



## KIS-PIMS

" Knowledge Intensive Services in the Planning, Installation, Maintenance, and Scrapping services (PIMS) for renewable energy production systems "

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# IPR MANUAL FOR SERVICE ENTERPRISES IN THE RENEWABLE ENERGY SECTOR

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Chapter 2 is mainly based on the research findings of Prof. Jari Kuusisto and Dr. Seliina Päälylyaho from SC-Research (Finland). Their study focused on formal and informal ways of protecting intellectual property in SMEs, prepared in the frame of the ProACT project (2002-2005) ([1], [2] and [3]). Grateful thanks are addressed to Kimmo Halme and Janne Lehenkari from ADVANSIS, who shared with us the report of Prof. Jari Kuusisto and Dr. Seliina Päälylyaho and got their approval for dissemination of this IPR Manual towards SMEs and innovation intermediaries of the Renewable energy sector.

Grateful thanks to Martin Schimke, from the international law firm BIRD & BIRD, and his team specialized in Intellectual Property protection for the valuable review of the Manual from the legal point of view.

This manual also includes contributions from Serge Galant from TECHNOFI.

## GLOSSARY

“IP” stands for Intellectual Property in the broad meaning. It includes any kind of measure, either formal or informal, that helps securing human intellectual creation.

“IPR” stands for Intellectual Property Rights. It is meant any kind of formal protection of human intellectual creation.

“KIS” stands for Knowledge Intensive Services. It is meant services involving science-based and technology-based innovations, commercial and business model innovations.

“PCT” stands for Patent Cooperation Treaty. This treaty was signed by a majority of the world countries allowing for patent delivery. It allows for lighter and cheaper procedures to obtain an international coverage of a patent beyond Europe.

“RTD” stands for Research and Technical Development and designate the related activities.

“SME” stands for Small and Medium size Enterprise, as defined by the European Commission (see [http://ec.europa.eu/research/sme-techweb/pdf/sme-definition\\_en.pdf](http://ec.europa.eu/research/sme-techweb/pdf/sme-definition_en.pdf)).

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## INTRODUCTION

This Manual is a tool to be used by innovation experts willing to support SMEs offering services to the renewable energy producers, but also by these very same SMEs.

The targeted innovation experts are:

- public bodies like Innovation Agencies, Energy and Environmental Agencies, Incubators, Chambers of Commerce, etc..., or
- private bodies like Energy focused Clusters, Professional Associations, Innovation management Consultants, etc...

The Manual is organized in three sections:

1. The uses of IP management in Service SMEs;
2. A review of the existing formal and informal intellectual property protections of relevance for these SMEs;
3. A set of recipes that can help company managers and/or innovation experts in providing their clients with appropriate options to implement coherent IPR policy.

The main sources used to produce this manual are listed in the Reference section at the end of the document. This manual dedicated to the Service SMEs does benefit from work presented in reference [1] which describes interviews performed amongst 300 SMEs in Finland and the UK, such interviews are in support of a report published by Pro INNO<sup>1</sup>.

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<sup>1</sup> Pro INNO is a European project co-funded by the European Commission, DG Enterprise & Industry, in the frame of the Europe INNOVA programme.

# 1. IPR MANAGEMENT IN SERVICE SMEs

## 1.1. IP protection in the SME population

The SME ecosystem is made of very heterogeneous groups of businesses that covers different sectors, growth strategies, degrees of innovativeness and a broad variety of IP strategies. Overall, it is agreed that the use of IPRs by SMEs is rather low. However, empirical research demonstrates that many SMEs have realised the value of their IP: they know how to manage such intangible assets. They use a wide range of informal as well as formal methods which aims at protecting their creativity and know-how. As a matter of facts, intellectual property rights (IPRs) such as patents, trademarks and copyrights represent only part of the IP management and protection practices, as used in SMEs.

Very often, SMEs are in a weak position to make use of IP rights;

Business case 1	Business case 2
<p>A SME files a patent about an innovative car suspension system based on composite materials.</p> <p>The industrial development requires cooperation with at least one car manufacturer. The SME signs a Non-Disclosure Agreement (NDA) with such a large company and presents the background gained by internal research and development.</p> <p>The day after, the large company files a patent application on the very same idea. Patent reviewers refuse to accept the claims, because of the prior patent (whose application was not disclosed to the large car manufacturer. The SME is therefore protected against the infringing use of its creative knowledge. A license was granted by the SME exclusively to a foreign car part manufacturer (first tier contractor), who did not succeed in selling the technology to the car manufacturers.</p>	<p>A SME develops a sensor dedicated to medical application in the heart surgery. It is patented and then manufactured by the company at small volume.</p> <p>A large world based manufacturer copies the design and start selling it worldwide. The SME filed a patent suit against the large company and starts spending large amounts of court expenses to fight against the infringer. At the same time, the company sees its sales slowing down. After 18 months of court battle, the SME wins, but the royalties due by the big group do not cover the profit losses due to falling sales. The SME went bankrupt.</p>

Hence, SMEs are usually less likely to capture returns from their innovative efforts than large firms. Moreover, there is some evidence that the present segmented patent system neither fosters innovation, nor effectively protects the results of SMEs' innovation activities [12].

Approaches towards IPR management vary also from sector to sector: this can be observed through different types of intellectual property practices and strategies. R&D intensive manufacturing businesses appear to be the most active in using IPRs (especially patents). At the same time, the awareness about different protection methods in the service sector is relatively low compared to the manufacturing and software product sectors. Arguably, low level of IPR utilisation in services reflects problems related to protection of intangible knowledge and the novel business concepts developed by service companies. In addition, the multidimensional and often incremental nature of service innovation can lead to situations where formal IPR is of no use.

IPRs are therefore seen as irrelevant by many SMEs, which typically rely more on informal practices [5]. These protection practices are often simple, easy to control and affordable: to some extent, they are very often embedded in normal working practices within the business.

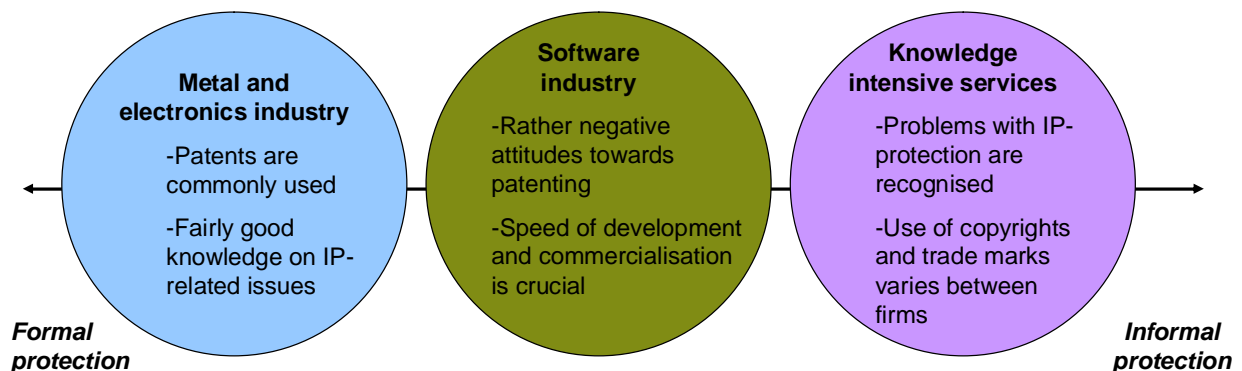


Exhibit 1 : A gross picture of IP protection practices by SMEs according to their core activity (source [1])

From the above exhibit, it can be seen that the IPR system (formal protection) is most important for SMEs that are, for instance in the metal or electronics industry. This is typical of a strong industry tradition of using patenting. The IPR system itself has been originally developed to serve the product manufacturing industry.

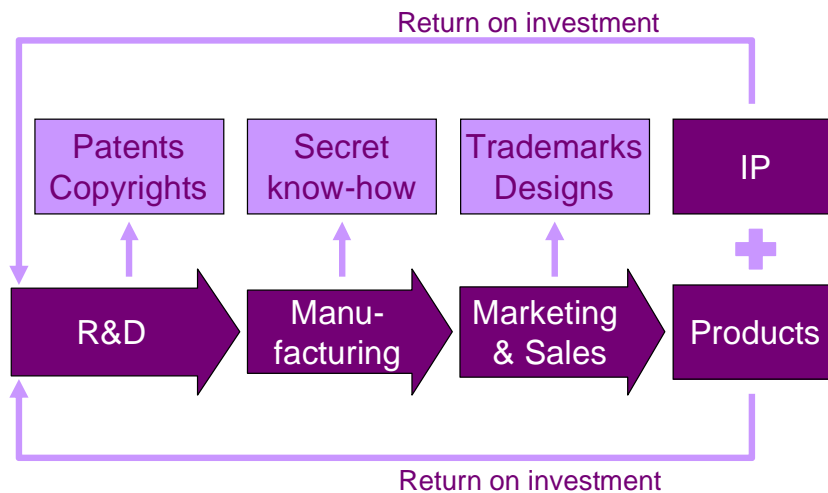


Exhibit 2 : uses of IP protection in industry (inspired from source [10])

In the software sector, patenting by SMEs is an issue: it is often used for marketing reasons and as a way to make sure that the firm's products are protected by own patent(s), thereby limiting the risk of violating other firms' protective rights. Things are moving at a European level to define patentable software. In terms of IP protection, the patenting process sometimes tends to be too slow to benefit businesses that are operating in a highly dynamic and rapidly developing business environment.

In knowledge intensive services, informal IP management and protection dominates. Although the importance of IP issues is well recognised, the nature of the intangible knowledge and innovations do not favour the use of a structured IPR system. Instead, the use of informal methods leads often to sophisticated practices. The following section will provide more insights in the informal IP management and protection practices within knowledge intensive service companies.

