



## GREEN CHEMICALS & MATERIALS: EXECUTIVE SUMMARY

- ❑ The green chemicals & materials (aka bio-based/renewable chemicals) industry is being driven by climate change & energy security concerns as well as increasing consumer ecological awareness; expectations of sustained elevated fossil fuel prices have receded
- ❑ Adoption is affecting the sugar, oil/fats & lignin supply chains, but in turn is affected by the expansion of the shale gas sector (feedstock, energy costs), especially in C1-C3
- ❑ Established chemical and agri-food majors are showing strong interest in green chemicals & materials, with both in-house programs and via external levers
- ❑ From a small base (2%-3%) green chemicals are expected to capture a growing share of the (annual) ~US\$2 trillion chemicals sector in coming years; but product is sellable on “green” credentials alone (vs. cost, “functionality” ...)
- ❑ Relative economics (and sensitivity to fossil fuel prices) dictate that the adoption of green chemicals is being led by the (smaller) Specialty & Fine chemicals segments, in particular bioplastics (packaging, bottles ...)
- ❑ Despite notable exits, as with other renewables subsectors, green chemicals is currently going through a consolidation phase, given depressed fossil fuel prices, long market adoption cycles, under-performing investments and capital intensity (at plant stage)
- ❑ While the EU and US are leading in bio-chemicals start-ups, China, Brazil, US and SEA are leading in large-scale bio-chemicals plant construction
- ❑ Interest has shifted from 1<sup>st</sup> gen to 2<sup>nd</sup> generation bio-chemicals feedstocks, due principally to concerns on resource utilisation (land, food, water ...); 3<sup>rd</sup> generation initiatives have stalled
- ❑ VC interest is tempered by CapEx intensity (commercial scale-up), with preferences for companies with strategic backing, low capital requirements (e.g. licensing models), drop-in solutions ...; as a result, sometimes creative funding approaches are required