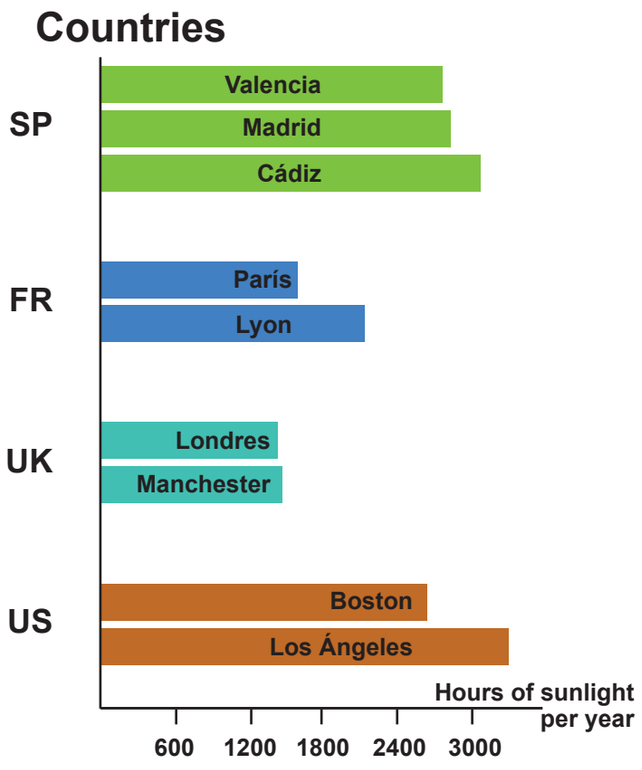
Direct impact on resources.
In addition to the enormous impact that weather has on **energy consumption**, due to heating, air conditioning, lighting, cold room temperature control and other resources (see above), weather conditions affect other categories of greenhouse gas emissions, such as **water** consumption to hydrate the crew, for special effects such as rain or fog, cleaning sets, etc.

It also affects the use and **transport of materials**. Tents, thermal blankets, fans, windbreaks and other types of shelters and devices need to be transported, which requires more vehicles, more storage space and more loading, unloading and assembly time. All of this increases the carbon footprint.

The climate also has an impact on **food**, with more cooling in the summer and energy in the winter for preservation.

When planning a film shoot, the best way **to keep energy consumption down** is to choose **mild climates with many hours of daylight**. For example, Mediterranean Spain is the perfect location, and so is southern France, which both guarantee lower energy consumption. Further south in Spain, the need for air conditioning increases exponentially as we approach the equator, with relative humidity skyrocketing.

Cold and humid climates in the **United Kingdom, northern France** and the **north-eastern United States** require more heating and more days' filming due to rain and shorter daylight.



Extreme climates, such as the deserts of the United States and southern Spain, increase expenditure on cooling, water and solar protection.

Areas with unstable weather, such as the American Atlantic, Wales and Brittany, perhaps have the greatest impact on total energy consumption, as they multiply the risk of downtime and additional consumption due to relocation and improvisation.

Climate comparison of annual averages in Spain, France, United Kingdom and United States, showing data of interest to summarise key meteorological factors:

1. Hours of sunlight/brightness.
A single value cannot be assigned per country, as it depends on each city, regional microclimate and various other factors. We will document the average number of "actual" hours of sunshine per year for each country's largest cities.

Spain.
- Valencia: 2,733 hours/year.
- Madrid: 2,769 hours/year.
- Cádiz: 3,061 hours/year. One of the sunniest and brightest cities in Europe.

France:
- París: 1,717 hours/year.
- Lyon: 2,002 hours/year.

United Kingdom.
- Londres: 1,410 hours/year.
- Manchester: 1,416 hours/year.

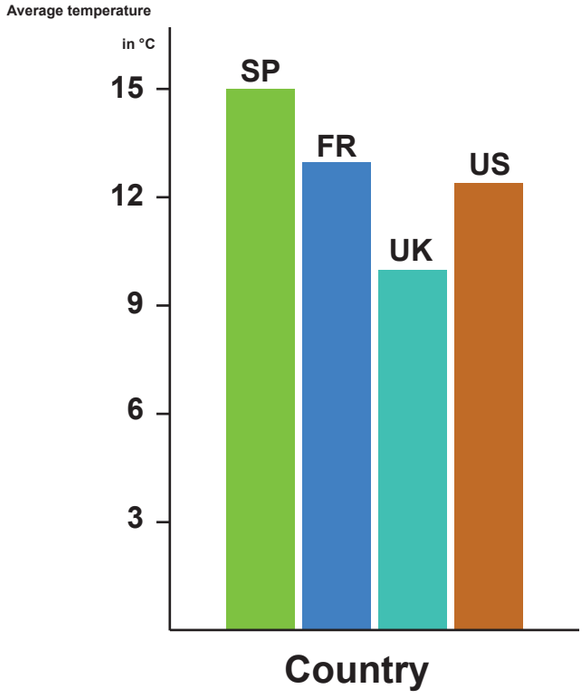
U.S.A..
- Boston: 2,634 hours/year; NYC: 2,535 hours/year.
- Los Ángeles: 3,250 hours/year of daylight/sunshine.

2. Average annual and seasonal temperatures.
As with hours' daylight or "real sunshine", we have in fact found references to national average temperatures, which we have documented together with the data source.

Spain:
Despite its varied climate, with all kinds of temperatures and atmospheric conditions, the **Spanish Weather Authorities (AEMET)** have set Spain's average annual temperature at **15°C.**

France:
It is a large country with a varied climate, from hot beach areas in the summer to cold mountain forests in the winter. However, Wikipedia has estimated its average temperature at 1**2.97 °C**. The country's average temperature, compared to Spain's similar climate, gives us a reasonable reference.

United Kingdom:
According to the TradingEconomics website, the average annual temperature recorded in 2024 was **10.14 °C**, a record for the country.



U.S.A.:
According to the **NOAA annual report issued by National Centers for Environmental Information (NCEI)**, the average temperature recorded in 2023 in the United States was **54.4 °F**, equivalent to approximately **12.4 °C**

3. Relative humidity (partial information).
This is an approximate estimate based on the values of each country's largest cities. There is large national territory with different climates and significant fluctuations between seasons, which is why there is no absolute value for the country.

Spain:
Given that the country's climate is very diverse, a reasonable representative value for annual relative humidity would be approximately **65%**

The **driest regions** (such as Madrid) are around **55–60%**, while Atlantic areas (such as Bilbao) and humid Mediterranean areas (such as Barcelona) reach **70–72%**.

The **Canary Islands** and certain areas in the south range between **65–66%.**

France:
A representative and reasonable value for **average annual relative humidity in France is around 77%**, derived from the 76–78% range observed in reference cities for the country's climatic diversity, such as Paris and Nice.

UK:
The **Met Office / HadUKGrid** publish annual relative

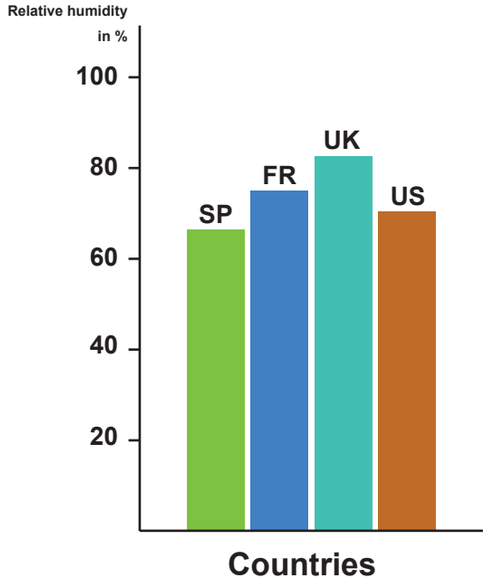
humidity maps where most of the country falls between **76% and 88%**; this range has indicated a national average of around **80%** (declining slightly in recent decades).

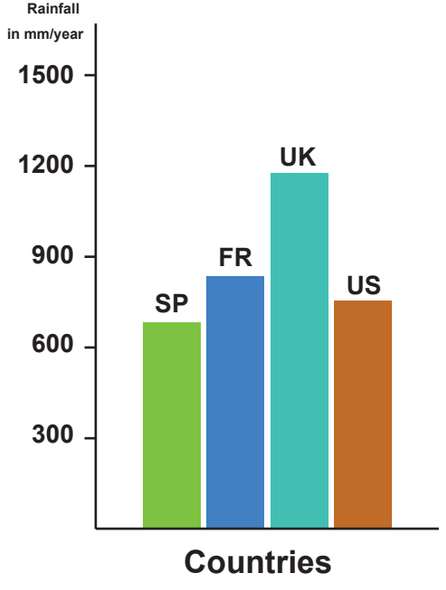
The average annual relative humidity is set at **81%** (±2 pp), consistent with the aforementioned Met Office / HadUKGrid maps, with WorldData (with an upper limit of 85%) and, finally, with the CurrentResults morning-afternoon city average (78%-83%).

U.S.A.: An annual average for United States as a whole may be less practical, as there is significant variation between regions and seasons. However, a reasonable average of **70%** is obtained from the Current Results website. To note is that the range varies from 40% for low humidity in the most arid regions (such as Denver) to 90% for the highest humidity (peaking in Miami).

4. Rainfall.
According to the Spanish Weather Authorities (AEMET), the annual average rainfall for **Spain** as a whole (1981-2010 series) is **636 mm/year**. To note is that this average includes semi-arid regions that barely exceed 100 mm/year in their driest seasons (such as Lanzarote and Fuerteventura), and very rainy regions such as mountainous areas in the north Atlantic and Cantabria, which can reach 2,000 mm/year.

From an audiovisual perspective, such sharp contrasts in a small area are the reason why Spain offers such a rich range of landscapes, flora, fauna and atmospheric conditions. Of the countries under analysis, only the U.S. may offer a similar variety of landscapes, but at a much greater





distance, which makes combined locations less efficient in sustainability and economic cost terms.

Various sources, such as Météo-France, TradingEconomics, the World Bank and the Climate Knowledge Portal, place the average rainfall in **France** at around **835 mm/-year**, covering a sample period from 1901 to 2024. France also has varying climates but lacks Spain's sharp contrast

The specialist source CurrentResults indicates an average of **1,163 mm/year** of rain or snow throughout the United Kingdom. This means that the **United Kingdom** is clearly ahead in terms of average rainfall compared to the other 3 countries analysed, which have similar averages, with Spain being slightly drier.

