As to possible green patent pools, experts point out that the dispersed nature of green technology across technical fields makes it challenging to set industry-wide standards.[306] Yet, as is the case for telecommunications and consumer electronics, interoperability is increasingly important to certain aspects of green technology, for example, the functioning of smart grids and other means of energy transportation.[307] Both foundational technologies and commoditized applications (*e.g.*, small-scale solar panels) also present opportunities for standardization.[308]

2. The Unocal Case: Abuse in Law of Environmental Standards

In December 1990, the Union Oil Company of California ("Unocal") filed for a US patent on environment-friendly gasoline fuel.[309] Meanwhile, the California Air Resources Board (CARB) was developing standards for clean reformulated gasoline in collaboration with interested parties that included Unocal. November 1991 saw the launch of new compulsory programs that adopted those standards, which would enter into force five years later.[310] In 1994, the USPTO granted Unocal's patent application (the '393 patent).[311] As the CARB standards covered the '393 patent claims, implementation of the standards by other companies effectively implied infringement of Unocal's rights.[312]

When Unocal subsequently announced a licensing plan involving royalties, its competitors responded by initiating declaratory judgment suits.[313] The competitors lost and a split panel of the Federal Circuit affirmed the judgment on appeal. In 2003, the competitors filed a complaint with the US Federal Trade Commission (FTC), arguing that Unocal "gained monopoly power by defrauding" the CARB and industry groups during the gasoline rule-making in the early 1990s.[314] Even-

306 Roger Ross, Via Licensing, Panel Discussion at the University of San Francisco School of Law Cleantech Symposium: Clean Technology and the Law (Oct. 1, 2010), Intellectual Property Mechanisms for the Development and Dissemination of Clean Technologies in the US (unpublished manuscript).
307 *Id.*
308 *Id.*
309 U.S. Patent Application No. 628,488 (filed Dec. 13, 1990) (the specification states that "by controlling one or more properties of a gasoline fuel suitable for combustion in automobiles, the emissions of NOx, CO and/or hydrocarbons can be reduced").
310 *Id.*
311 U.S. Patent No. 5,288,393 (issued Feb. 22, 1994).
312 Janice M. Mueller, *Patent Misuse Through the Capture of Industry Standards*, 17 Berkeley Tech. L. J. 623, 623-625 (2002).
313 Union Oil Co. of Cal. v. Chevron U.S.A. Inc., 34 F.Supp.2d 1222 (C.D. Cal. 1998).
314 Press Release, FTC, FTC Charges Unocal with Anticompetitive Conduct Related to Reformulated Gasoline, FTC Docket No. 9305 (Mar. 4, 2009).

tually, in 2005, just prior to merging with Chevron, Unocal agreed to release the relevant patents.[315]

In cases of "abusive" standards capture – intentional or willful non-disclosure of IP by a standard-setting participant who later refuses to grant a license at reasonable and non-discriminatory terms[316] – remedies may be available under patent law and on other legal bases. For example, in addition to patent misuse, US courts have applied antitrust,[317] deception,[318] equitable estoppel, fraud,[319] and implied license principles.[320] Courts also have highlighted the importance of clear IP directions by Standard-Setting Organizations (SSOs), whose policy role is further discussed below.

3. Green Technology Standards and IP Policies

A 2002 study on IP policies of SSOs[321] found that while most (36 out of 47) of the selected SSOs in the field of telecommunications and computer-networks operated policies governing IP ownership, their disclosure requirements varied significantly.[322] Many SSOs required the disclosure of issued patents, but not of pending applications.[323] Furthermore, some SSOs allowed members to own IP rights in a standard, subject to conditions on use such as royalty-free licensing.[324] Other SSOs prohibited or at least discouraged ownership.[325] Only a limited number of SSOs required a member to search its files or broader literature to identify relevant IP rights.[326] While "reasonable and nondiscriminatory licensing" was the majority rule for royalty-bearing licensing of essential patents, few SSOs explained what those terms meant or how licensing disputes would be resolved.[327]

315 Press Release, FTC, Dual Consent Orders Resolve Competitive Concerns about Chevron's $18 Billion Purchase of Unocal, FTC's 2003 Complaint against Unocal (June 10, 2005).
316 Mueller, *supra* note 312.
317 *E.g.*, United States v. Dell Corp. 1998 FTC LEXIS 30 (1998); *and* Rambus Inc. v. FTC No. 07-1086 (D.C. Cir. 2008).
318 *E.g.*, 15 U.S.C. § 45(1) (Section 5(1) of the Federal Trade Commission Act).
319 *E.g.*, Rambus Inc. v. Infineon AG, 318 F3d 1081 (Fed. Cir. 2003).
320 Mueller, *supra* note 312.
321 *See* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 Cal. L. Rev. 1889, 1904-1907 (2002).
322 *Id.*
323 *Id.*
324 *Id.*
325 *Id.*
326 *Id.*
327 *Id.*