Determination of the market volume for fluidized bed boiler services and development of an approach to ensure long-lasting customer loyalty

Master's thesis

by

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In Cooperation with:

ANDRITZ AG

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Kurzfassung

Die in Graz sitzende ANDRITZ AG wurde 1852 gegründet und beschäftigt ca. 25.000 Mitarbeiter in 40 verschiedenen Ländern, was die ANDRITZ AG zu einen der Weltmarktführer im Bereich des Anlagenbaus macht.

Mit Hydro, Pulp & Paper, Separation und Metals existieren vier verschiedene Bereiche innerhalb der ANDRITZ AG. Der Hauptfokus der ANDRITZ AG liegt auf Nachhaltigkeit und Umweltschutz, um dauerhaften Erfolg zu garantieren.

Die Produktgruppe „Power Plant Services“ der ANDRITZ Pulp & Paper (P&P) plant neue Serviceprodukte und Servicepakete für Boiler auf den Markt zu bringen. Hierbei werden Wirbelschichtkessel als Anlagen präferiert, da diese die meist genutzten Anlagen in der P&P Industrie sind. Aus diesem Grund möchte ANDRITZ P&P ein Key-Account-Management-System für ihre Topkunden etablieren um eine langfristige Beziehung aufbauen zu können. Die meisten Kunden befinden sich in der Pulp & Paper Industrie. Zum gegenwärtigen Zeitpunkt ist die ANDRITZ „Power Plant Services“ stark projektorientiert, allerdings soll in Zukunft aktive auf die Kunden zugegangen werden und Produkte/Services angeboten werden, welche die Wünsche und Bedürfnisse der Kunden befriedigt.

Das „Key-Account-Management“ beschäftigt sich mit der Betreuung von sehr wichtigen Kunden. Hierbei geht es nicht nur darum spezielle Serviceleistungen anzubieten, sondern auch darum, eine langfristige Kooperation mit dem Kunden aufzubauen. Dies wird benötigt, da der Austausch von Informationen und das Zusammenarbeiten Vertrauen generiert, was wiederum zu langanhaltenden Kundenbeziehungen führt.

Das Ziel dieser Arbeit ist es einen neuen Ansatz für die Kundenbindung in Europa zu definieren. Aus diesem Grund ist es wichtig die relevante Region exakt einzugrenzen, um die richtigen Daten zu erfassen. Im nächsten Schritt werden die wichtigsten Marktgrößen ermittelt, die zum gegenwärtigen Zeitpunkt noch nicht vorliegen. All dies dient dazu Kundengruppen zu bilden um die „Key-Accounts“ bestimmen zu können.

Das Ergebnis der Arbeit beinhaltet die Empfehlung, ein Pilotprojekt im Bereich „Key-Account-Management“ zu starten, damit ANDRITZ „Power Plant Services“ Erfahrungen in diesem Bereich sammeln kann. Dies soll helfen den benötigten Arbeitsaufwand für einen „Key-Account“ abschätzen zu können und daraus resultierend zu bestimmen wie viele „Key-Accounts“ betreut werden können. Kapitel 3.6 zeigt einen möglichen Ansatz, wie dieses Pilotprojekt ablaufen könnte. Während dieser Zeit sollte der Fokus nicht auf den Umsatz liegen, sondern vielmehr auf die Kundenzufriedenheit, da sich der Mehrwert eines „Key-Accounts-Management-Systems“ meist erst nach Jahren im Umsatz widerspiegelt. Ein großes Problem stellt der Mangel an Arbeitskräften dar, was sich besonders bei Ingieneurleistungen bemerkbar macht. Ein möglicher Ansatz um diesen Problem entgegenzuwirken wäre es ein allumfassendes „Key-Accounts-System“ für die gesamte ANDRITZ AG zu verwirklichen. Dies würde zusätzlich die Möglichkeit bieten, die Kunden effektiver betreuen zu können. Der Vorteil für den Kunden wäre es, dass dieser für sämtliche ANDRITZ AG Produkte einen Ansprechpartner hätte.

Abstract

The Graz-based company ANDRITZ was founded in 1852. ANDRITZ has about 25.000 employees in 40 different countries worldwide and is one of the world's biggest plant manufacturers. ANDRITZ comprises four business areas: Hydro, Pulp & Paper, Separation and Metals. To achieve long-term success, major goals of ANDRITZ are sustainability and environmental protection.

The product group (PG) "Power Plant Services" of ANDRITZ P&P wants to establish new service products and packages for boilers. The preferred boilers are fluidized bed boilers, more exactly circulating fluidized bed boilers and bubbling fluidized bed boilers. For this reason, ANDRITZ P&P wants to establish a key account management system for its top clients to ensure a long-term relationship. Most of the customers are settled in the Pulp & Paper industry, but there are also exceptions. Currently, the entire service business at ANDRITZ "Power Plant Services" is project-based, but the future focus should be on the active acquisition of customers in order to fulfil their requirements and needs.

Key account management is about establishing a close relationship with very important customers. It's not only about providing special services to them, but also to build up a kind of co-operation. This is needed because an exchange of information and co-working create mutual trust and reliance, and this leads to long-term relationships.

The main target of this master thesis is to develop a new approach for customer relations in Europe. It will be necessary to define the relevant region and the inspection area exactly in order to collect the appropriate data. In addition, it will also be crucial to calculate the market potential and the market share using this data. This will eventually serve to build up customer groups for the selection of the key account customers. Once the key accounts are defined, the potential competitors need to be analysed to find out how to face them with appropriate measures and create value added services.

The final recommendation for ANDRITZ "Power Plant Services" is to start a pilot project to get initial practical knowledge about the workload. Chapter 3.6 describes how to set up such a pilot project. During this project, the main focus should not be on the sales turnover, but on customer satisfaction because it usually takes several years to generate a sales benefit. A considerable challenge is the lack of workforce and engineering performance. One of the possible approaches to overcome these problems is a companywide ANDRITZ key account system. This would also make it possible to act more effectively because it would ensure that customers have one single person responsible for all ANDRITZ products.

Table of Contents

1 Introduction

1.1 Initial Situation

The Graz-based company ANDRITZ was founded in 1852. ANDRITZ currently operates over 250 sites worldwide and has 25,000 employees in 40 different countries all over the world. ANDRITZ is the world's biggest plant manufacturer, equipment producer, service provider for hydropower plants and in several other disciplines. There are four different fields within ANDRITZ AG: Hydro, Pulp & Paper, Separation and Metals. To achieve long-term success, major goals of ANDRITZ AG are sustainability and environmental protection. An additional goal is to achieve a growth rate of 5-8% every year. To ensure continuous growth, the enterprise invests about 3% of its yearly turnover into research and development.[1]

The product group "Power Plant Service" of ANDRITZ "Power Plant Services" wants to establish new service products and packages for boilers. The preferred boilers are fluidized bed boilers, more exactly circulating fluidized bed boilers and bubbling fluidized bed boilers. For this reason, ANDRITZ wants to establish a key account management system for the top clients to ensure a long-term relationship. Almost all customers are settled in the Pulp & Paper industry. Currently, the whole service business at ANDRITZ "Power Plant Services" is project-based but the future focus should be on the customers and their requirements and needs. [2]

Key account management is an approach suggested by Pegram in 1972. He examined how to deal best with the most valuable customers. In 1979, Kemna started to adopt the idea of key account management for the German market. In the 1980s, the key account management approach become more professional by some suggestions made in publications e.g. by Stevenson (1981) dealing with "national account management". Cunningham and Turnbull (1982) focused their research on the personal relations between companies. In the 1990s, key account management was booming. Since then the focus has been on global key account management which is a particular challenge because of the cultural differences. A magic recipe for successful key account management and for a lasting relationship with all important customers has not yet been found. In 2001, Jensen suggested that companies need to offer exclusive products and services and integrate top management into their key account management systems.[3]

[1] Cf. www.andritz.com (28.10.2017)
[2] Cf. Andritz Internal Data (2017=
[3] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 6 ff.

1.2 Targets of the thesis

This part of the thesis shows the big overall target and the sub-targets.

Main-Target
The target of this master thesis is to develop a new approach for selling services in Europe. The focus should be to ensure long-lasting customer loyalty by using a key account management system.

Sub-Target 1
Define the relevant region and the inspection area

Sub-Target 2
Collect market and (potential) customer data on the region which is defined in Sub-Target 1

Sub-Target 3
Look for ANDRITZ connections to highly attractive potential customers.

Sub-Target 4
Analysis of the customers and build customer groups for the selection of key account customers. Calculate the market volume by using the gathered information, internal databases, etc.

Sub-Target 5
Specify new added values and advantages for the potential key accounts.

Sub-Target 6
Formulate the strategy for the key account management system

1.3 Tasks

The structure of the thesis is divided into several tasks which are related to the above-mentioned targets:

Task 1:

- Use and analyse internal databases, papers and the intranet to define the region
- Definition of the region which is relevant for the product offered

Task 2:

- Analysis of the McCoy-Database which was modified by ANDRITZ
- Analysis of all relevant databases and papers
- Reduce the data on the relevant section
- Internet research
- Calculate the market volume and the market share

Task 3:

- Scan the ANDRITZ CRM-System for the potential key accounts
- Figure out if an ANDRITZ division is already in contact with that customer

Task 4:

- Define customer groups
- Assign customers to the groups, according to defined criteria

Task 5:

- Collect information on the internet about relevant products, services and the competitors
- Analysis of the competitors
- Examination of relevant internal papers
- Filter the gathered information
- Check for opportunities
- Find additional benefits for the key accounts

Task 6:

- Define and formulate a strategy with the collected information
- Work out how to use the information to establish a key account management system
- Look for new approaches to ensure long-lasting customer loyalty

Alongside the sub-targets, the following additional tasks should be considered:

- Research giving an insight into the topics of customer relationship strategies, key account management, sales psychology
- If necessary, procure additional data; contact customers
- Recording of the actual status

1.4 Field of Investigation

The limitation of the investigation is explained in this subchapter.

- Companies taken into consideration
  - ANDRITZ Pulp & Paper – PG Services
    - ANDRITZ Aktiengesellschaft (AG)
    - ANDRITZ Aktiebolag (AB)
    - ANDRITZ Osakeyhtiö (OY)
  - Costumers of ANDRITZ Pulp & Paper
  - Potential customers
- Region taken into consideration

  Countries with circulating fluidized bed boilers and/or bubbling fluidized bed boilers in geographical Europe
- Region not taken into consideration

  Everything outside of geographical Europe, even if the plants are operated by European customers

2 Theoretical Background

At this point the thesis deals with the theoretical background of key account management and related topics. The following theme is split into several subchapters: “Market and Marketing”, “Organisation”, “Fluidized Bed Boilers”, “Key Account Management”, “Change Management” and “McCoy and Pöyry”. These chapters explain the related topics to build up a basic knowledge for the practical part. The chapters are based on different literature and give an introductory insight into those topics.

In the first chapter, different terms are explained to provide all the information needed for a deeper understanding of the thesis. The next subchapter includes the company structure of ANDRITZ Kraft and Paper Mill Services (PKP) and all possible implementations of a key account management system. Subsequently the term key account management is highlighted in order to present a clearer understanding. The whole thesis will result in a change inside the company. How to deal with that change is discussed in the chapter “Change Management”. In the final subchapter there is a short introduction to the two databases, McCoy and Pöyry.

2.1 Market

The term market has different definitions. One of the most well-known definition is that the market is the place where buyers and sellers meet for the exchange of goods and services. The market activity is the clash of supply and demand.[4]

The two possible kinds of markets are the buyer’s market and the seller’s market. A buyer’s market describes the market situation where the consumer has a better bargaining position than the seller. The seller’s market is like the buyer’s market but the other way around. Currently the buyer’s market is more common today.[5]

For many decisions, it is necessary to know certain market values. These can be broken down into terms like market share, market volume, market potential and market capacity. [6]

[4] Cf. BRITZELMAIER, B.; STUDER, H.P. (2000), S. 27
[5] Cf. PIFKO, C. (2011), S. 12
[6] Cf. PIFKO, C. (2011), S. 12 f.

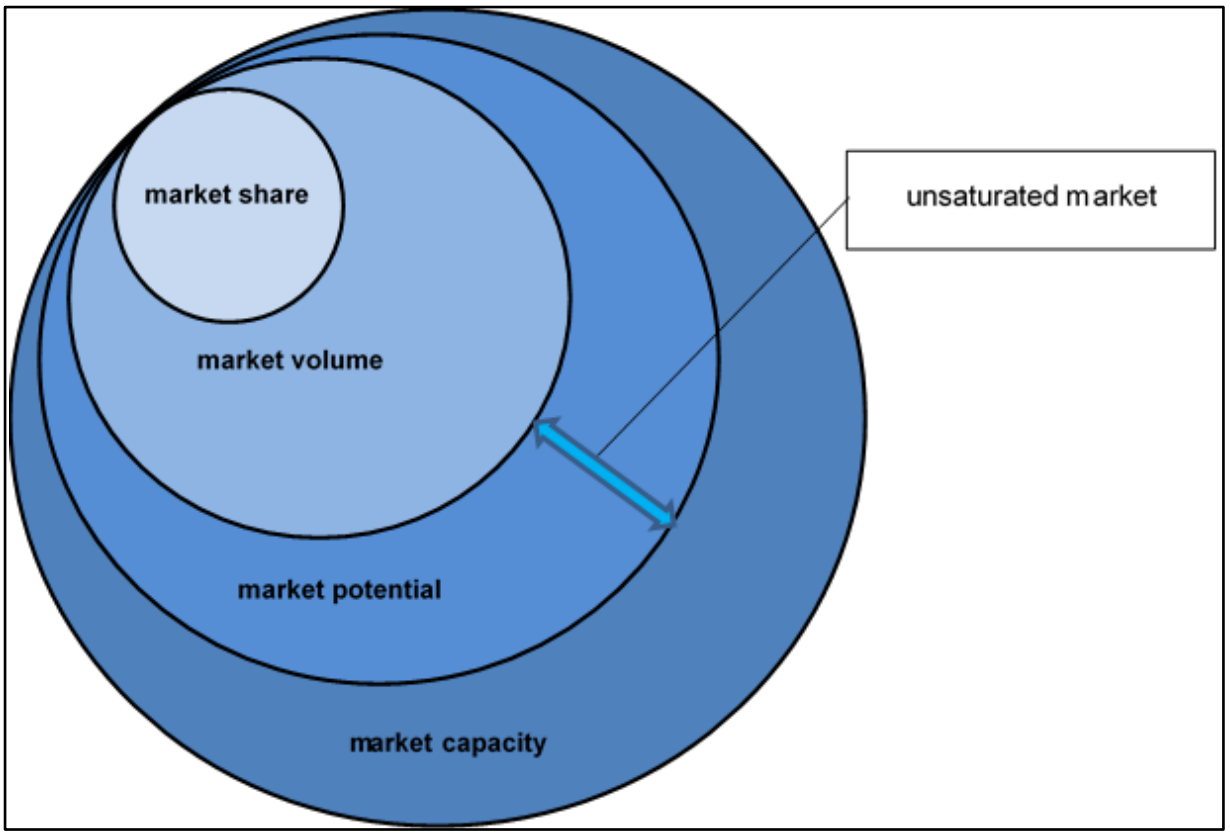

Figure 1: Market sizes [7]

Figure 1 illustrates the four market sizes and the unsaturated market. The market capacity is a theoretical size and stands for the maximum receptive amount of the market without taking the price and the purchasing power of the market into account. By taking the two excluded values into account, the market potential can be determined. The market potential is limited by the available money and the price perception of the customers. The market volume is the number of sold products or services inside the market. The deviation between the market potential and the market volume is the unsaturated market. Optimally, the unsaturated market should be zero. The amount of products which is derived from one specific company is known as market share.[8]

$$S = \frac{R}{V} * 100$$ Equation 1: Market share

S…Market share R…Corporate revenue V…Market volume

Equation 1 is for the calculation of the market share. Furthermore, the clash of supply and demand is called market activity. A positive change in the market share is called market growth and a negative market shrinkage. Normally, it is easier to gain market share in new/fast growing markets than in markets with strong price pressure.[8] [9]

[7] Cf. PIFKO, C. (2011), S. 46
[8] Cf. BRITZELMAIER, B.; STUDER, H.P. (2000), S. 29 f.
[9] Cf. KUß, A.; KLEINALTENKAMP, M. (2016), S. 40

Marketing is understood as a form of market-oriented corporate management, according to which all operational functions must be consistently aligned with the requirements of the sales market. The difference between marketing and selling is that marketing is consumer orientated and selling seller orientated.[10] [11]

There are three common types of marketing: consumer staples marketing, capital goods marketing and service-marketing. Consumer staples marketing – or business to customer (B2C) marketing – deals with physical products for the end consumer. The marketing mix for that kind of marketing is composed of the 4 P's. [12]

Product – design, function, development, etc.
Price – pricing
Promotion – communication and advertisement
Placement – implementation and control of the distribution

Capital goods marketing – or business to business (B2B) marketing – focuses on buildings, machinery and equipment. These goods are needed to produce and provide consumer or other capital goods. Service marketing can be found in e.g. banks and insurance groups. For this marketing group the 4 P'S are extended by 3 P's.[12]

People – helps to sell the service e.g. describes the friendly service
Process – who does what, when and how?
Physical evidence – a pleasing facility gives a sense of quality even if the product is non-physical

The 3 additional P's are needed because it is much harder to market a non-physical product. The reason for the harder market is that the customer can't touch, see and experience the product.[12]

To bring the products to the market different marketing concepts exist but every concept is built on the same 4 pillars:

- Focusing on the market
- Customer orientation
- Gaining profit through satisfied customers
- Holistic marketing

[10] Cf. LEVITT, T. (1986), S. 153
[11] Cf. BECKER, J. (2013), S. 3
[12] Cf. PIFKO, C. (2011), S. 21 ff.

For companies it's impossible to serve the entire market, therefore the right market must be de-limited and focused. To be able to offer a sought-after product the needs and wishes of the customers must be understood. If the needs and wishes are understood correctly, the customers will be satisfied. Customer satisfaction is highly important because relationships with long-term customers are cheaper than new customer acquisition. Holistic marketing means that the company must try to convey the marketing concept across every department in the whole organisation. As already mentioned above is it impossible to go for the entire market. For this reason, market segmentation is necessary. Market segmentation is the effective division of the market according to certain criteria. The focus is to find the right customer group for the company's product. Possible criteria could have a demographic, geographic or psychographic background. [13]

[13] Cf. THEWIßEN, C.; RUNIA, P.; WAHL, F.; GEYER, O. (2015), S. 5 f.

2.2 Organisation

ANDRITZ is organised as a joint-stock company / AG which is a kind of stock corporation. The liability of an AG is limited to the shareholder's capital contributions. For the foundation of an AG a minimum basic capital of 50000€ is needed. An AG is characterised by the following 3 organs:

- General meeting

  It consists of the shareholders and votes for the representatives onto the supervisory board.
- Supervisory board

  This organ is acting as a monitoring and control organ for the executive board.
- Executive board

  They are responsible for the leading tasks and the daily business.

Owing to different laws, the supervisory board must also contain employee representatives. Therefore, the steering of the company is split between the supervisory board and the executive board and is the so-called model of separation.[14]

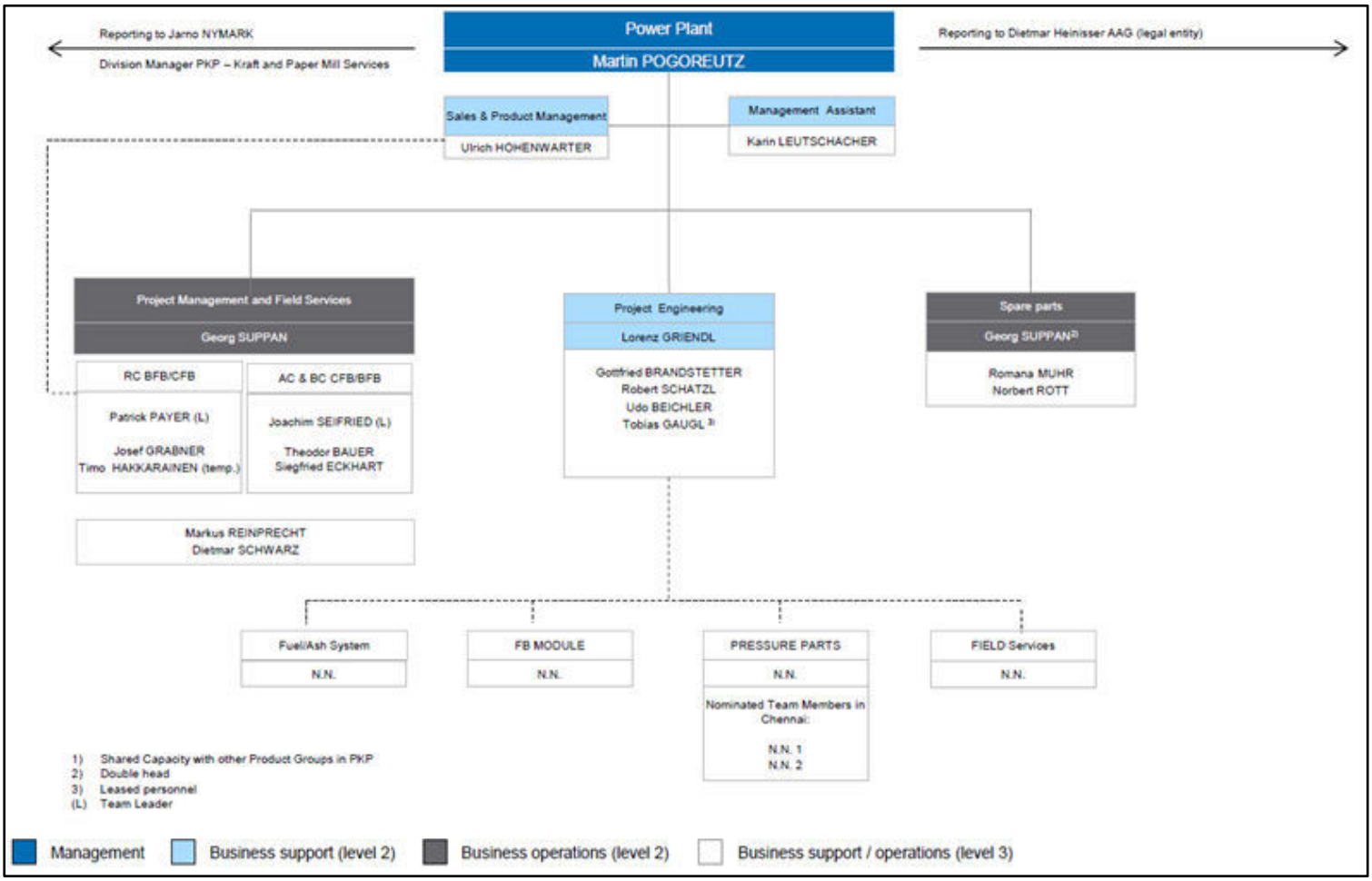

Figure 2: Organigram – Kraft and Paper Mill Service Division [15]

[14] Cf. HUTZSCHENREUTER, T. (2009), S. 43 f.
[15] Andritz Internal Data (2017)

The actual organigram of the Division PKP, which is hierarchically under ANDRITZ P&P and above the product group “Power Plant Services”, is shown in Figure 2. The shown “Project Management and Field Services” unit is also responsible for the sales. That unit is separated into two different subunits “Residue Concept (RC) BFB/CFB” and “Advanced Concept (AC) & Biomass Concept (BC) CFB/BFB”. At the current time there is no key account management department established at ANDRITZ P&P because of the lack of resources. There is a slim chance that there will be one in the near future. The idea of the management is that all employees who are working in the areas of RC and AB & BC, should be additionally used as key account managers in the future. [15]

The management unit “Sales & Product Management” should be the head of the key account management department, additional to standard sales and project management. However, the introduction of that system will need an extra employee for the co-ordination of the key account management to relieve the management and to improve the quality of the sales activities. [17]

2.2.1 Organisation of the key account department

Usually there are three different ways to establish a key account management system and operate with the key account managers (KAM).

1. Key account management as a line organisation

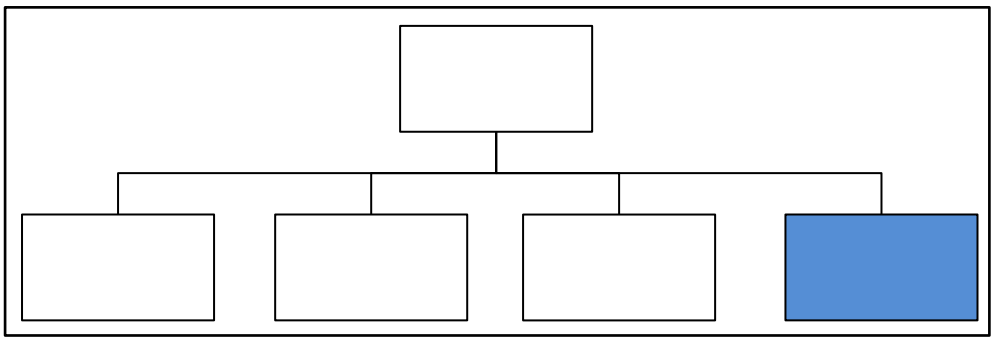

Figure 3: Line organization [16]

This integration of the key account management is used most often because the key account management is able to work autonomously and very efficiently. Due to the separate integration of the key account management it is easy to determine the specific costs and results. Another advantage is the simple integration into the existing organisation as illustrated in Figure 3. The key account unit is acting independently from the other units or as a part of the sales unit – as ANDRITZ management plans to do. The low assertiveness is because of a low hierarchical integration which can be regarded as a disadvantage of that kind of organisation.[17]

[16] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 162
[17] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 162 f.

2. Key account management as a matrix organisation

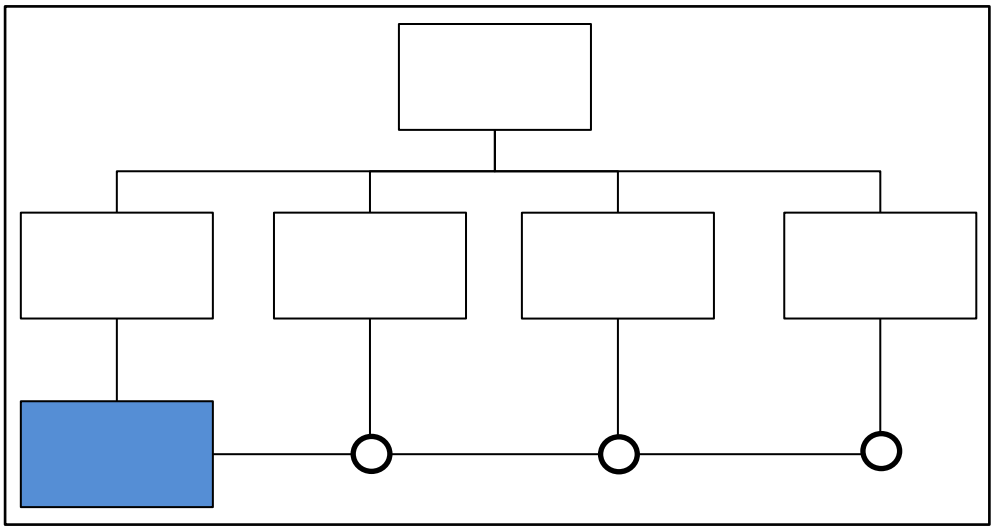

Figure 4: Matrix organization [16]

A matrix organisation in Figure 4 is an organisation with two equally important instruction systems. For key account management in particular, a matrix organisation is not common but often realized with interdisciplinary teams in the line organisation. The advantage of a matrix organisation is that the know-how of the single sectors, like IT, logistics, research and development etc., can be used in an effective way. Reasons why a matrix organisation is seldom used are: multiple authorities, high co-ordination costs, high pressure for the employees and time delays.[18] [19]

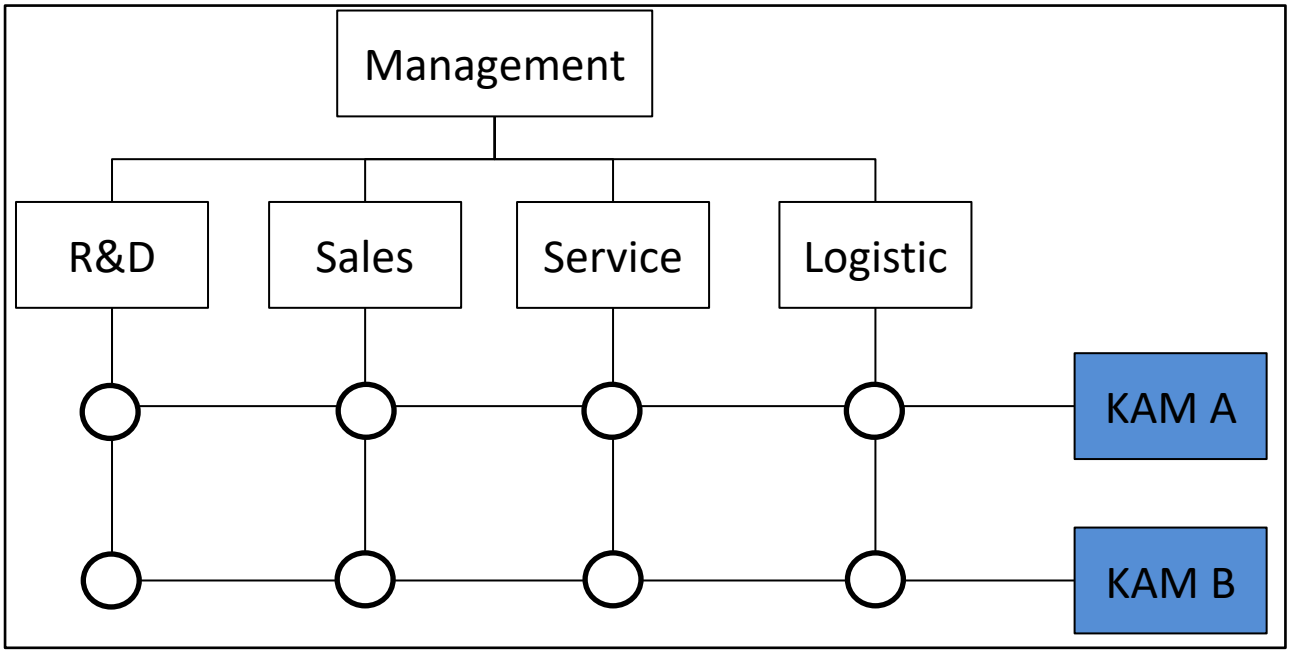

Figure 5: Key account management as customer-function-matrix [20]

[18] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 163 f.
[19] Cf. BAGUHL, O. (2004), S. 66 f.
[20] Cf. BAGUHL, O. (2004), S. 67

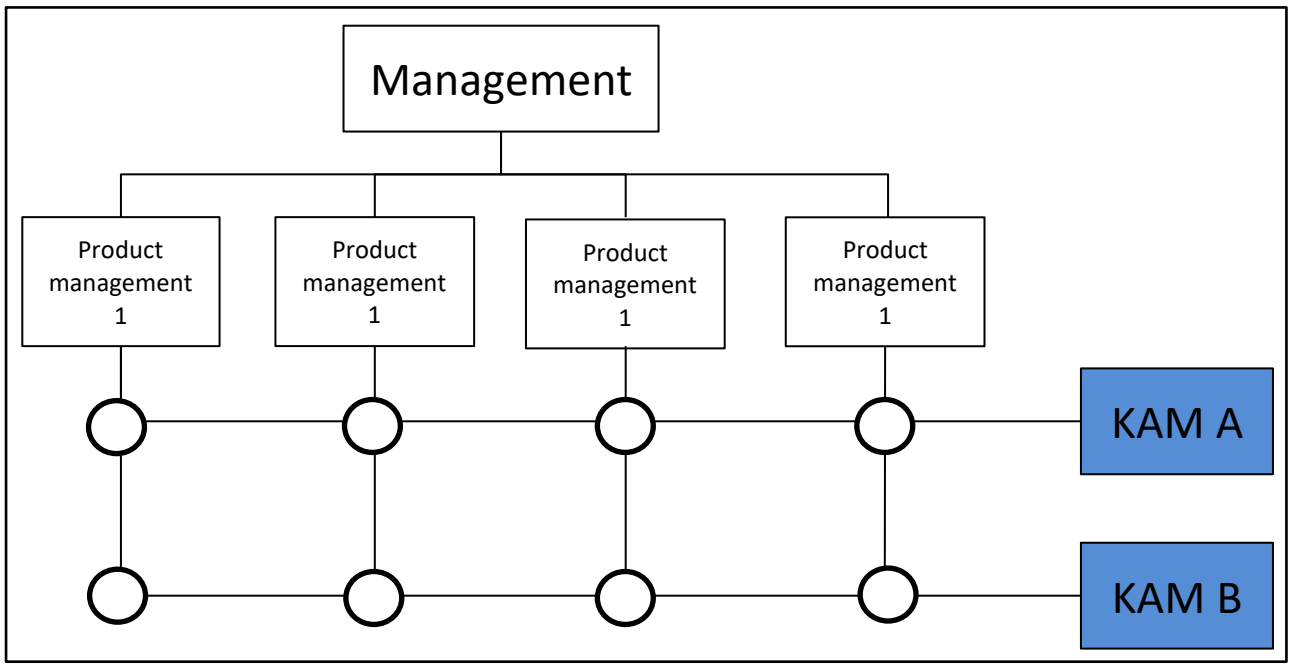

Figure 6: Key account management as product-function-matrix [21]

The matrix organisation can be realized in two different ways as shown in Figure 5 and Figure 6. On the one side the team is built with specialists of different departments and on the other with specialists of different product groups.[22]

3. Key account management as a staff organisation

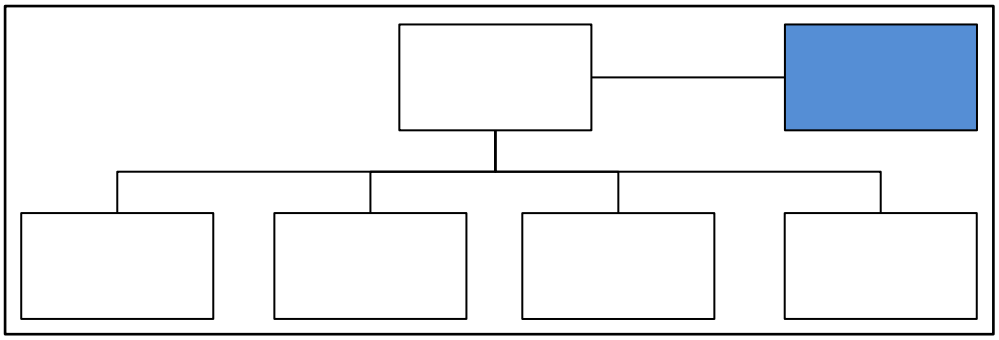

Figure 7: Staff organization [23]

A staff position has only an advisory function and no authority and is realized as in Figure 7. For this reason, that organisation form is just supplementary and should not be adopted for the integration of a key account management.

