



PackGPT



USER MANUAL



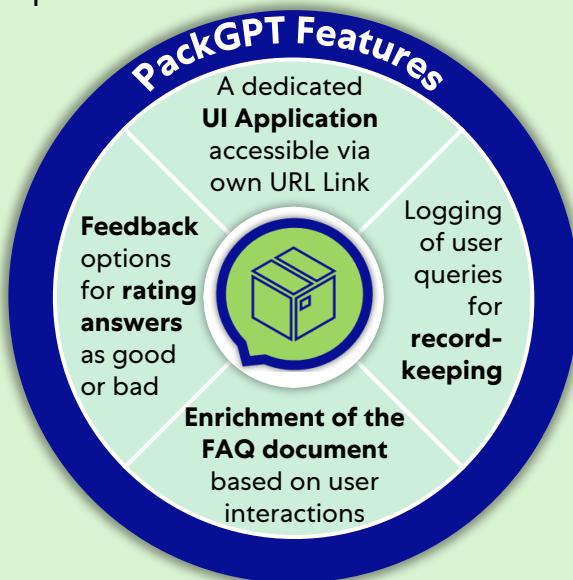
SUMMARY

BACKGROUND & GOALS

In alignment with the Sustainability Mission Program's goal of achieving carbon neutrality by 2050, Mars is committed to **enhancing visibility and transparency** throughout its **packaging value chain**.

Mars plans to develop an advanced **Smart Assistant** focused on **packaging specific knowledge**. This AI Assistant will serve as a **Conversational Chatbot**, providing detailed information on various packaging types, materials, and sustainable practices. Users will interact with the Chatbot using natural language, making it easy and intuitive to access information.

This Chatbot will be **fed with standardized, agreed documents** and could evolve into a more-advanced solution embracing structured data from ODS Data Assets (e.g., Veripack), and more advanced functionalities (e.g., Interface to manage updated, new or to be removed documents) in a later phase.



Gytis Kulbickas
SUSTAINABLE PACKAGING LEAD



Lionel Koster
CORP. TECH SUST. DT LEAD



Rajesh Kumar Ballem
CORP. TECH SUST. DT LEAD



Lee Bogner
SENIOR ENT. ARCH. LEAD. MGS



HOW PACKGPT WORKS

BACK-END PROCESS

USER-INTERACTION

1

Upload the documents.



2

Split every document into paragraphs and segments.



3

Extract images, tables and non-textual elements.



4

Enrich the model accuracy with SME's interviews.



5

The user type the question in the chatbot.



Chat with PackGPT

I'm your AI Assistant, here to help with insights on packaging. Please keep your questions within these topics and avoid personal inquiries.

Try one of the examples below or type your own prompt!

What are the Design for Circularity (DfC) Guidelines? What about reusable packaging or ESR? What are the main Packaging Challenges?

6

The AI model gathers the most relevant paragraphs to narrow the context.



7

The AI model elaborates answers (with images and tables if considered related).



8

The user can rate and comment the response. It will be used to improve PackGPT's accuracy.



Download



A PRACTICAL EXAMPLE

On Design for Circularity Guidelines

STEP 1: DOCUMENT UPLOAD

D4C methodology helps to assess our packaging portfolio and incentivize work across Design and Infrastructure axes

Design	Infrastructure
Advanced	Eliminate (Red)
Limited	Redesign (Orange)
Absent	Circular (Green) Advocate (Yellow)

Eliminate: Packaging that is likely to be recycled or scale. For a format to be classified internally as "Circular" by Mars, it needs to be designed to fit local infrastructure and the relevant recycling stream requires an existing recycling rate of 30%.

Advocate: Packaging that can technically be recycled, but the infrastructure within the market is yet to reach sufficient scale. Resulting in the need for advocacy and partnership strategies to help scale the system.

Redesign: Packaging that is not designed for any recycling system and therefore needs to be redesigned, such as multi-material flexible packaging.

Circular: Packaging that contains materials that inhibit recycling systems (e.g. plastic) and all current flexible plastic packaging formats in high leakage markets that risks ending up in nature.

