

LIFE 3R

**Circular economy ecosystem to Recover, Recycle and
Re-use F-gases contributing to the depletion of
greenhouse gases - LIFE 3R**

Deliverable: Marketplace platform

Action C3

**Responsible for Deliverable: DAIKIN EUROPE N.V.
(DENV)**

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Abstract

Among the ten (10) deliverables already completed under Life3R project, the eight (8) of them are focused on the functionalities available on the Retradeables Marketplace platform for both sellers and buyers of recovered refrigerant (registered users). In other words, there are currently eight (8) different work packages that are considered to meet a wide range of requirements than those could be claimed by F-gas installers and distributors, respectively. The following report will summarize all the basic operating principles of the Retradeables platform that have been assumed so far, in a more advanced version (beta), however, as a direct result of the continuous improvements achieved because of the applied “Plan Do Check Act” cycle. Hence, the corresponding F-gas selling and buying processes within the Retradeables Marketplace is now presented at a more mature level while some snapshots are attached to illustrate the relevant update on user’s interface. A summary of the Retradeables registration process is also included.

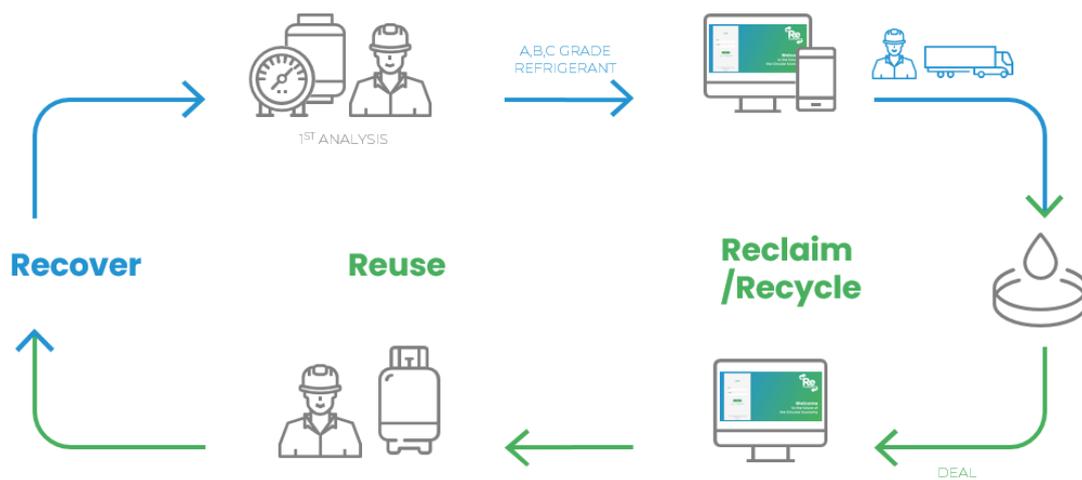


Figure: The basic operating principle of the Retradeables platform.



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1 Sign-up process

For both F-gas sellers (installers) and buyers (distributors) wishing to use 3R ECOSYSTEM to participate in the relevant transaction procedures through the Marketplace platform, an account must first be created. The sign-up process can be divided into 4 key steps:

- **Step 1:** Register for an account on the Retradeables website.
- **Step 2:** Add your information and F-gas certificate details.
- **Step 3:** Complete the KYC process to activate trading.
- **Step 4:** Start buying and selling your recovered F-gases.

1.1 Company sign-up onto the platform

The F-gas seller/buyer must initially visit the Retradeables website (<https://retradeables.com>) homepage and click on the "Join Retradeables" button on the left-hand corner of the screen (**Figure 1**).

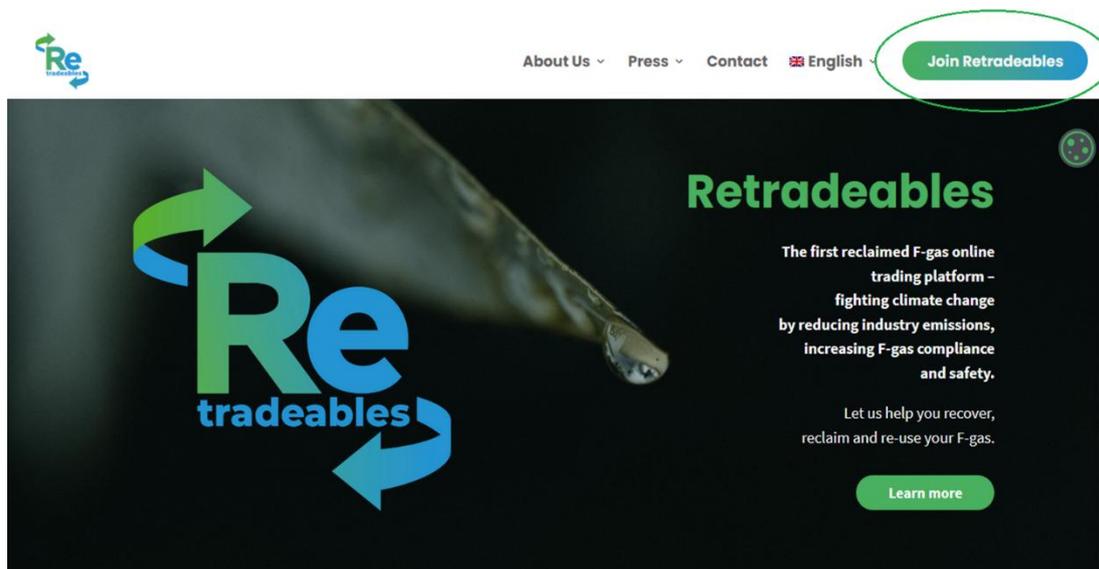


Figure 1: The Retradeables website homepage.

Automatically, he/she will be redirected to the login form. Since an account has not yet been created, the user needs to click on "Sign Up", underneath the "Login" button (**Figure 2**).

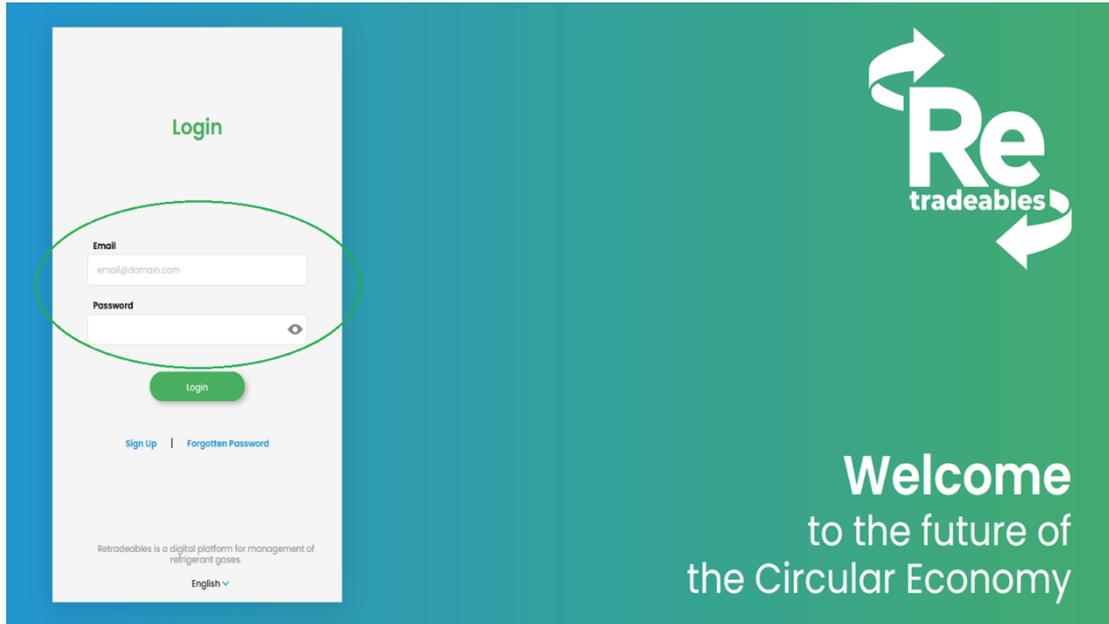


Figure 2: User Interface (UI) design for "Login" form.

Within the Sign-Up form, all required fields must be completed so that the company's registration on Retradeables can proceed (**Figure 3**). Regarding the "Company Type" field, the user can choose, via a drop down menu, whether his/her company is considered as an installation or a distribution one. Moreover, the VAT number must be the registered number corresponding to the company. Meanwhile, the specified email address is proposed to be a directly accessible one so that the registration can surely be confirmed later.

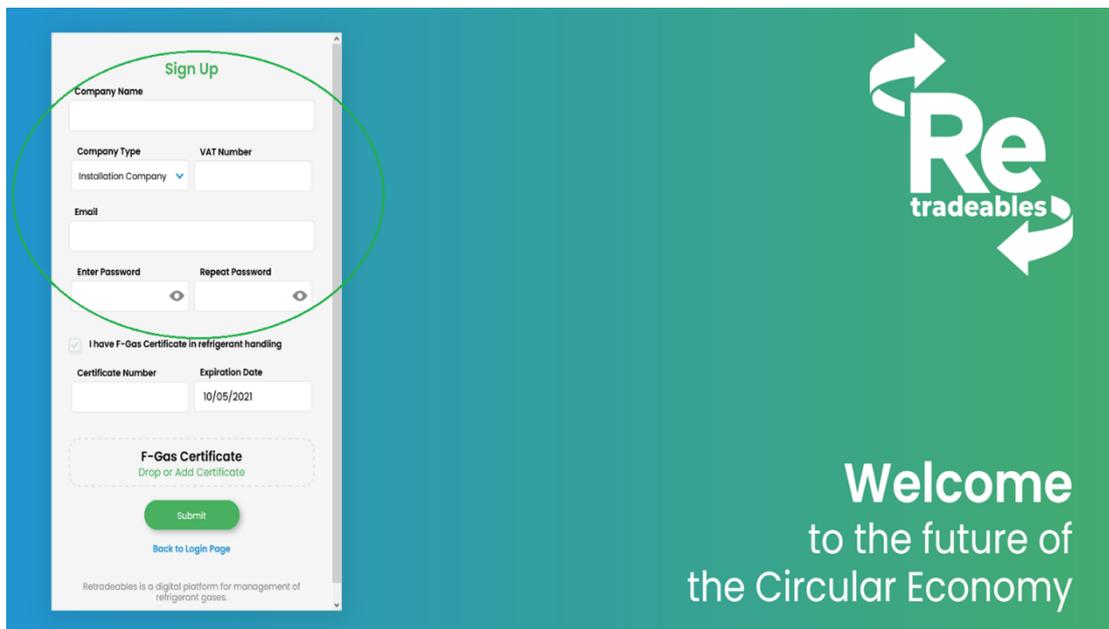


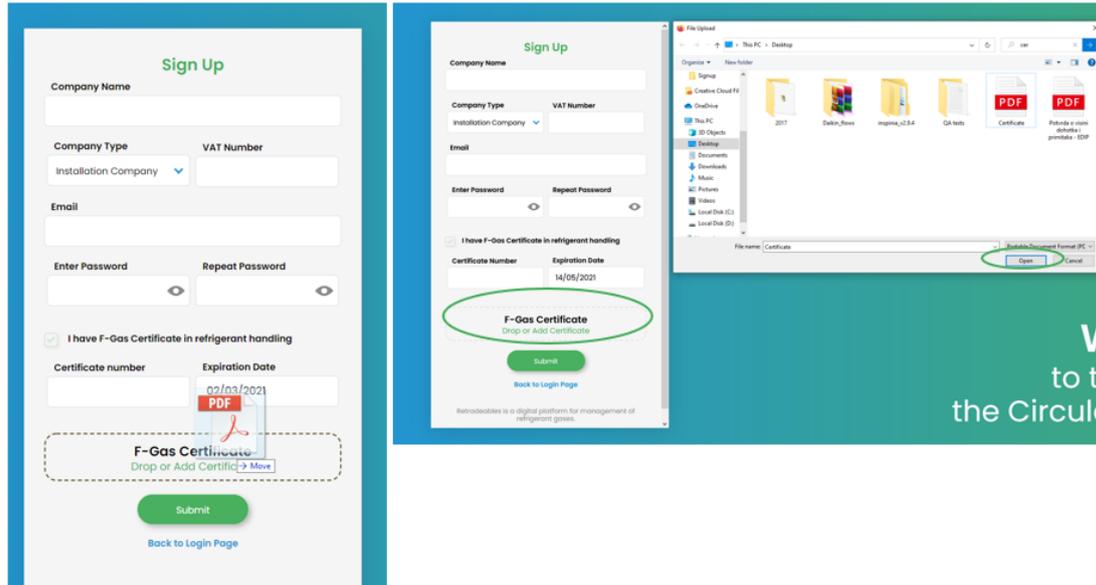
Figure 3: First-level information required in the Retradeables Sign Up form.



Furthermore, the company is strictly requested to hold a F-gas Certificate in refrigerant handling so that the use of Retradeables can be possible. Consequently, the relevant checkbox in the form is pre-selected by default and cannot be unselected. In addition, the "Certificate number" and "Expiration date" fields are to be completed with the appropriate details according to the company's F-gas Certificate (**Figure 4**). It is worth noting that the expiration date must be a future date.

Figure 4: Second-level information required in the Retradeables Sign Up form.

Once the company's F-gas Certificate details are entered, the user will need to upload a copy of the certificate onto the sign-up form. As illustrated in **Figure 5**, this can be managed either by dragging and dropping the company certificate directly onto to the "F-gas Certificate" field (Option 1) or by clicking on "Drop or Add Certificate" (Option 2).



Option 1

Option 2

Figure 5: The two options available for uploading a F-gas Certificate onto the Retradeables Sign Up form.

In the second case, it is needed to select the certificate from the file explorer box and then click "Open". It should be underlined that the F-Gas Certificate must be in PDF format. For ease of registration, users are also proposed to check each time if the certificate information reported in the relevant fields is similar to that of the PDF file.

Since all the necessary registration data has been submitted and the required F-gas certificate has been attached, the seller/buyer has to select the "Submit" button. As a result, a success screen will then appear, letting him/her know that an email with a verification link has been sent to the specified e-address (**Figure 6**).

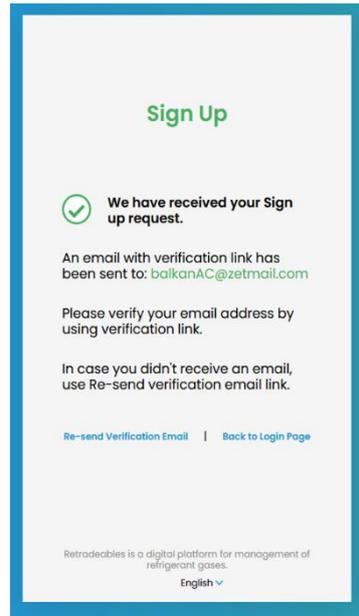


Figure 6: The confirmation message about receiving the user's sign-up request.

It is supposed that the email will normally arrive within a few minutes. Nevertheless, it may occasionally be found in the Spam folder. After opening it, the user should click on the "Confirm email address" button in order to be redirected back to the Retradeables website (Figure 7).