There is also the possibility of establishing an companywide/worldwide key account management system with different kinds of account managers (AC): regional account managers (RAM), global account managers (GAM) and corporate account mangers (CAM).

[21] Cf. BAGUHL, O. (2004), S. 67
[22] Cf. BAGUHL, O. (2004), S. 66 f.
[23] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 162

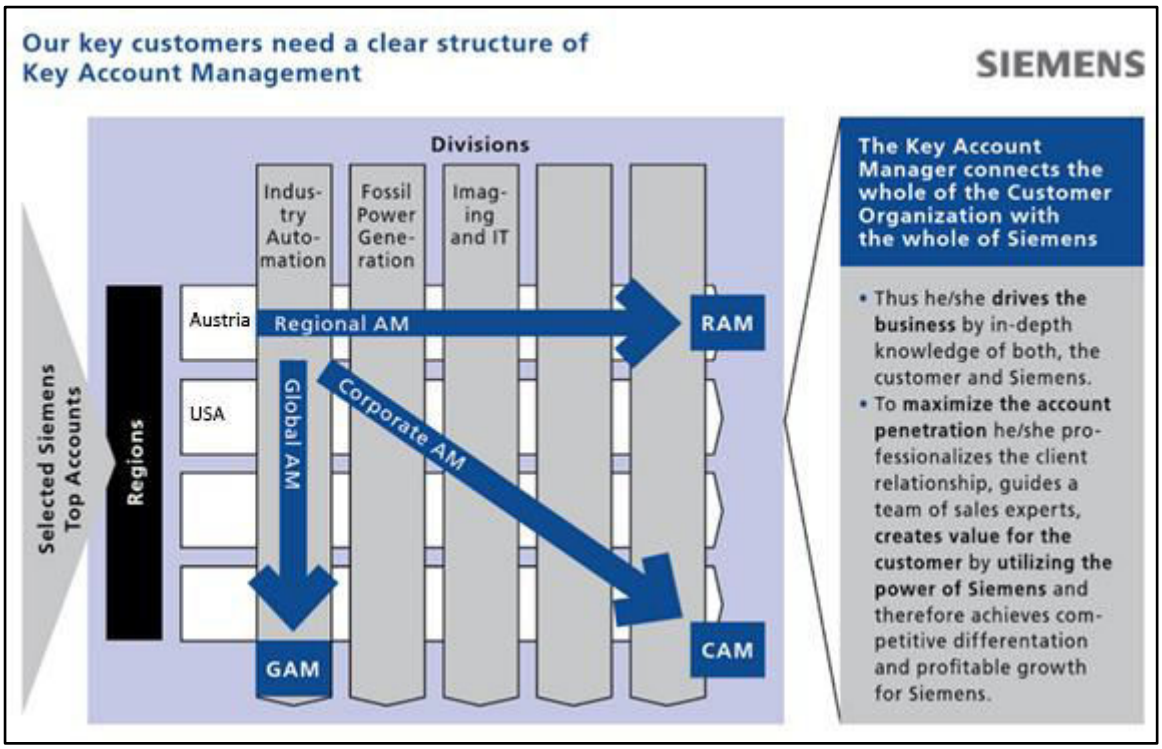

Figure 8: Siemens [24]

The Siemens example in Figure 8 shows how to establish a companywide key account management system in an impressive way. They use three kinds of key account managers: regional, global and corporate. The system shows that the regional account management is responsible for local customers over different divisions. Global account managers are operating in one specific division but worldwide and the corporate account managers are operating over different divisions worldwide and get supported by the global and regional key account manager. Without a doubt, the corporate key account manager must have the most experience.[25]

[24] BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 165
[25] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 164 f.

2.3 Fluidized Bed Boilers

Fluidized bed boilers are based on the principle of the so-called fluidized bed process. There are two different kinds of fluidized bed processes, the circulating and the bubbling. Generally, a fluidization medium (e.g. air), a fuel material and a bed material (e.g. sand) is needed for that process. Inside the combustion chamber, the fluidization of the fuel and bed material is realized by an injection with the fluidization medium from below. By using membrane walls the heat that is created generates steam which is used for heating systems or to create power via a steam turbine. [26] [27]

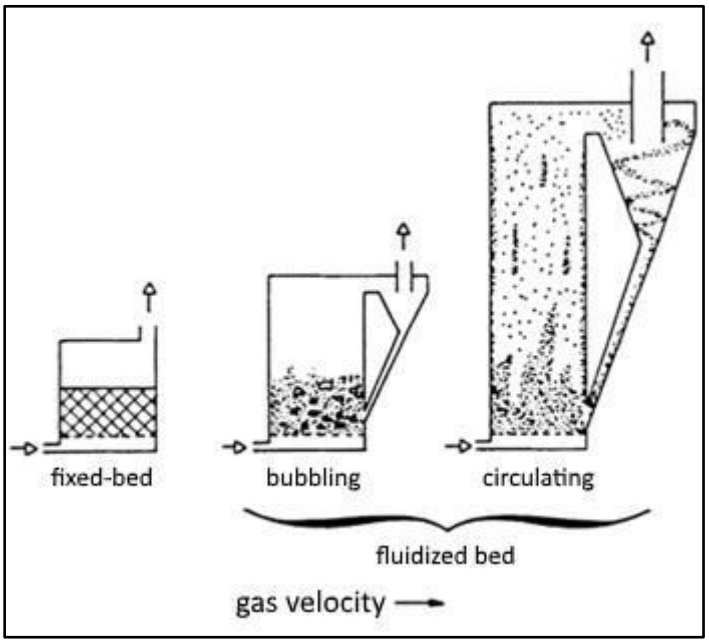

Figure 9: Fluidized bed types [28]

Figure 9 shows the different kinds of fluidized bed boilers which are mentioned above. The circulating fluidized bed (CFB) boiler discharges the bed material and circulates it inside the boiler. Another designation for that kind of boiler is “fast fluidized bed boiler” because of the higher gas velocity which is needed for the discharge. This discharge gets separated from the fuel gas by means of a separator and is returned to the combustion chamber. Circulating fluidized bed boilers are used for higher power demands but they are much more demanding than bubbling fluidized bed boilers. [26] [27]

For a bubbling fluidized bed (BFB) a lower gas velocity is needed so that bubbles are formed without any discharge. As there is no discharge the bubbling fluidized bed boiler doesn’t need a separator. If the gas velocity is too low – under the loosening speed – the bed will turn into a fixed-bed. [29]

[26] Cf. WIRTH, K.E. (2013), S. 1 ff.
[27] Cf. BRANDT, F. (1999), S. 55 ff.
[28] Cf. WIRTH, K.E. (2013), S. 6
[29] Cf. WIRTH, K.E. (2013), S. 5 ff.

Commonly used fuels are bituminous coal, coke, bark and wood wastes, residue derived fuel (RDF), peat and wood chips. The limitations for fuels are the chlorine and alkaline content, contamination (stones, glass, ceramics, etc.) and the particle size of the fuel material which is related to the technology being used. [31]

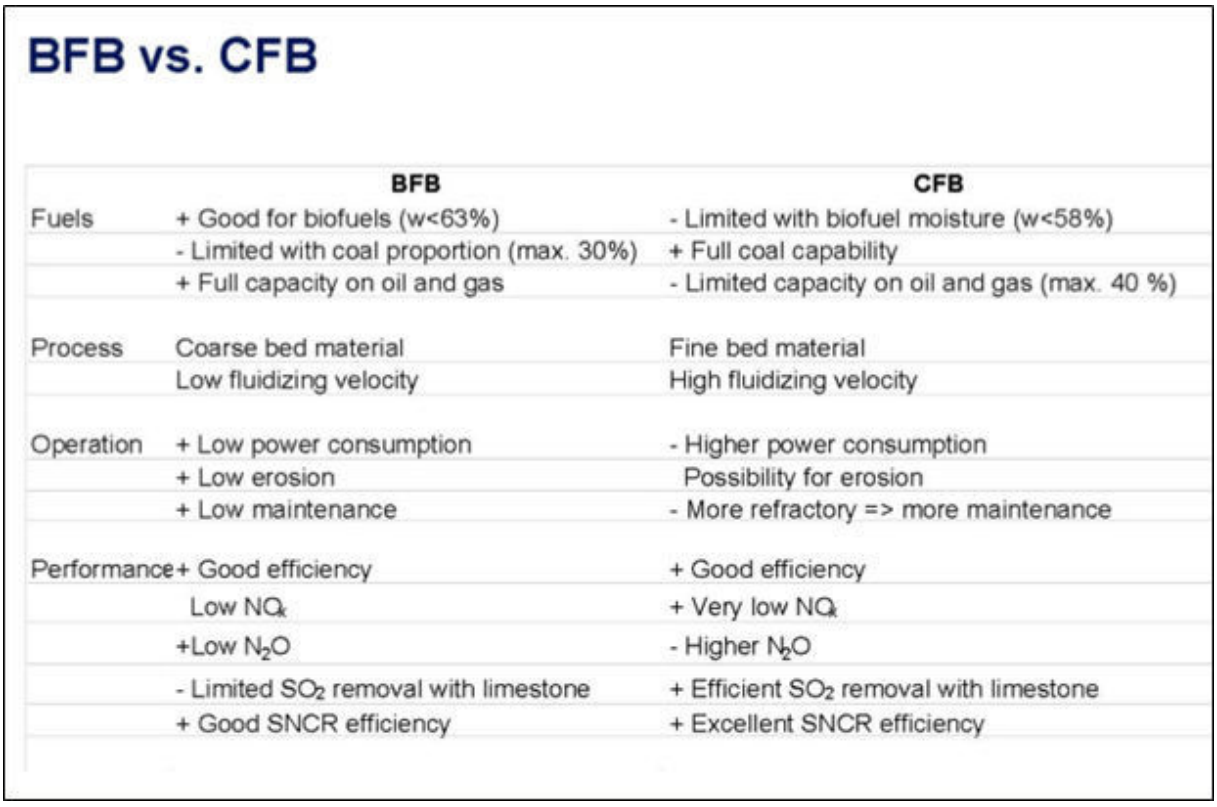

Figure 10: BFB vs. CFB [30]

Advantages of the fluidized bed boiler concepts are the lower combustion temperature which leads to lower nitrogen oxides (NO_x) and the possibility to use a broad range of fuels. Another positive property is the excellent burn-out rate which minimizes the carbon monoxide (CO) and total organic carbon (TOC) flue gas emissions. The biggest disadvantage is the high abrasive stress because of the bed material. Further differences between BFB and CFB boilers can be seen in Figure 10. [31]

[30] Andritz internal Data (2017)
[31] Cf. Andritz internal Data (2017)

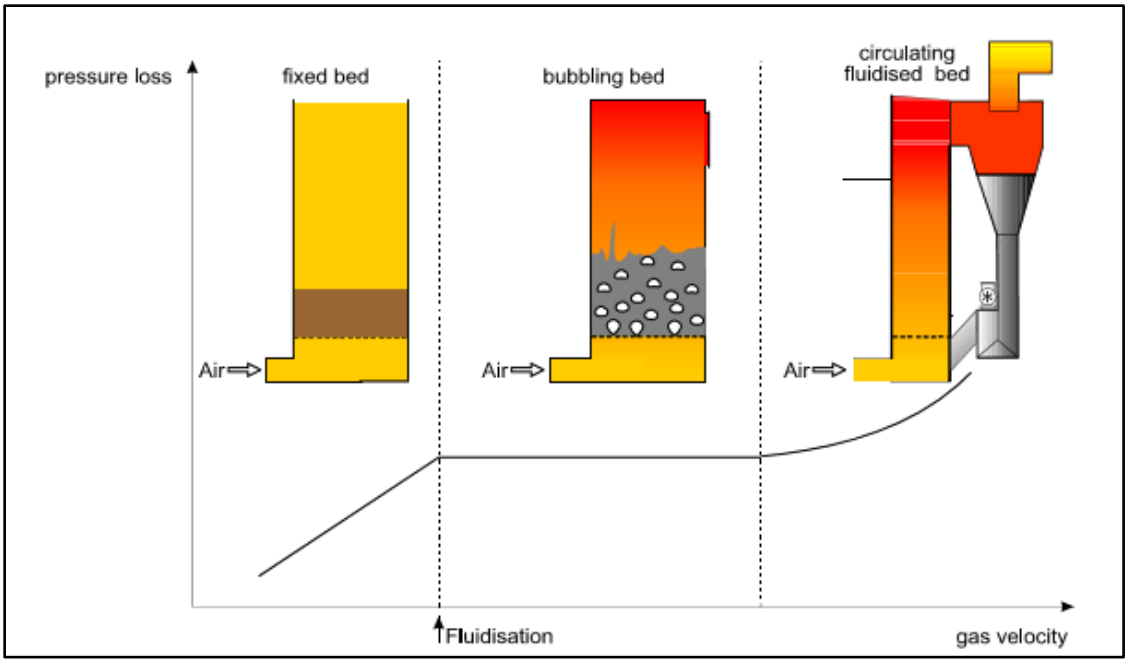

Figure 11: Pressure loss [32]

Figure 11 shows the pressure loss of the different boilers. The pressure loss of the gas increases over the height of the bed with increasing gas velocity. On the so-called loosening point the solid bed turns into the flow state. For the bubbling bed the pressure loss is constant.[32]

For the determination of the market volume it is also necessary to calculate the investment costs of the plants. To convert a thermal heat flow [MW_{th}] to electrical performance [MW_{el}] the total efficiency η_P is needed. Normally the total efficiency is somewhere between 40 and 45 percent for fluidized bed boilers.

$$\eta_P = \frac{P_{el}}{\dot{Q}_B}$$

$$\dot{Q}_B = \frac{\dot{Q}_{th}}{\eta_{th}}$$

$$\eta_P = \eta_{th} * P_{el}/\dot{Q}_{th}$$

Equation 2: Efficiency [32]

Q_{th}…thermal heat flow Q_B…heat input P_{el}…electrical performance
η_P…total efficiency η_{th}…thermal efficiency

Equation 2 shows that the total efficiency is the electrical performance divided by the heat input [MW]. The heat input multiplied by the thermal efficiency η_{th}, thermal efficiency is about 90%, yields to the thermal heat performance $\dot{Q}_{th}$ [MW]. By transforming the equation, it is possible to determine P_{el} for every single boiler.

[32] Cf. Andritz internal Data (2017)

$$\eta = \eta_P / \eta_{th}$$

$$C = \frac{q}{1.2} * \eta * C_{ref}$$ Equation 3: Investment costs [33]

C…investment costs q…plant capacity C_{ref}…reference investment costs
η…efficiency

Experience has shown that the plant capacity q is approximately 1.2 times greater than the electrical plant performance [MW_{el}]. [40]

$$C_2 = C_1 \left(\frac{q_2}{q_1}\right)^n$$ Equation 4: Relation [34]

C…investment costs q…plant capacity n…exponent

$$\frac{\ln\left(\frac{C_2}{C_1}\right)}{\ln\left(\frac{q_2}{q_1}\right)} = n$$ Equation 5: Exponent [34]

To define the costs of services between a maximum and a minimum which a direct related to the plant size Equation 4 is used. In Equation 4, C stands for the costs and q could be used as a variable of amount or size of capacity. In the first step it is necessary to calculate the exponent n with the upper and lower costs and capacities for all parts – Equation 5. If, according to the "typical exponents for equipment cost versus capacity", all exponents are valid, it is possible to determine the missing prices.[35]

[33] Andritz Internal Data (2017)
[34] GREEN, D.W.; PERRY, R.H. (2007), S. 9
[35] Cf. GREEN, D.W.; PERRY, R.H. (2007), S. 9 ff.

2.4 Key Account Management

The clients are the greatest asset of a company and to keep them over a long-time period is one of the most challenging issues. There are many ways to ensure permanent collaboration with the customers. One approach is key account management. This strategy concentrates on the most valuable customers for a company, the so-called key accounts. Key account management is a strategic approach and is long term orientated. The approach is to analyse and supervise the most important key customers. The focus is not on the competitive advantage but rather to create a customer advantage. The competitive advantage is an indirect result of that. Key account management is also not about the relation to individuals. Key account management is about the relation to a whole company through every hierarchical level. All in all, key account management is individual, dynamic and complex. There are a lot of chances and risks in establishing such a system.

Chances: High possibility to grow and increase the income of the company. The competition for key accounts is very high and this pushes the company to new top-level performances. This learning process promotes improvements in every discipline and leads to new innovations.

Risks: Losing key accounts can threaten the company's existence. The customers can also use their positions to exercise pressure. Another problem can be that key accounts acquire knowledge from the company to become independent.

[36] [37]

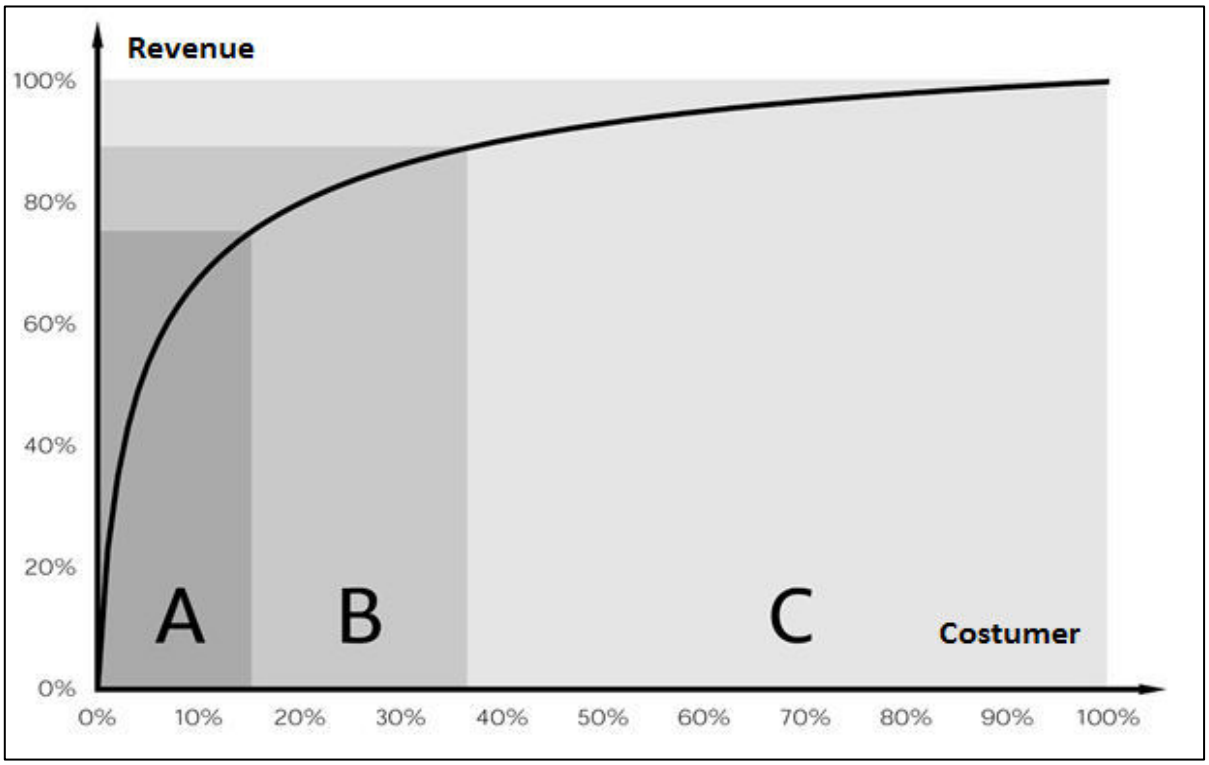

Figure 12: A-, B-, C-customers [38]

[36] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 88 f.
[37] Cf. DILLER, H.; KUSTERER, M. (1988), S. 2 ff.
[38] www.vertriebslexikon.de (20.07.2017)

By definition, key accounts are the 20% of clients who generate about 80% of the revenue, as shown in Figure 12. C-customers are negligible and should not be supervised in a special way because of a limitation of resources and the relative low share of revenue of those clients. Additional requirements for A-customers, which should be built up to key accounts are good connections/relationships, frequent buying and high development potential. One of the most essential things is to find and define the right key accounts. Otherwise failure is very likely.[39] [40] [41]

Within each group the customers can be further divided thus:

- Image customers
  Acquiring image customers helps to increase the image of the own company.
- Know-how customers
  Extensive customer know-how requires very high quality services to satisfy them.
- Lead customers
  Can be used for reference projects because they have a lot of influence on other customers. This can help to acquire new clients.
- Complex customers
  Because of the complexity of the customer, this supervision requires special attention.
- Inter-regional customers
  The key account needs a corporate account manager to realize the full potential. A regional account manager would only hit the surface of the customers' potential.
- Scary customers
  The key account manager should have a very direct and strong leadership personality.
- Superior customers
  Because of the highly professional role of the key account it's necessary to provide a key account manager who is on the same professional level.
- Large customers
  Losing this type of customer can have a far-reaching impact on the company's turnover.
- Development customers
  The customer has a lot of unused potential. The key account manager should help to develop that potential.
- Rehabilitation customers
  The recent deterioration in co-operation requires special highly intensive care.[42] [43]

The list makes clear that each type of customer has to be treated in a particular way.

[39] Cf. ZUPANCIC, D.; MÜLLNER, M. (2008), S. 32 ff.
[40] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 61
[41] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 71
[42] Cf. SIDOW, H.D. (1988), S. 28 f.
[43] Cf. BIESEL, H.H. (2002), S. 46 f.

The change from the project based business model to a key account management system makes it indispensable that every key account manager has to think about the following two statements: “The product is paying off for the customer because of…” and “How to show the client, that the product is paying off?” These two sentences are relevant for new as well as for established clients.[44]

There are also two different approaches when upgrading a customer to a key account. On the one hand it is possible to communicate the customer the key account status but on the other hand it could be better not to mention it. The main problem of informing the customer is that this information can be exploited because the customer knows his importance.. A positive effect is that this can cause an emotional state of being flattered. Furthermore, it should be mentioned that Bruhn says that customer loyalty programs become inefficient if they are applied to all customers.[45]

In general, there is one possible assumption that the customer relationship is directly connected to customer loyalty. In addition, customer satisfaction is also directly related to customer exactions. [46]

To fulfil all expectations, it is very important to know the target state and the actual state. The more the two states are equal, the greater the chance that the customer will be satisfied. If there is a difference between the states, there are two different options. The first option would be that the project is exceeded, and the second option is that the project is not well fulfilled. To over fulfil means that there is an added value for the customer and an under fulfilment will lead to negative customer satisfaction; he will be dissatisfied.[47]

[44] Cf. KIRCHNER, K. (2003), S. 155 ff.
[45] Cf. BRUHN, M. (2016), S. 83 ff.
[46] Cf. BRUHN, M. (2016), S. 77 ff.
[47] Cf. HIPPNER, H.; HUBRICH B.; WILDE, K.D. (2011), S. 222 ff.

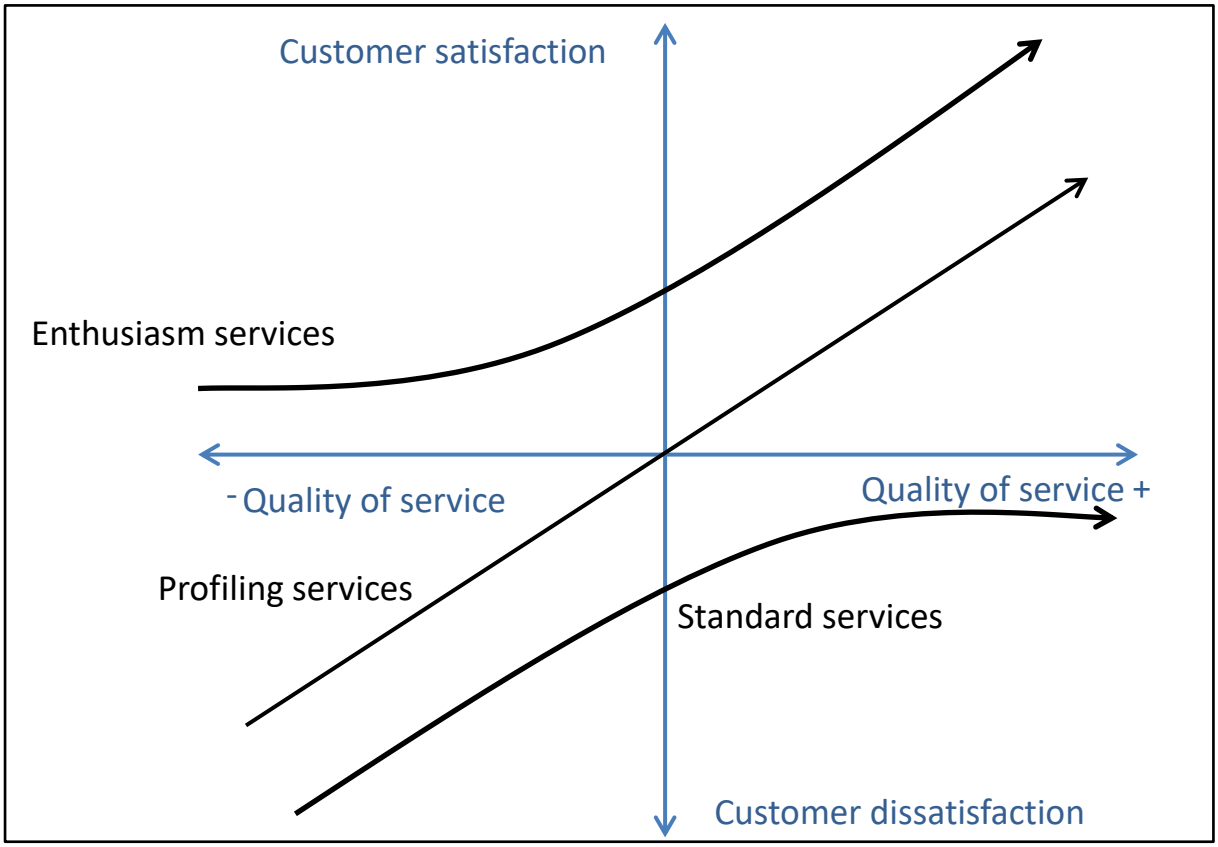

Figure 13: Satisfaction [48]

Figure 13 shows the three main areas which have an effect on the satisfaction level of customers. The standard service is the minimum requirement for the customer. The fulfilment of that service has no influence on the customer's satisfaction even if the quality of the service is excellent. The profiling service is an additional service. Even the offer of that service will increase satisfaction. The last kind of service is the enthusiasm service; this is a unique and extraordinary service. There will be an increase in customer satisfaction even if the quality of the service is poor.[49] [50]

However, it should be noted that customer expectations are dynamic and could change during the project. The extremeness of the reaction is directly proportional to the emotional state and is also connected to customer satisfaction. e.g. a good outcome of a project will cause the emotional state of calmness but a state which is divergent from what is expected will cause a more intense emotional state in a positive or negative way.[51]

According to Rapp there are 5 important factors to generate customers' satisfaction: "service quality", "reputation", "quality of the personal relationship", "technical product quality" and "price". In addition to these factors, other sources include the following phases: pre-buy-, buy- and after-buy.[52] [53]

[48] Cf. SEJA, C.; NARTEN, J. (2017), S. 48
[49] Cf. TROMMSDORF, V.; STEINHOFF, F. (2013), S. 243
[50] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 121 ff.
[51] Cf. BRUHN, M. (2016), S. 77 ff.
[52] Cf. KRÜGER, S.M. (1997), S. 70
[53] Cf. RAPP, R. (2013), S. 119

Figure 14: Key account risk diagram [54]

Figure 14 shows the four areas of risk, with the lowest risk on the bottom left and the highest risk on the top right. The horizontal axis shows that, if there are already existing key account managers, the vertical axis shows the status of the key accounts. New key account managers increase the risk because they have to be trained first. Potential key accounts also carry a high risk because the company is investing in the hope that the customer will become a key account, but it is unclear because assessment of the customer could be false. A key account management system that is eventually put in place should be classified in area one. Companies which want to reduce the risk have the option to use more key account managers in the beginning because the more key account managers who are used the lower the risk. In the likelihood of no more key account managers being hired, the company can reduce the number of key accounts to decrease the risk.[55]

[54] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 69
[55] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 69 f.