## 1.2. IP protection practices by Service Companies

In Service Companies, and especially in Knowledge Intensive Service Companies, knowledge and innovations are mainly intangible and typically co-produced by the supplier and the client within their contracting relationship.

IP management and protection is highly relevant for KIS companies, since co-production of knowledge and innovative solutions development to the benefits of the client business is the core activity: KIS companies are known as carriers, sources and facilitators of innovation. Most service innovations are not patentable because of their intangible or, respectively, non-technical nature: existing formal methods of IP protection are then considered as irrelevant by service innovators. But still, effective IP protection is a significant motivation for innovation, and increasing input in service R&D highlights the need to protect on ever evolving IP.

Besides formal protection methods (IPR), informal practices can also be an effective way to protect and manage IP. Emerging informal protection practices are extremely heterogeneous in nature and they reflect a variety of needs among service businesses. The protection methods are either targeted to protect the business against internal threats, such as departure of the key personnel (methods like personnel committing, documentation and task swapping), or against external threats, such as competitors (methods like technical protection, fast innovation cycle and secrecy). Furthermore, some methods cover the risks related to co-operative relationships with external partners.

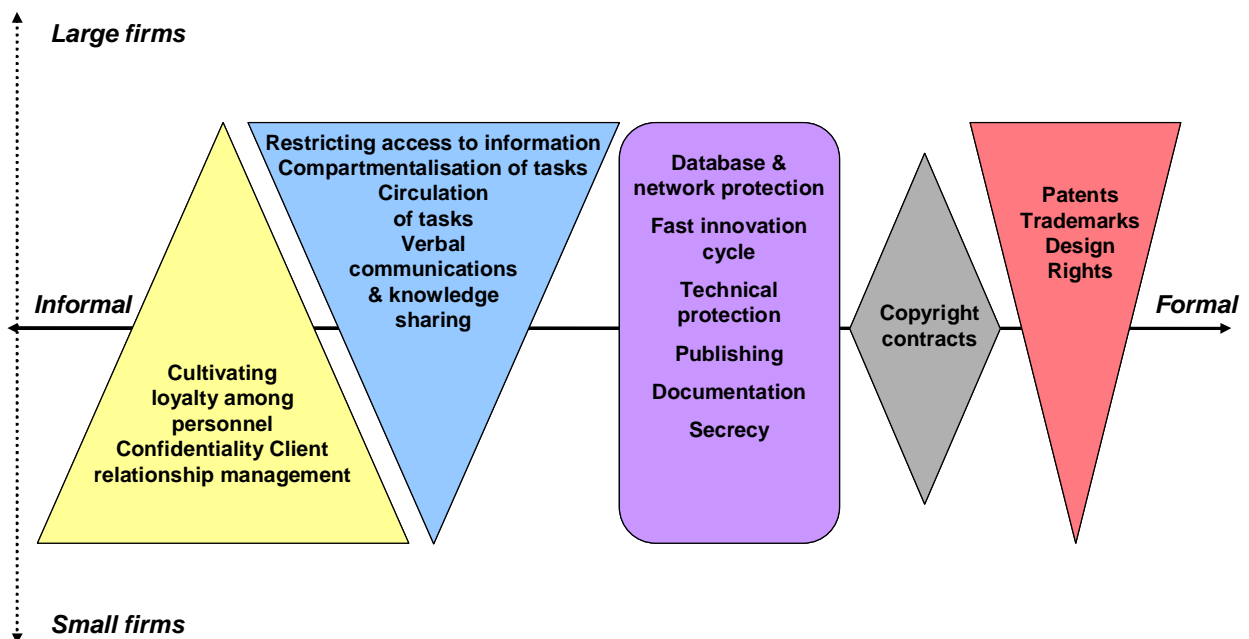


Exhibit 3 : Relative positioning of current IP protection practices on formal and informal aspects (source [1])

It can be argued that the systematic use of both formal and informal methods may provide the optimum level of protection for the firm, using the positive aspects of both informal and formal protection practices.

The primary asset of KIS companies is mainly knowledge and intellectual<sup>2</sup> capital. Hence, service firms' production processes are often wholly dependent on the employees' knowledge and skills, the physical capital and tangible assets have a less significant role. In particular, when IP depends on tacit knowledge, formal protection methods cannot be used efficiently. Overall, it is important to recognise that informal and formal protection methods of IP are not mutually exclusive or even competing with each other; rather, they are supporting each other in many different ways.

<sup>2</sup> Intellectual capital combines expertise and motivation

## 2. FORMAL AND INFORMAL INTELLECTUAL PROPERTY PROTECTIONS

Exhibit 4 depicts the different types of IP protection that have been identified as used in KIS enterprises.

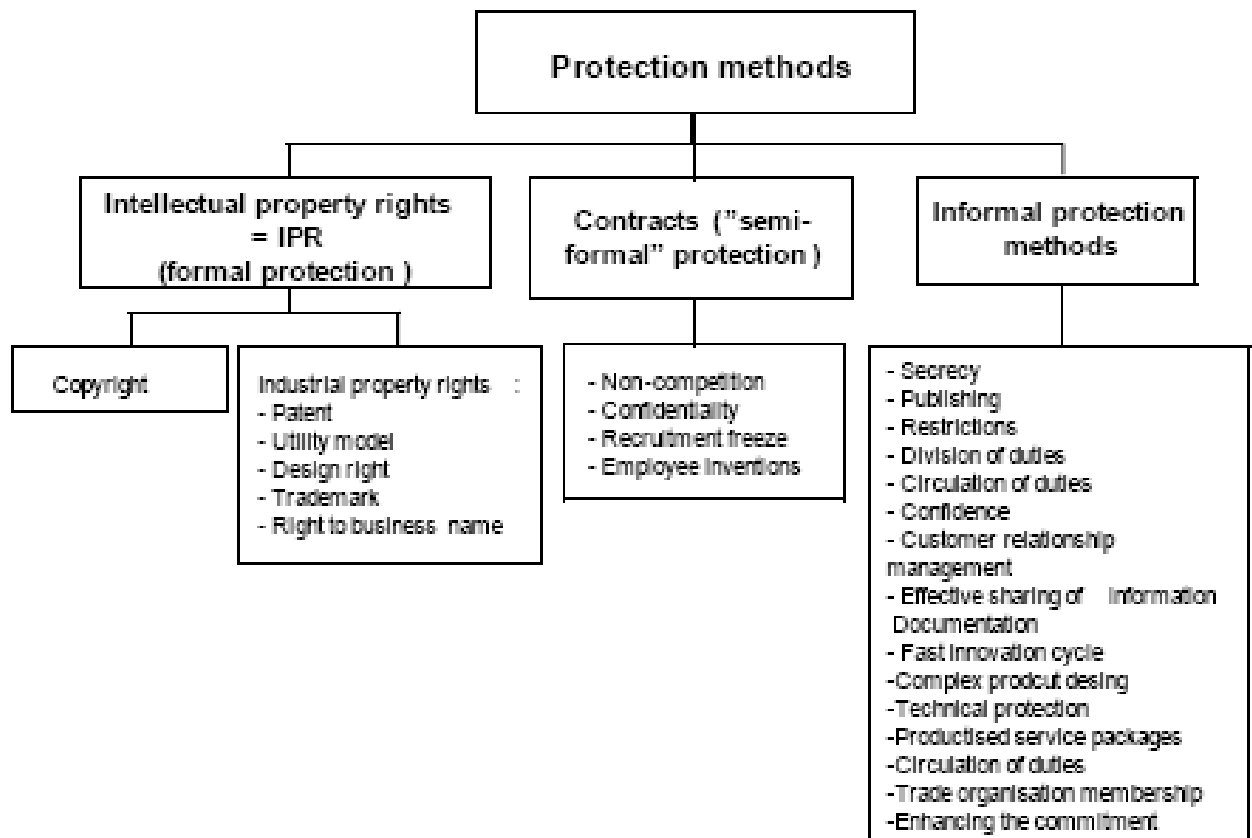


Exhibit 4 : Use of different IP protection types among KIS enterprises (source [1])

### 2.1. Formal IP protection

Formal IP protection deals with legally recognised ways of obtaining a proprietary advantage (Rights) on the market, which leads to a time-limited monopoly for idea and innovation exploitations granted by a public authority, and a systematic publication. Formal IP includes:

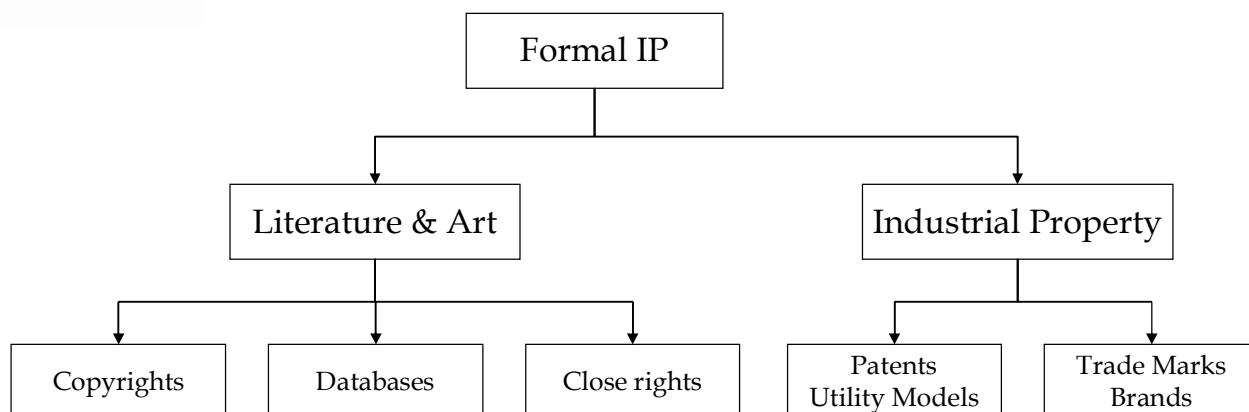


Exhibit 5 : Formal IP protection tools

For KIS enterprises in the Renewable Energy sector, the main formal IP deals with:

Patents	They are used to protect the results of technical creations (products, methods and means), which were not publicly known
Design Patents	There are used to protect specific designs of products
Copyrights	They are used to protect intellectual creations (art, literature, , software encoding, etc..., possibly fragrances), which can be linked to their author by a self standing "signature"
Trade Marks	They are used to protect commercial names and logos, including their design
Utility Models	They are used to provide a less formal protection for technical innovations that is less comprehensive than patent protection

However, examples of service enterprises in the energy sector exploiting paying databases<sup>3</sup> or design patents (see section 2.1.2) do exist.