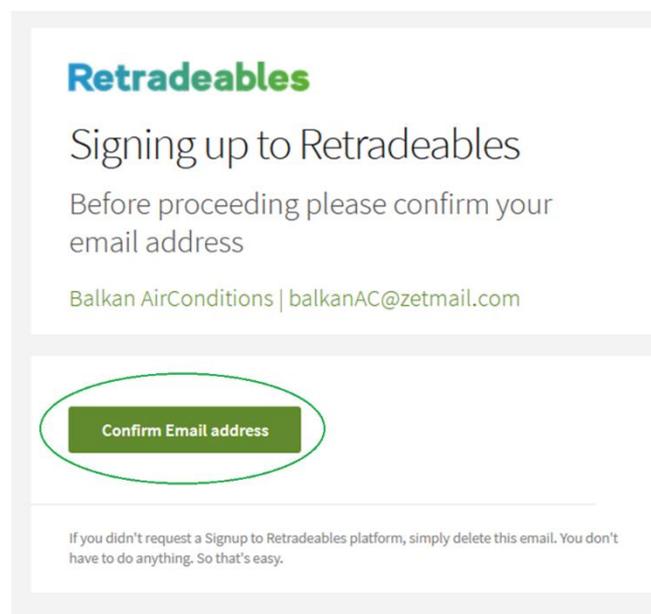


Figure 7: The confirmation email sent to the user, including a verification link within it.

A new message will now be shown in the Sign-Up form indicating that the registration request has been received and is in process (Figure 8). This practically means that one of the Retradeables platform administrators has already undertaken the relevant evaluation process (this could take up to 24hrs).

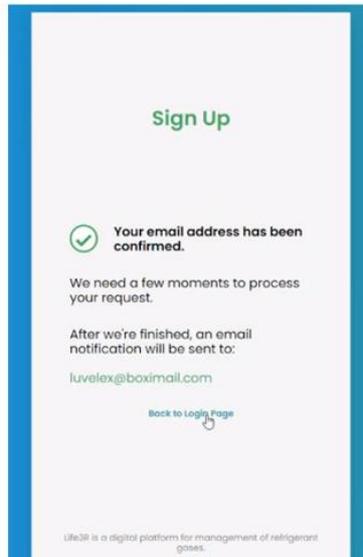


Figure 8: The success message for the validation of user's email address.

The final results of the review will be announced to the seller/buyer via a notification email. Given that no issues were detected and the administrator's response is therefore positive, a "Finish Signing up" button will be extra available at the bottom of the email so that the user is able to (almost) finalize the first stage of registration on the 3R ECOSYSTEM by clicking on it (Figure 9).

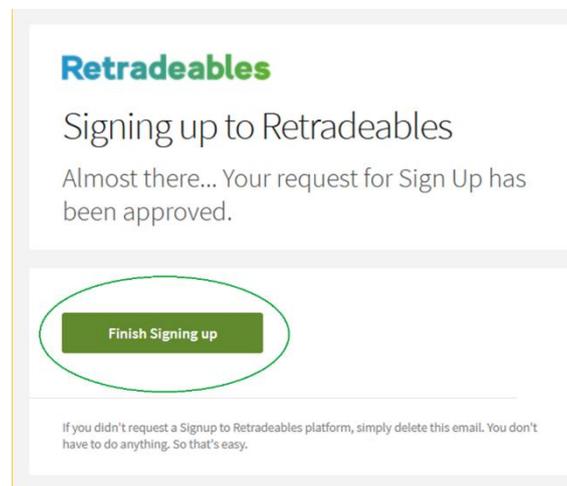


Figure 9: The notification email sent to the user to announce the approval of his/her registration request.

Back to Retrtradeables website, a login form should be completed with both the email address and password set by the seller/buyer at the previous stage. For additional security, a 2-Factor (2F) Authentication is also enabled. This implies that once the required login data is added and the user selects the "Login" button, a verification 2F code will be sent to him/her via an email. This code should be then applied in the relevant field of the "2-Factor Authentication" pop-up. All the procedures taking place during the first login to the Retrtradeables platform are summarized in **Figure 10**:

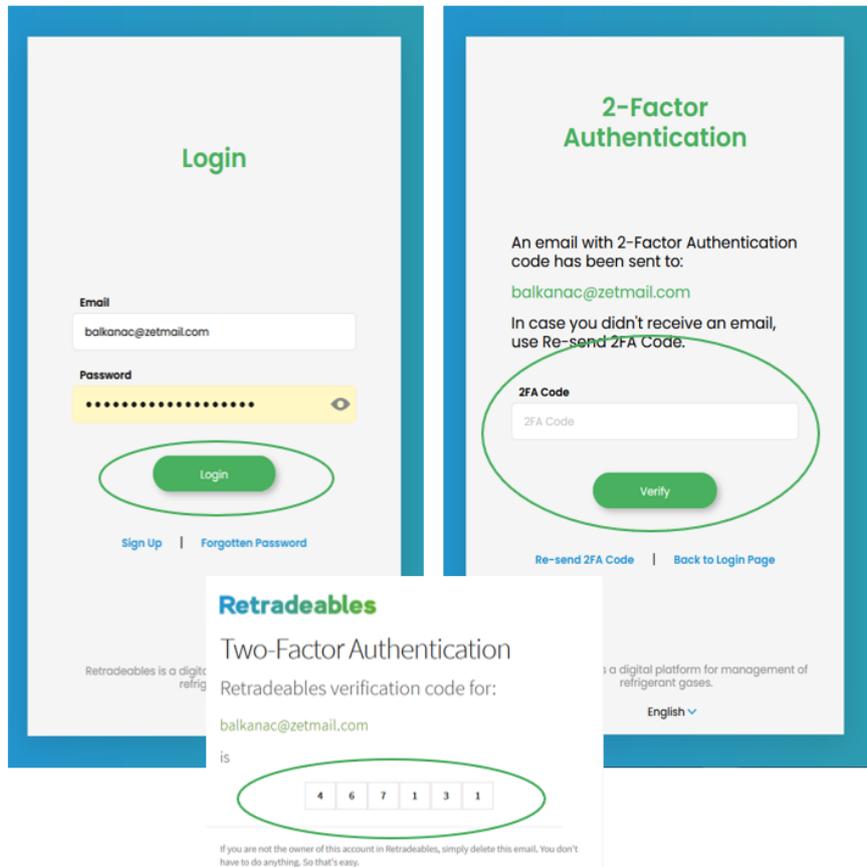


Figure 10: Basic procedures taking place during the first login to the Retrtradeables.

1.2 Company, representative and user information

As it can be seen in Figure 10, a "Verify" button is also featured in the authentication form. By clicking on it, the seller/buyer can be redirected onto the Retrtradeables platform. It is when the second stage of registration is starting ("Set up your account"). Once entering the platform, the user will be asked to read and give his/her consent to the following documents (sub-step 1):

- General terms and conditions of Retrtradeables.
- Data protection policy of Daikin Europe Group.
- Framework agreement of MANGOPAY payment solution.



To accept all of these, the user must select the tick boxes under each document and then click on "Next" (**Figure 11**).

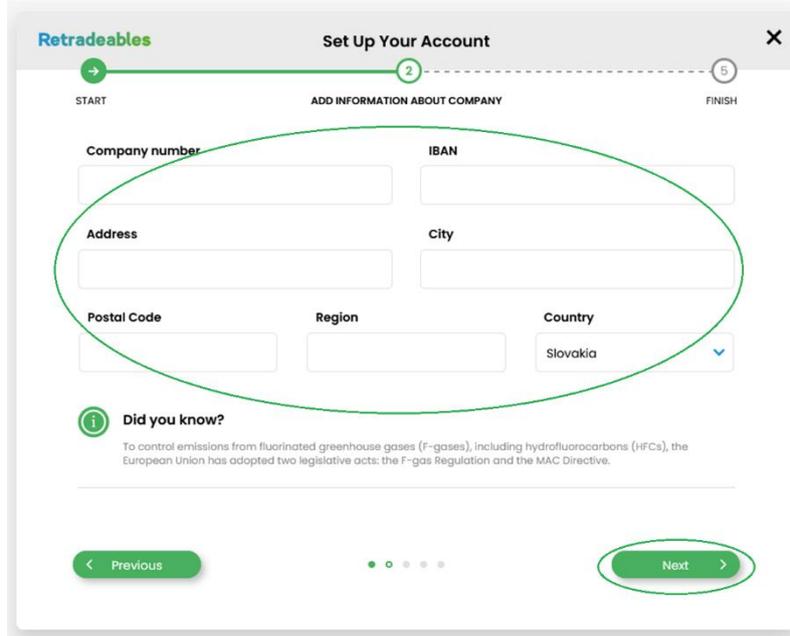
The screenshot shows a web interface for 'Retradeables' titled 'Set Up Your Account'. At the top, there is a progress bar with three steps: 'START', 'GIVE YOUR CONSENT TO TERMS AND CONDITIONS' (the current step, marked with a '1'), and 'FINISH' (marked with a '5'). Below the progress bar, the user is prompted to 'Please read and give your consent to:'. There are three sections, each with a heading and a checkbox: 1. 'Terms and Conditions of Retradeables digital platform for the management of refrigerant gases.' with a checkbox labeled 'have read and accept the Terms and Conditions of Retradeables digital platform'. 2. 'Data Protection Policy of Daikin Europe Group.' with a checkbox labeled 'have read and accept the Data Protection Policy of Daikin Europe Group'. 3. 'Framework Agreement of MANGOPAY payment solution for marketplaces.' with a checkbox labeled 'have read and accept the Framework Agreement of MANGOPAY payment solution'. Below these is an information icon and the text 'Did you know? To control emissions from fluorinated greenhouse gases (F-gases), including hydrofluorocarbons (HFCs), the European Union has adopted two legislative acts: the F-gas Regulation and the MAC Directive.' At the bottom, there is a 'Previous' button on the left and a 'Next' button on the right, which is highlighted with a green circle.

Figure 11: Retradeables terms and conditions to which the user should give his/her consent. ("Set up your account": Step 1)

On the second screen of "Set up your account" form, more details will be asked for the company's profile to be registered on the Retradeables platform (sub-step 2). Especially, the extra information required will be relevant to:

- Company's official registration number.
- Company's IBAN (which will be used for payments).
- Location details.

Figure 12 illustrates all the individual fields to be completed. After dealing with this task, the user will need to click on "Next".



Retradeables Set Up Your Account

START 2 ADD INFORMATION ABOUT COMPANY FINISH 5

Company number IBAN

Address City

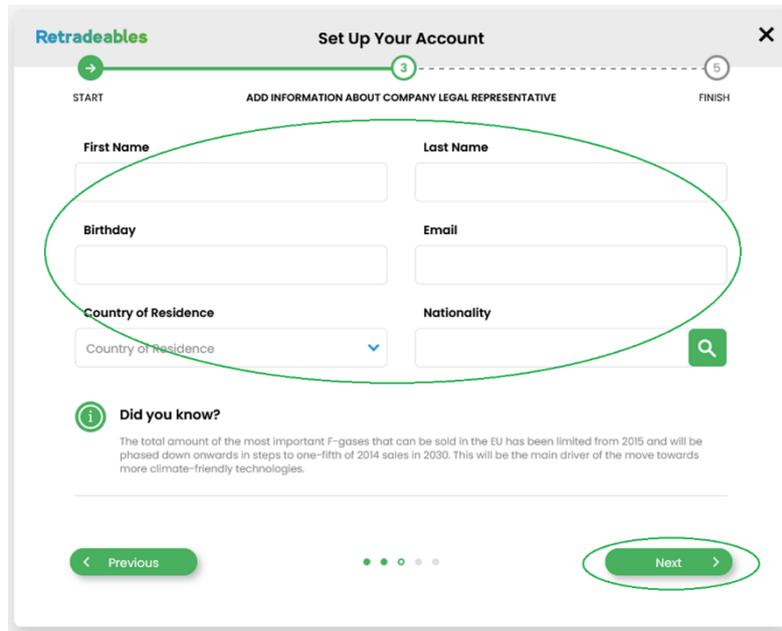
Postal Code Region Country

Did you know?
To control emissions from fluorinated greenhouse gases (F-gases), including hydrofluorocarbons (HFCs), the European Union has adopted two legislative acts: the F-gas Regulation and the MAC Directive.

[Previous](#) [Next](#)

Figure 12: The type of extra information required for the Company's profile.
("Set up your account": Step 2)

On the third screen of "Set up your account" form, information about the legal representative of the company will be requested (sub-step 3). This constitutes a legal requirement from the payment solution assumed to be applied to the Retradeables platform (i.e., MANGOPAY). As shown in **Figure 13**, "Next" should be chosen for one more time when all the fields have been filled in.



Retradeables Set Up Your Account

START 3 ADD INFORMATION ABOUT COMPANY LEGAL REPRESENTATIVE FINISH 5

First Name Last Name

Birthday Email

Country of Residence Nationality

Did you know?
The total amount of the most important F-gases that can be sold in the EU has been limited from 2015 and will be phased down onwards in steps to one-fifth of 2014 sales in 2030. This will be the main driver of the move towards more climate-friendly technologies.

[Previous](#) [Next](#)

Figure 13: The type of information required for the Company's Legal Representative.
("Set up your account": Step 3)

Subsequently, the user is asked to add some additional information about the account holder (Installer/Distributor Co. administrator). The relevant required fields are depicted in **Figure 14** (sub-step 4). It should be highlighted that the indicated person may be different than the Legal representative.

Figure 14: The type of information required for the user's account. ("Set up your account": Step 4)

Furthermore, any personal F-gas certificates can also be attached in this section (sub-step 5), thus enabling different functionalities to be unlocked within the platform for individual users under company's account. After user account settings have been managed, the selection of "Finish" button is considered to mark the end of the second stage of the registration on Retradeables (**Figure 15**).

Figure 15: The functionality available for uploading any personal F-gas certificates. ("Set up your account": Step 5)

1.3 KYC and payment verification

The third and last registration stage includes a standard KYC (Know-Your-Customer) process being managed and required by MANGOPAY in accordance with the EU anti-money laundering regulations. It is expected that the KYC pop-up will automatically appear once the second registration stage is complete. As shown in **Figure 16**, "Submit KYC" and "Cancel" are the two available options. If cancelled then KYC process will occur the next time the user will login to the platform again.

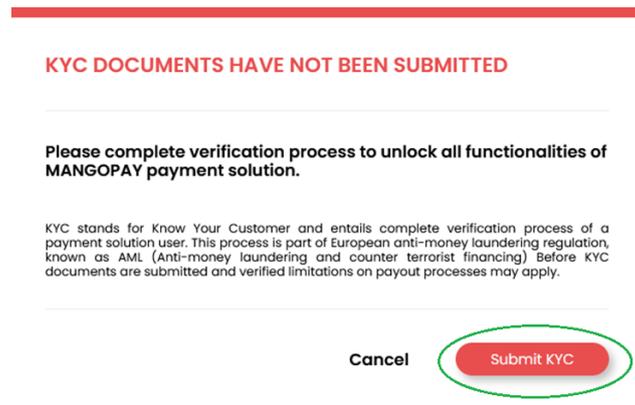


Figure 16: The KYC pop-up message appears at the beginning of the 3rd registration stage on Retradeables.

Therefore, the user can choose to submit KYC documents at the end of sign-up process or at a later stage. It is underlined that the activation of buy and sell functionalities within the Retradeables platform is possible only if the KYC verification process has been made before. During this, the user will be required identification and company documents such as:

- Proof of identity;
- Articles of association;
- Proof of company registration.

