

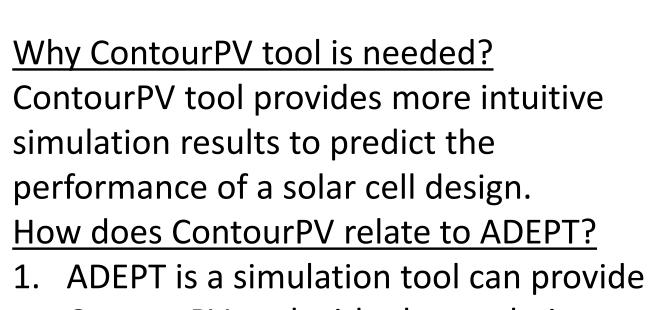
Predicting and Optimizing Solar Cell Performance with Material/Surface Characteristics

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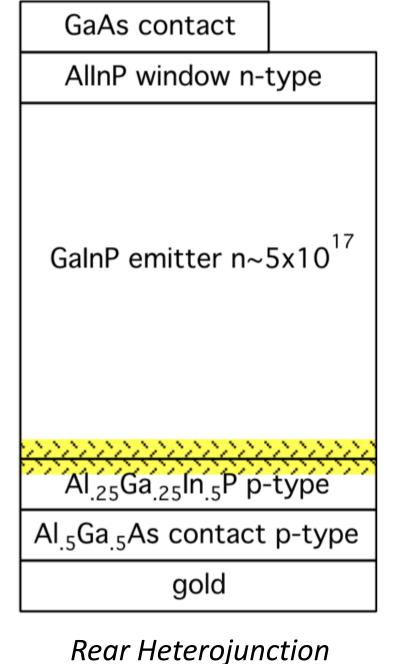
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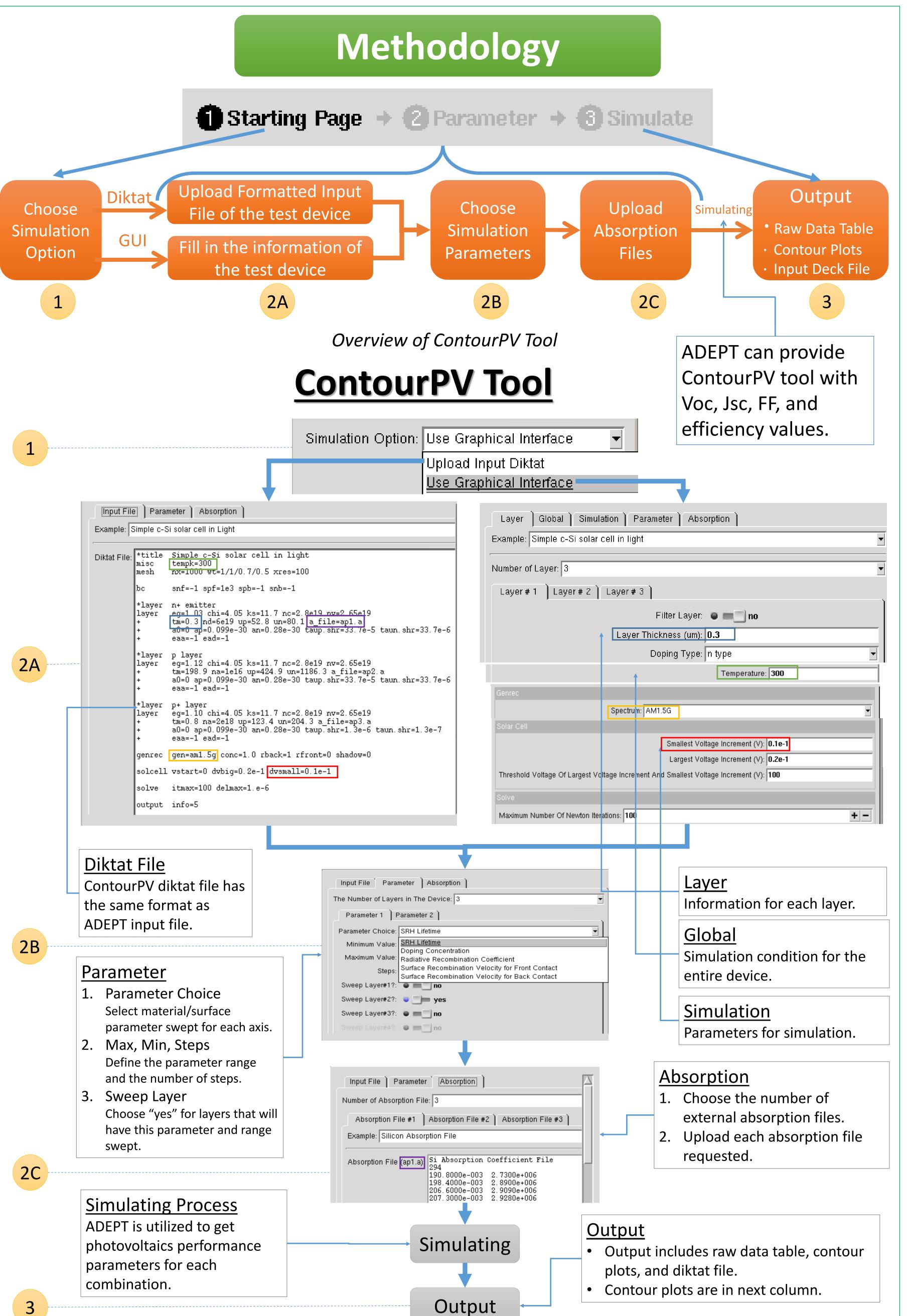
Nonrenewable Energy Limited Pollution Renewable Energy Sustainable Clean Solar's Projected Market Share % of Global Electricity Generation Solar Market Share Increases Nonrenewable Energy Cost of Solar Decreases