The USGS/NCEI sets the annual average rainfall in the 48 contiguous states of the **U.S.** at 30.21 inches, equivalent to **767 mm/year.** This figure places the average for this huge country between Spain and France, although there are sharp contrasts in annual rainfall depending on different regions and seasons, ranging between extremely arid areas and others with heavy rainfall.

Another source, NOAA NCEI, has published a recent study (2024) indicating an average last year of 31.58 inches, or **802 mm/year**, indicating an **upward trend** in rainfall.

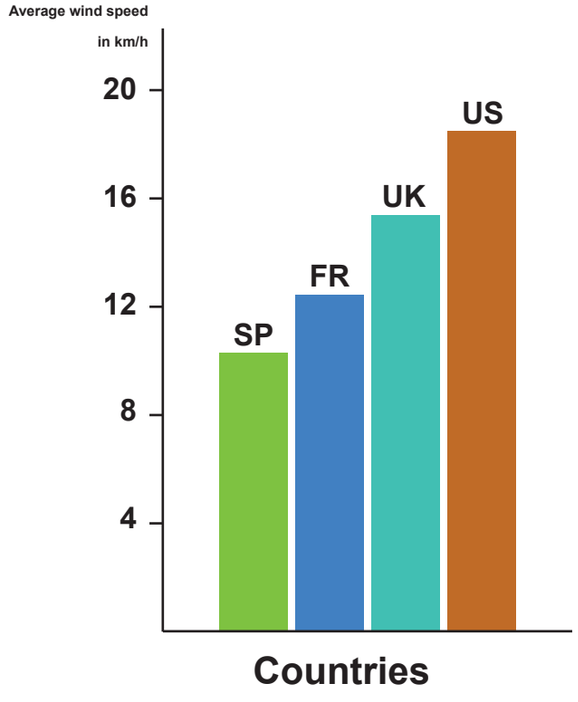
5. Wind.
Spain is a relatively stable country in terms of wind strength, with no excessive contrast between regions. From its sunny coasts (with an annual average of 1.5 m/s) to mountainous areas with higher wind speed (up to 4 m/s), covering urban inland areas such as Madrid, with an average of 2.5 m/s.

We have set the national average at approximately **3.0 m/s** or **10.8 km/h.**

In **France**, we find inland and northern regions with moderate average wind speeds of between 3 and 4 m/s and very windy areas, such as Provence and cities such as Marseille and Toulon, where up to 100 days a year are affected by mistral, an intense and recurring wind. We have set the national average at **3.5 m/s** or **12.6 km/h.**

According to an analysis published by Lumify Energy, in 2023 the average wind speed in the **United Kingdom** was **4.27 m/s** or **15.4 km/h**, which represents a decrease of 0.10 m/s compared to the previous year, and 0.21 m/s below the average for the last 20 years, showing a trend towards moderate wind speed.

For a **U.S.** wind analysis, we have used reliable sources such as the US Energy Information Administration (EIA), NREL/Stanford and Wyoming Climatological. As with all parameters in such a large country, there is a wide range of samples in most states, including inland areas with "normal" conditions (recording a stable average of 4 m/s or 14.4 km/s) and windy regions, such as the Great Plains, the north coast and mountain heights (averaging up to 7 m/s or



or 25.2 km/h).

TBased on all the foregoing, a national average for the **United States** could be set at around **5 m/s** or **18 km/h**, almost twice the average for Spain.

6. Extreme weather conditions .
The weather in **Europe** is generally moderate, although some summers have been extreme as of late, with heat waves and fires, and torrential rains at certain times of the year, especially in Spain and France. There are some snowstorms in winter. But in general, the European climate is stable compared to other continents.

In the **U.S.**, extreme weather is more common than in Europe. In addition to heat waves and large fires, hurricanes are common in the south-southeast, tornadoes in inland regions, and heavy snowfall in the north.

Interpretation of national averages by country and season.

- **Summer.**

Spain is extremely bright, temperatures are high but conditions are perfect for natural light.

France has a temperate summer, good light and moderate temperatures.

The **United Kingdom** also enjoys a moderate, but cloudy, summer.

The **United States** generally has hot, humid summers, with high air conditioning demand, but with late twilight and many hours of sunshine.

- **Winter.**

Southern and eastern Spain generally had mild winters, with less light in the north.

France is moderately cold, but the days are shorter and there is limited daylight.

Winter in the **United Kingdom** is grey, wet and dark.

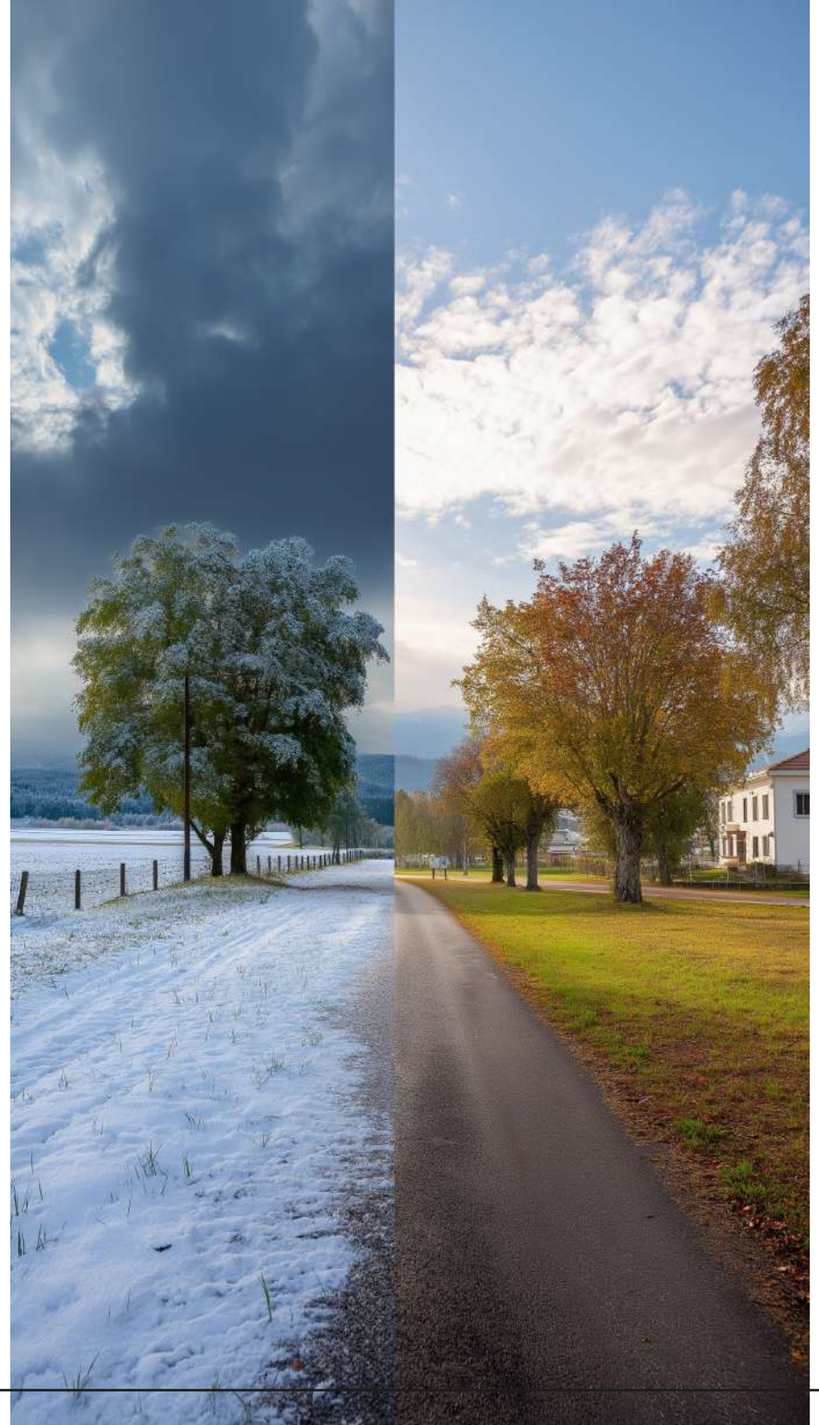
In the **U.S.**, winter is cold and wet, with possible snow-storms and short days on the east coast. The west coast has mild and bright winters.

- **Spring/autumn.**

In **Spain**, the weather is generally mild and bright, making it ideal for outdoor filming.

France has varied, yet manageable weather conditions for filming. It is a good destination in terms of climate.

In the **United Kingdom**, it often rains and overcast skies reduce brightness and complicate outdoor filming.



In the **U.S.**, the west coast remains bright with moderate and pleasant temperatures. Spring on the east coast varies, with some rain and storms. Autumns are pleasant but hurricanes are a possibility.

Impact of climate on generator fuel consumption in various countries.

We have presumed that all filming energy (lighting, temperature control, kitchens, cold rooms, common areas, etc.) comes from **diesel generators**, and that the **operational plan (hours' filming, equipment size, comfort standards and food preservation)** is identical in all four countries, shooting the same days in cities located in all sites in each country. The varying factor in **fuel consumption** is, above all, **climate-related energy demand** (heating/cooling and dehumidification) and, to a lesser extent, the **need for artificial light** in the absence of sunlight/overcast skies.

Spain is the country that would require the least fuel consumption to power the generators, used as a reference or assigned 0%. The main reason it the most efficient country is its lower **annual heating load and moderate CDD (cooling) and HDD (heating)** compared to France, United Kingdom or United States.

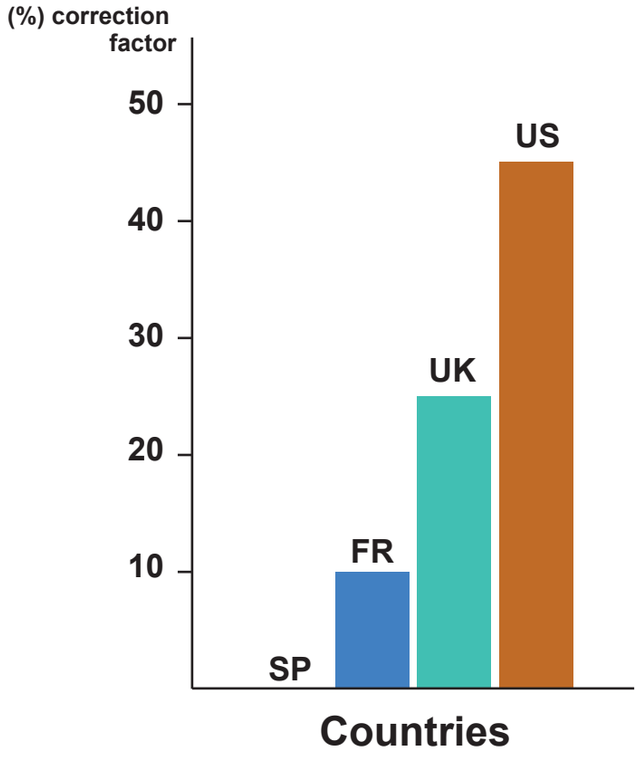
The other critical factor in Spain's efficiency, among a multitude of less significant factors, is that it has **more hours of sunshine** and **more clear days per year**, especially in the southern half and east of the country, which exponentially reduces the need for artificial light during the day.

