GLOBAL IP STRATEGIES FOR PROCURING AND PROTECTING GREEN INNOVATIONS: A FOCUS ON EUROPE, BRAZIL, CHINA, AND THE US

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ABSTRACT: Global competition for clean and sustainable processes using renewable resources as raw material drives many companies to biotech routes. European and U.S. companies alone contribute more than €2.5 trillion annually to the global bio-economy and employ nearly 30 million people. Patents play a key role supporting the companies operating in these regions. As the global bio-based economy grows, so should your plan for global IP protection in key markets. But much is in flux. US IP has experienced significant upheaval following the America Invents Act (AIA). Any company operating in Europe must be considering the impact of the Unified Patent system when tailoring its patent strategy for Europe. Brazil, once criticized for lax intellectual property rights protection, has been stepping up implementation and enforcement. Indeed, in December 2016, the Brazilian Patent Office established a fast track examination of green inventions. And some global indexes indicate that the trend of IP creation is shifting toward Asia.
Keywords: biofuels, bioethanol, decision making

1 INTRODUCTION

This paper provides key considerations for navigating global IP markets with a goal of maximizing your return on IP investment. Viewing the patent systems in Europe, Brazil, China, and the United States, this paper focuses on three elements of procurement and freedom-to-operate: ways of accelerating examination with a focus on green technology; options for challenging blocking patents by opposition; and means of enforcement.

2 EUROPE

Nearly 40 European countries are members of the European Patent Organisation (or EPO).[1] The EPO acts as a centralized patent office for all of the member countries, including Germany, France, and Great Britain. Though an applicant may choose to file directly with a local patent office, it can be more efficient to first apply for a patent with the EPO and then validate, or register, the EPO issued patent in any one or more of the member states.

In addition to acting as a centralized European patent office, the EPO examines and issues patents based on a common legal framework, the European Patent Convention (EPC). Copies of the EPC are available online at the EPO website.

2.1 Accelerated Examination

The EPO offers two avenues for accelerating examination, neither of which is limited specifically to green technologies.[2,3,4] Any applicant may request accelerated examination of an application through (1) the "program for accelerated prosecution of European patent applications" or "PACE," or (2) through the patent prosecution highway ("PPH"). There are benefits and limitations for each of these options, and deciding which method to avail oneself of depends on the specific circumstances.

One major benefit of the PACE program is the cost: it's free. An applicant need only make a formal request online, specifying whether the applicant would like to accelerate search or examination. In general, it takes about 3 to 5 years from filing to grant in the EPO under standard prosecution. Through the PACE program, an applicant can expect to receive the next office action within three months, which continues for the remainder of examination. Assuming allowance following 2-3 office actions, the PACE program can greatly decrease the pendency time of the application by decreasing the time between office actions.

The PACE program is not without limitations. First, an application must be "in a fit state," wherein any previously identified defects, *e.g.*, from a European Search Report, have already been addressed. Second, an applicant withdraws from accelerated examination by taking an extension of time. Finally, once an application loses accelerated status under PACE, it cannot re-enter the PACE program.

Accelerated examination through the PPH is an alternative to the PACE program, where a related application has been allowed or issued. The EPO offers accelerated examination through the IP5 PPH pilot program, which was renewed in December 2016 for an additional three years, expiring in January 2020. Through this PPH program, an applicant may request accelerated examination of claims that substantially correspond to allowed or issued claims in the US, China, Japan, or Korea. Fig. 1.

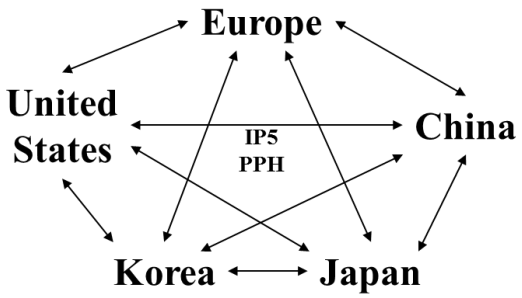

Figure 1: Members of the IP5 PPH Pilot Program.

In order to accelerate examination through the IP5 PPH program, the EP application must share priority with the allowed or issued foreign application/patent. Further, every claim in the EP application must sufficiently correspond with one or more allowed/issued claims in the foreign application/patent, wherein the EP claims and the foreign claims have the same or similar scope, or wherein

the EP claims are narrower than the foreign claims. Further, an application is only eligible for the IP5 PPH program if a request is made prior to the start of substantive examination.

Deciding whether to pursue accelerated examination through the PACE program or the IP5 PPH program can depend largely on the timing and the goals of the applicant. In general, it can be difficult to obtain allowed or issued claims in the US, China, Japan, or Korea before the start of substantive examination in the EPO. Thus, for a first application in the EPO, in cases where related applications are still pending in the US, China, Japan, and/Korea, it may be more practical to use the PACE program. However, if an application has not been advancing as quickly in the EPO as in one of the IP5 countries, an applicant may consider filing a divisional application with the EPO, and relying on allowed/issued claims in one of the IP5 PPH countries.

