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Technical and organizational solutions of supply in the Southern Poland Power Concern

The supply and procurement processes are extremely important for proper functioning of power plants, especially for continuous production process because any breaks have negative effects on the costs linked to idle time.

Processes of procurement (purchasing) are a stage in logistics processes, which provides the company with supplies of material goods necessary to perform its tasks (e.g. raw materials, materials, fuels, cooperation elements). As a result of execution of these processes, the goods flow from suppliers on materials market to the warehouses within the manufacturing companies. Procurement encompasses various activities, relating to wide selection of materials and raw materials¹. This is the case in Południowy Koncern Energetyczny S.A. (the Southern Poland Power Company) which uses for its production processes several or even more than ten thousand of (widely understood) material items.

The most important issues connected with logistics processes of procurement in PKE S.A. include: timing, quality and completeness of deliveries since they condition efficient flow of production processes. In terms of procurement (supply) a basic logistics tasks include:

- Planning of warehousing and transport processes,
- planning of warehouse locations,
- planning of purchasing structure,
- planning and control of flow of materials and raw materials,
- planning of use of means of transport,
- planning of lead time and types of packaging,
- exchange of information,
- assessment and selection of suppliers,
- determination of needs in terms of procurement.

Procurement department, even after getting the authority in terms of supply management – is a unit whose operations requires close (partnership) cooperation with other units, both internal and external ones. Performing service functions in relation to production should not be limited to one-direction flow of information on its needs. Forwarding information from procurement to production departments is equally significant. Employees of procurement divisions should be found to be one of the most important links in information system which is capable to collect data for other departments.

Through market relations, participation in negotiations during which they find out about numerous economic and technology details, they have opportunities to acquire important information on current production. Information may concern: substitution material, availability of materials, recalling some products from the market, price trends, production conditions at suppliers which may impact quality.

A precondition of effective work in purchasing departments is providing this departments in advance with detailed information from

¹ Penc J., Nowe koncepcje zarządzania, *Ekonomika i Organizacja przedsiębiorstwa*, nr.7, 2002

other departments. Precision of information relates both to the product and to purchasing process. In case of product this means determination which parameters of the supply product are categorical i.e. no deviations are accepted and which of them are referential – some tolerance limits are defined². For the purchasing process a precision of information on time of use-up of supply products, requirements for the transport and reloading is crucial³.

One of the fundamental functions performed during logistics procurement stage is organization of deliveries. It is composed of many tasks, whose fulfilment conditions proper influx of raw material and materials into the company, their proper quality or reduction of costs of procurement etc.

Basic activities connected with organization of supplies include:

1. Preparation of the order and placing it at the supplier. Orders should contain all information necessary for its unequivocal execution by the supplier (e.g. the technical details on deliveries, type of packaging). After acceptance and confirmation of the order, it becomes a contract which obliges the supplier to deliver the subject of delivery and its recipient to accept it and pay for it.
2. Record-keeping of the placed orders and tracking its execution. Nowadays, when the computer databases are a common thing, this task is almost entirely automated and ensures periodical (or on demand) issuing information on execution of orders, delays etc.
3. Monitoring of incoming deliveries and assurance of immediate and proper acceptance in terms of quality and quantity. In case of any divergence from the terms contained in the contract (lower quantity, improper quality, lack of necessary documents etc.), procurement employees should immediately initiate complaint procedure.
4. Payment for delivery. Except for fundamental tasks of acceptance of particular documents, procurement department duties also include an obligation of charge supplier with stipulated penalty due to non-observance of terms of contract.

Important issue in terms of supply is choice of supply sources. Due to various reasons this does not concern typically supply goods on the basis of contracts or long-term agreements, which is connected with technical cooperation and passing on the know-how. However, it is a typical problem for supply on a large scale, from which the selection of delivery offer can be made⁴. While making decision on

² Witkowski J., Organizacyjna konfiguracja sieci logistycznych, *Struktury organizacyjne dla potrzeb logistyki*, Praca zbiorowa pod redakcją Danuty Kisperskiej-Moroń, AE, Katowice 2000

³ Miłosz M., *Dynamika systemów logistycznych*, *Ekonomika i Organizacja Przedsiębiorstwa*, nr 2, 2002

⁴ Zieliński T.: *Koncepcje i narzędzia wspierające zarządzanie kosztami i efektywnością procesów w łańcuchach dostaw*. [w:] *Logistics 2002 – Elastyczne łańcuchy dostaw – koncepcje, doświadczenia, wyzwania*. ILiM Poznań 2002

one of the sources of supply, it is obvious for customer to expect:

- simplification in determination of supply stream, particularly flexible formation of the size and lead time for the deliveries,
- surety of keeping the terms of delivery,
- increase in guarantee for continuous quality.