France is once again closely behind Spain, with a **10%** increase in fuel consumption by energy-producing generators. It registers a **higher HDD than Spain** (more heating demand) and generally **low CDD** (low dependence on cooling). With fewer hours of sunshine in most of the country than in eastern and southern Spain, slightly more artificial light will always be necessary.

In this case, France's **low-CO_2 electricity mix** is not an advantage, as we assume that 100% of the energy is generator-supplied (as is usually the case in filming that takes place in natural locations, not on a set). So, the difference only depends on **daily temperature and available light.**

The **United Kingdom** requires on average **25%** more fuel than Spain to shoot exactly the same script, with the same resources. It has significantly higher **HDD** (greater heating demand for most of the year) and low **CDD** (little dependence on cooling), but a large need for **dehumidification** and more risk of heat loss, as well as more unpredictable weather. Here, the environmental impact of energy consumption is **25% higher than Spain**.

Energy consumption. Diesel oil in generators.



A critical factor in the **United Kingdom**'s low energy efficiency is the lack of sunlight to reduce artificial lighting. Its **scarce hours of sunshine and frequently cloudy skies** require more artificial indoor lighting and assistance for outdoor climate control.

Finally, the **United States** once again greatly surpasses Europe in terms of energy consumption demand. We estimate an extra **45%** in diesel consumption to run the same project in America.

Such a demanding shoot in a variety of locations magnifies the effect of a large country's size on production sustainability. Shooting all over the country means dealing with **cold winters** in the Northeast and Midwest (with a lot of **HDD/heating**) at the same time as very **hot and humid summers** in the South, which require a lot of **CDD and latent load** (air conditioning and refrigeration). Furthermore, as a side effect, **extreme weather conditions** require more hours of standby air conditioning in each site, which in long shoots exponentially multiplies the environmental impact (which is reduced if filming is short, e.g. ads).

On the East Coast, in Boston and New York, hot and humid summers greatly increase the need to dehumidify tents/dressing rooms (latent load), and the cold and equally humid winters increase the need for heating.

fríos e igualmente húmedos elevan el consumo de calefacción.

Methodology. Construction of our hypothesis..

1.Climatic thermal demand: the logic of heating degree days (HDD) and cooling degree days (CDD) has been used as a solid reference for heating and cooling loads throughout the year. Following Eurostat/JRC comparables by country in the EU (ES, FR, UK) and EPA/EIA methodology for the U.S.

2. Lighting: Sunshine duration is weighted because greater brightness reduces the use of artificial light on sets, in offices, common areas, workshops and specific workspaces for each department; Spain and southern France fare better in this respect than United Kingdom and northern France.

3. Latent loads (humidity): these are presumed higher in the U.K. and the U.S., especially in the east and south (more dehumidification in summer).

4. **Conditions and seasonality:** The U.S. registers more extremes (heat waves, intense cold and storms) that require more hours of air conditioning, standby air conditioning, changes of plans and improvisation.

***Note:** when the shooting schedule is identical (hours/comfort levels/caloric menu for the team) and generator performance is constant, what varies is energy demand (kWh) depending on the climate and available light, with a linear equivalent into litres of diesel.

Water.

A country's water consumption efficiency depends on a set of structural, climatic, technological and management factors, of which the most relevant are the following:

1. Climate and water availability.
This mainly depends on local rainfall. Countries with heavy rainfall are less dependent on water transfers or desalination.

Also relevant is **evapotranspiration** or the sum of evaporation- whereby water changes from liquid to vapour- and transpiration- whereby water seeps into the soil, is root-absorbed and returns to the atmosphere in a vapour state through plant leaf stomata. Hot, dry climates require more water for agriculture and cooling because of their high evapotranspiration rates.

The frequency of e**xtreme weather conditions**, such as droughts and floods, reduces water management efficiency, increasing losses and infrastructure stress.

2. Economic structure.
Water management in **agriculture** plays an important role in the overall management of this resource. If, for example, irrigation is significant and inefficient methods are used (such as flood irrigation), this will reduce the overall efficiency of water management.

Industry is another determining factor in water management. Some industries, such as energy, textiles and mining, are very water-intensive, while others use less water. Each country’s industrial focus influences water

management efficiency.

Tourism and services also influence water management, as cities with high tourist occupancy have greater per capita consumption.

3. Technology and usage practices.
The state of the art in technological developments affects the level of water management. For example, switching from furrow irrigation to efficient drip or sprinkler irrigation reduces water consumption by 30 to 50%.

The **reuse and recycling of water,** regenerated for use in agriculture or industry, has a major impact on its overall management.

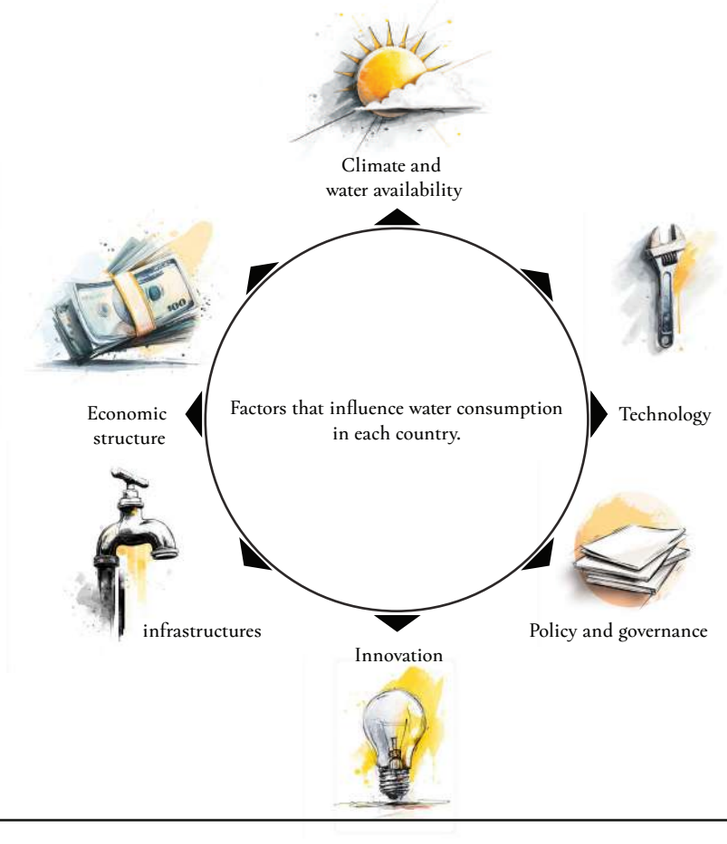
Finally, **domestic efficiency**, the widespread use of low-consumption appliances and sanitary facilities, among other factors, tends to tip the balance in water management, as it has a massive impact on consumption.

4. Management and infrastructure.
Obviously, **distribution network** quality is of vital importance. Losses due to leaking pipes can exceed **20–30%** in countries with poor infrastructure.The availability of **water storage and reservoirs** determines the potential regulation of available water.

One of the most important qualitative factors in water management is **treatment and purification**, the quality of the urban water cycle, or how much treated wastewater is returned.

Comparison of water management efficiency.

Country	Losses	Per capita domestic consumption
Spain	-19%	120 L/day
France	-26%	165-262 L/d
UK	-19%	150 L/d
U.S.A.	-10%-16%	330 L/d



5. Policy and governance.
Various aspects come into play here. These range from the **price of water** itself (realistic tariffs encourage savings and poorly designed subsidies lead to overconsumption), **regulation and control**, efficiency standards in irrigation, industry and construction, and penalties for bad practices. Even public awareness, such as campaigns to reduce waste, affect the level of water management.

6. Innovation and associated energy.
Desalination, for example, increases water availability in arid areas, but requires a lot of energy. Technologies such as sensor-based **digitalisation**, telemetry and smart meters, improve control and management efficiency.

There are many other aspects that affect water management, such as **"virtual water footprint"** policies, importing water-intensive products, shifting water consumption abroad.

A country's water efficiency depends not only on how much water it has, but also on **how it is used, how it is managed and what technology is applied.** An arid country can still be very efficient, e.g. Israel or the Emirates, thanks to innovation, while another wet country can waste water in the absence of adequate infrastructure or pricing.

Spain.
Water distribution losses are estimated to be similar to those in the United Kingdom, approximately **19%**, indicating a reasonable level of efficiency.

Domestic consumption is around **120 L/person/day**, **among the lowest in Europe**, which means that demand is more efficiently managed.

France.
Despite having extensive networks and almost universal coverage, losses are higher than Spain, around **26%**

Consumption is **between 165 and 262 L/day**, meaning that there is room for optimising water use as a precious resource in cities.

United Kingdom.
In the British Isles, distribution losses are similar to Spain's (approximately 19%) but consumption is higher (150 L/day). Recent data have reported losses of **1 trillion litres** per year due to leaks and outdated networks but are inconsistent, which indicates deficient infrastructures.

United States.
It registers the **lowest losses (10%-16%)**, occasionally reaching 25% in outdated systems. However, **domestic consumption is very high (330 L/day)**, partly due to outdoor watering with a huge impact on overall efficiency.

Cities such as Seattle have been able to significantly reduce consumption through awareness-raising policies and efficient tariffs.

Key factors influencing efficiency.

1. **Infrastructure and outdated networks.**
   - High losses in old networks or with insufficient maintenance **(France, United Kingdom)**.
2. **Per capita consumption and non-domestic use.**
   - **U.S.:** high due to watering, swimming pools, regular outdoor use.
3. **Regulation and governance of the sector.**
   - **France:** multiple utilities, without prejudice to the prominence of local government.
   - **UK:** privatised and regulated sector (OFWAT), though criticised for under-investment.
4. **Technology and modernisation.**
   - **Spain and the United Kingdom** have made progress in leak detection and smart meters.
5. **Tariff policy and demand management.**
   - **U.S.A.:** Programmes to promote efficiency (WaterSense, block pricing).
   - **United Kingdom:** Tariff incentives could still be improved.
6. **Climate context and insufficient resources.**
   - The **United Kingdom** suffers from recurrent drought, requiring urgent action to reduce leaks and consumption.

