SecREEts Citizen Lab

SecREEts

Secure European Critical Rare Earth Elements

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 776559

PUBLIC

Ellesmere Port, Cheshire, Holiday Inn
27 April 2022

Led by Prospex Institute
With Less Common Metals Ltd and SINTEF

About SecREEts

SecREEts is a project receiving funding from the European Commission Horizon 2020 programme for research & innovation. It aims to establish a secure and stable supply of Rare Earth Elements (REEs) in Europe, using sustainable extraction methods from European apatite sources used in the production of NPK fertilisers. SecREEts partners are developing pilot processes for a sustainable extraction, separation and manufacturing of REEs to create permanent magnets for application to areas such as electric vehicles, industrial motors, wind turbines, with replication potential in consumer products or medical equipment. The main objective of SecREEts is to set up a new integrated European value chain for extraction, refining and production of REEs.

SecREEts partners are:
SINTEF AS – Norway – Coordinator
Yara International ASA – Norway – Industrial pilot
REEtec AS – Norway – Industrial Pilot
Less Common Metals Ltd – UK – Industrial Pilot
Vacuumschmelze GMBH & Co kg – Germany
Quantis – Switzerland
Institut National de l'Environnement et des Risques INERIS – France
Prospex Institute vzw– Belgium

Please find all relevant information and latest updates on the project website: www.secreets.eu

Citizen Engagement in SecREEts

As part of the SecREEts Public Engagement strategy, Prospex Institute organises regular Citizen Labs, to engage local communities in areas where industrial partners are established. Through identifying civil society organisations, media groups, political parties and public authorities, Prospex Institute facilitates discussions between local communities and industrial partners to highlight challenges and opportunities related to SecREEts throughout the whole duration of the project. The outputs of these meetings allow SecREEts to co-create a level of social awareness around the project and incorporate local stakeholders' feedback into future developments.

The final Citizen Lab in Ellesmere Port (Cheshire, United Kingdom) took place on 27 April 2022, following the second UK Citizen Lab in February 2021. After COVID-19-related restrictions were reduced, this year's meeting was held in person in the Holiday Inn, Ellesmere Port.

Together with Less Common Metals (LCM) and SINTEF, Prospex Institute presented the outcomes of SecREEts in Ellesmere Port to a group of local stakeholders from Cheshire and Ellesmere Port. The project team delivered brief presentations and conducted an exercise to evaluate stakeholder engagement activities throughout the project. The workshop was organised around group discussions, interviews and a visit to the LCM site to show participants the results of the SecREEts projects and the future steps of LCM in Ellesmere Port.

For this event, Prospex Institute worked with LCM to complete the mapping of relevant local stakeholders carried out for the first Citizen Lab. Overall, 46 stakeholders were mapped based on categories and quotas defined together with LCM, for a balanced group of stakeholders as illustrated in the table below.

Following an invitation process in several rounds, Prospex Institute received registrations from 7 stakeholders.

Table 1 - Stakeholder Quotas

	Actual
Civil Society Organisations	
Community-based associations	2
Academia and Education	2
Political Parties	1
Local influencers	
Local Media	0
Local elected officials	1
Local councils and public services	1
Business-related organisations	
Business organisations	2
Trade unions	0
Gender	
Male	*3*
Female	*2*
Age	
16-30	0
30-60	1
60 and older	3

In accordance with the EU General Data Protection Regulation, participants were requested to fill in a registration form online ahead of the event, with personal information and consent for the sharing of their personal data among SecREEts partners and permission for us to take pictures and use them as part of SecREEts communication activities. A recording of the meeting was performed for internal note-taking purposes only. To ensure transparency, participants were explained at the start of the Citizen Lab that the meeting is public, and information presented by the SecREEts team during the event can be shared externally.

List of Abbreviations

CMA: Critical Mineral Association
EU: European Union
LCA: Life Cycle Assessment
LCM: Less Common Metals
PI: Prospex Institute
RE: Rare Earths
REE: Rare Earth Elements
UK: United Kingdom
VAC: Vacuumschmelze

Agenda and discussions

1 – Welcome & Introduction

Carolyn Brand from Prospex Institute (PI) and lead moderator of the Citizen Lab opened the session by thanking all participants for their time and introduced the PI team. Ian Higgins, Managing Director of Less Common Metals (LCM) followed by welcoming participants and introduced the LCM team.

