


Novozymes use of patents

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Introduction

- Preben Rasmussen,
 - Department Manager for EnzymeBusiness-patents –DK
 - Civilingeniør 1988, DTU
 - Ph D 1991, DTU
 - European Patent Attorney 2004
- Joined Novozymes in 2006

Introduction

- Novozymes is the World leader in Bioinnovation
 - World largest producer of industrial enzymes
 - Provides enzymes, ingredients to biopharmaceutical industry, microorganisms and biosolutions
 - Headquarter in Bagsværd, Denmark
- Have more than 1,000 patent families
 - (a patent family is a group of patents and patent applications having same priority application)
 - More than 6,000 patents and patent applications

Organisation

- Patent department integrated in R&D
 - We find it beneficial that the patent attorneys are close to the inventors
- In house Patent functions in different countries
 - Denmark, USA, China, UK and India
 - Co-located with R&D
- We use external patent agents in other countries
 - Most countries require local representative

Novozymes innovation

Innovation is the key to our business

- R&D continuously strive to create new and better products
 - Improved functionality give better prices
 - Differentiate from competitors
 - We prefer to compete on performance not on prices

- We invest R&D resources in developing new business areas
 - E.g. Biofuel,
 - Often in partnership with other players

- No "me too" products

Use of patents

- Patent use:
 - Protects R&D investments
 - Patents are a main way to secure the values generated in R&D
 - Keep competing products away from market
 - Provide a competitive advantage for our own products
 - Grant licenses to selected technologies in selected fields
 - Provides an income for our R&D investment

Others patent rights

- We respect others valid patent rights
 - We take licenses to third party patents
 - A way to get access to a market covered by third parties technology
 - An option if a third party patent covers our product
 - We try to invalidate patents limiting our activities
 - Mainly using patent invalidation procedures running at the patent offices:
 - Re-examinations in the USA
 - Oppositions in Europe

Type of protection

- Patents claiming the product (Enzymes)
 - This is our favorite claim type because:
 - It covers any possession, production or use of the products
 - It is easy to enforce because you only have to document the presence of the product to show infringement
- Patents claiming a production method
 - Difficult to enforce because we need to prove that a potentially infringing product is produced using the claimed method to show infringement
 - Some production methods are not patented but kept as know how

Type of protection

- Claims to the application/use of a product
 - Problematic because these patents covers our costumers activities
 - Customers bying our products gets license to application patents
 - In order to use such a patent against a competitor we must show that the competitor has marketed the product in question together with directions for the particular application/use
 - Each business segment decides on the use of such claims

