degassing the enriched solvent and recovering a first vapor fraction comprising the first portion of the butanes and butenes, a second vapor fraction comprising the C_3 and C_4 acetylenes, 1,3-butadiene, 1,2-butadiene, and C_{5+} hydrocarbons, and a bottoms fraction comprising partially degassed solvent; a degasser and cooling column for further degassing the solvent and recovering a liquid fraction comprising degassed solvent, a third vapor fraction comprising at least one of C4 acetylenes and 1,2-butadiene, and a fraction comprising C4 acetylenes. The system for recovering 1,3-butadiene is configured such that the cooling column is in operation during both the high pressure mode and the low pressure mode.

[0014] In another aspect, embodiments disclosed herein relate to a process for recovering 1,3-butadiene from a C_4 fraction, alternately, in a high pressure mode and a low pressure mode. The ~~system~~ process may include: at least partially vaporizing a hydrocarbon feed containing butanes, butenes, 1,2-butadiene, 1,3-butadiene, C_4 acetylenes, C_3 acetylenes, and C_{5+} hydrocarbons in a feed vaporization system; selectively dissolving a portion of the hydrocarbon fraction in an extractive distillation system by contacting the vaporized hydrocarbon fraction with a solvent, forming (a) an enriched solvent fraction comprising the 1,3-butadiene, the 1,2-butadiene, C_4 acetylenes, C_3 acetylenes, C_{5+} hydrocarbons, and a first portion of the butanes and the butenes and (b) a vapor fraction comprising a second portion of the butanes and the butenes; at least partially degassing the enriched solvent in a rectifier and afterwasher and recovering a first vapor fraction comprising the first portion of the butanes and butenes, a second vapor fraction comprising the C_3 and C_4 acetylenes, 1,3-butadiene, 1,2-butadiene, and C_{5+} hydrocarbons, and a bottoms fraction comprising partially degassed solvent; further degassing the solvent in a degasser and a cooling column and recovering a liquid fraction comprising degassed solvent, a third vapor fraction comprising at least one of C4 acetylenes and 1,2-butadiene, and a fraction comprising C4 acetylenes; alternatively (a) operating the degasser in a high pressure mode, and (b) operating the degasser in a low pressure mode.

[0015] Previous designs would have required many more changes to the processing scheme, resulting in either more investment cost or a less efficient process. By retaining much of the equipment used in the conventional process, and using this equipment when