Once again we may reach the conclusion that **Spain**'s overall optimal management gives it an advantage over the other countries, despite having the lowest amount of water.

This advantage is a result of reducing water loss thanks to its modern infrastructure and technology, which detect leaks and other problems. This is compounded with very moderate consumption, probably due to the Spanish population being traditionally aware of the need to manage water in order to fight scarcity and drought.

Spain is followed by United Kingdom and United States. Once again, the U.S. indicates less efficient water management as a whole, as its low loss rate is rendered ineffective by high consumption.

Based on this information, we will establish a **quantitative and traceable hypothesis of water consumption** for the same project, with the critical participation of 622 people during 90 days' filming, which adds up to 55,980 person/-day in **Spain, France, United Kingdom and United States**.

There are 2 key data when for calculating the estimate in this hypothesis: **actual per capita domestic consumption and network losses (Non-Revenue Water, NRW).**

We will also estimate the **water extracted and treated** for each litre actually used, known as the "water to tap" (from source to tap) impact.

Assumptions (identical in all 4 countries):

- Constant **direct production use** (set/catering/cleaning): **100 L/person/day** (comparative hypothesis applied to all countries).

Results (relative index vs. country with least consumption = 0%)

Country	Water extracted per person/day (L)	Losses
Spain	292 L	0%
France	293 L	+1%
UK	313 L	+10%
U.S.A.	477 L	+65%

Itemised calculation:

- **Spain:** (100+128) ÷ 0,78 ≈ 292 L.
- **UK:** (100+137) ÷ 0,81 ≈ 293 L.
- **France:** (100+150) ÷ 0,80 ≈ 313 L.
- **U.S.A:** (100+310) ÷ 0,86 ≈ 477 L.

Total water consumed in "The Walking Dead: Daryl Dixon" (622 pax 90 days = 55,980 pax/day).

Spain: 16.36 million litres (16,363 m3).
United Kingdom: 16.38 million litres (16,380 m3).
France: 17.48 million litres (17,480 m3).
U.S.: 26.69 million litres (26,690 m3).

- **Per capita domestic consumption.** Based on the latest official representative data for each country:
  - **Spain:** 128 L/person/day (INE 2022).
  - **France:** 150 L/person/day (INSEE/France24).
  - **United Kingdom (England, 2023 24):** 137 L/person/day (Ofwat/Defra).
  - **U.S.:** 82 gallons/person/day ≈ 310 L/person/day (EPA WaterSense/USGS).

- **Average network losses (NRW):**
  - **Spain:** Between **22** and **23.5%** (recent studies and sector summaries).
  - **France: 20%** (UFC Que Choisir).
  - **United Kingdom (England and Wales): 19%**; plus 48.8 L/person/day filtered.
  - **U.S. (national average): 14% (**EPA).

Our calculations are based on consumption delivered per person/day = 100 L (a common hypothesis for all countries) + PCC (per capita consumption in each country).

In addition, we will add the **water extracted/treated =** consumption delivered ÷ (1 − NRW). The result is the actual consumption for each the resource level.

Waste.

Spain clearly has room for improvement in waste management and recycling. To measure the quality of recycling and waste management, we will use the national average of the "municipal recycling rate".

In **Spain**, the municipal recycling rate was approximately **39%** in 2022, below the European average.

Action for improvement is required due to the large share landfill waste (approximately 47%), and recycled plastic (only 43% of plastic is recovered and the rest is incinerated or dumped).

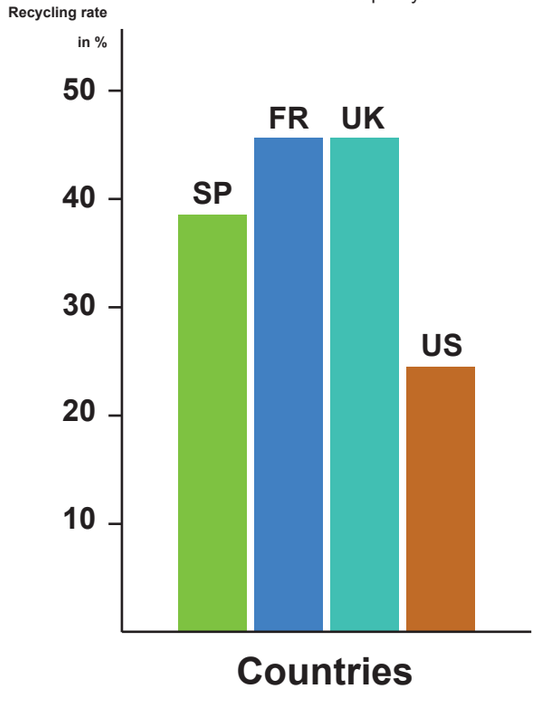
France's estimated national average rate is in line with Europe's **44%** average in 2022. It has continuously improved in the recycling of packaging and household waste, as has all-inclusive regulatory coverage.

In the **United Kingdom**, the household waste recycling rate was only **44%** in 2022, a slight decrease from 2021 but levelled with France. Regional disparities are evident, e.g. Wales is the best recycler in the British Isles (with a 57% rate), compared to 42% in Scotland and 43% in England. Incineration is broadly used as an alternative to dumping.

In the **United States**, the municipal recycling rate was **34.6%** in 2014. Although the number is out of date, it is still the best reliable figure nationwide. This means that the U.S. is by far the worst of the 4 countries analysed. Plastic is specifically problematic, as less than 5% was recycled in 2021, well below previous estimates (indicating a dropping indicator).

Comparison of recycling and waste management (annual national average).

Country	Municipal recycling rate (%)	Quality and key practices
Spain	39 % (2022)	Low recycling. High landfilling rate (≈ 47%).
France	44 % en 2022 (EU Average)	Relatively high. Better management of packaging and municipal waste.
UK	44 % (2022)	Large intra-regional differences. Significant incineration.
U.S.A.	35 % (2014)	Moderate average rate; high dependence on state and local government, no solid federal policy. Plastics <10%..



The absence of solid federal legislation means that there are huge differences between states, that the system is fragmented and that progress in waste management is slowed down.

At Creast, we use **DEFRA** emission factors to calculate the carbon footprint of waste, without making a fine distinction. However, in order to follow our analysis results, we will penalise those countries with inadequate waste management. For Spain, this will also indicate those issues where the country is lagging behind.

Hypothetical impact of waste in each country.

Common presumptions:

We will assume that exactly the same amount of waste is generated in each country when producing "The Walking Dead". Further to Creast's Big Data, the total amount of wastewould be close to 70 tonnes during 90 days' filming.

Based on this amount, depending on each country's level of recycling and waste management, we will apply a relative percentage to correct individually estimated impact. This percentage or correction index is only used to generate magnitudes and comparative proportions; and is not intended for accurate calculations.

In order to calculate the each country's correction index, we will estimate the most efficient country in recycling and waste management and take it as a reference. A difference of 0% will be assigned to the impact of estimated waste, which will be exactly the same for each country.

All other countries will apply a correction factor, a higher percentage of impact with respect to the estimate of the country of reference.

The following factors will be taken into account for this purpose:

Spain: average recycling **39%**, high landfilling (47%), rest incineration/others.

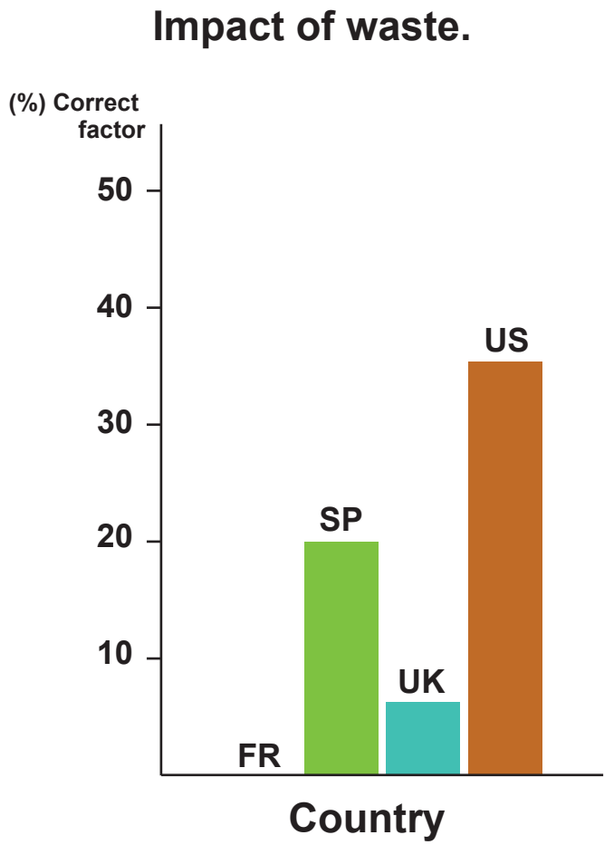
France: average recycling **44%**, medium-low landfilling, incineration and extended recovery.

United Kingdom: average household recycling **44%,** significant incineration, less landfilling than Spain.

U.S.: average recycling rate **35%,** predominant landfilling (many differences between states).

Calculation of the waste impact correction index.

For country comparison purposes, an "impact factor" is assigned according to the treatment method used, using typical LCAs as a qualitative reference:



- **Landfilling** (methane, leaks): 1.00
- **Incineration with energy recovery:** 0.60 (methane is avoided and energy recovered, but emissions generated).
- **Recycling/Composting:** 0.20 (credit for recovered material/biogas compost, lower net load).