As previously underlined, IPR is poorly addressed by SMEs, and even less by KIS enterprises, as shown by a study based on a telephone survey of 300 Finnish and UK knowledge intensive service (KIS) businesses in three dynamic industries (software

<sup>3</sup> The Swiss company ENECOLO uses satellite solar irradiation data to detect PV module maintenance needs. Access to precise real time irradiation maps is a paying service.

consultancy and supply, business and management consultancy activities and advertising agencies):

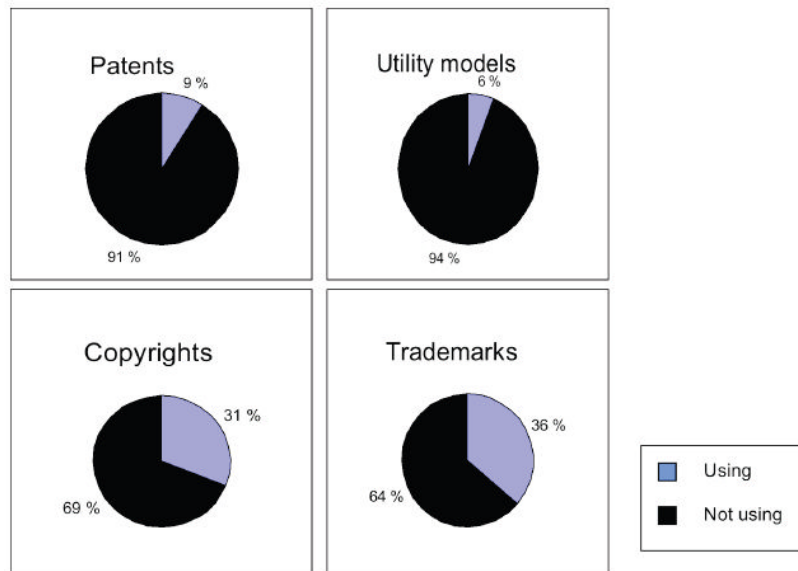


Exhibit 6 : Use of formal IPR among KIS enterprises in Finland and UK (source [1])

Service enterprises need more and more technological tools to deliver their services at the right performance and quality levels. They increasingly face a global economy, in a way similar to what the manufacturing industry does. Hence, they might be obliged in the next decades to think about IPR protection of their internal tools, software and/or brands.

### 2.1.1. Patents

Patents belong to the industrial part of intellectual property protection, also called “Industrial Property”.

Obtaining a patent is acquiring the right to exclude others from using the protected invention in products, processes etc. without the inventors’ consent. Getting a patent in Europe is also obtaining a legal industrial exploitation monopoly for a limited duration of generally 20 years from filing, provided that the annual fees to keep the patent alive are paid in due time. The protection is awarded in exchange for the publication of the invention.

To be patentable in Europe, an invention must fulfil 3 criteria:

1. Being new: it offers functionalities which do not exist on the market, and it has not been published, whatever the medium.
2. Being innovative: the invention does not come from an obvious deduction of several existing techniques being combined to accomplish a new task.

3. Being useful, thus bringing more economic value: the invention must be industrially exploitable for an economical benefit. It must solve a technical problem.

Basic rules about timing and geographical coverage of a patent should be known:

#### Timing (average)

To	Filing of the patent application.
To+9 months	Preliminary patentability advice (containing priority search results)
To+12 months	Deadline for requesting a geographical extension of the patent without losing the priority date, when filed nationally first.
To+18 months	Publication of the patent <u>application</u> . The final version of the patent can be different, especially when priorities are opposed during the examination process by the patent office concerned <sup>4</sup> . Then, claims are modified so that priorities can no longer be opposed (restriction of the patent coverage)
To+21 months	Potential Observations
To+27 months	Delivery of the final patent.
To+30 months	Decision deadline for confirming geographical extensions

#### Geographical coverage

Most often, a patent is filed first nationally (some national laws make it compulsory). Then, extensions in other countries where the enterprise has strategic market interests are decided. International agreements have been settled to simplify the procedures and limit the costs when a significant number of countries are targeted:

- The European pathway through the European Patent Office (EPO)
- The PCT<sup>5</sup> pathway through the World Intellectual Property Organization (WIPO), which addresses many more signatory countries.

However, some countries allow applicants to apply directly an international patent at EPO or WIPO (depends on national laws).

#### The particular case of software patenting

First of all, no precise definition of software exists in the IP Codes. According to a project of European Directive (COD/2002/0047), it would be an invention materialized by use of a computer.

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<sup>4</sup> The final patent can also differ from the original application on minor adjustments that do not impact the content of the claims, nor their coverage, but clarify and meet the standards of claims writing.

<sup>5</sup> Patent Cooperation Treaty

A source code, or software per se, cannot be patented. However, relying on the principle of solving a technical problem, there are exceptional cases for which software can be considered as a product: a patent can then be delivered.

To be patentable, software must [8]:

- Be used in a technical field
- Solve a technical problem
- Process technical data thanks to technical functionalities
- Have claims qualified by technical characteristics

For example, software which allows for synthesising the voice in view of its transmission via numerical radio communication is eligible. The problem solved is the voice transmission over long distance through a numerical process. The same applies to software that builds a 3D image from radiographic imagery. Etc...

On the other hand, accounting software, financial transaction software, semantic sorting programmes, etc... cannot be patented, because the functions they provide can be done by persons (even if it takes much more time than the software does).

It is underlined that the law is more flexible in the US, since the concept of code or software "per se" does not exist, nor the idea of a "technical solution to solve a technical problem". Only the result is analyzed: it must be new, useful and tangible.

For example, Hitachi patented in the US a web-based tool such as "e-Bay". It offered something new (enabling multi-actors auction sales remotely), was useful since avoiding people to move from their home to participate, and tangible since visible on an internet-connected computer screen. Their European extension was rejected for lack of innovativeness by the European Patent Office<sup>6</sup>, arguing that "the claims are about steps of a method consisting in modifying an economic activity model and aiming at circumventing a technical problem rather than solving it by technical means, thus not relevant to the technical character of the claimed object".[8]

To conclude, if the targeted IP protection of software aims to protect a code, an algorithm or not patentable software, copyrights and open source may be the most appropriate scheme (see Exhibit 7 hereafter).

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<sup>6</sup> EP97306722 (EPO Chamber of Technical Remedy 351, Hitachi 21/04/2004, T0258/03)

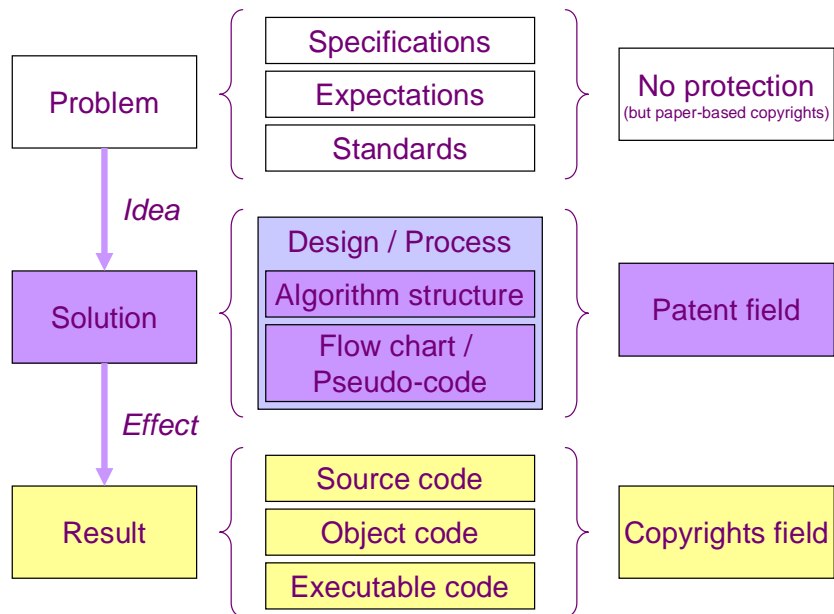


Exhibit 7 : Software IP protection (source INPI [8])

### 2.1.2. Design patents

A design patent is the type of protection devoted to intellectual creation used by designers. It is not meant drawings of a technical product, but designs having an aesthetic goal.

Some examples are :

- Aesthetic shape of a wind turbine (ENERCON egg-shaped drive system cover)
- The famous Philippe Starck tabouret



Design patent advantages are kept by the author, then his/her heirs during 70 years after the Author's death.

### 2.1.3. Copyrights

Copyrights aim at protecting non-technical intellectual creations, which can be linked to their authors by self standing “signatures” (“idea-expression” dichotomy). Among the most common creations registered under copyright, are found:

- Literature
- Music compositions
- Fragrances<sup>7</sup>
- Recipes
- Etc...