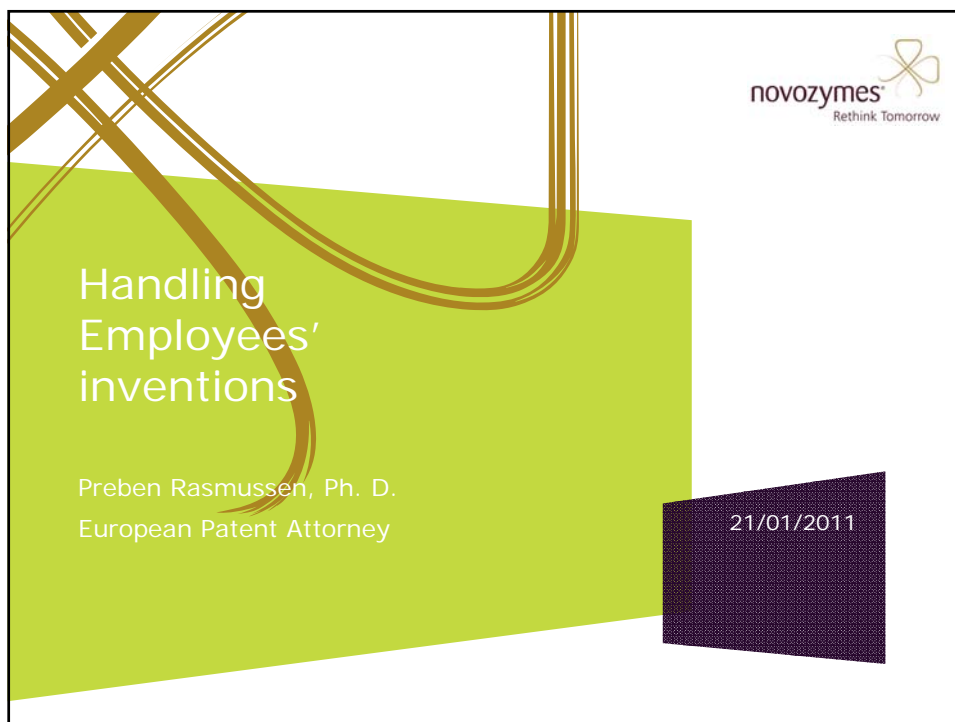
Activities in Patent department


- Create new patent rights
 - Draft patent applications
 - Prosecute patent applications
- Oppose or defend patent rights
 - To invalidate third party patent rights
 - To defend our patents opposed by third parties
- Secure freedom to operate for our products
 - Before launch of a new product FTO must be established
 - If problematic third party are identified we have the option of invalidting the rights or obtaining a license

Patent enforcement

- If our patents are infringed we try to enforce our rights

- Litigation
 - Performed together with external Lawyers
 - Takes place in court
 - Powerful process to stop infringement
 - Requires many resources
 - Only few cases proceeds to litigation



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Handling Employees' inventions

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- In general we patent inventions made in the company in order to protect the R&D investments

- We use prophylactic publication in few cases
 - Will prevent us and other to patent the subject matter
 - Only for subject matter with low value and where the prospect of obtaining a patent is not good

- A few inventions are not patented but kept secret
 - Only if we feel that we must divulge important information in the application and we have no opportunities of enforcing a patent

Handling inventors and inventions in a global organization

- We follow national law
 - National law determines employees basic rights
 - Employment contracts based on national law
 - Employment contracts entitles Novozymes to the rights of inventions made while working at Novozymes

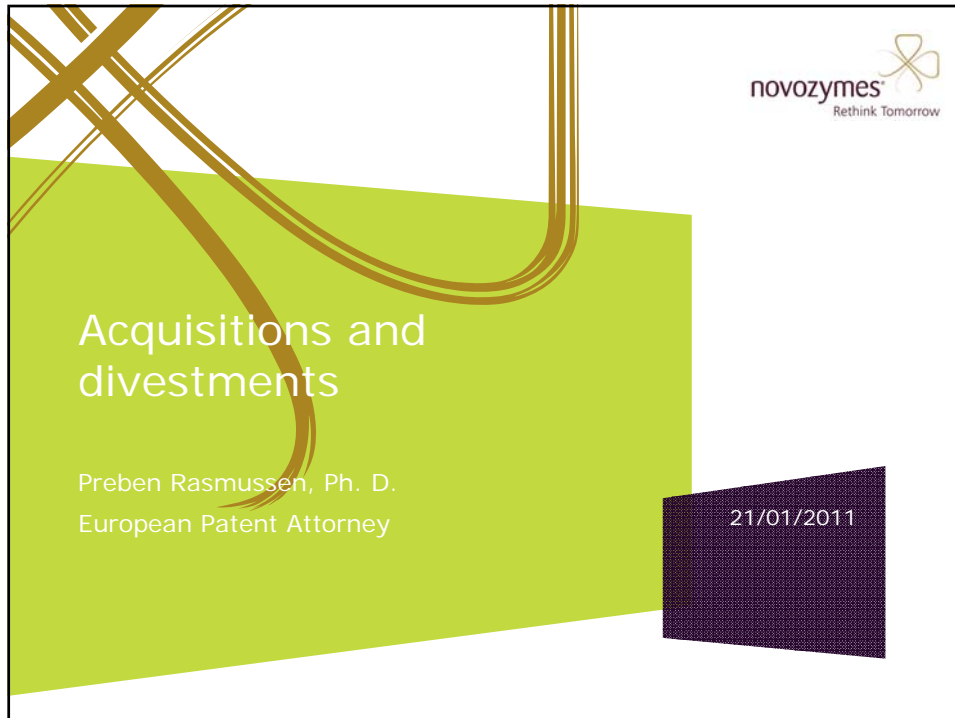
- Conflicting national laws
 - We have many R&D projects involving different sites
 - USA, China and India all require national first filing of applications for inventions made in the countries
 - Problem for inventions made jointly by inventors located at different sites – no easy solution