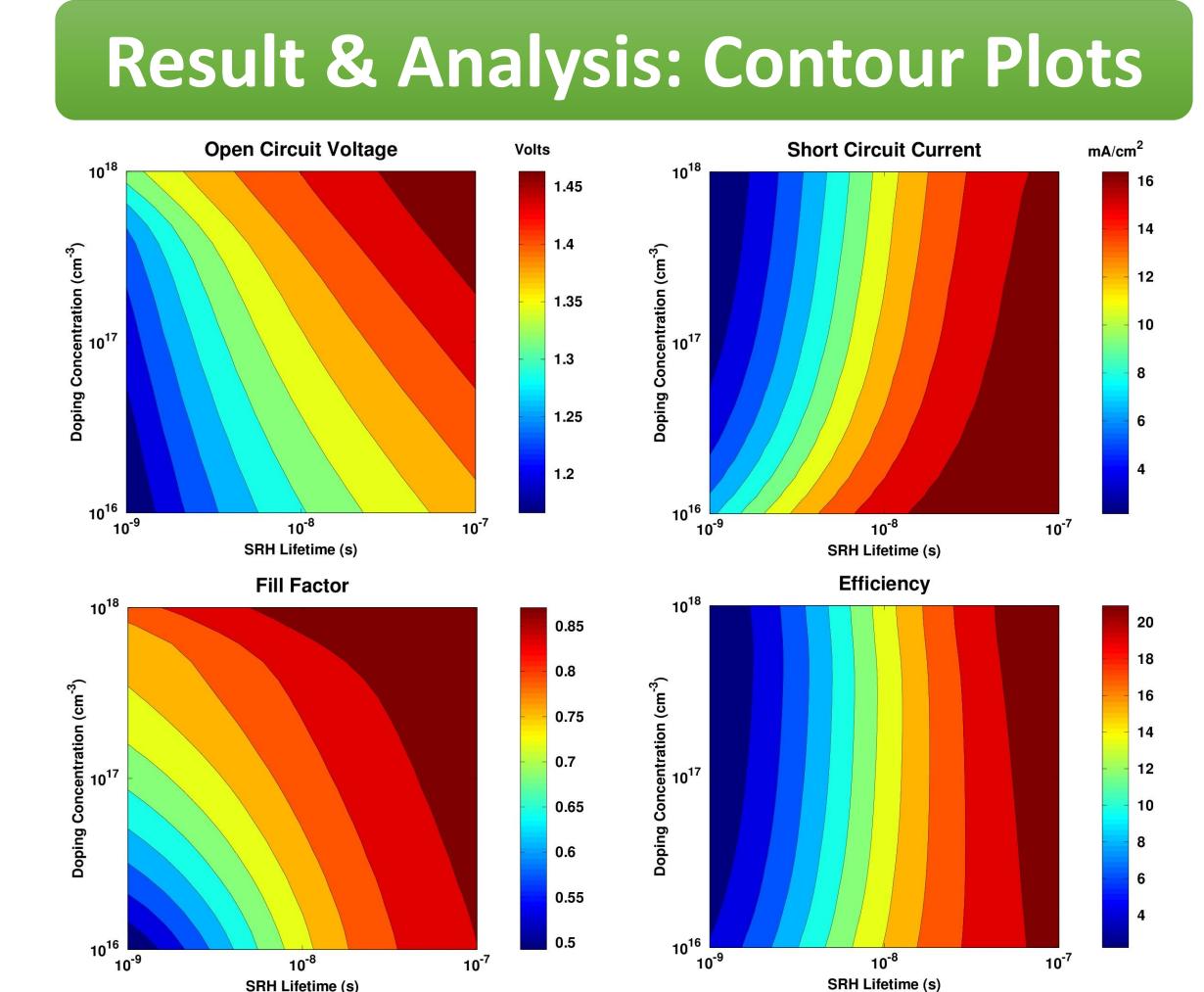
Project Goal GaInP (1.82 eV) 6aInAs Different types of solar cell devices Idea of Multijunction solar cell Structure Design Simulation tool can provide researchers with predictions Simulation of their solar device design. We created ContourPV tool. Fabrication Researchers can identify how material/interface Characterization characteristics affect solar cell device performance. Photovoltaics Research Steps GaAs contact



- 1. ADEPT is a simulation tool can provid ContourPV tool with photovoltaics performance data for each combination.
- 2. ContourPV tool uses the same diktat file format and graphical interface as ADEPT for input.







 Analysis above is for GaInP emitter layer of rear-junction GaInP solar cells. We find that lifetime strongly affects performance – especially short circuit current. Doping increases open circuit voltage.

Conclusion

- Researchers can use ContourPV to analyze how characteristic parameters affect photovoltaic performance for the photovoltaics design.
- Based on simulation analysis, researchers can optimize the design and decrease the number of samples to be fabricated.
- In the future, we will add more material/surface characteristics for analyzing III-V multijunction solar cells.
- The tool is published in nanoHUB and can be accessed via https://nanohub.org/tools/contourpv



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