2.5 Change Management

Every change inside a company will encounter resistance and barriers. For this reason, it is important to create an understanding of the emotional states which are causing such problems.

“Change management is purposeful analysis, planning, realization, evaluation and continuous development of complete change measures in a company” [56]

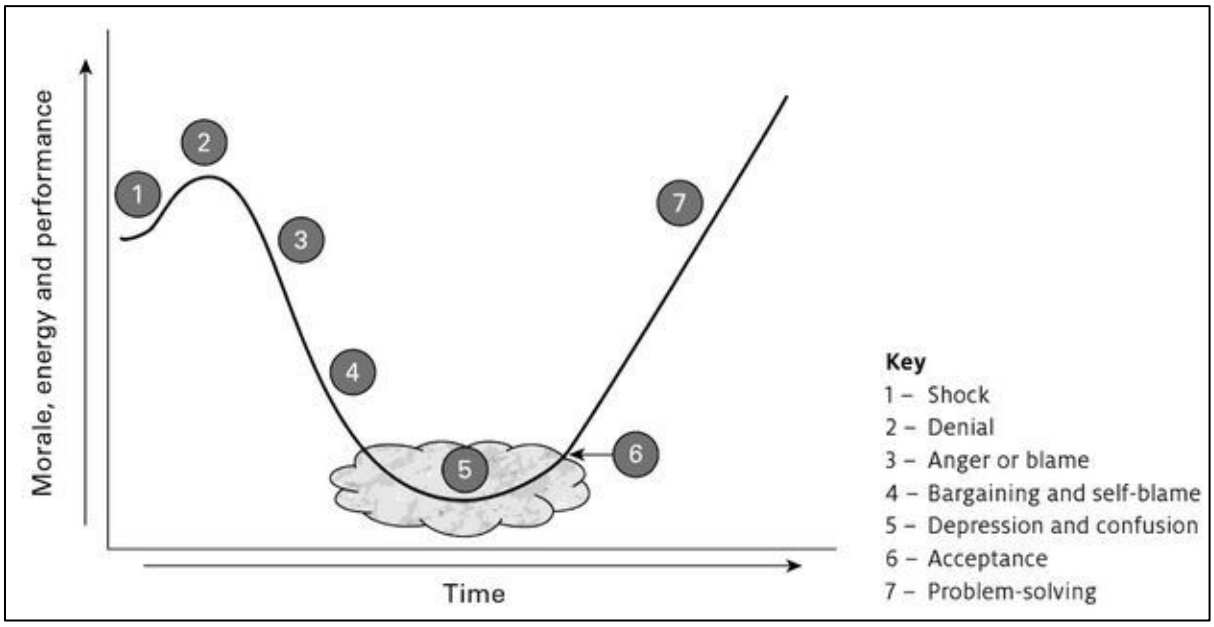

Figure 15: Change curve [57]

The change curve in Figure 15 is composed of 5 phases. All of these phases have to be completed. [57]

The first emotional state of an employee after hearing about the changes is the “shock”. In this phase a lower performance will be achieved; the motto is “keep going”. The management can also help to overcome that phase by adapting the message for the employees and show the importance of the change. [58]

The “denial” phase is that phase where the people try to ignore the changes. To make it easier to accept the changes there should be the freedom to express honestly one’s thoughts and opinions. [58]

“Anger or blame” is an expression of helplessness. To keep the performance as high as possible the management should focus on the team spirit and answer questions. [58]

[56] KARGL, U. (2013), S. 7
[57] SMITH, R.; KING, D.; SIDHU, R.; SKELSEY, D; APMG (2014), S. 9
[58] Cf. SMITH, R.; KING, D.; SIDHU, R.; SKELSEY, D; APMG (2014), S. 9 ff.

The phase of “depression and confusion” can last a long time. If no action is taken to keep motivating the employees, the depression can go so far as to cause the daily business to suffer. [59]

The last two steps before the full integration of the change are “acceptance” and “problem-solving”. In those phases all further measures should be applied – motivation, management as a role model, ideas and the uptake of ideas. [59]

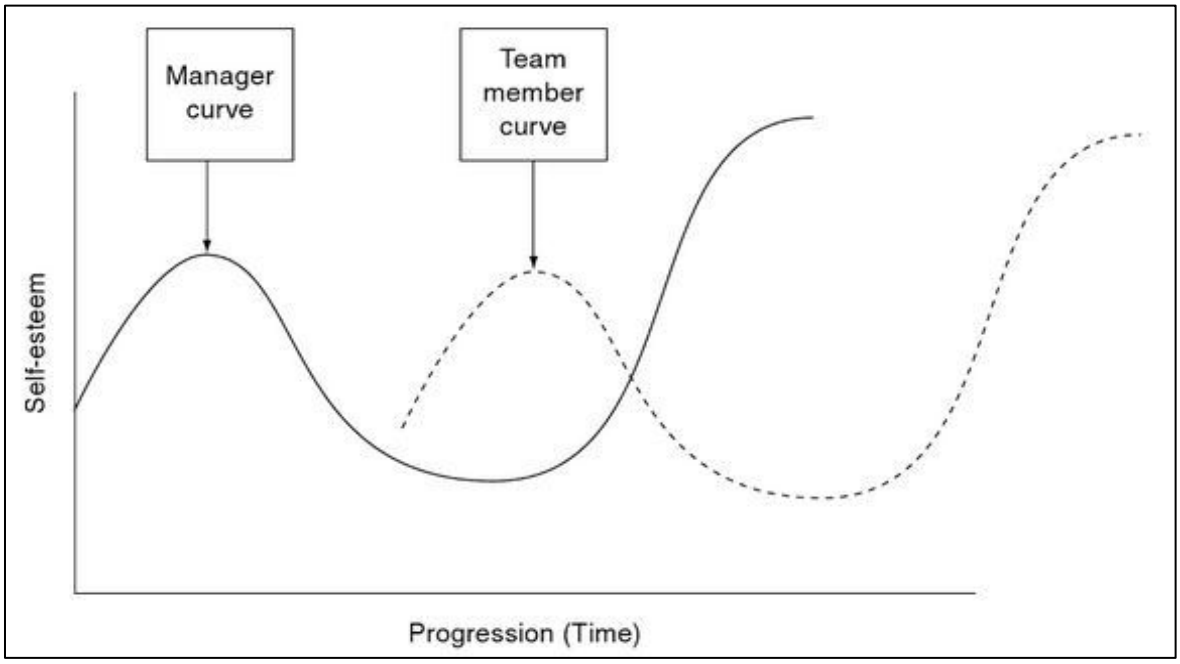

Figure 16: Change curves [60]

Figure 16 highlights that there is a time delay of the change curve between the different hierarchical levels. This is the reason why the change must be communicated as fast as possible, to minimise the delay. Otherwise it could happen that the management level thinks that the change is already implemented but at a lower level there is still a feeling of depression – the riskiest – phase. [67]

According to J.P. Kotter there are 8 steps towards changes:
1. Establish a sense of urgency
2. Create a guiding coalition
3. Develop a vision
4. Communicate the vision
5. Empower employees to implement the change
6. Generate quick gains
7. Consolidate and build on the change
8. Anchor the change in the culture [61]

[59] Cf. SMITH, R.; KING, D.; SIDHU, R.; SKELSEY, D; APMG (2014), S. 9 ff.
[60] CAMERON, E.; GREEN, M. (2015), S. 290
[61] Cf. KOTTER, J.P. (1996), S. 23

The feeling of urgency is very important for the employees in order to motivate them like "there is a problem and we have to do something". Crises, risks and opportunities have to be communicated. The target of this phase is that the employees start talking to each other "We have to change something!". A guiding coalition spreads the message and supports the change in the company. The guiding coalition should have confidence, commitment, team spirit and as much power as possible. A strongly formulated vision helps everyone to identify with the change and realize the need for it. This vision and the resulting strategy have to be communicated with all possible elements. It is essential to ensure that everybody is able to realize the measures of change. In the end the change should be anchored in the culture so strongly that it goes without saying and feels completely organic and appropriate, representing a natural evolution of the company. In order to keep the motivation and the energy high, quick successes should be achieved and appreciated. However, the practice shows that it is better to replace the last 4 steps by, "feedback and adaptation & maintaining". This adaptation shows that there is no real end because a change is a never-ending process. Every change should be improved – adapted and maintained – forever. [62]

The motivational tasks are very important and must be handled by the management. The manager must a "bit more" optimistic than the employees. Otherwise the manager would not be taken seriously. The emotional distance must be there but not too extreme. A pessimistic management would, indeed, make no sense.[63]

[62] Cf. KOTTER, J.P. (1996), S. 23 ff.
[63] Cf. BYKE, S.; LOWE-WINCENTSEN, D. (2014) S. 50 f.

2.6 McCoy and Pöyry

This chapter gives an overview of the primary used databases, the McCoy and the Pöyry database. Additional to that databases other sources like reference projects from competitors are used.

McCoy was founded in 1991 from Robert McCoy. The database includes thermal, nuclear and hydro power projects above 5 MW_e. There are exactly 330 fluidized bed boilers listed in the McCoy database – the biggest has about 1600 MW_e.[64]

The other database Pöyry is put together by using the references of the world leading forest industry consulting company Pöyry. 210 fluidized bed boilers from 2,5 MW_e to 580 MW_e are listed in the Pöyry database. The company was founded in 1958.[65]

Together those two databases represent the world's biggest fluidized bed boiler database for Europe. The further thesis shows that even this database is too small to determine useable data for determining the market volume and the market share. These two market sizes must be calculated because there is no market data available for Europe. Even the renowned Institute for Technical Processing at the Technical University of Vienna, with Ao.Univ.-Prof. Dipl-Ing. Dr. Franz Winter, who is known for intensive work with fluidized bed boilers, has no data in that area. [66]

[64] Cf. www.mccoypower.net (10.08.2017)
[65] Cf. www.poyry.com (10.08.2017)
[66] Cf. Andritz Internal Data (2017)

3 Practical Problem Solution

The “Practical Problem Solution” contains all practical calculations and considerations concerning the topic.

First of all, in the chapter “Market Situation” the region is defined more concretely. After a clear definition of the region the databases get filtered for the relevant fluidized bed boilers to determine the necessary market values. The chapter “Revenue” is a breakdown of the current strategy on the basis of the revenue. In the next step a preselection of the possible key account is carried out. The two final subchapters give a closer look at the customers/potential key accounts and the competitors. The last step is to define possible measures and how to handle the key accounts in the future.

3.1 Market Situation

The target market is limited to Europe and will be clearly defined in the next paragraph. Due to the new and intensified European Union (EU)-emission standards of 2020 this market will experience a stronger demand for service-products and upgrades. The new directive focuses on NO_x, SO_2 and dust. For that reason, especially, the demand for services and upgrades which are reducing emissions of plants according to the given standard will rise on a new level. In the long-term perspective it is to be expected that further reworks of the emission standards will be published. In general, it can be assumed that countries in the east of Europe have more catching up to do. The problem is that even though the potential is higher, the demand is much lower. One exception is Poland. As it is also a European country with a very high amount of CFB and BFB boilers, this service market is extremely attractive. Every country has the possibility to choose their emission-regulations between an upper and a lower level. It’s likely that the countries in the east of Europe will choose the upper level of the emission standards whereby the market for emission services and upgrades will not be as high as in the other European countries. From an economic point of view the focus of the sales should be the rest of Europe plus Poland. The trend in Central Europe is away from fossil fuels and towards biomass. In Central Europe it is “IN” to be “green” which offers a high market potential. According to chapter 2.3 fluidized bed boilers have an emission advantage against other boilers. [67] [68] [69]

[67] Cf. Industrial Emissions Directive (2016), S. 1 ff.
[68] Cf. Industrial Emissions Directive (2016), S. 19 ff.
[69] Andritz Internal Data (2017)

Table 1: Regions [70]

	Sub-regions				
Central Europe	UK, France, Belgium, Luxemburg, Algeria, Tunisia, Morocco	Austria, Germany and Switzerland	South Africa	Iberian Peninsula	Rest of South-, East- and Central Europe and Middle-East
North Europe	Finland and Baltic countries	Norway, Sweden and Denmark	Russia and former Soviet countries	Japan	Australia and New Zealand
North America	USA	Canada	Mexico		
South America	Brazil	Chile	Uruguay	Other South and Central American countries	
Asia	Thailand	Indonesia	Korea	South East Asia and other countries	
China	China and neighbours				

As already mentioned, at the present time, no firm or institution was able to provide a market volume estimation for fluidized bed boiler services because of the insufficient data To estimate the market volume for fluidized bed boiler services in Europe it is necessary to determine the amount of CFB- and BFB-boilers in North and Central Europe. Globally ANDRITZ is split into 6 different regions: Central Europe, North Europe, North America, South America, Asia and China – Table 1. The regions are not geographically correct so this thesis deals with geographical Europe which includes the ANDRITZ regions Central and North Europe excluding Middle-East, Algeria, Tunisia, Morocco, South Africa, Russia, former Soviet countries, Japan, Australia and New Zealand. [70]

[70] Cf. Andritz Internal Data (2017)

Country	Fluidized Bed Boilers [#]
Sweden	45
Finland	37
Poland	16
Germany	15
Austria	9
France	8
Czech Republic	6
United Kingdom	5
Spain	5
Netherlands	4
Portugal	4
Turkey	4
Belgium	3
Norway	3
Hungary	2
Estonia	2
Italy	2
Bulgaria	1
Denmark	1
Litauen	1
Latvia	1
Romania	1
Slovakia	1
SUM	176

Figure 17: Relevant boilers of the McCoy and Pöyry database [71]

The Mc-Coy and the Pöyry databases are, as mentioned in 2.6, the two biggest fluidized bed boiler databases on the market. Those databases were extended further by company internal information. This new fused collection of boilers has a size of 265 boilers for Europe. The 265 boilers are composed of 100 CFB, 160 BFB and 5 non- specified fluidized bed boilers in 25 different countries. For ANDRITZ, the services refer to those boilers which produce between 45 tonnes of steam per hour and 300 tonnes of steam per hour. The limitation of the boiler size is due to the existing references and projects. After filtering, the number of boilers came down to 176 and a further 13 boilers with no size specification. The distribution of the boilers is shown in Figure 17. As you can see the most important country in the fluidized bed boiler market is Sweden, followed by Finland and Poland. Nearly 55% of every relevant boiler in Europe is located in one of the top 3 countries. One important aspect is that even the countries which are not mentioned may also have fluidized bed boilers because the list is not complete. This aspect will be considered later.[71]

[71] Cf. McCoy & Pöyry DB (2017)

The first approach in calculating the potential service market volume is to find out the investment costs of the plant and to take an empirical percentage of the investment costs as annual service costs. This method comes from the retired head of the risk management department who offers support, hints and thought-provoking input at this point of the master thesis. According to chapter 2.1 the market volume must be defined for the determination of the market share.

Table 2: Reference projects [72]

Fuel Type	Plant Size	Costs	Total Costs	Percentage of Plant Costs in the total costs	Plant Costs
Biomass	50	2500 €/KW	125.000.000 €	30%	37.500.000 €
Residues	50	4000 €/KW	200.000.000 €	30%	60.000.000 €

By the usage of Equation 2 and Equation 3 it is possible to calculate the investment costs of every boiler with a known size. For this calculation a total efficiency of 40% is taken. Based on these two references as can be seen in Table 2, it is possible to estimate the investment costs C [€] of a plant. Finally, 2% of the accumulated investment costs represent the potential market volume for services. However, according to internal experts, the calculated market volume of 134 million euros for services in Europe is too high for this number of boilers because the 2% can be not taken in general. [72]

The other approach is to divide the plants according to their years of construction. Knowing the year of construction and the plant size makes it possible to estimate the spare parts and services which will be needed for one year. Due to the fact that fluidized bed boilers, which are fired with biomass, do not need such high-maintenance as waste fired boilers, they have to be split up. The boiler with unknown fuels are conjectured as RDF because this is the most expensive fuel. [72]

[72] Cf. Andritz Internal Data (2017)

Table 3: Age groups of fluidized bed boilers [73]

Biomass. Coal Plant Age [Years]	Waste, Residues Plant Age [Years]	Relevant Services
0-2	0-2	Guarantee
3-10	3-5	Revision, Spare-parts
10 >	5 >	Big Revision, Superheater, ECO

Table 3 show the three different age groups which are needed for the calculation. For the first 2 years the builder is responsible for all spare and worn parts, so this timespan does not have to be considered after this period. The most common combustible substances are biomass and wood because plants need much less maintenance than plants fired by waste. Between years 2 and 10 only service packages and spare parts are relevant for the plant owners of biomass fired plants. The maximum and minimum costs are based on empirical values. The service prices for the capacity 76-150 tonnes of steam per hour are calculated by the usage of Equation 4 and Equation 5 which are mentioned in chapter 2.3. [73]

If a plant is older than 10 years, there are a lot more parts which have to be changed. All the prices are given in kilo-Euros per annum. The distinction between waste and biomass fired plants is that almost all parts have a halved lifetime, the only exception being the economizer.[73]

	Biomass, Coal						Waste, Residues					
AGE [Years]	3 - 10			10 >			3 - 5			5 >		
Steam [t/h]	45 -75	76 -150	151 - 300	45 -75	76 -150	151 - 300	45 -75	76 -150	151 - 300	45 -75	76 -150	151 - 300
Service Package	60 k€	70 k€	80 k€	60 k€	70 k€	80 k€	120 k€	140 k€	160 k€	120 k€	140 k€	160 k€
Spare Parts	50 k€	100 k€	200 k€	50 k€	100 k€	200 k€	100 k€	200 k€	400 k€	100 k€	200 k€	400 k€
Superheater				20 k€	52 k€	100 k€				40 k€	104 k€	200 k€
Membran Wall Panels				10 k€	26 k€	50 k€				20 k€	52 k€	100 k€
Economizer				20 k€	52 k€	100 k€				20 k€	52 k€	100 k€
Heat Surface Protection				0 k€	2 k€	10 k€				0 k€	3 k€	20 k€
Nozzle Grid				20 k€	47 k€	80 k€				40 k€	94 k€	160 k€
Vortex Finder				10 k€	24 k€	40 k€				20 k€	47 k€	80 k€
Fuel Handling				10 k€	16 k€	20 k€				20 k€	32 k€	40 k€
Ash Handling				5 k€	8 k€	10 k€				10 k€	16 k€	20 k€
Potential Income	110 k€	170 k€	280 k€	205 k€	396 k€	690 k€	220 k€	340 k€	560 k€	390 k€	740 k€	1.280 k€
Relevant Boilers [#]	11	36	32	21	34	16	3	1	3	7	9	3

Figure 18: First calculation of potential service income

[73] Cf. Andritz Internal Data (2017)

All the data used for the exact procedure of Figure 18 can be found in Appendix 2. The first section of Figure 18 is just for biomass and coal fired plants. Through multiplying the potential value and the relevant boilers you get the potential market value of 61 million euros per annum. Based on the estimation of the ANDRITZ AG experts, this is a much more realistic value compared to the first approach. [74]

After the involvement of all the big players in Europe it was important to figure out if they had already bought some kind of services from ANDRITZ. To check for potential connections, it was necessary to analyse the customer relationship management (CRM) system of ANDRITZ AG from 2012 onwards. Later values are not considered because the connections have to be frequently maintained. The result of the CRM check can be seen in the Appendix 2 and will be picked up in 3.4. [74]

Country	Fluidized Bed Boilers [#]
Sweden	76
Finland	74
Germany	36
Poland	21
Austria	16
France	14
Spain	12
United Kingdom	10
Czech Republic	10
Netherlands	7
Turkey	5
Italy	5
Portugal	4
Belgium	4
Hungary	4
Norway	4
Estonia	4
Slovakia	3
Denmark	2
Bulgaria	1
Litauen	1
Latvia	1
Romania	1
Ireland	1
SUM	316

Figure 19: Relevant boilers of the new database [75]

[74] Andritz Internal Data (2017)
[75] Cf. McCoy & Pöyry DB plus Extentions (2017)

Rechecking all the information revealed a discrepancy because some of ANDRITZ AG customers are not mentioned in the database. This was the trigger to start intense online research to get as much information as possible about reference projects to build up a new extensive database. The new database is based on the same database used in Figure 18 but extended by the BFB and CFB reference lists from Foster Wheeler, the BFB and CFB reference list from Valmet, the ANDRITZ internal reference list and presentations, one unknown reference list, abstracts and the knowledge of experts. With the new database it was possible to identify 316 relevant fluidized bed boilers in Europe. [76] [77]

The analysis of the new database in Figure 19 shows that the ranking also changed, so Germany has more fluidized bed boilers than Poland. Surprisingly even a new country appeared on the list, Ireland. All in all, the number of boilers has almost doubled. There is however one problem. It is possible that some of these boilers do not exist anymore and for this thesis it is only feasible to check the boilers which are somehow connected to ANDRITZ AG. [76]

Table 4: Contact to plant operator [77]

no contact	Andritz AG	PKP Power
40%	25%	34%

Checking the company internal system shows that 60% of all plant operators are somehow connected to ANDRITZ. A company is classified as connected if there was at least one signed contract. Not all of those companies are directly related to ANDRITZ PKP but they are related to somewhere else inside ANDRITZ AG. The constellation of the percentage distribution is shown in Table 4. [77]

	Biomass, Coal						Waste, Residues					
AGE [Years]	3 - 10			10 >			3 - 5			5 >		
Steam [t/h]	45 -75	76 -150	151 - 300	45 -75	76 -150	151 - 300	45 -75	76 -150	151 - 300	45 -75	76 -150	151 - 300
Service Package	60 k€	70 k€	80 k€	60 k€	70 k€	80 k€	120 k€	140 k€	160 k€	120 k€	140 k€	160 k€
Spare Parts	50 k€	100 k€	200 k€	50 k€	100 k€	200 k€	100 k€	200 k€	400 k€	100 k€	200 k€	400 k€
Superheater				20 k€	52 k€	100 k€				40 k€	104 k€	200 k€
Membran Wall Panels				10 k€	26 k€	50 k€				20 k€	52 k€	100 k€
Economizer				20 k€	52 k€	100 k€				20 k€	52 k€	100 k€
Heat Surface Protection				0 k€	2 k€	10 k€				0 k€	3 k€	20 k€
Nozzle Grid				20 k€	47 k€	80 k€				40 k€	94 k€	160 k€
Vortex Finder				10 k€	24 k€	40 k€				20 k€	47 k€	80 k€
Fuel Handling				10 k€	16 k€	20 k€				20 k€	32 k€	40 k€
Ash Handling				5 k€	8 k€	10 k€				10 k€	16 k€	20 k€
Potential Income	110 k€	170 k€	280 k€	205 k€	396 k€	690 k€	220 k€	340 k€	560 k€	390 k€	740 k€	1.280 k€
Relevant Boilers [#]	14	43	36	62	72	38	3	1	3	11	17	8

Figure 20: Second calculation of potential service income

The analysis of the new data reveals a completely new situation because the potential market volume has almost doubled. Figure 20 shows the same calculation as Figure 18 but with the new data and shows why the new market volume is 115.724.400 euros.

[76] Cf. McCoy & Pöyry DB plus Extentions (2017)
[77] Cf. Andritz Internal Data (2017)

3.2 Revenue

For a meaningful value the revenue has to be split into two different categories, field services & spare parts and service upgrades. Even if the field services & spare parts bring less revenue than the modernisation upgrades, the focus should be on this kind of service. This is because field services etc. generate a base load which is important in promoting continuous income. This in turn is necessary to be able to bridge time without modernization upgrades. In addition, the long-term service contracts serve as a door opener for intensive co-operation and long-lasting customer satisfaction. The considered turnover in the P&P sector is from ANDRITZ AG, AB and Oy from 2012 to 2016. During those years the complete revenue is about 90 million euros for services. This means that the average revenue of the service sector is about 18 million euros per year.[78]

Table 5: Revenue distribution inside of the Andritz[76]

	Service Upgrades	Field Service	Spare Parts
FIN/SWE	84,74%	11,93%	3,32%
AT	65,03%	21,20%	13,77%

On closer inspection it is easy to see that 75% of the whole revenue comes from service upgrades. Table 5 contrasts ANDRITZ AG, AB and Oy to show the exact composition. To assign monetary values to these percentages it should be mentioned that all three ANDRITZ companies have, on average, a service revenue – field services & spare parts – of 5.5 million euros per year. At this point it should be clear that it is impossible to reach the company internal goal of 40-60 million euros per year within the next 5 years by just selling services. The company's experts' estimation is that the service revenue can be tripled maximally and only gradually over a very long period of time. For this reason, the goal should be seen in the long term in order to be able to focus primarily on the base load to reduce the risk. The Swedish and Finnish group in particular has to intensify the focus on service products. [76]

[78] Cf. Andritz Internal Data (2017)

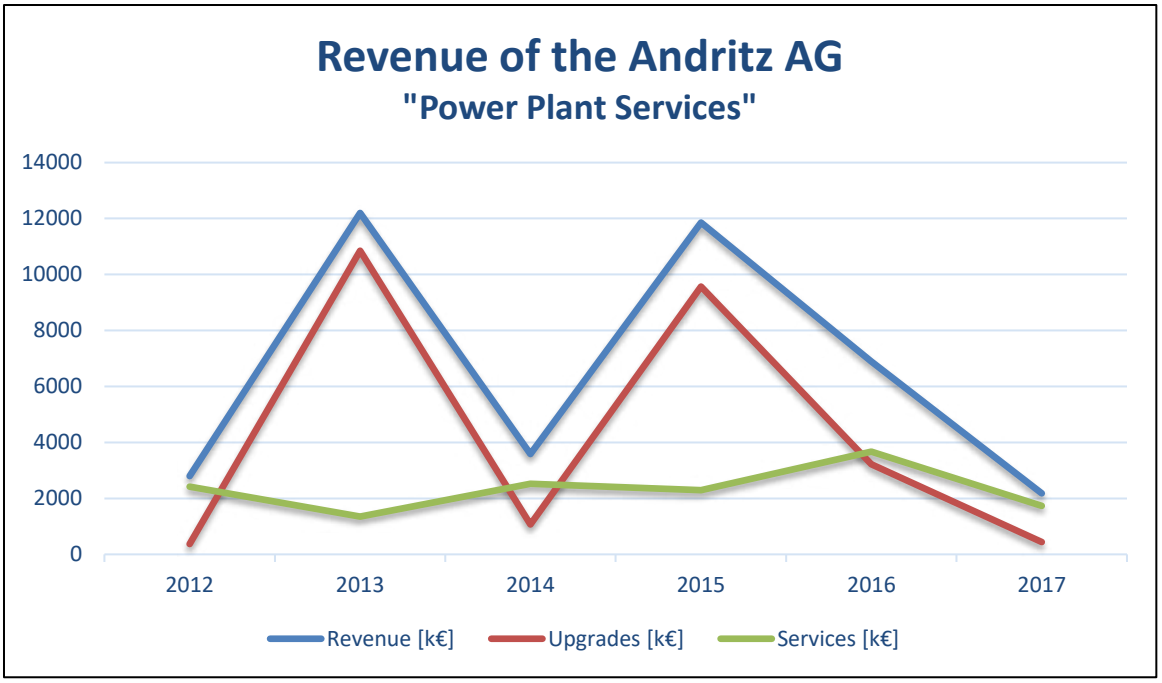

Figure 21: Revenue of ANDRITZ AG [79]

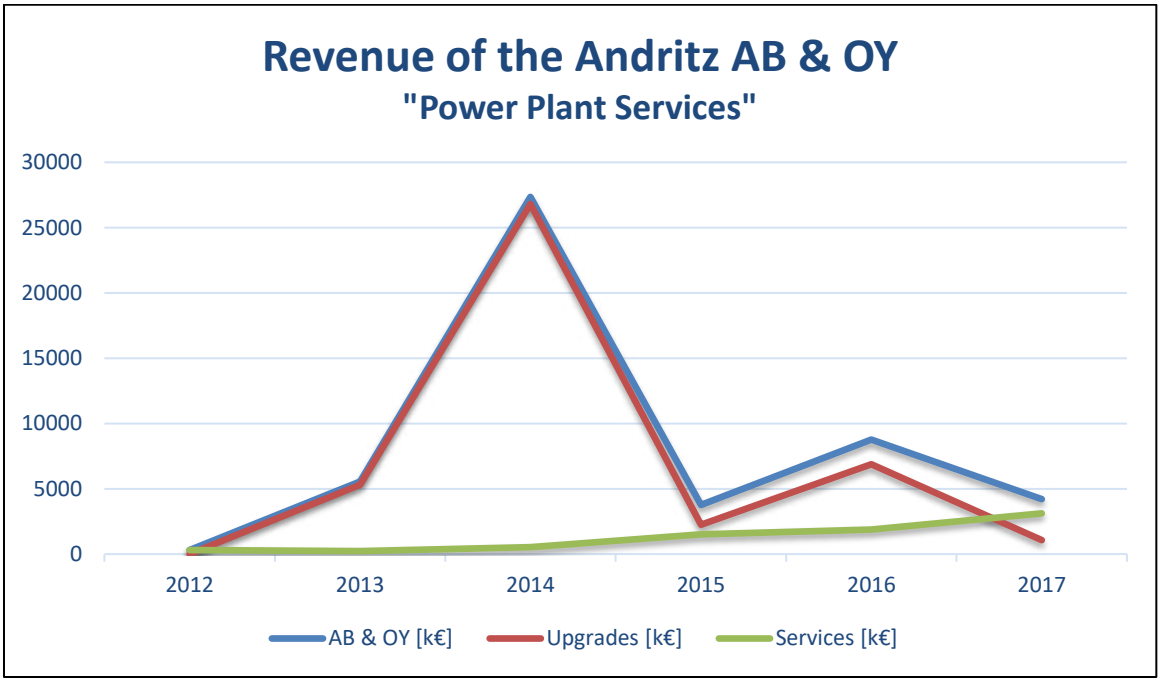

Figure 22: Revenue of ANDRITZ AB and ANDRITZ OY [77]

[79] Cf. Andritz Internal Data (2017)

Both Figure 21 and Figure 22 show the turnover in Europe over the time of inspection. In Figure 21 it is easy to see that ANDRITZ AG already realized the idea of services as a base load from the beginning. The service revenue is nearly constant over the whole period. In contrast, ANDRITZ AB & Oy had a high focus on the upgrade services and has to build up the service sector now. [81]