Carolyn Brand then introduced the Citizen Lab, stating that this workshop would focus on giving insights on what has been achieved in the SecREEts Project. She highlighted the importance of this specific Citizen Lab, as it was going to be the last one organized by SecREEts in the Ellesmere Port area and explained that this represented an important milestone not only from the engagement point of view, but for the whole project and for LCM in particular.

Carolyn Brand then provided an overview of the house rules, explaining that the session was a public meeting and that all participants are free to communicate about the meeting for this interactive session. She then gave the agenda of the day.

2 – Outcomes of the SecREEts project – w*ith Arne Petter Ratvik, SINTEF*

After a first introduction, Carolyn Brand introduced the first session in which participants heard about what happened over the past four years in SecREEts.

Arne Petter Ratvik, Senior Scientist at SINTEF and SecREEts Project Leader, took the floor and after introducing himself he briefly discussed the recent events (COVID-19, travel restrictions) that challenged the engagement activities as well as the overall continuation of the project. Arne Petter Ratvik presented an infographic with project results, giving an overview of the SecREEts achievements. The infographic can be found in the Annex.

3 – LCM's achievements in SecREEts – *with Vipin Pradeep & Sean Bennett LCM*

After hearing what has happened in the previous years, participants had a closer look at LCM's achievements in SecREEts, starting with a short video.

A capture of the video summarising the main outputs of LCM

At the end of the video, Carolyn Brand introduced Clara Boissenin from PI who interviewed Vipin Pradeep (Process Engineering) & Sean Bennett (Engineering Manager from LCM.

Interview with Vipin Pradeep & Sean Bennet

Clara Boissenin (PI) conducted an interview with Vipin Pradeep and Sean Bennett. The overarching objective of the interview was to understand the major outcomes and successes of LCM after four years of SecREEts. The following questions were asked.

Question for Sean Bennett: How did you set-up the electrolysis (metal making)?

Answer: We started the new process in 2017 with a trip to China to learn more about the process to produce the alloys and over the years we refined the procedure and made it highly efficient.

Question for Vipin Pradeep: Can you explain what data capture is?

Answer: The electrolysis process to make metals is extremely complicated and involves different kinds of variables. To make the metal, the fluorine and oxide material need to be well measured and understood. Hence, the purpose of the data capture process is to understand how these variables behave and can be changed by the operators to make the metal process more efficient. These variables include (not exclusively) current, voltage, conductivity, temperature, federated, feed frequency, gases, etc.). The data capture system incorporates many of these variables on to a screen for operators to see as well as indicate when certain parameters are drifting out of range, so actions can be taken to resolve any issues with the production process.

Question for Vipin Pradeep: Could you tell us more about the gas that is generated during the metal making process?

Answer: When we produce metals, HF gas is released. LCM's main goal is not only to have a modern and efficient process but to ensure the well-being and safety of all the employees. We developed safety measures by designing an elaborate system to keep the employees safe and reduce environmental impacts.

Question for both: What was the most rewarding part of SecREEts?

Sean's answer: The most rewarding aspect of SecREEts was to see the new equipment installed and used successfully. Seeing the machine working properly after designing the process with the entire team was a big satisfaction.
Vipin's answer: The satisfaction of optimising, solving problems and producing metal with a highly efficient process and ensuring the safety of the operators and the environment. Seeing the design and the digital process coming to life in the industrial LCM environment was quite pleasing.

4 –Recap of local community engagement – *with Georgia Macey LCM and Clara Boissenin PI*

Carolyn Brand introduced this session to participants by referring to the regular interaction that LCM and SecREEts had with local communities in Ellesmere Port and Chester over the past four years.

Clara Boissenin (PI) took the floor and presented the achievements in terms of community engagement in the past years within the SecREEts project. She explained that this was the 7th Citizen Lab within the project, and the third one in Ellesmere Port. The first one took place in January 2019, and the second one happened online due to Covid restrictions in February 2021, followed by "school labs" in November 2021. In the meantime, other activities were organised, based on the feedback received by the local community as part of the Citizen Labs.

Georgia Macey from LCM started by mentioning that LCM engaged 200 people throughout SecREEts lifetime, ensuring they understood what the project meant, also on a bigger scale. Over the past years, LCM was able to engage with individuals from different age ranges – as little as 9 years old up to 70 years old, thanks to museums, universities, and schools.

