System-Wide Flexibility Exchange • User Journeys

Introduction & Explanation

This User Journey document provides a map view of how the System-Wide Flexibility Exchange could operate within the electricity market ecosystem. To help illustrate this vision, a fictional set of user flows are described through the experiences of selected personas.

These three personas have been selected to represent how the SFE platform would interact with users from different areas of the market, from System Operators, to Aggregators and Investors.

This document depicts typical flows, with defined steps in their journeys. At each stage, you can see whether the process happens on or off the SFE platform, as well as the related Use Cases and associated Pain Points which are being addressed, down in the tramlines below. Here it is also possible to cross-reference some of the potential options suggested by IBM, relative to the execution of both the functionality and architecture of the SFE platform.

PERSONAS

Louis
- 27 years old
- Bachelor in Economics and Engineering
- Studied in Edinburgh
- Works on a flexible part-time basis
- Looking to be the first tech-savvy partner

'New to market Aggregator'

STRENGTHS
- He is good at analysing markets
- Understands key aspects of energy regulations

NEEDS, WANTS AND MOTIVATIONS
- He wants his company to succeed in gaining a significant market share of the flexibility market and is looking for opportunities to help him achieve this goal
- Motivated by net-zero goals and the democratisation and digitalisation of the energy market

> "I'm proud to be part of a young and ambitious start-up, but there's a lot of pressure on me to learn the complexities of the market quickly."

PAIN POINTS
- The company is new to the market, their team is small and there is a lot of work and different tasks that he needs to get up to speed with in a short amount of time
- Lack of knowledge and experience in the market and how it operates on a daily basis
- Current uncertainty and instability in new forms of energy is putting a lot of pressure on him to focus and perform which is attributed by his senior management in the company

Ed
- 37 years old
- Bachelors in Electrical Engineering
- Studied in Paris
- A practical approach to problems
- Enjoys working as part of a wider team

'System Operator'

STRENGTHS
- He is good at remaining calm under pressure
- He focuses on facts and is a logical thinker

NEEDS, WANTS AND MOTIVATIONS
- He wants to widen clear boundaries between work and private life
- He needs good internet access on weather, supply & demand data to record a live ride
- His goal is to operate at a low cost level whilst maintaining security of supply

> "The NSE role is very challenging and intensive, which I quite enjoy."

PAIN POINTS
- Working in a fast-moving, small, units aren't user friendly and can't handle the amount of data such units
- It's hard to manage the growing number of DFSPs
- He lacks properly prioritised visualisation of data

Emma
- 44 years old
- Masters in Finance from Bath Uni
- Lives in London
- Enjoys playing team sports
- Spends a great deal of time researching financial information from news, podcasts and newspapers

'Investor'

STRENGTHS
- Strong analytics, mathematical and analytical thinking
- Growing and maintaining a portfolio

NEEDS, WANTS AND MOTIVATIONS
- Wants to maintain a worthwhile return on her investments
- Is looking for opportunities to diversify her investment portfolio
- She is motivated by identifying new innovative markets and products which have a high growing rate

> "Understanding previous prices and performance is good, but what we really need to know is trustworthy forecast of how the markets will develop in the future."

PAIN POINTS
- Energy Ltd is currently being made particularly challenging due to the volatility within the energy sector
- She is frustrated by the lack of transparency within both markets and products
- Emma finds the regulatory uncertainties within the energy markets, an unnecessary complication

1. Shaping the Market and Products

Louis
NEW TO MARKET AGGREGATOR

Context
A new aggregator wants to understand the different flex markets, market needs and the potential value of an asset (type) to decide which products/assets to pursue.

Louis goes to the Landing Page to register as a new aggregator. Since Louis is a new aggregator, he gets an email and verifies his account.

Louis explores the market trends to understand the high-level potential business value for the next 2 years and long term. "Which markets are on a growth curve, how was the price development,?"

Next he reads up on policy information and the latest news on recent developments and regulation for certain asset types and markets.