Alternatively, the PACE program offers accelerated examination with minimal requirements. An applicant need not wait until claims are allowed or issued in a foreign country before accelerating examination in the EPO. Further, under the PACE program, the applicant is not required to characterize the claims as having the same or similar scope as a related claim set in a different country. Rather, PACE allows an applicant to merely speed up Examination.

2.2 Opposition

Various options are available to oppose a pending application or a granted EP patent. During prosecution, any third party may submit observations regarding the patentability of a published application.[5] These third party observations can include comments on the novelty, inventiveness, clarity, sufficiency of disclosure, patentability, or allowability of amendments of the claims. An Examiner is tasked with issuing the next Office Action within three months from receiving the third party observations.

Any party not already a part of the proceedings before the EPO, *e.g.*, any party other than the applicant, can submit third party observations. As a result, a third party will often submit observations through a law firm or a straw man. By doing so, the interested third party can conceal its identity. This can be a very appealing benefit if the third party is a competitor that does not want to alert the applicant of their interest in the particular application. The practice of using a straw man is so common that companies exist to serve in this capacity.

After the grant of an EP patent, a potential opponent must file an opposition within nine months from the date of the publication of the mention that the patent has granted.[6,7] Of note, the EPO has a mailing rule that allows, *e.g.*, an opponent to actually file a notice of opposition nine months from ten days after the publication of the mention of grant of the patent.[8] Thus, as a patent holder, reaching the nine-month date without a notice of opposition does not guarantee that your patent will issue without opposition. Opponents often wait until the final few days to submit their notice of opposition, and this is often after the nine-month date (but within the extra ten-day mailing rule).

Any person can bring an opposition to a granted EP patent within the specified time period, except the patent holder may not oppose its own patent. As in third party observations, the opponent may use a straw man to protect its identity.

An opponent must provide grounds for invalidating the patent in its notice of opposition. These grounds are limited to (1) Articles 52-57 of the European Patent Convention (EPC; including novelty, inventive step, patentable subject matter, and industrial application), (2) that the invention is not clearly and completely disclosed so as to enable a person of skill in the art to practice the invention, and (3) that the claims extend beyond the scope of the disclosure as filed.

Upon notice of opposition, the patent holder is given an opportunity to respond to the grounds of opposition in writing. In the response, the patent holder can amend the claims and/or the specification, though doing so is not required. Often, a patent holder will submit multiple alternative amended claim sets. The patent holder will rank them in order of preference, giving options should the patent holder's main arguments be rejected.

The opposition is reviewed by a panel, typically having three experienced Examiners. In general, either the opponent or the patent holder will request an oral hearing to present its arguments to the panel. Following the oral hearing, the panel decides to either (1) revoke the patent; (2) maintain the patent as granted; or (3) maintain the patent in amended form, *e.g.*, if amendments were made during opposition.

In 2016, only 4% of granted patents were opposed. Of that 4% (representing about 4100 patents), the patent was revoked in 28% of the cases, the patent was upheld in amended form in 40% of the cases, and the opposition was rejected (the patent was upheld in issued form) in 32% of the cases.[10] Fig. 2.

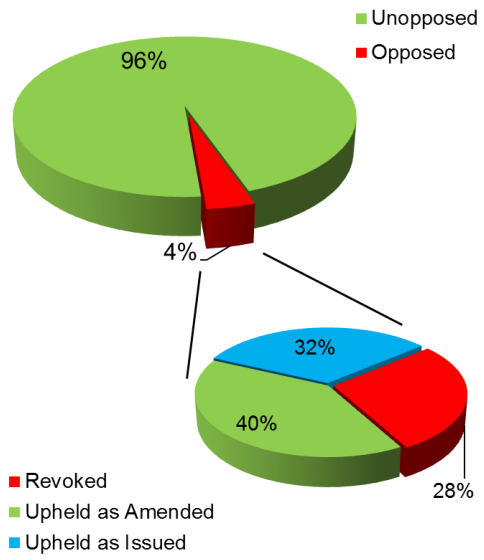

Figure 2: EP opposition rates and outcomes in 2016.[10]

2.3 Enforcement

Patent enforcement in Europe is in somewhat of a transition. The current system involves state by state enforcement and litigation. However, in 2013 the Agreement on the Unified Patent Court was signed by 25 EU member states.[10,11] Once ratified by at least thirteen states (including France Germany, and the United Kingdom), the agreement will go into effect, drastically changing the way patents are litigated in Europe. At this time, twelve member states, including France, have ratified the Agreement, yet neither Germany nor the United Kingdom has done so.