Handling inventors and inventions

- Process for drafting and filing applications
 - Inventors inform patent function of new invention
 - Patent agent and inventors agrees on patenting or not
 - Patent agent draft application with technical input from inventors
 - Priority application is filed
 - Optionally an assignment is executed
 - In the convention year the inventor supplies further data according to agreement
 - PCT application is drafted and filed 1 year after priority date
 - Optionally an assignment is executed
 - PCT application is published 18 months after priority date

Handling inventors and inventions

- Education of staff is important for patent function
 - Increase awareness of patenting
 - Scientific staff should know when to contact patent function
- Controlling scientific publications is also part of patent function
 - Publication of an invention prevents later patenting
 - Manuscripts for scientific publications must be approved by patent department before submission to publisher




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Acquisitions and divestments

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- We routinely scout for potential acquisition targets in order to:
 - Enter new business areas
 - Establish business in a new geographical regions
- If we decided to stop development and other activities in an area we try to divest patents and know how

Acquisitions and due diligence

- When a potential acquisition target is identified an due diligence team is formed
 - Composition depends on the particular acquisition target but usually the team has members from Legal, finance, Patents and licensing, regulatory, R&D and production
 - The task of the team is to conduct a due diligence i.e. establish that the apparent values of the acquisition target are real values
 - Part of the task can be done with publicly available information but usually the team gets acces to confidential information in a short period

Due diligence

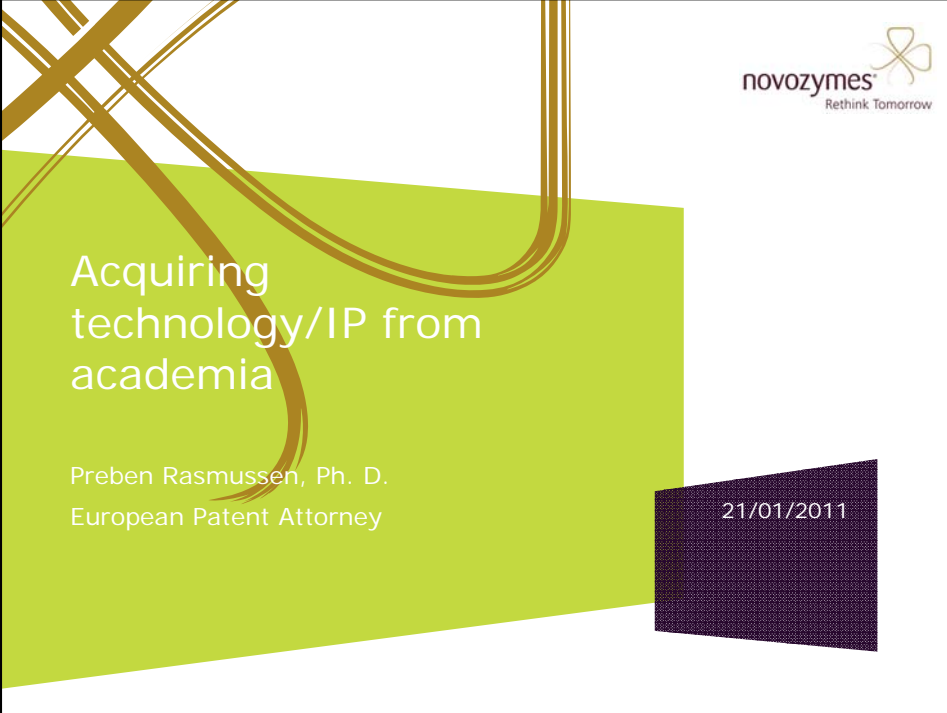
- Patent tasks in due diligence
 - Patents and patent applications
 - Entitlement to patents
 - Predicted scope of pending applications
 - Outcome of pending conflicts, oppositions etc.
 - Licenses
 - Identify licenses
 - Are license agreements valid and transferable
 - Freedom to operate
 - Is there freedom to operate for the present and intended activities


Due diligence report

- The Due diligence ends with a report of the findings made in the analysis
 - The aim of the report is to give the best possible picture of the value of the potential target
 - The report will further mentioned any problems, benefits, risks and opportunities discovered during the process
- The report is an important element in deciding on the acquisition