Fundamental arguments for purposefulness of supply from more than one supplier include assurance of continuity and reliability of deliveries. It should be mentioned that existence of competition between suppliers makes it possible to increase the requirements, but while entering into contacts with various suppliers of the same goods some unfavourable effects can be expected.

Functions of procurement, as other functions of organization, can not be performed efficiently in isolation from other ones⁵. Ideal organizational structure of supply does not exist since each organization has its specific needs and requirements. However, two orientations are highlighted:

1. centralization,
2. decentralization.

In companies with developed structure, often spread out throughout the country (such as PKE) it is important to judge if purchasing management should be focused in one centre or if decentralized form is more appropriate.

Centralized supply enable:

- establishment of stronger negotiation position due to the level of turnover and bigger batches of goods of the same kind,
- reduction in unit costs of supply services since total costs are divided into bigger groups of orders and transport deliveries,
- avoiding ambiguity in product coding, which facilitates balancing material flows and payments,

It can be easily observed that advantages mentioned above are usually inconvenience-prone as:

- headquarters may have difficulties in effective use of information on local needs, especially in comparison to the materials bought less frequently and on smaller scale,
- in communication system between units subordinate to headquarters there appear links which delay flow of information, which critically extends the lead time for the delivery,
- erratic decision-making in headquarters impacts the subordinate units.

Advantages of decentralized purchasing include:

- involvement of buyers during contacts with suppliers since the supply are made on their own needs
- response to own needs is more flexible since local opportunities of profitable supply are easily perceived,
- extend of supply relates closely to the scale of demand and more careful approach to costs of supply services is observed.

In case of decentralized supply each buying unit places smaller orders than it would be in the case of centralized purchasing, thus:

- they can not count on favourable price terms at the supplier,
- some orders do not obtain high enough priority,
- there appear tendency to buy the same materials from various suppliers.

It seems that in times of efficiently operating IT systems which can be applied within developed organization structures, one can seek such solutions in terms of management which can employ the advantages of both forms by avoiding or reducing the inconveniences⁶. Such an opportunity is created by process approach to purchasing perceived within the whole stream – from order to

warehousing. Comprehensive integration approach enables to separate the processes which should not be decentralized and those whose centralized execution is most effective.

1. *Central purchasing in PKE*

Analysis performed in each power plant comprising PKE shows necessity of centralization of logistics functions in all the power plants within PKE. Nowadays there is no common system which enables efficient implementation of modern logistics solutions, which could significantly facilitate operation in terms of procurement. The performed investigations show that one of the possible solutions may be creation of common Procurement Centre which would execute the orders placed by individual departments in each power plant and would manage their warehousing.

Procurement Centre would take care both of execution of these orders which are convergent for all the power plants comprising PKE and of the parts and equipment which is used for planned repair works in each power plant. Another issue is assurance of continuity of production in case of breakdowns. In such situations supply should be executed according to their priority in order to make fastest possible supply.

Good solution, from point of view of the company operation is taking over, by Procurement Centre, of all the activities associated with purchasing of typical goods for individual power plants, and taking over the functions often performed by administration departments in terms of procurement of detergents and cleansing products, health & safety products etc. Centralization of these tasks could enable use of procedure of selection of qualified supplier with full consequences for this fact: purchasing performed at the same time for all the units within the company enables negotiation of prices and particular discounts or free transport from suppliers as well as opportunity to negotiate deferred payments.

Analysis performed in individual power plants indicates relatively big differences in equipment used for production of energy. This is caused mainly by different time of operation for these items. Thus it seems that centralization of tasks in terms of material purchasing for these elements may be a difficult initiative. However, there are materials and raw materials bought daily e.g. industrial gases, whose purchasing may be realized for the whole company. In spite of existence of selected qualified supplier who is obliged to deliver supplies for each power plant within the company there are some deviations from the supply from this supplier due to the fact of finding cheaper suppliers closer to a particular power plant (as in case of Łagisza Power Plant). The purposefulness of the selection of supplier should therefore be analyzed or even finding of another supplier or negotiation of lower prices should be considered.