In Europe, a granted patent must be validated in each country that acts through the EPO. Validation can be an expensive step in procuring a patent, as many of the countries require that the claims *and* the specification are translated into the country's native language. Depending on the length of the application, costs associated with validating an EP patent can quickly climb to over €100,000. As a result, patent holders sometimes chose to limit the number of countries for validation.

However, under the current system, an EP patent is only enforceable in the countries where it is validated. And, in order to enforce a patent, a patent holder would need to bring an action in every European country where the patent is validated and where the patent is infringed. A decision of infringement in the United Kingdom cannot necessarily block the same infringer in Italy, for example.

This system makes it very difficult—and expensive—for patent holders to protect their technologies in Europe. In addition, differing legal standards and procedures further complicate matters for patent holders.

The Agreement on the Unified Patent Court (UPC)[11] was signed to add predictability, reduce inconsistency, and limit the appeal of forum shopping by creating a European court system for patent litigation. Once in effect, the UPC will serve as a centralized patent court for all EPO-issued patents in force. The UPC will have the power to issue injunctions, seize infringing items, and to invalidate all or part of a patent.

Furthermore, Art. 69 of the Agreement provides that "reasonable and proportionate" legal fees and expenses incurred by the winning party "shall, as a general rule, be borne by the unsuccessful party, unless equity requires otherwise, up to a ceiling set in accordance with Rules of Procedure."[11]

Centralization of EP patent enforcement and provisions awarding attorney's fees and costs to the winning party can be viewed as favoring patent holders, as both elements make it easier to enforce a patent in Europe. However, until the UPC comes into effect, we will not know how the forum will favor patent owners or alleged infringers.

3 BRAZIL

Brazil stands as the largest economy in Latin America, though only 2.7% (30,219 applications) of all applications filed worldwide in 2015 were filed with the Instituto Nacional de Propiedade Industrial (INPI; the Brazilian patent office).[12] However, Brazil's economy may be in the process of emerging from several years of recession, signaling a potential period of economic growth. This growth combined with favorable green technology patent rules makes Brazil an attractive market for companies specializing in green technologies.

3.1 Accelerated Examination

Though accelerated examination through the PPH is not available, Brazil offers an accelerated examination option for applications directed to green technologies. The "Green Patents" priority examination program began as a pilot program in 2012, but was made permanent in December 2016. It allows an applicant to dramatically reduce the time to allowance from an average of about 10 years under traditional examination to an average of about 2 years.[13] Fig. 3.

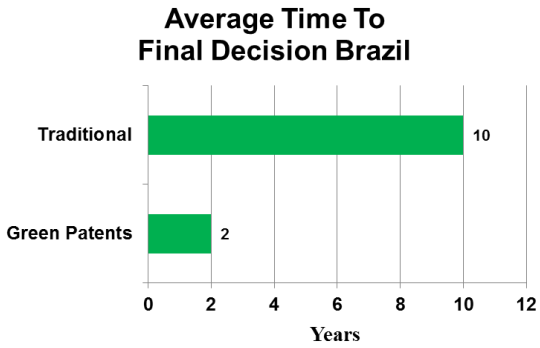

Figure 3: Average pendency time (months) for patent applications filed in Brazil.[13]

Since the Green Patents pilot program started in 2012, 325 out of 480 applications have been accepted into the program.[13] To be eligible, the application must be related to any field of green technology, must have been published (or the application will be published early), must not have entered substantive examination, and must have 15 claims or less (3 or less independent claims).

The INPI defines eligible green technologies as including biofuels (including solid fuels, liquid fuels, biogas, and biofuels from genetically modified organisms), pyrolysis or gasification of biomass, harnessing energy from waste from human activities.

However, it is worth noting that Brazil does not generally allow the patenting of living organisms. This includes naturally occurring cells, animals, plants, etc. Though an exception is made for modified microorganisms, other modified organisms such as modified animals, plants, animal cells, or plant cells are not patent eligible under Art. 10(IX) and Art. 18(III) of Brazilian Industrial Property Law (BIPL).

While Art. 18 may serve as a barrier for various classes of pharmaceutical claims, it is unlikely to block patentability for many green technologies. Under Art. 18, various genetically modified microorganisms may be patent eligible as long as they are novel and inventive and as long as they have industrial application (*e.g.*, they must do more than their natural counterparts). Thus, genetically modified microorganisms that are engineered, *e.g.*, to produce biofuels or digest biomass would likely be patent eligible in Brazil.

3.2 Opposition

Brazil has limited opportunities for a third party wishing to oppose a pending application or a recently granted patent before the INPI. During prosecution, any party can oppose the patentability of a pending application within sixty days from the publication of the application.[14] The applicant then has sixty days to respond to the reasons for opposition. The Examiner then commences examination based on the pending claims and the arguments put forth by the opponent and the applicant. The opponent does not submit a response to the applicant's arguments. Thus, in practice, the opposition brief serves as a first Office Action, which the applicant can argue against.