Figure 17 illustrates a typical "Submit KYC document" form. Any selected document between the three options above can be easily uploaded in a way similar to that of F-Gas documents. Once uploaded, MANGOPAY will review and verify the information and remove trading restrictions, if no problems are detected. Any additional steps will be provided directly by MANGOPAY, too.

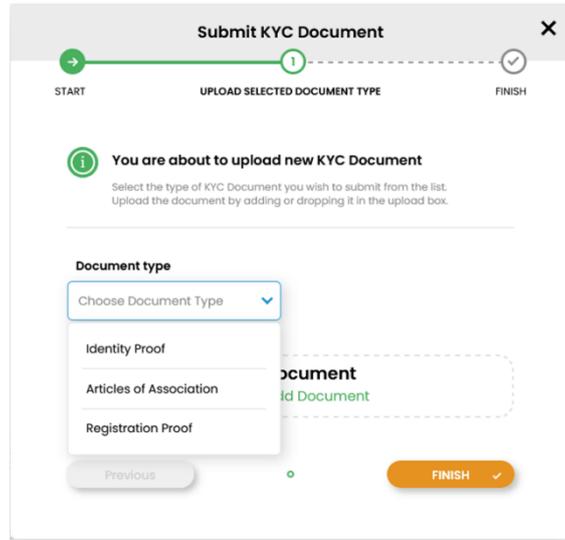


Figure 17: A typical "Submit KYC document" form.

Finally, the successful implementation of all registration stages implies that the seller/buyer will now have access to all Retradeables' functionalities and thus be able to start selling and buying recovered F-gases within the 3R ECOSYSTEM, respectively.

2 Selling process

The supply side (F-gas sellers) in the 3R trading scheme is considered to be the various F-gas installers/installation companies as well as the service companies and partner networks that have access to refrigerant through small/medium or large installations. It is expected that the implementation of the Life3R project will enable them to handle and sell any quantities of recovered F-gas in a sustainable way, thus contributing to an extra revenue and asset stream, too. The selling process within the Retradeables Marketplace platform can be divided into 5 key steps:

- **Step 1:** Offer your stock onto the Retradeables Marketplace.
- **Step 2:** Accept the most desirable offer.
- **Step 3:** Arrange the collection of the stock with buyer.
- **Step 4:** Receive quality test results from the buyer.
- **Step 5:** Finalise your offer.

2.1 Login Retradeables

Given that a registration on the Retradeables has preceded, the seller (installer) will be asked to login each time he/she wants to make use of the platform. To this end, he/she only needs to visit the Retradeables website (<https://retradeables.com>) homepage and click on the "Join Retradeables" button on the right-hand corner. Automatically, he/she will be

redirected to the login form where an email and a password must be entered similar to those have been given by the seller when creating an account on the platform (**Figure 18**).

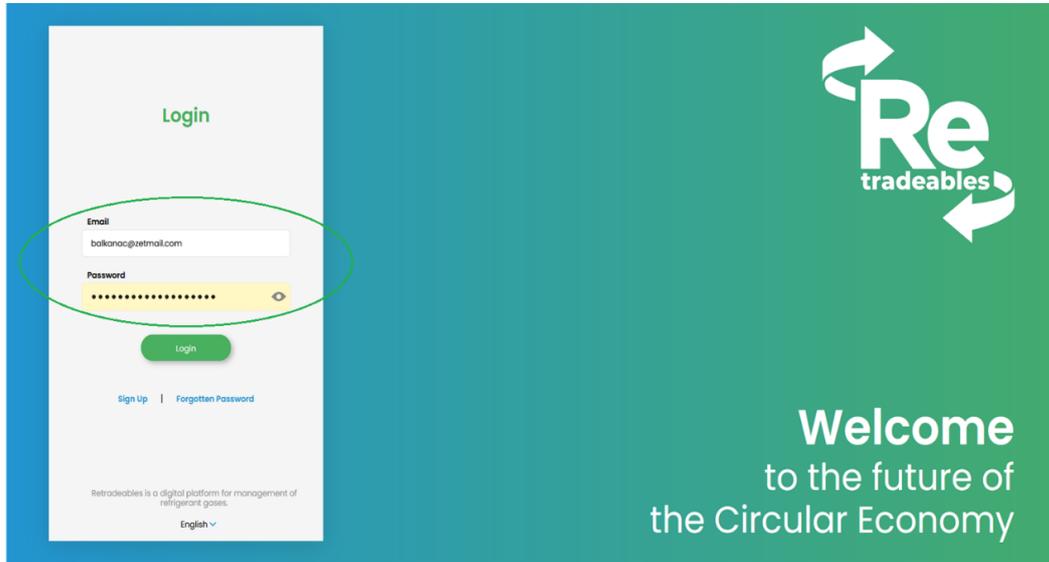


Figure 18: Email and password fields to be filled in Retradeables login form.

After filling in the two fields referred above, the seller should click the "Login" button in order to be directed to the main dashboard of the Retradeables platform. **Figure 19** depicts all available cards within it. For the purpose of selling recovered F-gas, he/she must go to the "Your stock snapshot" card and click on "Stock".

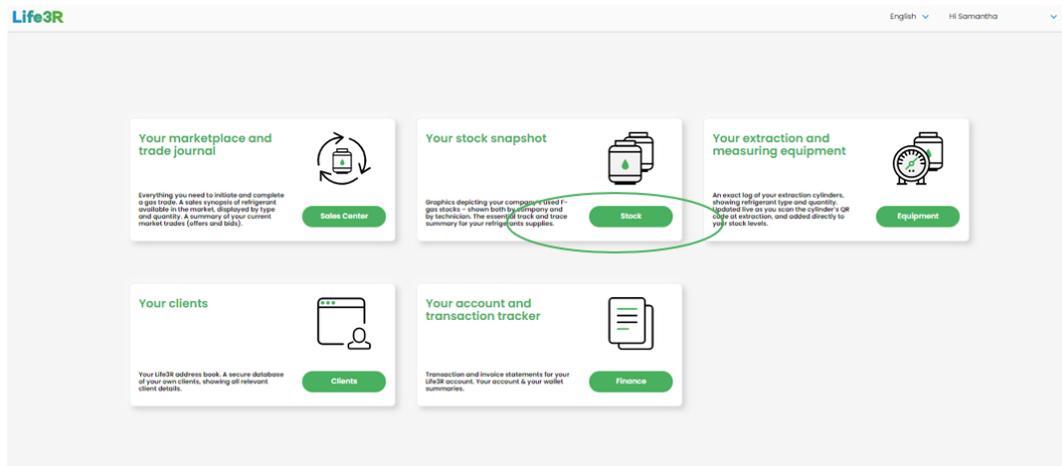


Figure 19: Seller's main dashboard ("Stock" button is marked).

2.2 Place F-gas stock onto the Retradeables marketplace

It is the "Company Stock" sub-category of "Stock" section that offers a full overview of all recovered F-gases in the company's possession. As it can be seen in **Figure 20**, a seller can create a listing on the Retradeables marketplace by selecting the item for sale each time and clicking on the burger menu. Then, he/she should choose the first of the two available



options (i.e. "Sell"). The other one is "Dispose" in the case that stock is determined to be C-grade.

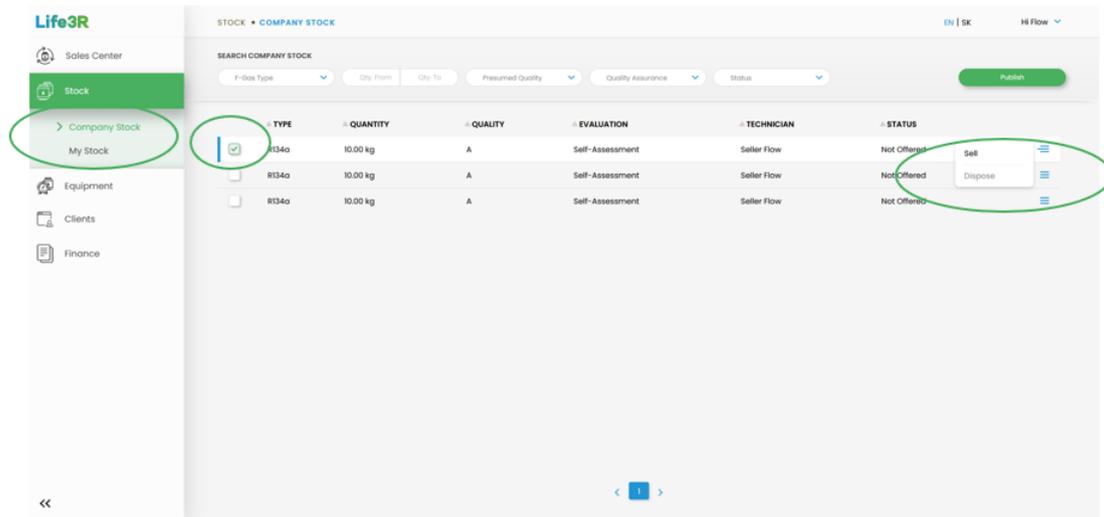


Figure 20: User Interface (UI) design of "Company Stock" sub-section of "Stock".

Subsequently, a pop-up message will appear asking the seller to confirm his/her choice to list the selected recovered F-gas stock on the Retradeables marketplace (Figure 21). By clicking the "Publish" button, the relevant item is officially for sale and so the buyer can now see this new listing via Sales Centre.

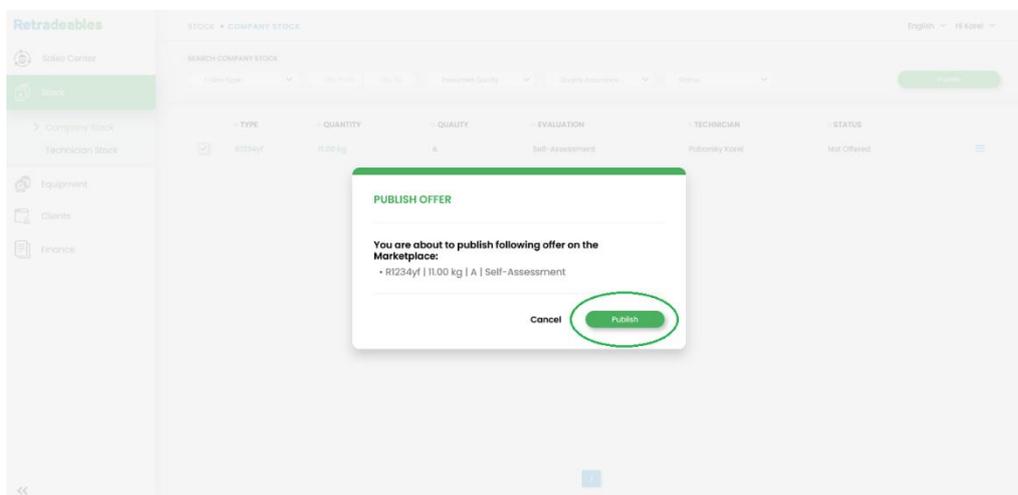


Figure 21: The confirmation pop-up message for publishing a F-gas offer in the Retradeables marketplace.

Regarding seller (installer), he/she can track the entire selling journey of his/her F-gas stock in the "My Offers" sub-category of "Sales Center" section (Figure 22). Basically, there are 4 different tabs (functionalities) available:

1. The "Pending" tab containing each new listing published on the marketplace by the seller. Therefore, the F-gas stock offered for sale in the 3R market can be found here.
2. The "Accepted" tab containing all these seller's items for which a buyer's offer has recently been approved.
3. The "Quality test" tab containing results and updates added by buyers in relation to the F-gas quality grade.
4. The "Sold" tab containing all the stock under a finalised purchase condition.

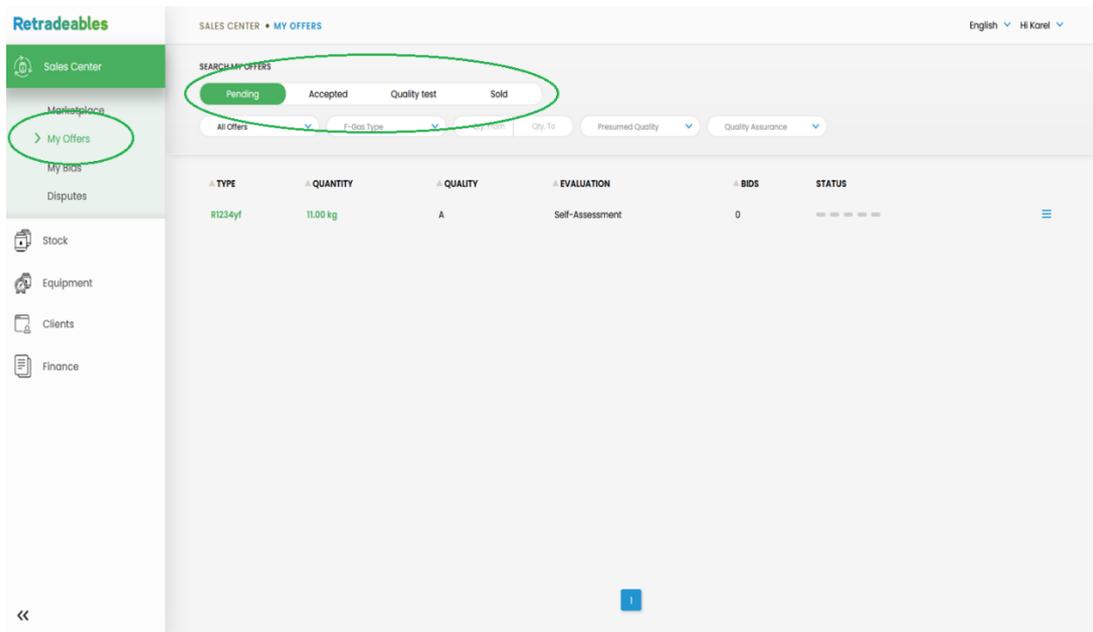


Figure 22: User Interface (UI) design & available functionalities of "My Offers" sub-section of "Sales Center".

2.3 Seller's Retradeables e-wallet

As long as the seller is waiting for a buyer's offer on any of the published F-gas stock, he/she must ensure that his/her Retradeables e-wallet is credited so that he/she can make use of it in a future purchase story. For this purpose, a "Finance" section is incorporated into the left-hand side menu via which transaction and invoice statements can be accessed (**Figure 23**).