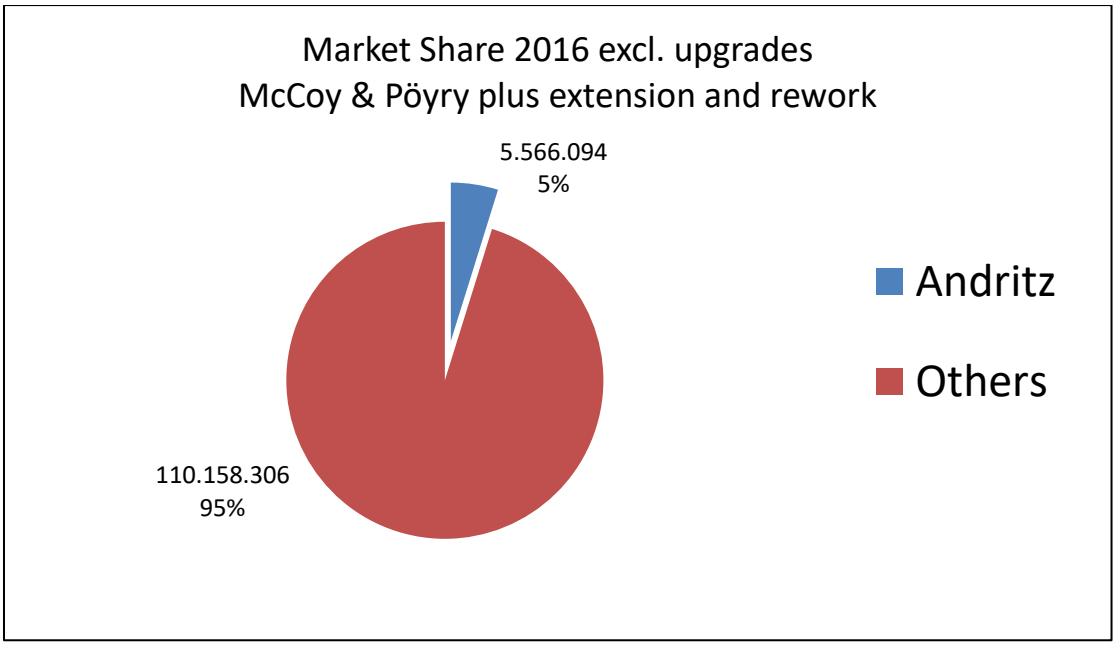

Figure 23: Market share based the new database [80] [81]

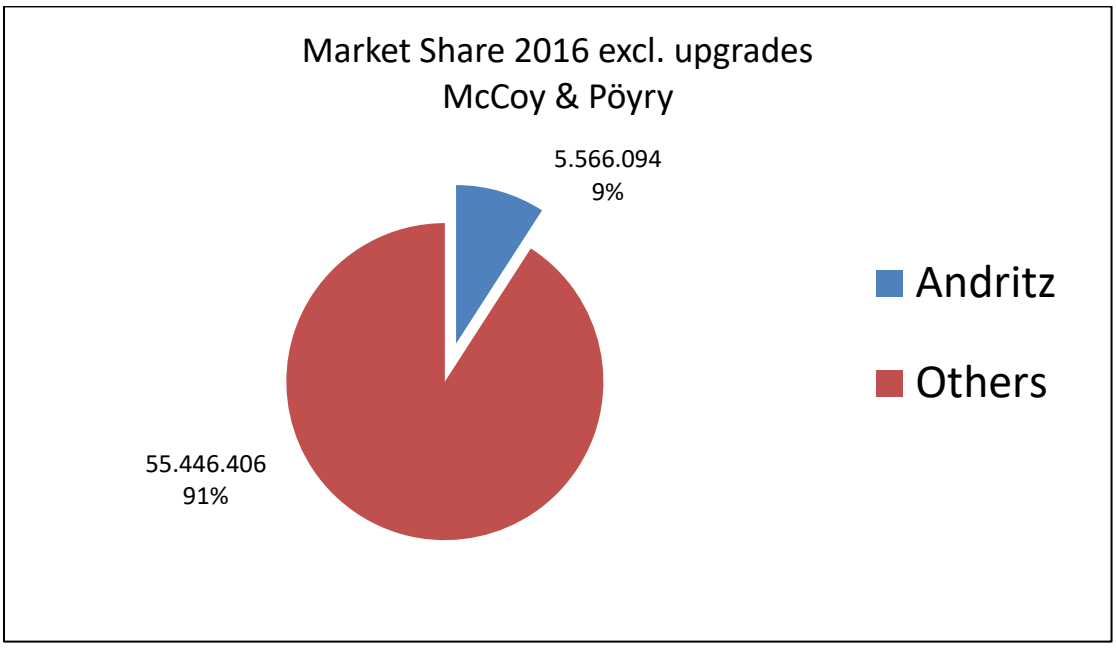

Figure 24: Market share based on McCoy and Pöyry [81] [82]

[80] Cf. McCoy & Pöyry DB plus Extentions (2017)
[81] Cf. Andritz Internal Data (2017)
[82] Cf. McCoy & Pöyry DB (2017)

Figure 23 and Figure 24 show the market share of ANDRITZ “Power Plant Services“, in which case Figure 24 is merely illustrative and includes the calculated values from the McCoy and the Pöyry database without the extension and the rework. This means that deviation by using both the biggest and most used databases is about 4%. It can be concluded that these two databases alone cannot be considered sufficient for further analysis. These two figures show the difference between the official database and the new one. The market share of ANDRITZ “Power Plant Services“ would thus be around 5% and justify to the analysts that the share of sold services can be tripled because the competition, especially in central Europe, is not as strong as in other parts of the world. The reason for that is that the market is not so big and hasn’t a high growing rate. [83]

Table 6: Biggest customers [83]

Stora Enso	Steinbeis	Jyväskylän
Aditya Birla	Mondi	Energiantuotanto Oy
UPM	BMC	Fortum
Voestalpine	Palm	SCA
E.ON	DS Smith Norske Skog	ENCE
Smurfit Kappa	Propower GmbH	ENAV
HOLMEN	Mondi	Södra Energy

The biggest customers of ANDRITZ AG, AB and Oy are listed in Table 6. Although these are the biggest customers of ANDRITZ “Power Plant Services” they do not all qualify as a potential key account. For example, it is very important that a key account has a continuous and good relationship with the company but some of the companies just had one very big contract. Aditya Birla is the best example of that problem because they had one contract with ANDRITZ which was worth more than the income generated over a period of ten years from another company. This was, however, a one-off action and it is unclear if there will be any projects with them in the future. For this reason it would make no sense to make Aditya Birla a key account. [80]

[83] Cf. Andritz Internal Data (2017)

3.3 Classification

The minimum requirements for key accounts are already defined in chapter 2.4 and are, for example, that the customer must have a long-lasting relationship and must make frequent purchases.

Weighting	40.0%	22.5%	37.5%	SUM	Rank
Name	Boilers	Upgrades	Service		
	#	k€	k€		
BMC	1	754	383	0.089451	12
E.ON	4	438	768	0.192574	8
ENAGES	1	0	1562	0.235192	6
Fortum	12	6692	700	0.479913	2
Holmen	1	75	952	0.152513	9
Mondi	6	1729	1126	0.310010	5
Palm	1	0	753	0.123245	11
Propower	1	700	1439	0.234330	7
Steinbeis	1	459	2710	0.404643	4
Stora Enso	21	9747	2616	0.986993	1
UPM	16	4262	148	0.423626	3
Voestalpine	1	3680	303	0.145925	10
MAX	21	9747	2710		

Figure 25: Classification [84] [85]

After that filtering process there were still 12 customers left. These 12 customers do not generate 80% of the revenue as usual but for ANDRITZ “Power Plant Services” this is not a must-have-criterion because they don’t have the resources to supervise all potential key accounts even though the customers from Figure 25 generate over 50% of the revenue. Because of financial and workflow bottlenecks there must be a ranking of these clients. For this classification of the key accounts a benefit-analysis is used. The analysis is based on the boilers, the base-load and the upgrades. The amount of boilers should reflect the future potential of the customer. That is why this part is so heavily weighted. As before, upgrade and service income since 2012 are shown separately for a more realistic presentation of regular income and single contracts. Voestalpine is an exceptional customer because they don’t have any fluidized bed boilers but they are consumers of the services on a regular basis for the other boiler. [85]

It is hard or even impossible to determine how many key accounts could be supervised by one key account manager. For this reason, it would be advisable to start a pilot project with a very loyal customer to make the workload assessable. This topic will be discussed, in chapter 3.6. The ranking should help to distribute the workforce correctly if it is not possible to serve all of the potential key accounts.

[84] Cf. McCoy & Pöyry DB plus Extentions (2017)
[85] Cf. Andritz Internal Data (2017)

$$sum = \frac{b}{b_{max}} * w_b + \frac{u}{u_{max}} * w_u + \frac{s}{s_{max}} * w_s$$ Equation 6: Ranking calculation

b…number of boilers b_{max}…maximum number of boilers w…weighting
u…sold upgrades in k€ u_{max}…maximum sold upgrades in k€
s…sold services in k€ s_{max}…maximum sold services in k€

The “SUM” column of Figure 25 is calculated with Equation 6 and is the reference for the final ranking. According to the calculation the “max” values are the maximum value of the column. The weightings for the boilers, upgrades and services are set in co-operation with the management of the product group services.

3.4 Company overview

This chapter should give a short company overview of the example used in the ranking. The overview consists of a short introduction and the value of services they consumed at ANDRITZ “Power Plant Services“. Each subchapter contains graphics to visualize the sales between the companies and ANDRITZ.

3.4.1 Stora Enso

Stora Enso is a company from Finland with a turnover of over 10 billion Euros. It is the second largest forestry enterprise in the world and one of the biggest pulp and paper companies. The company is already a long-term customer of ANDRITZ AG and has a significant impact on the considered revenue of ~8.5 million Euros since 2012. The services which are sold to them range from spare parts, shut-downs, boiler-audits, revisions to modernization. Stora Enso are some of the main focused supervised European sites by ANDRITZ and are located in Belgium/Gent, Germany/Karlsruhe and Sweden/Nymölla.[86]

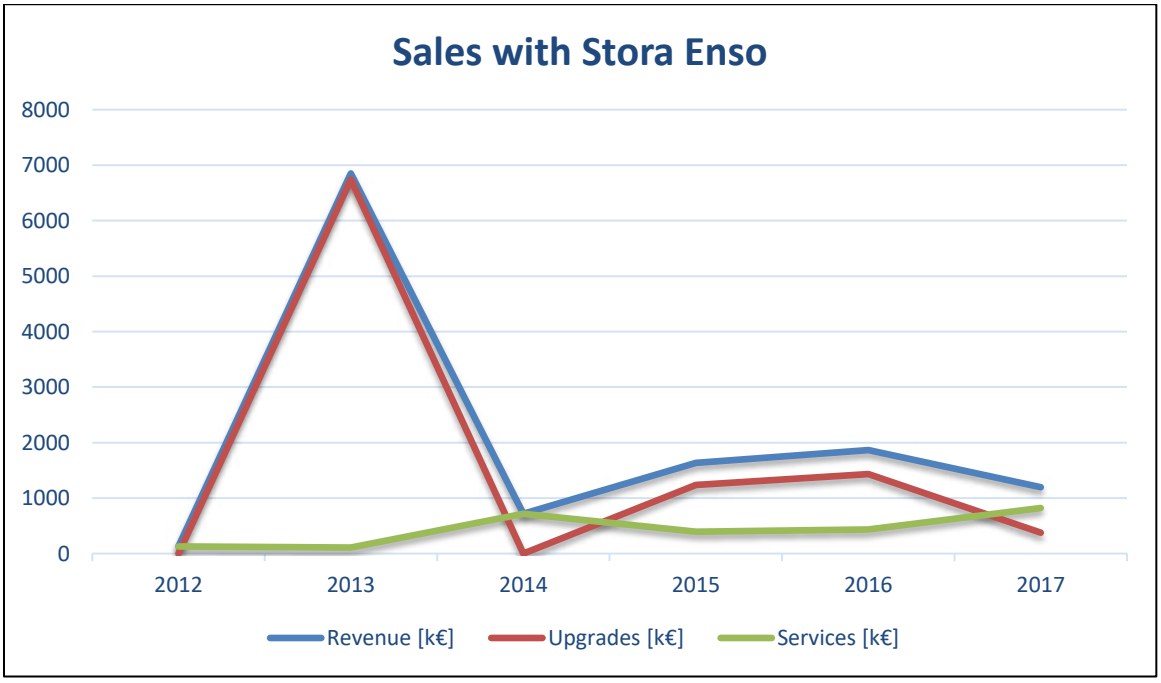

Figure 26: Revenue with Stora Enso [87]

Stora Enso generates a satisfying baseload; this makes it easy to stay in contact and to maintain the relationship. The year 2014 in Figure 26 above makes it clear why a baseload is so important because without any baseload the revenue would be zero. Without these services contact could break off. According to the Appendix 2, the connection to Stora Enso in Europe gives the impression that ANDRITZ PKP Power has contact with 14 plants and the ANDRITZ AG to 3 more. [87]

[86] Cf. www.storaenso.com (15.08.2017)
[87] Cf. Andritz Internal Data (2017)

3.4.2 Fortum

Fortum is in 3rd place behind Stora Enso and UPM in the ownership of fluidized bed boilers. Globally it is the 5th biggest heat producer in the world. However, Fortum has had falling revenues since 2010. In 2010 the company had a turnover of 6 billion Euros. By 2016 it reached 3.6 billion Euros. Fortum is an environmentally friendly company and the biggest provider of "green electricity" in Finland and Sweden. The connection of ANDRITZ to Fortum is very poor because there are just three plants which are related to ANDRITZ AG/PKP.[88] [89]

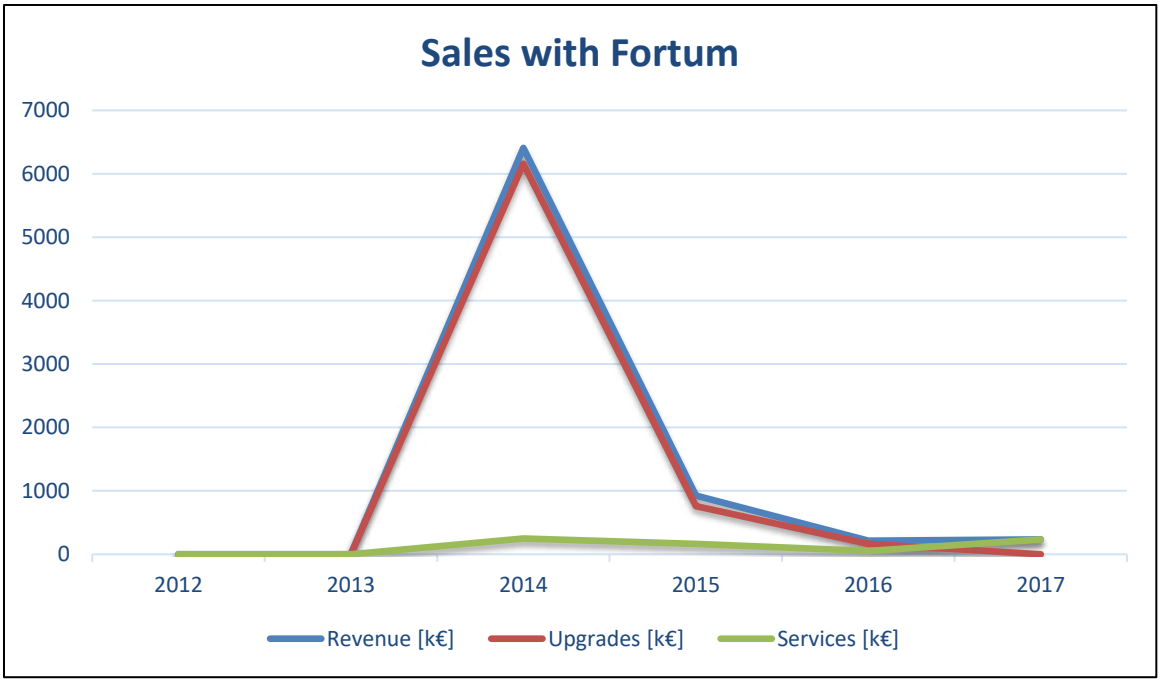

Figure 27: Revenue with Fortum [90]

The service contracts of Fortum are always between 50,000€/Year and 25,000€/Year. In comparison with the other companies this is too low a value for a huge company like Fortum which owns 7 relevant boilers in the inspected area. Contact with Fortum started in 2014 with a very substantial upgrade contract as a door opener. Since this point in time there has been a good and constant relationship between ANDRITZ and Fortum – shown in Figure 27. [90]

[88] Cf. www.fortum.com (15.08.2017)
[89] Cf. www.finanzen.net (20.11.2017)
[90] Cf. Andritz Internal Data (2017)

3.4.3 United Paper Mill

The Finland-based company United Paper Mills, or UPM, was created as a result of the merger of the two P&P companies Kymmene Oy and Repola Oy in 1996. Repola Oy was founded in 1990 and was a specialist in the engineering and forestry industry. Kymmene Oy was also a Finnish company focused on the forestry industry. The origins of the Kymmene Oy company date back to 1870. As the biggest European company in the pulp and paper industry UPM is a duty customer for ANDRITZ P&P. UPM has been a customer of ANDRITZ Services since 2013 and the supervised locations of UPM generated over 4 million Euros for ANDRITZ. The turnover of the concern UPM is about 10 billion Euros. [91] [92]

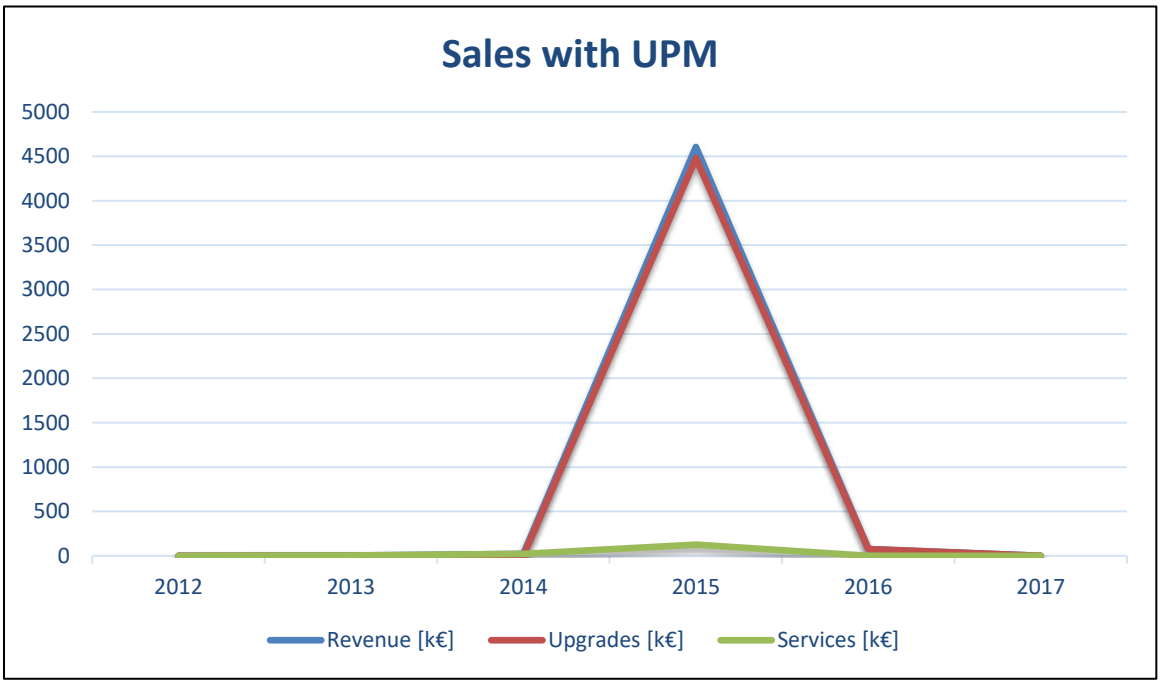

Figure 28: Revenue with UPM [93]

Figure 28 shows that the first service contract was in 2013 followed by a huge modernization contract in 2014. After that contract the contact subsided. Therefore, it is very important to invest time and resources to keep in touch with UPM. The crux of the problem is that almost no services have been sold from the beginning. The focus was on the big upgrades. According to the Appendix 2 there are connections to every single site– PKP Power is related to 9 sides and ANDRITZ AG to 6 - except to Lappenranta in Finland. [93]

[91] Cf. www.upmpaper.com (25.07.2017)
[92] Cf. www.upm.de (25.07.2017)
[93] Cf. Andritz Internal Data (2017)

3.4.4 Steinbeis

With 3.2 million Euros earned since 2014 Steinbeis is also one of the top customers of ANDRITZ. The only company site is in Glücksstadt near Hamburg Germany. Low emissions of every kind are a key aspect for this company. Therefore, the prime focus should be on the emission services. All in all, the company is very environmentally friendly, and they are only producing recycled paper. Steinbeis has about 40 years of knowledge in paper production and produces about 300.000 tonnes of recycling paper per year. Even if the potential of that client is quite low, there are high sales and a long-term and good relationship with Steinbeis. This is the reason why that company is listed as a key account and takes place number four in the ranking. [94]

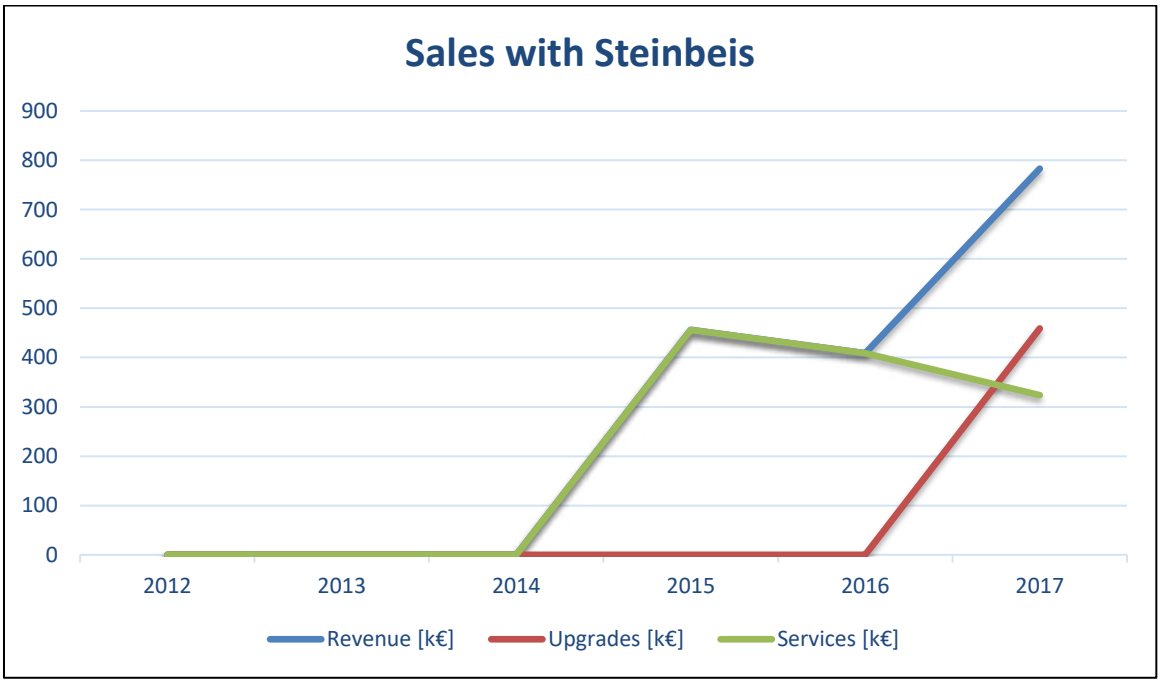

Figure 29: Revenue with Steinbeis [95]

The Figure 29 shows that the company Steinbeis has been a very solid customer since 2015 with a very high focus on services. Steinbeis has only one boiler and this boiler was upgraded in 2017, so it is very unlikely that there will be more modernization upgrades in the near future. The service revenue is constant and there are no indicators why it should break down. Precisely because of this, the relationship should not be taken too lightly. The focus should be to give the customer the feeling of being in good hands with ANDRITZ. [95]

[94] Cf. www.steinbeis.de (25.07.2017)
[95] Cf. Andritz Internal Data (2017)

3.4.5 Mondi

In comparison with the previous companies Mondi is a much smaller customer. It is, however, also important to keep in touch with this particular company because it is one of the top 5 plant operators with 3 relevant CFB and 3 relevant BFB boilers in Europe. Mondi employs 25.000 people around the world. The main business area is the pulp and paper industry but compared with the other companies Mondi is not involved in the forestry business. All plants of the enterprise are supervised by ANDRITZ PKP or at least connected to ANDRITZ AG.[96] [97]

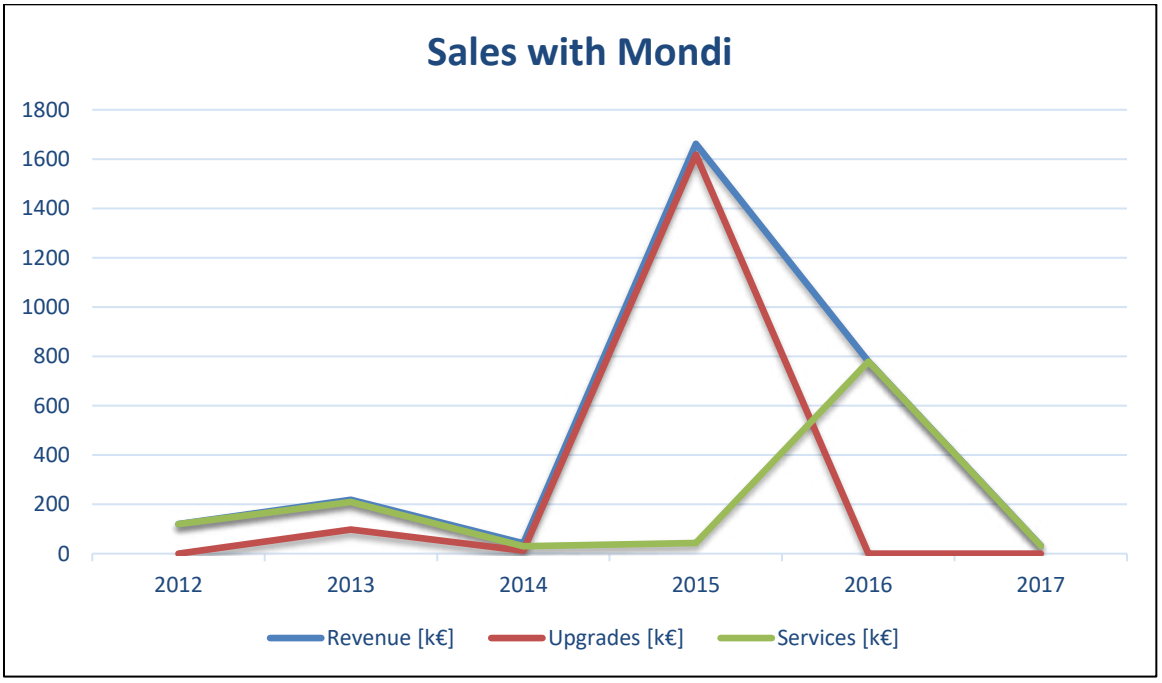

Figure 30: Revenue with Mondi [98]

The revenue with Mondi reached a peak in 2015 and since then it has fallen dramatically. It is now extremely important to find measures to counter this trend. According to Figure 30 still has a base load of 32000 Euros, but this means nothing for the future. The turnover between ANDRITZ “Power Plant Services“ and Mondi is definitely too low. This means that the potential is very high because Mondi has 6 fluidized bed boilers but generating a revenue which is comparable with a company which has only one boiler. [98]

[96] Cf. www.mondigroup.com (01.10.2017)
[97] Cf. www.finanzen.net (20.11.2017)
[98] Cf. Andritz Internal Data (2017)

3.4.6 Energie- und Abfallverwertungs GmbH

Since 2012, the turnover of the Energie- und Abafallverwertungs GmbH is just 11.5 million Euros and the lowest of all key accounts mentioned here. However, this company has bought 1.5 Million Euros of services over the last 5 years. The Styrian company has 34 employees and one BFB Boiler in Niklasdorf – Austria. This enterprise is operating in the energy- and waste recycling sector.[99]

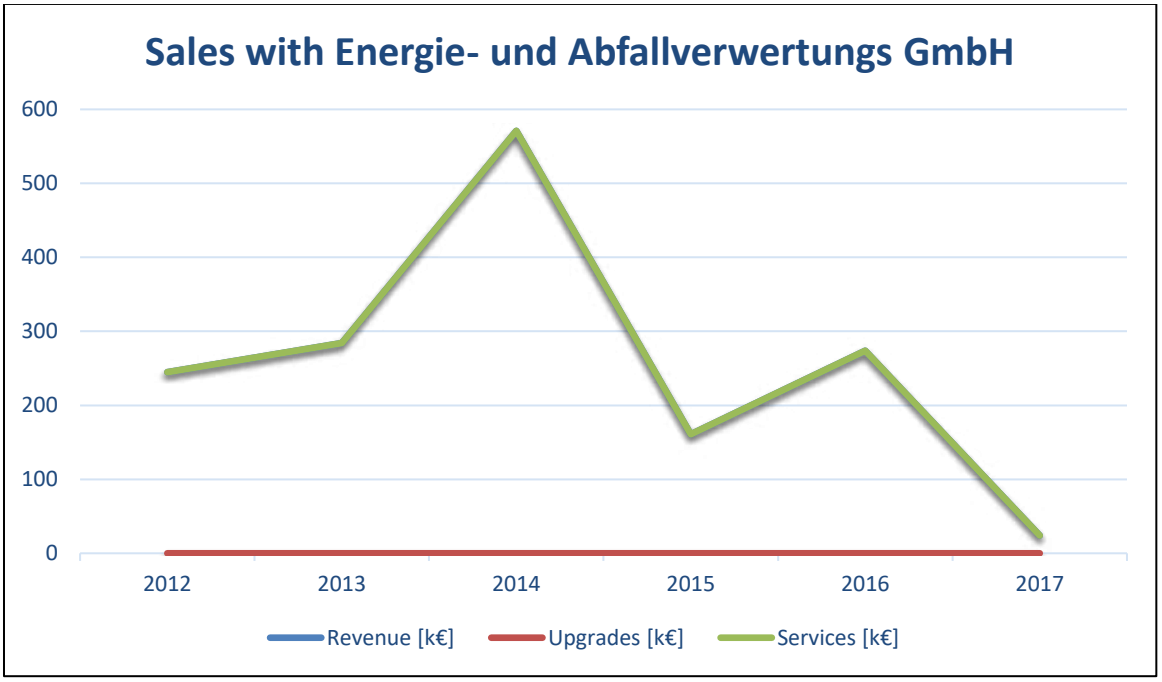

Figure 31: Revenue with Energie- und Abfallverwertungs GmbH [100]

Energie- und Abfallverwertungs GmbH is a special kind of customer because of the super long-term relation and the small size of the company. The relation goes back well before 2012 but because of the falling service revenue it is essential to invest in that customer so that he will not be lost. A long relationship is no guarantee that it will continue without having to invest in it. The upgrade contracts are non-existent in Figure 31 because they just have one single boiler, so the frequency is extremely low and since the chart only goes back to 2012, the upgrades are not visible at this point. [100]

[99] Cf. www.firmenabc.at (01.10.2017)
[100] Cf. Andritz Internal Data (2017)

3.4.7 Propower GmbH

The Propower GmbH is part of the Progroup AG which consists of several companies. The companies are: Propapier GmbH (2 paper factories), Propower GmbH (one thermal power station), Prowell GmbH (some corrugated-board plant) and some service companies like Prologistik GmbH, Proservice GmbH and Profund GmbH. In 2016 the turnover of the company was about 733 million Euros. The fluidized power boiler used by Propower GmbH is being heated with domestic waste and waste from the paper industry. With an order quantity of 2.1 million Euros between 2016 and 2017 it is a young but important customer of ANDRITZ.[101]