Software and programming codes can also be protected under copyright, provided that the way they are encoded is unique and specific to their authors (the idea of “signature”). It means that copyright protects the shape of the code, but not its function.

It must be underlined that copyrights belong to the authors, who keep the moral property rights whatever his/her situation. An employer can only claim use of such copyrights.

Copyright advantages are kept by the author, then his/her heirs until 70 years after the Author’s death.

#### The particular case of Open Source software

Open source software means that the source code is publicly accessible<sup>8</sup>. It lies in the principle of contagion: any new software developed using an open source code becomes automatically open source software, whatever the size of the first open source technological brick. Successively, software can therefore be improved, functionally augmented and shared again with the others. It works thanks to communities of contributors having shared interest in developing a software product.

Open source software does not mean that software can be obtained for free. This will depend on the strategy choices of the developer. Sometimes the developer will choose to make money by direct sales of a new product using open source bricks. In other cases, he/she will make business on the commercialisation of services associated to the product. Generally, the market drives the choice. When there is purchase potential from the customers for software product, the licensing is often retained. When there is more need for customization of the software parameters, then sales of services are preferred.

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<sup>7</sup> No other case confirming the copyright protection of fragrances than the favourable decision for L’Oreal in France

<sup>8</sup> For more information, visit the Free Software Foundation <http://www.fsf.org/> and the Open Source Initiative <http://www.opensource.org/>.

But open source software offers much more flexibility than above mentioned. Some developers use the versions system to commercialise as software product the latest available version, whereas the previous ones become downloadable for free, playing the role of teasers [11]. Some duration can be decided for a paying product (e.g. 1 year) before it becomes free of charge.

Communities<sup>9</sup> is the key word in the open source world. To access the community, one has to sign a licence contract, which gives rights (free access...) and binds to obligations (contagion...). The use of open source code is never constrained, but distribution freedom of derivate products can be limited. Among others, an open source license calls rules and regulations related to :

- Intellectual property
- Contracts
- Consumers

Two types of communities are distinguished:

- Academic licenses
  - o Total distribution freedom of knowledge
  - o No obligation of improvements feedback to the community
  - o Examples : BSD - MIT/W3C - Apache, CeCILL-B
- Counterpart licenses
  - o Counterpart: upgrades feedback to the community
  - o Contamination of the derived productions
  - o Total and dogmatic:
    - Protection against any appropriation as ultimate freedom
    - Examples : GNU GPL, CeCILL, EUPL..
  - o Partial and pragmatic:
    - Adapted to the particular case of library components
    - Eased interest of- and adoption by- industrials
    - Examples : LGPL, CeCILL-C, MPL...

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<sup>9</sup> Today, about 60 open source licenses are recognised by the Open Source Initiative

#### 2.1.4. Trade marks

Trade Mark protection targets commercial names and logos. It may include non-exclusively the name itself, its typology, and its graphical representation.

For example, in the case of Technofi, the name and the graphical representation are protected, but not the typology of the name.

Trade marks protection covers only the classes chosen by the owner, which classes are defined in line with the activity types of the trade mark owner. The more classes one wants to cover, the higher the trademark filing costs.

In view of avoiding unused Trade Marks bookings, some countries (US, Mexico, etc...) ask for regular proof of use of the TM (every year to every 3 years depending on the country). Regarding community trademarks, they can be cancelled after 5 years of consecutive non-use, subject to a respect action, e.g., by an accused infringer.

#### 2.1.5. Utility models

A utility model is an exclusive right granted for an invention, which allows the right holder to prevent others from commercially using the protected invention, without his authorization, for a limited period of time. In its basic definition, which may vary from one country (where such protection is available) to another, a utility model is similar to a patent. In fact, utility models are sometimes referred to as "petty patents" or "innovation patents."

The main differences between utility models and patents are the following:

- The requirements for acquiring a utility model are less stringent than for patents. While the requirement of "novelty" is always to be met, that of "inventive step" or "non-obviousness" may be much lower or absent altogether. In practice, protection for utility models is often sought for innovations of a rather incremental character which may not meet the patentability criteria.
- The term of protection for utility models is shorter than for patents and varies from country to country (usually between 7 and 10 years without the possibility of extension or renewal).
- In most countries where utility model protection is available, patent offices do not examine applications as to substance prior to registration. This means that the registration process is often significantly simpler and faster, taking, on average, six months.
- Utility models are much cheaper to obtain and to maintain.
- In some countries, utility model protection can only be obtained for certain fields of technology and only for products but not for processes.

Utility models are considered particularly suited for SMEs that make "minor" improvements to, and adaptations of, existing products. Utility models are primarily used for mechanical innovations.

## 2.2. Semi-formal IP protection: contracts

Some methods are closely linked to formal methods such as contracts, which have a legal basis, even though not being included in "IPR". A great variety of contracts provides a flexible and legally binding way to protect IP within the firm and in view of future external relations. Typically businesses make contracts with their employees, customers, suppliers and various types of financing partners. The purpose of the contracts is not only to protect IP, but also to organise the daily working routines of the business in a more systematic manner. As such, contracts provide a flexible tool for IP protection and management because parties are free to agree about almost anything on a contractual basis, naturally following the limitations of the relevant legislation. Contracts can include different types of sanctions that can be implemented through legal actions. In case parties end up in disputes, arbitration and civil court procedures can be used to enforce the agreed cooperation rules or the sanctions, as stipulated in the contract. But it is recognized that many contracts, such as subcontracting, are weakly anticipating potential IP ownership conflicts due to excess of confidence. The most typical types of contracts, which are used in intellectual property protection include:

- non-disclosure agreements
- non-competition clauses
- agreements about the ownership of IPRs
- recruitment freeze (e.g. limiting staff from working for a given set of competitors)
- agreements that forbid reverse engineering and product modifications
- agreements on the compensation for employee inventions

## 2.3. Informal IP protection

The primary goals of informal IP protection techniques are:

- to decrease the risk of losing the core knowledge
- to prevent the leaking of confidential knowledge to outsiders
- to reduce the risk of incidences, which could cause knowledge leaks
- to reduce the risk of being copied or imitated by competitors
- to prevent from the risk of losing key employees or to minimize the impacts of employee mobility

- to create a 'lead-time' advantage over competitors
- to assist the patenting process
- to increase business efficiency and innovativeness

The various informal protection methods are not entirely independent from each other: they partially seem to overlap. Motivations for the use of each method vary as well: sometimes the main objective of the method is merely to protect IP. Sometimes it may simply be used to support the business activity.

Exhibit 8 gives the overview of the various types of knowledge protection methods that will be discussed in more details later on.

Informal protection practice	Rationale for IP protection
• Secrecy	• Prevents confidential information from being distributed to outsiders
• Restricted access to information	• Decreases the risk of knowledge leaks through employees
• Database and network protection	• Prevents the risk of information diffusion to outsiders
• Confidentiality	• Prevents from attacks, viruses and other abuses
• Technical protection: Complex product design Software code protection	• Prevents the risk of being copied
• Documentation	• Makes copying and imitation difficult and time-consuming
• Compartmentalising of tasks	• Increases efficiency
• Circulation of staff between tasks	• Decreases the risk of losing knowledge
• Loyalty building among personnel	• Assists in patenting process
• Client relationship management	• Decreases the risk of losing knowledge through the departure of an employee
• Membership in professional organisation	• Decreases the dependency on individual employees
• Information sharing and exchange of knowledge	• Decreases the risk of losing knowledge bound to employees
• Fast innovation cycle	• Increases motivation and efficiency
• Publishing	• Prevents knowledge leaks
	• Seeks to supervise IPRs among the members.
	• Decreases the risk of losing knowledge bound to employees
	• Increases efficiency and innovativeness
	• Creates 'lead-time' edge over the competitors
	• Makes copying and imitation less harmful
	• Prevents the risk of being copied or imitated and builds credibility of the inventor / originator of knowledge. Prevents other parties patenting of the published idea.

Exhibit 8 : Rationale of informal IP protections among KIS enterprises (source [1])

Exhibit 9 gives the results of the interview study performed in Finland and UK regarding informal IP protection by KIS SMEs.

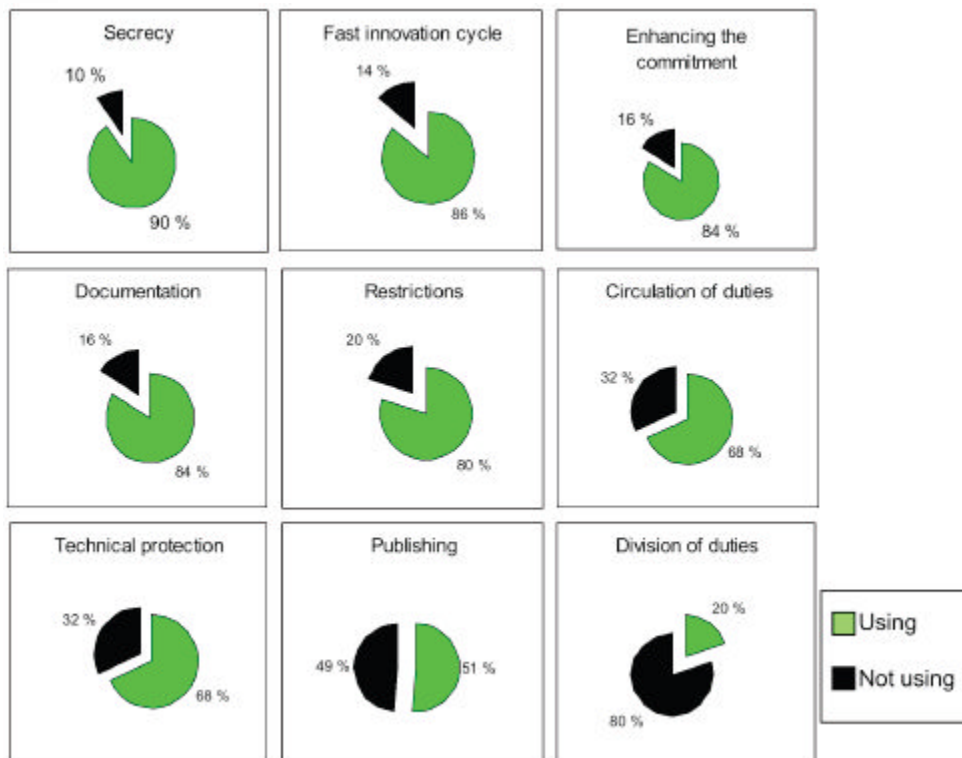


Exhibit 9 : Use of informal IP protection methods in KIS Finnish and UK firms (source [1])

### 2.3.1. Non Disclosure

Key knowledge can be kept secret either at least from some of the employees inside the firm and/or from external collaborators, such as business partners or customers. Many companies are defining carefully what type of information is classified and which parties should be kept away from such information. Secrecy may have a negative impact on innovativeness and the quality of the collaboration since it prevents from open attitudes, thus narrowing information flows between parties. A way to manage this issue is to use semi-formal protection methods through contracts (e.g. NDA or confidentiality agreements). Furthermore, in some companies, secrecy intends to maintain a lead-time advantage over competitors.