Principles of Reusability

Refill: Users refill a reusable package either at home, with the use of a refill pack delivered via their door or a dispensing station (e.g. in-store/vending). Users retains ownership of the reusable package and are responsible for cleaning.

Case study – Mars Pet Nutrition / Mars Food
Mars Pet Nutrition UK launched several product lines in Asda's Refill Zones as part of a pilot. Enabling consumers to use single use plastic thrice bringing their own containers to refill from bulk dispensers in store. Mars Food let a similar pilot in France, both taking place in 2021.

Case study – Dove Beauty "Inflatable"
Buy once, refill for life. The refill use far less plastic, and the small amount used is recyclable. The small amount used is recyclable. On the case, it's designed to be brought online and used for life.

STEP 2: DOCUMENT PROCESSING AND SEGMENTATION

STEP 3: ELEMENTS RECOGNITION

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Techniques Applied

TEXT
(both paragraphs and images with text)

AZURE OPTICAL CHARACTER RECOGNITION (OCR)

IMAGES, TABLES, GRAPHS

AZURE OCR + VISUAL LANGUAGE MODEL (VLM)

OTHER ELEMENTS
(Footer, Header, Icons)

DELETE



HOW TO NAVIGATE



Get ready to embark on an exciting journey through our **PackGPT AI Packaging Chat!**



Here below **the Ingested Documents** by the first version of **PackGPT**.

D4C Guidelines



It ensures that packaging can be **reused**, **recycled**, or **composted** effectively, thereby minimizing environmental impact and promoting resource recovery. It encompasses various stages, including specifying the packaging format, designing according to sustainability criteria, and testing with trusted partners to validate compliance.

Iso Standards



It provides guidelines for environmental labels and self-declared environmental claims, also known as Type II environmental labelling. It sets requirements for these claims, including how they should be evaluated and verified.

Claims Packaging Addendum



It provides guidance on making sustainability claims for Mars packaging, focusing on recycled content and recyclability. It sets targets, and explains acceptable claims based on content traceability and recycling design. It covers substantiation and legal requirements, local infrastructure compatibility.

Claims Protocol



It outlines the review process, criteria for making claims, and the necessary substantiation required to ensure that claims are credible, truthful, and not misleading.

Waste Infrastructure



It covers Waste Management and so an overview of the circular economy, realities of waste management infrastructures and an introduction to the EPR schemes.

Sustainability Packaging 101



It explains Extended Producer Responsibility (EPR), where producers bear the costs of recycling and waste management for packaging, promoting more sustainable practices. Examples like Belgium's system illustrate EPR's financial impact as it expands globally and within the U.S.



HOME PAGE

Hello, Lara!



Welcome to PackGPT!

A smart virtual assistant ready to help you with packaging and sustainability-related topics

B Start New Chat



Watch Video Tutorial



Read User Manual



In alignment with the Sustainability Mission Program's goal of achieving carbon neutrality by 2050, Mars is committed to **enhancing visibility and transparency** throughout its **packaging value chain**.

Mars has developed an advanced **Smart Assistant** focused on **packaging specific knowledge**. This AI Assistant **will serve as a Conversational Chatbot**, providing detailed information on various packaging types, materials, and sustainable practices. Users can interact with PackGPT using natural language, making it easy and intuitive to access information.

PackGPT's knowledge base:

D4C Guidelines

Sustainable
Packaging 101

ISO Standards

Waste Management
Infrastructure

Claims Documents

Keep in mind!

Ask questions only on Packaging and Sustainability, as PackGPT is trained on five D4C-related documents, and off-topic queries may yield irrelevant answers. Detailed questions enhance response accuracy.

While PackGPT aims to provide reliable information, please verify critical details with trusted sources.

Your feedback is valued! Rate each response to help us improve PackGPT's accuracy.

A

Profile Information

From here the user can log-out.

(In the second phase, a Notification Button and voice-activated access to PackGPT will also be available next to this button).

B

Three top button

Start a New Chat will directly conduct the user to Interactive Smart Chatbot to ask questions about packaging.