Use Case Legend

- Maintain the taxonomy — An easy way for the SFE admin user to make changes to the taxonomy through the UI.
- User registration — Enables users to access the exchange facilitating access to multiple markets through a unified experience.
- Asset registration — Flexibility service provider registers assets 'once', by providing detailed information (such as asset type, location, asset size, connection point) common to all products/markets.
- Product registration — Once a System Operator is register a product is published.
- Role enablement — A rules engine, ensuring adherence to the rules around participation in multiple markets.
- Reporting on prices and volumes for market trends — Provision of information around prices and volumes that were sold, broken down by product and asset type, to support DFSPs, suppliers and investors in understanding market trends.
- Existing information provision (market rules) — Presenting current market rules in a single place to make them easy to find.
- Asset value based on historic data — Guides DFSPs in deriving a high level understanding of what their asset would have been worth in the past to support building an initial business case. Asset value per asset type.
- Understand eligibility for pre-qualification — Enables DFSPs to easily understand which products their asset(s) could get pre-qualified for.
- Reporting on trade, dispatch and settlement for asset performance — Provision of information around trades, dispatch and settlement broken down by asset type and location to support DFSPs with performance analysis.
- Market conflict identification — If one asset is participating in two markets and there is a conflict, users are alerted to it.
- Market testing of products — Enable SOs to test new products by allowing DFSPs to provide early feedback.
- Streamlining contracts across markets & products — Simplifying and digitalising contracts across multiple markets.
- Centralised pre-qualification — Enable DFSPs to enter data that is common to the pre-qualification processes for many products in one place, reducing admin burden and repetition.
- Transparency of DFSP positions & actions — Enable market coupling by creating transparency of asset position and action.
- SO disclosure of rationale behind asset dispatch — Add transparency around dispatch decisions.
- Secondary market — Creating a Secondary market where DFSPs can resell their successful bids. This allows DFSPs to offload asset that, based on their positions, ended up being more than they want and much money will their assets be provided.
- Bid strategy support (third party offering) — Enable DFSPs to make bids in a way that maximises the best way for their assets at any point in time.
- Asset value using price forecasting (third party offering) — Third party service to forecast the asset value for a specific asset (group).
- Dispatch — Send instruction signal to assets to confirm set point, start and end time.
- Feature — Collect data on prices, volumes, dispatch, trades, metering and settlement.

Ed
SYSTEM OPERATOR

Context
A System Operator wants to register a new product and retrieds details to SFE to gather some market feedback.

Ed goes to the Landing Page to register as a new user, choosing the "System operator" role. Since Ed is a new user, he gets an account and that he is actually a system operator.

Ed's team is designing a new product which they want to test with the market to get feedback. They want to understand the product design, and other market participants are able to provide feedback.

Key:
- User Steps — Process happens **on the SFE**
- User Steps — Process happens **off the SFE**
- MS.UC — **Architectural** Implementation Option for mentioned Use Case
- PS.UC — **Functional** Implementation Option for mentioned Use Case

Emma
INVESTOR

Context
Emma wants to understand how attractive an investment in flexibility assets would be.

Emma goes to the Landing Page to register as a new user, declaring her role as investor. She gets an email and verifies her account.

Emma explores market trends to understand the high-level potential business value for the next 2 years and long term. "Which markets are on a growth curve, how was the price development?"

Next she wants to understand the performance of different asset types, broken down by asset size.

Emma explores asset data to get a group of assets priced for multiple markets/ products) so she can utilise the asset value functionality.

Emma wants to understand her asset value based on historic data to get a first high-level business case.

2. Understanding / Exploring the Flexibility Market

Context
Aggregator has decided which products/markets they want to partake in, and is now undertaking the asset registration and subsequent prequalification.

The positive value case motivates Louis to pay for the more detailed 'forecasting capability' an external company provides combining SFE data with their own algorithm. This helps her to understand even better what the future value of his assets could be.

Louis shares the positive value case with the asset owners, and they agree to go ahead and build the capabilities to invest in flex assets. They start the prequalification processes for two products via SFE.

Context
A System Operator registers the new product and sets up the pre-qualification process for it.

Ed registers a new product that the SO is launching.

Pre-qualification process for the new product is defined and implemented.

A few weeks later, Ed reviews the first pre-qualification results for the product launched with the FSP, after a successful pre-qualification.

Context
Investor has decided which products/markets they want to partake in, and is now undertaking the asset registration, and subsequent PQ.

The positive value case motivates Emma to pay for the more detailed 'forecasting capability' – an external company provides combining SFE data with their own algorithm. This helps her to understand what the future value of her assets could be.

Emma shares her insights and the positive value case with investors/owners, and they agree to go ahead and build the capabilities to invest in flex assets.

3. Registration and Pre-qualification in the Flexibility Market

Context
Aggregator is partaking in the markets by bidding in auctions to utilise their assets, set flexibility and ends up winning one of their bids.

Louis is confident that he is allowed to bid for both products, which is confirmed by a pop-up notification.

Louis starts forecasting his available capacity, and bids into the auction for which he is pre-qualified. Information around his bids are captured on the SFE.

He won at an auction and is very happy.

Context
System Operator benefits from transparency around asset positions and dispatch signals.

Eds colleagues from the control room and the algorithm deciding which assets to dispatch, can see the asset positions and the planned actions of aDAsy assets they plan to dispatch.

The control room receives an alert that an asset is not responding to a dispatch signal, or a conflicting dispatch order from a different SO. They take action to resolve the conflict.

The control room discloses their rationale behind asset dispatch.