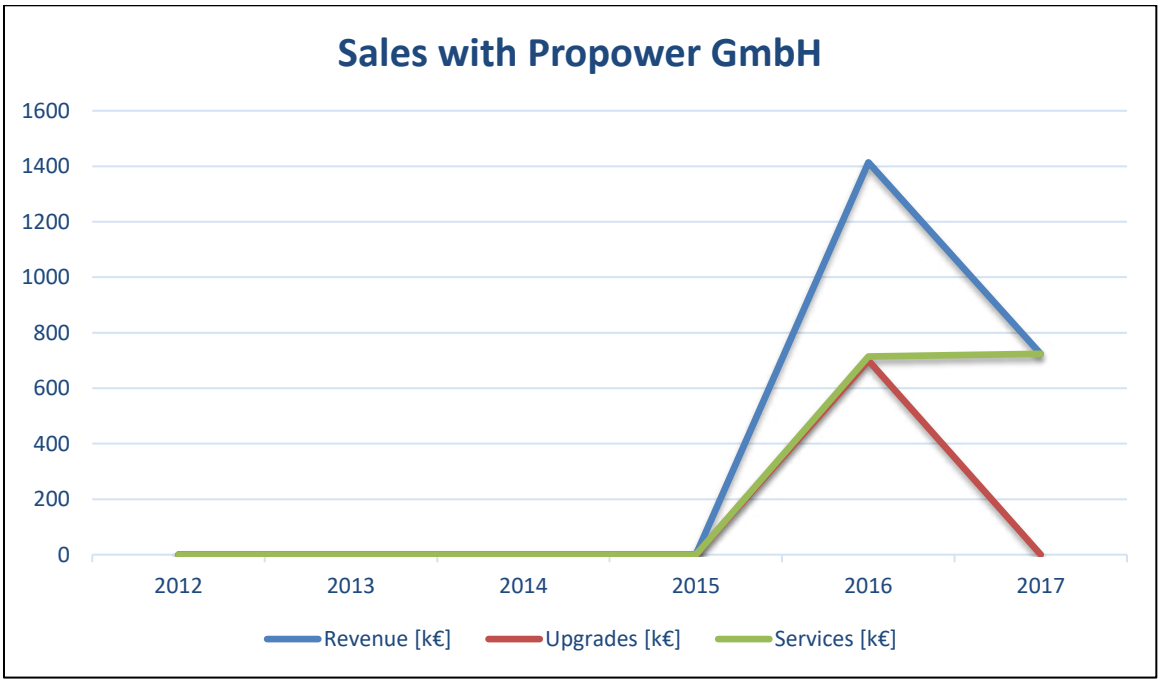

Figure 32: Revenue with Propower GmbH [102]

In 2016 services sold to the Propower GmbH was split between about 50% upgrades/modernizations/revisions and 50% services. Figure 32 shows that the service contracts stayed on a constant level for 2017. This is a really good sign and starting point for future co-operation with that company. Compared with the other key accounts the base load of services is on a very high level. A similar level should also be achieved with each of the other companies. [102]

[101] Cf. www.progroup.ag (01.10.2017)
[102] Cf. Andritz Internal Data (2017)

3.4.8 E.ON

With 56.000 employees and a turnover of 116bn Euros since 2012, E.ON is a very high potential customer. With 4 fluidized bed boilers in Europe there is a very high probability that E.ON will evolve into a much more valuable customer in future because only 2 boilers are supervised by ANDRITZ. Due to these reasons it is essential to invest in the relationship with this particular customer. E.ON's revenue with ANDRITZ last year was about 1.1 million euros. According to E.ON this deficit is caused by having transferred the conventional energy business into a subsidiary. [103] [104]

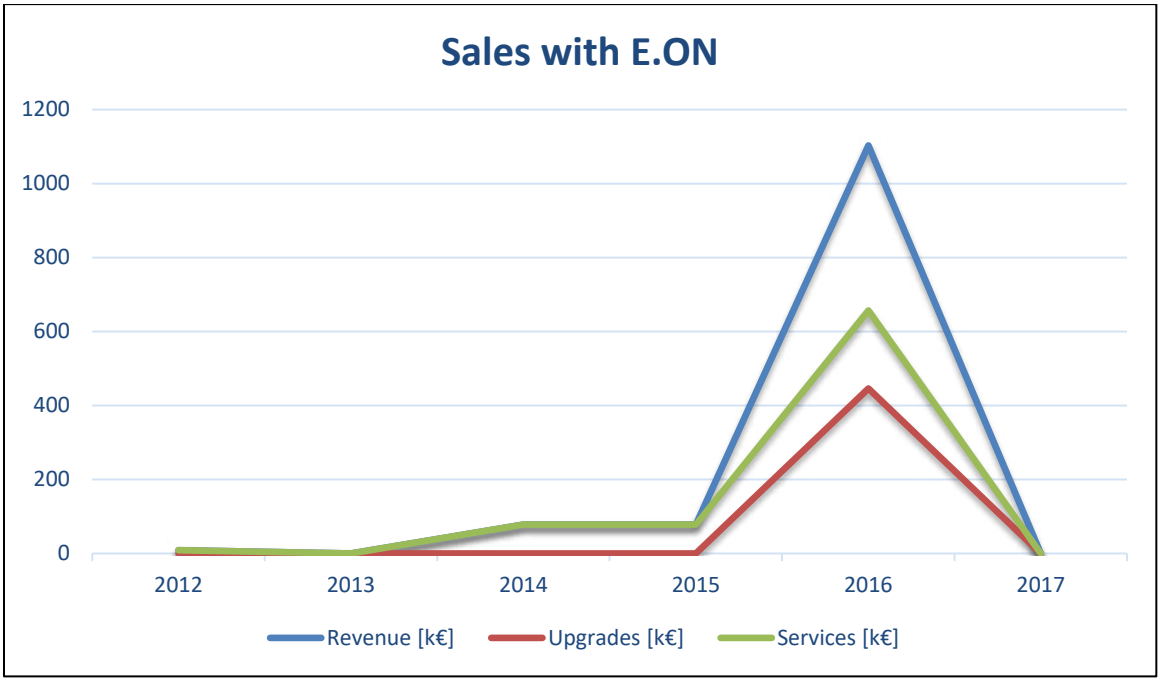

Figure 33: Revenue with E.ON [105]

In the years before 2015 E.ON was an average customer on a low level, as shown in Figure 33. The first step for more intense co-operation was started in 2016 but after that big upgrade and service contract in that year the connection subsided dramatically. This upgrade contract should have been regarded as a door opener for more service and upgrade projects in the future. Now it is necessary to fight against that problem because E.ON is a client with a very high potential. The turnover with E.ON fell down to zero. This should be seen as an alarm signal to supervise the customer in a more effective way and to give him the feeling of importance. [105]

[103] Cf. www.eon.com (03.10.2017)
[104] Cf. www.finanzen.net (20.11.2017)
[105] Cf. Andritz Internal Data (2017)

3.4.9 Holmen/Iggesund Paperboard

The forestry industry group Holmen or more exactly Iggesund Paperboard has one fluidized bed boiler, the Workington Mill in the United Kingdom. Iggesund Paperboard was founded 1916 and is, like most other key accounts, in the pulp and paper industry. In 2016 the net sales of the company were about 1.5 billion Euros. About 400 people are employed by Iggesund Paperboard.[106] [107]

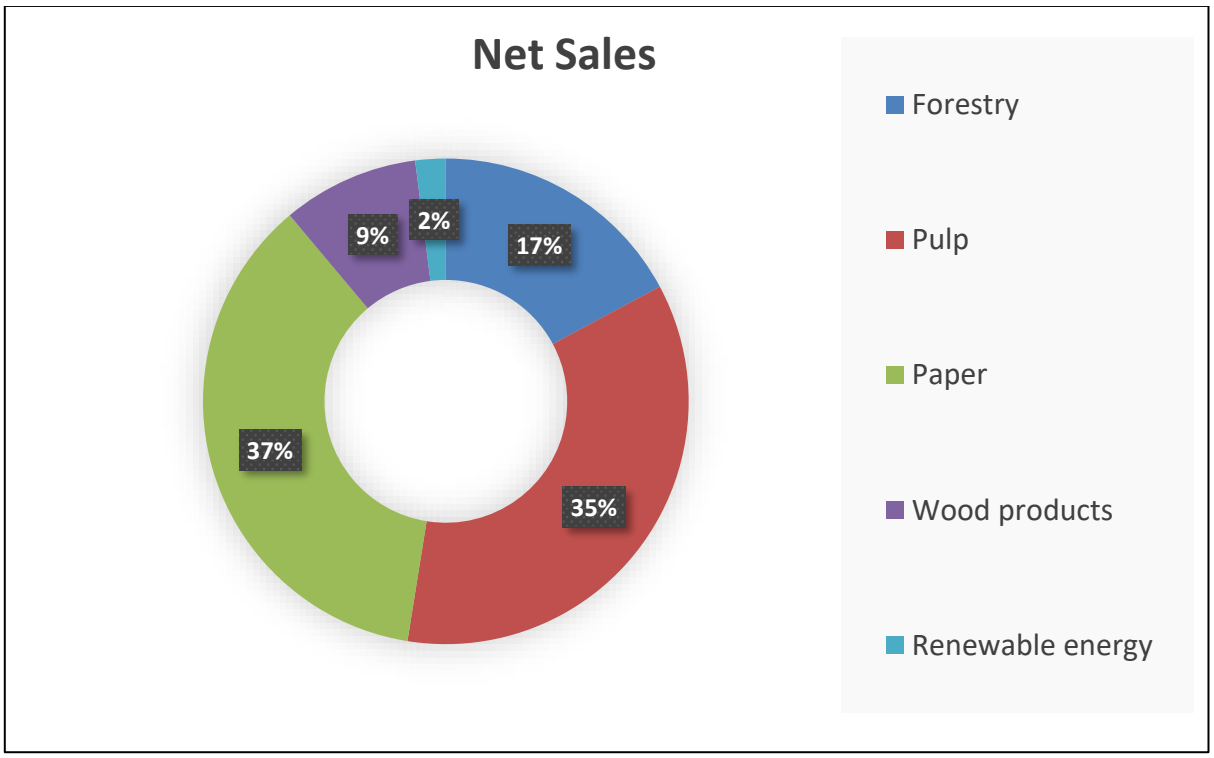

Figure 34: Net Sales Holmen/Iggesund Paperboard [103]

The composition of the net sales of Iggesund Paperboard is shown in Figure 34. Figure 34 also shows the core businesses of the company – forestry, pulp, paper, other wood products and renewable energy. [103] [104]

[106] Cf. www.iggesund.com (03.10.2017)
[107] Cf. www.holmen.com (03.10.2017)

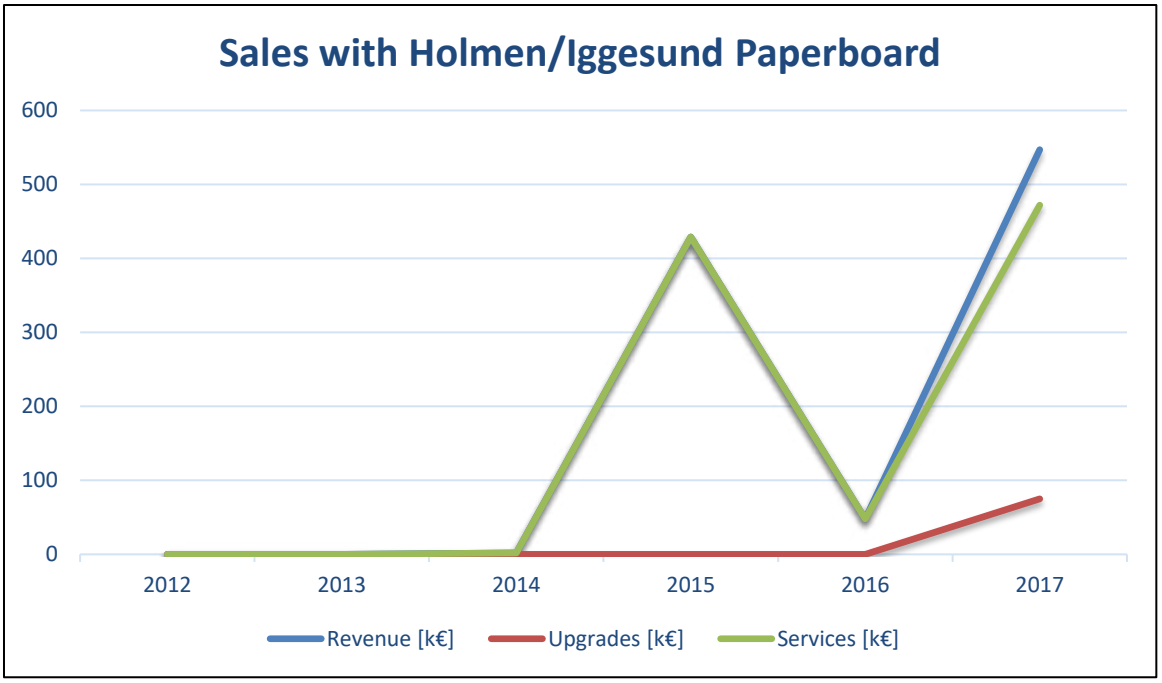

Figure 35: Revenue with Holmen/Iggesund Paperboard [108]

As shown in Figure 35 the company has had a business relationship with ANDRITZ since 2015. The services with Holmen are not constant but sufficient. If the service contracts keep going in this direction, the company can be turned into a very valuable customer. Even if the company has only one relevant fluidized bed, which means a low potential, the year 2015 shows that this one alone can generate a relatively high service revenue as a base load. [108]

[108] Cf. Andritz Internal Data (2017)

3.4.10 Voestalpine

Voestalpine is the only potential key account which is not operating in the P&P industry. Nevertheless, it is essential to treat Voestalpine like every other key account because they are still a loyal long-term customer. In the light of the excellent experience of ANDRITZ it is still possible to offer services for a wide spectrum of boilers. For this reason, companies without any CFB or/and BFB boilers like Voestalpine can be served, too. Voestalpine is a huge provider of product- and system-solutions in the metal and steel industry. Voestalpine's history dates back to 1938 and the company now has over 50000 employees worldwide. As a customer Voestalpine has bought services for 4 million Euros since 2012 and with a turnover of 11 billion Euros it is definitely one of the big-players. An additional advantage is the favourable distance to the sites in Leoben and Linz. [109] [110]

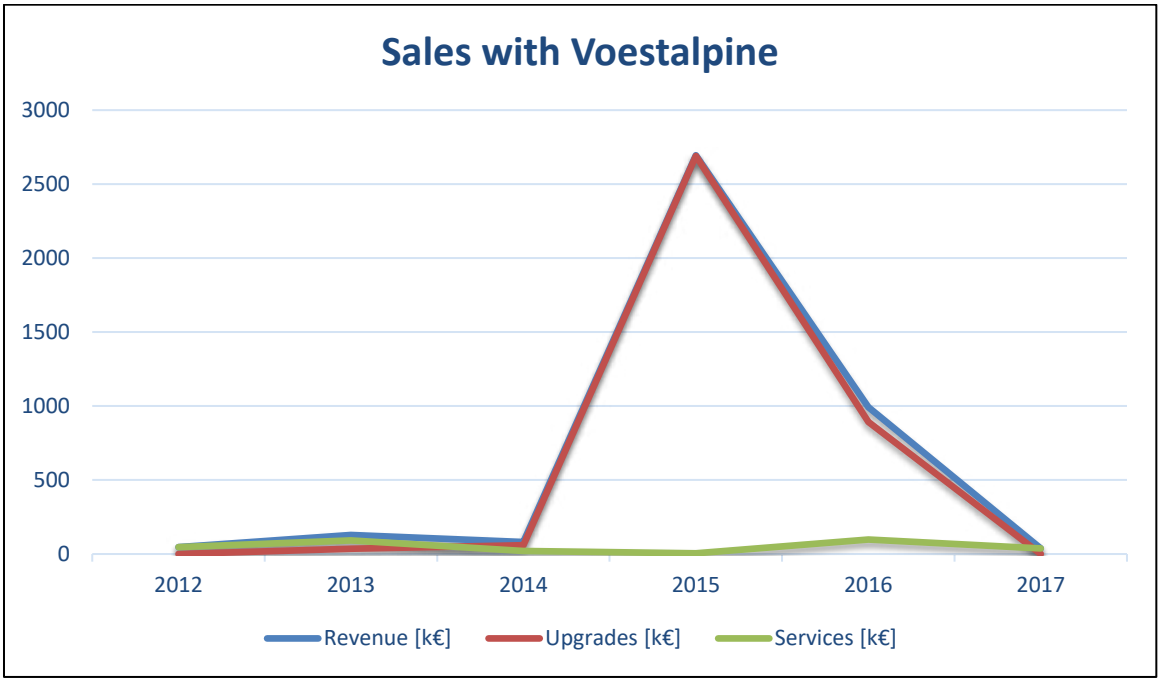

Figure 36: Revenue with Voestalpine [111]

The position of Voestalpine which is shown in Figure 36 is quite similar to Stora Enso because there is a solid amount of services which they have purchased. All this is already described in 3.4.1. This is the reason why it is no problem if there is a year without bigger upgrades like from 2012 to 2014 even though the service turnover is relatively low. For this reason, there is a need for action in order not to lose this important customer. As this company is not part of the pulp and paper industry, it is especially important to deal with the strategy of Voestalpine. [111]

[109] Cf. www.finanzen.net (20.11.2017)
[110] Cf. www.voestalpine.com (07.10.2017)
[111] Cf. Andritz Internal Data (2017)

3.4.11 Palm

Palm is one of the leading companies in the paper industry and was founded in 1872. The company is located in Germany and is the only one with an order volume of under 1 million Euros since 2012. Nevertheless, there is a very intense relationship and it's worth keeping it going. There are four different business areas: newspaper, corrugated board base paper, package and procurement of selected resources. About 4000 people are employed at Palm. The turnover of the company was about 1.4 billion Euros in 2016. Palm's philosophy consists of five points. The first point is to be a reliable and competent partner for their customers. Another key aspect is to offer their employees secure jobs. Two product related philosophy rules are to produce with as few resources as possible and to improve the quality continuously. The last directive is to maintain the independence of the family enterprise permanently. [112]

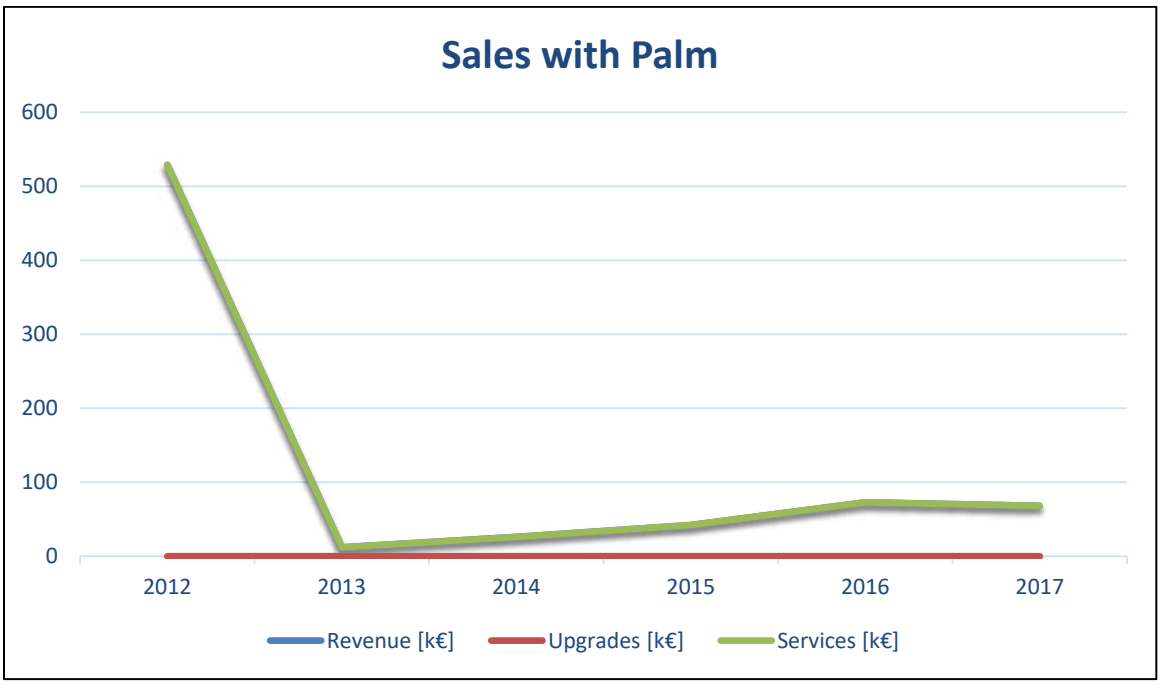

Figure 37: Revenue with Palm [113]

The long-term relationship and Figure 37 yields quite a similar picture to Energie- und Abfallverwertungs GmbH and will not be further discussed. In summary, the long-term relationship should not be over-estimated. For this reason, some measures should be taken to monitor this situation. [113]

[112] Cf. www.palm.info (08.10.2017)
[113] Cf. Andritz Internal Data (2017)

3.4.12 BMC

The Dutch company BMC Moerdijk is the only European company which uses poultry litter as fuel to produce “green electricity”. There are 600 farmers who deliver their poultry litter to BMC and therefore fuel flow is ensured for the next 10 years. The ramp-up of the plant was supported by ANDRITZ. There is currently a very good connection between BMC and ANDRITZ. Between 2013 and 2017 ANDRITZ sold 1.1 million Euros of services to BMC.[114]

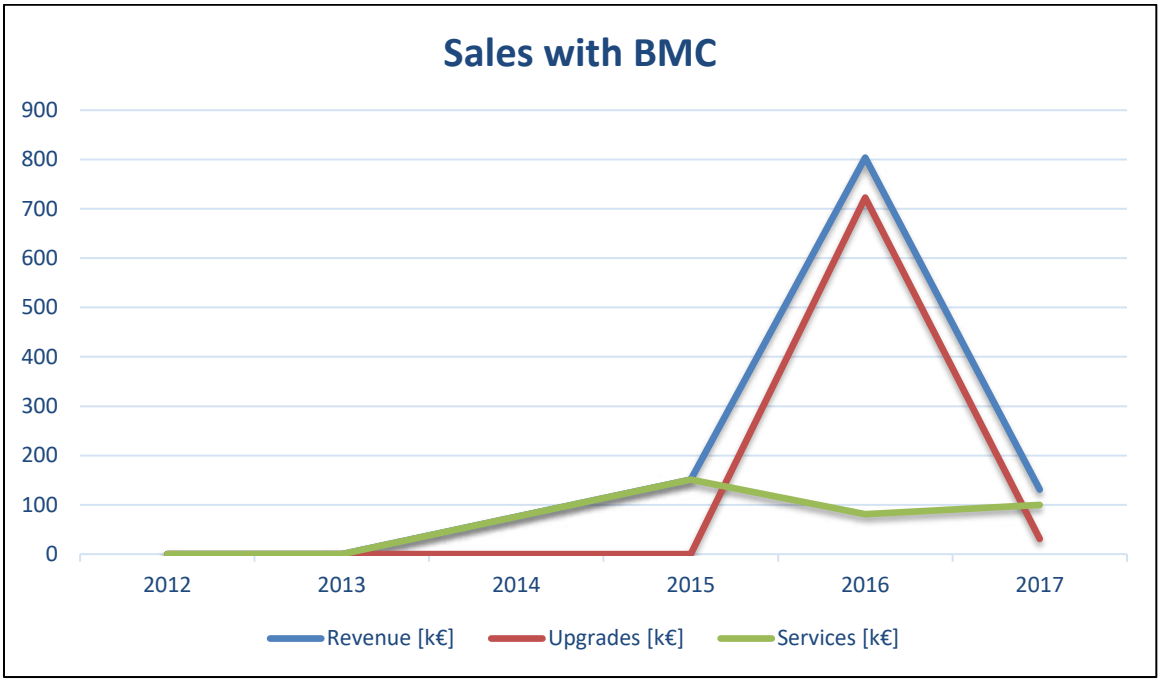

Figure 38: Revenue with BMC [115]

As seen in Figure 38 the service contract with this company is on a good constant level. The big contract in 2016 strengthened the relationship additionally. Now is the time for more intensive co-operation in order to increase the relatively low level of the base load. As at Palm there is potential for more services because other key account plants, even smaller ones, revealed this development. [115]

[114] Cf. www.bmcmoerdijk.nl (08.10.2017)
[115] Cf. Andritz Internal Data (2017)

3.4.13 Extraordinary Consideration

In this subpart of chapter 3.4 two companies are explored. Both companies have high potential but they either have an order volume which is too low or they have no order volume at all with ANDRITZ “Power Plant Services“ which means that they could not be considered like the companies above.

3.4.13.1 Metsä Group

Another Finnish company in the forestry and P&P industry is the Metsä Group. With 9600 employees and a turnover of between 4.5 and 5 billion Euros it is the biggest European co-operative in the P&P industry. The company owns 10 BFB boilers of which 9 have connections with ANDRITZ – 3 sites are directly related to PKP Power and 6 have connections to ANDRITZ AG. Metsä is highly focused on using certified wood (86%) which is 100% traceable. This means that the company is extremely highly motivated to act in a sustainable way. They are operating in 30 different countries with 9300 employees. [116] [117]

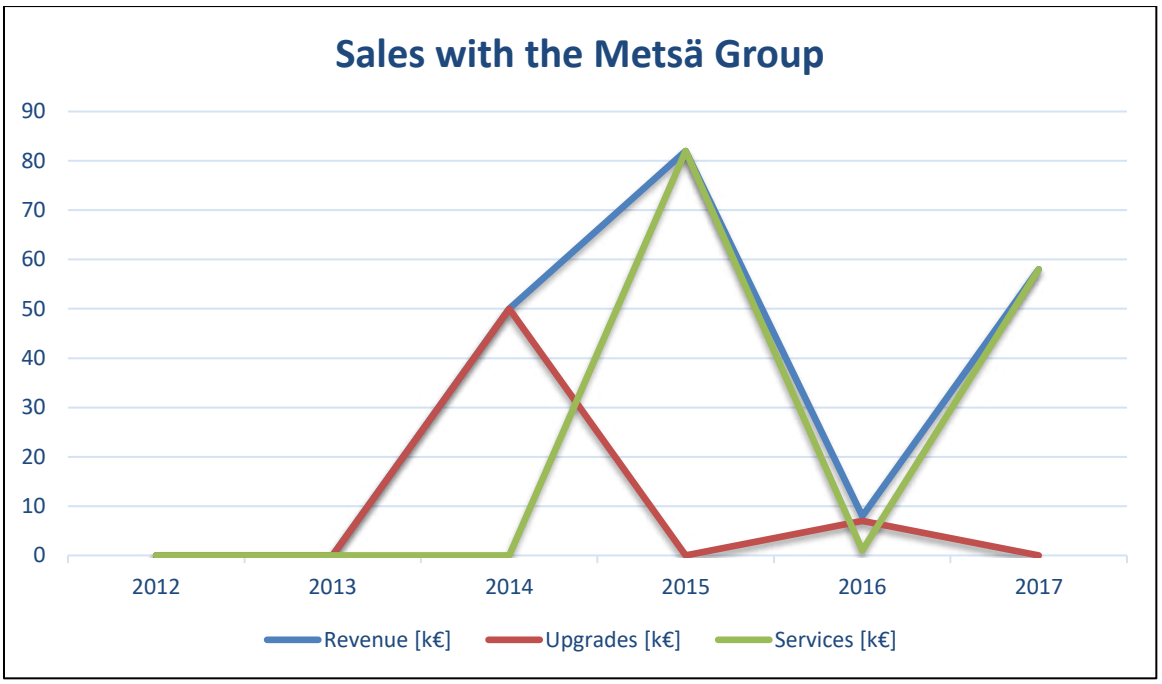

Figure 39: Revenue with Metsä Group [118]

Even if little revenue is generated with this customer, it has enormous potential due to the number of boilers. The contact itself already exists, as can be seen in Figure 39 above. Now it must be worked on to expand this contact further in order to increase the general market share in the area of services and to build up the Metsä Group as a key account. [118]

[116] Cf. www.metsagroup.com (09.10.2017)
[117] Cf. www.finanzen.net (20.11.2017)
[118] Cf. Andritz Internal Data (2017)

3.4.13.2 BillerudKorsnäs

With a turnover of 2.2 billion Euros and 4400 employees the Swedish company is one of the smaller businesses in the P&P industry. The reason for a classification as a potential new customer is that BillerudKorsnäs doubled their turnover between 2012 and 2016 and it is very likely that this winning streak will continue. There were already contracts with this company before 2012. The company has 6 BFB boilers which are all somehow connected to ANDRITZ AG. BillerudKorsnäs is challenging conventional packaging for a sustainable future. [119] [120]

[119] Cf. www.billerudkorsnas.com (10.10.2017)
[120] Cf. www.finanzen.com (20.11.2017)

3.5 Competitive Situation

At this point of the thesis the most relevant competitors are discussed and compared with ANDRITZ. Examining these comparisons should make it possible to decide where ANDRITZ should put their focus in the future and what significant advantages already exist. The regional limitation also plays a part, so the competitors are only relevant if they have European customers.