Once a patent has granted, any party with a legitimate interest may file an administrative nullity action within six months from grant. Nullity actions are covered by Chapter VI of the BIPL (46-57 BIPL). In general, the INPI will issue a nullity decision within about sixty days

from receipt of the patent owner's response.

Alternatively, a judicial nullity proceeding may be requested by any person having a "legitimate interest," including the INPI itself, at any time during the life of the patent.[15] Judicial nullity actions must be filed within the Federal Courts of Brazil, and the INPI must participate in the proceedings, even if the INPI did not itself bring the action.

3.3 Enforcement

A patent infringement action in Brazil must be filed with a state court (as opposed to a federal court).[16] In general, an infringement case has two phases. The first phase includes a hearing similar to a mediation. The judge attempts to facilitate a settlement between the two parties. If no settlement can be reached, the case progresses to the second phase, where the parties present their witnesses and the judge issues a final disposition on the case.

The average patent infringement suit takes from two to three years to reach a decision.[16] The appeals process then generally takes an additional two years to run its course. Preliminary injunctions are available as a remedy, which can lessen the extent of damages during prolonged litigation.

In 2016, Brazil passed the New Civil Procedure Code (NCPC), which moved Brazil's previously statute-based legal system to one that places value on court precedent.[17] The NCPC also adds additional hurdles to dissuade parties from protracted litigation. First, the NCPC places greater emphasis on mediation, requiring the parties to engage in extrajudicial mediation prior to taking the case before a judge. Second, the NCPC increases the cap on attorneys' fees that the losing party must pay to the winning attorneys. Note that unlike in many countries where attorneys' fees are paid to the winning *party*, in Brazil, attorney's fees are paid to the winning attorneys.

The NCPC also strengthens the role of the judge in litigation. In particular, the judge is granted greater powers for enforcing a decision, including seizure of a debtor's assets, impositions of restrictions on a debtor (*e.g.*, blocking the ability of the debtor to make contracts with public institutions). (Columbia Article) The changes also strengthened injunctive relief by requiring a losing party to appeal against a decision for a preliminary injunction or else the injunction becomes final. (Rocha)

Thus, the trend in Brazil is towards a more unified, predictable, and stronger patent enforcement system.

3.4 Working Requirement

Brazil has an interesting working requirement that is different and noteworthy.[18] Many countries require that a patent holder actually use and/or sell its invention in the country where the patent is issued. Though a patent holder can't be forced to make or sell its product, countries with working requirements typically reserve the right to grant compulsory licenses to third parties in order to ensure that the invention is available.

Brazil takes this a step further. While some countries only require that the invention is available in the country, Brazil requires that the invention is *manufactured* in Brazil. Article 68 provides that a compulsory license may be granted for:

> non-exploitation of the object of the patent within the Brazilian territory for failure to manufacture or incomplete manufacture of the product, or also failure to make full use of the patented process, except cases where this is not economically feasible, when importation shall be permitted.

This is interpreted to mean that if the product is manufactured outside of Brazil and imported into Brazil, a third party may be permitted to also import the patented product through a compulsory license. The Brazil working requirement thus requires manufacture in Brazil (not just importation into Brazil). Although this interpretation was challenged by the US Trade Representative in the early 2000's, no final decision was reached as to whether the working requirement requires manufacture within Brazil.

This has the potential to be a major issue for patent holders interested in selling their technology in Brazil. Unless the patent holder manufactures the technology in Brazil, a third party may be able to secure a compulsory license to import and sell the patented technology in Brazil. Patent holders should consider the risks associated with Article 68 when deciding where to manufacture products destined for Brazil.

4 CHINA

The Chinese patent office (SIPO) received more patent applications (1,101,864) than any other country in 2015, representing 38% of all patent filings worldwide. China had nearly twice as many applications filed as the United States (589,410) and over six times as many applications filed as Europe (160,028).[12] From 2014 to 2015, patent filings in China increased by over 18%.[12] As a global manufacturing hub, innovators should strongly consider including China in their global IP strategy, even if there are no plans to commercialize in China.

4.1 Accelerated Examination

China offers two means of accelerated examination: the IP5 PPH pilot program (like in the EPO) and prioritized examination program for green technologies.[19]

Under the IP5 PPH pilot program, extended until January 2020,[20] an applicant may rely on allowed or issued claims from the United States, Europe, Japan, or Korea.[21] As in the EPO, an applicant must make a request for accelerated examination before receipt of a first office action. China requires the applicant to make a formal request for examination, and a request for accelerated examination through the PPH may be made concurrently with the request for substantive examination.