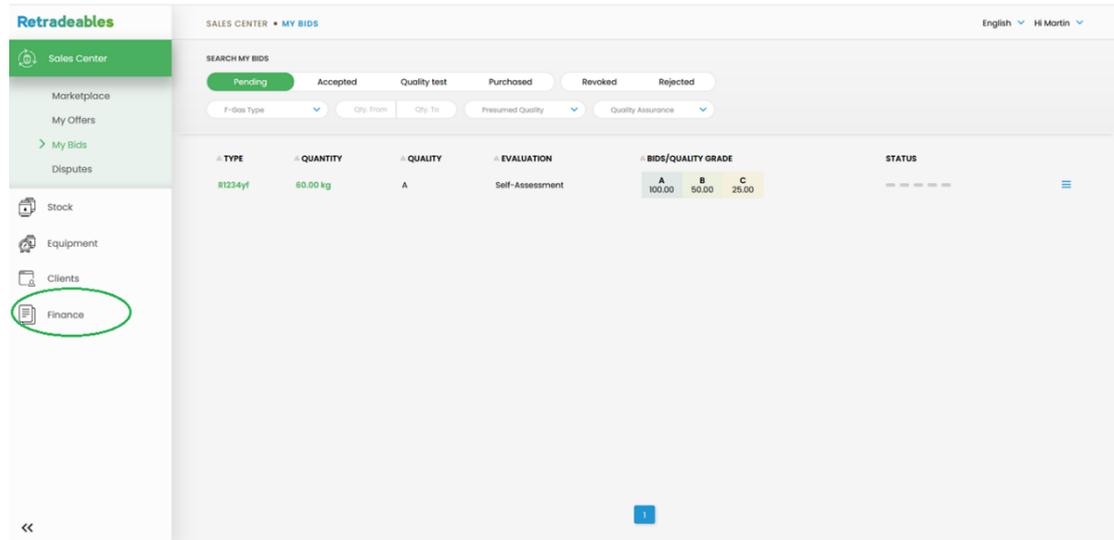


Figure 23: The "Finance" section containing transaction and invoice statements.

Especially, it is the "Transactions" sub-category of "Finance" that enables the seller to manage funds for his/her trades as well as track all his/her transaction history. As depicted in **Figure 24**, he/she will also be able to add money to his/her e-wallet by clicking on the three-dot functionality available in the "Main Wallet" field and then selecting "Deposit funds" option. After that, a dedicated form will pop-up. There, the seller has to specify the amount of money to be added to the e-wallet and click the "Finish" button afterwards. Once submitted, the seller will be provided with all the necessary information to transfer the funds directly from the bank account to the Retradeables e-wallet.

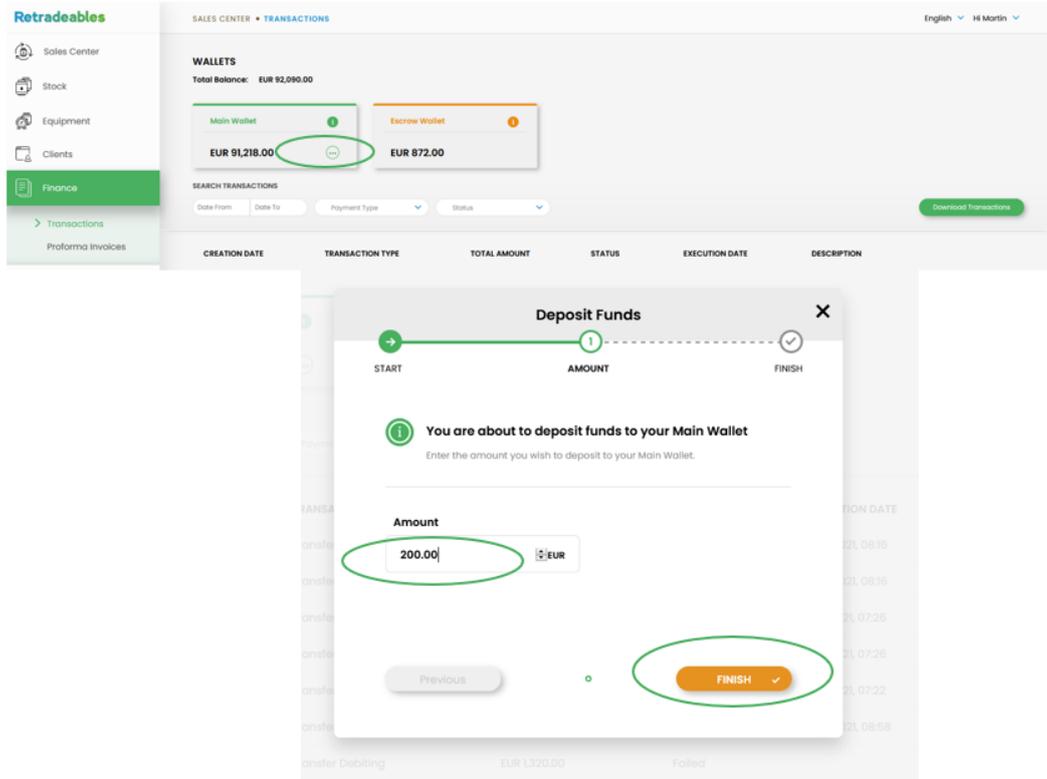


Figure 24: The 3-step process for depositing funds into the seller's Retradeables e-wallet.

To conclude, it should be highlighted that only if the seller has already set up his/her payment details as well as completed MANGOPAY's KYC process during registration, he/she can smoothly manage Retradeables e-wallet.

2.4 Manage a buyer's offer (bid)

For each offer made by a buyer for a seller's stock, the latter one will be properly notified via a relevant message at the email address indicated when creating his/her account in Retradeables platform. As shown in **Figure 25**, this email notification will make the seller capable of learning what is the buyer's willingness to pay for the stock or charge it (to dispose) according to the determined F-gas quality grade. Hence, the first case refers to F-gas Grades A or B whereas the second case to Grade C.

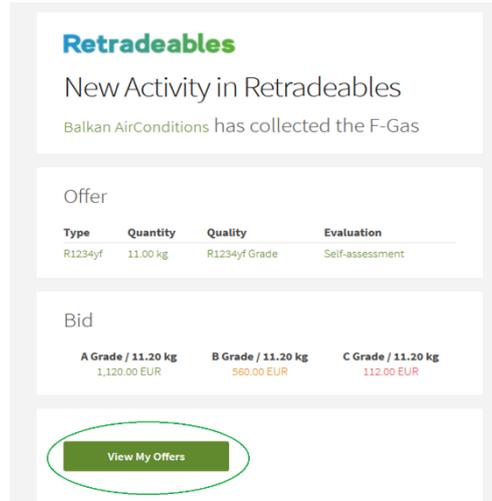


Figure 25: The notification email sent to the seller to announce a new bid for his/her stock.

Furthermore, additional information for both the buyer and the received offer (bid) can be possible through the "View my Offers" button in the email. By clicking on it, the seller will be redirected from the email area back to the Retradeables platform thus gaining access to all details related to the offer for his/her stock (offer details, buyer profile, bid details, etc.). In addition, he/she is able to scroll through all the offer and buyer's details as well as accept or reject the bid by selecting the corresponding button at the bottom of the offer form (Figure 26). It is noted that the offer information will appear on the left-hand side of seller's screen. However, this kind of details can also be found directly from "My Offers" sub-section in the Sales Centre.

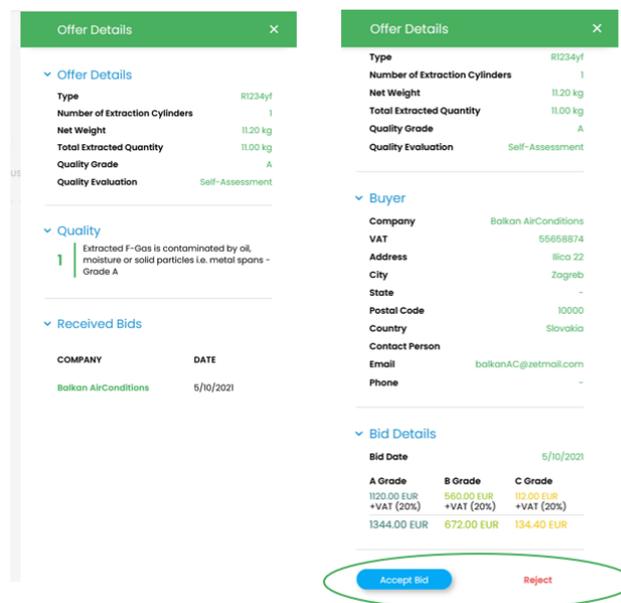


Figure 26: User Interface (UI) design after clicking the "View my Offers" button within notification email - Primary acceptance/rejection of a bid by the seller.

Each acceptance of a bid will be followed by a pop-up form where the seller needs to put in escrow the amount of money defined by the buyer if the stock is determined as C-grade. The relevant funds can be withheld from the confirmed bank account (IBAN) or the electronic wallet (e-wallet). After approving one of the two available payment options, the seller has to select the "Finish" button (**Figure 27**). The rest of the process will be done automatically. It is emphasized that no funds will be exchanged between any party until the purchase is completed and finalised.

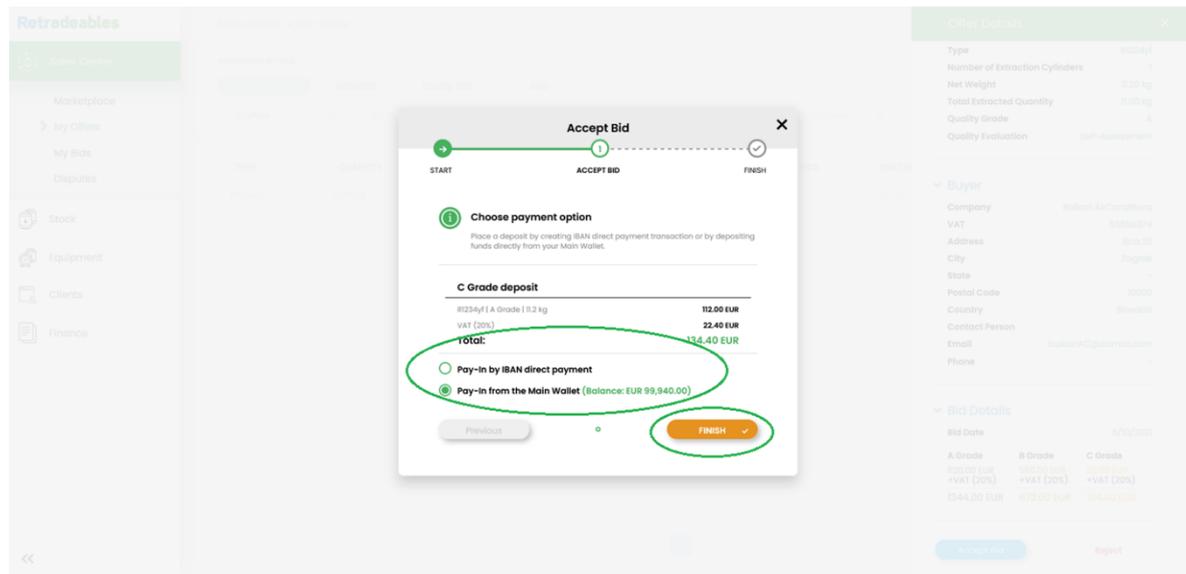


Figure 27: The two pay options provided to the seller (C-Quality Grade Scenario).

Once both the buyer and the seller have placed the indicated funds for A/B and C grade, respectively, the first of them has to arrange a collection from the seller's site. To confirm the F-gas collection on the Retradeables platform, the buyer will be required to scan the QR code on the cylinder. This means that the seller needs to ensure that the cylinders are suitably labelled and the codes are clearly visible, too. After the buyer confirms the collection of the stock, the seller will be informed via an email (**Figure 28**).

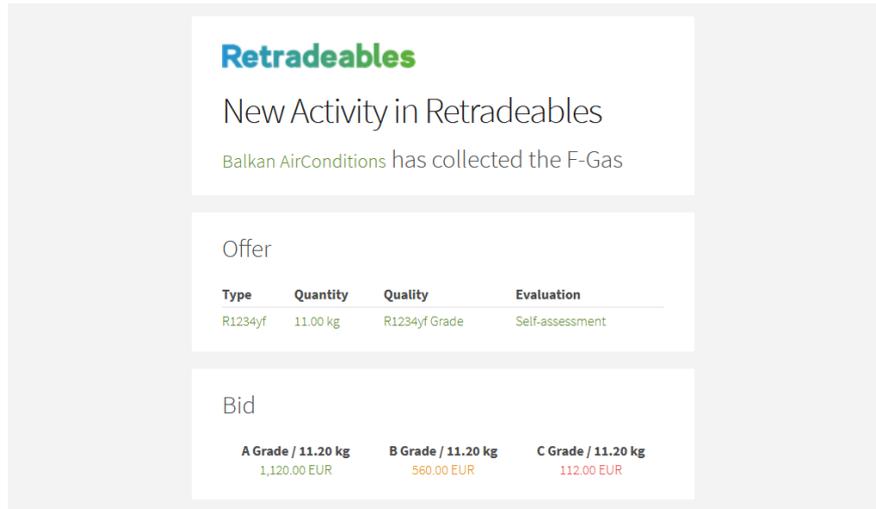


Figure 28: The confirmation email sent to the seller to report the successful F-gas collection by the buyer.

The buyer will then be provided with the choice either to proceed to the payment of the stock by approving its assumed quality or alternatively to perform a formal quality test. In the second case, he/she should update any changes to the "Quality Grade" and "Evaluation" status as well as attach the quality test results onto the Retrtradeables platform. Once all the above-mentioned steps are completed, the seller will be instantly notified of the results and the final bid amounts for his/her stock, via an email (Figure 29).

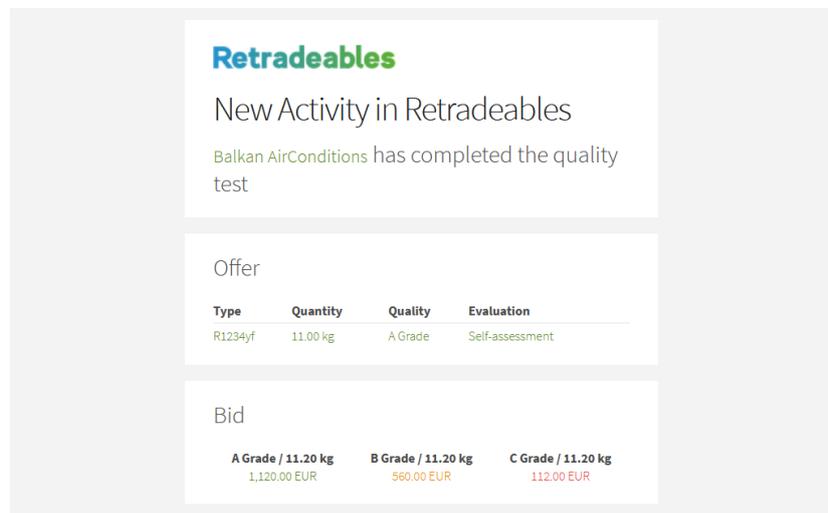


Figure 29: The notification email sent to the seller containing the updates applied by the buyer. (A Quality test has been performed)

Back to "My Offers" sub-section of the seller's Sales Centre, the relevant listing is supposed to be now on the "Quality test" tab and not on the "Accepted" tab that was before, due to the uploading of a quality test by the buyer. From there, the seller will be able to review the quality test results and either to accept/finalise the purchase or doubt the results.



In the first case, he/she has to click on the burger menu in the left-hand corner of the row that corresponds to the item under negotiation and select "Finish" (**Figure 30**). Otherwise, he/she should select the other available option called "Start Dispute".