The established Procurement Centre could thus perform most of the tasks which presently are performed by purchasing departments in each power plant. In case of necessity of keeping the level of inventory, Procurement Centre would use the warehouses which have not been used so far, owned by Katowice Power Plant, which plans to reorganize in this area by reduction of warehouse number from 5 to 2. Open issue is a necessity of assurance of means of transport which would secure the deliveries. Analysis conducted in this area indicates opportunities of finding non-used reserves within current transport fleet which can serve for this purpose. The conducted investigations show necessity of reorganization of the ordering system. In case of implementation to the system of a new Procurement Centre, it is necessary to ensure communication between the Centre and individual links comprising the company. A useful thing can be implementation in all the power plants of IFS computer module which, if employed everywhere, could become an information database for Procurement Centre. A consolidation and unification of nomenclature seems to be necessary for all the parts and materials supply for each power plant since presently there is a wide divergence between individual power plants. System of indexation implemented as in Jaworzno III Power Plant will certainly become a significant facilitation in this area.

The analysis also indicates necessity of verification of tasks in

⁵ Man M., *Management industrial - lucrări practice și studii de caz*, Editura AGIR, București, 2007

⁶ Dima I.C., *Management operațional*, Editura ARVES, Craiova, 2007

terms of purchasing and assuring execution of planned repair works. Due to implementation of budgeting policy within the power plants comprising the company, the close cooperation seems to be necessary between investment departments who plan, within the budget, resources for repair works performed during a year and the purchasing departments which execute the planned supply. In case of establishment of Procurement Centre it could take over the necessity of supply of parts required for the process of realization of repair management. This issue requires, however, a more detailed study since a number of parts is deposited in the warehouses in the power plants (e.g. Łagisza power plant which indicates very high inventory level) and they could be used for other power plants within PKE, at least partly. It seems to be necessary to perform thorough stocktaking of the resources existing in the warehouses in individual power plants and to create the lists of redundant parts and materials and which could be used by other entities comprising PKE.

In case of assurance of efficient network which connects individual power plants of PKE to Procurement Centre, more efficient and faster placing of orders would be possible as well as detailed identification of inventory in individual power plants. The established Procurement Centre could become a coordinator of activities in terms of procurement for individual power plants and IT network would enable proper realization of this tasks. It would be necessary to unify documents which are used within the ordering procedures so that they are the same for all the power plants. This enables reduction in quantity of documents in circulation. Presently, according to the investigations, there are wide divergences between power plants. For instance, in Jaworzno III Power Plant the purchasing department has to deal with 57 types of documents and in Łaziska Power Plant the employees of purchasing department have to work on the basis of 33 documents. Standardization of this issue would enable elimination of informal registers used currently in many power plants. Such registers should be, if necessary, generated by a computerized system.

Centralization of procurement and warehousing functions could bring PKE certain benefits. Firstly, procurement tasks would be taken over by specialized units and, on the other hand, being a component of structure of the whole company. Due to this fact the company's management would have opportunity of simplified monitoring of the unit's operation and also would be able to track the costs generated by such operation in real time. This is even more important since the company implements budgeting and controlling initiatives. Centralization of purchasing and procurement area in Procurement Centre is according to the company's plans. Another benefit is an opportunity to negotiate lower supply prices for these materials which can be bought collectively. Thus economies of scale are obtained and PKE can negotiate, except for the prices, free transport, deferred payment etc. Centralization brings also opportunities of simplified control of this area of operation, which enables its easier rationalization.

A significant issue from the point of view of facilitation of procurement processes in PKE is its organizational structure and formal document flow. Analysis of this aspect of activity indicates some deficiencies. Organizational structure in the investigated power plants has some significant differences. They mainly concern the fact that in some power plants (e.g. in Łaziska Power Plant) Procurement Department includes also Investment Department. Except of this, in different power plant the situation connected with social supply (i.e. health and safety products) is different. Such supply are partly the responsibility of administrative departments, which are not related to procurement department (e.g. Katowice Power Plant). New structure should take this issue into consideration and Procurement Centre should be assigned a task of execution of all the supply. Certainly it does not concern supply of coal and oil. Some departments own their own stock, which can be used exclusively by them (e.g. in Katowice Power Plant), which causes appearance of conflicts concerning this issue and the responsibility of the employees in material management department for creation of too high inventory. This causes the problems with proper document circulation.