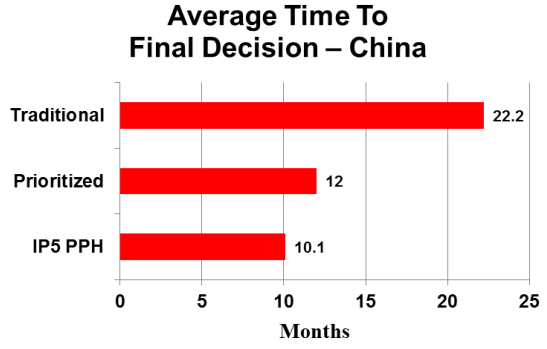

Figure 4: Average pendency time (months) for patent applications filed in China.[22]

An application is eligible under the PPH pilot program if the pending Chinese claims sufficiently correspond to one or more of the allowed or issued claims in the foreign application or patent. However, it is not necessary to copy over all allowed or issued claims to the Chinese application. In addition, the Chinese application must have been published.

Under the IP5 PPH, the average time to a final decision is about 10.1 months, which is less than half the average time under traditional examination (22.2 months).[22] Fig. 4.

The second option for accelerated examination in China does not require an applicant to amend the claims to match allowed or issued claims from another country. Rather, an application directed to energy conservation, environmental protection or green technologies ("green technologies"), may be eligible for prioritized examination though a process distinct from the PPH pilot program. Rather than submitting issued claims, an applicant need only submit a search report from another country, *e.g.*, from the EPO or USPTO. If the application is accepted into prioritized examination, the applicant can expect a first examination report within 30 working days. The applicant is required to respond to the examination report within 2 months, and any extensions of time will result in a loss of priority status. Further, an applicant can expect a final decision within 1 year,[19] as compared to 22.2 months for traditional examination. Fig. 4.

As in Europe, applicants should consider which path best suits their individual needs. The requirement that the Chinese claims sufficiently correspond to the claims of a foreign allowed or issued application may be undesirable for some applicants. It can be risky to characterize the scope of claims, and patent applicants should generally try to avoid doing so unless absolutely necessary. By pursuing the green technologies prioritized examination over PPH, an applicant can avoid this potential pit fall.

In addition, an applicant may want to avoid narrowing the claims in China to the extent that they may have been narrowed in a different country. Different countries have different laws, and issued claims bear the hallmarks of a particular country's patent laws. Thus, an applicant may prefer not to rely on allowed or issued claims in China.

However, issuance of related claims in one of the other IP5 countries can be persuasive to a Chinese Examiner. Approximately 76.1% of applications are ultimately allowed through traditional examination, whereas approximately 87.8% of applications are ultimately allowed through the PPH program.[22] Fig. 5. The Chinese Examiner may have the same questions as to the patentability of the claims as the foreign Examiner, and the fact that the foreign Examiner ultimately allowed the claims may help move the Chinese Examiner towards the same conclusion.

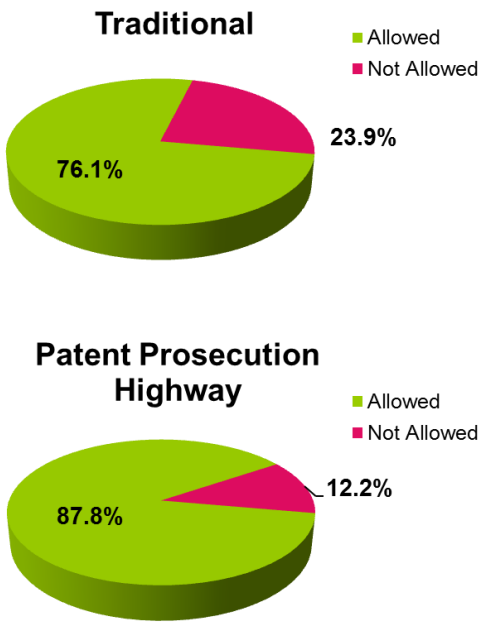

Figure 5: Average allowance Rates in China for applications undergoing traditional examination (top panel) and accelerated examination through the IP5 PPH pilot program.[22]

However, the Chinese Examiner is not required to allow the claims simply because they were allowed in an IP5 country, and thus even though the application may ultimately be allowed, the allowed claims may still be narrower than those claims allowed in other IP5 countries.

The persuasiveness of allowed or issued foreign claims may be the most useful in cases where the Chinese Examiner has been particularly reluctant to allow a pending application. Although an application can only enter the PPH pilot program before commencement of substantive examination, an applicant may consider filing a divisional application and abandoning the parent application in order to restart examination. The applicant can request accelerated examination of the divisional application through the PPH pilot program, if issued or allowed claims are available, and provide the Examiner with an example of how the pending claims can be allowed.

4.2 Opposition

In 2001, China abolished the previously existing opposition procedures. Under current laws, a party wishing to invalidate an issued Chinese patent may challenge the patent through an invalidation procedure.[23] Any party may file a request for invalidation. Requests are made to and decided on by the Patent Re-examination Board (PRB). The PRB is not a part of SIPO.