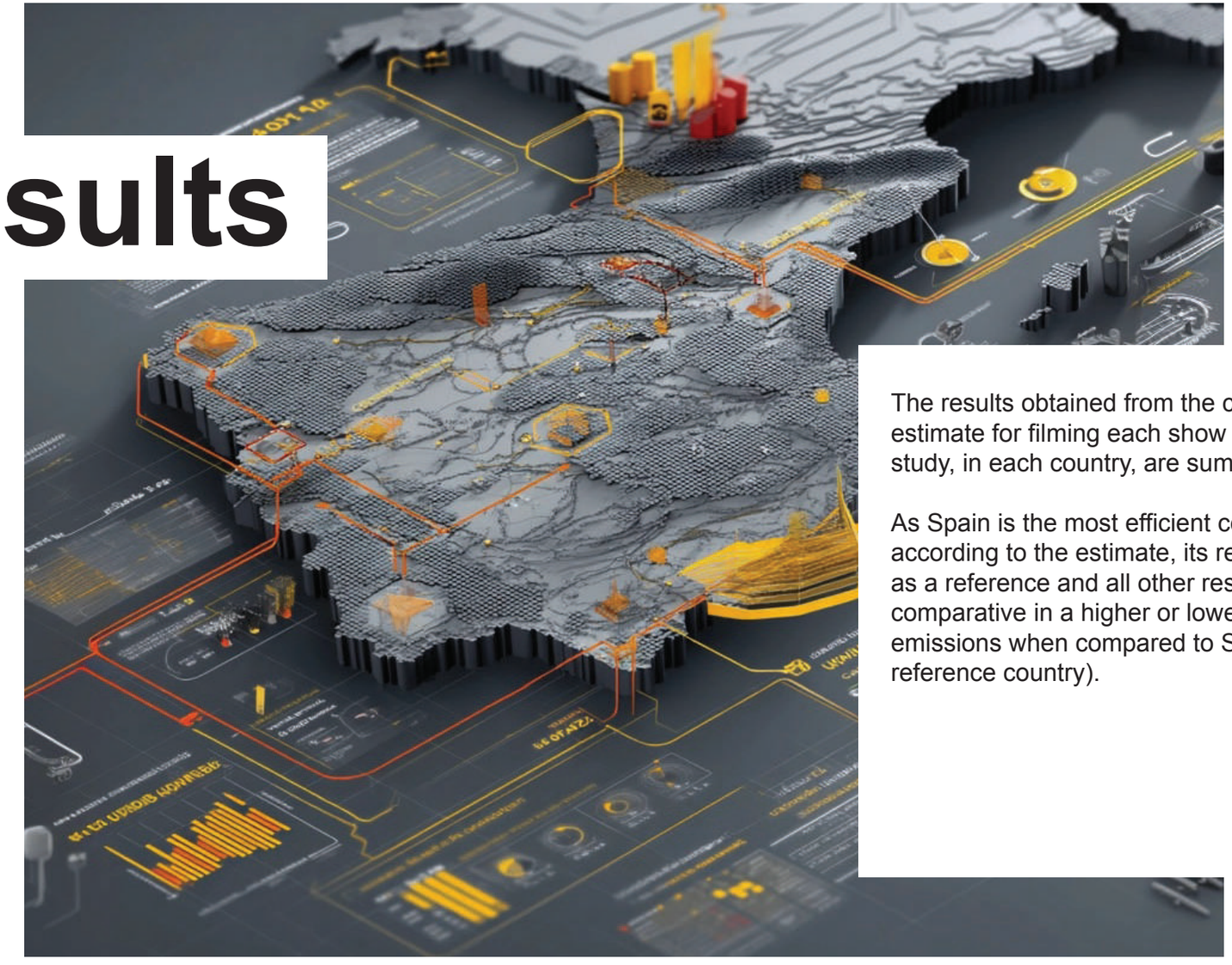
Each country's impact is calculated by applying (the % landfilling ×1.00) + (the % incineration ×0.60) + (%recycling/composting ×0.20).

Then, each country is compared to the best (the one with the lowest value) and the difference is expressed as a percentage (%).

Results of our comparative hypothesis.
France is considered the best country (0%). The reason for its good results are a combination of efficient recycling and extensive energy recovery, with less landfilling.

France: 0% (reference country).
United Kingdom: +5%
Spain: +20%
United States: +35%

Results



The results obtained from the carbon footprint estimate for filming each show covered by this study, in each country, are summarised next.

As Spain is the most efficient country according to the estimate, its result is marked as a reference and all other results offer a comparative in a higher or lower percentage of emissions when compared to Spain (the reference country).

The Walking Dead: Daryl Dixon.

Spain.
Mobility: 314,562.1 Kg CO2eq.
Energy: 121,725 Kg CO2eq.
Materials: 301,515.72 Kg CO2eq.
Waste: 47,845.12 Kg CO2eq.
Catering: 599,580.2 Kg CO2eq.
Accommodation: 138,355 Kg CO2eq.
Water: 5,628.87 Kg CO2 Eq.

Total: 1,067,986.81 Kg CO2eq.

France.
Mobility: 876,992.78 Kg CO2eq. **+178.8 %**
Energy: 133,897.5 Kg CO2eq. **+10%**
Materials: 301,515.72 Kg CO2eq.
Waste: 38,276.096 Kg CO2eq. **-20%**
Catering: 659,538.22 Kg CO2eq. **+10%**
Accommodation: 132,425.5 Kg CO2eq. **-4.29%**
Water: 6,013.12 Kg CO2 Eq. **+6.83%**

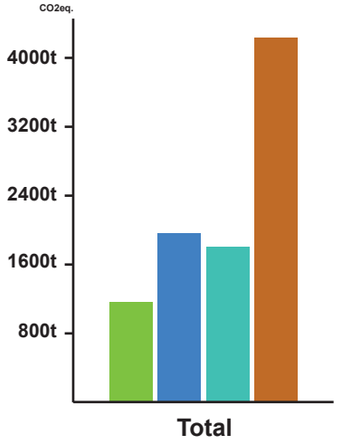
Total: 2,148,658.936 Kg CO2eq. +101.19%

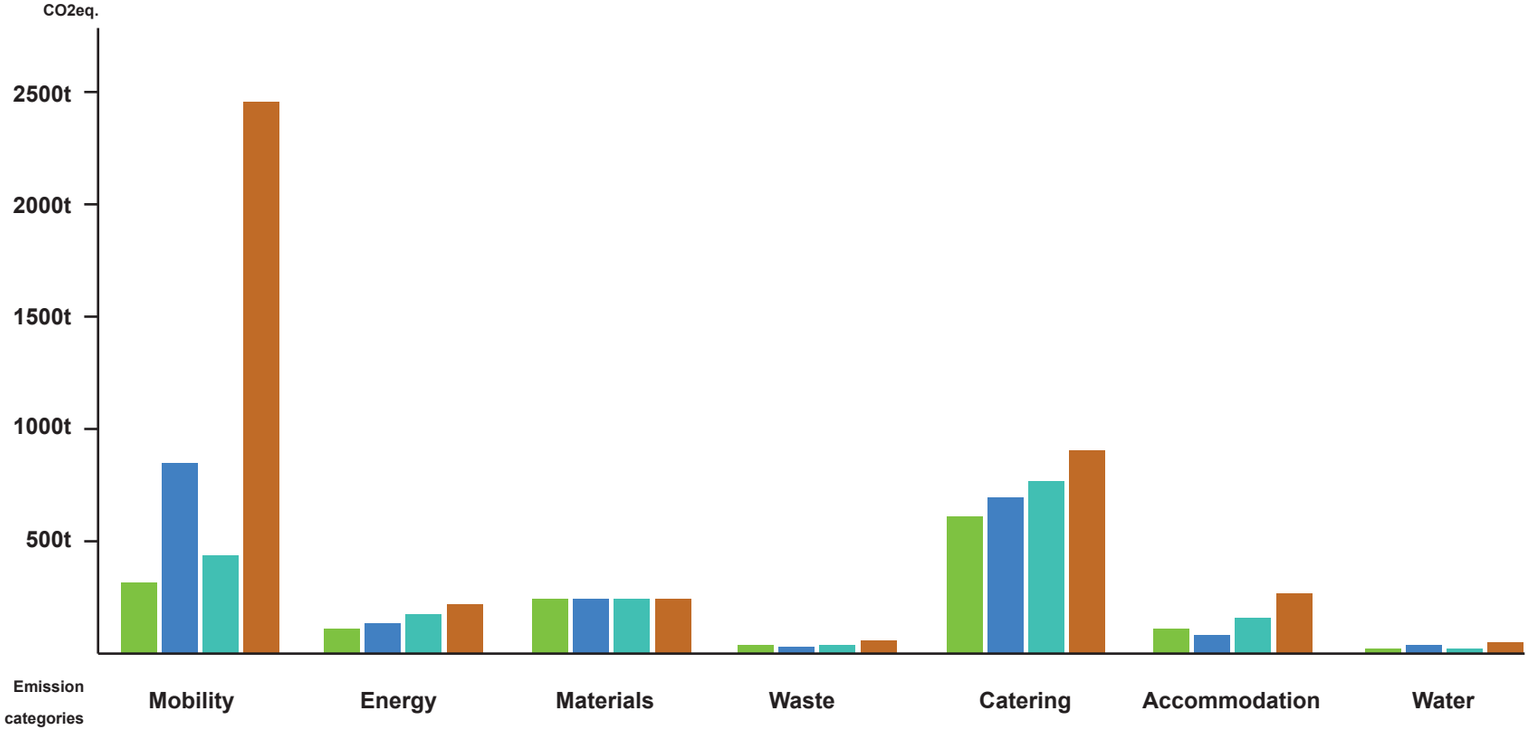
United Kingdom.
Mobility: 438,563.15 Kg CO2eq. **+39.42 %**
Energy: 152,156.25 Kg CO2eq. **+25%**
Materials: 301,515.72 Kg CO2eq. **–12.5%**
Waste: 45,452.864 Kg CO2eq. **–5%**
Catering: 749,475.25 Kg CO2eq. **+25%**
Accommodation: 205,556 Kg CO2eq. **+48.57%**
Water: 5,634.72 Kg CO2 Eq. **+0.1%**

Total: 1,898,353.954 Kg CO2eq. +77.75%

United States.
Mobility: 2,439,225.26 Kg CO2eq. **+675.44 %**
Energy: 176,501.25 Kg CO2eq. **+45%**
Materials: 301,515.72 Kg CO2eq.
Waste: 55,021.888 Kg CO2eq. **+15%**
Catering: 839,412.28 Kg CO2eq. **+40%**
Accommodation: 318,216.5 Kg CO2eq. **+130%**
Water: 9,181.36 Kg CO2 Eq. **+63.11%**

Total: 4,139,074.258 Kg CO2eq. +287.56%





La unidad. Kabul.