New structure of Procurement Centre would enable elimination of these units in procurement departments which deal directly with supply of materials and parts. It is obvious that activities currently performed by procurement traders would be done by their counterpart in Procurement Centre. Some people who now work at the above mentioned positions may want to be transferred to procurement departments in Procurement Centre. This would give opportunity to use their knowledge and experience and also would enable reduction in relevant costs. Situation of warehouse workers looks slightly different; they would have to keep their positions and new workers would have to be employed to redistribution warehouse which accounts directly to the new Procurement Centre. Due to such a reorganization it would be necessary to perform activities in order to reduce the number of warehouses in many power plants. According to the investigations, several power plants (e.g. Katowice) plan reductions in this area resulting from too big number of warehouses which are actually not used at full extent.

Manager of Procurement Centre should report to Technical Director. Tasks of Procurement Centre should include:

- execution and registration of orders,
- selection of qualified suppliers and negotiations with them,
- transport services for individual power plants,
- warehousing and packaging of ordered products,
- execution of supply procedures according to the Act of Public Procurement.

The above organization structure would enable facilitation of procurement processes in the company and would also directly impact reduction of related costs. In the presented structure one should also take into consideration material management departments which function in individual power plants of the PKE and which would perform function subordinate in relation to Procurement Centre and also would become a link which loses its importance due to planned reorganization and in its hands will remain only the activities connected with production waste disposal as well as reception and storage of materials and parts delivered from Procurement Warehouse.

Board's meetings would take place periodically, depending on the number of items in the agenda. Organization of meetings would also be possible out of the schedule in case of need for decisions on supply of material not predicted by supply schedules in the departments, however, necessary to perform tasks in emergency situations. In case of need for immediate decision on supply to be made it can be assumed that opinions of members of the Board sent to the Board chairman by fax or e-mail would be enough.

Assortment of goods which appear as material requirements would be divided into four groups and each group would be subordinate to a relevant boards. This would limit tasks of the Board to selection of suppliers within a particular assortment. This idea would enable an enhanced specialization of the Board, much more efficient operation due to smaller number of data on requests forwarded to be processed as compared to the centralized model.

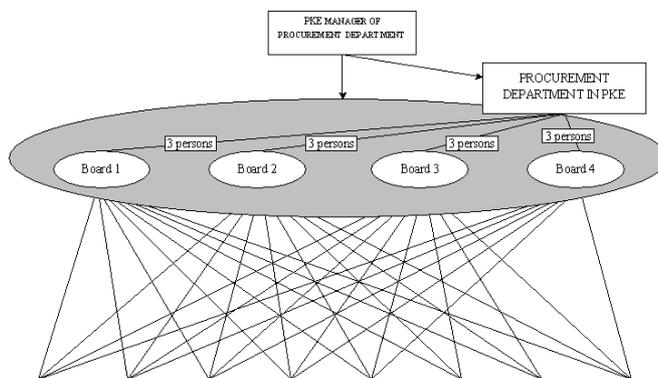


Fig. 2.1. Structure of the Board for Selection of Suppliers in PKE.

Source: Prepared by the author

A detailed procurement procedure in the model above is as following:

1. The departments in individual power plants / combined heat and power plants prepare yearly quantity and value demand plans on the basis of current practice with consideration of the assigned limits on material supply. They also prepare the suggested delivery schedule which is aimed to prevent from excess inventory and long-term allocation of financial resources in stock. Purposefulness of the prepared demand plans should be approved by the manager in a particular department and the director of the relevant management department.
2. On the basis of yearly demand plans prepared by the departments, current procurement departments in the units within PKE prepare lists of future needs with division into assortment groups. They forward these lists to the director in order to get them approved and sent them to the appropriate boards.
3. A) The Tender Board, after obtaining the requests from each unit subordinate to the Board, takes appropriate actions for selection of suppliers according to the Act of Public Procurement. Detailed information concerning significant factors which influence choice of supplier will be described in further part of this study. The special attention, from point of view of logistics costs of procurement process, should be paid to possibility of selection of supplier within the confines of option agreements. Then the supplier will deliver goods to PKE units within the predefined limit of delivery value or 'on demand'.
4. B) In case of obtaining, by the Board, a request which is not listed in demand plans prepared by the departments, the president of the Board, together with procurement department from where the request has come, estimates a time horizon for execution of the request and defines a mode for making a decision on selection of supplier.
5. After selection of suppliers the procurement departments in power plants place orders directly to selected suppliers for the materials according to the conditions previously agreed by the Board.
6. After previous analysis, transport and warehousing costing for the particular case, the supplies can be delivered according to the following procedure:
 - a) supplies are delivered directly to the ordering units and they are stored there
 - b) supplies are delivered to the central warehouse located in one of the power plants with suitable location and warehousing infrastructure and then, on demand, packaged and redistributed according to the schedule or the request,
 - c) suppliers rent a warehouse area in PKE units and take care of satisfying current demand
7. Supply is settled immediately between unit which supply the goods and the supplier selected by the Board.