4. Partaking in the Flex Market
(Bids and Auctions)

Context
Aggregator gets dispatch notice from flex buyer to activate the product.

The system operator dispatches Louis' assets.

Louis receives payment for reservation and activation time.

Louis checks which assets were dispatched and provided the flexibility.

Context
Transparency of DER positions help identify market conflicts.

The assets are dispatched, as per the optimiser output.

5. Dispatch onward

Context
Aggregator starts the settlement process for transactions.

SFE role

- Role in Market Aggregator + Louis: Create a data entry for the user into database. SFE sends account confirmation link to user via email.
- Role in Market Aggregator + Louis: Provide raw data set on prices, volumes, dispatch and settlement
- Role in Market Aggregator + Louis: Provide an up-to-date collection of market rules and regulations
- Role in Market Aggregator + Louis: SFE provides some of the input data into the external algorithm. User interface allows Louis to select the functionality and view input and output data.
- Architecture: Creates a data entry for the user into database. SFE sends account confirmation link to user via email
- Role in Market Aggregator + Louis: SFE instrument depends on the option we choose. The SFE shows that the assets are prequalified for products A and B.
- Process: Provide raw data set on prices and volumes and simple graphs over a selected timeline
- Role in Market Aggregator + Louis: SFE uses asset register entry and historic data on asset performance, trades, dispatch and settlements to create the output
- Role in Market Aggregator + Louis: Option 1: SFE facilitates use of potential problem. Option 2: SFE blocks action if not in alignment with the rules
- Architecture: User interface allows Emma to select the functionality and view input and output data. SFE provides some of the input data into the external algorithm
- System Function: SFE creates an entry in the product database
- Role in Market Aggregator + Louis: Transaction data (bid) is ingested onto the SFE providing a unified data source across all products and markets in a harmonised taxonomy. The trading does not happen on the SFE.
- System Function: SFE provides the data via API
- Role in Market Aggregator + Louis: Transaction data (winning bid) is ingested onto the SFE providing a unified data source across all products and markets in a harmonised taxonomy.
- Consideration: Using a digital contract using a standard template defined by the SOs, referencing standards and codes as much as possible to avoid bilateral deviation
- Role in Market Aggregator + Louis: Transaction data (settlement) is ingested onto the SFE providing a unified data source across all products and markets in a harmonised taxonomy.
- Role in Market Aggregator + Louis: SFE identifies the conflict and send notification to all involved parties
- Role in Market Aggregator + Louis: SFE ingests the data via API and displays it through UI.

Functional and Architectural options

- MS.UC — Functional Options for UC2 — User Registration
  - Manual: user registration for our platform via a User Interface
  - Using a Single Sign On (SSO) for multiple platforms
- MS.UC — Functional Options for UC4 — Reporting on trade, dispatch, settlement
  - Data extracted as an Application Programming Interface (API)
  - Data extracted from SFE using a CSV download
  - Data can be extracted from SFE via both an API and CSV Downloads
- MS.UC — Functional Options for UC10 — Reporting on trade, dispatch, settlement
  - Data extracted as an Application Programming Interface (API)
  - Data extracted from SFE using a CSV download
  - Data can be extracted from SFE via both an API and CSV Downloads
- MS.UC — Architectural Options for UC3 — Asset Data
  - (a) Store data on platform in a standard form via a set-UI
  - (b) Store data in platform in a standard form via an API (the data requires the product owner to have a standard mandate)
  - (c) Access data via an API on an as-needed basis. This data would remain the property of the asset owner (data extracted from system could be translated by humans or machines)
  - (d) Access data via an API on an as-needed basis. This data would remain the property of the asset owner (data extracted from system could be translated by humans or machines)
- MS.UC — Architectural Options for UC4 — Product Data
  - (a) Store data in SFE platform in a standard form via a set-UI
  - (b) Store data in SFE platform in a standard form via an API (the data requires the product owner to have a standard mandate)
  - (c) Access data via an API on an as-needed basis. This data would remain the property of the asset owner (data extracted from system could be translated by humans or machines)
  - (d) Access data via an API on an as-needed basis. This data would remain the property of the asset owner (data extracted from system could be translated by humans or machines)
- MS.UC — Architectural Options for UC10 — Asset-side Issuance of historic data
  - (a) Data is standard format
  - (b) Data is source format
  - (c) Data stored locally in SFE
  - (d) Data provided from data owner, via API
- MS.UC — Architectural Options for UC5 — Asset-side Issuance of historic data
  - (a) Data is standard format
  - (b) Data is source format
  - (c) Data stored locally in SFE
  - (d) Data provided from data owner, via API
- MS.UC — Architectural Options for UC6 — Asset-side Issuance of historic data
  - (a) Data is standard format
  - (b) Data is source format
  - (c) Data stored locally in SFE
  - (d) Data provided from data owner, via API
- MS.UC — Architectural Options for UC7 — Asset-side Issuance of historic data
  - (a) Data is standard format
  - (b) Data is source format
  - (c) Data stored locally in SFE
  - (d) Data provided from data owner, via API
- MS.UC — Functional Options for UC11 — Standardised Pre-Qualification
  - Users complete entirety of pre-qualification process on SFE
  - Some steps completed on the SFE (e.g. asset-data submission), and some completed off the SFE (e.g. testing requirements)
- MS.UC — Architectural Options for UC5 — Asset-side Issuance of historic data
- MS.UC — Functional Options for UC12 — Market Conflict Identification
  - Flexibility Service Provider
  - Properties
  - Reserve
  - Triggers
  - Event driven
  - Schedule driven