3.5.1 Burmeister & Wain Scandinavian Contractor (BWSC)/Völund

The Burmeister & Wain Group was bought in 2017 from BWSC which is part of the Misui Engineering and Shipbuilding Co. Ltd.BWSC is very similar to ANDRITZ because their main focus is on the project business but with an additional key account management system.[121]

The core competences of BWSC are:

- Plant construction and engineering
- Project management
- Procurement of equipment and materials
- Auditing and commissioning
- Construction planning with guaranteed completion date
- Performance-Guarantee for:
    - Production
    - Heat output
    - Emission
    - Lube oil consumption [121]

Table 7: BWSC [122]

BWSC		
Country	**Customer**	**Plant side**
Poland	International Paper	Kwidzyn
Slovakia	Mondi	Ruzomberok

In the annual report of 2016 BWSC mentions 182 projects in 53 countries. With 533 employees BWSC is much smaller than ANDRITZ. The main focus of BWSC is America. This becomes clear if you take a look at the McCoy-Database because of the possible relevant customer connections. BWSC seems no appreciable contender on the European market because they have only two relevant connections as shown in Table 7.[121]

[121] Cf. www.bwsc.com (11.10.2017)
[122] Cf. McCoy & Pöyry DB plus Extentions (2017)

3.5.2 KPA Unicon

The company KPA Unicon concentrates on the modification of biomass boilers and boilers for fossil fuels. The second mainstay is to offer all kinds of services for those types of boilers. The idea of KPA is to support a plant over the whole lifecycle with services.[123]

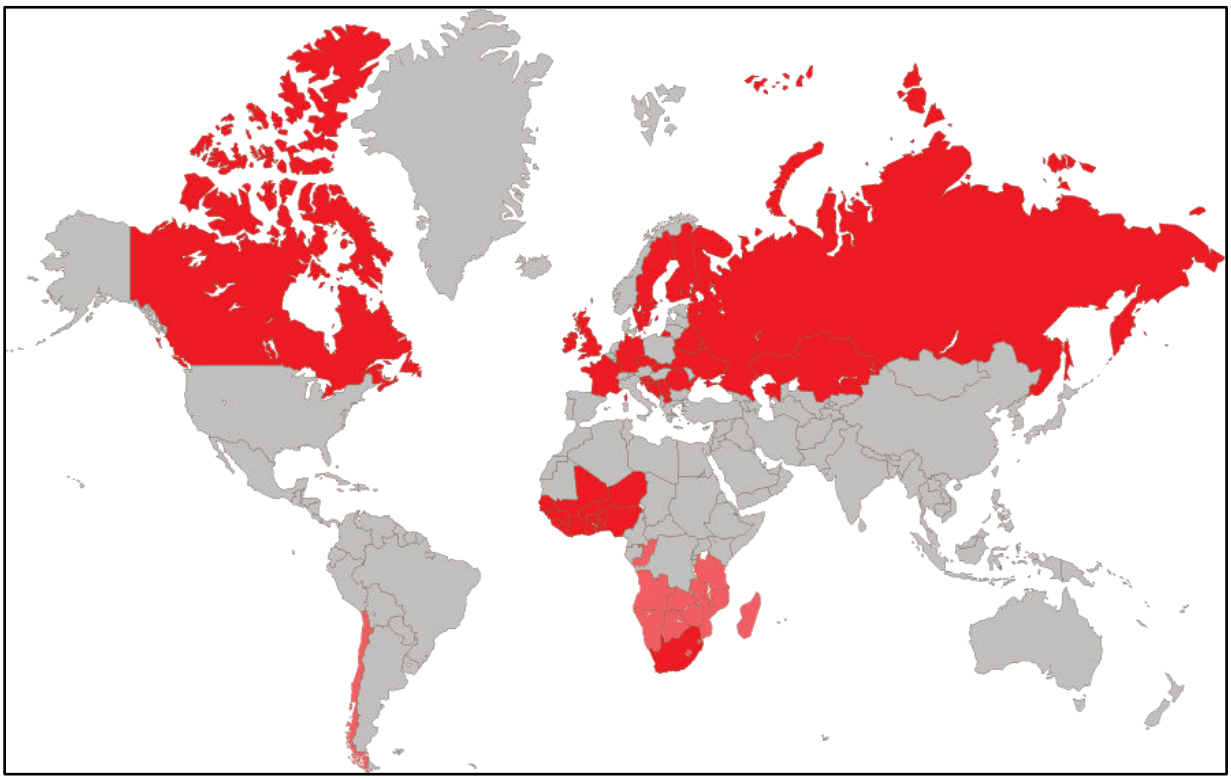

Figure 40: KPA Unicon[120]

Figure 40 shows geographically which target market KPA Unicon wants to supply. Looking at Europe, you will recognise that Spain, Portugal, Italy, Swiss, Austria, Hungary, Poland, Estonia, Latvia, Lithuania, Denmark, Netherlands and Norway are not part of the served market of KPA Unicon. [123]

[123] Cf. www.kpaunicon.com (13.10.2017)

The customers also operate in different branches and not primarily in the P&P industry.In fact, KPA Unicon tries to support client from all branches:

- Oil & gas industries
- Process industry
- Food industry
- District heat
- Chemical industry
- Metallurgy
- Nuclear power enterprises
- Construction industry
- Municipal energy sector
- Paper industry
- Forest industry
- Municipal sector [124]

Table 8: Strength and weaknesses – KPA Unicon [125]

Strength of ANDRITZ vs. KPA Unicon	Weaknesses of ANDRITZ vs. KPA Unicon
Strong presence in the P&P industry	Weaker local organisation
P&P frame agreement	Higher prices
KPA is mainly active in smaller applications	Larger/Complex organisation
	Tight commercial terms

KPA Unicon offers two different BFB boilers but the McCoy-Database delivers no relevant plants even though this company has been compared to ANDRITZ in Table 8 – KPA Unicon. The reason why there are no relevant plants listed in the databases could be that KPA Unicon is primarily building smaller plants.[124] [126]

[124] Cf. www.kpaunicon.com (13.10.2017)
[125] Cf. Andritz Internal Data (2017)
[126] Cf. McCoy & Pöyry DB plus Extentions (2017)

3.5.3 Amec Foster Wheeler (Sumitomo)

The former company Foster Wheeler was founded in 1848 and taken over by AMEC in 2014. In 2017 came the next takeover. This time it was Sumitomo which bought Foster Wheeler. Amec Foster Wheeler is focused on maintenance jobs and the designing and delivering of plants. The global company concentrates on the “environment and infrastructure”, “the mining industry”, “energy and process industry” and the “oil, gas and chemical industry”. With over 35.000 employees in 313 offices all over the world, Amec Foster Wheeler has a direct connection to almost every customer of the P&P industry.[127]

Table 9: Amec Foster Wheeler references 1st part [128]

Amec Foster Wheeler		
Country	**Customer**	**Plant site**
Germany	Koehler Kehl GmbH	Kehl
Belgium	A&S ENERGY	Oostrozebeke
Bulgaria	DEVEN (SOLVAY SODI)	Deven
Bulgaria	DEVEN (SOLVAY SODI)	Devnya 1
Finland	Metsä Group	Äänekoski
Finland	UPM	Jämsänkoski
Finland	UPM	Lappeenranta
Finland	TORNION VOIMA	RCR
Finland	KAUKAAN VOIMA & UPM	Lappeenranta
Netherlands	NV HUISVUILCENTRALE	Alkmaar
Norway	Hafslund	Haraldsrud
Norway	Norske Skog Skogn	Skogn
Romania	LUKOIL ENERGY & GAS	Ploiesti
Spain	CD Project	Ponferrada ccs

[127] Cf. www.amecfw.com (17.09.2017)
[128] Cf. McCoy & Pöyry DB plus Extentions (2017)

Table 10: Amec Foster Wheeler references 2nd part [129]

Amec Foster Wheeler		
Country	**Customer**	**Plant site**
Poland	Polimex Mostostal	Bielsko Biala
Poland	Electrobudowa S.A.	Tychy
Poland	ZE PAK	Konin
Poland	FORTUM HEAT	Czestochowa
Poland	FORTUM	Zabrze
Sweden	Metsä Group	Mariestad
Sweden	SCA Munksund AB	Munksund
Sweden	Stora Enso	Borlänge
Sweden	E.ON VARME	Norrkoping
Sweden	LUNDS ENERGI	Ortofta
Sweden	SODERENERGI	Sodertalje
Sweden	Växjö Energi	Växjö
Sweden	Skellefteå Kraft	Skellefteå
Sweden	Fortum	Brista
Sweden	Fortum	Högdalen
Sweden	Metsä Board Husum	Husum
Sweden	Södra Cell Mönsterås	Mönsterås
Sweden	Skellefteå Kraft	Lycksele
Sweden	Mälarenergi	Västerås
Sweden	Jämtkraft	Östersund
Sweden	Stora Enso Hylte	Hyltebruk

The company has built a lot of plants over the last few years. This is the reason why Amec Foster Wheeler has excellent customer relations with most operators. Table 9 and Table 10 show all the plants with which Foster Wheeler has had contact since 1991. [130]

[129] Cf. McCoy & Pöyry DB plus Extentions (2017)
[130] Cf. Andritz Internal Data (2017)

Table 11: Strength and weaknesses – Amec Foster Wheeler [131]

Strength of ANDRITZ vs. Amec Foster Wheeler	Weaknesses of ANDRITZ vs. Amec Foster Wheeler
P&P wide product presence	Fewer references in Finland and Sweden
P&P frame agreement	Fewer manufacturing capabilities
SWE: FW reduced the number of employees and resources	FIN: Smaller, not independent organization
FIN: ANDRITZ hired several key people from Foster Wheeler	No material storage
SWE: Clients have followed employees	FIN: No service contracts
SWE: more recent references	SWE: FW try to regain market share (low prices)
Wider product portfolio	FIN: FW try to keep or grow their market share (low prices)
	FIN: Short 24/7 experience

The connections with UPM, Stora Enso, Fortum, E.ON and Metsä Group should be especially highlighted because these customers are potential key accounts for ANDRITZ “Power Plant Services“. In order to win these customer locations, ANDRITZ ”Power Plant Services“ should consider extremely carefully the strengths and weaknesses of Amec Foster Wheeler – Table 11. [131]

Table 11 shows the opportunity taken by the strong presence of ANDRITZ, in combination with recent reference projects, the reduction in employees and the lower resources of Amec Foster Wheeler to steal customers in Sweden. The aggressive price policy of Foster Wheeler could be countered by the better service quality of the key account management. [131]

[131] Cf. Andritz Internal Data (2017)

3.5.4 Valmet

Indeed, the biggest rival, Valmet, has over 200 years of experience and 12.000 employees. The company is located in the stronghold of BFB- and CFB-boilers, Finland. In 2016 the turnover of Valmet was 2.9 billion Euros. Like ANDRITZ, Valmet concentrates on the P&P and the energy sector. With the mission: “Converting renewable resources into sustainable results”[132], Valmet hits the nail on the head.[132]

Table 12: Valmet references 1st part [133]

Valmet		
Country	**Company**	**Plant site**
Czech Republic	Lovosice	Lovosice
Estonia	Fortum Tartu	Tartu
Finland	Kotka	Kotka
Finland	Kerava Lampovoima	Kerava
Finland	Fortum intl	Jarvenpaa
Finland	Porvoon energia	Tolkkinen, Porvoon
Finland	Tampereen	Tampere
Finland	Kuopion Energia	Haapaniemi 1
Finland	Neste, Veolia, Borealis	Porvoo 1, Kilpilahti
Finland	Kuopion Energia	Kuopio
Finland	PVO	Porin, Pori
France	Dalkia France	Facture
Latvia	Fortum intl	Jelgava
Netherland	Eneco	Delfzijl
Poland	Zespol Elektrowni	Szczecin
Spain	Saica	El Burgo De Ebro
Sweden	Affärsverken Karlskrona AB	Karlskrona

[132] Cf. www.valmet.com (20.10.2017)
[133] Cf. McCoy & Pöyry DB plus Extentions (2017)

Table 13: Valmet references 2nd part [134]

Valmet		
Country	**Company**	**Plant site**
Sweden	Affärsverken Karlskrona AB	Karlskrona
Sweden	Vattenfall	Jordbro
Sweden	Jonkoping Energi	Torsvik 1
Sweden	Molndal Energi	Riskullaverket
Sweden	Kalmar Energie Varme	Kalmar
Sweden	Ovik Energi	Ornskoldsvik
Sweden	Boras Energi Och Miljö	Boras, Sobacken
Sweden	Bomhus Energi	Korsnäs
Sweden	Malarenenergie	Allstaham
United Kingdom	RWE npower	Tullis Russel, Markinch Fife

Due to the size of the company, Valmet has a sheer endless list of customers. Table 12 and Table 13 show all relevant BFB- and CFB-customers of Vamlet which could be determined by Database.

Table 14: Strength and weaknesses – Valmet [135]

Strength of ANDRITZ vs. Valmet	Weaknesses of ANDRITZ vs. Valmet
P&P wide product presence	Fewer references in Finland and Sweden
SWE: More recent references	Fewer manufacturing capabilities
SWE: Valmet gets a bad reputation for poor execution and not finalizing projects	FIN: Smaller, not independent organization
SWE: Valmet is losing technology competence	No material storage
	FIN: short 24/7 experience

[134] Cf. McCoy & Pöyry DB plus Extentions (2017)
[135] Cf. Andritz Internal Data (2017)

Out of the over 50 registered boilers of Valmet in the database since 1991, there are still 26 boilers relevant for the thesis because the others are placed outside of central Europe or are too small/big. However, there is just one potential key account, Fortum, included. The last time when the reputation of Valmet was negatively affected was because they carried out some very poor-quality jobs. On top of this, they also cancelled some projects – Table 14. For these reasons, it is the right time to contact customers of Valmet. [136] [137]

[136] Cf. McCoy & Pöyry DB plus Extentions (2017)
[137] Cf. Andritz Internal Data (2017)

3.6 Planned Measures

The goal of the measures is to block customer access for competitors by building up long-term customer loyalty. In this chapter several ideas, plans, etc. are presented and explained. The specific way to reach the goal of long lasting customer loyalty can be different for every client. At the beginning it is essential to know everything about the customer for example, the competitors, the target market, maybe unseen possibilities which can be focused on together, structure and strategy. As already mentioned, it is not only about seeing a company as a customer, but rather it is more important to treat them like a partner in co-operation. The customer's strategy should be internalized to help them to identify and unlock their capabilities for the future. This also includes asking for their needs and wishes, developing services etc. and coming up with a strategy together. The co-operation can have different forms, but a key aspect is to work together and to define a strategy together which has long lasting advantages for both companies. Of course, the whole co-operation poses a risk to ANDRITZ, because there is always the risk that the customer could become independent due to the acquired knowledge of ANDRITZ. [138] [139]

Other indispensable approaches to achieve better customer loyalty are connections over different hierarchical levels and to offer a uniform level of service quality. In the area of communication across different hierarchical levels in particular, ANDRITZ "Power Plant Services" has already gained experience with many long-standing customers such as Steinbeis, Voestalpine and Energie- und Abfallverwertungs GmbH. This experience must now be applied to all key accounts; in this area the management has a special responsibility. As already described in chapter 2.5, the management should constantly communicate the importance of this aspect to all employees. In addition, the management should also act in exceptional cases directly relating to key accounts, because communication at management level plays a key part in strengthening the relationship between companies. [140] [141]

Referring to the book "Spitzenleistungen im Key Account Management" there is a step by step approach to building up a solid key account.

1. Build up a knowledge-base
2. Organisation of the key account
3. Key account needs
4. Areas of co-operation
5. Customizing the key accounts strategy
6. Added value for the key account
7. Key account team
8. Plans and performance indicators[142]

[138] Cf. BAGUHL, O. (2004), S. 43 f.
[139] Cf. BRUHN, M. (2016), S.175 ff.
[140] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 187 ff.
[141] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015),), S. 205 ff.
[142] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 85

1. The first step is, as already described, to find out everything about the potential key account; this can be the strategy, revenue, key-numbers, field of activity.
2. Point number two deals with the structure and the organisation inside the customer's company.
   Possible questions are:
   - Who are the decision-makers?
   - What personal requirements do they have?
   - Do they have a buying-centre?
3. Continuing with the needs and wishes of the customer but also working out what the value chain looks like and what critical processes they have.
4. All co-operation should be regulated by contracts and frameworks. The target revenue for the coming years should also be discussed.
5. The aim is to find and define a vision and a mission for every single customer and to determine internal company goals.
   For defining the key account specific strategy there are some helpful aspects which should be considered.
   - Are there synergies which could be used?
   - Does the customer want an intense level of contact?
   - What are the advantages for the customer and for me?
   - Do the benefits outweigh the effort?
6. The key accounts should be offered special products and services as well as special prices.
7. This step is very important because the team must stay in touch frequently and directly with the key accounts. It must be clear how many and which resources are available for the key account team. The requirements for a key-account-manager is explained later.
8. A key account relationship is always long-term orientated, so it is very hard to measure success because there will be almost no revenue impact within the first 2-4 years. Seen in the short-term, the success can just be measured by using key account satisfaction surveys. In any case, milestones should be defined.[143] [144]

In the case of ANDRITZ, the best approach would be to start a pilot project with one customer to estimate the workload and the additional costs. This is necessary to define the possible amount of key accounts. Because of the risk of losing potential key accounts as customers, the pilot project should be as short as possible. One year would be a possible timespan to collect enough information.

[143] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 85
[144] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 187

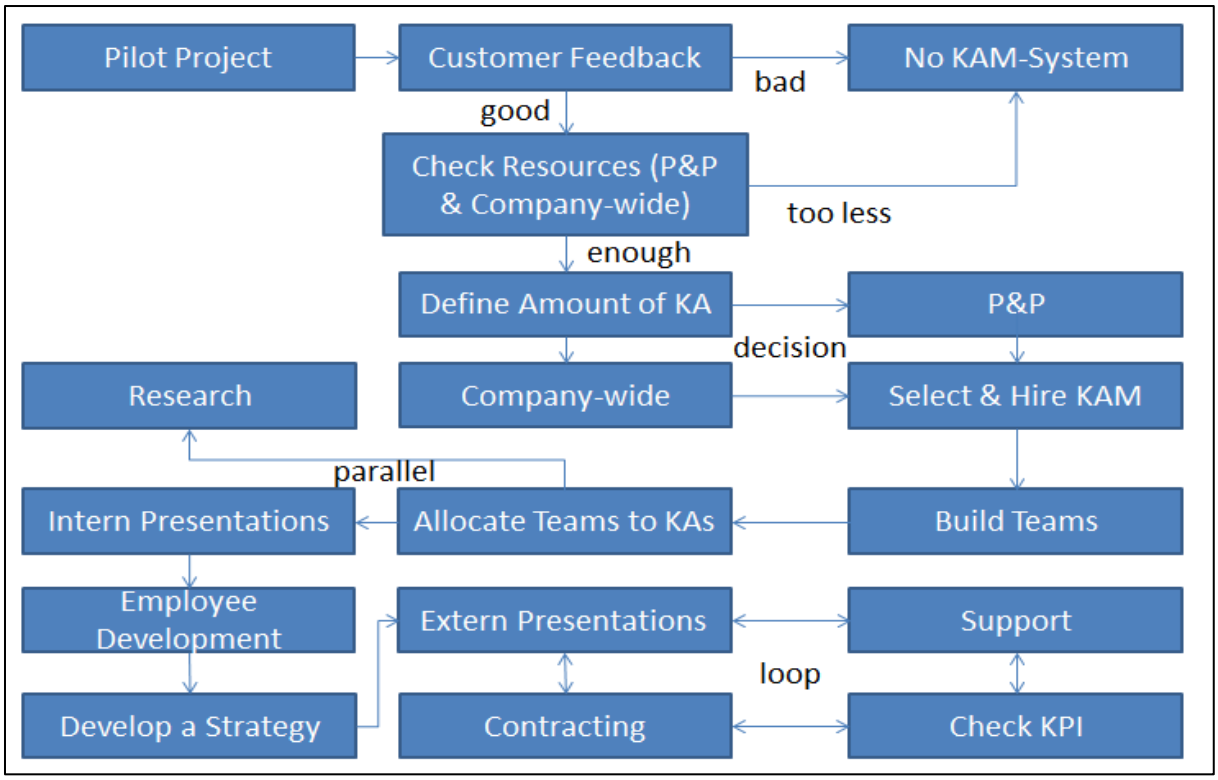

Figure 41: Process plan of the pilot project

Figure 41 shows a practical plan on how to establish a key account management system. The whole plan is dependent on the pilot project and the resulting customer feedback.

If the feedback isn't as good as it should be, ANDRITZ "Power Plant Services" has to shift the implementation back in time and improve the added value. If the customer gives satisfactory feedback, ANDRITZ "Power Plant Services" must use the information gathered to determine the possible amount of supervised key accounts and if there are enough resources available. In consultation with the whole of ANDRITZ AG it must be decided if they want to implement a companywide system or a system such as that mentioned below for ANDRITZ "Power Plant Services" – according to chapter 2.2 Figure 8. When all decisions have been made the responsible key account managers have to be nominated or hired. The key account managers or the teams get allocated to specific key accounts and start their research. Alongside that action there will be internal presentations on "who are the responsible persons for which key account". As preparation for the new tasks to come, employees should receive internal training to improve their skills. It is then up to the teams to develop the right strategy for their key accounts. This should also include a vision and a specific mission. The final phase consists of a loop of four tasks. Firstly, a presentation for the customer should be held. As mentioned above there are two different approaches to do that. The other three operations are contracting, KPI check and supporting.

ANDRITZ is, according to chapter 2.4 Figure 14, classified in area 2 or 4. At the moment, no key accounts exist but there are potential ones waiting. The number of key account managers is unclear because there are already good sales engineers, but it is not known whether or not they have the skills for being key account managers. So, the risk ranges from a manageable risk to a very high risk. The risk potential can be reduced if only a small number of key accounts are managed initially and the number of key accounts increases over time.

To forge key accounts, it is necessary to offer additional services for that customer group. There follows a list of possible services. The order of the list has no significance to the importance or the relevance of the individual points.

Forecasting

The forecasting tool is already in place but has not yet been used. This tool is directly connected with the CRM and helps to estimate what key accounts could be needed in the near future. To use these tools in an effective way it is necessary to maintain the CRM because the actual state is not optimal. This means that there are a lot of old contacts in the systems, so it is very hard to comprehend which contact is the responsible person. Sometimes there are also names without contact information or information without a name. For this reason, it is necessary to clean up the whole system and bring it up-to-date. The key account managers should also be informed how to use the CRM and the forecasting tool; a 1-2-day workshop should be enough to build up the knowledge-base. The above-mentioned forecasting-tool of the CRM is a core factor in using the CRM system. It is used to predict the future of the key accounts plants. With that forecasting the key account managers are able to operate more effectively and more easily. For example, the forecasting-tool shows that a specific part will soon break. With that information it is possible to contact the key account in good time to inform him that a part has to be changed. This also allows the possibility to give the key account an offer before the competitors are able to react. The biggest advantage for the customer is that the downtime of the plant gets reduced dramatically which is directly correlated to the costs. As already mentioned, the management should be responsible for keeping the forecasting-tool and the CRM in the mind of the key account managers and ensure that these tools are used. [145] [146]

Monitoring

This kind of service is also already offered by ANDRITZ. The problem is that there is a bottleneck of qualified persons for that particular tool. For this reason, this service is offered at a very high price. Another approach would be to offer the monitoring of the fluidized bed boilers only to the key accounts, to ensure an optimal customer experience and to increase the satisfaction of the key accounts. [140]

[145] Cf. ANDERSON, D.R.; SWEENEY, D.J.; WILLIAMS, T.A.; CAMM, J.D.; COCHRAN, J.J. (2015), S. 195 ff.
[146] Cf. Andritz internal Data (2017)

Engineering-Packages

This is another bottleneck at ANDRITZ because they do not have a large engineering workforce. As a result, there could be a special offer just for key accounts. Other companies combine this service with a package deal. The package deal includes e.g. 200h of engineering services with a 10% discount, but the hours must be consumed within one year otherwise the hours would expire. In this way it is possible to plan and use the engineering workforce in the most effective way, year by year. [147]

In-house workshops

As a gesture of gratitude annual workshops should be offered. If the demand is there, ANDRITZ "Power Plant Services" should also offer workshops on the customer's site. Almost every company is interested in keeping their employees mentally fit, so ANDRITZ could also provide this new kind of service under this category. There is no doubt that the key topic would be the personal bottleneck, therefore it should only be offered to key accounts.

Leasing workers

Especially in the early phases of new projects, ANDRITZ could provide highly skilled employees, who are educated at ANDRITZ, as leasing workers. This helps the customers and would also relieve the key account management team because the leasing worker can explain and help the customers more quickly and on site. [148]

Creative marketing

The marketing should be customized for every single key account and the account needs should be based on its strategy for the future. Creative marketing channels can help to stand out from the crowd. Other channels for communications are blogs, chatrooms, social media, internal wikis, news services, forums etc. These kinds of channels create an emotional relationship to the company. A special focus should be on the usability, moderation, design, creating profiles and a direct connection. [149] [150]

Personal contact and regular presentations

This service is the key for successful co-operation with the key accounts. Personal contact has a psychological factor which should not be underestimated. It shows the effort and the willingness for a successful collaboration. Frequently presentations also help to keep the key accounts up-to-date about new services and trends. Video conferences in particular should be used more intensively because they help to strengthen the personal aspect. At the moment, ANDRITZ "Power Plant Services" is working on a company internal wiki. This will help the seller to find the right solution quickly and directly on the customer site.

[147] Cf. www.amecfw.com (17.09.2017)
[148] Cf. HOFFMANN, P.C.; LENNERTS, S.; SCHMITZ, C.; STÖLZLE, W.; UEBERNICKEL, F. (2015), S. 88
[149] Cf. ELLIS, N. (2010), S. 224
[150] Cf. SEJA, C.; NARTEN, J. (2017), S. 38 ff.

Continuous improvement process (CIP)
Organisations must continue to improve themselves in a continuous way to keep up with the changing tasks of the market. This can be realized with a combination of new ideas and innovations. The knowledge, creativity and the learning ability of the employees are the most important resources for those tasks. The continuous improvement process or CIP is an approach to counter the stagnation of a company. This process can be used both for the company and for the key accounts. To realize the CIP the ANDRITZ management should motivate the employees to think about possible improvements for the key accounts. For example, at least 2 improvements per year, for every key account. [151]

Individual packages & developing new services to fulfil the customer needs
Specific and individual services and service packages for a key account give the company a tremendous advantage over the competitors, who will have difficulty in catching up. If a key account needs a specific service, the product group ANDRITZ “Power Plant Services“ should think about the development of that service just for that client. If there is a demand for that new service on the market, it could be offered to all customers in the future.

Pilot projects
If they wish, key accounts can obtain services which are not on the market or being developed. Together with the customer it is possible to work out these services for the market. As is the case with the individual packages, offering pilot projects provides a great advantage in comparison with other companies.

Exchange of ideas on the top management level
Referring to previous statements, an exchange of ideas on a high hierarchical level helps to create better customer loyalty. Actually, this can be considered as directly related to the statement: Key account management is not only about the relation to single persons, it is more about the relation to a whole company through every hierarchical level. This helps to consider wishes, needs and requirements of every single level. [152] [153]

Access to exact detailed project documentations
To generate trust, it is necessary to share information. For this reason, exact documentation and reference projects should be visible for every single key account. The documentation should include everything that ANDRITZ has done on that specific key account plant in detail and some special reference projects which are not accessible for every normal customer on the homepage.

[151] Cf. BARRANTES, L.; BECKER, S.; BURGHARTZ-WIDMANN, M.; KLINGSPORN, F.; LANDSCHEIDT, V.; NICHT, H.; NORDMANN, H.; ÖHL, J.; SCHLEDE, J.; WEBER, T.; WEILAND, H.H.; WOLTER, T. (2014), S. 1 ff.
[152] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 187 ff.
[153] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 88 f.

3.7 Requirements for a Key Account Manager

A key account manager is a personal caregiver of one or more key accounts, but he also has to represent the interests of his own company. This job combines a lot of other jobs like: seller, consultant, trouble-shooter, relationship-manager, communicator, leader, analyst, team-leader, project-manager, etc. As this is virtually impossible for one person, it's recommended to build up key account manager teams to share the work and the responsibilities. The main tasks can be split into three phases which follow on from each other. The first "project-phase" is to carry out relationship care, conflict and problem solving and to overcome barriers. The next step is the real goal of the company because this is concerned with everything about the contract. After-sales service and support is the last step for the key account management. To handle all that, a key account manager should have "personal and social" and "professional" competences. The professional competences consist of "good knowledge about the own company", "good knowledge about the customer" and "good knowledge about the competitors". He should know everything about the products, functions, processes, structures, strength and weaknesses of all three market participants. Additionally, it's important to know the needs strategy and the decision-making persons of the customer. Personal and social competences are self-explanatory and can be checked in the Appendix 3. For most successful key account managers the position is more important than the money. This psychological aspect should be considered in the selection process when hiring new key account managers. On average a key account manager has 13 years of experience when he gets the job.[154]

To build up a new key account manager it can also help to use mentoring- and trainee-programs. Other options could be assessment-centre and job rotations to choose the right candidate. [155]

[154] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 139 ff.
[155] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 150

3.8 Key-Performance Indicators

According to the chapter 3.6step 8 there are different KPIs which can be used to measure success. The measurement of success is one of the most difficult tasks because wrongly chosen KPIs can give a false impression or it can happen that problems are recognized too late. Using different KPIs and the checking of these helps to assess the actual state correctly. The most common KPI is the profit but the profit itself doesn't show which part of the strategy is responsible for the improvement/deterioration.[156] [157]

Table 15: Key account orientated KPIs [158]

Target	Measured values	Aims
Improvement in customer satisfaction	Customer satisfaction index Qualitative/Quantitative survey	Increase the index by X%
Reduction of complaints	Number of complaints Causes of the problem	Reduction by X
Increasing the efficiency	Qualitative survey	Qualitative evaluation
Increasing quality of supply	Number of awards	Increase by X%
Status of supplier from customer's view	Evaluation by the key account	Improve own position

Table 16: Process orientated KPIs [159]

Target	Measured values	Aims
Optimization of logistic processes	Time, Quality, Flexibility, Complaints	Improve the index
Increasing quality of supply	Number of awards	Increase by X%
Increasing quality of realizing projects	Time, Quality, Flexibility, Complaints, …	Improve the index
Improve the co-ordination	Project duration Order process time	Shorten

[156] Cf. HILKER, C. (2017), S. 63 f.
[157] Cf. HILKER, C. (2017), S. 205 f.
[158] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 210
[159] Cf. BELZ, C.; MÜLLNER, M.; ZUPANCIC, D. (2015), S. 211

Table 15 orientated and Table 16 show KPIs from the two different views, the key account orientated, and the process orientated. These are just examples of KPIs because every client can have specific targets which should be reached. It should be possible to determine the KPIs easily and the moment of determination should also be defined.

3.8.1 Customer Satisfaction Index

One of the KPIs in Table 15 is key account oriented. In my opinion this is the most important KPI because almost everything is related to customer satisfaction. It can also be used to get feedback from the customer after a short period of time. This is very important in key account management because of the long-term orientation. However, this customer satisfaction index is not that hard to determine.

This index can be calculated in different ways. The easiest way is to add a question at the end of the survey which could look like this: “How satisfied are you with our services and products of…” A problem of this approach is that it is very inexact because everybody is interpreting different things in that question. A better approach is to have a quantitative questioner and calculate the average of all questions to get the overall satisfaction. The disadvantage of this method is that some points are more important than others and this cannot be displayed in this calculation. For a good and exact index, it is necessary to create a table with weighting factors. These factors can be determined by previous surveys.[160]

$$rr = \frac{ac - nc - rc}{lc}$$ Equation 7: Retention rate [161]

rr…retention rate lc…long-term customers
ac…active customers nc…new customers rc…reactivated customers

The customer satisfaction index is a nice way to determine the customer satisfaction and its change. Another helpful value is the “customer retention rate”. For a key account management system, the retention rate should be as high as possible – approximately 100%. The result of Equation 7 is the percentage of customers who do not get lost.

Active customers are companies which bought products and services in this period and the period before. New customers are companies which bought products and services in this period for the first time. Reactivated customers are customers who came back to the company within a defined time period. Long-term customers bought products and services over several time periods. [162]

[160] Cf. HILL, N.; BRIERLEY, J. (2017), S. 92 f.
[161] BIESEL, H. (2013), S. 29
[162] Cf. BIESEL, H. (2013), S. 29 f.

4 Results and Outlook

The target of this thesis was to summarize the essential content of a key account management system and to estimate the possibility of implementing such a system at ANDRITZ “Power Plant Services”. The databases and market values used in the pulp and paper industry are largely inadequate because of that the first calculation of the market share gives an incorrect picture of the situation. After building up a new database, which can be regarded as a new milestone, it became clear that the potential for key account management is not being fully used because there is no contact with at least 40% of all potential customers. The approach adopted in the management statement below would be an alternative to the key account management system. This approach consists in trying to generate new customers by contacting the newly-found plant operators. This strategy is more short-term driven but could help to achieve the company-internal target of 40 million Euros per year until 2020. To maximize the use of collected data, the new database should be kept up-to-date by regular research, and by aligning it with other databases and papers.

The statement of the management is that establishing a key account management system is too cost intensive for ANDRITZ “Power Plant Services” at the moment. Another problem is the lack of workforce, but hiring more qualified people is directly related to the cost factor. The turnovers in chapter 3.4 show that revenues from almost every company with business relations to ANDRITZ “Power Plant Services” division are decreasing. It is essential that ANDRITZ “Power Plant Services” stops this decrease. In the next few years, customer relations should have priority over aiming for targets and it is therefore recommended to suspend the target of 40 million Euros. Keeping hold of customers is a strategic approach and helps to ensure a good and stable income in the long term. This should be every company’s most important target because business success means far more than a short-term result generated by one-off revenues.