The above model of procurement will, in effect, bring:

- use of uniform supply procedures for all units within PKE
- planning of demand by the department and accumulation of value of orders will strengthen the position of PKE during negotiation with suppliers which will result in lower prices, more convenient terms of deliveries (including additional services: transport, safety stock at supplier's place, taking over a part of holding costs etc.)
- application of selection of supplier in the form of option agreement for the deliveries in all PKE units will enable being independent of market fluctuation (connected with the time and place of supply) or basing on negotiated terms and use of detailed instructions for deliveries in terms of place and lead time through application of delivery schedules,

- fast preparation of analyses for the boards for selection of suppliers, managers of procurement departments in PKE headquarters and the Board of Directors in terms of:
 - collective analyses, which provides a review of quantity and value of current supply orders,
 - ABC analysis, which enables determination of a group of suppliers responsible for material supplies with highest value (A), a group associated with medium value (B) and a group of suppliers responsible for deliveries of goods of lowest value (C),
 - analyses during comparative period which indicates changes in procurement activities for the whole company. During this analysis the procurement groups or quantities of ordered materials with division into the suppliers can be compared to previous periods,
 - analyses of frequency, which shows the number of orders placed at a particular supplier, which may in the future be the basis for further negotiations with this supplier on price discounts.
- leaving the decision on selection of suppliers up to current procurement departments. This will prevent anxiety about loss of influence on decisions in procurement departments in power plants, which will lessen the unwillingness or dispel fears during implementation,
- in case of deliveries in which suppliers will manage the stock while covering holding costs the reduction of holding cost, costs of warehouse handling and frozen assets

Threats during implementation of the above mentioned model of procurement include:

- lack or inconsistency in procurement plans prepared by the departments, which will cause that most of requests will be placed on demand and the board will be forced to analyze huge number of cases; impossibility of making supply on a bigger scale and thus worse terms of supply, higher prices and poor tender position in relation to the suppliers,
- organizational paralysis caused by conflict of interests within group of members of the Board as a result of particular preferences for suppliers, pressures from local authorities who supervise development in local entrepreneurship
- insignificant rise in employment rate, especially in case of shortage of persons with legal background in PKE headquarters who would fill in administrative vacancies in each board.

The model described above is one of the proposed concepts of procurement with its advantages and is obviously not without drawbacks, however, in comparison with other model it seems to show higher possibility of execution and higher efficiency of application. The model is a suggestion as a result of talks with procurement department employees and general strategy of PKE in terms of human resources. The company does not expect changes in employment rate or transfer of employees into headquarters. Thus it seems purposefulness to assume this model as a target solution.

Analyzing supply departments in single PKE element one can noticed almost proper functioning, however it is clear that there is not any coordination activity in whole PKE allowing to use the scale effect, for example. There are also many dilemmas connected to savings based on the inventory cost decrease on the one hand and worse ability to fast repair in case of emergency, on the other hand. PKE as the one subject of this type in Poland has a great chance to be a leader among the enterprises of the power industry.

Bibliography:

1. Dima I.C., *Management operațional*, Editura ARVES, Craiova, 2007
2. Man M., *Management industrial - lucrări practice și studii de caz*, Editura AGIR, București, 2007

3. Miłosz M., Dynamika systemów logistycznych, *Ekonomika i Organizacja Przedsiębiorstwa*, nr 2, 2002
4. Penc J., Nowe koncepcje zarządzania, *Ekonomika i Organizacja Przedsiębiorstwa*, nr 7, 2002
5. Witkowski J, Organizacyjna konfiguracja sieci logistycznych, *Struktury organizacyjne dla potrzeb logistyki*, Praca zbiorowa pod redakcją Danuty Kisperskiej-Moroń, AE, Katowice 2000
6. Zieliński T.: Koncepcje i narzędzia wspierające zarządzanie kosztami i efektywnością procesów w łańcuchach dostaw. [w:] *Logistics 2002 – Elastyczne łańcuchy dostaw – koncepcje, doświadczenia, wyzwania*. ILiM Poznań 2002