Watch Video Tutorial – short video that illustrates the purpose of Artificial Intelligence, PackGPT and it could be developed in the future, as well as its main functionalities.

Read User Manual – download of this User Manual

C

Documents Library

This is the list of documents ingested by PackGPT.

On the Main Page (page 5), the Library provides options to download documents locally to the user's computer and to contact the respective Subject Matter Expert (SME) for additional insights if PackGPT's responses are not fully comprehensive. On the right Useful tips and best practice on how to use PackGPT.



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≡ Your GenAI assistant

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LG ▾



PackGPT

Chat with PackGPT

I'm your AI Assistant, here to help with insights on packaging. Please keep your questions within these topics and avoid personal inquiries.

Try one of the examples below or type your own prompt!

What are the Design for Circularity
(D4C) Guidelines?

What about reusable packaging in
B2B?

What are the main Packaging
Challenges?

Feel free to ask me anything about packaging! How can I assist you?

PackGPT is designed to assist you, but double-check important information.



Start a New Chat

A

It allows the user to begin a conversation with the AI PackGPT Assistant. When clicking on this button, the user'll be taken to a new screen where will be able to ask questions or share information about Packaging and Sustainability. The AI will respond in real-time, providing accurate answers and relative images, if any.

User Guide

B

Helpful tips and best practices for using PackGPT are available in this section.

Start New Chat

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Hello, Lara!

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Gen AI & Technologies used

Generative AI (Gen AI) refers to artificial intelligence models capable of generating human-like text, images, and other forms of content by leveraging vast amounts of data and sophisticated algorithms. OpenAI plays a key role in advancing Gen AI with its large language models (LLMs), which can process and generate coherent, context-aware responses. These models are accessible through APIs, allowing developers to seamlessly integrate AI capabilities into applications, websites, and chatbots.

What is PackGPT?

PackGPT is an advanced Smart Assistant designed specifically for packaging-related knowledge. Acting as a conversational chatbot, this AI Assistant provides detailed information on various packaging types, materials, and sustainable practices. Users can interact with the chatbot using natural language, making information access both easy and intuitive. Additionally, Mars users will have access to the same comprehensive repository of documentation, ensuring PackGPT provides a unified base of knowledge about sustainable packaging.

User Manual

Contact the Expert

The first button to download the User Manual, beneficial for users who want to revisit specific functionalities later on. The second button to directly contact Gytis Kulbickas, the expert of Packaging and PackGPT tool.



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Documentation Library

C

In this section the user can find PackGPT knowledge base, so the source of the documents ingested in the model as well as the contact information of the document owner/topic expert or additional information.

Welcome to PackGPT Library!

This section offers a list of downloadable documents ingested by PackGPT, along with the option to directly contact document experts.



Download D4C Guidelines >

Contact the Expert >



Download ISO Standards
document >

Contact the Expert >



Download Claims
documents >

Contact the Expert >



Download the Sustainable
Packaging Transcript >

For more info: <https://mars.e...> >



Download the Waste
Management Transcript >

For more info: <https://mars.e...> >

Users can download the corresponding document and have it on their computer, contact the topic expert via email, and explore suggested links for further information.



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D

History

In this section, all past questions asked to PackGPT are recorded in chats and organized by topic. Once a chat is saved, users can rename it, mark it as a favorite, or delete the entire conversation. The conversational history is preserved, ensuring that users can access their past interactions each time they log in.

★ Favorites

History

What are the Design for Circu...

Rename
Delete
Save as Favorite

★ Favorites

History

What about reusable packagi... ...

What are the De...
Rename
Delete
Save as Favorite

★ Favorites

What about reusable packa...

History

What about reusable packagi... ...
What are the Design for Circu...

Conversation saved to favorites!

E

Go-Back to the Homepage

By clicking on this icon, the user is able to go back to the Initial Homepage (illustrated at page 4)



STEP-BY-STEP EXAMPLE

Now, it's time to dive in! Follow these simple steps to start your journey with PackGPT.

Before exploring a specific topic, let's begin by asking: What is PackGPT?