Spain.
Mobility: 181,106.357 Kg CO2eq.
Energy: 23,670.765 Kg CO2eq.
Materials: 113,549.61 Kg CO2eq.
Waste: 2,325 Kg CO2eq.
Catering: 78,678.04 Kg CO2eq.
Accommodation: 87,585.48 Kg CO2eq.
Water: 42.08 Kg CO2eq.

Total: 486,957.332 Kg CO2eq.

France.
Mobility: 373,375.587 Kg CO2eq. **+106.16%**
Energy: 26,037.8415 Kg CO2eq. **+10%**
Materials: 113,549.61 Kg CO2eq.
Waste: 1,860 Kg CO2eq. **-20%**
Catering: 86,545.844 Kg CO2eq. **+10%**
Accommodation: 396,981.27 Kg CO2eq. **+353.25%**
Water: 46.288 Kg CO2eq. **+10%**

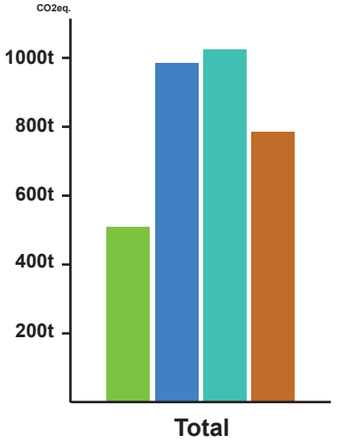
Total: 998,396.4405 Kg CO2eq. +105.03%

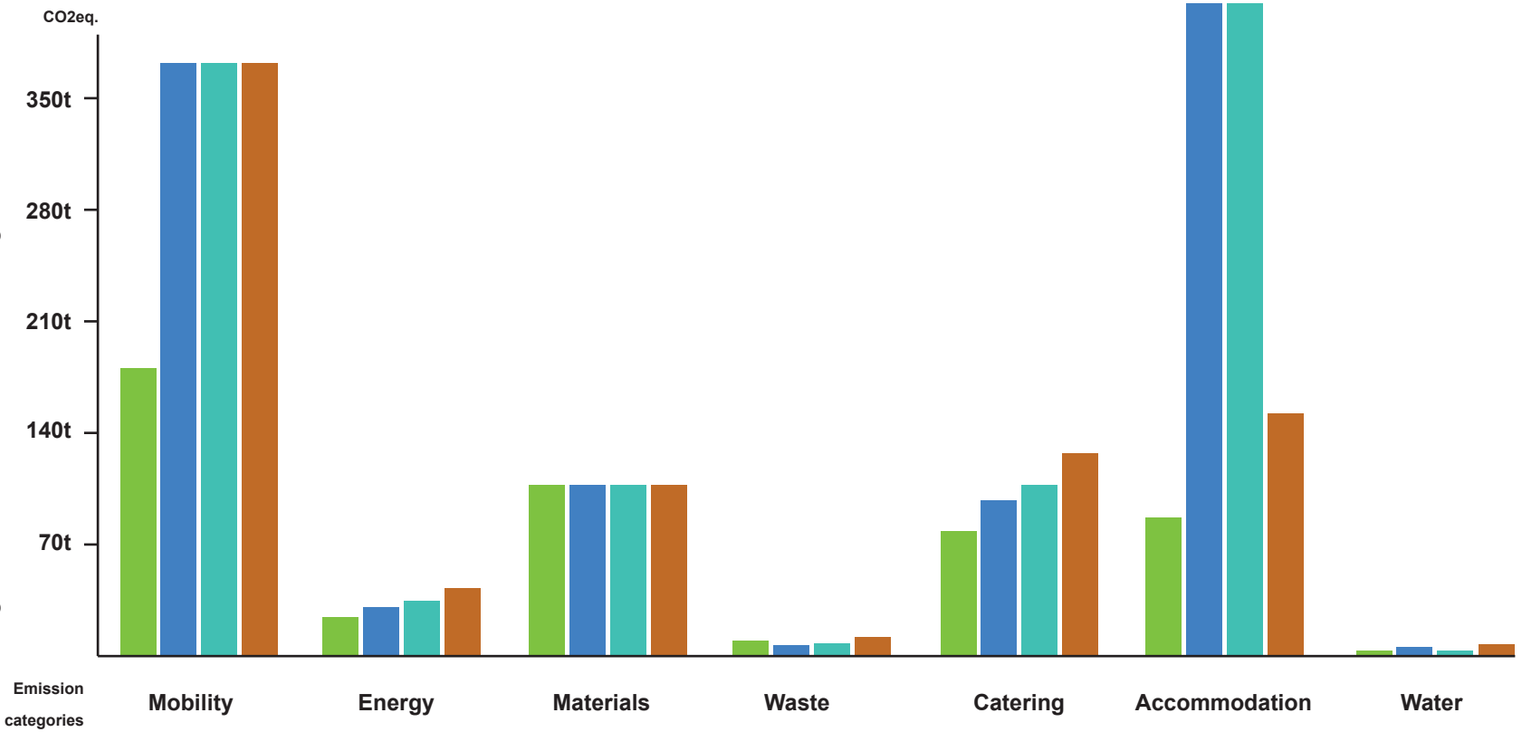
United kingdom.
Mobility: 373,375.587 Kg CO2eq. **+106.16%**
Energy: 29,588.45625 Kg CO2eq. **+25%**
Materials: 113,549.61 Kg CO2eq.
Waste: 1,976.25 Kg CO2eq. **-15%**
Catering: 98,347.55 Kg CO2eq. **+25%**
Accommodation: 396,981.27 Kg CO2eq. **+353.25%**
Water: 42.5008 Kg CO2eq. **+1%**

Total: 1,013,861.224 Kg CO2eq. +108.2%

United States.
Mobility: 373,375.587 Kg CO2eq. **+106.16%**
Energy: 34,322.60925 Kg CO2eq. **+45%**
Materials: 113,549.61 Kg CO2eq.
Waste: 2,673.75 Kg CO2eq. **+15%**
Catering: 110,149.256 Kg CO2eq. **+40%**
Accommodation: 158,215.68 Kg CO2eq. **+80.64%**
Water: 69.432 Kg CO2eq. **+65%**

Total: 792,355.9243 Kg CO2eq. +62.72%





El Inmortal.

Spain.

Mobility: 175,516.49 Kg CO2eq.
Energy: 4,014.29 Kg CO2eq.
Materials: 60,371.25Kg CO2eq.
Waste: 40,585.22 Kg CO2eq.
Catering: 56,426.38 Kg CO2eq.
Accommodation: 30,125.07 Kg CO2eq.
Water: 29.81 Kg CO2eq.

Total: 367,068.51 Kg CO2eq.

France.
Mobility: 261,709.88 Kg CO2eq. **+49.11%**
Energy: 4,415.719 Kg CO2eq. **+10%**
Materials: 60,371.25 Kg CO2eq.
Waste: 32,468.176 Kg CO2eq. **-20%**
Catering: 62,069.018 Kg CO2eq. **+10%**
Accommodation: 19,500.21 Kg CO2eq. **-35.27%**
Water: 32.791 Kg CO2eq. **+10%**

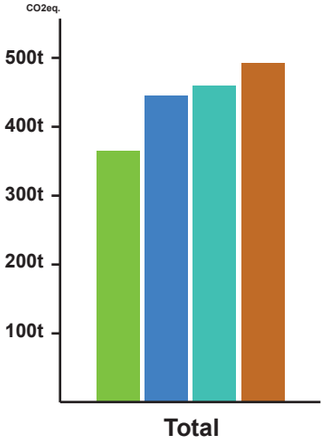
Total: 440,567.044 Kg CO2eq. +20.02%

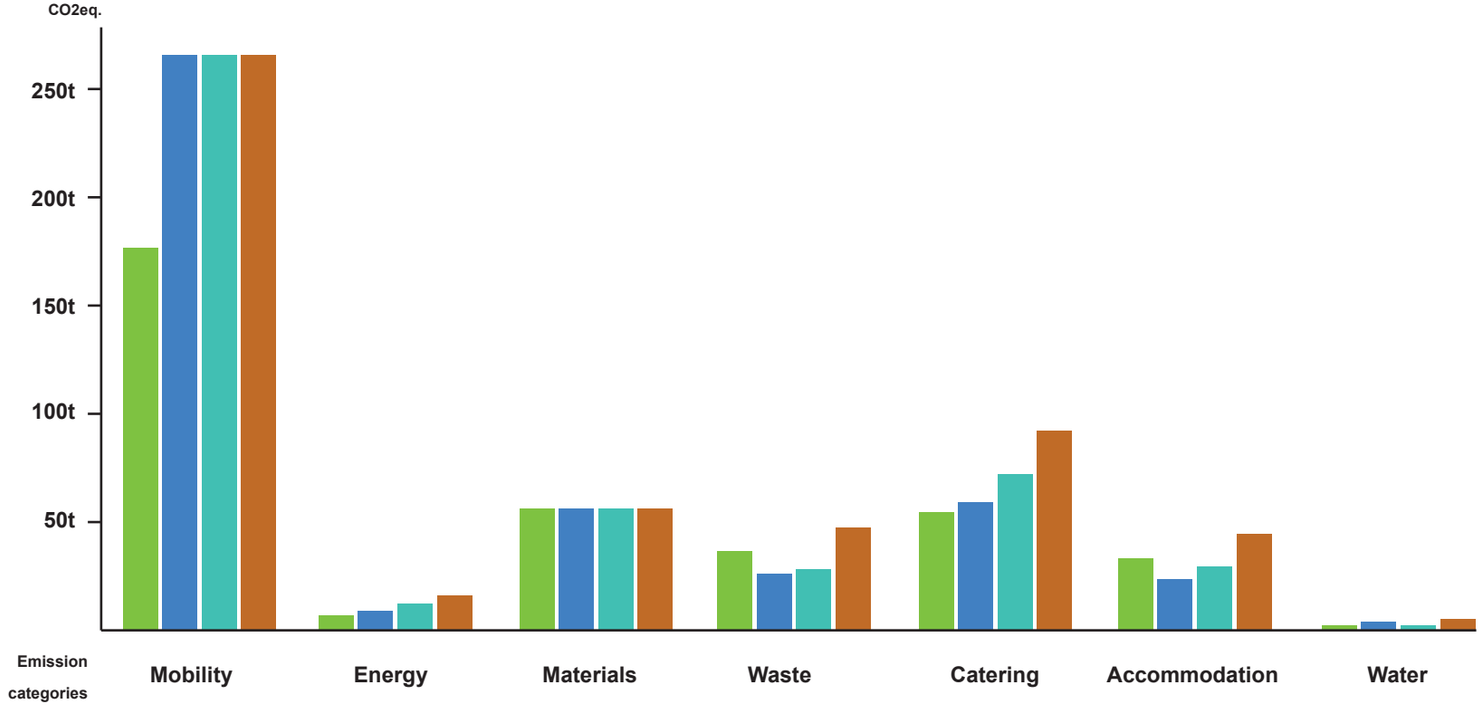
United Kingdom.
Movilidad: 261,709.88 Kg CO2eq. **+49.11%**
Energy: 5,017.8625 Kg CO2eq. **+25%**
Materials: 60,371.25 Kg CO2eq.
Waste: 34,497.437 Kg CO2eq. **-15%**
Catering: 70,532.975 Kg CO2eq. **+25%**
Accommodation: 28,662.61 Kg CO2eq. **-4.85%**
Water: 30.1081 Kg CO2eq. **+1%**