### 2.3.2. Publishing

In contrast to secrecy, the new idea or working practice can be published as widely as possible and the initial developer of the idea will become well-known as the innovator. That might lead to prevention of copying the new idea because imitation is seen unethical by society. Reputational sanctions can then be effective barriers to imitation, in particular when firms consider reputation for innovation to be a factor of differentiation [9]. This protection method is critical particularly in the service sector, for instance in advertising, where copying and imitation of ideas are easy and quite the common rule.

Publishing is also legally valid in the sense that publishing in any way is an obstacle to novelty patenting. Hence, publishing can be used to prevent other businesses from claiming patents in the same area. For instance, the key information can be published in small local newspapers. In such case patenting will be prevented and there is very limited chance that any competitor would pick up the key information from a local paper with a limited number of readers.

### 2.3.3. Restrictions about using knowledge

IP related risks can be limited by restricting the number of people who have access to sensitive data. Such limitations may concern people inside and outside of the business, hence the limitations encompass internal as well as external relationships. In principle this method is similar to secrecy. For instance, a company database may include documents and files accessible for viewing and editing only by those employees who are working on a certain project. Company premises may house facilities with limited access, for instance using access control. However, extensive use of restrictions within the business may lead to insufficient knowledge sharing which then becomes a barrier to innovativeness and productivity. In addition, restricted knowledge sharing poses a threat of a sudden loss of IP in the form of the departure of a key employee.

### 2.3.4. Enhancing the commitment of personnel

Effective building strategies of staff loyalty are seen powerful tools to protect intellectual property, since much of the knowledge lies with the brain of key employees. Different loyalty building methods can be used, regardless of the sector and the size of the company. In the service sector, employees are considered the most valuable asset of the company, and the departure of a key person may cause a sudden loss of IP. Effective strategies to maintain staff loyalty encompass financial incentives, training opportunities or other occupational development related incentives. Moreover, one successful way to enhance employees' motivation is to place company ownership arrangements with the key-employees. However, significant incentives to recognize individual employees' effort may also harm the atmosphere inside the company. They become counter productive when competition among employees discourages cooperation.

### 2.3.5. Task allocation

Fragmentation of labour means that work tasks within the business are divided between employees, so that each employee controls only a fraction of the knowledge to be polluted: no single person knows the overall concept underlying a new product or service. This method is also tightly linked to secrecy inside the business: the objective is again to minimise employee-related risks, e.g. to avoid the loss of valuable knowledge in case an employee chooses to leave the firm. However, in small firms, human resources are often limited and tasks cannot be fragmented. Such fragmentation of work tasks may also yield

problems in firms where free flow of information is important. In practice, this method is typically more suited for very large organisations.

#### 2.3.6. Suited swapping of tasks

Rotating staff from one task to another (together with naming deputies for employees) can be used to decrease the dependence on key personnel. The advantages of this protection practice are acknowledged especially in the marketing and advertising sectors, where employee mobility is high and long-term commitments of personnel are rare. Effective task rotation is, however, difficult in small businesses where the key employee is often the sole expert in his/her own narrow field of work. This issue can be managed with systematic and comprehensive documentation. Yet, this method naturally fits better to larger organisations where the knowledge structure overlaps substantially.

#### 2.3.7. Documentation

Documentation of ideas, resources and thoughts can reduce the risk of losing key knowledge. Businesses can transfer tacit knowledge into more explicit forms, e.g. into written documents, CD Roms or databases. To be effective, documentation should be simple to implement; the process should be carried automatically in parallel of the innovation process or the idea development. Documentation has two different dimensions. First, it enables the effective gathering and sharing of knowledge inside the company. Secondly, documentation allows firms reducing the risk of a sudden loss of IP through the departure of a key person.

#### 2.3.8. Fast innovation cycles

By maintaining a fast innovation cycle and bringing new products and services to market quickly, businesses can create a lead time advantage over their competitors. Introducing new products fast enough helps companies reducing the risk of being copied or imitated by competitors. As a result, by the time any product or service is copied, the business has already moved on to the next generation of products. Fast innovation cycle may have a significant role especially in fast developing businesses such as software and mobile phone technology. This method may suit smaller firms due to their ability to respond quickly to changing market demands. In this kind of business, patenting has clearly low value, but the branding strategy can take the front scene.

#### 2.3.9. Technical protection

Technical protection provides a number of instruments to protect the intellectual assets. Some common methods in software protection are e.g. (1) coding or scrambling the information so that it can only be decoded and read by someone who owns the appropriate key (encryption), (2) using security keys (dongles) or (3) converting a program into an equivalent one that is more difficult to reverse engineer (obfuscation). Also

firewalls and passwords are widely used. Technical protection can also mean incorporation of specific identification codes into software programs or e.g. in photographs or other documents. Such codes can later be used to prove the copyright. In addition, software products can be sold as a black box (object code), which means selling the product without releasing the source code.

On the opposite, open source software goes against this protection strategy. It must be known that any new algorithm using an open source module becomes automatically an open source algorithm. Thus, the increasing use of open source codes will lead to an action against IPR, which is actually a trend in the whole software industry. Start-up entrepreneurs, looking carefully after all their expenses, may widely use open source software while purchasing installation, customization and maintenance services.

### 3. BUSINESS CASES DESCRIBING IP PROTECTION STRATEGIES AND EXPLOITATION BY SERVICE SMEs IN THE RENEWABLE ENERGY SECTOR

8 typical Service company profiles of the Renewable Energy sector have been put under scrutiny regarding their potential concerns about Intellectual Property protection. In each situation, recommendations are presented, without taking into account the financial aspects, which remains the choice of each entrepreneur.

For each of them, a mapping of the IP types is graduated according to the frequency of use as follows:

To be used often     
  To be used sometimes     
  Rarely of use

#### Formal IP

- Patents
- Design patents
- Copyrights
- Trade Marks
- Utility Models

#### Semi-Formal IP

- Client subcontracts
- Confidentiality agreements
- Employee contract policy

#### Informal IP

- Secrecy
- Publication
- Restriction on knowledge access
- Enhanced commitments of personnel
- Division of duties
- Circulation of duties
- Documentation
- Fast innovation cycles
- Technical protection

### 3.1. Business case 1: System Engineering SME

Formal IP	Semi-Formal IP	Informal IP
<input type="checkbox"/> Patents	<input checked="" type="checkbox"/> Client subcontracts	<input type="checkbox"/> Secrecy
<input type="checkbox"/> Design patents	<input type="checkbox"/> Confidentiality agreements	<input checked="" type="checkbox"/> Publication
<input type="checkbox"/> Copyrights	<input checked="" type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input type="checkbox"/> Trade Marks		<input type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input type="checkbox"/> Division of duties
		<input type="checkbox"/> Circulation of duties
		<input checked="" type="checkbox"/> Documentation
		<input type="checkbox"/> Fast innovation cycles
		<input type="checkbox"/> Technical protection

A system engineering SME is often acting as subcontractor of a bigger player in a large contract. Its main assets are know-how and creativity. Its employees rely on tools like simulation software tools or test equipments to perform their engineering tests. These tools are often proprietary, since built from past contracts.

According to this SME profile, the following IP management approaches should be considered:

**Patenting:** An innovative system design can emerge from the contract, which is eligible for patent application. This may occur in the frame of an outsourced contract. Hence, care must be taken to see what the subcontract specifies with regards to the ownership of the new knowledge created. Very often, outsourcing contracts do not mention any specific rule or the simplest one: who pays owns?

**Branding (Trade Marks):** Engineering SMEs file Trade Marks from time to time. Most of the time, the company name is filed as a TM. Yet, very few other applications use TM since TM is usually linked to products.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Subcontracting:** referring to the "Patenting" section above, Engineering SMEs are strongly advised to care about the ownership section of their contract with their clients, at least when there is potential innovation or future business potential. The subcontract (or outsourcing contract) should clearly mention what is considered as background (existing knowledge that is claimed as proprietary and will be used in the frame of the contract). It should specify who will be the owners of the foreground (new knowledge created in the

frame of the contract) and the exploitation rules of that foreground beyond the end of the contract. The usual rule is that the one who pays has the rights to exploit in the business area of interest. Yet, exploitation outside that area can be granted to the subcontracts with fees back to the one who paid. The same principle applies in the frame of multi contractor projects.