PackGPT is a knowledgeable assistant specializing in sustainable packaging. It provides insights and guidance on packaging sustainability, focusing on areas such as recyclable design, material selection, and regional waste management infrastructures. PackGPT leverages detailed guidelines and protocols, like the D4C Guidelines, to help companies design packaging that fits local recycling systems and promotes a circular economy. It also emphasizes the importance of collaboration with local governments and industries to improve waste management infrastructure, ensuring that sustainable packaging can be effectively recycled or composted at scale.

1

Show PDF

Download

Feedback

The user interacting with PackGPT is invited to rate the accuracy, completeness, and consistency of the answers. The ratings are collected in a database and will be used to continuously improve the AI chat's performance.

Thumb-Up

Why did you choose this rating?

(Optional) feel free to add any details

Submit

Thumb-Down

Why did you choose this rating?

Wrong metric or data source referenced

The reference is not updated

Visual is incorrect

Missing information

Didn't fully follow the instructions

Other

(Optional) feel free to add any details

Submit



Your rating has been successfully submitted!



STEP-BY-STEP EXAMPLE

Let's put PackGPT to the test and see how much it knows about packaging! The following question could be: What are the most recyclable materials?

LG what are the most recyclable materials?



The most recyclable materials, based on the provided context, are glass, steel, and aluminum. These materials have straightforward recycling processes and high recycling rates. Glass can be collected through bring points or commingled bins and sorted by color, with high-quality yields. Steel and aluminum are efficiently sorted and recycled, often achieving high recycling rates due to their ability to be recovered from incineration ashes. Aluminum beverage cans, in particular, can return to food-grade applications when collected through deposit systems.

For plastics, PET beverage bottles have the best recycling outcomes, often returning to food-grade applications. However, other types of PET, PE, and PP face more challenges and are less commonly recycled back into food-grade materials.

2

Paper, especially corrugated cardboard, also has a high recycling rate, although the quality of recycled paper can vary depending on the collection system.

Answer based on D4C Guidelines, pages: 138

Answer based on ISO Standards, pages: 39

Download

Show PDF



Citations

At the bottom of each answer, PackGPT provides the official documents used to generate the response. However, it is important to note that PackGPT may also incorporate information from other unofficial sources (such as Gytis' interview), which are not cited as references.

By clicking on “**Show PDF**” the users can view the cited pages (in this case page 138 for D4CG and page 39 for ISO Standards document), zoom in and zoom out as well as download the respective pages locally on their computer.

LG what are the most recyclable materials?

D4C Guidelines PDF

Page 138

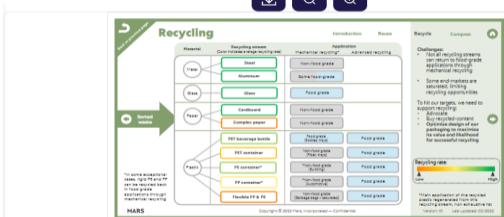
Download

Search

Zoom

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For plastics, PET beverage bottles have



ISO PDF

Page 39

Download

Search

Zoom



STEP-BY-STEP EXAMPLE

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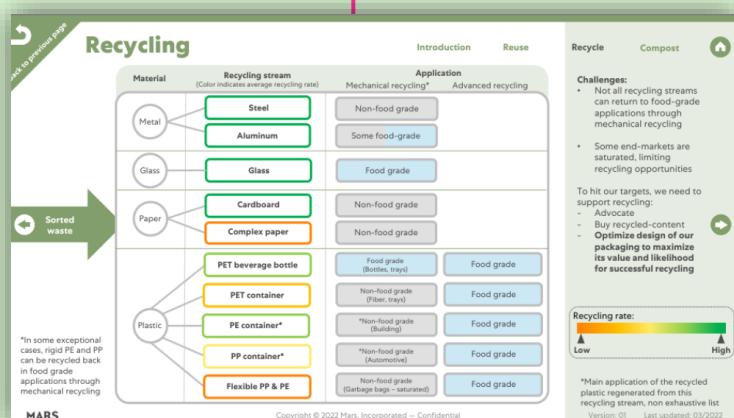
[Download](#)

[Show PDF](#)



Relevant image

At the bottom of each answer, PackGPT displays the most relevant picture, chosen for its high similarity to the question and for meeting a similarity threshold set in the back-end code. In this case, the image illustrates the list of materials and their recycling processes. Users can click on the picture to enlarge it.