Total: 460,822.1226 Kg CO2eq. +25.54%

United Estates.
Movilidad: 261,709.88 Kg CO2eq. +49.11%
Energy: 5,820.7205 Kg CO2eq. +45%
Materials: 60,371.25 Kg CO2eq.
Waste: 46,673.003 Kg CO2eq. +15%
Catering: 78,996.932 Kg CO2eq. +40%
Accommodation: 34,583.04 Kg CO2eq. +14.8%
Water: 49.1865 Kg CO2eq. +65%

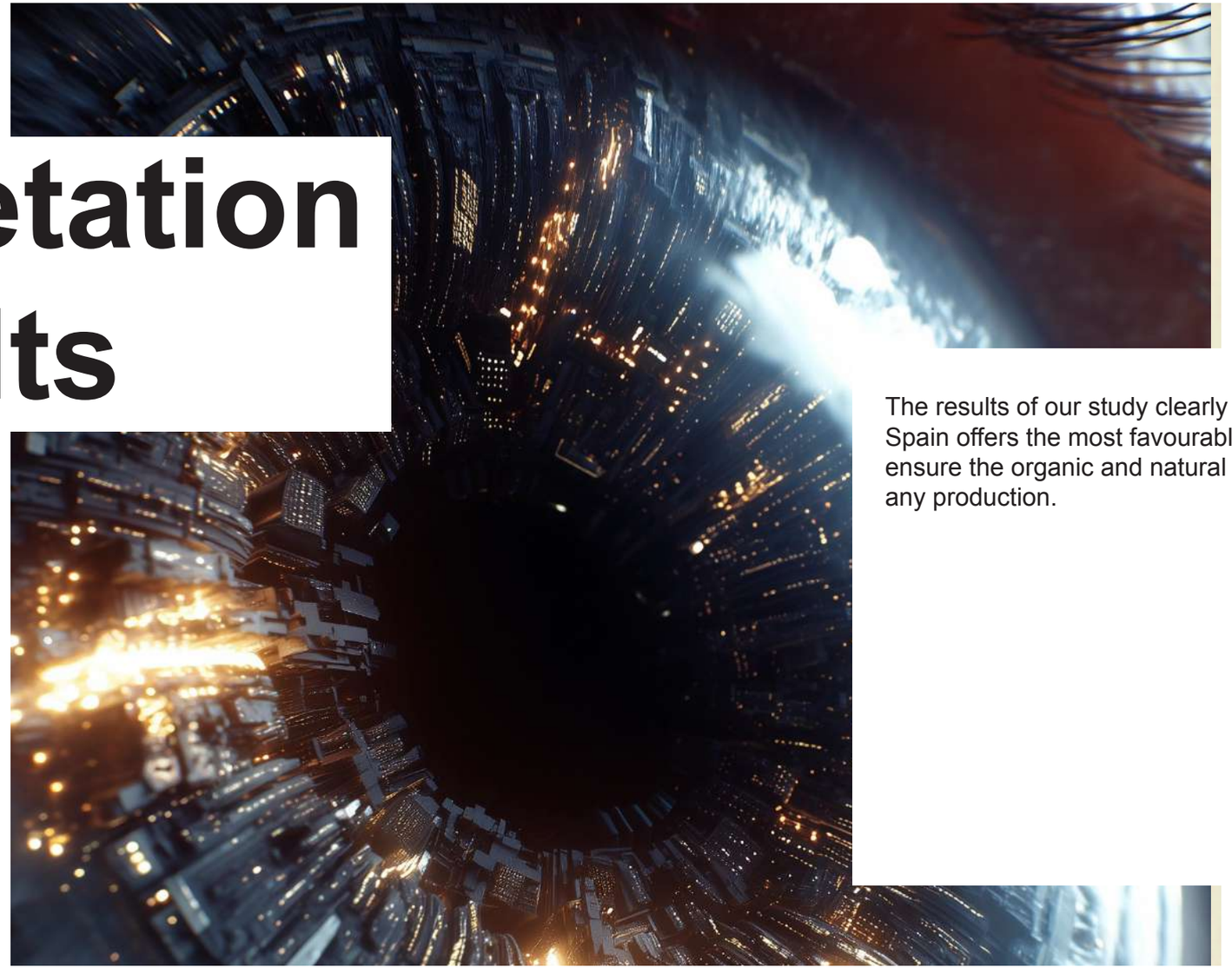
Total: 488,204.012 Kg CO2eq. +33%





06

Interpretation of results



The results of our study clearly show that Spain offers the most favourable conditions to ensure the organic and natural sustainability of any production.

In addition to any sustainability management effort- a factor not included in the study and where Spain is in a leading position, in Creast's opinion, given its wide range of audiovisual sustainability specialists (Creast is self-excluded to ensure unbiased information), in the same type of activity as Creast-, Spain's level of knowledge and experience is unrivalled by the other countries analysed.

Also valuable is ICAA's work and that of Spain's regional ministries of culture, when raising awareness and promoting sustainability amongst content producers. All public aid has been conditioned to each company's compliance with sustainability criteria, thereby rapidly increasing an interest in sustainability throughout the country and encouraging professionalism to improve sustainability in each field.

Once again based on our results and given Spain's undoubted advantage in sustainability terms, thanks to its geographical characteristics, it could be equalled in second place by France and the United Kingdom (both countries, depending on the project, alternate with the least environmental impact). France may perhaps enjoy a slight advantage over the United Kingdom, due to its better energy mix, milder climate and greater food chain sustainability. France's position drops as soon as more transport is required. This advantage is lost when transport requirements increase, as Britain is smaller and more efficient (despite a worse infrastructure).

The enormous country size of the U.S. is a great disadvantage in all categories of greenhouse gas emissions when compared to Europe. It is also weighed down by its long-standing use of road transport and dependence on fossil fuel consumption, as opposed to Europe's recent low- or zero-emission high-speed rail transport policies. The United States is the least efficient country in sustainability terms, except when the range of locations required is small but varied, as in the case of "La Unidad. Kabul", a project that only simulates two (widely contrasting) locations: the West and Afghanistan. Although the United States offers all kinds of landscapes, they are very far apart. By reducing the amount of travel, the broad range of sites available in this huge country becomes a bonus, over France and the United Kingdom, as long as the impact of mobility is reduced.

In any case, the United States cannot rival Spain, as the same range of locations are available here, but closer together and with more efficient infrastructure.

To note is that Spain's main advantage over other countries is the fact that its transport network is centralised, reducing travel distance between regions. Madrid is the key to Spain's efficiency, not only because it offers direct transport, but also because of its impact on the distribution of food, materials, etc. In fact, the backbone of France (Paris, in the north), United Kingdom (London, in the north-east) and United States (New York in the east and Los Angeles in the west) is geographically decentralised. In addition to Spain's logistical advantage, unbeatable by other countries, it offers highly efficient infrastructure, great natural, climatic and light conditions, as well as quality cuisine and local food, accommodation and services. Spain thus holds an unparallelled position and the Region of Madrid may even offer the best conditions in the world for production sustainability.

07

Conclusions

The study’s results are conclusive despite its small sample (only 3 productions were analysed), albeit with a variety of genres and characteristics strategically chosen to cover a broad range of needs.

Our analysis seeks to at least open up a line of research, which we would like to continue exploring in greater depth. The sample studied may be broadened and statistical data enriched, finding new fields of research that often come to light with accumulated data and reflections.

What is obvious and readily comprehensible is that Spain has a natural advantage that it must exploit for the good of the planet. Not only does this constitute the ultimate weapon for the entertainment sector to fight climate change, but is also good for the country: it is able to attract investment, generate wealth and accelerate social progress.

The Region of Madrid is responsible for heading this movement, reclaiming the position Spain deserves worldwide, by taking advantage of its unrivalled assets. The rest of the world must know that in Spain and in the Region of Madrid there is a solution to mitigate the environmental impact of the entertainment industry. Such a finding must become part of Spain's communication strategy when drawing film and audiovisual investment.

Nevertheless, this competitive and permanent advantage leaves open several opportunities for potential improvement:

- **Guaranteed sustainability**, officially certified as compliant with essential good practices which, together with the natural conditions covered by this study, will help audiovisual content producers vouch for the quality of their product in sustainability terms. In this regard, the Spanish Authorities are promoting the **Spanish Audiovisual Sustainability Seal (SESA)**, a quality seal that would top off Spain's efficiency.

- **Accessibility to the public grid.** Policies to facilitate the connection of film sets to the electricity grid, known in the sector as "connection to the public grid", would be a definitive solution to lower fossil fuel consumption during shoots.

- **Waste management.** To compensate Spain's inadequacy in waste management, a clear disadvantage when compared to the other European countries analysed. Solutions could improve the collection and processing of filming waste, as the best way to take on the greatest opportunity for improvement in the sector in sustainability terms.