The approach of changing from a project-based business model to an active one is the right step, but it must be clear that changes cost money and willpower. An active business model needs employees to maintain customer relations, whether they are key accounts or not. It seems that ANDRITZ “Power Plant Services” is providing special services for big customers, which is often wrongly mistaken for a key account management system. The difference is that a key account system deals with cooperation and collaboration and is long-term orientated. Key accounts can be important customers involved in big projects, but not necessarily. It is much more important that the customers have a large potential for future business. One of the main targets should be to have as detailed information as possible about the key accounts so that they can be supported in the most effective way. This can help the customers recognize opportunities like new markets, potential risks, etc.. According to the statement of the managementthe company is afraid that such measures would eventually disclose too much knowledge to the customer. As a consequence, a customer could even become a supplier of the same product offered by ANDRITZ “Power Plant Services”, a fear which has been openly communicated.

Competition in this market is fierce but also reveals problems which offer several opportunities. Maybe one of the biggest challenges is that the products and services offered by ANDRITZ “Power Plant Services” are at the high end of the market. This makes it especially important to acquire and keep customers by offering outstanding quality and services, thus setting oneself apart from the competition. An ingenious key account management system could guarantee that the most important customers – the key accounts – will not prefer competitors with cheaper prices.

The recommendation for ANDRITZ is, as already mentioned, to start with a pilot project as soon as possible to get first basic practical knowledge about key account management. Further steps are displayed in chapter 3.6 Figure 41. Depending on the kind of customers, according to 2.4, a pilot customer is selected. This pilot project could even help to generate and acquire new customers.

The main focus should not be on sales but on customer satisfaction because the sales benefit usually materializes only after several years. It is also important to ensure that not every customer has access to every product/service. This kind of two-class system has different reasons. Firstly, the lack of workforce in engineering services, and secondly the fact that setting some customers apart from “normal” customers makes these key accounts feel special and important. By joining forces with the entire ANDRITZ group it would also be possible to establish a special key account system to maintain close customer relations in all ANDRITZ core competences. This would also counter the engineering bottleneck and reduce the risk and the financial burden for the product group ANDRITZ “Power Plant Services”.

By way of conclusion it can be said that there are several strategy options. The key account management looks like the most promising but is also long-term orientated and the most complex. Although the management decided that the system will not be established at the moment, this does not mean that it will never happen, because from an objective point of view this is the modern way to deal with very important customers. Most other companies already have a key account management system, and the longer ANDRITZ keeps waiting, the more time other companies will have to gain more advantages and knowledge.

Combinations of these options which result from the collected data, i.e. of short- and long-term driven solutions, are certainly also possible. Using a strategy like this could help to overcome the barriers and to reach the company target. Regarding the decreasing sales figures in chapter 3, a fundamental change will have to take place anyway because no company should permanently rely on isolated major projects like upgrades and modernizations.

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List of Figures

List of Tables

List of Equations

List of Abbreviations

AB	Aktiebolag
AC	Advanced Concept
AG	Aktiengesellschaft
AM	Account Manger
AT	Austria
BFB	Bubbling Fluidized Bed
BWSC	Burmeister & Wain Scandinavian Contractor
CAM	Corporated Account Manager
CFB	Circulating Fluidized Bed
CIP	Continuous Improvement Process
CRM	Customer Relationship Management
CO	Carbon monoxide
DB	Database
etc.	et cetera
e.g.	example given
EU	European Union
EUR	Euro
excl.	excluded
FIN	Finland
GAM	Global Account Manager
GmbH	Gesellschaft mit beschränkter Haftung
NOx	nitrogen oxides
MWe	Mega-Watt electric
OY	Osakeyhtiö
PG	Product-Group
PKP	Kraft and Paper Mill Services
P&P	Pulp and Paper
RAM	Regional Account Manager
RC	Residue Concept
RDF	Residue Derived Fuel
SWE	Swedish
TOC	total organic carbon
UPM	United Paper Mills

Appendix

Appendix 1: McCoy and Pöyry DB

Company	Site	no of units	Type of unit	Fuels	Capacity t steam/h/un
W. Hamburger GmbH	Pitten	1	BFB	coal # sludge # oil	70
Mondi Frantschach GmbH	St. Gertraud, Lavantta	1	CFB	internal wood based # oil # coal	70
Norske Skog Bruck GmbH	Bruck an der Mur	1	BFB	coal # internal wood based	..
Zellstoff Pöls AG	Pöls	1	CFB	gas # internal wood based	50
Sappi Austria Produktions GmbH and Co. KG	Gratkorn	1	CFB	100% coal	165
Lenzing AG	Lenzing	1	CFB	internal wood based # sludge # coal	120
UPM-Kymmene Austria GmbH	Steyrermühl	1	CFB	sludge # internal wood based	55
Lenzing AG	Lenzing	1	CFB	100% waste derived fuel # sludge	125
Brigl & Bergmeister Papierfabrik GmbH	Niklasdorf	1	fluidized bed boiler	100% waste derived fuel	..
FUNDERMAX	FUNDER	1	CFB	biomass	47
FUNDERMAX	St. Veit	1	BFB	biomass	57
LINZ AG	LINZ MITTE	1	BFB	RDF	95
Stora Enso Langerbrugge N.V.	Gent	1	BFB	sludge # internal wood based # gas	65
Stora Enso Langerbrugge N.V.	Gent	1	CFB	internal wood based # sludge # waste derived fuel # coal	136
A&S ENERGY (ASPIRAVI & SPANO)	OOSTROZEBEKE	1	CFB	biomass	98
DEVEN JSCO. (SOLVAY SODI)	DEVEN	1	CFB	Petcoke	189
Mondi Steti a.s.	Steti	1	CFB	internal wood based # sludge # coal	220
Pardubice	Pardubice	1	BFB	coal # biomass	76
TEPLARNA Eckrohrkessel (ERK)	Strakonice 1&2	2	BFB	60 % coal # 40% biomass	47
LOVOSICE	LOVOSICE	1	CFB	Coal	114
Trinec	Trinec	1	CFB	Coal	132
Helsingør Kraftvarmeværk A/S	Helsingör	1	BFB	biomass	76
FORTUM TARTU	TARTU/CHP	1	BFB	biomass	98
PÄRNU		1	BFB	biomass	102
UPM-Kymmene Oyj	Rauma	1	BFB	oil	80
Enocell Oy	Uimaharju	1	CFB	internal wood based # sludge	115
Savon Sellu Oy	Kuopio	1	BFB	85% peat # 10% internal wood based # purchased wood based # sludge	120
UPM-Kymmene Oyj	Jämsänkoski	1	BFB	peat # internal wood based # sludge # purchased wood based	65
UPM-Kymmene Oyj	Jämsänkoski	1	BFB	peat # internal wood based # sludge # purchased wood based	65
Sappi Finland Operations Oy	Lohja	1	BFB	internal wood based # gas	85
Stora Enso Publication Papers Oy Ltd	Anjalankoski	1	BFB	peat # internal wood based # sludge # oil	265
Stora Enso Oyj	Sunila	1	BFB	95% internal wood based # 5% gas	100
Metsä Tissue Oyj	Mänttä	1	BFB	peat # purchased wood based # oil	120
Metsä Board Corporation	Simpele	1	BFB	peat # internal wood based # sludge # oil	145
Metsä Board Corporation	Kaskinen	1	BFB	internal wood based # oil	..
Metsä Fibre Oy	Kemi	1	BFB	internal wood based # peat # sludge	144
Stora Enso Oyj	Heinola	1	BFB	peat # 5% coal # internal wood based # 10% oil	140
Stora Enso Oyj	Varkaus	1	CFB	internal wood based # coal # oil	216
UPM-Kymmene Oyj	Kaipola	1	BFB	45% peat # internal wood based # sludge # oil	144
Stora Enso Oyj	Imatra	1	BFB	internal wood based # peat # sludge # oil	285
UPM-Kymmene Oyj	Valkeakoski	1	BFB	peat # internal wood based # sludge # gas	100
UPM-Kymmene Oyj	Rauma	1	CFB	internal wood based # purchased wood based # oil # peat	248
Pankaboard Oy	Pankakoski	1	BFB	internal wood based # peat # sludge	54
Metsä Fibre Oy	Äänekoski	1	BFB	internal wood based # sludge # purchased wood based # peat	216
UPM-Kymmene Oyj	Jämsänkoski	1	BFB	peat # internal wood based # sludge # oil	252
UPM-Kymmene Oyj	Rauma	1	BFB	internal wood based # purchased wood based # peat # sludge	144
UPM-Kymmene Oyj	Lappeenranta	1	CFB	internal wood based # purchased wood based # peat # gas	180
Metsä Board Corporation	Kyröskoski	1	BFB	internal wood based # purchased wood based # peat	105
Sappi Finland Operations Oy	Lohja	1	CFB	coal # internal wood based # purchased wood based	..
Oy SCA Hygiene Products Ab	Nokia	1	fluidized bed boiler	..	..
UPM-Kymmene Oyj	Pietarsaari	1	BFB	90% internal wood based # 5% coal # 5% oil	180
HAMEENKYRON VOIMA	HAMEENKRYO	1	BFB	biomass	45
	Riikinvoima	1	CFB	RDF	57
KOTKA	KOTKA	1	BFB	biomass	68
Nokianvirran Oy	Nokia	1	BFB	biomass	76
KERAVAN LAMPOVOIMA	KERAVA	1	BFB	biomass	85
FORTUM INTL	JARVENPAA	1	BFB	biomass	85
Sappi	Kirkniemi	1	CFB	coal	132
TORNION VOIMA	RCR*	1	CFB	Peat	170
PORVOON ENERGIA	TOLKKINEN, PORVC	1	BFB	biomass	189
Tampereen	Tampere	1	BFB	biomass	189
KUOPION ENERGIA	HAAPANIEMI 1	1	CFB	Peat	189
Neste, Veolia, Borealis	Porvoo 1, Kilpilahti	1	CFB	biomass	227
KUOPION Energia	KUOPIO	1	BFB	biomass	265
UPM-Kymmene France S.A.S.	Grand-Couronne	1	BFB	purchased wood based # sludge # gas	50
Norske Skog Golbey S.A.	Golbey	1	BFB	internal wood based # sludge # gas	70
Norske Skog Golbey S.A.	Golbey	1	BFB	internal wood based # sludge # waste derived fuel # gas	118
Fibre Excellence Saint-Gaudens SAS	Saint-Gaudens	1	BFB	internal wood based # sludge	60
UPM-Kymmene France S.A.S.	Grand-Couronne	1	BFB	sludge # purchased wood based	..
Tembec Tartas S.A.S.	Tartas	1	BFB	internal wood based # purchased wood based # gas	85
Smurfit Kappa Cellulose du Pin S.A.	Biganos	1	BFB	internal wood based # purchased wood based # biofuel not spec.	170
Gascogne	Mimizan	1	BFB	biomass	76
DALKIA FRANCE	FACTURE	1	BFB	biomass	159
UPM-Kymmene Papier GmbH & Co. KG	Schongau	1	BFB	sludge # internal wood based # gas	68
Kämmerer GmbH	Osnabrück	1	BFB	coal # internal wood based # sludge	85
LEIPA Georg Leinfelder GmbH	Schwedt	1	BFB	waste derived fuel # sludge # oil # gas	58
Koehler Kehl GmbH	Kehl	1	BFB	100% purchased wood based	60
Zellstoff Stendal GmbH	Arneburg	1	BFB	internal wood based # sludge # oil # gas	103
Papierfabrik Palm GmbH & Co. KG	Wörth, near Karlsruh	1	BFB	sludge # waste derived fuel	60

DS Smith Paper Deutschland GmbH	Witzenhausen	1	fluidized bed boiler	waste derived fuel	..
Steinbeis Papier Glückstadt GmbH & Co. KG	Glückstadt	1	BFB	sludge # waste derived fuel # oil # coal	108
LEIPA Georg Leinfelder GmbH	Schwedt	1	BFB	waste derived fuel # sludge	155
Stora Enso Maxau GmbH & Co. KG	Karlsruhe	1	BFB	purchased wood based # sludge # waste derived fuel # coal	198
Papierfabrik August Koehler AG	Oberkirch	1	BFB	biofuel not spec. # coal # sludge	100
Propapier PM2 GmbH & Co KG	Eisenhüttenstadt	1	BFB	coal # waste derived fuel # sludge	170
HHKW Aubrugg	Aubrugg	1	BFB	biomass	47
STADTWERKE LEIPZIP (SWL)	WITTENBERG-PIES	1	CFB	biomass	76
EVM ENERGIEVERSORGUNG MAXAU, STORA ENSO	EVM MAXAU	1	CFB	biomass	155
Infraserv Höchst	Frankfurt	1	BFB	RDF	265
Hamburger Hungaria GmbH	Dunaujvaros	1	CFB	biofuel not spec. # coal # sludge # gas	225
NITROGENMUVEK	PETFURDO 1	1	CFB	MISC	91
Hamburger Dunaujvaros Kft.	Dunapack	1	CFB	multifuel	151
SICET	SICET	1	BFB	biomass	45
EUROENERGY GROUP	MANFREDONIA 2	1	CFB	RDF	53
FORTUM INTL	JELGAVA	1	BFB	biomass	51
Leituvos Energija	Vilnius	1	CFB	coal	265
Parenco B.V.	Renkum	1	BFB	sludge # waste derived fuel	47
NV HUISVUILCENTRALE NOORD-HOLLAND (HVC-NI	ALKMAAR	1	CFB	biomass	91
BMC MOERDIJK	BIO MASSA CENTRA	1	BFB	biomass	136
ENECO	DELFZIJL	1	CFB	biomass	189
Norske Skog Saugbrugs AS	Halden	1	BFB	internal wood based # purchased wood based # sludge # other biofuel	87
Norske Skog Skogn	Skogn	1	CFB	biomass + waste & DI sludge	63
Hafslund	Haraldsrud	1	CFB	Industrial waste	47
Mondi Swiecie S.A.	Swiecie	1	BFB	internal wood based	115
International Paper - Kwidzyn S.A.	Kwidzyn	1	BFB	internal wood based # biofuel not spec.	100
Mondi Swiecie S.A.	Swiecie	1	CFB	internal wood based # coal # sludge # oil	234
Stora Enso Poland S.A.	Ostroleka	1	CFB	coal # internal wood based # sludge # biofuel not spec.	136
DALKIA POZNAN		1	BFB	biomass	95
PGNiG Termika SA	Siekierki / Warsaw	1	BFB	biomass	189
Polimex Mostostal	Bielsko Biala	1	CFB	coal	189
Electrobudowa S.A.	Tychy	1	CFB	coal	189
ZE PAK	KONIN	1	CFB	biomass	208
PKE	JAWORZNO 3	1	CFB	biomass	227
PGE ZESPOL ELEKTROWNI DOLNA ODRA	SZCZECIN	1	BFB	biomass	231
FORTUM HEAT POLSKA	CZESTOCHOWA/CH	1	CFB	coal	250
Swiecie Umbau		1	BFB	biomass	265
Zofiowka	Zofiowka	1	CFB	RDF	284
FORTUM	Zabrze	1	CFB	coal	284
Oswieciem	Oswieciem	1	CFB	Coal	102
Portucel - Empresa Produtora de Pasta e Papel S.A.	Mitrena, Setubal	1	BFB	internal wood based # oil	70
Portucel - Empresa Produtora de Pasta e Papel S.A.	Cacia	1	BFB	internal wood based # purchased wood based	58
Portucel - Empresa Produtora de Pasta e Papel S.A.	Mitrena, Setubal	1	BFB	internal wood based # purchased wood based	58
Soporcel - Sociedade Portuguesa de Papel S.A.	Lavos, Figueira da Fo	1	BFB	internal wood based # oil # sludge	100
LUKOIL ENERGY & GAS	PLOIESTI	1	CFB	Petcoke	265
Mondi SCP a.s.	Ruzomberok	1	BFB	internal wood based # sludge # oil # gas	135
ENCE Energía y Celulosa, S.A.	Pontevedra	1	BFB	internal wood based # oil	100
ENCE Energía y Celulosa, S.A.	Navia	1	BFB	internal wood based # other biofuel	120
SAICA - S.A. Industrias Celulosa Aragonesa	El Burgo de Ebro	1	CFB	100% waste derived fuel	..
COMPOSTILLA DEMOSTRATION PROJECT (ENDES/	PONFERRADA CCS	1	CFB	coal	114
ENCE HUELVA		1	BFB	biomass	189
SAICA	EL BURGO DE EBRO	1	CFB	RDF	204
SCA Graphic Sundsvall AB	Ortviken	1	BFB	internal wood based # sludge	50
BillerudKorsnäs AB	Skärblacka	1	BFB	internal wood based # purchased wood based # sludge	100
SCA Graphic Sundsvall AB	Östrand	1	BFB	internal wood based # oil	..
Södra Cell AB	Mörrum	1	BFB	internal wood based # sludge	..
Stora Enso Hylte AB	Hyltebruk	1	BFB	sludge # internal wood based # purchased wood based	90
Stora Enso Nymölla AB	Nymölla	1	BFB	internal wood based # sludge # 32% oil # 6% gas	130
Metsä Board Husum	Husum	1	BFB	internal wood based # sludge	110
Stora Enso Skoghall AB	Skoghall	1	BFB	internal wood based # purchased wood based # sludge	160
BillerudKorsnäs AB	Karlsborgsverken	1	BFB	internal wood based # purchased wood based # sludge	75
BillerudKorsnäs AB	Frövi	1	BFB	44% internal wood based # 56% sludge # oil	110
Stora Enso Hylte AB	Hyltebruk	1	CFB	coal # peat # internal wood based # sludge	65
Södra Cell AB	Mönsterås	1	BFB	internal wood based # sludge # other fuels	90
Stora Enso Fors AB	Fors	1	CFB	peat # internal wood based # coal # sludge	72
BillerudKorsnäs AB	Grums	1	BFB	internal wood based # purchased wood based	150
Karlstad Energi	Karlstad	1	CFB	biomass	117
C4 Energi	Kristianstad	1	BFB	biomass	63
Söderenergi	Södertälje	1	BFB	bio + demolition wood	160
Växjö Energi	Växjö	1	CFB	biomass	133
Skellefteå Kraft	Skellefteå	1	CFB	biomass + peat	122
Fortum	Brista	1	CFB	biomass	180
Fortum	Högdalen	1	CFB	Industrial waste	114
Mätse Board Husum	Husum	1	BFB	Bark + waste sludge	116
Södra Cell Mönsterås	Mönsterås	1	BFB	biomass	140
Skellefteå Kraft	Lycksele	1	CFB	biomass + peat	62
Mälarenergi	Västerås	1	CFB	biomass + demolition wood	231
Metsä Tissue AB	Mariestad	1	BFB	sludge # biofuel not spec.	49
SCA Munksund AB	Munksund	1	CFB	internal wood based # waste derived fuel	150
Jämtkraft	Östersund	1	CFB	biomass + demolition wood	184
Stora Enso Kvarnsveden AB	Borlänge	1	CFB	internal wood based # sludge # coal # oil	160
Smurfit Kappa Kraftliner AB	Piteå	1	BFB	internal wood based # purchased wood based # peat # sludge	180
BillerudKorsnäs AB	Gävle	1	BFB	internal wood based # oil	..
BOLLNÄS ENERGI AG	BOLLNÄS	1	BFB	RDF	49
Affärsverken i Karlskrona AB	Karlskrona	1	BFB	biomass	49
Vattenfall,	JORDBRO	1	BFB	biomass	76
JONKOPING ENERGI	TORSVIK 1	1	BFB	biomass	79
MOLNDAL ENERGI	RISKULLAVERKET	1	BFB	biomass	95
E.ON	ÖREBRO	1	BFB	biomass	98
E.ON VARME SVERIGE	NORRKOPING/CHP	1	CFB	RDF	106
KARLSTADS ENERGY	KARLSTAD, HEDEN	1	BFB	biomass	121

Smurfit Kappa Kraftliner AB	Piteå	1	BFB	internal wood based # purchased wood based # peat # sludge	180
BillerudKorsnäs AB	Gävle	1	BFB	internal wood based # oil	..
BOLLNÄS ENERGI AG	BOLLNÄS	1	BFB	RDF	49
Affärsverken i Karlskrona AB	Karlskrona	1	BFB	biomass	49
Vattenfall,	JORDBRO	1	BFB	biomass	76
JONKOPING ENERGI	TORSVIK 1	1	BFB	biomass	79
MOLNDAL ENERGI	RISKULLAVERKET	1	BFB	biomass	95
E.ON	ÖREBRO	1	BFB	biomass	98
E.ON VARME SVERIGE	NORRKOPING/CHP	1	CFB	RDF	106
KARLSTADS ENERGY	KARLSTAD, HEDEN	1	BFB	biomass	121
KALMAR ENERGI VARME	KALMAR/CHP	1	BFB	biomass	125
OVIK ENERGI	ORNSKOLDSVIK/CH	1	BFB	biomass	132
LUNDS ENERGI	LUNDS 2, ORTOFTA	1	CFB	biomass	132
Växjö Energi AB	VÄXJÖ	1	BFB	biomass	148
UMEA ENERGI	UMEA DAVA 2/CHP	1	BFB	biomass	151
Boras Energi Och Miljö	Boras, Sobacken	1	BFB	biomass	151
Bomhus Energi	KORSNÄS	1	BFB	biomass	170
MALARENERGIE	VASTERAS WTE, AL	1	CFB	RDF	227
Stora Enso Hylte	Hyltebruk	1	BFB	biomass, sludge, demolition wood	90
MODERN KARTON (EREN HOLDING)	CORLU 1, ISTANBUL	1	BFB	RDF	57
PARK	BEYPAZARI 1&2	2	CFB	coal	95
MODERN KARTON (EREN HOLDING)	CORLU 2, ISTANBUL	1	CFB		242
UPM-Kymmene (UK) Ltd	Shotton	1	BFB	sludge # purchased wood based	..
UPM-Kymmene (UK) Ltd	Irvine	1	BFB	purchased wood based # internal wood based # biofuel not spec.	..
Iggesund Paperboard (Workington) Ltd.	Siddick, Workington	1	BFB	internal wood based # purchased wood based # energy crops	195
Levenseat Renewable Energy	Lanarkshire	1	BFB	RDF	45
Stelrad Grp Ltd.	Kingston upon Hull	1	BFB	biomass	95
E.ON	BLACKBURN MEADV	1	BFB	biomass	125
RWE npower	Tullis Russel, Markinc	1	CFB	biomass	189

Appendix 2: McCoy and Pöyry DB plus Extensions

Region	Contact	Country	Company	Site	Type	Fuel	Capacity t/h	Column	year
RCE	PKP Power	Austria	Mondi Frantschach GmbH	St. Gertraud, Lavanttal	CFB	biomass	70	P&P	1983
RCE	Andritz AG	Austria	Solvay Österreich GmbH	Ebensee	CFB	coal	55	P&P	1986
RCE	Andritz AG	Austria	Zellstoff Pöls AG	Pöls	CFB	biomass	50	no P&P	1987
RCE	Andritz AG	Austria	Lenzing AG	Lenzing	CFB	biomass	120	P&P	1988
RCE	PKP Power	Austria	UPM-Kymmene Austria GmbH	Steyrermühl	CFB	biomass	55	P&P	1994
RCE	Andritz AG	Austria	Lenzing AG	Lenzing	CFB	RDF	125	P&P	1998
RCE	PKP Power	Austria	W. Hamburger GmbH	Pitten	BFB	coal	70	P&P	2002
RCE	PKP Power	Germany	Südzucker	Zeitz	CFB	coal	150	no P&P	2003
RCE	PKP Power	Austria	Energie AG Oberösterreich	Timelkam	BFB	biomass	54	no P&P	2004
RCE	PKP Power	Austria	Sappi Austria Produktions GmbH s	Gratkom	CFB	coal	165	P&P	2005
RCE	PKP Power	Austria	FUNDERMAX	Neudörfl	CFB	biomass	47	no P&P	2006
RCE	PKP Power	Austria	FUNDERMAX	St. Veit	BFB	biomass	57	no P&P	2006
RCE	PKP Power	Austria	Wienstrom	Wien	CFB	biomass	73	no P&P	2006
RCE	PKP Power	Austria	LINZ AG	LINZ MITTE	BFB	RDF	95	P&P	2009
RCE	PKP Power	Austria	Energie Burgenland	Heiligenkreuz	BFB	biomass	52	no P&P	2006
RCE	PKP Power	Belgium	Stora Enso Langerbrugge N.V.	Gent	BFB	biomass	65	P&P	2003
RCE	no contact	Belgium	A&S ENERGY (ASPIRAVI & SPA	OOSTROZEBEKE	CFB	biomass	98	no P&P	2008
RCE	no contact	Belgium	Stora Enso Langerbrugge N.V.	Gent	CFB	RDF	136	P&P	2010
RCE	PKP Power	Belgium	Stora Enso	Langerbrugge	BFB	RDF	150	P&P	2010
RCE	no contact	Bulgaria	Solvay Bulgaria (Saline Devnya, S	DEVNYA	CFB	coal	189	no P&P	2014
RCE	no contact	Bulgaria	DEVEN JSCO. (SOLVAYSODI)	DEVNYA 1	CFB	coal	379	no P&P	2006
RCE	PKP Power	Czech Republic	CEZ A.S. - Elektráma Hodonin	Hodonin	CFB	coal	170	no P&P	1997
RCE	PKP Power	Czech Republic	CEZ A.S. - Elektráma Hodonin	Hodonin	CFB	coal	170	no P&P	1997
RCE	no contact	Czech Republic	Ostrava Karvin Power	Olomouc	CFB	coal	169	unknown	1998
RCE	PKP Power	Czech Republic	CEZ A.S. - Porici Power Plant	Trutnov	CFB	coal	214	no P&P	1998
RCE	PKP Power	Czech Republic	Mondi Steti a.s.	Steti	CFB	Biomass	220	P&P	1999
RCE	no contact	Czech Republic	TEPLARNA Eckrohrkessel (ERK)	Strakonice 1	BFB	coal	47	no P&P	2010
RCE	no contact	Czech Republic	TEPLARNA Eckrohrkessel (ERK)	Strakonice 2	BFB	coal	47	no P&P	2010
RCE	Andritz AG	Czech Republic	Elektramy Opatovice	Pardubice	BFB	coal	76	no P&P	2013
RCE	Andritz AG	Czech Republic	Lovochemie	LOVOSICE	CFB	coal	114	no P&P	2013
RCE	Andritz AG	Czech Republic	Energetika Trinec, a.s.	Trinec	CFB	coal	132	no P&P	2013
RCE	Andritz AG	Czech Republic	ArcelorMittal Energy	Ostrava	CFB	coal	303	no P&P	2014
RCE	no contact	Denmark	Midtkraft Power Company	Grena	CFB	biomass	93	no P&P	1992
RCE	Andritz Ag	Denmark	Helsingør Kraftvarmeværk A/S	Helsingör	BFB	biomass	76	no P&P	2016
RNE	no contact	Estonia	AS Narva Elektrijaamad	Narva	CFB	not included	291	no P&P	2003
RNE	no contact	Estonia	FORTUM TARTU	TARTU/CHP	BFB	biomass	98	no P&P	2007
RNE	no contact	Estonia	Oü Digismart	Tallinn	BFB	biomass	93	no P&P	2008
RNE	PKP Power	Estonia	PÄRNU	PÄRNU	BFB	biomass	102	no P&P	2009
RNE	PKP Power	Finland	Metsä Board Corporation	Kaskinen	BFB	biomass	115	P&P	1977

RNE	no contact	Finland	Länsi-Suomen Käynnissäpito Oy	Kauttua	CFB	coal	78	unknown	1981
RNE	no contact	Finland	Kemira Fibres Oy	Valkeakoski	BFB	biomass	60	no P&P	1982
RNE	no contact	Finland	Kemira Chemicals Oy	Oulu	CFB	biomass	66	no P&P	1983
RNE	no contact	Finland	Metsäliiton Teollisuus Oy	Kirkniemi, Lohja	FB	coal	45	P&P	1985
RNE	no contact	Finland	Paper mill	Rauma	BFB	biomass	60	P&P	1985
RNE	Andritz AG	Finland	UPM-Kymmene Oyj	Jämsänkoski	BFB	coal	65	P&P	1985
RNE	Andritz AG	Finland	UPM-Kymmene Oyj	Jämsänkoski	BFB	coal	65	P&P	1985
RNE	no contact	Finland	Paper mill	Rauma	BFB	biomass	72	P&P	1985
RNE	Andritz AG	Finland	Sappi Finland Operations Oy	Lohja	BFB	biomass	85	P&P	1985
RNE	no contact	Finland	Espoon Sähkö Oy	Espoo	CFB	coal	96	no P&P	1986
RNE	PKP Power	Finland	Enso-Gutzeit Oy	Summa, Kotka	FB	not included	78	unknown	1987
RNE	no contact	Finland	Kemira Pigments Oy	Pori	CFB	coal	97	no P&P	1987
RNE	Andritz AG	Finland	Kymmene Oy, Kuusankoski	Kuusankoski	FB	biomass	85	P&P	1989
RNE	PKP Power	Finland	Kainuun Voima Oy	Kajaan	CFB	biomass	288	no P&P	1989
RNE	PKP Power	Finland	Etelä-Savon Energia Oy	Mikkeli	CFB	coal	100	no P&P	1990
RNE	PKP Power	Finland	Vaskiluodon Voima OY	Seinajoki	CFB	coal	133	no P&P	1990
RNE	PKP Power	Finland	Stora Enso Oyj	Varkaus	CFB	Biomass	216	P&P	1990
RNE	PKP Power	Finland	Enocell Oy	Uimaharju	CFB	biomass	115	P&P	1992
RNE	PKP Power	Finland	Stora Enso Oyj	Imatra	BFB	Biomass	285	P&P	1992
RNE	no contact	Finland	Imatran Voima	Uimaharju	BFB	biomass	109	unknown	1993
RNE	Andritz AG	Finland	Metsä Tissue Oyj	Mänttä	BFB	coal	120	P&P	1993
RNE	no contact	Finland	Porin Lämpövoima Oy	Pori	FB	biomass	108	unknown	1994
RNE	no contact	Finland	IVO International Oy	Kokkola	CFB	coal	118	unknown	1994
RNE	Andritz AG	Finland	Metsä Fibre Oy	Kemi	BFB	biomass	144	P&P	1994
RNE	PKP Power	Finland	Rovaniemi Energia	Rovaniemi	CFB	coal	115	unknown	1995
RNE	no contact	Finland	Kaukas Oy	Voikkaan Paperitehdas	FB	biomass	120	P&P	1995
RNE	no contact	Finland	Fortum Engineering Ltd. Oulun Ene	Toppila 2, Oulu	CFB	coal	123	no P&P	1995
RNE	no contact	Finland	Forssan Energia Oy	Forssa	BFB	biomass	69	no P&P	1996
RNE	PKP Power	Finland	UPM-Kymmene Oyj	Rauma	BFB	coal	80	P&P	1996
RNE	PKP Power	Finland	UPM-Kymmene Oyj	Valkeakoski	BFB	coal	100	P&P	1996
RNE	Andritz AG	Finland	UPM-Kymmene Oyj	Lappeenranta	BFB	biomass	131	P&P	1996
RNE	no contact	Finland	Pori Lämpövoima Oy	Pori	FB	biomass	140	unknown	1996
RNE	Andritz AG	Finland	UPM-Kymmene Oyj	Pietarsaari	BFB	biomass	180	P&P	1996
RNE	PKP Power	Finland	UPM-Kymmene Oyj	Rauma	CFB	Biomass	248	P&P	1996
RNE	PKP Power	Finland	Veitsiluodon Voima Oy, Enso Grou	Kemi	BFB	biomass	296	P&P	1996
RNE	Andritz AG	Finland	Metsä-Serla Oy	Simpele	BFB	biomass	136	P&P	1997
RNE	Andritz AG	Finland	Metsä Board Corporation	Simpele	BFB	coal	145	P&P	1997
RNE	no contact	Finland	Oulun Voima Oy, Enso Group, Oulu	Oulu	BFB	biomass	296	P&P	1997
RNE	no contact	Finland	Fortum Power & Heat	Hämeenlinna	CFB	biomass	66	no P&P	1998
RNE	no contact	Finland	Tampere Power Utility, Naistenlaht	Tampere	FB	biomass	228	no P&P	1998