Download

By clicking the 'Download' button, the user can locally download the answer text.



STEP-BY-STEP EXAMPLE

So far, so good! Furthermore, if the user is intrigued by a particular topic and wants to explore more, PackGPT can provide additional information or links, when available (depending on the topic). This allows the user to continue their research with external resources.

3

Certainly! Here are some additional links that you can explore for more information on sustainable packaging and related topics:

- **REDCert Certification Schemes:** Learn about certification schemes for sustainable biomass, biofuels, bioliquids, and sustainable agricultural raw materials.
[REDCert Certification Schemes](#)
- **Mass Balance Approach in Feedstock Substitution:** Understand the benefits and methods of the Mass Balance Approach to foster sustainability in existing infrastructure.
[Mass Balance Approach](#)
- **Recyclability Claims Substantiation Airtable:** View a grid on packaging format and structure for various countries.
[Recyclability Claims Substantiation Airtable](#)

Feel free to explore these resources for more detailed information on sustainable packaging practices

The screenshot shows a web browser displaying the REDcert website at <https://www.redcert.org/en/>. The page features a large circular collage of images related to sustainability and biomass. The text on the page includes:
Your partner for sustainability certification
Home About us Schemes Trainings Events Media center Contact
REDcert
We offer you certification schemes for sustainable biomass, biofuels and bioliquids as well as sustainable agricultural raw materials for use in the food and feed industry as well as biomass for material purposes bzw. material purposes for the chemical industry.
United States | Sustainability
The Mass Balance Approach in Feedstock Substitution
In its transition towards a circular economy, BASF is increasingly using recycled or renewable raw materials as alternatives to fossil resources at the beginning of its value chain. The alternative feedstocks are attributed to downstream products via the mass balance approach. While mass-balanced products keep all product properties unchanged compared to their conventional equivalents, they contribute to the substitution of fossil resources in BASF's production process and may have a smaller product carbon footprint than their conventional equivalent.



STEP-BY-STEP EXAMPLE

What happens when we venture beyond PackGPT's knowledge base? Let's put it to the test and ask about specific regulations in Japan!

LG Can you tell me what are the sustainability regulations in Japan?

PackGPT I'm sorry, but I'm unable to provide an answer at this time.

4

Like Dislike Download

"I'm sorry, but I'm unable to provide an answer at this time"

When a user's question is out of scope, PackGPT cannot find semantic similarities in the text or images extracted from the documents and, as a result, does not generate a response. However, if the question was actually covered in the documents ingested by the PackGPT model, the user is encouraged to rate the response as negative.



LIMITATIONS

While PackGPT is a powerful tool for providing information on packaging and sustainability, there are certain limitations that users should be aware of to set realistic expectations:

Accuracy Not Guaranteed at 100%



While PackGPT aims to provide accurate and reliable information, the **deterministic nature of the model** means that its responses are not always perfectly precise or comprehensive. In cases where the data source has ambiguities, or if the question involves complex judgment, PackGPT may struggle to achieve complete accuracy. Users are encouraged to verify critical information, reformulate the question or consult primary sources or experts when precision is essential.

Fixed Knowledge Base



PackGPT relies on a **specific set of documents** and sources that have been carefully selected and ingested into its knowledge base. Because it does not learn dynamically or adapt based on new, real-time information, it may lack accuracy when dealing with rapidly evolving fields or with information not included in its initial training data.

No Self-Correction or Learning



Unlike some AI systems that adjust based on user interactions or learning algorithms, PackGPT does not self-correct over time. Any errors or inaccuracies will persist until a formal update or adjustment to the underlying model and database is made. Therefore, **feedback from users is crucial** but will not result in immediate corrections.