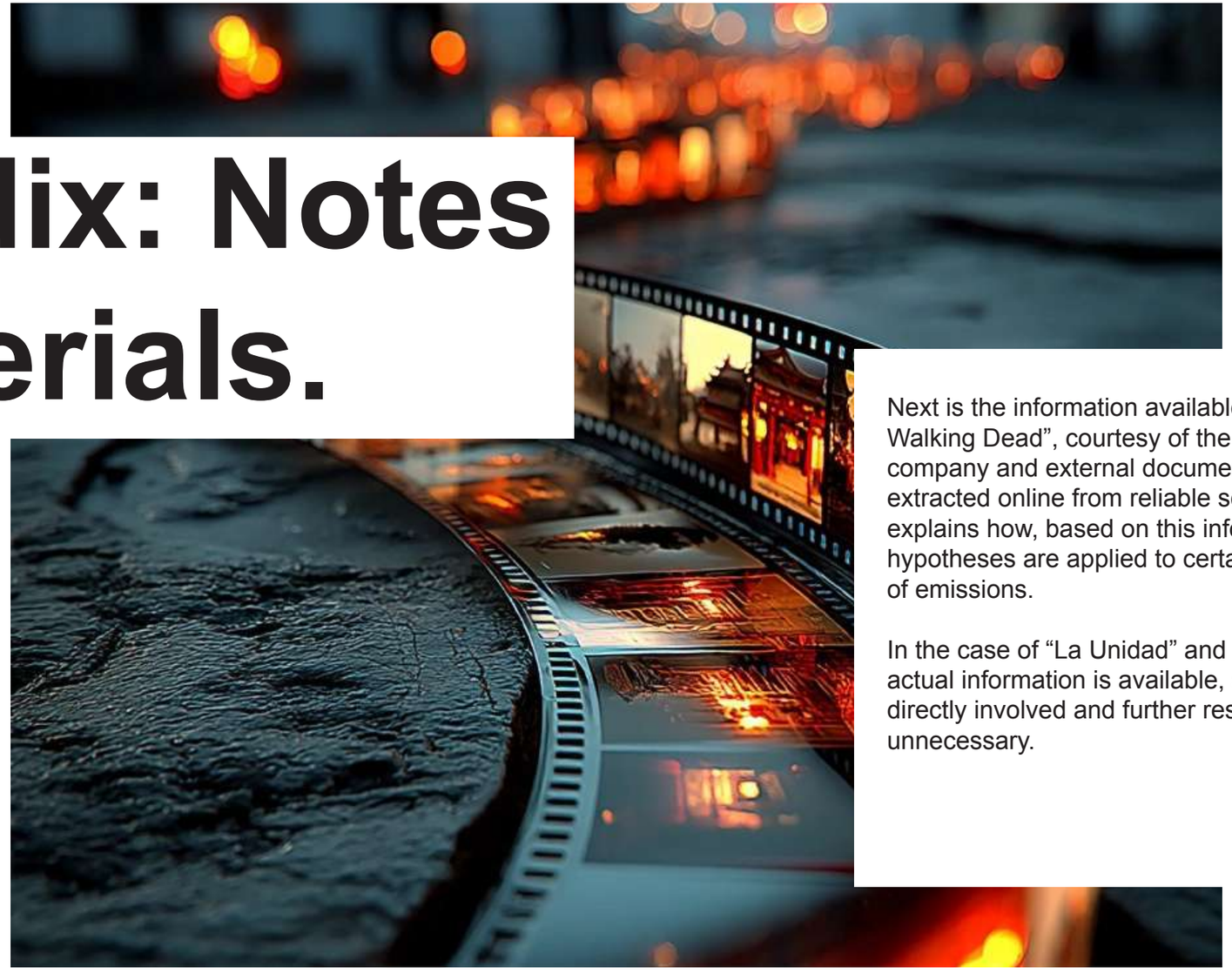
- **Range of sustainable solutions.** Encouraging the participation of sustainable suppliers with sustainable solutions, making them visible in a marketplace or directory where producers can find everything they need to improve production sustainability (along with guaranteed quality service). This would be a great step forward in positioning and generating wealth in this key and promising sector.

- **Support for sustainability management companies.** By promoting and supporting sustainability management companies, currently highly dependent on economic, social and political scenarios, procurement regulations and other factors (this emerging sector is still relatively immature), the niche would be safeguarded in order to consolidate Spain's position as a leading destination for more sustainable productions.

- **Communication plan.** Investment are needed to expand this new value proposition worldwide, placing Spain as a sustainability leader. This would increase the country's reputation beyond the audiovisual sector, adding a future-oriented profile to its national characteristics.

08

Appendix: Notes on materials.



Next is the information available on “The Walking Dead”, courtesy of the production company and external documentation extracted online from reliable sources. It explains how, based on this information, hypotheses are applied to certain categories of emissions.

In the case of “La Unidad” and “El Inmortal” all actual information is available, as Creast was directly involved and further research was unnecessary.

Filming and base: Season 3 was filmed in Spain between August 2024 and February 2025, with Madrid as the operational base (centre in Coslada) and a "road" location plan covering several Spanish regions.

Locations: 8 regions, 22 cities and 38 locations for a post-apocalyptic Spain. In addition to Spanish and English, Catalan and Galician are also used in the plot.

Crew and cast: 98% of the production crew is Spanish; 93% of the 70 actors are Spanish; 98% of the stunt performers are Spanish. New additions include Eduardo Noriega, Óscar Jaenada, Alexandra Masangkay (regulars) and Hugo Arbués, Candela Saitta, among others (recurring and guest stars).

Release date (U.S.): 7 September (AMC/AMC+). EPs: Scott M. Gimple, David Zabel, Norman Reedus, Melissa McBride, Greg Nicotero... and Spaniards Silvia Aráez and Jesús de la Vega (Ánima Stillking).

Direction/cinematography: Spanish director Paco Cabezas directs some season episodes; Wikipedia also credits Pau Esteve Birba with cinematography and confirms that filming will end in February 2025. (Data compiled and cited; pending final official credits).

Decorations and sets (construction of this dystopian world). "Replication" strategy and intelligent reuse of the city:

Madrid functions as a logistics hub and also "replicates" other cities. The production indicates that Arlabán and Cedaceros (downtown) were transformed into London with the support of decor, VFX, vehicles, costumes and art. This avoids having to move the entire unit to the United Kingdom.

Colonia del Pico del Pañuelo (Arganzuela) stood in for Barcelona for a key action sequence.

Vicálvaro hosted a pre-apocalyptic sequence with emotional weight in the backstory of one of the protagonists.

Spanish itinerary and monuments:

The shoot was announced with Madrid, Galicia, Aragon, Catalonia and the Region of Valencia as the main locations, and the local press added locations such as Bajo Aragón, Granada (Alhambra, Albaicín), Seville (Casa Pilatos, Real Alcázar), Navaluenga (Ávila) and Badalona. (Specific monuments appear in media coverage; as always, the final scenes may vary in editing).

Communities and look of this apocalyptic world:

The miniseries “Behind the Dead” (AMC) previews "new communities" in Season 3 (e.g. Fede, a community leader; Paz, a new character), which requires original sets in addition to real heritage sites: fortified squares, port/industrial enclaves, and converted religious sites, consistent with the use of doubles and the touring of several regions. (This is evident from AMC's previews and editorial notes).

Costumes (visible guidelines and props):

Functionality + layers: the franchise maintains its utilitarian logic (leather, waxed canvas, capes/ponchos, sturdy boots), now with climatic and cultural suggestions of the Iberian peninsula. In the promotion, Daryl is seen wearing sturdy work clothes (heavy shirts/Henleys, harnesses, vests or overshirts) and Carol wearing leather jackets and light capes; this is a continuation of their iconography, adjusted to the climate and environment. (Based on official images and materials from AMC/press).

Weapons/attrezzo:

Reedus commented to the press that the new season involves "several knives, a mace and a new version of this mace", in addition to the classics (crossbow, knives), which requires the design of props and rigging for the costumes (sheaths, straps, gloves).

Spanish cast:

The introduction of local characters has involved palettes and silhouettes linked to specific communities (militias, port clans, religious groups or post-apocalyptic bandits), a "culturally rich dimension" according to EPs and the showrunner when relocating to Spain.

Note: A technical dossier from the costume designer for S3 has not yet been published; the above is based on official material, promos and interviews. As soon as AMC publishes costume credits/featurettes, more detail will be provided about specific fabrics, patterns and ageing techniques.

Makeup and FX (walkers and specialities):

KNB EFX Group (Greg Nicotero) continues to lead the prosthetic makeup with a local team in Madrid. Nicotero has publicly praised the KNB and FX teams in Madrid during S3. Specifically damaged walkers (sun, saltpetre, dust) and stab wounds, consistent with the new weapons, are to be expected.

The local scale helps: thousands of Spanish extras and specialists feed the sfx-makeup process in volume (with a direct impact on the logistics of quick moulds, airbrushing and grime by region).

What specific sets have been confirmed (and are verifiable today)?

Madrid streets set-dressed as London (Arlabán/Cedaceros): signage, vehicle fleet, props and VFX for skyline; specific exteriors were shot in the United Kingdom, but the big scene was shot in Madrid.

Action sequence set in Colonia del Pico del Pañuelo as Barcelona (stunt choreography + traffic control).

Pre-apocalypse section filmed in Vicálvaro (clean and controlled set, municipal support for stunts and picture vehicles).

Rest of Spain: production and press coverage in Aragón, Galicia, Catalonia and Region of Valencia (with Granada/Seville/Ávila/Badalona as landmarks). Historic interiors and old town exteriors adapted to the after-fall are expected.

Key (verifiable) sources:

AMC (teaser, premiere, new characters, EPs, "Behind the Dead").

AMC Networks – press release on the start of production in Spain (based in Madrid; Galicia/Aragón/Catalonia/Valencia).

El Confidencial (filming summary in Spain: 8 regions, 22 cities, 38 locations; percentage crew, stunt performers and extras; Paco Cabezas).

Madrid Film Office – Interview with EP/UPM Steven Squillante (Madrid replicating London and Barcelona; Coslada; details of filming in the city).

The Hollywood Reporter (Spanish edition) – announcement of S3 set and filmed in Spain.

KNB/Nicotero (IG) – presence of makeup FX team in Madrid for S3.

Variety (clip) – reference to new weapons/props in promotional interviews (mace, etc.).

Technical Dossier on Sets – “The Walking Dead: Daryl Dixon” (Season 3). This dossier presents a technical summary of the main sets built or adapted for Season 3 of *The Walking Dead: Daryl Dixon*. It includes estimated dimensions, materials used by type and approximate logistical load, according to art and set design production standards. The figures are reasonable approximations based on public information and experience in large-scale film shoots.

Notes on calculation methodology:

Dimensions: estimated from visible sections in public locations and urban filming patterns (effective length and width).

Materials: standard quantities in metric units (m², m³, units) for art elements (signage, fencing, props, set debris).

Logistical load: calculated by adding the estimated weight of debris (density ~300 kg/m³), fencing (~8 kg/ml), containers/props (~20 kg/unit), signage (~5 kg/unit) and fake posts/streetlights (~25 kg/unit).

Data are provided for technical planning purposes only and should not be used instead of official production plans or lists.

09

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