Table I: Grounds for an Invalidity Decision in China

Basis	Grounds
Art. 22	Lack of Novelty, Inventive Step, and/or Practical Applicability
Art. 26.3	Insufficiently Clear and Complete Description (Enablement)
Art. 26.4	Claims Lack Support
Art. 33	Amendment Made to Specification Extends Beyond Original Disclosure
Rule 2	Claimed Invention Is Not a Technical Solution or Improvement
Rule 13	Double Patenting
Rules 20.1/21.2	Claims Are Not Clear and Concise/ Claims Do Not Sufficiently Define the Invention
Art. 5	Invention Is Contrary to Chinese Laws/Social Morality or Is Detrimental to the Public Interest
Art. 25	Unpatentable Subject Matter
Art. 9	Inventor Was Not the First to File an Application

Invalidity arguments presented to the PRB must be different from the reasons for objection addressed by the Examiner during prosecution. The possible grounds for invalidity are presented in Table I.

4.3 Enforcement

A patent holder has three venues for enforcing its patent rights in China: through SIPO, through civil courts, and through the General Administration of Customs.[24] Figure 6. The majority of all patent cases proceed through an administrative action at SIPO. However, SIPO can only make infringement determinations and issue injunctive relief, and SIPO cannot award monetary damages. In addition, though appealable, SIPO is the only authority that can decide on the validity of an issued patent. As a result, many patent holders treat administrative action at SIPO as a first step.

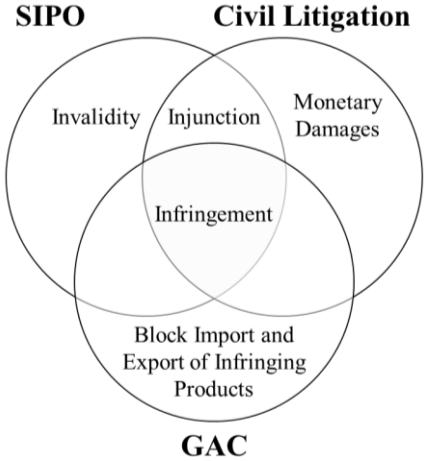

Figure 6: Venues for Patent Litigation in China.

Civil litigation through a civil court strongly encourages settlement. However, if the parties are unable to reach a settlement, a judge will issue an opinion on infringement and assess remedies on average within about 124 days from the filing of the suit.

A patent holder may further decide to bring an action against a potential infringer through the General Administration of Customs (GAC). As a requirement, the patent holder must first register the patent with the GAC before bringing an action. The GAC has the power to issue injunctions for the import and/or *export* of infringing products.

The ability of the GAC to bar a party from exporting an infringing product raises the value of strong freedom to operate analyses before deciding to manufacture a product in China for international sales. Of the 1,101,864 filings in China in 2015, 968,252 filings (about 88%) were filed by Chinese applicants.[12] As this number alone is considerably higher than the total filings in the US and EP combined, it is highly likely that many of these applications filed by Chinese applicants do not have US or EP counterparts. Thus, prior to deciding whether to manufacture a product in China, a patent holder may want to conduct a targeted search for related Chinese applications or patents. Failure to do so may result in a situation where a previously unidentified Chinese patent covers either the product itself, a component thereof, or an element of the manufacturing process enough so that a patent holder may be able to block the export of the product through the GAC. This potential problem has been referred to as a "chokepoint" for foreign companies manufacturing their products in China and should be carefully considered.[24]

5 UNITED STATES

The United States Patent and Trademark Office (USPTO) accepted approximately 589,410 applications for examination in 2015, or 20% of all patent applications filed worldwide, second only to China.[12] However, the USPTO currently has a backlog of over 500,000 applications, leading to an average pendency of about twenty-five months.[25] Thus, developing a proactive US prosecution strategy is essential to obtaining strong and early patent protection.

5.1 Accelerated Examination

On average, the USPTO issues a first substantive Office Action after about 15 months from the filing of the patent application.[15] If this application is a national phase application, which entered the US thirty months after the priority filing, this first Office Action is issued nearly four years after the priority application was filed. For some technologies, this may be too late.

The US offers various means of accelerating examination: including accelerated examination, the patent prosecution highway, and prioritized ("track one") examination. Under the accelerated examination procedure, an applicant can petition for an application to be examined out of turn if the application meets several requirements. In the past, the US offered this option for certain green technologies, as part of the Green Technology Pilot Program; however, the program was discontinued in 2009.[26]

Under the current system, the most noteworthy requirement is that the applicant is required to conduct a pre-examination search. This can be a deal breaker for many applicants, as applicants generally do not like to identify prior art that may show that their invention is not patentable. However, many applicants are already well aware of the art in their field, and they may be confident that conducting a search for prior art will not identify anything that presents a major challenge.