Divestment of IP

- Potential buyers are identified by the business peoples
- Patents & Licensings role is to present the IP in a fair and unbiased way:
 - We present official documents
 - We may present optional external opinions
 - We do not present our own opinion or expectations




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Acquiring technology/IP from academia

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Acquiring technology /IP from academia

- General schedule
 - Primary contact
 - Often R&D makes first contact
 - Business consideration
 - Do we believe that the technology/IP generates value in our set up?
 - Patent evaluation
 - Performed by inhouse patent attorney
 - Agreement

Primary contact

- We contact academia
 - Contacts via scientific meetings or publications
 - R&D contacting academia
- Academia contacts us
 - R&D evaluates the technology
 - In existing areas
 - Potential for new areas

Initial considerations

- R&D:
 - Does the technology/IP fit into our technology
 - How much R&D effort must we provide to develop the technology/IP to enter the market?
- Business
 - Can we see a business model where the new technology creates a revenue?

Patent evaluation the application as such

- Evaluating the technology
 - Is the technology patentable?
 - Who has the right to the invention?

- Evaluating an optional patent application
 - Is it valid?
 - Is the application thoroughly drafted?
 - Is the invention broadly exemplified?
 - Is the country selection satisfactory for our needs?
 - When was the application filed, and has the technology been published?

Patent evaluation Freedom to operate

- Freedom to operate analysis
 - Search for third party patent and applications
 - National rights must be considered in each jurisdiction

 - Evaluate retrieved documents
 - Evaluate scope of found patents
 - Evaluate possible scope for identified patent applications
 - Consider validity of found patent rights

 - Conclude
 - We can practise the offered technology
 - We can not practise the technology
 - Can we get license to blocking patent rights?

Agreement

- Acquiring patent rights
 - Gives us the full control of the technology

- License agreement
 - Exclusive or not
 - May contain prosecution clause

- Co-development agreement
 - Often desirable a for non-mature technology
 - We prefer to patent inventions created during the cooperation

Potential problems Ownership

- Who owns the invention:
 - University
 - students

- Which rights can we get and which rights will the university keep
 - We prefer to have all commercial rights to the invention
 - What can the university do with the technology?
 - Can the university use the technology in cooperations with other parties?

Potential problems Publications

- Inherent dilemma: Academia wishes to publish; we prefer to wait to publish until the patent application has been published:

- General patenting time line
 - 0 Month – filing of priority application
 - 0-12 Month – optional additional priority applications
 - 12 Months – filing PCT application comprising content of priority applications and added subject matter
 - 18 Months – PCT application is published

Potential problems Publications

- Consequence of publication:
 - Prior to Priority filing: no valid patent in many jurisdictions
 - 0-12 Months: publication is prior art for subject matter added in PCT application
 - 12-18 Months: we can not withdraw a pending patent application before publication and refile to obtain a later priority date.

- Possible compromise:
 - No publications allowed before filing of PCT application
 - Scientists notify us of an invention and allows us 2-6 months to file patent application covering the invention whereafter it can be published

Potential problems valuation of an invention

- The value of an invention depend on the additional revenue generated by implementing the invention

- The value of an invention depends on many factors including:
 - Revenue of expected sale
 - Maturity of invention
 - Time to marketing
 - Likelihood of succes

Value of an invention

- Revenue
 - New market
 - Sale expectations based on market analysis and business models
 - High costs connected with developping new market
 - High risk
 - Existing market
 - Sales expectations based on known market size
 - Lost sale of existing products
 - Lower risk
 - New process
 - Cost reduction can be calculated based on existing sales

Value of an invention Maturity of an invention

- We practically never find technology ready to be marketed

- Before marketing we need to do additional research/development:
 - Expression studies
 - Production
 - Application studies

- The value depends on how much research/development we must do before the technology can be marketed.

Value of an invention Other considerations

- Time to commercialization

- Likelihood of success

- These factors may affect the value or the structure of payment for an invention

Structure of payments

- Up-front payment
 - Less attractive if the likelihood of success is low or the time until commercialization is long

- Milestone payments
 - Specified payments when certain technical or commercial goals are achieved such as expression in microorganism, registration of product, first commercial sale
 - Attractive if technical challenges are foreseen

- Royalty
 - e.g. payment of a percentage of sale

Questions?