**Confidentiality:** Confidentiality rules can be inserted in the subcontracts when particular knowledge and/or know-how are intended to be used, and for which the SME requires protection with regards to divulgation to outsiders. They can be either covered in a separate Non-Disclosure Agreement (NDA), or inserted directly as dedicated Articles of the subcontract. They will always have a limited duration depending on the standard innovation cycle time of the product (say 2 to 5 years after the contract termination).

**Employee's contract:** Closer to the informal IP protection but still having a legal basis, the job contract is often used as a protection against the release of knowledge and know-how outside the engineering company. Several clauses can be used, such as:

- No competition rule: an employee can be forbidden to be hired to a direct competitor for a couple of years to avoid immediate operational loss of the competitive advantage. Such a clause is usually subject to a financial compensation (from 2 to 24 monthly salaries depending on the financial challenge). It must be underlined that this clause is not validated when the sector of activity is highly specialised with a very limited number of players, because, in that case, the employee would have too much difficulty to find another job if fired by the company.
- Non disclosure commitment
- Ownership of the generated knowledge: most often, the IPR generated in the frame of a working contract belongs to the employer. However, this must be written in the job contract. Otherwise the inventor can get the rights with priority. In practice, courts consider that when the occupied position is naturally aiming at producing new knowledge (typically R&D activities) and the invention comes from this activity, the property is transferred to the company. Any how, an inventor must always be remunerated for the IPR that has been generated, unless otherwise agreed.

**Publication:** A system engineering company usually promotes the technologies and techniques they have developed in view of generating more contracts. This communication, which has the effect of preventing competitors from patenting these technologies or techniques (default of novelty), is often preferred to filing a patent application for two reasons:

- cost of filing
- the absence of strategic objective regarding patent exploitation (licensing patents is not the core business, and is not necessary to sell know-how)

Enhanced commitment of personnel: In engineering SMEs, the employee's loyalty towards the enterprise is based on a set of incentives like:

- financial incentives as a recognition of expertise;
- ownership sharing with the enterprise;
- trainings to acquire new competences;
- job evolution in the company.

Division of duty: In engineering SMEs, task split among the employees is driven by the individual skills rather than by a strategic IP protection decision.

Documentation: To avoid release of knowledge and know-how out of the company, many engineering SME put knowledge management as a key priority. It is often advised for such companies to invest in knowledge management tools,<sup>10</sup> since knowledge is part of the company assets.

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<sup>10</sup> Examples :.....

### 3.2. Business case 2: a SME specialised in simulation and/or technical software development

Formal IP	Semi-Formal IP	Informal IP
<input type="checkbox"/> Patents	<input checked="" type="checkbox"/> Client subcontracts	<input checked="" type="checkbox"/> Secrecy
<input type="checkbox"/> Design patents	<input type="checkbox"/> Confidentiality agreements	<input type="checkbox"/> Publication
<input type="checkbox"/> Copyrights	<input type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input checked="" type="checkbox"/> Trade Marks		<input type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input checked="" type="checkbox"/> Division of duties
		<input type="checkbox"/> Circulation of duties
		<input checked="" type="checkbox"/> Documentation
		<input checked="" type="checkbox"/> Fast innovation cycles
		<input checked="" type="checkbox"/> Technical protection

A SME developing simulation software tools is often acting as a subcontractor. Its main assets are software products (proprietary or not), know-how and creativity. Its employees rely on tools like prior software building blocks and mathematical models to achieve their tasks.

According to this profile, the following approaches should be considered:

**Patenting:** Referring to section 2.1.1 about patenting software, a patent application can be an opportunity in some cases. The best example is, about 25 years ago, a software application which simulates dynamically a fluid flow in a complex geometry (wind energy transfer on a turbine rotor). Clearly in the past, such software solved a technical problem which could not be handled easily. Nowadays, opportunities for patentable innovations in that field should be limited. Moreover, software life cycle is so short that patenting becomes a worthless investment.

**Copyright:** Referring to section 2.1.3 about software copyright, there might be opportunities of IP protection via copyrights in this business, if the enterprise develops its own software products and employs programmers. This is of limited scope and impact.

**Branding (Trade Marks):** Simulation software SMEs made use of Trade Marks for the commercialisation of the software products. Even if the software application is bought to / licensed from a supplier for simulation tasks only, the name of the used tools can be exploited for external communication. Besides, the company name is often filed as a TM too.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Subcontracting:** referring to the “Patenting” section above, simulation software SMEs are strongly advised to take a specific care of the ownership section of their contract with their clients, at least when it may lead to innovations with business potential. The subcontract (or outsourcing contract) should clearly mention what is considered as background (existing knowledge that is claimed as proprietary and will be used in the frame of the contract), specify who will be the owners of the foreground (new knowledge created in the frame of the contract). The same principle applies in the frame of multi contractor projects.

**Confidentiality:** Confidentiality rules can be inserted in the subcontracts when particular knowledge and/or know-how are intended to be used, and for which the client requires protection with regards to divulgation to outsiders. The simulation subcontractor will rarely request for such a protection, since it has the ability to protect technically (see below) its knowledge and know-how. Confidentiality rules can be ruled either in a separate Non-Disclosure Agreement (NDA), or inserted directly as Articles of the subcontract. They will always have a limited validity duration, depending on the standard innovation cycle time of the product (say 2 to 5 years after the contract termination).

**Employee’s contract:** Closer to the informal IP protection but still having a legal basis, the employer contract is often used as a protection against the release of knowledge and know-how outside the simulation software company. Several clauses can be used, such as:

- the competition rule: an employee can be forbidden to go to a direct competitor for a couple of years in order to avoid immediate operational loss of the competitive edge of its former company. Such a clause is usually subject to a financial compensation (from 2 to 24 monthly earnings depending on the financial challenge). It must be underlined that this clause is not valid when the sector of activity is highly specialised with a very limited number of business players. In that case, the employee would have too much difficulty to find another job when fired from the company.
- Non disclosure commitment
- Ownership of the generated knowledge: most often the IPR generated in the frame of a working contract belongs to the employer. This must be written down in the job contract. Otherwise, the inventor can get the rights with priority. In practice, courts consider that when the occupied position is naturally aiming at producing new knowledge (typically R&D activities) and the invention comes from this activity, the property is transferred to the company. An inventor must always be remunerated for the IPR that he has been generated, unless otherwise agreed.

**Secrecy:** Secrecy is a wide spread practice in the simulation software business. It deals with the combination of different mathematical models to simulate complex phenomena as closely as possible to reality. This knowledge (a compendium of mathematical models)

and know-how (the way to combine and compile them) are usually protected by technical means (see below), so that non disclosure is reached naturally.

**Publication:** In this science-based business, scientific papers are published about new models developed to simulate more and more complex phenomena. Mathematical models cannot be patented, which explains the publication attitude. However, publication is not much used by private companies.

**Enhanced commitment of personnel:** In simulation software SMEs, the employee's loyalty towards the enterprise is based on a set of incentives:

- financial incentive, as recognition of expertise;
- ownership sharing of the enterprise;
- trainings to acquire new competences;
- job position upgrading in the company.

But this offer will depend strongly on the competition and the related financial capacities of the SME.

**Division of duty:** In simulation software SMEs, the split of the tasks among the employees is driven by the individual skills rather than by a strategic IP protection decision.

**Documentation:** For SMEs which only perform simulations using commercial software, knowledge management is a key priority. It is even advised to such companies to invest in knowledge management tools, since this knowledge is part of the company assets. For those SMEs which develop their own software, the documentation is often embedded in the software thanks to comments that are inserted to ease the navigation for the next colleague who will use it. The quality of the comments in the software will make the quality of the knowledge management.

**Fast innovation cycles:** the software world is known for its short innovation cycle. Two drivers pull the simulation performance:

- The accuracy of the simulation results, based on the models used
- The functionalities offered.

The lifetime of a software version extends from 12 to 24 months, which lowers the interest of potential IPR protection.

**Technical protection:** Referring to section 2.3.9, the software world is typically the one using technical protection of the source codes to lock access to the knowledge. Only the function remains available to the user.

### 3.3. Business case 3: SME specialised in renewable resource assessment

Formal IP	Semi-Formal IP	Informal IP
<input type="checkbox"/> Patents	<input checked="" type="checkbox"/> Client subcontracts	<input type="checkbox"/> Secrecy
<input type="checkbox"/> Design patents	<input type="checkbox"/> Confidentiality agreements	<input type="checkbox"/> Publication
<input type="checkbox"/> Copyrights	<input type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input type="checkbox"/> Trade Marks		<input type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input type="checkbox"/> Division of duties
		<input type="checkbox"/> Circulation of duties
		<input checked="" type="checkbox"/> Documentation
		<input checked="" type="checkbox"/> Fast innovation cycles
		<input type="checkbox"/> Technical protection

A resource assessment SME is often acting as a subcontractor of an investor pool. Its main assets are measurement equipments, software products (proprietary or not), and know-how. Its employees rely on tools, like sensors, and on techniques to fulfil their tasks.

According to this profile, the following approaches should be considered:

**Patenting:** Patenting will be highly relevant for SMEs which develop their own sensors and other specific technical equipment. However, this is not often the case: most often the resource measurement SMEs buy standard equipments and use proprietary data processing tools. Patent can be envisaged on sensing techniques.

Also, referring to section 2.1.1 about patenting software, a patent application can be an opportunity when the enterprise develops its own software for data processing to deliver resource maps (solar, wind, biomass, wave...)

**Copyright:** Resource measurement SMEs handle large amounts of data which have commercial value. Provided that they constitute a self standing piece of knowledge as a whole, they can be registered as a proprietary creation.