LCM worked closely together with Prospex Institute to make sure feedback from Citizen Labs was taken into account. For instance, upon suggestion from local stakeholders, LCM and Prospex Institute worked together with Xplore! Science Museum to deliver workshops to children to teach them about the rare earth & permanent magnet value chain in the SecREEts project. The workshop targeted local schools and about 120 children were engaged (9 to 11 years old). One of the difficulties of these activities consisted in finding ways to explain in an easy manner the challenges of the rare earth value chain in SecREEts to children.

Other activities included visits of the local Member of Parliament to the LCM site, resulting in media coverage as well as new connections made on a national level. LCM also gave different talks and seminars, for instance at the Knutsford Science Bar and the University of Chester.

At the end of this session, an evaluation exercise moderated by Carolyn Brand and Clara Boissenin from PI was carried out. Participants gathered in groups of 2 or 3 and were asked to reflect on the engagement activities and to fill in an evaluation form with three questions. (Answers in “Evaluations”)

- *Have you been involved in any of the activities mentioned by Clara and Georgia?*
- *In what you heard just now or in activities you attended, what do you think has been the most valuable for the local community?*
- *What would have been your suggestions to improve the process of engaging the local community? Or what would you have done differently/in addition?*

After having let everyone discuss with their neighbour(s), Carolyn Brand brought everyone back in plenary and asked each group to share their thoughts and participants were encouraged to react to each other’s points and share their questions. Clara Boissenin took notes of the points on a flipchart.

Small group discussions on evaluating the engagement activities

The main aspects that came out of the discussion can be summarised as follows:

- *The **school workshops** are the **most valuable activities,** making children aware of such topics is vital.*

- ***Educating children can be highly powerful**, as they can then bring that knowledge home and **share it with others.***

- *School engagement activities should be carried out on a **national level.***

- *It is important to keep on involving schools and make **partnerships with local authorities** and try to upscale engagements activities also in universities.*

- *It would be **very beneficial to have more children and students have this opportunity** and make the link on **how it connects to the climate emergency** and the challenges we face.*

- *Establish a **connection between universities and the industry** and create links with possible career opportunities and find ways to make technical and engineering sciences more attractive.*

- *Importance of **engaging different age groups,** including individuals that might want to change their careers or transfer from different fields, and how to transfer skills and knowledge.*

- *Given the limited lifetime of the project, and the importance of **continuation of engagement with local communities beyond the lifetime of SecREEts,** try to involve more industries in the local community*

- ***Raise profile of these projects** and companies by connecting with libraries or bookstores, displays on public spaces to reach people living in the area*

At the end of the sessions all evaluations forms were collected by Clara Boissenin from PI.

5 – LCM after SecREEts – *with Jeff Townsend CMA & Ian Higgins LCM*

During this session, Carolyn Brand (PI) conducted two brief interviews with Jeff Townsend (CMA) and Ian Higgins (LCM). The topics covered included the UK Net-Zero Strategy, the role of LCM in the transition to this net-zero strategy and the role of LCM to counteract the predominance of China in the REEs global market:

Interview with Jeff Townsend

Jeff Townsend is the founder of the Critical Minerals Association (CMA). CMA aims to ensure secure and sustainable critical mineral supply chains.

Three key questions were asked:

- What is the UK Net-Zero Strategy?
- How can we secure the supplies of critical REE?
- What role can LCM play to help the UK to underpin the Net-Zero strategy?

Mr Townsend's main points are summarised as follows:

- Seven out of ten points of the UK Net-Zero Strategy heavily depend on REE.
- Securing the supply chain is critical to ensure the UK achieves the goals of the Strategy.
- LCM is a key player, with a unique position in the Western society, to counteract China's predominance on REE's market.
- Increasing exploration and exploitation will be needed in Africa and South America in the next years.
- Cost-efficient solutions are needed to make the UK competitive against China.

Interview with Jeff Townsend

Interview with Ian Higgins

Ian Higgins, Managing Director of LCM, joined the company in 2001. Ian has a long-standing experience in the rare earth supply chain and the metals industry in general.

Carolyn introduced Ian Higgins and asked him to build over what Jeff Townsend had presented. In particular, Carolyn enquired regarding the role of LCM in the future of the REE supply chain and the achievement of UK Net-Zero Strategy.