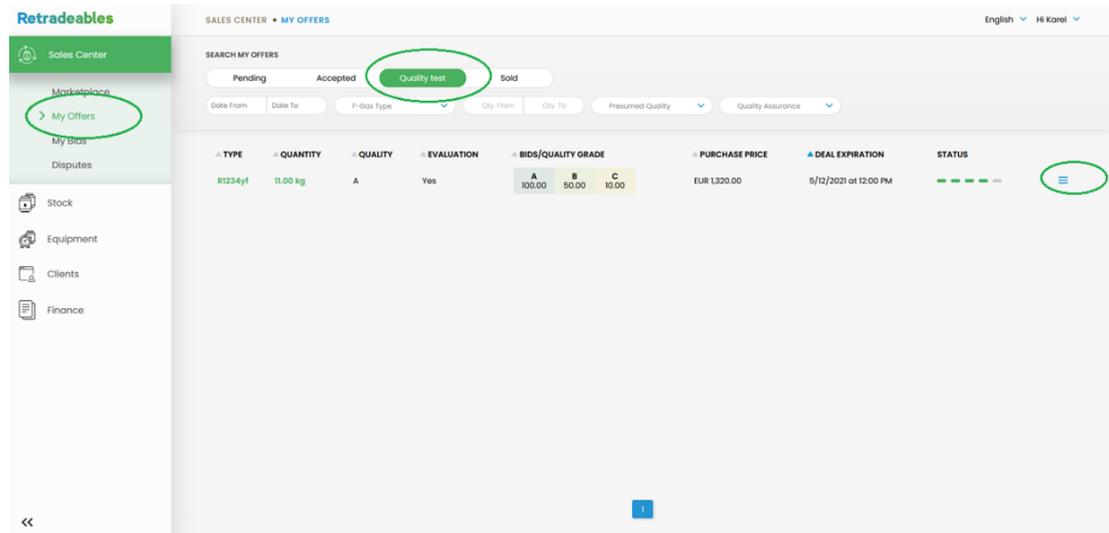


Figure 30: The burger menu through which the seller can accept/reject the Quality test results. ("Quality test" tab)

Finally, any purchase approval by seller (i.e.: "Finish" choice has been selected) will always be followed by a pop-up with a transaction confirmation request. By clicking on "Finish" for one more time (**Figure 31**), the seller formally accepts all payment terms and specifications of the offer, thus triggering payments from the buyer's or seller's wallet, depending on the determined quality grade.

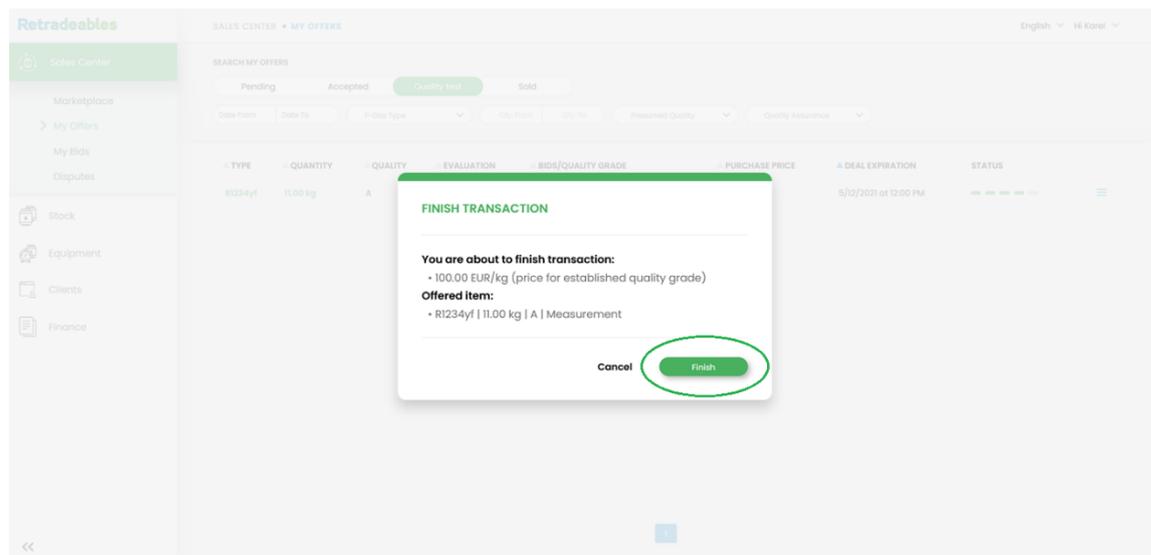


Figure 31: The "Finish Transaction" pop-up window. (The Quality test results have been accepted)



The seller's stock has now been successfully sold. All information about the sold stock can now be found in the "Sold" tab under the "My offers" sub-section of the Sales Centre (**Figure 32**).

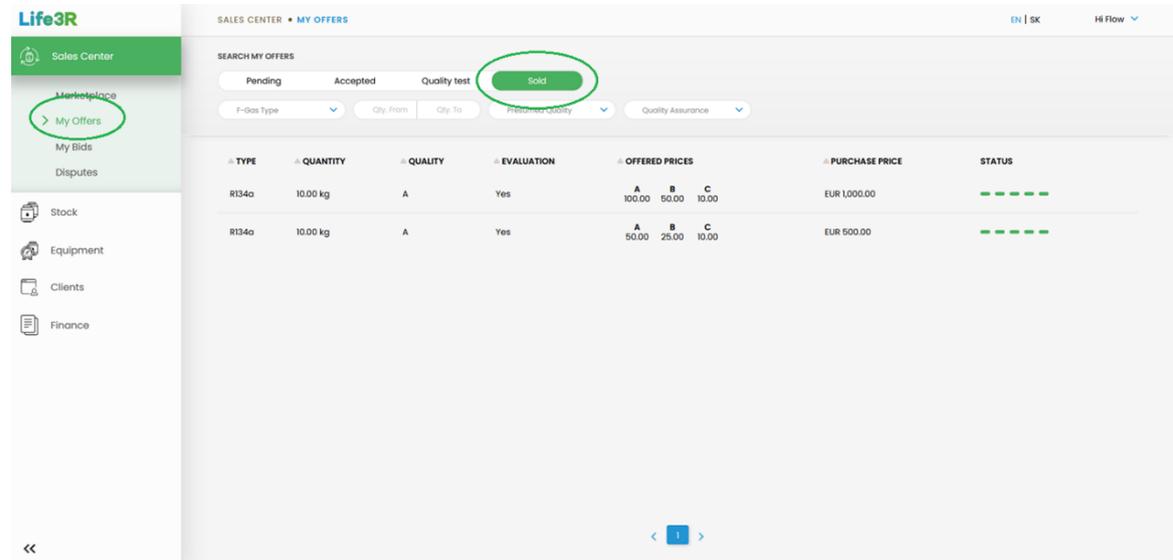


Figure 32: User Interface (UI) design of "Sold" tab under "My Offers".

3 Buying process

The demand side (F-gas buyers) in the 3R trading scheme is considered to be the various F-gas distributors/distribution companies wishing to increase the amounts of product received from the market and relax the pressure on their quota. It is expected that the implementation of the Life 3R project will enable them to access high quality recovered refrigerants and at a lower price, too. The buying process within the Retrtradeables Marketplace platform can be divided into 5 key steps:

- **Step 1:** Register for an account on the Retrtradeables website.
- **Step 2:** Browse through all available listings in the Sales Centre.
- **Step 3:** Make a bid for the F-gas you need.
- **Step 4:** Collect accepted bids and test the quality.
- **Step 5:** Finalise your bid and pay with your e wallet.

3.1 Login Retrtradeables

Given that a registration on the Retrtradeables has preceded, the buyer (distributor) will be asked to login each time he/she wants to make use of the platform. To this end, he/she only needs to visit the Retrtradeables website (<https://retradeables.com>) homepage and click on



the "Join Retradeables" button on the left-hand corner. Automatically, he/she will be redirected to the login form where an email and a password must be entered similar to those have been given by the buyer when creating an account on the platform (**Figure 33**).

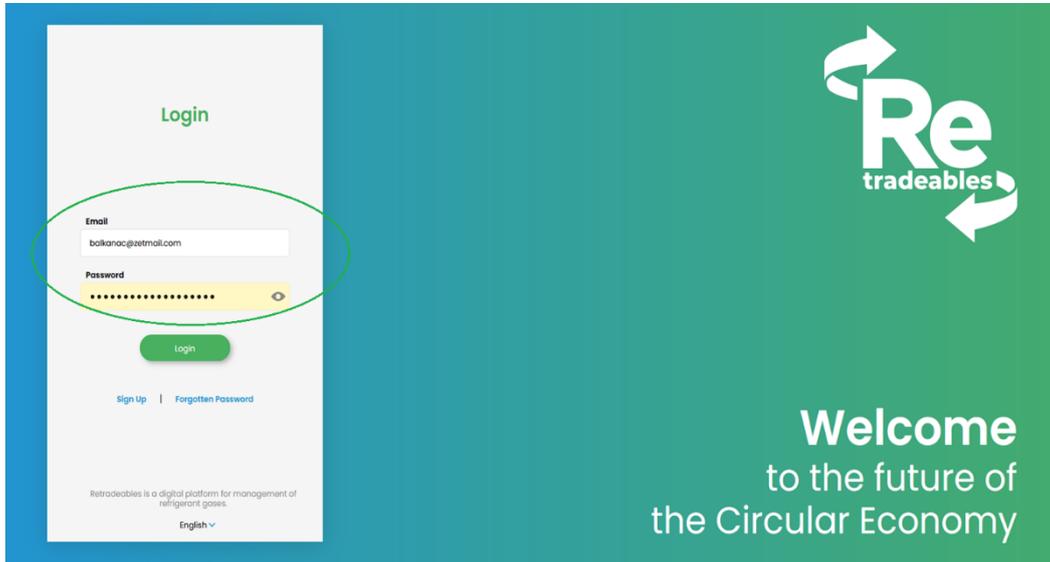


Figure 33: Email and password fields to be filled in Retradeables login form.

After filling in the two fields referred above, the buyer should click the "Login" button in order to be directed to the main dashboard of the Retradeables platform. **Figure 34** depicts all available cards within it. For the purpose of buying recovered F-gas, he/she has to go to the "Your marketplace and trade journal" card and click on "Sales Center".

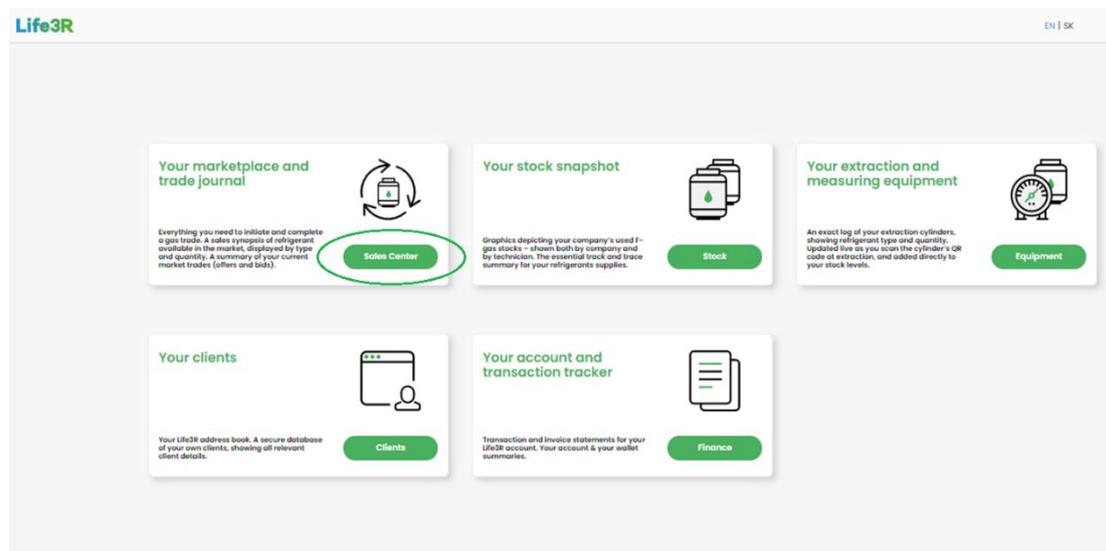


Figure 34: Buyer's main dashboard ("Sales Center" button is marked).



3.2 Access to F-gas stock for sale

Basically, it is the "Marketplace" sub-section that offers a full overview of the recovered F-gases available on the marketplace. As it can be seen in **Figure 35**, for each listing item, the buyer can access the following information:

1. The type of F-gas available.
2. The quantity in both Kg and cylinders.
3. The official or assumed F-gas quality.
4. The type of evaluation applied for the estimation of F-gas quality grade.
5. The seller.
6. The date submitted to the Retradeables marketplace.

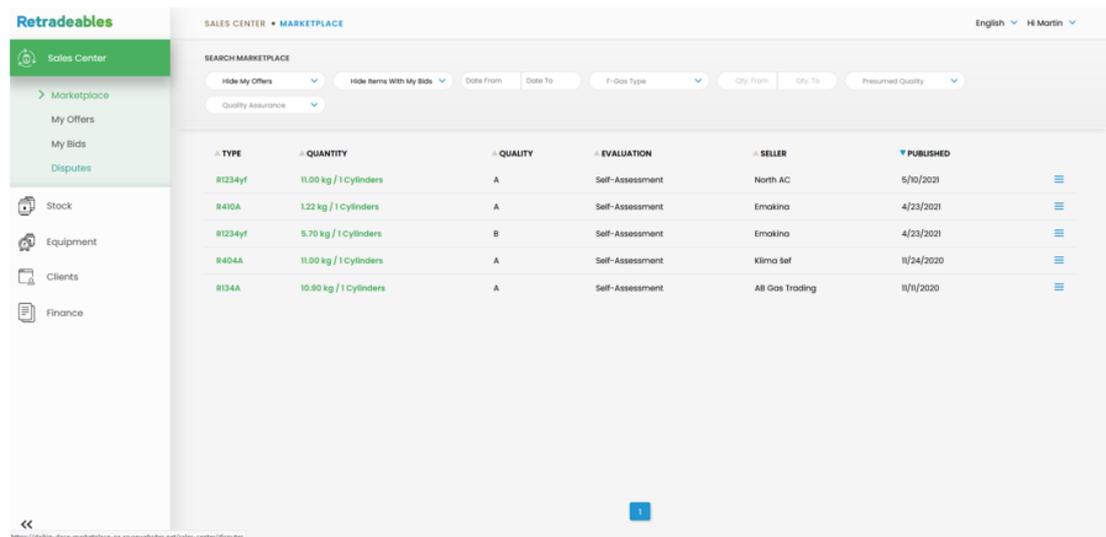


Figure 35: User Interface (UI) design of "Marketplace" sub-section of "Sales Center".

3.3 Place a bid

In the case that the buyer is interested in one or more of the listing items, he/she must click on the corresponding burger menu on the far-right corner and select the "Place bid" option (**Figure 36**).