**Branding (Trade Marks):** SMEs which develop their own sensing equipment will be more sensitive to TM applications. Basically, most of these companies will apply for the company name as a Trade Mark.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Subcontracting:** A resource measurement SME usually acts as a subcontractor. Provided there is potential innovation in the work plan, some clauses about ownership of the results can be envisaged. The subcontract (or outsourcing contract) should clearly mention what is considered as background (existing knowledge that is claimed as proprietary and will be used in the frame of the contract), specify who will be the owners of the foreground if any (new knowledge created in the frame of the contract), and detail compensations to the other party if any.

**Employee's contract:** Closer to the informal IP protection but still having a legal basis, the job contract is often used as a protection against the release of knowledge and know-how outside the resource measurement SME. Several clauses can be used, such as:

- No competition rule: an employee can be forbidden to be hired to a direct competitor for a couple of years to avoid immediate operational loss of the competitive advantage. Such a clause is usually subject to a financial compensation (from 2 to 24 monthly salaries depending on the financial challenge). It must be underlined that this clause is not validated when the sector of activity is highly specialised with a very limited number of players, because, in that case, the employee would have too much difficulty to find another job if fired by the company.
- Non disclosure commitment
- Ownership of the generated knowledge: most often, the IPR generated in the frame of a working contract belongs to the employer. However, this must be written in the job contract. Otherwise the inventor can get the rights with priority. In practice, courts consider that when the occupied position is naturally aiming at producing new knowledge (typically R&D activities) and the invention comes from this activity, the property is transferred to the company. Any how, an inventor must always be remunerated for the IPR that has been generated, unless otherwise agreed.

**Secrecy:** Secrecy is a wide spread practice in the resource measurement business. It deals with the commercial value of the measurements and their storage in databases. This knowledge (data) and know-how (measurement techniques) are usually protected by non disclosure rules (due t the high cost of data acquisition and processing).

**Access restriction to knowledge:** Complementarily to the above non disclosure practice, access to the databases can be put under control by the management to avoid someone going to the competition with a whole self-standing data set.

**Enhanced commitment of personnel:** In resource measurement SMEs, the employee's loyalty towards the enterprise is based on a set of used incentives:

- financial incentive as a recognition of an expertise;
- ownership sharing of the enterprise;

- trainings to acquire new competences;
- position evolution in the company.

One option or the others will depend strongly on the company culture and wealth creation.

**Documentation:** In the resource measurement sector, the main goal of the documentation will be to capitalise and train employees on the techniques used for resource assessment..

**Fast innovation cycles:** accuracy and reliability of the data processing chain is a key asset. There is continuous improvement on the existing techniques, but no major breakthrough or speed up of the innovation cycle can be expected, except if satellite data processing makes a break.

**Technical protection:** With regards to access to the resource databases, some technical protections can be used, such as encryption of data or firewalls.

### 3.4. Business case 4: Solar or wind farm installer

Formal IP	Semi-Formal IP	Informal IP
<input checked="" type="checkbox"/> Patents	<input checked="" type="checkbox"/> Client subcontracts	<input checked="" type="checkbox"/> Secrecy
<input type="checkbox"/> Design patents	<input type="checkbox"/> Confidentiality agreements	<input type="checkbox"/> Publication
<input type="checkbox"/> Copyrights	<input type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input type="checkbox"/> Trade Marks		<input checked="" type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input type="checkbox"/> Division of duties
		<input checked="" type="checkbox"/> Circulation of duties
		<input checked="" type="checkbox"/> Documentation
		<input type="checkbox"/> Fast innovation cycles
		<input type="checkbox"/> Technical protection

An installer is often an engineering company which is, almost never involved in intellectual property protection. The job is based on know-how which can be easily acquired (for instance by hiring people from the competition). When addressing small residential PV units, an installer can act both as a retailer of equipment and as an installation operator. When addressing large farms, the installer is acting as a subcontractor of the investor or plant operator. Its main asset lies in equipments and know-how. Its employees rely on tools, like special cranes, and on techniques to fulfil their tasks.

According to this profile, the following approaches should be considered:

**Patenting:** Patenting will be highly relevant for SMEs, which develop new products and techniques allowing for efficient and safe installation.

**Branding (Trade Marks):** SMEs which develop their own equipment will be more sensitive to TM applications. Basically, most of these companies will apply for the company name as a Trade Mark.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Subcontracting:** referring to the "Patenting" section above, Engineering SMEs are strongly advised to care about the ownership section of their contract with their clients, at least when there is potential innovation or future business potential. The subcontract (or outsourcing contract) should clearly mention what is considered as background (existing knowledge that is claimed as proprietary and will be used in the frame of the contract). It should specify who will be the owners of the foreground (new knowledge created in the

frame of the contract) and the exploitation rules of that foreground beyond the end of the contract. The usual rule is that the one who pays has the rights to exploit in the business area of interest. Yet, exploitation outside that area can be granted to the subcontracts with fees back to the one who paid. The same principle applies in the frame of multi contractor projects.

Non disclosure: Non disclosure about engineering techniques can be seen as an exit, since it requires special skills that give competitive advantages.

Enhanced commitment of personnel: installation SMEs can use incentives to keep the competence inside. The employee's loyalty towards the enterprise can be based on:

- financial incentive, as a recognition of an expertise;
- trainings to acquire new competences, within the company;
- position evolution in the company.

Options will depend on company culture and wealth creation

Swapping of tasks: In order to avoid the loss of competences with the departure of key employees (or even illness), tasks can be shared and/or swapped. The goal is to increase employee skills for any of the job position in the company.

Documentation: Knowledge must be made as explicit as possible. This can be done through internal training programme to share knowledge that it is written down explicitly, or through the writing of internal quality procedures. It can be by setting up an internal training programme which ensures the transmission of the know-how to the new employees. It can also be by the writing of quality procedures.

### 3.5. Business case 5: Logistic SME for biomass power plants

Formal IP	Semi-Formal IP	Informal IP
<input type="checkbox"/> Patents	<input type="checkbox"/> Client subcontracts	<input checked="" type="checkbox"/> Secrecy
<input checked="" type="checkbox"/> Design patents	<input checked="" type="checkbox"/> Confidentiality agreements	<input type="checkbox"/> Publication
<input type="checkbox"/> Copyrights	<input checked="" type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input checked="" type="checkbox"/> Trade Marks		<input type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input type="checkbox"/> Division of duties
		<input checked="" type="checkbox"/> Swapping of tasks
		<input type="checkbox"/> Documentation
		<input type="checkbox"/> Fast innovation cycles
		<input type="checkbox"/> Technical protection

A logistic SME is based on capital investment (trucks, cranes, storage, bins) with some specific knowledge, intellectual property protection is rarely a key issue. Their job is highly competitive, and based on know-how which can be easily acquired. This is why the logistic job is exemplified hereafter with the particular case of biomass load for biomass-fuelled power plants, since it requires special knowledge on resource management and commercial know-how with raw material provider. When addressing biomass power plant feeding, the logistician is acting as a subcontractor of the power plant operator.

According to this profile, the following approaches should be considered:

**Branding (Trade Marks):** In the highly competitive sector of logistics, the brand is a powerful commercial tool. Basically, most of these companies will apply for the company name as a Trade Mark, and will exploit it for advertising in view of obtaining visibility.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Subcontracting:** Although subcontracting will be the main relationship of the logistician with its client, it is not seen as significantly relevant for IP protection.

**Confidentiality:** Confidentiality rules can be inserted in subcontracts when specific knowledge is intended to be used, and for which the SME requires protection against divulgation (for instance low cost drying techniques of the raw material).

**Employee's contract:** Close to informal IP protection but still having a legal basis, the job contract is often used as a protection against the release of knowledge and know-how outside the logistic SME. Several clauses can be used, such as:

- No competition rule: an employee can be forbidden to be hired to a direct competitor for a couple of years to avoid immediate operational loss of the competitive advantage. Such a clause is usually subject to a financial compensation (from 2 to 24 monthly salaries depending on the financial challenge). It must be underlined that this clause is not validated when the sector of activity is highly specialised with a very limited number of players, because, in that case, the employee would have too much difficulty to find another job if fired by the company.
- Non disclosure commitment

### 3.6. Business case 6: Remote operation and maintenance SME

Formal IP	Semi-Formal IP	Informal IP
<input type="checkbox"/> Patents	<input type="checkbox"/> Client subcontracts	<input checked="" type="checkbox"/> Secrecy
<input type="checkbox"/> Design patents	<input type="checkbox"/> Confidentiality agreements	<input checked="" type="checkbox"/> Publication
<input type="checkbox"/> Copyrights	<input checked="" type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input type="checkbox"/> Trade Marks		<input type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input type="checkbox"/> Division of duties
		<input type="checkbox"/> Circulation of duties
		<input type="checkbox"/> Documentation
		<input type="checkbox"/> Fast innovation cycles
		<input type="checkbox"/> Technical protection

A remote operation and maintenance SME is often acting as a main contractor for the end-user. Its main assets are software products (proprietary or not), know-how and knowledge acquired about the power plant behaviour. Its employees rely on tools like monitoring and control software, spare parts (when repairs are needed) and techniques to fulfil their tasks.

According to this profile, the following approaches should be considered:

**Branding (Trade Marks):** In the highly competitive sector of plant operation, the brand is a powerful commercial tool. Basically, most of these companies will apply for the company name as a Trade Mark, and will exploit it for advertising in view of obtaining visibility. In addition, an operation and maintenance operator developing its own software tools can use a brand name for these products.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Non disclosure:** Confidentiality rules can be inserted in the subcontracts between the operator and the power plant owner when particular knowledge is intended to be used, and for which the client requires protection against its divulgation. Confidentiality rules will be preferably inserted directly as Articles of the subcontract rather than tackled in a separate Non-Disclosure Agreement. They apply over a fixed period of time.