The main points of the conversation can be summarised as follows:

- LCM aims to improve in-house procedures and regulations as much as possible (environmental standard, treatment of the metals, health & safety) and increase efficiency to be competitive against China.
- New REE projects must be found in Africa and South America to secure a competitive source of raw materials and build up the capacity of securing the supply chain for the UK and Europe.
- Strategical alliances need to be built (e.g., with Canada, Australia)
- The UK should strengthen its reputation as an industrial player and make sure that they are part of the international competition for REE. LCM has a key role to play in this.

Ian Higgins - LCM Managing Director

7 – Conclusions & Wrap up

Carolyn Brand wrapped up the Citizen Lab by thanking all participants for attending. On behalf of SecREEts, Arne Petter Ratvik followed thanking everyone for their inspirational words. Ian Higgins welcomed participants to the LCM site visit in the afternoon.

LCM Guided Tour in small groups

Evaluations

1- Evaluation of this Citizen Lab workshop

Participants were sent a link to an online evaluation form at the end of the meeting. These forms are designed to help the SecREEts team get feedback on each workshops in order to improve future engagement activities.

Here is a full overview of the questions and the participants' aggregated responses. We received 3 completed evaluation forms in total.

1. How do you rate the Citizen Lab in general?

Please mark:	5 – Very good	4 – Good	3 – OK	2 – Bad	1 – Very bad
Number of answers	1	2			

Comments:

- Well organised and formative
- More people from the local community might be nice

2. How much did this lab help you understand challenges related to Rare Earth Elements?

Please mark:	5 – Very much	4 – Much	3 – Somewhat	2 – Little	1 – Very little
Number of answers	2	1			

Comments:

- I have some understanding, but this enabled me to have up to date information
- The supply chain issues were illuminating

3. How much did this lab help you understand about what the SecREEts project has done in Ellesmere Port so far, and what it will do next?

Please mark:	5 – Very good	4 – Good	3 – OK	2 – Bad	1 – Very bad
Number of answers	1	2			

Comments:

- I was involved with the project in the initial phases, it was good to see the progress and conclusions

4. How much were you enabled to contribute to the discussion?

Please mark:	5 – Very much	4 – Much	3 – Somewhat	2 – Little	1 – Very little
Number of answers	2		1		

Comments

- I have an understanding, so it was easy for me to interact

5. If you joined us on the field trip to LCM, how would you rate the site visit?

Please mark:	5 – Very good	4 – Good	3 – OK	2 – Bad	1 – Very bad
Number of answers	2		1		

Comments?

- Well organised lunch and site tours
- I didn't join (person who answered OK)

6. Were you satisfied with the offer and quality of food?

Please mark:	5 – Very good	4 – Good	3 – OK	2 – Bad	1 – Very bad
Number of answers	1	1	1		

Comments?

- Thanks to everyone involved with the Lab and site visit
- I was only there for a bit in the hotel and had coffee which was lovely

2- Evaluation of the full local engagement by SecREEts

1. ***Have you been involved in any of the activities mentioned by Clara and Georgia?***

Answers from the forms:

- *NO*
- *All of them.*
- *Met with Justin Madders MP*
- *I have been involved in previous Citizen Labs but not in any other activities*
- *No, but a former Engineer at LCM so awareness of RE industry*
- *LCM Sponsor Catalyst*
- *Yes, School engagement*
- *Citizen Labs*

2. ***In what you heard just now or in activities you attended, what do you think has been the most valuable for the local community?***

Answers from the forms:

- *School engagement, would love to see this rolled out at a national level*
- *school workshops (potential to work together)*
- *Creating awareness of what is available in terms of REE industries*
- *Engaging with school-age children*
- *The workshop organised for the school children are hugely beneficial for them to firstly understand and have knowledge of how the permanent magnets are made and used in various applications. As well as engaging with the local community for them to be more relatable with the industrial process and applications.*
- *Promoting awareness of RE. Opens a path that maybe hadn't been considered*
- *Xplore children workshop*
- *The school engagement! Linking children with business, showcasing local industries*
- *School engagement; - local awareness; - inspiring young people into a STEM career; - business engagement*

- *Better Knowledge of neighbourhood industrial activities. Knowledge dissemination related to RE magnets. Educational efforts.*

3. ***What would have been your suggestions to improve the process of engaging the local community? Or what would you have done differently/in addition?***

Answers from the forms:

- *If cost wasn't an issue, it would be important to expand to a wider audience, could it go national? Hopefully*
- *Expanding to other school*
- *Choose students that are very interested in the subject to visit LCM. Create a tour of LCM for them. An avenue for older children to pursue career option opportunities*
- *Try to produce leaflets/brochures for the local community to first of all understand the purpose of the project and try to engage more with the LCM and other partners*
- *Next step for interested parties, e.g., site visit or further awareness sessions. Career awareness for school leavers age to highlight opportunities in industry.*
- *Do regular update workshops for all age groups*
- *Continuing engagement with communities. Don't stop here!*
- *Working with my business in the Ellesmere Port industrial areas. Work experience opportunities for year 10, Cheshire College South-West, University of Chester. Anything from 2-week/5-week placements. Engaging with local educational establishments, increase profile by hosting activities at Ellesmere Library, Brio Leisure, Cheshire Oaks, Chester City Centre/Storehouse. Enhance local and visitor experiences.*
- *Possibility to engage more of the industrial companies locally (industrial citizens day). Include all partners also in local events- higher benefits for the partners*

ANNEX: Outcomes of the SecREEts project – Arne Petter Ratvik SINTEF

ANNEX: Local community engagement – Georgia Macey LCM

LCM less common metals

SecREEts

Xplore!

University of Chester

Thornton Science Park

CHILDER THORNTON PRIMARY SCHOOL

...targetting community groups, science museums, universities, schools and the local MP.

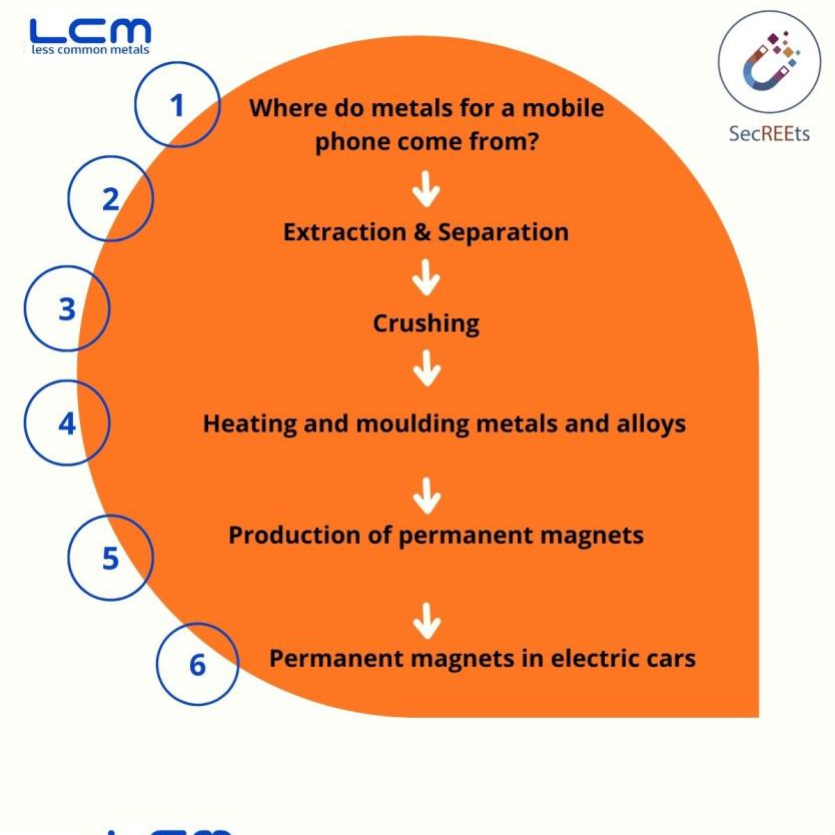
Knutsford SciBar

Discussing Science in a Bar

LCM less common metals

SecREEts

LCM, Prospex Institute and Xplore Science Museum worked together to deliver workshops to children to teach them about the SecREEts project.