In addition, the US is a member of the IP5 PPH program, described above. As in Europe and China, making an application special through the PPH program allows the applicant to rely on allowed or issued claims in another IP5 PPH country. If a PPH request is granted by the USPTO, the Examiner will generally issue a first Office Action within two to three months from the grant of the PPH request. However, there is no guarantee that the application will reach final disposition within any set period of time. Further, the US examiner will consider the patentability of the claims based on US law, and thus may not allow claims that are identical to those allowed in the other IP5 PPH country.

As an alternative, an applicant may request prioritized ("track one") examination. The applicant does not need to conduct a preexamination search and the claims need not be allowed or issued in another country. However, the applicant is required to pay a relatively substantial fee of $4000 for a large entity, $2000 for a small entity, or $1000 for a micro entity. Entity size is based on several factors including the total number of employees an applicant company has. In addition, the application must be limited to 30 total claims, including a maximum of 4 independent claims. Like in other countries, an application is removed from prioritized examination if the applicant takes an extension of time.

On average, a US Examiner will issue a first Office Action in a track one case within about two months from a granted track one petition and will issue a final decision within about six to seven months from granting a track one petition. However, quick examination by no means guarantees a quick allowance. Since the program's inception, about 45% of track one applications were allowed while in the track one program, whereas about 44% were issued a final rejection.[25] Fig. 7.

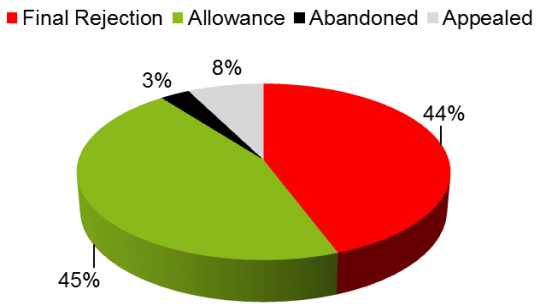

Figure 7: Final disposition rates for track one applications since inception of the program.[25]

Prioritized examination through the track one program can be a very appealing and useful strategy for many applicants. Though the upfront cost is higher than standard examination, the petition fee may be worth the ability to obtain an issued patent in a little over 1 year from filing. In fields where technology advances very quickly, or for small companies looking to establish a patent portfolio, obtaining that first patent can be essential. Conversely, in fields that require long term patent protection, such as in the pharmaceutical industry, it may be more beneficial to delay prosecution and potentially accrue patent term adjustment to extend the life of the patent. Whether to pursue prioritized examination in the US depends not only on the applicants short term goals, *e.g.*, obtaining a patent, but also on their long term strategy.

5.2 Opposition

During examination, any third party may submit any published patent application, patent, or other publication for consideration by the Examiner. The third party must submit the documents for consideration prior to the allowance of the application or the later of within 6 months of the publication of the application and before the issuance of the first office action. The submission must also include a brief description of the relevance of the submitted documents.

While the Examiner will consider the submission, there is no guarantee that the Examiner will reject the pending claims based on the documents or arguments presented in the submission. In this sense, third party submissions in the US are different from, *e.g.*, Brazil, as the submission is not treated as an opposition that the applicant must respond to. The examiner merely must consider the art cited.

Post grant opposition in the US has changed dramatically in the past few years since the induction of the America Invents Act (AIA), which reshaped US patent law. The AIA introduced three post grant opposition procedures called (1) post grant review ("PGR"); (2) inter partes review ("IPR"), and (3) covered business method ("CBM").[27]

Under a PGR, any third party may file a petition with the USPTO to invalidate a patent (filed on or after March 16, 2013) within nine months from the grant or reissue of the patent, so long as the petitioner has not previously filed a civil action against the validity of the patent. The petitioner may challenge the validity of the patent for lacking novelty, inventiveness, patentable subject matter, written description support, enablement, definiteness, and/or double patenting. Once instituted, the Patent Trial and Appeal Board (PTAB) will complete the review within twelve months.

Alternatively, any third party may also challenge the validity of an issued US patent through an IPR. In an IPR, the third party can file a petition with the USPTO for AIA patents and at any time after nine months after grant or termination of a PGR proceeding for pre-AIA patents. The third party cannot have previously filed a civil action against the validity of the patent, and the third party cannot have been served with a complaint alleging infringement of the patent more than one year before filing the petition.

In effect, IPRs have become a means for current or potential defendants in patent litigation cases to challenge the validity of the patent with the USPTO before the case advances in the civil courts. In many cases, a defendant will be served with notice of an infringement suit, and the defendant will file an IPR to challenge the validity of the patent within the next year.

A petitioner may challenge the validity of a patent through an IPR only on limited grounds: novelty and/or inventiveness based on patents and printed publications. Like a PGR, the PTAB must issue a final decision within twelve months of institution of the IPR.