RNE	Andritz AG	Finland	Pankaboard Oy	Pankakoski	BFB	biomass	54	P&P	1999
RNE	no contact	Finland	Fortum Power & Heat	Säteri	FB	biomass	60	no P&P	1999
RNE	PKP Power	Finland	Fortum Power & Heat	Joensuu	CFB	biomass	224	no P&P	2000
RNE	PKP Power	Finland	Turku Energia	Turku	BFB	biomass	48	no P&P	2001
RNE	no contact	Finland	Vamy Oy / Vattenfall Oy	Anjalankoski	BFB	biomass	106	unknown	2001
RNE	no contact	Finland	Salmi Voima Oy	Iisalmi	BFB	biomass	54	unknown	2002
RNE	no contact	Finland	Järvi-Suomen Voima Oy	Ristiina	BFB	biomass	88	unknown	2002
RNE	Andritz AG	Finland	Metsä Fibre Oy	Äänekoski	BFB	Biomass	216	P&P	2002
RNE	Andritz AG	Finland	UPM-Kymmene Oyj	Jämsänkoski	BFB	coal	252	P&P	2002
RNE	no contact	Finland	Järvi-Suomen Voima Oy	Savonlinna	BFB	biomass	87	no P&P	2003
RNE	Andritz AG	Finland	UPM-Kymmene Oyj	Kaipola	BFB	coal	144	P&P	2006
RNE	PKP Power	Finland	UPM-Kymmene Oyj	Rauma	BFB	biomass	144	P&P	2006
RNE	PKP Power	Finland	TORNION VOIMA	Tornio	CFB	coal	170	no P&P	2006
RNE	Andritz AG	Finland	KERAVAN LAMPOVOIMA	KERAVA	BFB	biomass	85	no P&P	2007
RNE	PKP Power	Finland	Stora Enso Oyj	Heinola	BFB	coal	140	P&P	2007
RNE	no contact	Finland	KUOPION ENERGIA	HAAPANIEMI 1	CFB	coal	189	no P&P	2008
RNE	no contact	Finland	Stora Enso Publication Papers Oy	Anjalankoski	BFB	coal	265	P&P	2008
RNE	no contact	Finland	Vattenfall Kaukolämpö Oy	HÄMEENKYRÖN	BFB	biomass	63	no P&P	2009
RNE	PKP Power	Finland	Stora Enso Oyj	Sunila	BFB	biomass	100	P&P	2010
RNE	no contact	Finland	UPM-Kymmene Oyj	Lappeenranta	CFB	biomass	180	P&P	2010
RNE	no contact	Finland	HÄMEENKYRÖN VOIMA	HÄMEENKYRÖN	BFB	biomass	45	no P&P	2011
RNE	Andritz AG	Finland	KOTKA Energia	KOTKA	BFB	biomass	68	no P&P	2011
RNE	no contact	Finland	FORTUM INTL	JARVENPAA	BFB	biomass	85	no P&P	2011
RNE	PKP Power	Finland	Savon Sellu Oy	Kuopio	BFB	coal	120	P&P	2011
RNE	Andritz AG	Finland	PORVOON ENERGIA	TOLKKINEN, PORVOON	BFB	biomass	189	no P&P	2011
RNE	PKP Power	Finland	Metsä Board Corporation	Kyröskoski	BFB	biomass	105	P&P	2012
RNE	Andritz AG	Finland	KUOPION Energia	KUOPIO	BFB	Biomass	265	no P&P	2012
RNE	PKP Power	Finland	Several Companies	Riikinvoima	CFB	RDF	57	no P&P	2014
RNE	no contact	Finland	Nokianvirran Oy	Nokia	BFB	biomass	76	no P&P	2014
RNE	Andritz AG	Finland	Sappi	Kirkniemi	CFB	coal	132	no P&P	2014
RNE	Andritz AG	Finland	Tampereen	Tampere	BFB	biomass	189	no P&P	2014
RNE	Andritz AG	Finland	Oy SCA Hygiene Products Ab	Nokia	BFB	biomass	82	P&P	2016
RNE	Andritz AG	Finland	Neste, Veolia, Borealis	Porvoo 1, Kilpilahti	CFB	biomass	227	no P&P	2016
RNE	PKP Power	Finland	Stora Enso Oyj	Kemi	BFB	coal	342	P&P	1996
RNE	PKP Power	Finland	Stora Enso Oyj	Nuottasaari, Oulu	BFB	Biomass	342	P&P	1997
RNE	Andritz AG	Finland	UPM-Kymmene Oyj	Kuusankoski	BFB	Biomass	385	P&P	2002
RNE	PKP Power	Finland	PVO (PORIN PROSESSIVOIMA)	PORIN/CHP, PORI	CFB	biomass	307	no P&P	2006
RNE	no contact	Finland	KAUKAAN VOIMA (UPM, POHJO	KAUKAS/CHP, LAPPEENRANT/	CFB	biomass	473	no P&P	2007
RCE	PKP Power	France	UPM-Kymmene France S.A.S.	Grand-Couronne	BFB	biomass	50	P&P	1986
RCE	PKP Power	France	Chapelle Darblay	Couronne	BFB	RDF	59	P&P	1986

RCE	no contact	France	Somedith/COF	Marseilles	CFB	coal	63	unknown	1988
RCE	no contact	France	Aluminum Pechiney	Gardanne	CFB	coal	112	no P&P	1988
RCE	no contact	France	Papeteries de Golbey Pulp & Pape	Golbey	BFB	RDF	54	P&P	1991
RCE	PKP Power	France	Norske Skog Golbey S.A.	Golbey	BFB	biomass	70	P&P	1991
RCE	no contact	France	City of Grenoble	Grenoble	CFB	coal	87	no P&P	1993
RCE	no contact	France	Fibre Excellence Saint-Gaudens S	Saint-Gaudens	BFB	biomass	60	P&P	2005
RCE	PKP Power	France	Norske Skog Golbey S.A.	Golbey	BFB	RDF	118	P&P	2006
RCE	PKP Power	France	UPM-Kymmene France S.A.S.	Grand-Couronne	BFB	biomass	50	P&P	2007
RCE	PKP Power	France	Tembec Tartas S.A.S.	Tartas	BFB	biomass	85	P&P	2008
RCE	no contact	France	DALKIA FRANCE	FACTURE	BFB	biomass	159	no P&P	2008
RCE	Andritz AG	France	Smurfit Kappa Cellulose du Pin S.A	Biganos	BFB	biomass	170	P&P	2010
RCE	Andritz AG	France	Gascogne	Mimizan	BFB	biomass	76	no P&P	2014
RCE	PKP Power	Germany	Stadtwerke Wuppertal	Wuppertal	CFB	Biomass	170	no P&P	1986
RCE	PKP Power	Germany	Stadtwerke Wuppertal	Wuppertal	CFB	Biomass	170	no P&P	1986
RCE	no contact	Germany	Stadtwerke Pforzheim	Pforzheim	CFB	coal	90	no P&P	1988
RCE	no contact	Germany	TWS Stuttgart	Stuttgart	CFB	coal	138	no P&P	1988
RCE	no contact	Germany	KW Wachtberg	Wachtberg	CFB	coal	178	no P&P	1988
RCE	no contact	Germany	GEW Köln	KW Merkenich	CFB	Biomass	300	no P&P	1988
RCE	Andritz AG	Germany	Kämmerer GmbH	Osnabrück	BFB	coal	85	P&P	1990
RCE	no contact	Germany	KW Berrenrath	Berrenrath	CFB	coal	233	no P&P	1990
RCE	PKP Power	Germany	LEIPA Georg Leinfelder GmbH	Schwedt	BFB	RDF	58	P&P	1993
RCE	Andritz AG	Germany	Hornitex	Beeskow	CFB	Biomass	105	no P&P	1996
RCE	PKP Power	Germany	UPM-Kymmene Papier GmbH & C	Schongau	BFB	biomass	68	P&P	2000
RCE	Andritz AG	Germany	Hornitex Energie GmbH	Horn Bad Meinberg	CFB	Biomass	113	no P&P	2000
RCE	Andritz AG	Germany	Hornitex	Horn Bad Meinberg	CFB	Biomass	123	no P&P	2000
RCE	no contact	Germany	Stadtwerke Flensburg	Flensburg	CFB	coal	130	no P&P	2001
RCE	Andritz AG	Germany	Koehler Kehl GmbH	Kehl	BFB	biomass	60	P&P	2002
RCE	no contact	Germany	Fortum Enertec GmbH	Afferde	FB	biomass	65	no P&P	2002
RCE	no contact	Germany	Heizkraftwerk Kehl GmbH	Kehl	CFB	Biomass	53	no P&P	2003
RCE	no contact	Germany	Prokon Nord Energiesysteme Gmb	Papenburg	CFB	Biomass	76	no P&P	2003
RCE	PKP Power	Germany	SWN Stadtwerke Neumünster	Neumünster	CFB	RDF	90	no P&P	2003
RCE	PKP Power	Germany	Zellstoff Stendal GmbH	Arneburg	BFB	biomass	103	P&P	2004
RCE	no contact	Germany	Stadtwerke Leipzig	Bischofferode	CFB	biomass	63	no P&P	2005
RCE	no contact	Germany	Harpen Energie Contracting GmbH	Bergkamen	CFB	Biomass	70	no P&P	2005
RCE	Andritz AG	Germany	MVV Energie AG	Königs Wusterhausen	CFB	Biomass	72	no P&P	2005
RCE	Andritz AG	Germany	Prokon Nord Energiesysteme Gmb	Hamburg	CFB	Biomass	75	no P&P	2006
RCE	Andritz AG	Germany	Prokon Nord Energiesysteme Gmb	Emlichenheim	CFB	Biomass	80	no P&P	2006
RCE	PKP Power	Germany	STADTWERKE LEIPZIG (SWL)	WITTENBERG-PIESTERITZ/CHP	CFB	biomass	76	no P&P	2007
RCE	Andritz AG	Germany	Infraserv Höchst	Frankfurt	BFB	RDF	265	no P&P	2007
RCE	no contact	Germany	HHKW Aubrugg	Aubrugg	BFB	biomass	47	no P&P	2008

RCE	PKP Power	Germany	Papierfabrik Palm GmbH & Co. K	Wörth, near Karlsruhe	BFB	RDF	60	P&P	2008
RCE	PKP Power	Germany	DS Smith Paper Deutschland Gmb	Witzenhausen	CFB	RDF	153	P&P	2008
RCE	PKP Power	Germany	EVM ENERGIEVERSORGUNG M	EVM MAXAU	CFB	biomass	155	no P&P	2008
RCE	PKP Power	Germany	Steinbeis Papier Glückstadt GmbH	Glückstadt	BFB	RDF	108	P&P	2009
RCE	PKP Power	Germany	LEIPA Georg Leinfelder GmbH	Schwedt	BFB	RDF	155	P&P	2010
RCE	PKP Power	Germany	Stora Enso Maxau GmbH & Co. K	Karlsruhe	BFB	biomass	198	P&P	2010
RCE	Andritz AG	Germany	Papierfabrik August Koehler AG	Oberkirch	BFB	biomass	100	P&P	2011
RCE	PKP Power	Germany	Propapier PM2 GmbH & Co KG	Eisenhüttenstadt	BFB	coal	170	P&P	2011
RCE	PKP Power	Hungary	Pannonpower Rt.	Pecs	FB	Biomass	174	no P&P	2004
RCE	no contact	Hungary	NITROGENMUVEK	PETFURDO 1	CFB	RDF	91	no P&P	2014
RCE	Andritz AG	Hungary	Hamburger Dunaujvaros Kft.	Dunapack	CFB	RDF	151	P&P	2014
RCE	Andritz AG	Hungary	Hamburger Hungaria GmbH	Dunaujvaros	CFB	Biomass	225	P&P	2015
RCE	no contact	Ireland	Esb West Offaly Power	Shannonbridge	CFB	biomass	259	no P&P	2004
RCE	no contact	Italy	Euroenergy S.R.L	Cutro	BFB	RDF	59	no P&P	2002
RCE	no contact	Italy	Enel Produzione SpA	Laino Borgo	unknown	biomass	133	no P&P	2005
RCE	no contact	Italy	EUROENERGY GROUP	MANFREDONIA 2	CFB	RDF	53	no P&P	2007
RCE	no contact	Italy	Lomellina Energia S.r.l.	Parona	CFB	biomass	157	no P&P	2007
RCE	Andritz AG	Italy	SICET	Ospitale Die Cadore Provinz Bell	BFB	biomass	45	no P&P	2009
RNE	Andritz AG	Latvia	FORTUM INTL	JELGAVA	BFB	biomass	51	no P&P	2011
RNE	no contact	Litauen	Lietuvos Energija	Vilnius	CFB	coal	265	no P&P	2016
RCE	no contact	Netherlands	Shell Netherland Raffinaderij B.V.	Den Haag	BFB	coal	48	no P&P	1982
RCE	no contact	Netherlands	NV PNEM	Cuijk	BFB	Biomass	94	no P&P	1999
RCE	Andritz AG	Netherlands	Norske Skog Parenco B.V.	Renkum	BFB	RDF	45	P&P	2004
RCE	Andritz AG	Netherlands	Parenco B.V.	Renkum	BFB	RDF	47	P&P	2004
RCE	Andritz AG	Netherlands	NV HUISVUILCENTRALE NOORD	ALKMAAR	CFB	biomass	91	no P&P	2006
RCE	PKP Power	Netherlands	BMC MOERDIJK	Moerdijk	BFB	biomass	136	no P&P	2006
RCE	no contact	Netherlands	ENECO	DELFZIJL	CFB	biomass	189	no P&P	2011
RNE	Andritz AG	Norway	Norske Skog Saugbrugs AS	Halden	BFB	biomass	87	P&P	1996
RNE	no contact	Norway	Norske Skog	Nordenfjelske Treforedling	CFB	biomass	60	unknown	1998
RNE	PKP Power	Norway	Norske Skog Skogn	Skogn	CFB	RDF	63	unknown	2000
RNE	no contact	Norway	Hafslund	Haraldsrud	CFB	RDF	47	unknown	2001
RCE	no contact	Poland	Elektrim KWK Czeczott Coal Mine	Tychy	BFB	coal	55	no P&P	1991
RCE	PKP Power	Poland	International Paper - Kwidzyn S.A.	Kwidzyn	BFB	biomass	100	P&P	2000
RCE	PKP Power	Poland	Mondi Swiecie S.A.	Swiecie	CFB	Biomass	234	P&P	2003
RCE	no contact	Poland	FORTUM HEAT POLSKA	CZESTOCHOWA/CHP	CFB	coal	250	no P&P	2007
RCE	PKP Power	Poland	Mondi Swiecie S.A.	Swiecie	BFB	biomass	115	P&P	2009
RCE	no contact	Poland	ZE PAK	KONIN	CFB	Biomass	208	no P&P	2009
RCE	no contact	Poland	PGE ZESPOL ELEKTROWNI DOI	SZCZECIN	BFB	Biomass	231	no P&P	2009
RCE	no contact	Poland	Kogeneracja S.A.	Wroclaw	FB	biomass	91	no P&P	2010
RCE	PKP Power	Poland	DALKIA POZNAN	POZNAN	BFB	biomass	95	no P&P	2010

RCE	PKP Power	Poland	Stora Enso Poland S.A.	Ostroleka	CFB	coal	136	P&P	2010
RCE	no contact	Poland	Polimex Mostostal	Bielsko Biala	CFB	coal	189	no P&P	2010
RCE	no contact	Poland	PKE	JAWORZNO 3	CFB	Biomass	227	no P&P	2010
RCE	Andritz AG	Poland	Dalkia Lodz S.A.	Lodz	FB	biomass	155	no P&P	2011
RCE	no contact	Poland	Elektrociepłownia Białystok S.A	Białystok	FB	biomass	90	unknown	2012
RCE	no contact	Poland	Energoinstal S.A. / SEJ S.A.	Jastrzębie-Zdrój Zofiowka	CFB	coal	90	P&P	2013
RCE	no contact	Poland	Oswieciem	Oswieciem	CFB	coal	102	no P&P	2013
RCE	PKP Power	Poland	PGNiG Termika SA	Siekierki / Warsaw	BFB	biomass	189	no P&P	2013
RCE	no contact	Poland	Electrobudowa S.A.	Tychy	CFB	coal	189	no P&P	2013
RCE	PKP Power	Poland	Zofiowka	Zofiowka	CFB	RDF	284	no P&P	2013
RCE	PKP Power	Poland	Mondi Swiecie S.A.	Swiecie	BFB	Biomass	265	P&P	2014
RCE	Andritz AG	Poland	FORTUM	Zabrze	CFB	coal	284	no P&P	2015
RCE	PKP Power	Portugal	Portucel - Empresa Produtora de P	Mitrena, Setubal	BFB	biomass	70	P&P	2003
RCE	PKP Power	Portugal	Soporcel - Sociedade Portuguesa	Lavos, Figueira da Foz	BFB	biomass	100	P&P	2004
RCE	PKP Power	Portugal	Portucel - Empresa Produtora de P	Cacia	BFB	biomass	58	P&P	2009
RCE	PKP Power	Portugal	Portucel - Empresa Produtora de P	Mitrena, Setubal	BFB	biomass	58	P&P	2009
RCE	Andritz AG	Romania	LUKOIL ENERGY & GAS	PLOIESTI	CFB	coal	265	no P&P	2007
RCE	no contact	Slovakia	SES Tlmace	SCP Ruzomberok	FB	biomass	115	no P&P	1998
RCE	Andritz AG	Slovakia	Mondi SCP a.s.	Ruzomberok	BFB	biomass	135	P&P	2005
RCE	no contact	Slovakia	Martinska Teplarenska a.s.	Martin	FB	biomass	72	no P&P	2010
RCE	no contact	Spain	Vetejar/El Tejar	Andalusia	BFB	biomass	47	unknown	1994
RCE	PKP power	Spain	Empresa Nacional de Celulosas, S	Huelva	FB	biomass	66	P&P	1994
RCE	no contact	Spain	Hunosa	La Pereda, Mieres, Austurias	CFB	biomass	172	no P&P	1994
RCE	Andritz AG	Spain	ENCE Energía y Celulosa, S.A.	Pontevedra	BFB	biomass	100	P&P	1995
RCE	no contact	Spain	Sogama S.A.	Meirama	CFB	RDF	97	no P&P	2000
RCE	no contact	Spain	Sogama S.A.	Meirama	CFB	RDF	97	no P&P	2000
RCE	PKP power	Spain	ENCE HUELVA	Huelva	BFB	biomass	189	P&P	2006
RCE	no contact	Spain	Carbonifera Energia	Mequinenza	CFB	biomass	120	no P&P	2008
RCE	PKP power	Spain	ENCE Energía y Celulosa, S.A.	Navia	BFB	biomass	120	P&P	2008
RCE	Andritz AG	Spain	SAICA	EL BURGO DE EBRO	CFB	RDF	204	P&P	2009
RCE	Andritz AG	Spain	SAICA	EL BURGO DE EBRO	CFB	RDF	204	no P&P	2009
RCE	no contact	Spain	COMPOSTILLA DEMOSTRATION	PONFERRADA CCS	CFB	coal	114	no P&P	2010
RNE	PKP Power	Sweden	Stora Enso Hylte AB	Hyltebruk	CFB	coal	65	P&P	1983
RNE	PKP Power	Sweden	Mölndal Energi	Mölndal	CFB	coal	48	no P&P	1984
RNE	no contact	Sweden	Nyköping Värmeverk	Nyköping	CFB	coal	48	no P&P	1984
RNE	no contact	Sweden	Nyköping Värmeverk	Nyköping	CFB	coal	48	no P&P	1984
RNE	Andritz AG	Sweden	Uddevalla Energi	Uddevalla	CFB	coal	48	no P&P	1985
RNE	no contact	Sweden	Eskilstuna Värmeverk	Eskilstuna	CFB	biomass	60	no P&P	1986
RNE	no contact	Sweden	Karlskoga Kommun & Nobel Chematur		CFB	coal	65	no P&P	1986
RNE	no contact	Sweden	Karlskoga Kommun & Nobel Chematur		CFB	coal	65	no P&P	1986

RNE	no contact	Sweden	ASEA-PFBC	Värtan	CFB	coal	200	unknown	1987
RNE	no contact	Sweden	ASEA-PFBC	Värtan	CFB	coal	200	unknown	1987
RNE	no contact	Sweden	ASEA-PFBC	Värtan	CFB	coal	200	unknown	1987
RNE	no contact	Sweden	Örebro Energi AB	ÖREBRO	CFB	coal	256	no P&P	1990
RNE	Andritz AG	Sweden	Perstorp	Perstorp	CFB	coal	69	P&P	1992
RNE	PKP Power	Sweden	Karlstad Energi	Karlstad	CFB	biomass	117	unknown	1992
RNE	no contact	Sweden	Norrköping Energie AB	Händelöverket	CFB	biomass	151	no P&P	1993
RNE	no contact	Sweden	C4 Energi	Kristianstad	BFB	biomass	63	unknown	1994
RNE	no contact	Sweden	Stora Nymölla AB	Bromölla	FB	not included	76	P&P	1995
RNE	no contact	Sweden	Nyköping Energi Ab	Nyköping	BFB	biomass	120	P&P	1995
RNE	PKP Power	Sweden	Stora Enso Nymölla AB	Nymölla	BFB	biomass	130	P&P	1995
RNE	Andritz AG	Sweden	Skellefteå Kraft	Skellefteå	CFB	biomass	122	unknown	1996
RNE	PKP Power	Sweden	Växjö Energi	Växjö	CFB	biomass	133	unknown	1996
RNE	no contact	Sweden	Brista Kraft AB	Märsta	CFB	biomass	146	no P&P	1996
RNE	PKP Power	Sweden	Söderenergi	Södertälje	BFB	biomass	160	unknown	1996
RNE	Andritz AG	Sweden	Stora Cell AB	Norrsundet	BFB	biomass	60	P&P	1997
RNE	Andritz AG	Sweden	BillerudKorsnäs AB	Frövi	BFB	biomass	110	P&P	1997
RNE	PKP Power	Sweden	Stora Enso Fors AB	Fors	CFB	coal	72	P&P	1998
RNE	no contact	Sweden	Fortum	Brista	CFB	biomass	180	unknown	1998
RNE	PKP Power	Sweden	Modo Paper	Husum	BFB	biomass	104	P&P	2000
RNE	PKP Power	Sweden	Metsä Board Husum	Husum	BFB	biomass	110	P&P	2000
RNE	no contact	Sweden	Fortum	Högdalen	CFB	RDF	114	unknown	2000
RNE	PKP Power	Sweden	Mätse Board Husum	Husum	BFB	RDF	116	unknown	2000
RNE	PKP Power	Sweden	Eskilstuna Energi och Miljö AB	Eskilstuna	BFB	biomass	132	no P&P	2000
RNE	no contact	Sweden	Härnösand Energi & Miljö AB	Härnösand	BFB	biomass	50	no P&P	2001
RNE	no contact	Sweden	Viken Energinett	Oslo	CFB	biomass	56	unknown	2001
RNE	Andritz AG	Sweden	Södra Cell AB	Mönsterås	BFB	biomass	90	P&P	2001
RNE	Andritz AG	Sweden	Södra Cell Mönsterås	Mönsterås	BFB	biomass	140	unknown	2001
RNE	Andritz AG	Sweden	Metsä Tissue AB	Mariestad	BFB	biomass	49	P&P	2002
RNE	no contact	Sweden	Skellefteå Kraft	Lycksele	CFB	biomass	62	unknown	2002
RNE	Andritz AG	Sweden	SCA Munksund AB	Munksund	CFB	RDF	150	P&P	2002
RNE	PKP Power	Sweden	Jämtkraft	Östersund	CFB	biomass	184	unknown	2002
RNE	no contact	Sweden	Göteborg Energi AB	Sävenäs	unknown	not included	120	no P&P	2004
RNE	no contact	Sweden	Stora Enso Kvarnsveden AB	Borlänge	CFB	biomass	160	P&P	2004
RNE	Andritz AG	Sweden	BillerudKorsnäs AB	Karlsborgsverken	BFB	biomass	75	P&P	2005
RNE	Andritz AG	Sweden	BillerudKorsnäs AB	Skärblacka	BFB	biomass	100	P&P	2005
RNE	PKP Power	Sweden	BillerudKorsnäs AB	Gruvön	FB	not included	141	P&P	2005
RNE	PKP Power	Sweden	BillerudKorsnäs AB	Grums	BFB	biomass	150	P&P	2005
RNE	PKP Power	Sweden	Stora Enso Hylte	Hyltebruk	BFB	biomass	90	unknown	2006
RNE	PKP Power	Sweden	Stora Enso Hylte AB	Hyltebruk	BFB	biomass	90	P&P	2006

RNE	no contact	Sweden	OVIK ENERGI	ORNSKOLDSVIK/CHP	BFB	biomass	132	no P&P	2006
RNE	Andritz AG	Sweden	Stora Enso Skoghall AB	Skoghall	BFB	biomass	160	P&P	2006
RNE	Andritz AG	Sweden	Stora Enso Skoghall AB	Skoghall	unknown	not included	255	P&P	2006
RNE	no contact	Sweden	MOLNDAL ENERGI	RISKULLAVERKET	BFB	biomass	95	no P&P	2007
RNE	no contact	Sweden	KALMAR ENERGI VARME	KALMAR/CHP	BFB	biomass	125	no P&P	2007
RNE	PKP Power	Sweden	UMEA ENERGI	UMEA DAVA 2/CHP	BFB	biomass	151	no P&P	2007
RNE	PKP Power	Sweden	Smurfit Kappa Kraftliner AB	Piteå	BFB	biomass	180	P&P	2007
RNE	Andritz AG	Sweden	Vattenfall,	JORDBRO	BFB	biomass	76	no P&P	2008
RNE	no contact	Sweden	E.ON VARME SVERIGE	NORRKOPING/CHP	CFB	RDF	106	no P&P	2008
RNE	Andritz AG	Sweden	Övik Energi AB	Örnsköldsvik	BFB	biomass	156	no P&P	2008
RNE	PKP Power	Sweden	BOLLNÄS ENERGI AG	BOLLNÄS	BFB	RDF	49	no P&P	2009
RNE	no contact	Sweden	Affärsverken i Karlskrona AB	Karlskrona	BFB	biomass	49	no P&P	2009
RNE	PKP Power	Sweden	Mälarenergi	Västerås	CFB	biomass	231	unknown	2009
RNE	no contact	Sweden	Vattenfall AB, Värme Norden	Haninge	BFB	biomass	76	no P&P	2010
RNE	PKP Power	Sweden	E.ON	ÖREBRO	BFB	biomass	98	no P&P	2010
RNE	no contact	Sweden	Bomhus Energi	KORSNÄS	BFB	biomass	170	no P&P	2010
RNE	no contact	Sweden	JONKOPING ENERGI	TORSVIK 1	BFB	biomass	79	no P&P	2012
RNE	PKP Power	Sweden	KARLSTADS ENERGY	KARLSTAD, HEDEN ETAPP	BFB	biomass	121	no P&P	2012
RNE	no contact	Sweden	LUNDS ENERGI	LUNDS 2, ORTOFTA	CFB	biomass	132	no P&P	2012
RNE	PKP Power	Sweden	Växjö Energi AB	VÄXJÖ	BFB	biomass	148	no P&P	2012
RNE	PKP Power	Sweden	MALARENERGIE	VASTERAS WTE, ALLSTAHAM	CFB	RDF	227	no P&P	2012
RNE	Andritz AG	Sweden	BillerudKorsnäs AB	Gävle	BFB	biomass	180	P&P	2013
RNE	Andritz AG	Sweden	SCA Graphic Sundsvall AB	Ortviken	BFB	biomass	50	P&P	2014
RNE	Andritz AG	Sweden	Jönköping Energi AB	Jönköping	BFB	biomass	120	no P&P	2014
RNE	PKP Power	Sweden	Nybro Värmecentral AB	Transtorp / Nybro	BFB	RDF	45	no P&P	2016
RNE	Andritz AG	Sweden	Boras Energi Och Miljö	Boras, Sobacken	BFB	biomass	151	no P&P	2016
RNE	no contact	Sweden	Fortum Värme	VÄRTAVERKET	CFB	biomass	492	no P&P	2012
RCE	no contact	Turkey	PARK	BEYPAZARI 1	CFB	coal	95	no P&P	2006
RCE	no contact	Turkey	PARK	BEYPAZARI 2	CFB	coal	95	no P&P	2006
RCE	Andritz AG	Turkey	MODERN KARTON (EREN HOLD	CORLU 1, ISTANBUL	BFB	RDF	57	P&P	2012
RCE	Andritz AG	Turkey	MODERN KARTON (EREN HOLD	CORLU 2, ISTANBUL	CFB	coal	242	P&P	2016
RCE	Andritz AG	Turkey	YUNUS EMRE	Koyunagil	CFB	coal	290	unknown	2017
RCE	no contact	TURKEY	EREN ENERJI ELEKTRIK URETIM	ZONGULDAG	CFB	coal	382	no P&P	2006
RCE	no contact	TURKEY	AKSA ENERJI URETIM	BOLU GOYNUK 1&2	CFB	coal	454	no P&P	2009
RCE	no contact	TURKEY	AKSA ENERJI URETIM	BOLU GOYNUK 1&2	CFB	coal	454	no P&P	2009
RCE	PKP Power	United Kingdom	Caledonian Paper plc	Irvine	CFB	coal	52	P&P	1989
RCE	no contact	United Kingdom	Abbengoa SA / Energy Power Res	Westfield, Fife	BFB	biomass	47	no P&P	1998
RCE	no contact	United Kingdom	SembCorp Utilities (UK) Ltd. (SCU	Middlesbrought	BFB	biomass	111	P&P	2007
RCE	no contact	United Kingdom	E.ON UK plc	Lockerbie	BFB	biomass	151	no P&P	2007
RCE	PKP Power	United Kingdom	UPM-Kymmene (UK) Ltd	Irvine	BFB	biomass	126	P&P	2009

RCE	no contact	United Kingdom	RWE npower	Tullis Russel, Markinch Fife	CFB	biomass	189	no P&P	2010
RCE	PKP Power	United Kingdom	E.ON	BLACKBURN MEADWS, SHEF'I	BFB	biomass	125	no P&P	2011
RCE	PKP Power	United Kingdom	Iggesund Paperboard (Workington	Siddick, Workington	BFB	biomass	195	P&P	2013
RCE	no contact	United Kingdom	Levenseat Renewable Energy	Lanarkshire	BFB	RDF	45	no P&P	2015
RCE	no contact	United Kingdom	Stelrad Grp Ltd.	Kingston upon Hull	BFB	biomass	95	no P&P	2015

Appendix 3: McCoy and Pöyry DB plus Extensions

Requirements for key account manager – Social and personal competences	
Foreign languages	Ability to work in a virtual environment
Intercultural competences	Customer orientation
Strategic thinking and acting	Analytical skills
Flexibility	Active listening
Communicative	Team-minded
Persuasion	Joined-up thinking
Fast learning skills	Etc.