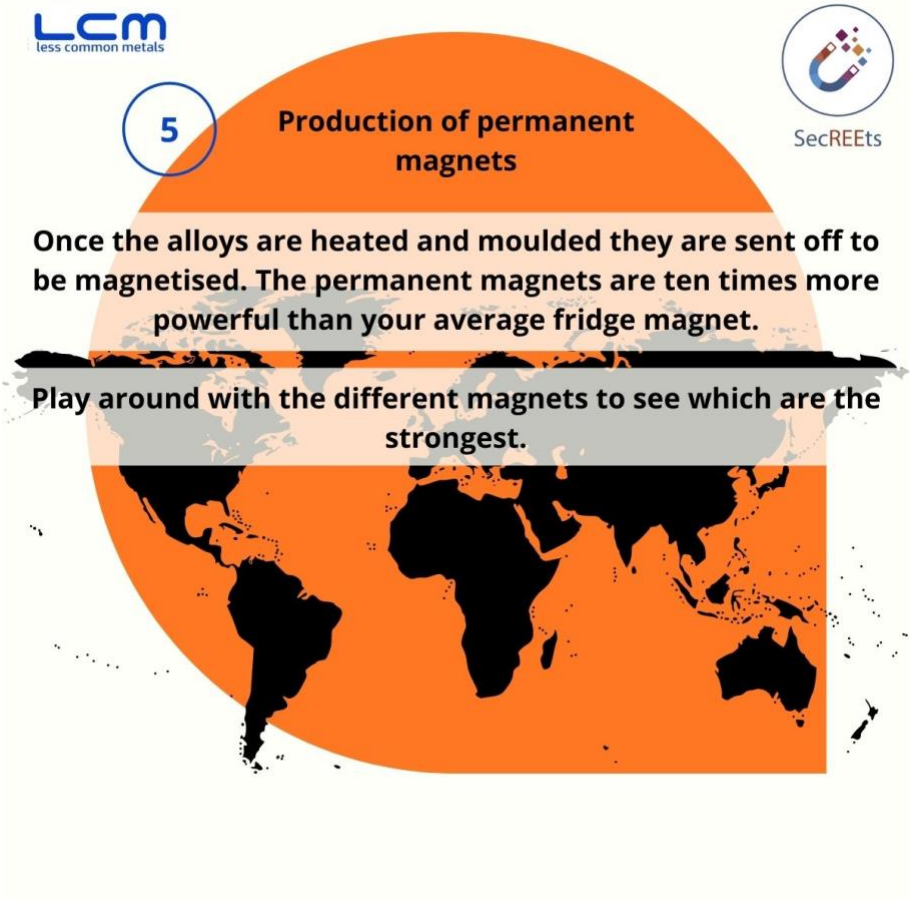

LCM
less common metals
SecREEts
1
Where do metals for a mobile phone come from?
2
Extraction & Separation
3
Crushing
4
Heating and moulding metals and alloys
5
Production of permanent magnets
6
Permanent magnets in electric cars