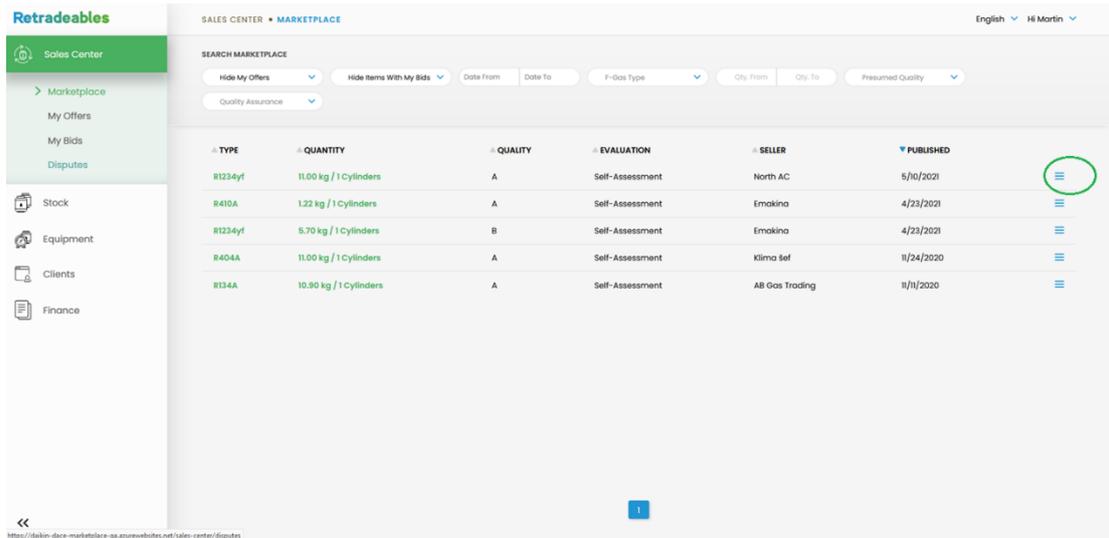


Figure 36: The burger menu through which one or more of the selling items on the "Marketplace" can be selected by the buyer in order to place a bid.

A "Place bid" form will then pop-up where the buyer needs to specify the amount of money that he/she is willing to pay per kilo of selected F-gas, depending on its final and determined quality. Meanwhile, the total amount of each transaction (total bid) is automatically calculated at the bottom of the form as a combination of the entered price/kg and the total quantity, too (Figure 37).

Place bid

START — PRICE PER QUALITY OF NET WEIGHT AMOUNT — FINISH

You are about to place a bid on published offer
Enter your bid per kilo for each quality grade.
Total bid price is calculated per net weight of extraction cylinder.

A Grade	B Grade	C Grade
100.00 EUR \kg	50.00 EUR \kg	10.00 EUR \kg

Total Bid for R1234yf:

A Grade / 11.20 kg	B Grade / 11.20 kg	C Grade / 11.20 kg
Buyer's Deposit 1120.00 EUR + VAT	Seller's Deposit 560.00 EUR + VAT	Seller's Deposit 112.00 EUR + VAT
1344.00 EUR	672.00 EUR	134.40 EUR

Previous | FINISH

Figure 37: The "Place bid" pop-up form.

All the bids are supposed to be always placed based on the net weight of extraction cylinder. This means that if by the end of the purchase there is a difference in the weight, then any additional/negative costs will be automatically adjusted before being paid out to the relative party. Moreover, it should be highlighted that the bid price for the C-quality grade is equivalent to the amount of money that the buyer would require the seller to pay him/her in order to arrange the appropriate disposal. Finally, it is the "Finish" button that the buyer has to click so that completing the placement of his/her bid for a stock (see Figure 37).

After that, the buyer will be redirected again to the main Sales Centre page where a kind of success message will appear such as "Proposal has been placed" is. In addition, the stock for which a bid has just been placed on, it will be filtered out of the list of available F-gases on the marketplace and therefore will now be detected in the "My Bids" sub-category of "Sales Center" section (**Figure 38**). It is reminded that the seller's side receives a notification once the buyer has placed a bid to be reviewed.

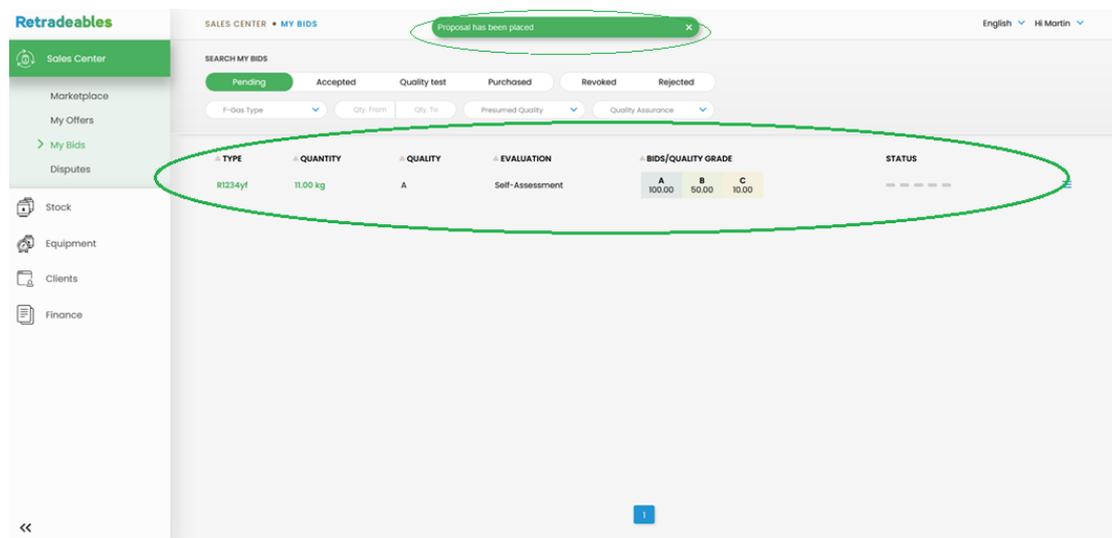


Figure 38: User Interface (UI) design of "Pending" tab under "My Bids".

Furthermore, a buyer can follow the complete journey of a bid through the top tabs (functionalities) available in the "My Bids" sub-section (**Figure 39**). Basically:

1. New submitted bids will always appear on the "Pending" tab.
2. Each acceptable bid will then move to the "Accepted" tab.
3. The quality test results to verify the presumed quality of the F-gas will appear in the "Quality test" tab.
4. After a purchase is finalised, the relevant bid will appear in the "Purchased" tab.

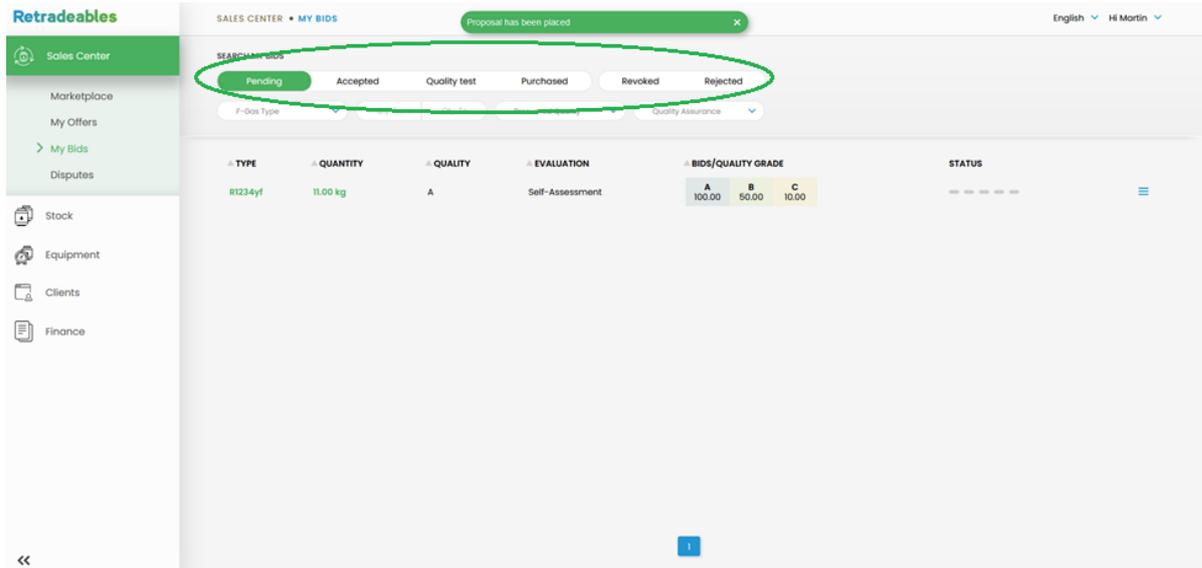


Figure 39: Available functionalities in the "My Bids" sub-section of "Sales Center".

As shown in **Figure 40**, a buyer is also able to withdraw a bid if he/she changes his/her mind for any reason. This can be achieved by clicking on the burger menu in the right-hand corner of the corresponding item row and then selecting "Revoke bid". It is noted that this action is only possible if the seller has not accepted the relevant offer, yet. Hence:

5. Revoked as well as rejected bids will appear in the respective tabs.

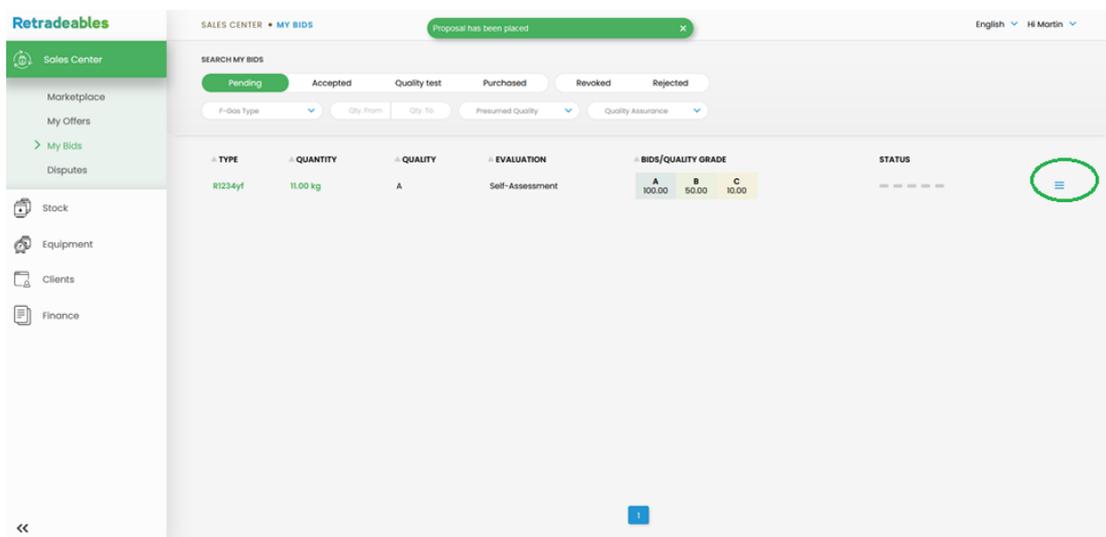


Figure 40: The burger menu through which the "Revoke bid" option becomes available. ("Pending" tab)



3.4 Buyer's Retradeables e-wallet

As long as the buyer is waiting for the seller to accept/reject the bid, he/she has to ensure that his/her Retradeables e-wallet is credited, thus making the purchase process faster and easier if the offer becomes accepted. In similar way to the seller's mode, a "Finance" option is incorporated into the left-hand side menu via which transaction and invoice statements can be accessed (**Figure 41**).

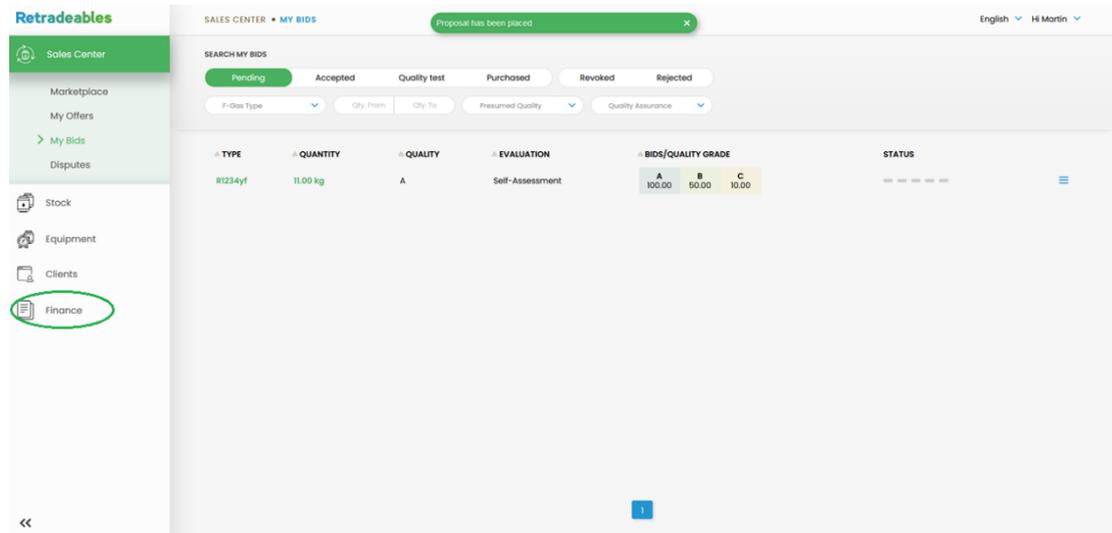


Figure 41: The "Finance" section containing transaction and invoice statements.

Especially, it is once again the "Transactions" sub-category of "Finance" that enables the buyer to manage funds for his/her trades as well as track all his/her transaction history. As depicted in **Figure 42**, he/she will also be able to add money to his/her e-wallet by clicking on the three-dot functionality available in the "Main Wallet" field and then selecting "Deposit funds" option. After that, a dedicated form will pop-up. There, the buyer has to specify the amount of money to be added to the e-wallet and click the "Finish" button afterwards. Once submitted, the buyer will be provided with all the necessary information to transfer the funds directly from the bank account to the Retradeables e-wallet.

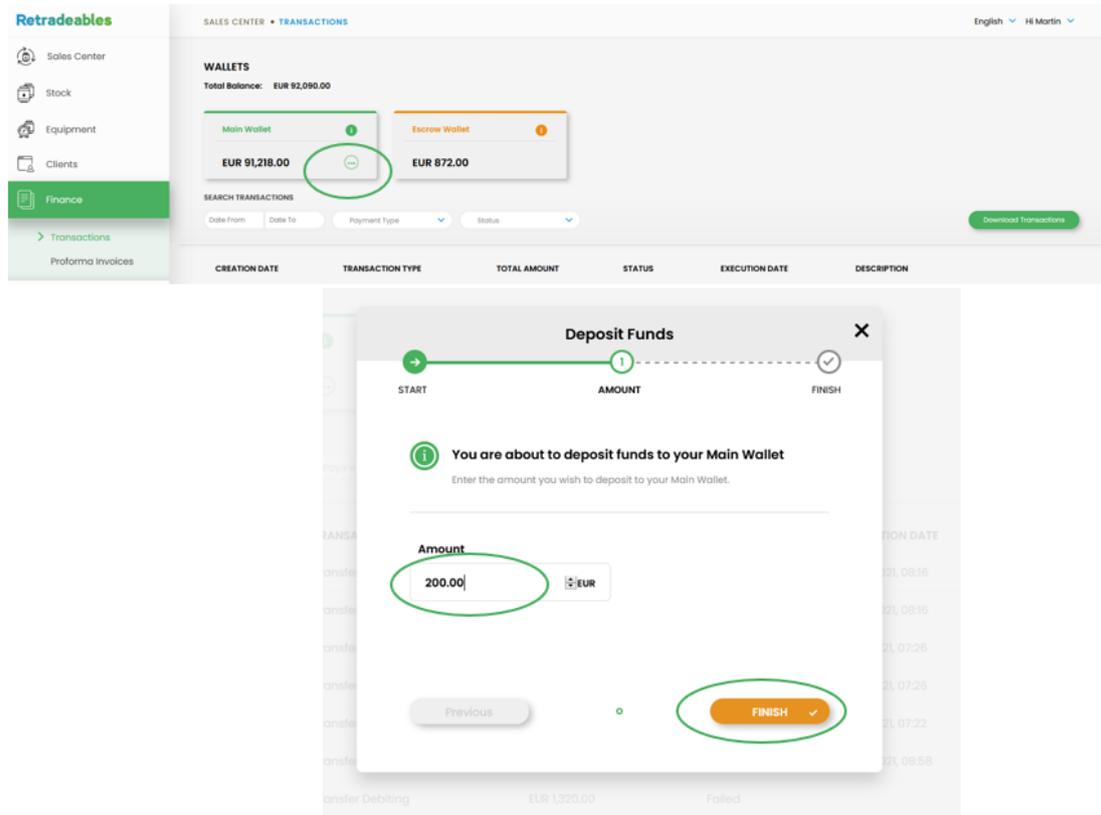


Figure 42: The 3-step process for depositing funds into the buyer's Retradeables e-wallet.