Pain Point addressed

- Louis registration: This is standard user registration. At the moment, Louis is required to register on multiple platforms for multiple different platforms if they want to participate in multiple markets, resulting in an unhealthy user experience.
- Reporting on prices and volumes for market trends: Lack of information on historic prices and volumes broken down by product and asset (products to provide available and not easy to interpret).
- Reporting on trade, dispatch and settlement for asset performance: Users experience a lack of visibility and transparency on trade, dispatch and settlement data across markets, so they can truly understand how assets are being utilised.
- Existing information provision (market rules): Existing information is disparately provided over multiple platforms, leading to confusion and potential over-trading.
- Asset registration: Asset registration is repeated many time a flex asset owner wants to participate in more than one market/product, this creates duplication of data entry, in different formats and taxonomies, this causes unnecessary admin burden.
- User registration: This is standard user registration. At the moment, Louis is required to register on multiple platforms for multiple different platforms if they want to participate in multiple markets, resulting in an unhealthy user experience.
- Understand eligibility for pre-qualification: It is often challenging to understand which products an asset (or asset group) could be prequalified for.
- Market testing of products: Feedback on new products is often informal and not well documented, which makes capturing feedback from a range of DSOs a difficult to incorporate and products are not optimised to the widest market feasible.
- Understand eligibility for pre-qualification: It is often challenging to understand which products an asset (or asset group) could be prequalified for.
- User registration: This is standard user registration. At the moment, multiple different platforms if they want to participate in multiple markets, resulting in an unhealthy user experience.
- Product registration: Once Louis is an enabler for other use cases, Louis is required to register a product in order for their assets and be able to be registered for a certain product.
- Centralised pre-qualification: Louis is required to enter data for each product, which requires time and money to decode the requirements, decide if data entry is worthwhile, and then enter the data in a manner that is laborious and time consuming.
- Reporting on prices and volumes for market trends: Information on historic prices and volumes broken down by product and asset (products to provide available and not easy to interpret).
- Reporting on trade, dispatch and settlement for asset performance: Users experience a lack of visibility and transparency on trade, dispatch and settlement data across markets, so they can truly understand how assets are being utilised.
- User registration: Asset registration is repeated many time a flex asset owner wants to participate in more than one market/product, this creates duplication of data entry, in different formats and taxonomies, this causes unnecessary admin burden.
- Asset value based on historic data: Data is spread across multiple channels and platforms, which makes it difficult to collate data for DFSPs aggregators to understand performance of similar assets, and therefore the value of their own assets.
- Asset value based on historic data: Data is spread across multiple channels and platforms, which makes it difficult to collate data for DFSPs aggregators to understand performance of similar assets, and therefore the value of their own assets.
- Asset value using price forecasting (third party offering): Lack of understanding in which market an asset would be most valuable in, and how much value it could add in every market. This will only increase with markets are coupled.
- Product registration: Once Louis is an enabler for other use cases, Louis is required to register a product in order for their assets and be able to be registered for a certain product.
- Reporting on trade, dispatch and settlement for asset performance: Users experience a lack of visibility and transparency on trade, dispatch and settlement data across markets, so they can truly understand how assets are being utilised.
- Streamlining contracts across markets & products: Cumbersome contracting process has resulted in many flexibility providers to drop out of the SOs, hence this is not an ideal preferred market solution.
- Reporting on prices and volumes for market trends: Users experience a lack of visibility and transparency on prices and volumes broken down by product and asset (products to provide available and not easy to interpret).
- Reporting on trade, dispatch and settlement for asset performance: Users experience a lack of visibility and transparency on trade, dispatch and settlement data across markets, so they can truly understand how assets are being utilised.
- Market conflict identification: Lack of visibility of potential operating problems or conveying lack of conflicts.
- All processes of customer service: Lack of resource to provide service SOs do not (re)allocate it. Lack of resource to provide service SOs do not (re)allocate it. Poor transparency around the decision making on which results in flexibility providers to lose confidence in the commitment of the SOs.