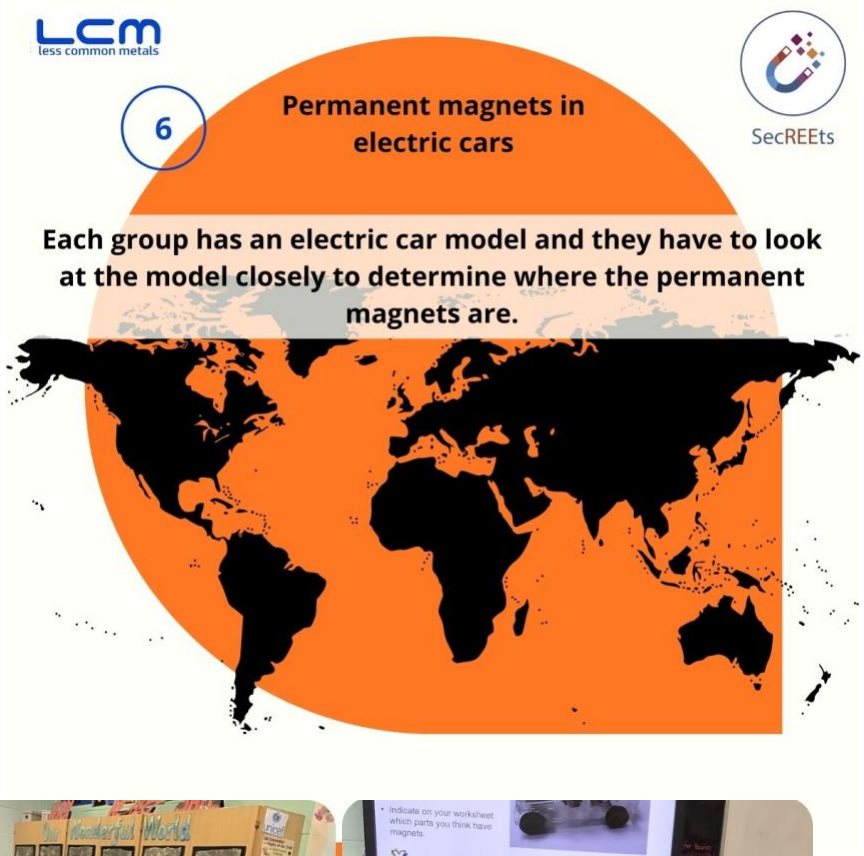

LCM
less common metals
SecREEts
1
Where do metals for a mobile phone come from?
Each group has to locate their 5 countries and draw a line to them on their blank map.
This exercise is to help the children understand that rare earth elements are not rare.
China has been repeated on the maps to show they have the biggest control over the market.


LCM
less common metals
SecREEts
2
Extraction & separation
(Activity is replicating the process)
Groups are required to extract the metal from the sand and then sieve the sand into a container.
Removing the metal is *extraction* and sieving the sand is *separation.*
Place any metal pieces caught in the sieve into the petri dish.


LCM
less common metals
SecREEts
3
Crushing
Once the metal has been extracted, it has to be crushed and combined with oxygen to separate into oxides.
Pestle and mortars are used with a sugar cube in order for the children to feel the process of crushing material.


LCM
less common metals
SecREEts
4
Heating & moulding metals and alloys
To show the heating and moulding process, air-dry clay is handed out and students are instructed to use the heat from their hands to loosen the clay and to make a mould.
Magnets are handed out to be put in the back of the clay which can be used as a fridge magnet.


LCM
less common metals
SecREEts
5
Production of permanent magnets
Once the alloys are heated and moulded they are sent off to be magnetised. The permanent magnets are ten times more powerful than your average fridge magnet.
Play around with the different magnets to see which are the strongest.


LCM
less common metals
6
Permanent magnets in electric cars
SecREEts
Each group has an electric car model and they have to look at the model closely to determine where the permanent magnets are.


My Wonderful World


Indicate on your worksheet which parts you think have magnets.


WRITING WALL

LCM less common metals

SecREEts

Xplore!

What a wonderful team!

As an educational facility ourselves the team at Xplore! were intrigued to find out more about the environmental impact of today's green technologies and more importantly what can be done to create a more sustainable way to extract rare earth elements.

The LCM and SecREEts team did a brilliant job explaining the complex world of permanent magnets so that in turn we could share their truly innovative story with local primary age children.

- Katie Williams, Business Development Officer
Xplore! Science Discovery Centre.

LCM less common metals

SecREEts

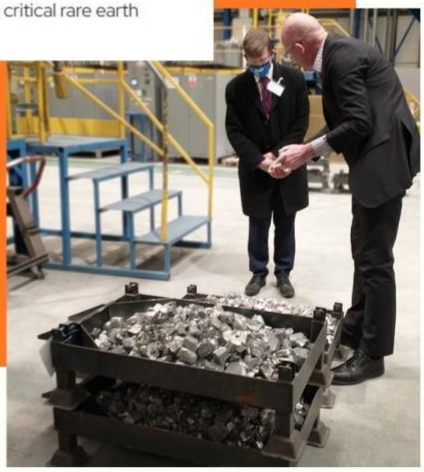
Praise for Ellesmere Port manufacturing company Less Common Metals

22nd April 2021

AN Ellesmere Port manufacturing company has been hailed for its hard work and dedication to the rare earth permanent magnet industry which is key for future technologies such as electric vehicles.

The town's MP Justin Madders was full of praise for Less Common Metals (LCM) following a recent tour of the North Road factory.

He met with director Ian Higgins to learn about the critical rare earth element – neodymium iron boron.



LCM less common metals

SecREEts

The impact of working with Justin Madders:

- ***Highlight in the local press***
- ***The Society of Motor Manufacturers & Traders Ltd (end-users of electric vehicles)***
- ***MP for Chester, Christian Matheson involved with electric vehicles***

LCM less common metals

SecREEts

Planned activities:

Glyndwr University are organising a STEM day for local Year 10 students who are less likely to enter Higher Education.

SecREEts will partake in this day by organising an engaging session to teach the students about the rare earth industry and the SecREEts project.

Wrexham glyndŵr UNIVERSITY