To conclude, it should be highlighted that only if the buyer has already set up his/her payment details as well as completed MANGOPAY's KYC process during registration, he/she can smoothly manage Retradeables e-wallet.

3.5 Finalize a purchase

3.5.1 Payment requirements

Once the seller accepts/rejects the buyer's bid, the latter one will receive a relevant email notification at the email address indicated when creating his/her account in Retradeables platform (**Figure 43**). Either the accepted or rejected bids can also be detected in the "Accepted" and "Rejected" tab under "My Bids" menu, respectively.

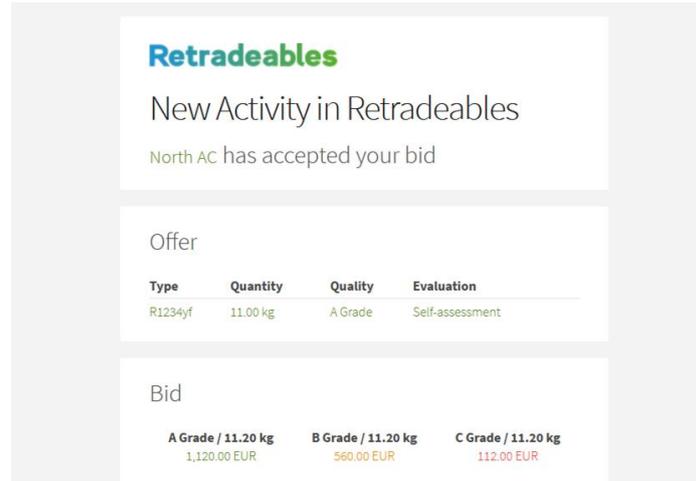


Figure 43: The notification email sent to the buyer to announce that his/her bid was accepted.

As previously stated, the acceptance of a bid by the seller is followed by the requirement to put in escrow the specified amount of funds if the F-gas quality is determined to be C-grade. Likewise, the buyer should now place the amount of money that matches A/B grade (**Figure 44**).

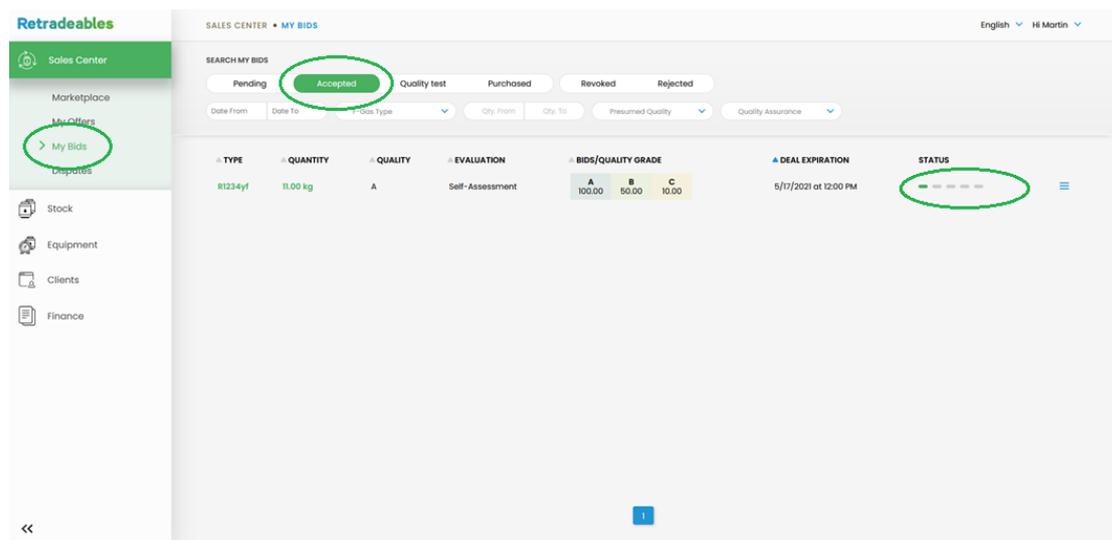


Figure 44: User Interface (UI) design of "Accepted" tab under "My Bids".

To put the specified funds in escrow, the buyer must click on the burger menu in the right-hand corner of the corresponding item row and select "Proceed to Payment" (**Figure 45**).

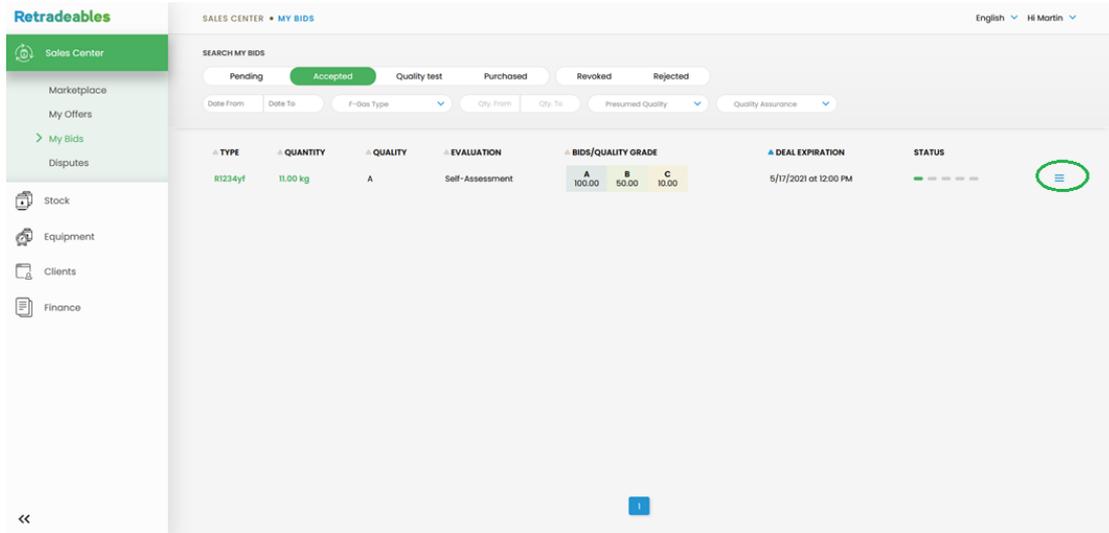


Figure 45: The burger menu through which the "Proceed to Payment" becomes available. ("Accepted" tab)

Subsequently, a pop-up form will appear under the label "Pay for A/B Grade". This will enable buyer to choose the favourable method of payment between a confirmed IBAN and e-wallet. After approving one of the two options above, the buyer has to select the "Finish" button. A typical design for a custom A-grade payment form is illustrated in **Figure 46**:

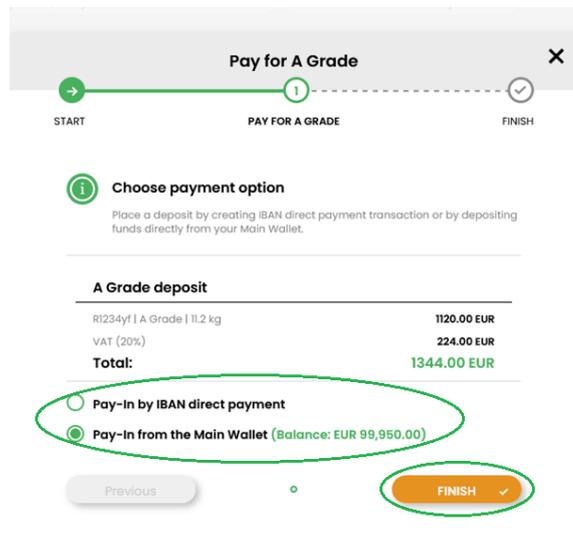


Figure 46: The two pay options provided to the buyer (A/B)- Quality Grade Scenario).

The rest of the process will be done automatically. Meanwhile, the buyer is going to be taken back to the "My Bids" sub-section of the Retradeables platform where he/she will be able to see the status change of his/her bid (**Figure 47**). It is reminded that the funds from any party will only be exchanged if the entire purchase is complete.

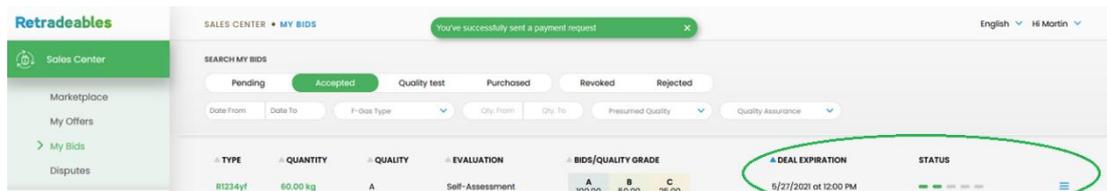


Figure 47: Status change after a successful payment request by the buyer ("Accepted" tab).

3.5.2 Collection requirements

The next part of the buyer's journey requires the F-gas collection. In this context, downloading of the Retradeables mobile app and accessing the company's account through it, both are considered as necessary prerequisites for the buyer or the person collecting the F-gas. Only then will they be able to confirm the collection within the platform and thus the F-gas transition from the seller to the buyer's possession.

The download process is quite simple as the buyer only needs to go to the main Retradeables dashboard and under user's name to select "Retradeables Technician Tools" (Figure 48).

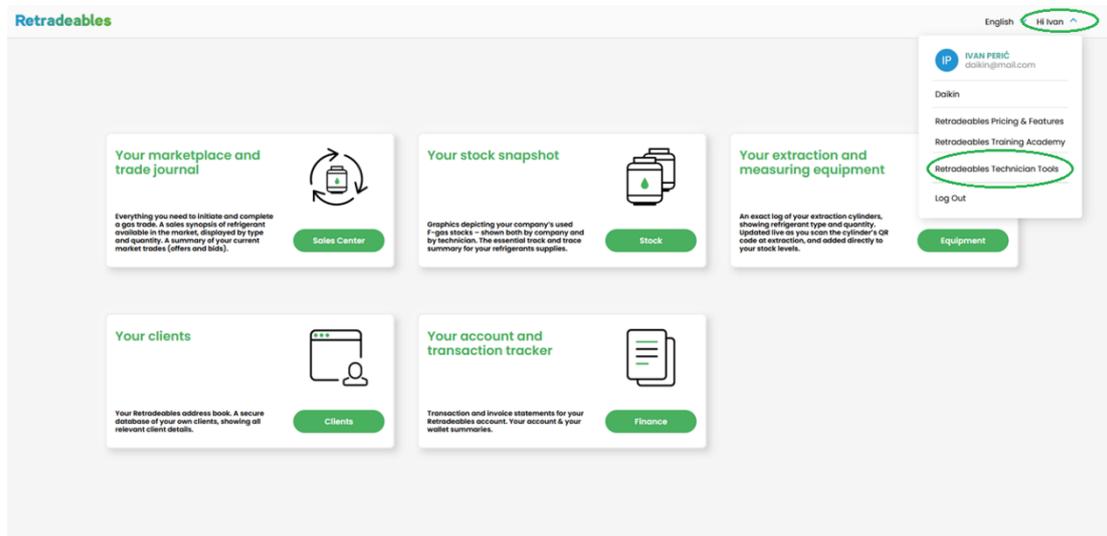


Figure 48: The "Retradeables Technician Tools" option available through the buyer's dashboard.

A new window, like this in Figure 49, is going to open containing a list of instructions to be applied. Previously, the operating system running the buyer's smartphone (IOS or Android) should have been selected.

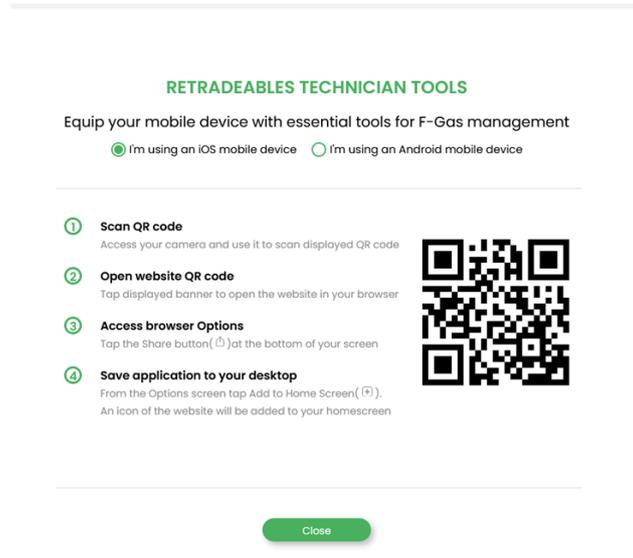


Figure 49: The list of instructions to be applied to download the Retradeables mobile app.

The proper implementation of the four steps listed in the figure above will mean the successful installation of the Retradeables app in the buyer's smartphone. Whenever the buyer is about to conduct an on-site F-gas collection, he/she will have to open the app from the home screen and log in. Normally, the start-up page will then become accessible for the buyer, who can enter the main menu by tapping on the plus symbol (+) on the top right corner (Figure 50).

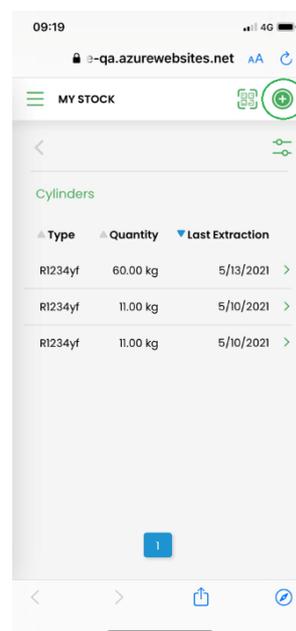


Figure 50: User Interface (UI) design of start-up screen of Retradeablesmobile app.

The main menu provides a wide range of available options, including that of "Collect F-Gas". Since both parties have placed the required funds in escrow, the buyer should tap on the option above so that he can see all ongoing bids currently at the collection stage (Figure 51).