The third option, CBM, is a means of challenging an issued patent through the USPTO by an accused infringer during civil litigation. CBMs are limited to challenges of patents directed to financial products or services, and technological inventions are excluded. Thus, CBMs are likely not relevant to green technologies. For a more detailed discussion of CBMs, please see Patent Office Litigation, 2nd Ed., Eds. Sterne and Eisenberg.

From September 2012 to November 2016, a total of

5375 IPR petitions, 489 CBM petition, and 42 PGR petitions were filed. At that time, the majority (58%) of filings targeted electrical and/or computer technologies. Mechanical patents came in second with about 25% of the filings, and biological/pharmaceutical patents came in third with 9% of the filings.

In general, as of March 2017, about 70% of petitions have led to institution of an IPR on at least some of the issued claims of the patent. Once an IPR has instituted, approximately 79% of the instituted claims have been held unpatentable. Fig. 8.

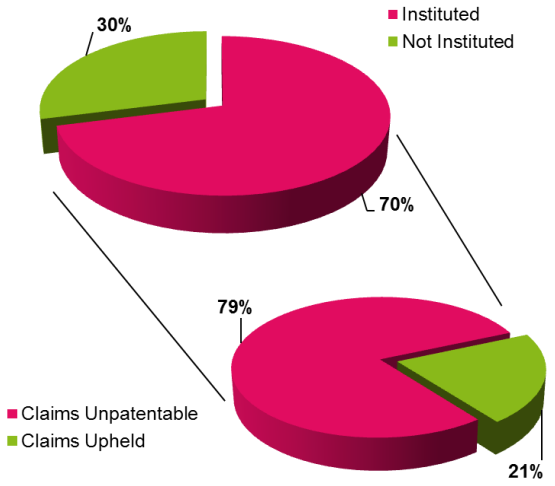

Figure 8: US Inter Partes Review institution rates and outcomes through March 2017.

Patent office litigation can be a valuable tool for third parties to clear patents that may block access to a particular field or technology. However, the process is still relatively new, and the time and resources required to successfully wage an IPR challenge can be high. In addition, under certain circumstances, various estoppels can limit the ability of a challenger to reassert arguments or art against the patent owner in civil litigation once the IPR or PGR has ended. Thus, it is critical that a challenger have a well-developed strategy prior to filing a petition for an IPR.

Conversely, patent holders should prepare for potential post grant challenges during examination of their patent applications. Patent applicants should to try to obtain claims that balance breadth with defensibility during a potential IPR or PGR.

5.3 Enforcement

A US patent holder may enforce its patent rights against an alleged infringer through multiple venues, including a federal district court and the International Trade Commission (ITC). Patent litigation through a federal district court is controlled by US patent law, encoded in title 35 of the United States Code (USC). Unlike other countries which may rely solely on codified laws, US courts interpret the law based on precedent, primarily created by the US Supreme Court or the Court of Appeals for the Federal Circuit.

A patent holder can obtain various forms of relief through district court litigation, including injunctive and/or monetary relief. Conversely, a potential infringer may claim invalidity as a defense, and a district court may invalidate all or a portion of an issued patent.

A patent holder may also, or in the alternative, choose to enforce its patent through a Section 337 investigation by the ITC to prevent unlawful importation of a patent-covered product into the US. The primary reason a patent holder may pursue an action with the ITC is that the ITC can issue an order blocking an infringing product from being imported into the US. Though the ITC cannot award monetary damages, blocking a competitor from selling its goods in the US can be a very powerful tool.

US ITC litigation is much less common than district court litigation. In 2016, a total of 79 complaints were filed with the ITC as compared to about 4300 patent lawsuits filed in a district court. On average, Section 337 investigation takes about fifteen to twenty months to complete, making ITC litigation an attractive means of quickly blocking import of infringing goods.

6 CONCLUSIONS

Navigating global IP systems can be a complicated exercise for even the most seasoned innovators. However, many countries have created means for quickly advancing applications encompassing green technologies in an effort to promote environmentally-friendly innovations. In countries that lack green policies, other avenues such as the PPH are available to reduce the pendency time of an application.

Applicants should consider the value of obtaining an early patent in a country that has a respected patent office. For example, Examiners is some countries will be more likely to allow an application if the same or similar claims were allowed or issued by the EPO or the USPTO. In some cases, Examiners will go so far as to issue an Office Action requesting that the applicant amend the claims to match allowed claims in Europe or the US. For this reason, it may be useful to seek accelerated examination in Europe or the US, and use the issued claims to facilitate examination in other countries. Though this may not reduce the wait time until the first office action in countries that do not offer accelerated examination through the PPH, this practice may reduce the total number of office actions before an allowance.

Green technology is a fast-paced sector that requires innovators to have a strong global IP strategy. Any green-tech company should consider what options are available to accelerate examination while taking steps to increase the probability that issued patents are likely to stand up to a potential challenge.

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8 LOGO SPACE