**Employee's contract:** Closer to the informal IP protection but still having a legal basis, the job contract is often used as a protection against the release of knowledge and know-how outside the remote operation and maintenance company. Several clauses can be used, such as:

- No competition rule: an employee can be forbidden to be hired to a direct competitor for a couple of years to avoid immediate operational loss of the competitive advantage. Such a clause is usually subject to a financial compensation (from 2 to 24 monthly salaries depending on the financial challenge). It must be underlined that this clause is not validated when the sector of activity is highly specialised with a very limited number of players, because, in that case, the employee would have too much difficulty to find another job if fired by the company.
- Non disclosure commitment

Non disclosure: Non disclosure is a widely spread practice in the power plant operation business. It deals with the public preservation from information that could generate uncontrolled reactions (leakage of toxic compounds, dioxin emissions, etc...) or the responsibility engagement against power interruptions for instance.

Publication: It is the interest of the power plant operator to communicate about its know-how to reach new markets. When using proprietary software, software modes will receive technical protections (see below).

Enhanced commitment of personnel: In operation and maintenance SMEs, the employee's loyalty towards the enterprise is based on a set of incentives:

- financial incentive, as a recognition of an expertise;
- ownership sharing of the enterprise;
- trainings to acquire new competences, within the company;
- increased responsibility in the company.

Swapping of tasks: In order to avoid the loss of competences with the departure of key employees (or even illness), tasks can be shared and/or swapped. The goal is to increase employee skills for any of the job position in the company.

Documentation: SMEs which perform remote operation and maintenance using commercial software. Writing procedures is the best way to secure the knowledge and know-how of the enterprise. SMEs which develop their own software use the software documentation (often embedded in the software code, thanks to comments that are inserted to ease the navigation for other colleague who will use it.) The quality of the comments in the code lines will make the quality of the knowledge management.

Technical protection: Referring to section 2.3.9, the software world is typically the one using technical protection of the source codes to lock access to the knowledge. The end-user sees it as a black box

### 3.7. Business case 7: Recycling of used equipments and materials

Formal IP	Semi-Formal IP	Informal IP
<input checked="" type="checkbox"/> Patents	<input checked="" type="checkbox"/> Client subcontracts	<input checked="" type="checkbox"/> Secrecy
<input type="checkbox"/> Design patents	<input type="checkbox"/> Confidentiality agreements	<input type="checkbox"/> Publication
<input type="checkbox"/> Copyrights	<input type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input checked="" type="checkbox"/> Trade Marks		<input type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input type="checkbox"/> Division of duties
		<input checked="" type="checkbox"/> Circulation of duties
		<input checked="" type="checkbox"/> Documentation
		<input type="checkbox"/> Fast innovation cycles
		<input type="checkbox"/> Technical protection

Recycling SME will become key players of the value chain, since rare or dangerous materials can be involved. It includes the collection of used parts, the sorting and the recycling techniques. Its main assets are knowledge and know-how about materials properties and processing techniques.

According to this profile, the following approaches should be considered:

**Patenting:** Any innovative recycling process is subject to a potential patent. However, when dealing with transformation processes, it can be preferred to choose non disclosure instead.

**Branding (Trade Marks):** Recycling SMEs will use Trade Marks for marketing their own enterprise, but also to sell proprietary recycling machines if any.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Subcontracting:** referring to the “Patenting” section above, Engineering SMEs are strongly advised to care about the ownership section of their contract with their clients, at least when there is potential innovation or future business potential. The subcontract (or outsourcing contract) should clearly mention what is considered as background (existing knowledge that is claimed as proprietary and will be used in the frame of the contract). It should specify who will be the owners of the foreground (new knowledge created in the frame of the contract) and the exploitation rules of that foreground beyond the end of the contract. The usual rule is that the one who pays has the rights to exploit in the business area of interest. Yet, exploitation outside that area can be granted to the subcontracts with

fees back to the one who paid. The same principle applies in the frame of multi contractor projects.

**Non disclosure:** Non disclosure rules can be inserted in the subcontracts when particular knowledge and/or know-how are intended to be shared with other partners, and for which the SME requires protection with regards to its divulgation. They can be either the object of a separate Non-Disclosure Agreement (NDA), or inserted directly as Articles of the subcontract. They will always have a limited validity duration reasonably depending on the standard innovation cycle time of the product.

**Employee's contract:** Close to informal IP protection but still having a legal basis, the job contract is often used as a protection against the release of knowledge and know-how outside the logistic SME. Several clauses can be used, such as:

- No competition rule: an employee can be forbidden to be hired to a direct competitor for a couple of years to avoid immediate operational loss of the competitive advantage. Such a clause is usually subject to a financial compensation (from 2 to 24 monthly salaries depending on the financial challenge). It must be underlined that this clause is not validated when the sector of activity is highly specialised with a very limited number of players, because, in that case, the employee would have too much difficulty to find another job if fired by the company.
- Non disclosure commitment
- Ownership of the generated knowledge: most often the IPR generated in the frame of a working contract belongs to the employer. This must be written down in the job contract. Otherwise, the inventor can get the rights with priority. In practice, courts consider that when the occupied position is naturally aiming at producing new knowledge (typically R&D activities) and the invention comes from this activity, the property is transferred to the company. An inventor must always be remunerated for the IPR that he has been generated, unless otherwise agreed.

**Non disclosure:** Non disclosure is a wide spread practice in the process industry. It deals with know-how protection of the techniques for sorting the different raw materials. Processes are proprietary and not publicly accessible. Since patenting means publishing, it is often advised to keep the recycling techniques secret.

**Enhanced commitment of personnel:** In such SMEs, the employee's loyalty towards the enterprise is based on a set of incentives:

- financial incentive, as a recognition of an expertise;
- ownership sharing of the enterprise;
- trainings to acquire new competences;
- position evolution in the company.

Task allocations: In recycling SMEs, the split of the tasks among the employees is driven by the individual skills rather than by a strategic IP protection decision.

Swapping of tasks: at shop floor level, it is relevant to encourage staff flexibility

Documentation: To avoid release of proprietary knowledge and know-how out of the company, SMEs performing recycling activities will put knowledge management as a key priority (such as knowledge management tools).

### 3.8. Business case 8: Training organization

Formal IP	Semi-Formal IP	Informal IP
<input type="checkbox"/> Patents	<input type="checkbox"/> Client subcontracts	<input type="checkbox"/> Secrecy
<input type="checkbox"/> Design patents	<input type="checkbox"/> Confidentiality agreements	<input checked="" type="checkbox"/> Publication
<input checked="" type="checkbox"/> Copyrights	<input type="checkbox"/> Employee contract policy	<input type="checkbox"/> Restriction on knowledge access
<input type="checkbox"/> Trade Marks		<input type="checkbox"/> Enhanced commitments of personnel
<input type="checkbox"/> Utility Models		<input checked="" type="checkbox"/> Division of duties
		<input type="checkbox"/> Circulation of duties
		<input checked="" type="checkbox"/> Documentation
		<input checked="" type="checkbox"/> Fast innovation cycles
		<input type="checkbox"/> Technical protection

The renewable energy sector requires training to give stakeholders the new knowledge needed for a safe, affordable and reliable implementation. Training assignments can be given by engineering companies proposing trainings to learn about power equipments and power plant sizing, a professional association delivering operator trainings (installer, dismantler, maintenance, etc...), or a training for software installation and use. A training organization is contracted by several clients at the same time (most often). Its main assets are knowledge and know-how. Its employees rely on tools like software and equipments to fulfil their tests. Tools are sometimes proprietary.

According to this profile, the following approaches should be considered:

**Copyright:** A training organization will produce publicly accessible documentation with high knowledge content. It can be seen as non-technical intellectual creation. Therefore, it is strongly recommended to use Copyright protection to prevent from dealers use of this material by competing organizations. It may also apply to proprietary training software.

**Branding (Trade Marks):** Most of the time, the organization name is filed as a TM for marketing purpose.

**Design Patents:** In addition to trade mark protection, if designs are used in the business (e.g. logo), design patent protection is also an option.

**Employee's contract:** Close to the informal IP protection but still having a legal basis, the job contract is often used as a protection against the release of knowledge and know-how outside the training organization. Several clauses can be used, such as:

- No competition rule: an employee can be forbidden to be hired to a direct competitor for a couple of years to avoid immediate operational loss of the competitive advantage. Such a clause is usually subject to a financial compensation (from 2 to 24 monthly salaries depending on the financial challenge). It must be underlined that this clause is not validated when the sector of activity is highly specialised with a very limited number of players, because, in that case, the employee would have too much difficulty to find another job if fired by the company.
- Non disclosure commitment
- Ownership of the generated knowledge: most often the IPR generated in the frame of a working contract belongs to the employer. This must be written down in the job contract. Otherwise, the inventor can get the rights with priority. In practice, courts consider that when the occupied position is naturally aiming at producing new knowledge (typically R&D activities) and the invention comes from this activity, the property is transferred to the company. An inventor must always be remunerated for the IPR that he has been generated, unless otherwise agreed.

Publication: A training organization is used to distribute a full documentation at the end of the training session. Copyright is a prerequisite.

Enhanced commitment of personnel: The employee's loyalty towards the enterprise is based on a set of incentives:

- financial incentive , as a recognition of a training expertise;
- ownership sharing of the enterprise;
- trainings to acquire new competences, within the company;
- increased responsibility in the company.

Task allocations: In training organizations, the split of tasks among the employees is driven by the individual skills rather than by a strategic IP protection decision.

Fast innovation cycles: Knowledge is expanding continuously a professional training must be "state of the art". Training approach is performed on at least a yearly basis, to be ahead of competitions.

Documentation: To avoid release of knowledge and know-how out of the company, many training organization put knowledge management as a key priority.

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