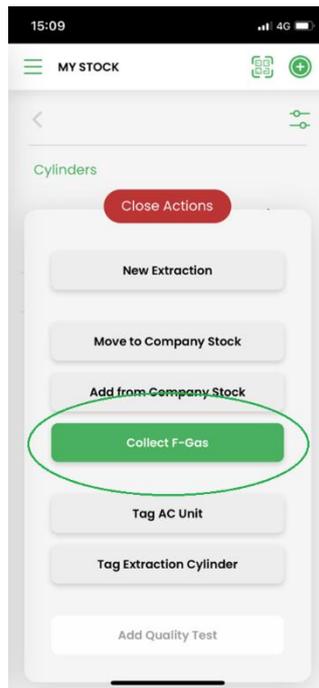


Figure 51: The "Collect F-Gas" option and the other ones available through the Retradeables mobile app.

By selecting the seller's name/surname in whose location he/she has just gone to arrange a F-gas collection, the buyer will be able to see all the basic company details (Figure 52).

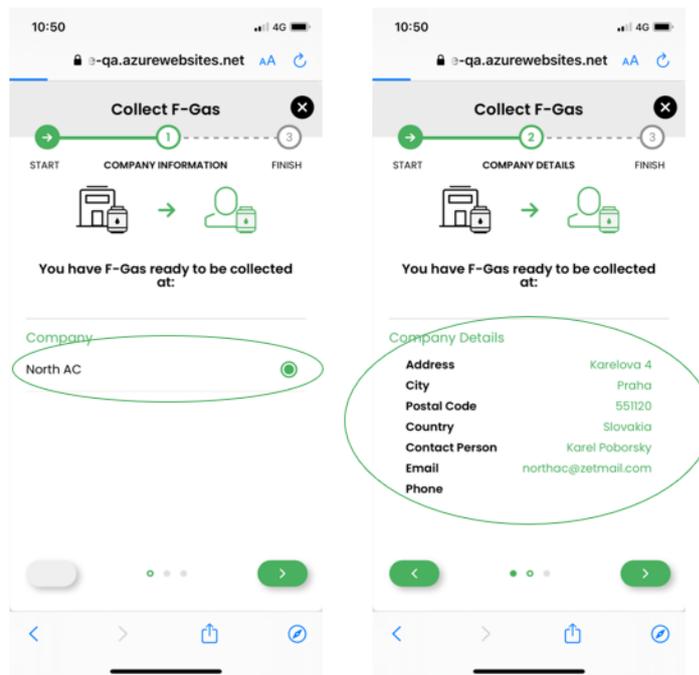


Figure 52: Getting access to information about the company that the buyer is to visit for F-gas collection purposes (Retradeables mobile app).

In the following stage, the buyer will be asked to either scan the QR code using his/her smartphone's camera or add the QR number of the cylinder in the available field (**Figure 53**). It is reminded that each installer (seller) will be required to add a QR code on any cylinders placed on the Retradeables marketplace in order to ensure the transparency and the correct validation of F-gas trades.

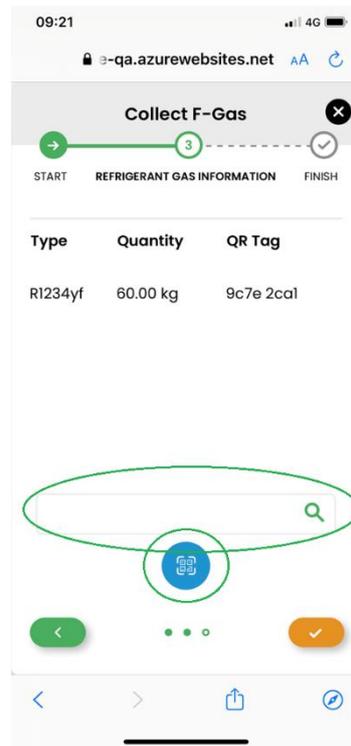


Figure 53: The two options available for submitting the QR code/number of the cylinder via the Retradeables mobile app.

Finally, the F-gas collection process is supposed to be ended with a success message at the top of the mobile screen, once the QR code of the cylinder is submitted. At the same time, an email notification will be sent to the buyer containing a confirmation that the F-gas stock was collected as well as details on the deadline for a quality test (**Figure 54**).

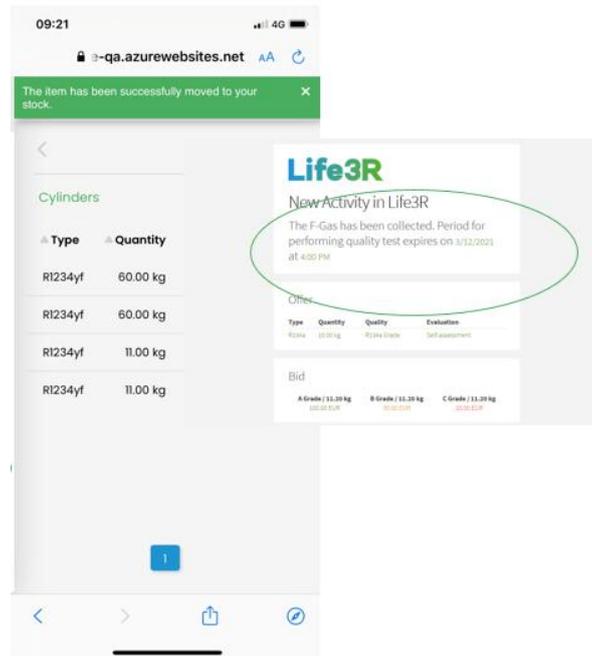


Figure 54: i) The success message appears on the buyer's mobile screen & ii) The confirmation email sent to the buyer (F-gas collection has been completed).

3.5.3 Quality check (optional)

Furthermore, the buyer must decide whether to purchase the collected F-gas for its presumed quality or perform a formal quality check in order to determine its true quality. For this reason, he/she firstly needs to go to the "My Bids" sub-category of "Sales Center" section where the newly collected F-gas can be tracked in the "Quality test" tab. As shown in **Figure 55**, the buyer should then click on the burger menu on the right-hand corner of the corresponding item row and select one of the two possible options: "Quality Test" or "Buy Presumed Quality".

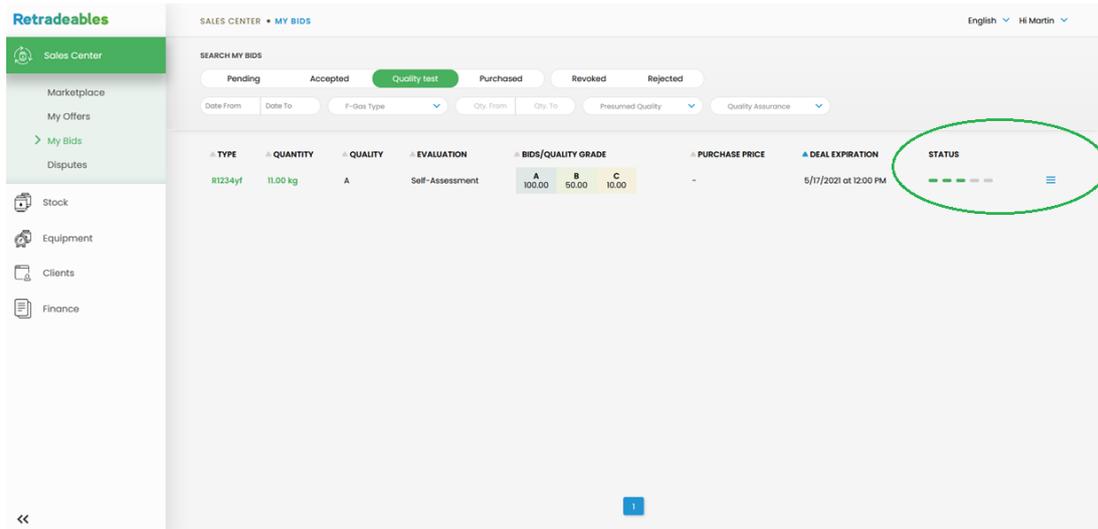


Figure 55: The burger menu through which the buyer can decide for the future handling of the collected F-gas ("Quality Test"/ "Buy Presumed Quality"). ("Quality test" tab)

If the first option is selected between the two above, a pop-up form will appear like this of **Figure 56**. In the case that the quality results present a different quality or quantity status than these ones shown by default in the form, the buyer will need to manually amend the "Measured Quality" and "Measured Quantity" fields, respectively. It is noted that a Quality Test must be performed per cylinder collected.

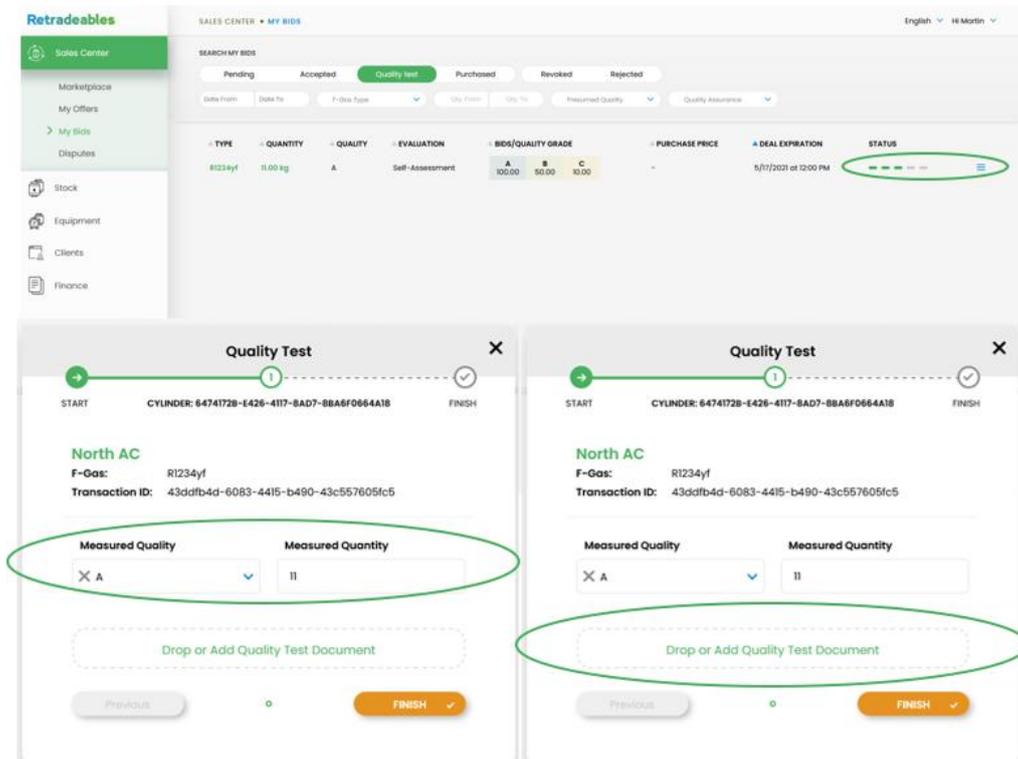


Figure 56: i) Updates on F-gas quality and quantity status & ii) PDF Quality test document to be added/uploaded by the buyer.

Finally, the buyer has to directly add (drop) or upload a PDF version of the quality test verification document to his/her possession, through the corresponding functionality within the form (see Figure 56). Once this requirement is also satisfied, the click of "Finish" button is considered to be the last step.

The seller will then be able to accept or reject the quality check results. The seller's final intention will be announced to the buyer via an email notification. If the reply is positive then the appropriate funds will be automatically sent to the respective party. As shown in **Figure 57**, an attached (PDF) file with all the relevant information about purchased F-gas will also be available within the email sent to the buyer. After that, the purchase is finished and the corresponding F-gas will now appear under the "Purchased" tab in the "My Bids" subsection of the Sales Centre.

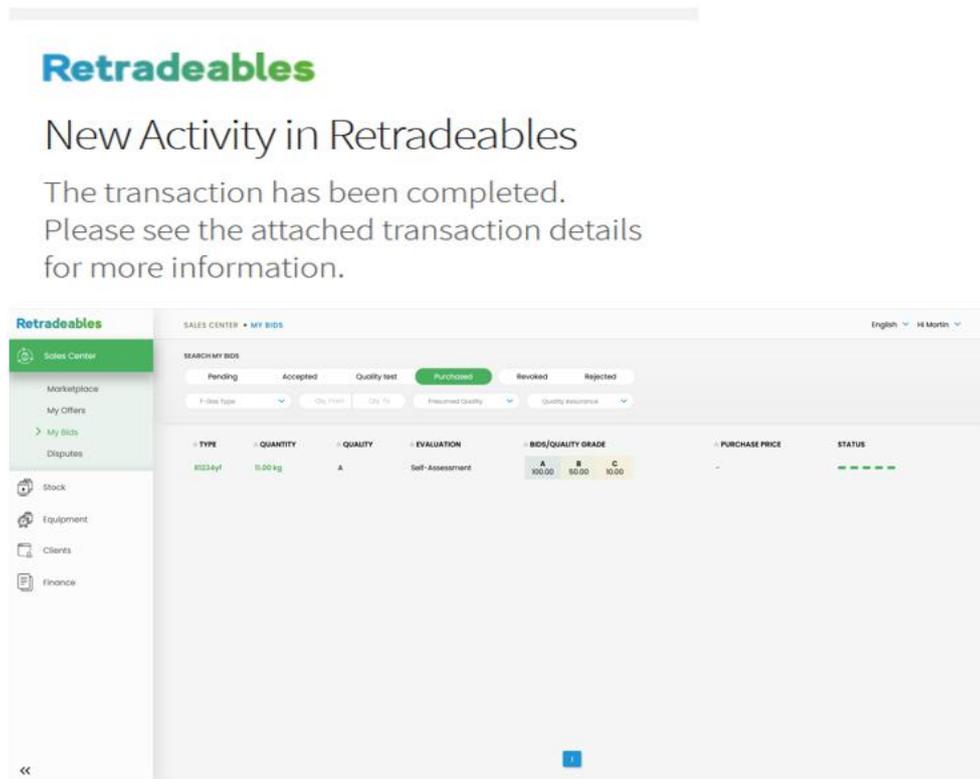


Figure 57: i) The confirmation email sent to the buyer to imply the end of the purchase & ii) User Interface design (UI) of the "Purchased" tab under "My Bids".

4 Conclusions

One of the basic goals of the Life3R project is to establish an online high-end marketplace across Europe, thus enabling both sellers and buyers to have a reliable trade of recovered F-gases within an innovative circular economy ecosystem. In this context, special emphasis is given on the proper development of the Retradeables platform so that well-defined legal frameworks, full-transparent transaction processes as well as secure payments methods can be guaranteed for all the acting parties.



Overall, the Retradeables marketplace is based on state-of-the-art technology to provide best performance and easy usage. This conclusion can be verified by the relevant operating manual briefly described in the present report. Although new upgrades are constantly applied until the final version is officially confirmed, a huge progress has already been made since a wide range of functionalities is incorporated into the current beta version of Retradeables, such as:

1. Registration as an installer or distributor company.
2. Validation check of Refrigerant licenses.
3. Data input of extracted F-gas.
4. Quality check and validation of the extracted F-gas.
5. Stock management of F-gas which should be recycled.
6. Supply and demand management including aggregation of average prices on the market.
7. Selling process including payment solution via SEPA transaction.
8. Data processing of information which is not accessible as today there is no mechanism/platform that helps to aggregate and modulate data directly as it is entered.

The platform is fully developed and the demos have started in the 3 selected countries (Slovakia, Hungary, and Czech Republic). These are considered to be the perfect test-case to scale the project to whole Europe.